MISSOURI PSYCHIATRIC CENTER - RENOVATE RESTROOM PC2120

MU Project #: CP212341

For: The Curators of the University of Missouri

UNIVERSITY OF MISSOURI HEALTHCARE

BID SET
1.13.22

DRAWING INDEX

GENERAL NOTES

1. THESE NOTES APPLY EQUALLY TO THE FULL SET OF DOCUMENTS.

2. THE NOTES AND SYMBOLS SET DOWN ON THESE DRAWINGS ARE FOR THE GUIDANCE OF ALL TRADES INVOLVED IN THE PROJECT AND MUST BE FOLLOWED TO EXECUTE THE WORK AS INTENDED.

3. THE CONTRACTOR SHALL REFER TO THE DRAWINGS FOR DETAILS OF BUILDING CONSTRUCTION TO INSURE SPACE AND SATISFACTORY ARRANGEMENT FOR THEIR WORK. THE VARIOUS DRAWINGS COMPRISING THE SET ARE INTERDEPENDENT AND MUST BE USED JOINTLY AT ALL TIMES. EACH CONTRACTOR SHOULD REFER TO THE GENERAL REQUIREMENTS OF THE CONTRACT. IF DISCREPANCIES OCCUR, CONTACT THE ARCHITECT THRU THE GENERAL CONTRACTOR FOR CLARIFICATION BEFORE PROCEEDING.

4. IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR THE CONDITIONS ON THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

5. ALL WORK MUST BE COORDINATED WITH THE OWNER TO MAINTAIN OPERATION OF THE EXISTING CAMPUS ACTIVITY. ALL WORK THAT AFFECT CAMPUS ACTIVITES, INCLUDING UTILITY TIE-INS, ETC. SHALL BE DONE AFTER BUILDING HOURS.

6. USE DIMENSIONAL INFORMATION GIVEN. DO NOT SCALE DRAWINGS.

7. DIMENSIONS ARE TYPICALLY INDICATED TO THE FINISHED FACE OF WALLS OR PARTITIONS AND CENTER LINES OF COLUMNS UNLESS NOTED OTHERWISE.

8. TITLES, CAPTIONS, HEADINGS, ETC. ARE INTENDED FOR GENERAL REFERENCE AND ARE NOT INTENDED TO LIMIT THE WORK REQUIRED IN ANY WAY.

9. EACH CONTRACTOR SHALL COORDINATE HIS WORK WITH THE WORK OF OTHERS. HE SHALL KEEP HIMSELF INFORMED OF THE PROGRESS AND DETAIL DEVELOPMENT OF THE WORK OF OTHERS AND SHALL BE RESPONSIBLE FOR COORDINATING AND EXPEDITING HIS WORK WITH THAT OF OTHERS SO THAT THE PROGRESS OF THE TOTAL WORK SHALL BE KEPT ON SCHEDULE.

10. ALL WORK SHALL BE PERFORMED IN STRICT COMPLIANCE WITH ALL GOVERNING CODES AND STANDARDS.

11. EXISTING CONDITIONS SHOWN HAVE BEEN BASED UPON AVAILABLE DRAWING INFORMATION AND MAY BE AT VARIANCE WITH ACTUAL WORK IN PLACE. THE CONTRACTOR SHALL TAKE ALL NECESSARY FIELD MEASUREMENTS AND FIELD VERIFY ALL CONDITIONS AFFECTING THE EXECUTION OF THE WORK. ANY WORK SHOWN ON THE CONTRACT DOCUMENTS WHICH MAY IMPACT THE PROGRESS OF THE WORK SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IN WRITING FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.

12. EACH CONTRACTOR AND/OR TRADE FITTING OR PLACING HIS WORK INTO OR ON THE WORK OF OTHERS DOES SO WITH THE UNDERSTANDING THAT THE INSTALLATION OF HIS WORK CONSTITUTES HIS ACCEPTANCE OF THE SUITABILITY OF THE WORK IN PLACE. IF THE WORK OF OTHERS IS NOT ACCEPTABLE, HE SHALL NOTIFY THE GENERAL CONTRACTOR AND SUCH WORK SHALL BE CORRECTED. ANY NEW WORK INSTALLED IN UNSUITABLE EXISTING WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR OR TRADE INSTALLING THE NEW WORK. NO CLAIMS FOR ADDITIONAL COMPENSATION FOR CORRECTING WORK INSTALLED IN UNSUITABLE EXISTING CONDITIONS WILL BE CONSIDERED.

ARCHITECTURAL STATEMENT:
I hereby certify that Sheets:
COVER, G100, G101, D100, A100 have been prepared by me, or under my supervision. I further certify that to the best of my knowledge these Drawings and/or Specifications are as required by and in compliance with Building Codes of the University of Missouri.

MECHANICAL, PLUMBING, MEDICAL GAS, & FIRE PROTECTION STATEMENT:
I hereby certify that Sheets:
M000, MD102, M102, M601, P000, P100, P400, P401, PFP600, FP000, FP100, and FP400 have been prepared by me, or under my supervision. I further certify that to the best of my knowledge these Drawings and/or Specifications are as required by and in compliance with Building Codes of the University of Missouri.

ELECTRICAL STATEMENT:
I hereby certify that Sheets:
E000, AND E100 have been prepared by me, or under my supervision. I further certify that to the best of my knowledge these Drawings and/or Specifications are as required by and in compliance with Building Codes of the University of Missouri.

PROJECT DESCRIPTION

THIS PROJECT CONSISTS OF RENOVATING AND REMODELING AN EXISTING ADA PSYCH SAFE PATIENT RESTROOM ON THE 2ND FLOOR SOUTH CARE UNIT OF MISSOURI PSYCHIATRIC CENTER. THE RESTROOM CURRENTLY HAS WATER DRAINAGE PROBLEMS OF THE SHOWER.

ADA Compliance for Alterations

The American with Disabilities Act (ADA) provides that alterations to a facility must be made in such a manner that, to the extent feasible, the altered portions of the facility are readily accessible to and by individuals with disabilities. The Client acknowledges that the requirements of the ADA will be subject to various and possibly contradictory interpretations. The Design Professional, therefore, will use his or her reasonable professional efforts and judgement to interpret applicable ADA regulations as they apply to the project. The Design Professional, however, cannot and does not warrant or guarantee that the Client's project will comply will all interpretations of the ADA requirements or the requirements of other federal, state and local laws , rules, codes, ordinances and regulations as they apply to the project.

STATEMENT OF ARCHITECTURAL SPECIAL INSPECTIONS

A. THE ARCHITECTURAL DESIGN FOR THIS PROJECT IS BASED ON COMPLETION OF SPECIAL INSPECTIONS DURING CONSTRUCTION IN ACCORDANCE WITH SECTION 1705 OF THE INTERNATIONAL BUILDING CODE. THE OWNER SHALL EMPLOY ONE OR MORE QUALIFIED SPECIAL INSPECTORS TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS.

B. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, OWNER, ARCHITECT AND ANY OTHER DESIGNATED PERSON.

C. ALL DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION, THEN, IF UNCORRECTED, TO THE PROPER DESIGN AUTHORITY OR BUILDING OFFICIAL.

D. THE SPECIAL INSPECTOR SHALL SUBMIT A FINAL SIGNED REPORT STATING THAT THE WORK REQUIRING SPECIAL INSPECTIONS WAS, TO THE BEST OF THE INSPECTOR'S KNOWLEDGE, IN CONFORMANCE WITH THE APPROVED PLANS AND SPECIFICATIONS AND THE APPLICABLE WORKMANSHIP PROVISIONS OF THE BUILDING CODE.

E. THE FOLLOWING INSPECTIONS AND TESTS ARE REQUIRED WITH THE FREQUENCY (CONTINUOUS OR PERIODIC) AS DEFINED WITHIN THE REFERENCED SECTION OR STANDARD LISTED BELOW. THE GENERAL CONTRACTOR SHALL PROVIDE NOTIFICATION TO THE INSPECTOR WHEN ITEMS REQUIRING INSPECTION ARE READY TO BE INSPECTED AND PROVIDE ACCESS FOR THOSE INSPECTIONS.

1. FIRE RESISTANT PENETRATIONS & JOINTS PER SECTION 1705.17.

CODE REVIEW INFORMATION

FACILITY NAME AND ADDRESS:
UNIVERSITY OF MISSOURI HEALTH CARE
ONE HOSPITAL DRIVE
COLUMBIA, MISSOURI 65212

TYPE OF CONSTRUCTION:
RENOVATION OF EXISTING HOSPITAL

AUTHORITY HAVING JURISD2ICTION:
UNIVERSITY OF MISSOURI SYSTEM

CITY, COUNTY, STATE:
CITY OF COLUMBIA
BOONE COUNTY
STATE OF MISSOURI

ARCHITECT:
BC**DESIGN**GROUP
12101 W 110TH STREET, SUITE 100
OVERLAND PARK, KS 66210

APPLICABLE CODES/REGULATIONS:

INTERNATIONAL BUILDING CODE –2018
INTERNATIONAL PLUMBING CODE -2018
INTERNATIONAL MECHANICAL CODE –2018
INTERNATIONAL EXISTING BUILDING CODE –2018 (LEVEL 1 & LEVEL 2 ALTERATIONS ONLY WITH PRE-APPROVAL OF AHJ)
INTERNATIONAL FIRE CODE -2018
INTERNATIONAL FUEL GAS CODE -2018
INTERNATIONAL SWIMMING POOL AND SPA CODE -2018
NATIONAL ELECTRIC CODE –2011 & 2017
NFPA 110 STANDARD FOR EMERGENCY AND STANDBY POWER SYSTEMS -2010 & 2016
NFPA 101 LIFE SAFETY CODE –2012
NFPA 99 STANDARD FOR HEALTH CARE FACILITIES –2012
NFPA 96 STANDARD FOR VENTILATING CONTROL AND FIRE PROTECTION OF COMMERCIAL COOKING OPERATIONS -2011 & 2017
NFPA 90A INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS -2012 & 2018
NFPA 72 NATIONAL FIRE ALARM CODE –2010 & 2016
NFPA 45 STANDARD ON FIRE PROTECTION FOR LABORATORIES USING CHEMICALS –2011 & 2015
NFPA 20 STANDARD FOR THE INSTALLATION OF STATIONARY FIRE PUMPS FOR FIRE PROTECTION -2016
NFPA 14 STANDARD FOR THE INSTALLATION OF STANDPIPE, PRIVATE HYDRANTS AND HOSE SYSTEMS -2010 & 2016
NFPA 13 INSTALLATION OF FIRE SPRINKLER SYSTEMS –2010 & 2016
ASHRAE 90.1 –ENERGY STANDARD FOR BUILDINGS –2016
ASHRAE 170 -VENTALATION OF HEALTHCARE FACILITIES -2013
ASME A17.1 –SAFETY CODE FOR ELEVATORS AND ESCALATORS
AMERICANS WITH DISABILITIES ACT –STANDARDS FOR ACCESSIBLE DESIGN 2010
FACILITY GUIDELINES INSTITUTE -2018

CONSTRUCTION TYPE (EXISTING):
TYPE I-A (EXISTING)

ALLOWABLE BUILDING HEIGHT/ AREA:
UNLIMITED

RENOVATED AREA:
MUPC 2ND FLOOR SOUTH: 82 SF

OCCUPANCY:
MUPC 2ND FLOOR: GROUP I-2

FIRE SUPPRESSION:
FULLY SPRINKLED

ACTIVE FIRE SAFETY SYSTEMS:
EXISTING BUILDING IS FULLY SPRINKLED

STRUCTURAL FIRE PROTECTION:

ITEM:	EXISTING:
EXTERIOR BEARING WALLS	3 HR
INTERIOR BEARING WALLS	3 HR
EXTERIOR NON-BEARING WALLS	1 HR
STRUCTURAL FRAME	3 HR
SHAFT ENCLOSURES	2 HR
FLOORS	2 HR
ROOF	1.5 HR
EXTERIOR OPENINGS	NA
STAIRWAY CONSTRUCTION	2 HR

CODE LEGEND

Symbol	Meaning
3HR — 3HR	3 HOUR FIRE BARRIER
2HR — 2HR	2 HOUR FIRE BARRIER
1HR — 1HR	1 HOUR FIRE BARRIER
2HR / SM — 2HR / SM	2 HOUR FIRE SMOKE BARRIER
SM — SM	1 HOUR SMOKE BARRIER
— — — —	TRAVEL DISTANCE
———	PROJECT AREA
(cabinet symbol)	FIRE EXTINGUISHER CABINET
KS	KEYED SWITCH
CR	CARD READER
DE	DELAYED EGRESS
##M	MINUTE FIRE RATED OPENING
(yellow area)	EXIT STAIRS
S#	SUITE ID
HZ	HAZARDOUS AREA
HZ (hatched)	HAZARDOUS AREA (MULTIPLE ROOMS)

2ND FLOOR - OCCUPANCY INFORMATION

NEW HEALTHCARE OCCUPANCY

COMPARTMENT ID	COMPARTMENT SQ. FT.	OCCUPANT LOAD	SPRINKLER SYSTEM	AREA USE	DISTANCE SMOKE	DISTANCE EXIT
MPC-2S	8,363	70	FULL	TREATMENT	129'	134'
MPC-2N	15,591	125	FULL	TREATMENT	170'	130'

OCCUPANCY LOAD:
I-2 INPATIENT TREATMENT AREAS 240 GROSS
I-2 OUTPATIENT TREATMENT AREAS 100 GROSS
I-2 SLEEPING AREAS 120 GROSS
BUSINESS AREAS 100 GROSS

MPC-2S OCCUPANT LOAD CALCS:
8,363 / 100SF = 84 OCCUPANTS

EGRESS WIDTH
84 OCCUPANTS X .2 = 16.8"

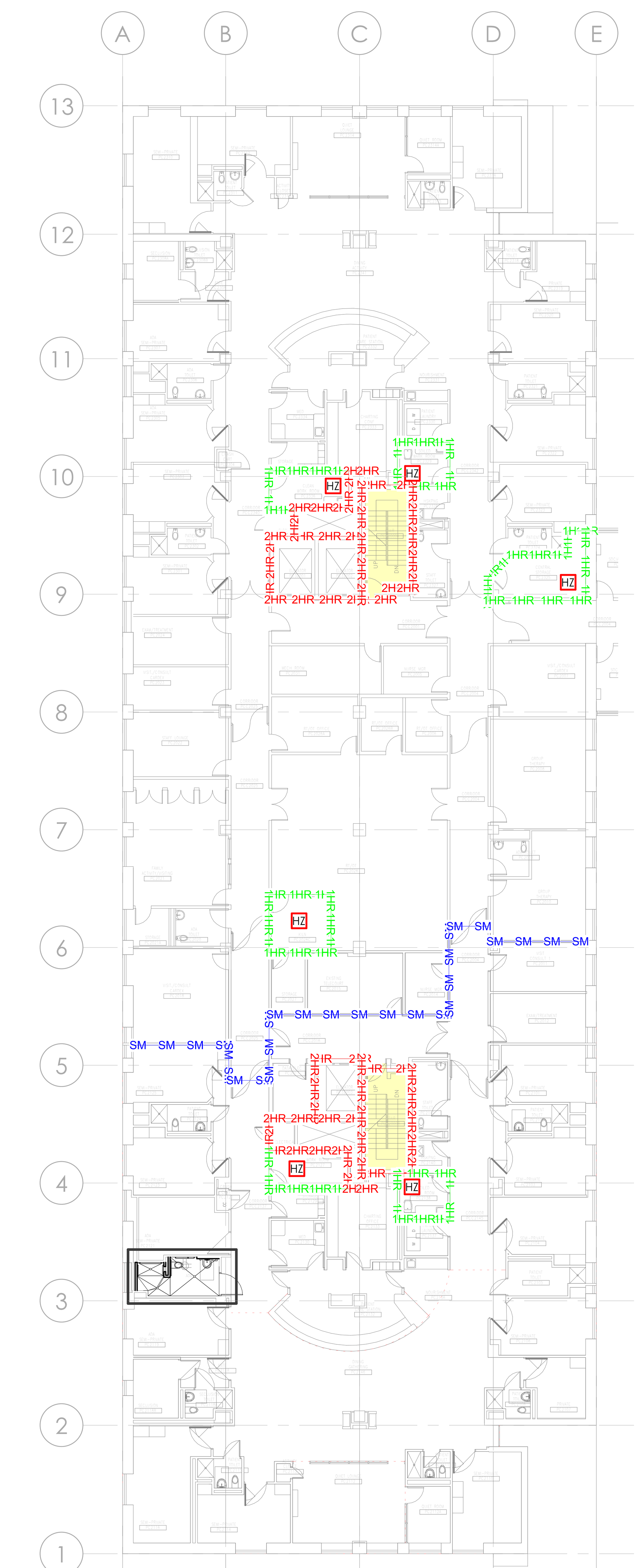
MPC- 2N OCCUPANT LOAD CALCS:
15,591 / 100 = 156 OCCUPANTS

EGRESS WIDTH
156 OCCUPANTS X .2 = 31.2"

I-2 OCCUPANCY:
MAX. TRAVEL DISTANCE: 200 FT
MAX. DEAD END CORRIDOR: 20'-0"
MAX. COMMON PATH OF TRAVEL: 50'-0"

GENERAL CODE NOTES PER MUHC PDCG

1. ALL PENETRATION (NEW OR EXISTING) SHALL BE SEALED AT ALL TIMES, EXCEPT WHEN ACTIVELY WORKING WITH THE PENETRATION. EXISTING UNSEALED PENETRATIONS, ONCE ENCOUNTERED, SHALL BE SEALED IMMEDIATELY WITH THE APPROPRIATE FIRE/SMOKE STOPPING MATERIAL. COORDINATE THE SEALING METHOD, WHETHER TEMPORARY OR PERMANENT, WITH THE OWNER'S REPRESENTATIVE.
2. EXISTING EXITS MUST REMAIN ACCESSIBLE. CLEAR PATHS OF TRAVEL TO EXITS MUST BE MAINTAINED WITHIN THE CONSTRUCTION LIMITS. CONTRACTOR IS TO COORDINATE WITH OWNER'S REPRESENTATIVE TO MAINTAIN PROPER EXIT SIGNAGE THROUGHOUT CONSTRUCTION.
3. EACH SMOKE AND/OR FIRE RATED PARTITION SHALL BE STENCILED WITH 4 INCH LETTERS DIRECTLY ABOVE CEILING TILE SO AS TO IDENTIFY RATED CONSTRUCTION UPON LIFTING OF CEILING TILES. WALLS ARE TO HAVE STENCILED FIRE RATINGS AT EIGHT FOOT INCREMENTS HORIZONTALLY.



1 SECOND FLOOR CODE PLAN
1/16" = 1'-0"

PARTITION SCHEDULE

TYPE	WALL THICKNESS	PLAN DETAIL	HEAD	SILL	U.L. #
A	4-7/8"	3 5/8" MTL STUDS @ 16" O.C. TYP. REFER TO PART. TAG FOR INSUL. 5/8" GYP. BD. EA SIDE METAL STUDS	CONT. FIRE CAULK PER SPEC. BOTH SIDES	CONT. FIRE CAULK PER SPEC. BOTH SIDES	U465
B	4-1/4"	3 5/8" MTL STUDS @ 16" O.C. TYP. REFER TO PART. TAG FOR INSUL. 5/8" GYP. BD. ONE SIDE MTL STUDS	CONT. FIRE CAULK PER SPEC. THIS SIDE	CONT. FIRE CAULK PER SPEC. THIS SIDE	N/A

PARTITION NOTES

1. ALL GYPSUM WALL BOARD ABUTTING OTHER MATERIAL TO BE FINISHED WITH METAL TRIM BEAD AND JOINT COMPOUND WHERE VISIBLE.
2. ALL WOOD AND PLYWOOD BLOCKING, WHERE CALLED FOR ON THE DRAWINGS, TO BE FIRE TREATED.
3. ALL DOOR OPENINGS SHALL HAVE 1'-6" CLEAR FROM THE FACE OF THE FRAME TO THE PERPENDICULAR WALL ON THE PULL SIDE, AND 1'-0" CLEAR ON THE PUSH SIDE, TYPICAL.
4. ALL FIRE RATED WALL AND FLOOR PENETRATIONS SHALL COMPLY WITH ASTM E-814.
5. PARTITIONS TO BE BUILT IN ACCORDANCE WITH PARTITION SCHEDULE AND DESIGN REFERENCED. REFERENCES ARE TO LATEST EDITION OF GYPSUM ASSOCIATION (GA) OR UNDERWRITERS LABORATORIES INC, FIRE RESISTANCE DIRECTORIES, TYPICAL.
6. PARTITION SCHEDULE IS GENERAL TO ALL WALL TYPES IN THE PROJECT. REFER TO DETAILS FOR SPECIAL CONDITIONS AND SIZE REQUIREMENTS.

PARTITION TAGS

AUD1

PARTITION TYPE RE: TO SCHEDULE ABOVE

WALL INSULATION:
I = PROVIDE SOUND BATT INSULATION
U = NON-INSULATED PARTITION

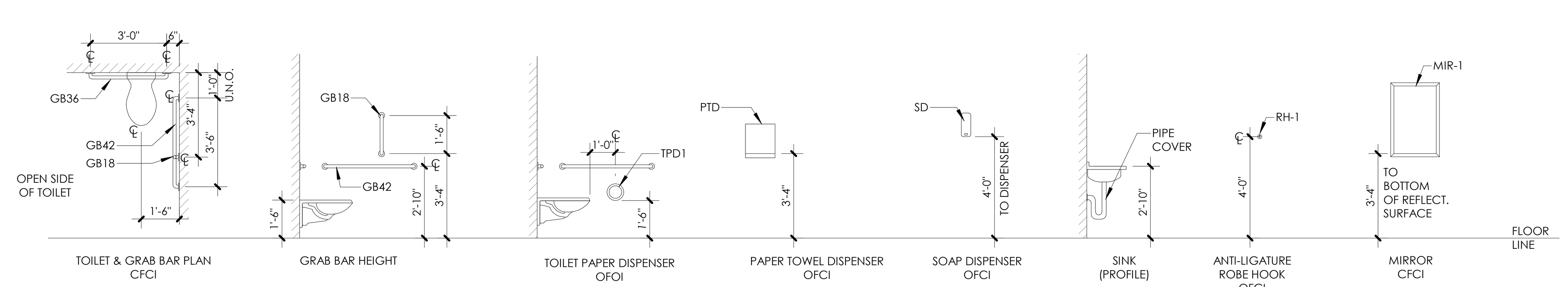
WALL FINISH HEIGHT:
C = EXTEND GYP. BD. FINISH TO 6" ABOVE FIN. CLG.
D = EXTEND GYP. BD. FINISH TO BOTTOM OF DECK
F = PROVIDE INFILL OF EXISTING WALL OPENING
P = PARTIAL HEIGHT WALL

PARTITION RATING:
0 = 0 HOUR RATED PARTITION
1 = 1 HOUR RATED PARTITION PER U.L. NO. AND ASSEMBLY SCHED.
2 = 2 HOUR FIRE AND SMOKE RATED PARTITION PER U.L. NO. AND ASSEMBLY SCHED.
S = 1 HOUR FIRE AND SMOKE RATED PARTITION PER U.L. NO. AND ASSEMBLY SCHED.
H = 2 HOUR SMOKE RATED PARTITION PER U.L. NO. AND ASSEMBLY SCHED.
N = NON-RATED PARTITION

PARTITION LEGEND & NOTES

ABBREVIATIONS LIST

AFF	ABOVE FINISHED FLOOR
ACT	ACOUSTICAL TILE
AWC	ACOUSTICAL WALL COVERING
AP	ACRYLIC / RESINOUS PANEL
ADJ	ADJACENT
AGGR	AGGREGATE
A/C	AIR CONDITIONING
ALT	ALTERNATE
AL	ALUMINUM
AMT	AMOUNT
APPROX	APPROXIMATE
APT	APARTMENT
ARCH	ARCHITECT / ARCHITECTURAL
AVE	AVENUE
BRS	BACKER ROD & SEALANT
BSMT	BASEMENT
BLK	BLOCK
BLKG	BLOCKING
BLVD	BOULEVARD
BLDG	BUILDING
BR	BUMPER RAIL
CPT	CARPET
CPTT	CARPET TILE
CB	CARPET BASE
CLK	CAULK(ING)
CLNG	CEILING
CFT	CERAMIC FLOOR TILE
CT	CERAMIC TILE
CWT	CERAMIC WALL TILE
CR	CHAIR RAIL
CLR	CLEAR(ANCE)
CLOS	CLOSET
CW	COLD WATER
COL	COLUMN
CO	COMPANY
CONC	CONCRETE
CMU	CONCRETE MASONRY UNIT
CONST	CONSTRUCTION
CONT	CONTINUOUS OR CONTINUE
CONTR	CONTRACT(OR)
CJ	CONTROL JOINT
CG	CORNER GUARD
CORR	CORRUGATED
CR	CRASH RAIL
CRM	CROWN MOLDING
CFM	CUBIC FEET PER MINUTE
CU FT	CUBIC FOOT
CU IN	CUBIC INCH
CU YD	CUBIC YARD
CC	CUBICLE CURTAIN
DFLM	DECORATIVE FILM
DEPT	DEPARTMENT
DTL	DETAIL
DIA	DIAMETER
DIM	DIMENSION
DW	DISHWASHER
DFP	DOOR FRAME PAINT
DN	DOWN
DWG	DRAWING
E	EAST
EA	EACH
EB	EDGE BANDING
ELEV	ELEVATION
ELEC	ELECTRIC(AL)
EM	EMERGENCY
ENGR	ENGINEER
EP	EPOXY PAINT
EPF	EPXOY / POURED FLOORING
EQ	EQUAL
EST	ESTIMATE
EXIST	EXISTING
ETR	EXISTING TO REMAIN
EJ	EXPANSION JOINT
EXP	EXPOSED
EXT	EXTERIOR
FWP	FABRIC WRAPPED PANEL
FPM	FEET PER MINUTE
FIN	FINISH(ED)
FFE	FINISHED FLOOR ELEVATION
FFL	FINISHED FLOOR LINE
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FHC	FIRE HOSE CABINET
FHY	FIRE HYDRANT
FLR	FLOOR(ING)
FD	FLOOR DRAIN
FT	FOOT / FEET
FTG	FOOTING
FND	FOUNDATION
FUR	FURRED(ING)
FUT	FUTURE
GA	GAGE, GAUGE
GC	GENTERAL CONTRACT(OR)
GL	GLASS / GLAZING
GLBK	GLASS BLOCK
GWT	GLASS WALL TILE
GD	GRADE, GRADING
GVL	GRAVEL
GR	GROUT
GYP BD	GYPSUM BOARD
HR	HAND RAIL
HVAC	HEATING / VENTILATION / AIR CONDITIONING
HT	HEIGHT
HID	HIGH IMPACT DOOR
HPR	HIGH PERFORMANCE RESIN
HC	HOLLOW CORE
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HW	HOT WATER
HR	HOUR
IN	INCH
INCL	INCLUDE(DED), (SION)
INFO	INFORMATION
IB	INTEGRAL BASE
ISB	INTEGRAL SINK BOWL
INT	INTERIOR
JT	JOINT
LAB	LABORATORY
LAM	LAMINATE(D)
LAV	LAVATORY
LVT	LAY-IN VINYL CEILING TILE
LH	LEFT HAND
LT	LIGHT
LWT	LIGHTWEIGHT
LWC	LIGHT WEIGHT CONCRETE
LVC	LOW VOLUME CHANGE
LB	POUND OR (#)
MFG	MANUFACTURE(ER)
MB	MARKER BOARD
MAS	MASONRY
MO	MASONRY OPENING
MAX	MAXIMUM
MECH	MECHANIC(AL)
MED	MEDICAL
MED	MEDIUM
MTL	METAL, MATERIAL
ML	METAL LAMINATE
MT	MILLWORK TILE
MIN	MINIMUM
MISC	MISCELLANEOUS
NF	NO FINISH
NOM	NOMINAL
N	NORTH
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OC	ON CENTER
OPNG	OPENING
OPP	OPPOSITE
OD	OVERFLOW DRAIN
OFCI	OWNER FURNISHED, CONTRACTER INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
P	PAINT
PTM	PATCH TO MATCH
PLAM	PLASTIC LAMINATE
PL	PLATE
PT	POINT
PFT	PORCELAIN FLOOR TILE
PTB	PORCELAIN TILE BASE
PWT	PORCELAIN WALL TILE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PCS	POURED COATING SYSTEM
PROP	PROPERTY
PPF	PVC FREE PLANK FLOORING
PS	PVC FREE SHEET
QTY	QUANTITY
QT	QUARRY TILE
QTB	QUARRY TILE BASE
Q	QUARTZ
QCT	QUARTZ COMPOSITION TILE
QS	QUARTZ SURFACING
RAD	RADIUS
RCF	RAISED COMPUTER FLOOR
REF	REFERENCE
RE	REFER TO
RCP	REFLECTED CEILING PLAN
REINF	REINFORCING
REQD	REQUIRED
RB	RESILIENT BASE
RP	REVEAL PAINT
REV	REVISION(S), REVISED
RD	ROOF DRAIN
RM	ROOM
RO	ROUGH OPENING
RB	RUBBER BASE
RS	RUBBER SHEET
RT	RUBBER TILE
SCHED	SCHEDULE
SCRN	SCREEN
SC	SEALED CONCRETE
SEC	SECTION
SHT	SHEET
SVT	SHEET VINYL FLOORING
SIM	SIMILAR
S	SOUTH
SC	SOLID CORE
SS	SOLID SURFACING
SPEC	SPECIFICATION(S)
SQ	SQUARE
SQ FT	SQUARE FOOT
STC	STAINED CONCRETE
SSTL	STAINLESS STEEL
STL	STEEL
STV	STONE VENEER
STOR	STORAGE
ST	STREET
STRUCT	STRUCTURAL
SUSP	SUSPENDED
TS	TACKABLE SURFACE
TB	TACK BOARD
TV	TELEVISION
TRZ	TERRAZZO FLOORING
TLT	TOILET
TLT PTN	TOILET PARTITION
T&G	TONGUE AND GROOVE
T O	TOP OF
TYP	TYPICAL
UL	UNDERWRITERS LAB
UNO	UNLESS NOTED OTHERWISE
VNR	VENEER
VERT	VERTICAL
VCC	VINYL CELING COVERING
VCT	VINYL COMPOSITION TILE
VET	VINYL ENHANCED TILE
VPF	VINYL PLANK FLOORING
VWC	VINYL WALL COVERING
WSC	WAINSCOT
WOM	WALK-OFF MAT
WP	WALL PROTECTION
WPS	WALL PROTECTION SHEET
WC	WATER CLOSET
WH	WATER HEATER
WR	WELD ROD
W	WEST
WF	WIDE FLANGE
WT	WINDOW TREATMENT
W/	WITH
W/O	WITHOUT
WD	WOOD
WDS	WOOD DOOR STAIN
WF	WOOD FLOOR
WS	WOOD STAIN
WV	WOOD VENEER



TOILET & GRAB BAR PLAN
CFCI

GB18 18" ANTI-LIG GRAB BAR
GB24 24" ANTI-LIG GRAB BAR
GB36 36" ANTI-LIG GRAB BAR
GB42 48" ANTI-LIG GRAB BAR

GRAB BAR HEIGHT

TOILET PAPER DISPENSER
OFOI

PAPER TOWEL DISPENSER
OFCI

SOAP DISPENSER
OFCI

SINK
(PROFILE)

ANTI-LIGATURE
ROBE HOOK
OFCI

MIRROR
CFCI

NOTE:
POSITION SHARPS DISPOSAL UNITS, TOWEL, SOAP, FOAM, AND GLOVE DISPENSERS BETWEEN UPPER AND LOWER CABINET AT SINK LOCATIONS IN CASEWORK.

INSTALLATION GUIDELINES NOTES:

1. CONTRACTOR SHALL REINFORCE WALLS AT LOCATIONS OF TOILET ACCESSORIES WITH METAL OR F.T. WOOD BLOCKING.

2. CONTRACTOR SHALL COORDINATE FLUSH VALVES WITH GRAB BARS.

3. ALL FLUSH VALVES SHALL BE LOCATED ON OPEN SIDE OF TOILET.

4. ALL SINKS, WALL HUNG AND COUNTERTOP, SHALL BE PROVIDED WITH PAPER TOWEL DISPENSER, SOAP DISPENSER AND OTHER NOTED ACCESSORIES.

5. THE CONTRACTOR SHALL COORDINATE WITH OWNER TO PROVIDE ACCESSORIES CONSISTENT WITH THE OWNER'S VENDOR SUPPLIES AND SHALL INSTALL ALL VENDOR SUPPLIED ACCESSORIES.

6. SEE REFERENCED INTERIOR ELEVATIONS FOR ADDITIONAL MOUNTING HEIGHTS.

7. AT ITEMS SHOWN TO BE RECESSED INTO A FIRE RATED WALL, CONSTRUCT A 5-SIDED BOX AROUND RECESSED ITEM. BOX SHALL BE 5/8" TYPE 'X' GYP. BD. TO MAINTAIN RATING.

8. WHERE TOILET ACCESSORIES OR WALL MOUNTED EQUIPMENT ARE MOUNTED ON WALL AND WALL PROTECTION, ADD ADDITIONAL WALL PROTECTION BEHIND OBJECT FOR A FLUSH MOUNTING SURFACE. WALL PROTECTION SHALL OVERHANG OBJECT 1/2" ON ALL SIDES.

INSTALLATION GUIDELINES

bc**DESIGN**GROUP
12101 W 110th Street, Suite 100
Overland Park, KS 66210
913.232.2123
MO Certificate of Authority Number
A-2011037290

Project Team:

ROSS & BARUZZINI
6 South Old Orchard | St. Louis, MO 63119
314.918.8383
Missouri Certificate of Authority #000148

Project Title:
MISSOURI PSYCHIATRIC CENTER - RENOVATE RESTROOM PC2120
UNIVERSITY OF MISSOURI HEALTHCARE

Issue Date: 1.13.22
#: Issue: Date:

Drawn by: Author

bcdg Project #: 12275.047
MU Project #: CP212341

COVER

PROJECT INFORMATION

BID SET

Specifications for MU MPC Renovate Restroom PC2120

November 15th, 2021

Division 1 – General Requirements and Notes:

1.1. General Requirements:

1.1.1. Refer to CP212341 Project Manual for Division 1 requirements.

1.2. Dimensions:

1.2.1. Wall construction dimensions are from inside face of outside wall to face of interior wall and from face of wall to face of wall, unless noted otherwise. Contractor to compensate for such when measuring chalk lines. Architect/Designer to review location of chalk lines prior to wall construction.

1.2.2. Electrical outlet dimension are from finish floor to centerline of outlet unless noted otherwise.

1.3. Existing Conditions:

1.3.1. Contractor shall carefully study the construction documents, verify all dimensions, field measurements and conditions, and shall at once report to Architect/Designer any error, inconsistency or omission he may discover. Contractor shall perform no portion of the work at any time without construction documents, or where required, approved shop drawings, product data or samples for such portion of the work.

1.4. Cutting and Patching:

1.4.1. General:

1.4.1.1. Do not cut-and-patch structural work in a manner resulting in reduction of load-carrying capacity or lead/deflection ratio; submit proposed cutting and patching to Architect/Designer for review prior to proceeding with the work.

1.4.1.2. Do not cut-and-patch work which is exposed on the exterior or in occupied spaces of building, in a manner resulting in reduction of visual qualities or resulting in substantial evidence of cut-and-patch work, both as judged solely by Architect/Designer.

1.4.2. Except as specifically noted on drawings, provide materials for cutting and patching which will result in equal-or-better work than work being cut and patched; in terms of performance characteristics and including visual effect where applicable. Use materials identical with original materials where feasible and where recognized that satisfactory results can be produced thereby.

1.4.3. Provide adequate temporary shoring and bracing where required to prevent failure. Do not endanger other work.

1.4.4. Restore exposed finished of patched areas and, where necessary, extend finish restoration onto retained work adjoining, in a manner that will eliminate evidence of patching.

Division 2 – Site Work:

2.1. Site Usage:

2.1.1. Refer to Drawings for contractor access plan.

2.2. Selective Demolition:

2.2.1. Refer to drawings for general scope of demolition.

2.2.2. Contractor shall be responsible for removing any/all existing items which conflicts with the intent of the new construction.

2.2.3. Job Conditions:

2.2.3.1. Neither Owner nor Architect/Designer assume any responsibility for actual condition(s) of items or structures scheduled to be demolished.

2.2.4. Damage:

2.2.4.1. Contractor shall promptly repair any damage caused by the work to areas shown to remain. This shall be done at Contractor's expense.

2.2.5. Utility Services:

2.2.5.1. All utility shutdowns shall be coordinated with MUHC 2 weeks in advance of shutdown. No unauthorized shutdowns are to occur.

Division 3 – Concrete: (Not Used)

Division 4 – Masonry: (Not Used)

Division 5 – Metals: (Not Used)

Division 6 – Wood and Plastic: (Not Used)

Division 7 – Thermal and Moisture Protection:

7.1. Vapor Barrier:

7.1.1. General: In the event that selective demolition includes any portion of an exterior wall, Contractor shall provide and install a new 8 mil poly vapor barrier along the inside face of the exterior wall studs at demolished wall areas. Said vapor barrier shall be taped to the existing one to provide a continuous barrier.

Division 8 – Doors and Windows:

8.1 Steel Door Frames:

8.1.1 Steelcraft DW16-4 or approved equal in sizes indicated on the drawings.

8.1.2 Install in accordance with manufacturer's recommendations and requirements.

8.2 Wood Doors:

8.2.1 High Impact, Acrylic Modified Vinyl Faced Doors. Subject to compliance with requirements, provide Marshfield-Algoma Aspiro Series by Masonite Architectural or an approved equal product by VT Industries – Eggers Division or Construction Specialties – Acrovyn Door Systems.

8.2.2 Owner to select from full range of manufacturer color options

8.3 Hardware:

8.3.1 Refer to Section 8.4 for Hardware Schedule.

8.3.2 Lock sets to be grade 1 heavy duty cylindrical or as specified

8.3.3 Stanley Patient Safety Lever (SPSL) to be used in psych safe patient areas.

8.3.3.1 Keying:

8.3.3.1.1 All cylinders to be keyed to existing master key system. Keying schedule must be approved by Owner prior to ordering locks.

8.3.3.1.2 Provide keys as follows:
Change Keys: 2 per lock
Master Keys: 6 required (per system)

8.3.4 Hinges: Ives;
Approved Equal: Stanley

8.3.4.1 Use non-rising pins for all doors.

8.3.4.2 Provide top hinge reinforcement straps for Doors over 3'-6" wide.

8.3.5 Pivots: Hager

8.3.6 Wall Door Stops: Ives
Approved Equal: Burns, Rockwood, Trimco

8.3.7 Door Closers: LCN; No substitutions

8.3.8 Flatgoods: Ives
Approved Equal: Burns, Rockwood, Trimco

8.4 Hardware Schedule:

8.4.1 General: Contractor to verify function of each door and provide any other necessary hardware required for proper operation and code compliance.

8.4.2 Set 1 –

Door: PC2120

1	Psych Privacy Lock	Existing reused	
1	Overhead Stop	106S US32D SOC	Glynn Johnson
1	Psych Emer. Door Alarm	SEDA-DSA-P2	Best Access Systems
1	Hinge	Existing Re-used	

Division 9 - Finishes:

9.1 Metal Studs and Runners:

9.1.1 Steelbenders, USG or approved equal.

9.1.2 Studs shall be of the size indicated on the drawings and of gauge recommended by manufacturer. Minimum gauge of metal studs shall be 25.

9.1.3 Stud spacing shall be a maximum of 16" OC, unless noted otherwise on the drawings.

9.1.4 At doorjambs, provide minimum 20 gauge double studs.

9.2 Gypsum Board and Accessories:

9.2.1 Walls and Ceiling: 5/8" tapered edge Fire Code (Type 'X') Abuse Resistant Gypsum board in compliance with GA-216 and as indicated on the drawings.

9.2.2 Accessories: Provide all necessary accoutrements, i.e. trim beads, control joint beads, etc. in accordance with manufacturers' literature and industry standards.

9.2.3 Sealants and Caulking: Provide required sealants and caulking, including fire safing and fire caulking, in accordance with manufacturers' literature, industry standards, and code requirements.

9.3 Floor Coverings:

9.3.1 General:

9.3.1.1 Install all floor coverings in accordance with manufacturer's recommendations.

9.3.2 Prepare substrates according to manufacturer's written recommendations to ensure adhesion of floor coverings.

9.3.2.1 Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

9.3.2.2 Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

9.3.3 Vinyl and/or Rubber Base: Refer to finish schedule for types and locations.

9.3.4 Seamless Resinous Flooring: Desco Cremona Quartz TG or Equal with 1" cove transition to wall. System to be hand-troweled.

9.3.4.1 Owner to select from full range of manufacturer color options.

9.3.4.2 Binder and all successive grout and topcoats shall be 100% solids clear/epoxy resin. Ceramic coated quartz aggregates as supplied by Manufacturer are to be used to achieve all color. No pigmented epoxy base or topcoats allowed.

9.3.4.3 Areas where flooring is existing must be cleaned to remove all floor material, grease or any residue that might retard interfacial adhesion between substrate and surfacing.

9.3.4.4 Slip resistant top coating to meet C.O.F. .80 minimum.

9.3.4.5 Owner to perform slip resistance testing.

Division 10 - Specialties:

10.1 Miscellaneous Construction Specialties:

10.1.1 General:

10.1.1.1 Refer to drawings for quantities and locations of various specialties.

10.2 Specialty Toilet Accessories:

10.2.1 General:

10.2.1.1 Refer to drawings for quantities and locations of various accessories.

10.2.2 Paper Towel Dispensers: OFCI

10.2.3 Toilet Paper Dispensers: TPD

10.2.3.1 Security Toilet Tissue Dispenser: Impact resistant solid surface material. Secure to wall with rear-mounting steel strap and adjustment bolts.

10.2.3.1.1 Sloping Design

10.2.3.1.2 Finish: Solid Surface

10.2.3.1.3 Products: Norva Plastics, Suicide Resistant Single Toilet Paper Dispenser or Approved Equal

10.2.4 Soap Dispensers: OFCI

10.2.5 Mirrors: MIR

10.2.5.1 Frame-less Mirror: Mirror is constructed of 18-gauge type 304 #8 architecutral grade finish steel. Corners to be welded and polished with 3/4" reinforced pressed board backing.

10.2.5.1.1 Finish: No. 8 for mirror; chrome plating for frame.

10.2.5.1.2 Mounting: No visible mounting, mouths to standard M1100 back plate.

10.2.5.1.3 Products: Meek, All Stainless Steel Mirror M5100 or Approved Equal.

10.2.6 Grab Bars: GB-xx

10.2.6.1 Ligature Resistant Grab Bars: 1-1/2" OD, heavy duty stainless steel with ligature resistant closure plate, front mounted with security fasteners.

10.2.6.1.1 Finish: Satin.

10.2.6.1.2 Mounting: 3-1/8" diameter, 11 ga., stainless steel flanges with exposed security fasteners for installation into backing in wall.

10.2.6.1.3 Products: Willoughby Industries – LRGB Series ADA Compliant or Approved Equal.

10.2.7 Breakaway Shower Curtain: CC

10.2.7.1 Break-A-Way shower curtain and track: Shower curtains made specifically for use with IFC-69 with 1-1/2" wide, double stitched top hem. Side hems are ½" wide. Staph Check shower curtain does not require a bottom hem. Provide clear vinyl security panels at top of curtain. Safety tabs are 4" long and ¾" wide. Three safety tabs per linear foot. Track shall be secured to ceiling with security fasteners.

10.2.7.1.1 Curtain Color: White

10.2.7.1.2 Products: Break-A-Way shower curtain and track using IFC-69 Jiffy Track and Staph Chek Curtain, by Weizel Security or approved equal.

10.2.8 Security Towel Hook: TH

10.2.8.1 Surface mounted safety hook, backplate to be 14 gauge stainless steel with exposed surfaces in architectural satin finish. One-piece formed and ground smooth. Safety hook to be bright, chrome plated brass housing with stainless steel ball and spring. Friction mechanism allows holder to clasp towels, clothing, etc. but release when excessive force is applied.

10.2.8.1.1 Products: Willoughby Industries – LRTH Series, LRTH1 or Approved equal.

Division 11 - Equipment: (Not Used)

Division 12 – Furnishings: (Not Used)

Division 13 – Special Construction: (Not Used)

Division 14 – Conveying Systems: (Not Used)

End of Specification

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Project Title:
MISSOURI PSYCHIATRIC CENTER - RENOVATE RESTROOM PC2120
UNIVERSITY OF MISSOURI HEALTHCARE

STATE OF MISSOURI
KURT M. BROECKELMANN
NUMBER
A-2007007677
1.13.2022
ARCHITECT

Issue Date: 1.13.22
Issue: Date:

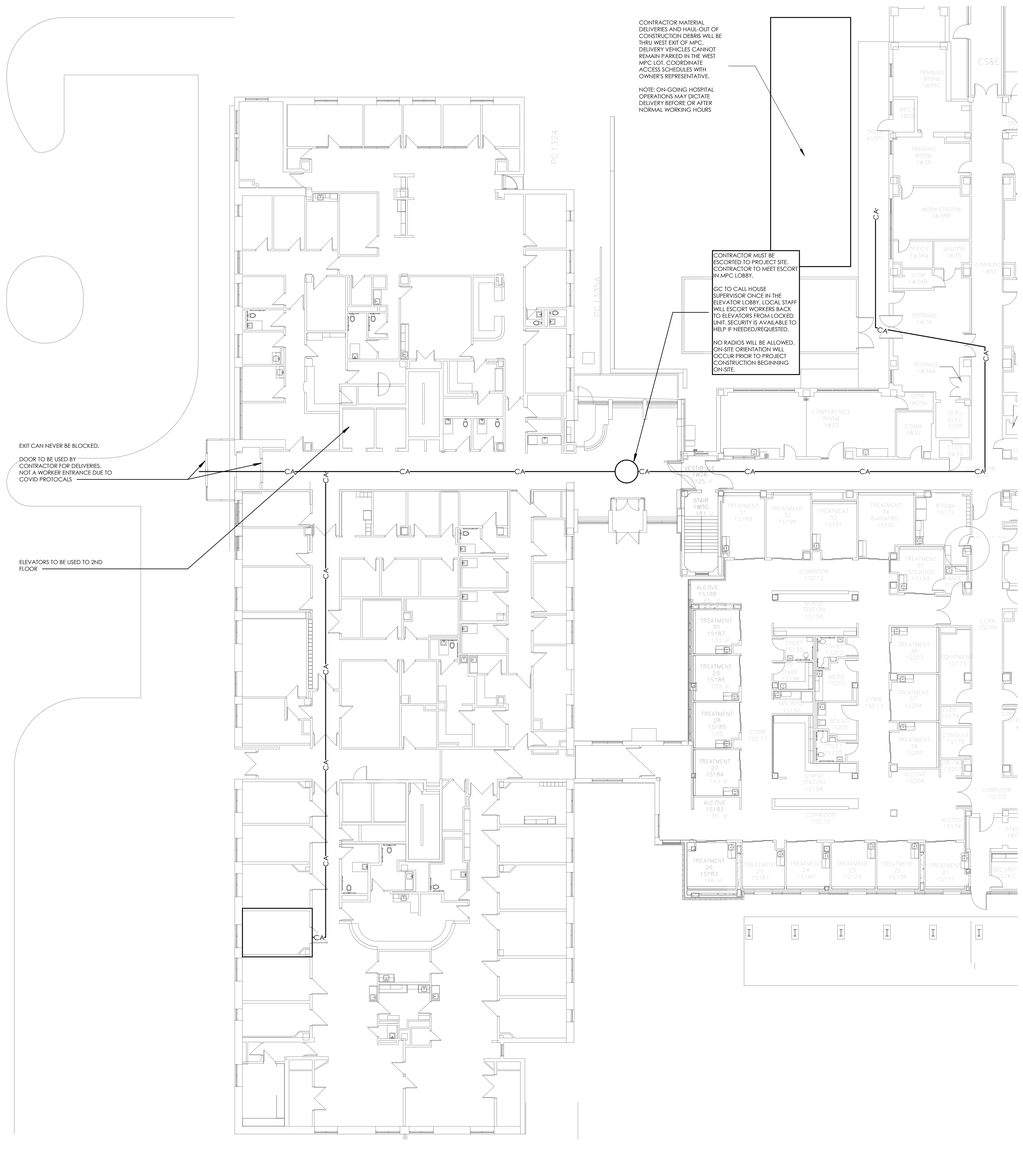
Drawn by: Author

bcdg Project #: 12275.047
MU Project #: CP212341

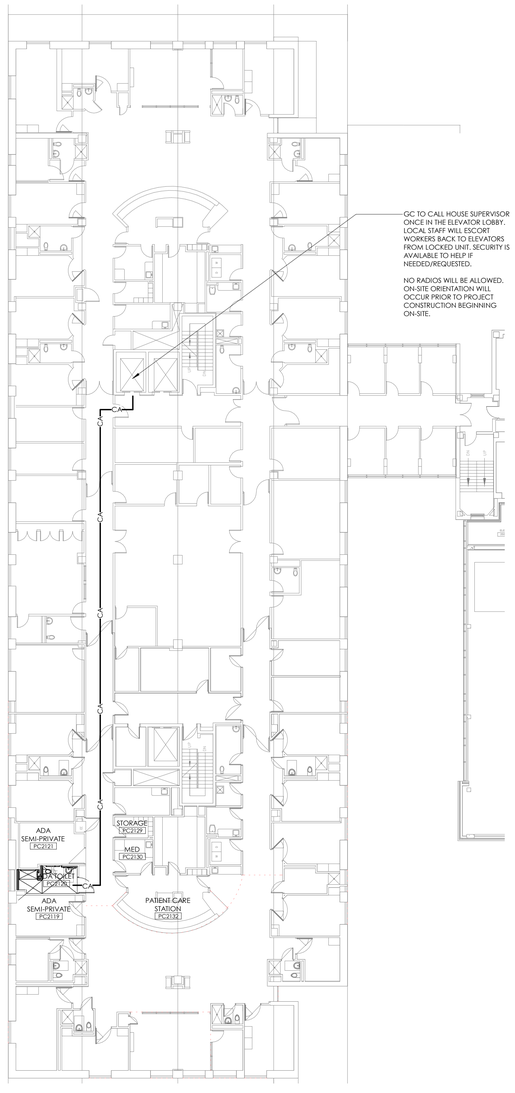
G100

ARCHITECTURAL SPECIFICATIONS

BID SET



1 CONTRACTOR ACCESS PLAN - FIRST FLOOR
1/16" = 1'-0"



2 CONTRACTOR ACCESS PLAN - SECOND FLOOR
1/16" = 1'-0"

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Issue Date: 1.13.22
Issue: Date:

Drawn by: Author

bcdg Project #: 12275.047
MU Project #: CP212341

G101
CONTRACTOR ACCESS PLANS

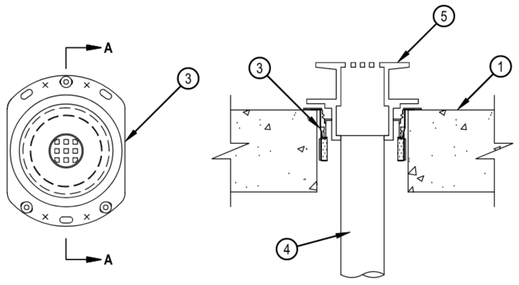
BID SET

FA 2230

System No. F-A-2230

F Rating — 2 Hr
T Rating — 0 Hr

Classified by Underwriters Laboratories, Inc. to UL 1479



SECTION A-A

1. Floor Assembly — Min 4-1/2 in. (114 mm) to max 8 in. (203 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor assembly. Diam of opening is 5 in. (127 mm).

1A. Floor Assembly — (Optional, Not Shown) — The fire rated concrete and steel deck floor assembly shall be constructed of the materials and in the manner specified in the individual D700, D800 or D900 Series designs in the UL Fire Resistance Directory and as summarized below:

A. Concrete — Min 4-1/2 in. (114 mm) to max 8 in. (203 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete, as measured over crest of fluted steel deck.

B. Steel Floor and Form Units* — Composite or non-composite max 3 in. (76 mm) deep galv steel fluted units as specified in the individual Floor-Ceiling Design.

2. Metallic Sleeve — (Optional, Not Shown) - Nom 5 in. (127 mm) diam Schedule 10 (or heavier) steel sleeve cast or grouted into floor assembly, flush with floor surfaces.

2A. Sheet Metal Sleeve — (Optional, Not Shown) - Nom 5 in. (127 mm) diam, min 26 ga galv steel and having a min 2 in. (51 mm) lap along the longitudinal seam, and may extend a max of 4 in. (102 mm) below the bottom of the floor and flush with the top surface of the concrete floor. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the openings and releasing the coil to let it uncoil against the opening.

3. Firestop Device* — Drop-in firestop device installed in core-drilled or sleeved opening in concrete floor assembly in accordance with accompanying installation instructions. The firestop device flange should be secured to the top surface of the floor with three 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel expansion bolts or screw anchors (installed in a triangular fashion through holes provided). As alternates to the anchors specified above, Hilti 1/4 in. (6 mm) diam by 1-1/4 in. (32 mm) long KWIK-CON II+ concrete screw anchor, Hilti 1/4 in. (6 mm) diam by 1-3/4 in. (45 mm) long KWIK-BOLT 3 steel expansion anchor or Hilti 1/4 in. (6 mm) by 3/4 in. (19 mm) long Metal HIT Anchor may be used. In addition, four 11/16 in. (18 mm) long Hilti X-GH P18 MX steel fasteners may be installed through the steel flange, two on each side. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-DID 3*MD

4. Drain Piping — Nom 2 in. (51 mm) diam Schedule 40 solid core or cellular core Polyvinyl Chloride (PVC) drain piping cemented into bottom of shower/floor drain. Drain piping rigidly supported at underside of floor with suitable hangers.

5. Shower/Floor Drain Fitting — Polyvinyl chloride (PVC) shower fitting with chromed steel shower drain or floor drain strainer sized to accommodate drain pipe. PVC body cemented to nonmetallic drain pipe (Item 4).

*Bearing the UL Classification Mark

Hilti Firestop Systems

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Project Title:
CP150492 | University of Missouri Teaching Hospital - West Wing - Expansion/Renovation
UNIVERSITY OF MISSOURI HEALTHCARE

FOR REFERENCE ONLY

Issue Date: 1.13.22

#	Issue:	Date:

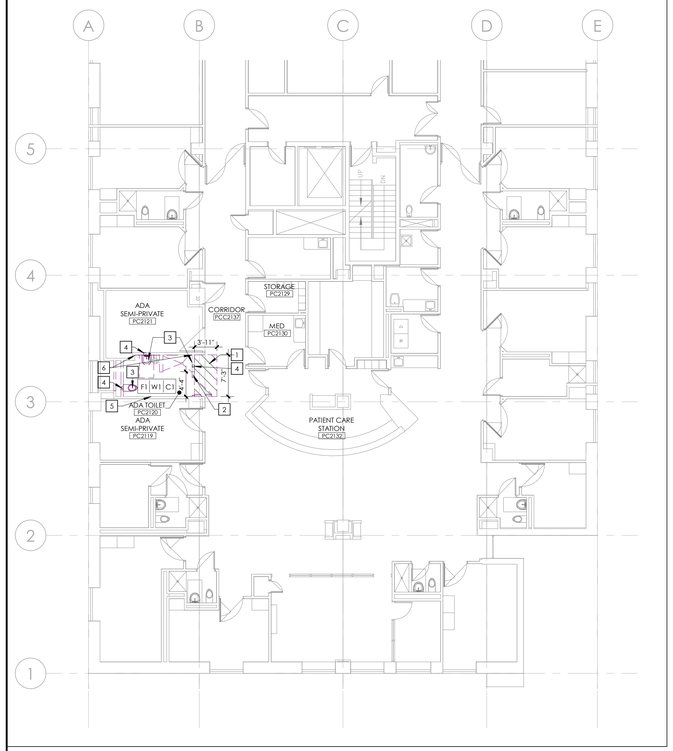
Drawn by: Author

bcdg Project #: 12275.15
MU Project #: CP150492

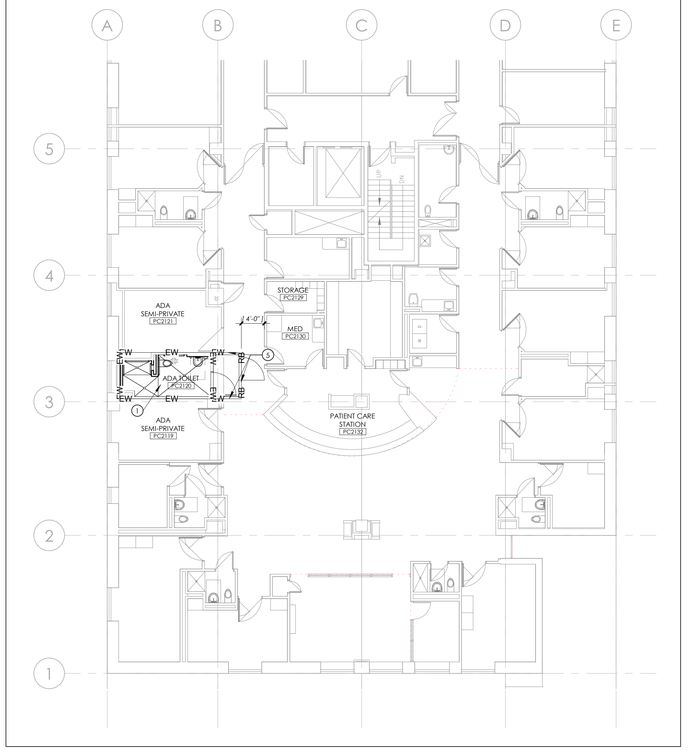
G102

UL DETAILS

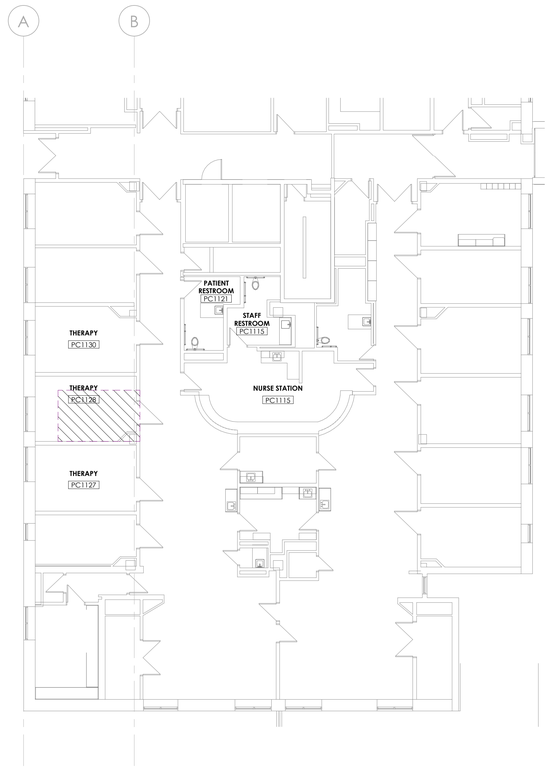
BID SET



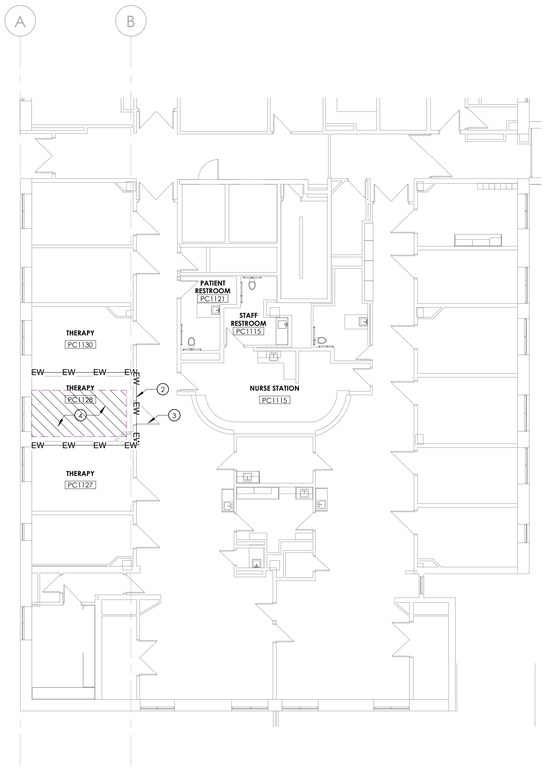
1 SECOND FLOOR DEMO PLAN
3/32" = 1'-0"



2 SECOND FLOOR INFECTION CONTROL PLAN
3/32" = 1'-0"



3 FIRST FLOOR DEMO PLAN
3/32" = 1'-0"



4 FIRST FLOOR INFECTION CONTROL PLAN
3/32" = 1'-0"

DEMOLITION PLAN LEGEND

- DEMO & REMOVE EXISTING WALL
- EXISTING WALL TO REMAIN
- EXISTING DOOR & FRAME TO REMAIN
- DEMO AND REMOVE EXISTING DOOR, FRAME, AND HARDWARE
- # KEYNOTE TAG
- CEILING DEMO/ABOVE CEILING WORK AREA

FLOOR/WALL/CEILING NOTES F# W# C#

FLOOR

F1 - REMOVE EXISTING FLOOR, BASE, GLUE, ETC., TO SLAB. PATCH, PRIME, AND PREPARE SUB-FLOOR TO RECEIVE NEW FLOORING AS SCHEDULED.
F2 - EXISTING FLOOR TO REMAIN
F3 - SPECIAL CONDITION - REFER TO KEYNOTE

WALL

W1 - REMOVE EXISTING WALL COVERINGS, PAINT, ETC. PATCH, PREP, AND PRIME WALL TO RECEIVE NEW FINISHES AS SCHEDULED
W2 - EXISTING WALL TO REMAIN
W3 - SPECIAL CONDITION - REFER TO KEYNOTE

CEILING

C1 - REMOVE EXISTING CEILING, HANGERS, ETC., TO BOTTOM OF STRUCTURE. EXERCISE EXTREME CAUTION AS TO NOT DISTURB SYSTEMS INTENDED TO REMAIN.
C2 - EXISTING CEILING TO REMAIN
C3 - SPECIAL CONDITION - REFER TO KEYNOTE

DEMOLITION KEYNOTES:

1. PORTION OF FLOORING IN CORRIDOR TO BE REMOVED. PATCH TO MATCH EXISTING.
   - EXISTING SHEET VINYL FINISH: TEKNOFLOR - NATURAL COLLECTION - WOOD LOOK SHEET VINYL - 52202 HARVEST CHERRY
2. REMOVE PORTION OF EXISTING WALL FOR INSTALLATION OF NEW DOOR & FRAME.
3. DEMO & REMOVE PLUMBING FIXTURE. RE: MEP
4. REMOVE CEILING AS NECESSARY TO REMOVE & INSTALL MEP WORK ABOVE IN HATCHED AREA. FOLLOW HOSPITAL INFECTION CONTROL STANDARDS FOR CONSTRUCTION DEBRIS CONTAINMENT. REPAIR/REPLACE CEILING AFTER COMPLETION.
4. INSTALL 16 OR 18 GA. PANNING ON THE UNDERSIDE OF EXISTING ABANDONED FLOOR PENETRATION AND INFILL WITH LIGHTWEGHT CONCRETE.
5. GC TO COORDINATE WITH MUHC FOR DEMOLITION OF EXISTING NURSE CALL DEVICES.
6. GYP BOARD TO BE REMOVED FOR INSTALLATION OF NEW PLUMBING FIXTURES AND ELECTRICAL. RE: PLUMBING AND ELECTRICAL

INFECTION CONTROL KEYNOTES:

1. ALL WORK TO BE DONE IN BATHROOM PC2120 USING EXISTING DOOR AS CONSTRUCTION ENTRANCE AND EXISTING WALLS AS BARRIERS. RIGID BARRIERS CONSTRUCTED IN THE CORRIDOR SHALL LEAVE MIN. 3'-0" FOR EGRESS & CIRCULATION.
2. WORK DONE ON THE 1ST FLOOR TO BE COORDINATED WITH THE HOSPITAL FOR ACCESS, SCHEDULING, ETC., ALL WORK TO BE DONE USING A BUDDY SYSTEM. 1 PERSON WILL BE DEDICATED TO MONITORING THE TOOLS AND SECURING THE WORK AREA.
3. ADD CONSTRUCTION LOCK TO EXISTING DOOR.
4. EXISTING CAMERAS ARE TO REMAIN AND BE PROTECTED DURING CONSTRUCTION.
5. RIGID BARRIER TO BE REINFORCED FOR PATIENT SAFETY.
6. ALL TOOLS AND MATERIALS MUST REMAIN SECURED AT ALL TIMES.

INFECTION CONTROL LEGEND:

NA NEGATIVE AIR EXHAUST CA CONTRACTOR ACCESS

FB FB **INFECTION CONTROL FLEXIBLE BARRIER**
THE BARRIER SHALL BE CONSTRUCTED OF 6-MIL FIRE-RESISTANT POLYETHYLENE EXTENDING FROM THE FLOOR TO CEILING. IF NECESSARY, NON-COMBUSTIBLE COMPONENTS (ZIP POLES, ETC...) SHALL BE UTILIZED TO SUPPORT THE POLYETHYLENE. THE BARRIER SHALL BE ADEQUATELY SEALED (AND MAINTAINED THROUGHOUT THE PROJECT) AT THE FLOOR AND CEILING CONNECTIONS TO PREVENT THE MIGRATION OF DUST FROM THE WORK AREA. THERE SHALL BE NO PENETRATIONS IN THE BARRIER.

RB RB **INFECTION CONTROL RIGID BARRIER**
THE BARRIER SHALL EXTEND FROM THE FLOOR TO THE CEILING AND SHALL BE CONSTRUCTED UTILIZING 3-5/8" METAL STUDS AND 1/2" OR 5/8" GYPSUM BOARD ON THE CLEAN SIDE OF THE BARRIER. THE METAL STUDS SHALL BE PLACED AT NO LESS THAN 16" AND NO MORE THAN 24" O.C. THE SEAMS AND JOINTS ON THE GYPSUM BOARD MUST BE SEALED WITH TAPE. THE BARRIER SHALL BE ADEQUATELY SEALED AND MAINTAINED AT THE FLOOR AND CEILING CONNECTIONS TO PREVENT THE MIGRATION OF DUST FROM THE WORK AREA. IF REQUIRED, DOOR/FRAME ASSEMBLIES DO NOT HAVE TO BE FIRE-RATED, HOWEVER, MUST BE HINGED SWING-TYPE, A MINIMUM WIDTH OF 36" AND BE SOLID WOOD OR METAL CLAD WITH A METAL FRAME. THE DOOR(S) SHALL BE EQUIPPED WITH A COMMERCIAL GRADE LEVER HANDLE WITH A REMOVABLE KEY CORE. THE HARDWARE MUST BE POSITIVE LATCHING AND ACCEPT A BEST 7-PIN CORE, WHICH WILL BE PROVIDED AND INSTALLED BY UNIVERSITY OF MISSOURI HEALTHCARE. A DOOR SWEEP MAY BE REQUIRED. THE BARRIER DOOR SHALL REMAIN CLOSED AND LOCKED DURING THE WORK PERIOD. AIR FILTRATION EQUIPMENT EXHAUST/VENT HOSE MAY PASS THROUGH THE UPPER PORTION OF THE BARRIER. THE PENETRATION/OPENING SHALL BE ADEQUATELY SEALED AND MAINTAINED THROUGHOUT THE PROJECT TO PREVENT THE MIGRATION OF DUST FROM THE WORK AREA.

OR

EW EW **INFECTION CONTROL BARRIER | RIGID BARRIER - MODULAR SYSTEM**
THE BARRIER SHALL BE ACHIEVED UTILIZING AN APPROVED MODULAR SYSTEM. THE SYSTEM SHALL BE COMPOSED OF ALUMINUM FRAMING EQUIPPED WITH WALL, CEILING, AND FLOOR PANELS. THE SYSTEM SHALL BE EQUIPPED WITH MAGNETIC SEALS THAT ATTACH THE SYSTEM TO THE METAL DOOR FRAME ASSEMBLY. THE SYSTEM SHALL BE EQUIPPED WITH AN INTEGRATED DOOR PANEL AND AN INTEGRATED AIR MANAGEMENT PANEL TO ACCEPT A NEGATIVE AIR EXHAUST DISCHARGE HOSE AND BE EQUIPPED WITH A MAGNAHELIC NEGATIVE AIR INDICATOR. THE DOOR SHALL BE EQUIPPED WITH A COMMERCIAL GRADE LEVER HANDLE WITH A REMOVABLE KEY CORE. THE HARDWARE MUST BE POSITIVE LATCHING AND ACCEPT A BEST 7-PIN CORE, WHICH WILL BE PROVIDED AND INSTALLED BY UNIVERSITY OF MISSOURI HEALTHCARE.

INFECTION CONTROL BARRIER TYPE EXISTING WALL
BARRIER SHALL BE ACHIEVED UTILIZING AN EXISTING WALL/ROOM AS A BARRIER. THE OWNER WILL REMOVE ALL PORTABLE EQUIPMENT AND/OR SUPPLIES FROM THE WORK AREA PRIOR TO START OF WORK. PRIOR TO START OF WORK, REPORT ALL PENETRATIONS/OPENINGS TO THE OWNER. THE OWNER WILL BE RESPONSIBLE TO REPAIR PENETRATIONS/OPENINGS IN EXISTING WALLS. COMPLETELY COVER ALL REMAINING ITEMS IN THE WORK AREA WITH POLYETHYLENE. THE ROOM DOOR(S) SHALL REMAIN CLOSED DURING THE WORK PERIOD.

GENERAL INFECTION CONTROL NOTES PER MUHC PCDG:

1. THE CONTRACTOR IS RESPONSIBLE TO CONFINE DUST AND DEBRIS TO WITHIN THE DUST PARTITION ENCLOSURE. THERE SHALL BE NO VISIBLE DUST OR DEBRIS OUTSIDE OF THE DUST PARTITIONED AREA. IF CONTRACTOR IS UNABLE TO MAINTAIN A DUST AND DEBRIS FREE AREA OUTSIDE OF DUST-PARTITION ENCLOSURE, MORE EXTENSIVE MEASURES WILL BE REQUIRED AT THE CONTRACTORS EXPENSE. THE FOLLOWING GENERAL NOTES FURTHER INDICATE REQUIRED MEASURES.
2. PRECUT MATERIALS FOR DUST PARTITIONS IN UNOCCUPIED AREAS.
3. CONSTRUCT DUST PARTITIONS OF NON-COMBUSTIBLE GYPSUM BOARD ON ONE SIDE OF METAL STUDS, TAPE ALL JOINTS AND INTERSECTIONS WITH EXISTING WALLS, DECKS, AND CEILINGS TO PREVENT THE SPREAD OF DUST. EXTEND DUST-SEAL PARTITIONS FROM THE FLOOR THROUGH THE SUSPENDED CEILING, TO THE UNDERSIDE OF THE FLOOR DECK ABOVE. AT TEMPORARY WALLS THAT INTERSECT EXISTING FINISHED WALLS, TAPE JOINT AT THE EXISTING WALL TO SEAL THE DUST PARTITION TO THE EXISTING WALL.
4. FIRE-RETARDANT POLYETHYLENE MAY BE USED ONLY WHEN APPROVED BY THE OWNER'S REPRESENTATIVE WHERE ABOVE-CEILING CONDITIONS ARE CONFIRMED TO PRELUDE CONSTRUCTION OF A GYPSUM BOARD PARTITION TIGHT TO DECK.

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Issue Date: 1.13.22
Issue: Date:

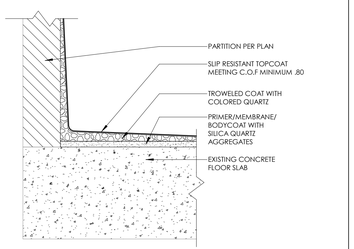
Drawn by: Author

bcdg Project #: 12275.047
MU Project #: CP212341

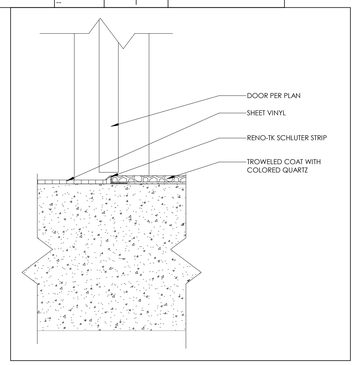
D100
DEMO AND INFECTION CONTROL PLANS

BID SET

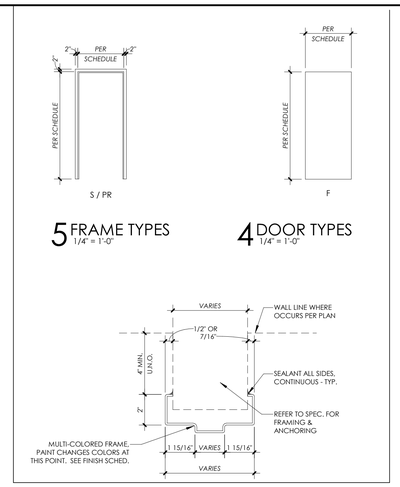
NO.	FRAME TYPE	OPENING SIZE WIDTH	HEIGHT	THICKNESS	DETAILS TYPE	MATERIAL	FRAME MATERIAL	FRAME DETAILS HEAD	JAMB	SILL	HARDWARE SET	COMMENTS
Level 2												
PC2120	S	4'-0"	7'-0"	1 3/4"	F	WD	ALUM	6/A100	6/A100	--	1	



12 EPOXY AT WALL AND FLOOR TRANSITION
1 1/2" = 1'-0"



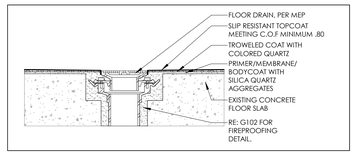
13 TRANSITION AT THRESHOLD
3" = 1'-0"



5 FRAME TYPES
1/4" = 1'-0"

4 DOOR TYPES
1/4" = 1'-0"

6 DOOR DTL - HEAD/JAMB SIM.
3" = 1'-0"



11 FLOOR DRAIN DETAIL
1 1/2" = 1'-0"

FLOOR PLAN LEGEND:

GENERAL FLOOR PLAN NOTES

1. ALL NEW INTERIOR PARTITIONS ARE TO BE 'AIDN' UNLESS NOTED OTHERWISE. **RE: COVER**
2. ALL DIMENSIONS ARE TO FACE OF FINISHED WALL, GC TO NOTIFY ARCHITECT OF ANY DISCREPANCIES PRIOR TO BEGINNING WORK IN THE AFFECTED AREAS.
3. DIMENSIONS SHOWN IN ITALICS ARE CRITICAL AND MUST BE MAINTAINED.
4. INSTALL METAL STRAP BLOCKING AT ALL ITEMS SHOWN TO BE MOUNTED TO WALLS, INCLUDING BUT NOT LIMITED TO WALL STOPS, CASEWORK, & GRAB BARS. STRAPS SHALL EXTEND A MINIMUM OF 3 STUDS. TYPICAL.
5. ALL OFCI ITEMS LOCATIONS ARE TO BE COORDINATED WITH THE OWNER.

FLOOR PLAN KEYNOTES:

1 EPOXY FLOOR HEIGHT AT DOOR TO BE 1/2" MAX.

MATERIALS LEGEND

SHEET VINYL FLOORING

SV1 MANUFACTURER: TEKNOFLOR, STYLE: NATURAL COLLECTION - WOOD LOOK SHEET VINYL, COLOR: 52202 HARVEST CHERRY, SIZE: 12" X 24", CONTACT: SHANNON SALES, INC. 417.425.1496

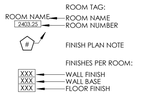
PAINT

PT1 MANUFACTURER: SHERWIN WILLIAMS, STYLE: INTERIOR ACRYLIC LATEX - LOW VOC FORMULA, COLOR: SW6106 KILN BIEGE

EPOXY

EPX1 MANUFACTURER: TNEMEC, STYLE: DECO-TROWEL, SERIES 223, COLOR: TBD

FINISH LEGEND:



REFLECTED CEILING PLAN LEGEND

- GYP. BD. SOFFIT/CEILING
- NEW DIFFUSER - RETURN, RE: MECH.
- NEW DIFFUSER - SUPPLY, RE: MECH.
- CEILING HEIGHT A.F.F. CEILING TYPE/PAINT
- PLAN KEYNOTE
- EMERGENCY LIGHT, RE: ELEC.
- CEILING MOUNTED EXIT LIGHT
- 2X4 LIGHT FIXTURE, RE: ELEC.
- 2X2 LIGHT FIXTURE, RE: ELEC.
- RECESSED CAN LIGHT,RE: ELEC.
- SMOKE DETECTOR, RE: MEP
- THERMAL DETECTOR, RE: MEP
- DOME LIGHT, RE: MEP

REFLECTED CEILING PLAN NOTES

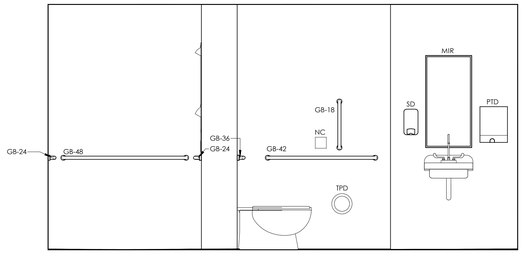
1. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO BEGINNING WORK. REPORT ANY DISCREPANCIES TO ARCHITECT IN WRITING BEFORE BEGINNING WORK IN AFFECTED AREA(S).
2. CONTRACTOR SHALL VERIFY ALL EXISTING HOSPITAL SYSTEMS CURRENTLY INSTALLED IN THE CONSTRUCTION AREA. ALL DEVICES SHALL BE CHECKED AND IN WORKING CONDITION UPON COMPLETION OF THE PROJECT.
3. ALL DIMENSIONS ARE TO FACE OF FINISHED WALL OR FACE OF MASONRY, NOTIFY ARCHITECT OF ANY DISCREPANCIES PRIOR TO BEGINNING WORK IN AFFECTED AREA(S).
4. 'ALIGN' AS USED THROUGHOUT THESE DOCUMENTS IS UNDERSTOOD TO MEAN FINISH SURFACE OF NEW CONSTRUCTION SHALL MEET FINISH SURFACE OF EXISTING CONSTRUCTION IN A NEAT AND SMOOTH MANNER PROVIDING A FLUSH FINISHABLE SURFACE.
5. REFER TO MEP DRAWINGS FOR ADDITIONAL INFORMATION AND WORK, INCLUDING, BUT NOT LIMITED TO, DIFFUSERS, GRILLES, LIGHTS, ETC..
6. ALL CEILINGS ARE TO 8'-0" AFF, UNLESS NOTED OTHERWISE.
7. REFER TO MEP DRAWING FOR ABOVE CEILING WORK RELATED TO THIS PROJECT. REMOVE TILE AS NEEDED TO INSTALL NEW MEP ITEMS AND PATCH ANY DAMAGED MATERIAL CAUSED FROM NEW INSTALLATION. COORDINATE SCHEDULE W/ HOSPITAL PRIOR TO START OF WORK.

GENERAL INTERIOR ELEVATION NOTES

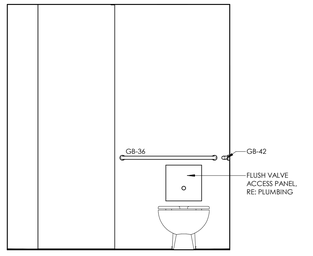
1. PROVIDE F.T. WOOD BLOCKING AS REQUIRED FOR EQUIPMENT. COORDINATE SIZE AND LOCATION WITH OWNER.
2. ALL ELECTRICAL, MECHANICAL, AND PLUMBING ITEMS ARE FOR REFERENCE AND LOCATION ONLY. REFER TO MEP DRAWINGS FOR SIZES, TYPES, AND EXACT QUANTITIES.
3. DIMENSIONS FOR MEP ITEMS ARE TO CENTERLINE OF COVERPLATE OR CENTER OF OPERABLE MECHANISM, TYP.
4. REFER TO INSTALLATION GUIDELINES/COVER FOR TYPICAL INSTALLATION GUIDELINES & MOUNTING HEIGHTS.
5. CORNER GUARD, OFOI. INSTALLATION WILL NEED TO BE IN SEQUENCE WITH THE WALL BASE. GC TO COORDINATE WITH OWNER.

INTERIOR ELEVATION LEGEND

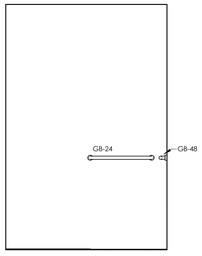
- N — NORMAL DUPLEX, RE:MEP
- E — EMERGENCY POWER DUPLEX, RE:MEP
- N4 — POWER 4-PLEX, RE:MEP
- D — DATA, RE:MEP
- L — LIGHT SWITCH(ES), RE:MEP
- H2O — WATER, RE:MEP
- N — EXISTING NORMAL DUPLEX
- E — EXISTING EMERGENCY DUPLEX
- NC — NURSE CALL, RE:MEP



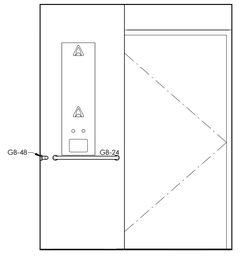
7 BATHROOM ELEVATION
1/2" = 1'-0"



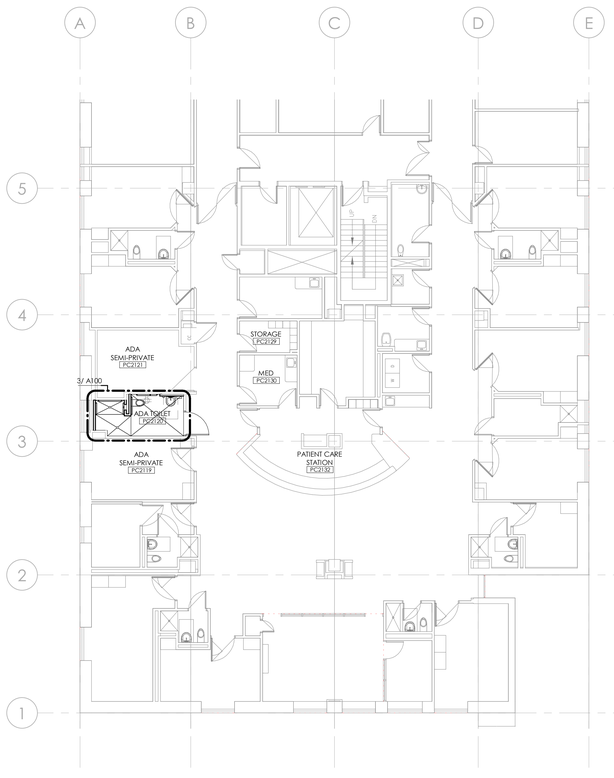
8 BATHROOM ELEVATION
1/2" = 1'-0"



9 BATHROOM ELEVATION
1/2" = 1'-0"

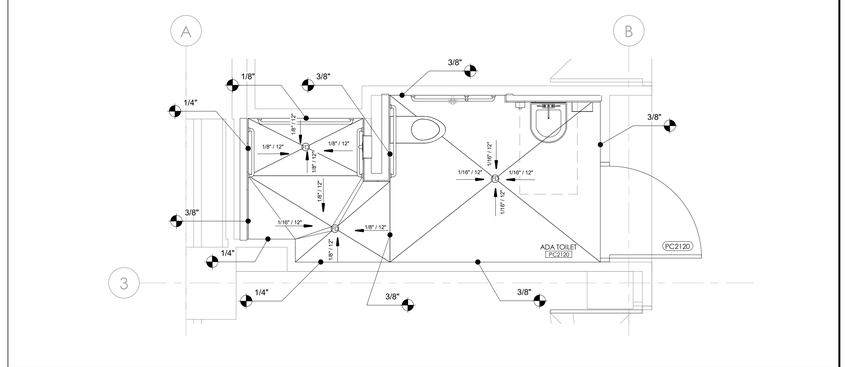


10 BATHROOM ELEVATION
1/2" = 1'-0"

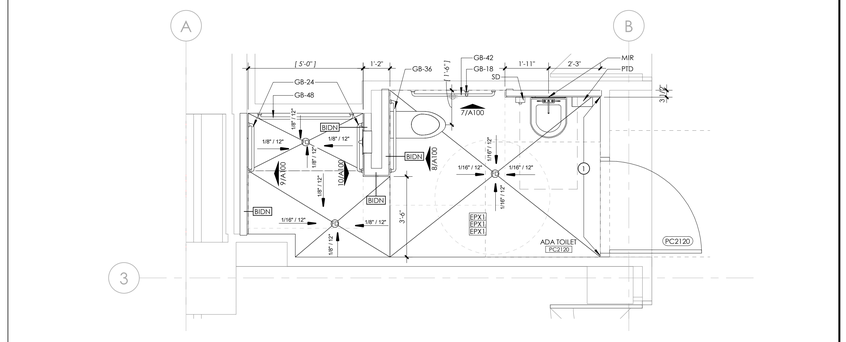


1 SECOND FLOOR PLAN
3/32" = 1'-0"

2 SECOND FLOOR RCP
3/32" = 1'-0"



14 ENLARGED PLAN
3/8" = 1'-0"



3 ENLARGED PLAN
3/8" = 1'-0"

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Project Title:
MISSOURI PSYCHIATRIC CENTER - RENOVATE RESTROOM PC2120
UNIVERSITY OF MISSOURI HEALTHCARE

Issue Date: 1.13.22

#	Issue:	Date:

Drawn by: Author

bcdg Project #: 12275.047
MU Project #: CP212341

A100

FLOOR PLAN, RCP, ELEVATIONS, AND DETAILS

BID SET

SPECIFICATIONS

23 01 00 BASIC MECHANICAL REQUIREMENTS

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH LOCAL BUILDING, MECHANICAL, PLUMBING CODES AS LISTED ON THE PROJECT COVER SHEET.

2. CONTRACTOR SHALL PROTECT ALL EXISTING WORK TO REMAIN, AND SHALL REPAIR ANY DAMAGED INCIDENTAL TO PERFORMANCE OF NEW WORK.

3. INTERFERENCE WITH OWNERS OPERATIONS OR INTERRUPTION OF SERVICES SHALL BE FULLY COORDINATED WITH OTHERS.

4. EXISTING CONDITIONS INDICATED ON THE DRAWINGS ARE TAKEN FROM THE BEST INFORMATION AVAILABLE ON DRAWINGS AND FROM VISUAL SITE INSPECTIONS AND ARE NOT TO BE CONSTRUCTED AS "AS-BUILT" CONDITIONS, BUT ARE TO INDICATE THE INTENT OF THIS WORK.

5. ALL PERMITS AND LICENSES THAT ARE REQUIRED BY GOVERNING AUTHORITIES FOR THE PERFORMANCE OF MECHANICAL AND ELECTRICAL WORK SHALL BE PROCURED AND PAID FOR BY THE OWNER.

6. CEILING SUPPLY AND RETURN DIFFUSERS SHALL BE AS SCHEDULED OR ENGINEER APPROVED EQUAL, STEEL CONSTRUCTION AND DESIGNED FOR HARD PLASTER SURFACES AS INDICATED IN THE ARCHITECTURAL DRAWINGS. COORDINATE THE FRAME STYLE WITH THE ARCHITECTURAL REFLECTED CEILING LAYOUT. FINISH SHALL BE OFF-WHITE BAKED ENAMEL.

23 05 00 BASIC MATERIALS AND METHODS

1. THE OWNER RESERVES THE RIGHT TO REJECT ANY MATERIALS IF THE CONTRACTOR IS NOT CONFORMING TO THE PRACTICES AND PROCEDURES FOR ENSURING A DIRT, DEBRIS, AND MOISTURE FREE PRODUCT THROUGHOUT CONSTRUCTION AS OUTLINED IN THE DELIVER, STORAGE, HANDLING, AND FINAL CLEAN REQUIREMENTS HEREIN
2. DELIVERY
    A. DELIVER PIPES, TUBES, DUCTWORK, AND FITTINGS WITH FACTORY APPLIED SEALS ON EACH END WITH AN IMPERVIOUS ADHERED PROTECTIVE COVERING (HAIRNETS ARE NOT ACCEPTABLE). MAINTAIN FACTORY APPLIED COVERINGS THROUGH SHIPPING, STORAGE, AND HANDLING TO PREVENT END DAMAGE AND ENTRANCE OF DIRT, DEBRIS, AND MOISTURE.
    B. DELIVER PRODUCTS TO THE JOBSITE PROPERLY IDENTIFIED WITH NAMES, MODEL NUMBERS, TYPES, GRADES, COMPLIANCE LABELS, AND OTHER INFORMATION NEEDED FOR IDENTIFICATION.
    C. ALL DUCTWORK AND ACCESSORIES SHIPPED FROM FABRICATION SHOP(S) SHALL BE SHIPPED IN AN ENCLOSED TRAILER OR ENCLOSED TRUCK TO PROTECT THE DUCTWORK FROM DAMAGE, DIRT, AND MOISTURE DURING TRANSIT TO THE JOBSITE.
    D. CURSORY CLEANING SHALL TAKE PLACE WHEN ANY FOREIGN SUBSTANCE IS NOTED.
    E. FABRICATION LABELS SHALL BE PLACED ON PRODUCT EXTERIOR ONLY. NO PAPER IDENTIFICATION LABELS SHALL BE INSIDE THE PRODUCT.
    F. ALL PRODUCTS SHALL BE PALLETIZED AND SHRINK WRAPPED FOR DELIVERY TO THE JOBSITE.
    G. UNASSEMBLED DUCTWORK: OCCASIONALLY DUCTWORK MAY BE SHIPPED UNASSEMBLED. THIS DUCT SHALL BE KEPT COVERED AND CLEANED AT THE SITE AS IT IS ERECTED.
3. STORAGE
    A. DUCTWORK AND PIPING THAT IS DELIVERED TO THE SITE SHALL BE INSTALLED AS SOON AS POSSIBLE.
    B. THE CONTRACTOR SHALL ENSURE CARE IS TAKEN TO SCHEDULE ONLY ENOUGH MATERIAL ON SITE FOR THE IMMEDIATE WORKLOAD.
    C. WHERE PRODUCTS MUST BE STORED ON SITE, STORAGE OF THESE PRODUCTS SHALL ADHERE TO THE FOLLOWING CONDITIONS:
    D. STORE PLASTIC PIPES PROTECTED FROM DIRECT SUNLIGHT. SUPPORT TO PREVENT SAGGING AND BENDING.
    E. PROTECT ALL PRODUCTS FROM MOISTURE, DIRT, AND DEBRIS. MAINTAIN FACTORY PROVIDED PROTECTIVE COVERINGS AT EACH END CAP.
    F. WHERE STORED EXTERIOR TO THE BUILDING, ELEVATE ABOVE GRADE
    G. WHERE STORED ON FLOOR OR ROOF, DO NOT EXCEED THE STRUCTURAL CAPACITY.
4. HANDLING
    A. PROTECT INTERIORS FROM THE ELEMENTS AND FOREIGN MATERIALS THROUGHOUT CONSTRUCTION.
    B. WHEN MOVING OR UNLOADING, PIPING AND/OR DUCTWORK SHALL NOT BE PLACED ON THE GROUND. PIPING AND/OR DUCTWORK SHALL BE PLACED DIRECTLY IN STORAGE VAS OR WITHIN THE BUILDING AS IT IS UNLOADED, NO EXCEPTIONS.
    C. DUCTWORK, PIPING, FITTINGS AND DEVICES SHALL BE MOVED ON CARTS OR DOLLIES.
    D. DUCTWORK THAT IS WRAPPED SHALL NOT BE DRAGGED ACROSS THE FLOOR (TO PREVENT DAMAGE OF SEALS)
5. FINAL CLEAN
    A. DUCTWORK SYSTEMS SHALL BE INSTALLED AT THE SITE TO MAINTAIN "SHOP" OR "MILL" (FREE OF MILL OIL) CONDITIONS. THE DUCTWORK SHALL BE CLEANED AS NECESSARY TO MAINTAIN THESE CONDITIONS.
    B. CLEANING SHALL BE PERFORMED USING A 20% ISOPROPYL ALCOHOL TO WIPE DOWN ALL INTERIOR SURFACES UPON INSTALLATION.
    C. INTERIOR SURFACES MUST BE DUST FREE AND EXTERIOR SURFACES MUST BE FREE OF FOREIGN SUBSTANCES
    D. COVER ALL ENDS OF INSTALLED DUCTWORK AT THE END OF EACH WORKDAY, OR WHEN WORK IS SUSPENDED FOR ANY LENGTH OF TIME (I.E. BREAKS, LUNCH, ETC.)
    E. THE CONTRACTOR SHALL INSURE ALL ENDS ARE COVERED ON BOTH STORED AND INSTALLED DUCTWORK.
    F. IF INSTALLED PRIOR TO ROOFING, PROTECT DUCTWORK FROM WATER INFILTRATION.

23 05 29 HANGERS AND SUPPORTS

1. HANGER AND SUPPORT INSTALLATION, COMPLY WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) CHAPTER 5, HANGERS AND SUPPORTS. BUILDING ATTACHMENTS: CONCRETE INSERTS, POWDER-ACTUATED FASTENERS, OR STRUCTURAL-STEEL FASTENERS APPROPRIATE FOR CONSTRUCTION MATERIALS TO WHICH HANGERS ARE BEING ATTACHED. WHERE PRACTICAL, INSTALL CONCRETE INSERTS BEFORE PLACING CONCRETE. INSTALL POWDER-ACTUATED CONCRETE FASTENERS AFTER CONCRETE IS PLACED AND COMPLETELY CURED. USE POWDER-ACTUATED CONCRETE FASTENERS FOR STANDARD-WEIGHT AGGREGATE CONCRETES OR FOR SLABS MORE THAN 4 INCHES (100 MM) THICK. DO NOT USE POWDER-ACTUATED CONCRETE FASTENERS FOR LIGHTWEIGHT-AGGREGATE CONCRETES OR FOR SLABS LESS THAN 4 INCHES (100 MM) THICK. DO NOT USE POWDER-ACTUATED CONCRETE FASTENERS FOR SEISMIC RESTRAINTS.

23 07 00 MECHANICAL INSULATION

1. MECHANICAL INSULATION
    A. SUPPLY AIR SERVICE: MIN. R-3.5 / 1.5" THICK FIBERGLASS BLANKET INSULATION WITH 1.5-LB DENSITY.
        a. OVERLAP UNFACED BLANKETS A MINIMUM OF 2-IN ON LONGITUDINAL SEAMS AND END JOINTS. AT END JOINTS, SECURE WITH STEEL BANDS SPACED MAX. 18-IN ON CENTER. INSTALL CONTINUOUSLY AND UNBROKEN OVER DUCT MOUNTED ACCESSORIES. INSTALL INSULATION ON ROUND DUCT ELBOWS WITH INDIVIDUALLY MITERED GORES CUT TO FIT THE ELBOW.
        b. INULATE DUCT STIFFENERS, HANGERS, AND FLANGES THAT PROTRUDE BEYOND INSULATION SURFACE WITH 6-IN WIDE STRIPS OF SAME MATERIAL. SECURE ON ALTERNATING SIDES WITH PINS SPACED 6-IN ON CENTER.
        c. DO NOT OVER-COMPRESS INSULATION DURING INSTALLATION.
    B. EXHAUST / RETURN AIR SERVICE: INSULATION NOT REQUIRED
    C. INSTALL CONTINUOUS UNBROKEN VAPOR BARRIER. CREATE A FACING LAP FOR LONGITUDINAL SEAMS AND END JOINTS WITH INSULATION BY REMOVING 2-IN. FROM 1 EDGE AND 1 END OF SEGMENT. SECURE LAPS TO ADJACENT INSULATION SECTION WITH 1/2-IN OUTWARD-CLINCHING STAPLES, 1-IN ON CENTER. COMPLETE THE VAPOR BARRIER BY APPLYING FSK TAPE OR VAPOR-BARRIER MASTIC AND SEALANT AT ALL JOINTS, SEAMS, AND PROTRUSIONS. REPAIR PUNCTURES, TEARS, AND PENETRATIONS WITH TAPE OR MASTIC TO MAINTAIN VAPOR BARRIER SEAL.

23 09 94 CONTRACTOR PROVIDED TEST & BALANCE

1. CONTRACTOR PROVIDED TEST AND BALANCE: AIR BALANCING OF EXISTING EXHAUST/VENTILATION SYSTEMS AND TERMINAL DEVICES INCLUDING VARIABLE VOLUME AND CONSTANT VOLUME BOXES. THIS PROJECT CONSIST OF A REMODEL OF EXISTING SPACES, THEREFORE THE TEST AND BALANCING SHALL INCLUDE EXISTING SYSTEMS AND MODIFICATIONS. PERFORM WORK UNDER THE SUPERVISION OF AN AABC CERTIFIED TEST AND BALANCE ENGINEER EXPERIENCED IN PERFORMANCE OF THIS WORK AND LICENSED AT THE UNIVERSITY OF MISSOURI - COLUMBIA. THE INDEPENDENT CONTRACTOR SHALL HAVE A PROVEN RECORD OF DOING TAB WORK FOR A PERIOD OF AT LEAST 3 YEARS. AT OWNER'S REQUEST, REFERENCES MAY BE REQUESTED FROM THE CONTRACTOR TO VERIFY PAST PERFORMANCE.

2. GENERAL TESTING AND BALANCING PROCEDURES: CUT INSULATION, DUCTS, PIPES AND EQUIPMENT CABINETS OF TEST PROBES TO THE MINIMUM EXTENT NECESSARY TO ALLOW ADEQUATE PERFORMANCE OF PROCEDURES. AFTER TESTING AND BALANCING, CLOSE PROBE HOLES AND PATCH INSULATION WITH NEW MATERIALS IDENTICAL TO THOSE REMOVED. RESTORE VAPOR BARRIER AND FINISH ACCORDING TO THE INSULATION SPECIFICATIONS FOR THIS PROJECT. MARK EQUIPMENT SETTINGS WITH PAINT OR OTHER SUITABLE, PERMANENT IDENTIFICATION MATERIAL, INCLUDING DAMPER-CONTROL POSITIONS, VALVE INDICATORS, FAN-SPEED-CONTROL LEVERS, AND SIMILAR CONTROLS AND DEVICES, TO SHOW FINAL SETTINGS.

3. FORM OF FINAL REPORTS - CONTRACTOR PROVIDED TEST AND BALANCE:
    A. INDICATE DEFICIENCIES IN SYSTEMS THAT WOULD PREVENT PROPER TESTING, ADJUSTING, AND BALANCING OF SYSTEMS AND EQUIPMENT TO ACHIEVE SPECIFIED PERFORMANCE.
    B. PRIOR TO COMMENCING WORK, SUBMIT REPORT FORMS OR OUTLINES INDICATING ADJUSTING, BALANCING, AND EQUIPMENT DATA REQUIRED.
    C. SUBMIT DRAFT COPIES OF REPORT FOR REVIEW PRIOR TO FINAL ACCEPTANCE OF PROJECT. PROVIDE FINAL COPIES FOR ARCHITECT/ENGINEER AND FOR INCLUSION IN OPERATING AND MAINTENANCE MANUALS.
    D. PROVIDE FOUR (4) COPIES OF REPORTS IN 3-RING BINDER MANUALS, COMPLETE WITH INDEX PAGE AND INDEXING TABS, WITH COVER IDENTIFICATION AT FRONT AND SIDE. INCLUDE SET OF REDUCED DRAWINGS WITH AIR OUTLETS AND EQUIPMENT IDENTIFIED TO CORRESPOND WITH DATA SHEETS, AND INDICATING THERMOSTAT LOCATIONS.
    E. AIR DATA: INCLUDE DESIGN AND ACTUAL VALUES FOR THE FOLLOWING
        a. AVERAGE ENTERING AIR, DRY-BULB AND WET-BULB, TEMPERATURE IN DEGREES FAHRENHEIT.
        b. AVERAGE LEAVING AIR, DRY-BULB AND WET-BULB, TEMPERATURE IN DEGREES FAHRENHEIT.
        c. AMBIENT TEMPERATURE, DRY-BULB AND WET-BULB, IN DEGREES FAHRENHEIT.
    F. INCLUDE DETAILED PROCEDURES, AGENDA, SAMPLE REPORT FORMS AND COPY OF AABC NATIONAL PROJECT PERFORMANCE GUARANTY PRIOR TO COMMENCING SYSTEM BALANCE.
    G. TEST REPORTS: INDICATE DATA ON AABC MN-1 FORMS.
    H. INCLUDE THE FOLLOWING IN EACH REPORT:
        a. TITLE PAGE.
        b. NAME, ADDRESS AND TELEPHONE NUMBER OF TESTING, ADJUSTING, AND BALANCING AGENCY.
        c. PROJECT NAME, NUMBER, AND LOCATION
        d. PROJECT ENGINEER AND CONTRACTOR NAME AND ADDRESS.
        e. REPORT DATE.
        f. SIGNATURE OF TESTING, ADJUSTING, AND BALANCING AGENT WHO CERTIFIES THE REPORT.
        g. SUMMARY OF CONTENTS, INCLUDING THE FOLLOWING:
            - DESIGN VERSUS FINAL PERFORMANCE.
            - NOTABLE CHARACTERISTICS OF SYSTEMS.
            - DESCRIPTION OF SYSTEM OPERATION SEQUENCE IF IT VARIES FROM THE CONTRACT DOCUMENTS.
        h. NOMENCLATURE SHEETS FOR EACH ITEM OF EQUIPMENT.
        i. NOTES TO EXPLAIN WHY CERTAIN FINAL DATA IN THE BODY OF REPORTS VARY FROM DESIGN VALUES.
        j. FAN CURVES

4. DUCT LAYOUT INDICATING SIZES, CONFIGURATION, AND STATIC-PRESSURE CLASSES.
    A. ELEVATION OF TOP OF DUCTS.
        - DIMENSIONS OF MAIN DUCT RUNS FROM BUILDING GRID LINES.
    B. REINFORCEMENT AND SPACING.
    C. SEAM AND JOINT CONSTRUCTION.
        - PENETRATIONS THROUGH FIRE-RATED AND OTHER PARTITIONS.
    D. EQUIPMENT INSTALLATION BASED ON EQUIPMENT BEING USED ON PROJECT.
    E. LOCATIONS FOR DUCT ACCESSORIES, INCLUDING DAMPERS, TURNING VANES, AND ACCESS DOORS AND PANELS.
    F. HANGERS AND SUPPORTS, INCLUDING METHODS FOR DUCT AND BUILDING ATTACHMENT AND VIBRATION ISOLATION.
    G. SHEET METAL THICKNESSES.
    H. JOINT AND SEAM CONSTRUCTION AND SEALING.
    I. REINFORCEMENT DETAILS AND SPACING.
    J. MATERIALS, FABRICATION, ASSEMBLY, AND SPACING OF HANGERS AND SUPPORTS.

23 31 13 METAL DUCTS

1. SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS TO COMPLY WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) BASED ON INDICATED STATIC-PRESSURE CLASS, APPLICABLE SEALING REQUIREMENTS, MATERIALS INVOLVED, DUCT SUPPORT INTERVALS AND OTHER PROVISIONS UNLESS OTHERWISE INDICATED. SELECT TYPES FOR EACH OF THE FOLLOWING FROM THE FIGURES IN SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) LISTED. TRANSVERSE JOINTS: SELECT JOINT TYPES AND FABRICATE ACCORDING TO FIGURE 2-1, "RECTANGULAR DUCT/TRANSVERSE JOINTS." LONGITUDINAL SEAMS: SELECT SEAM TYPES AND FABRICATE ACCORDING TO FIGURE 2-2, "RECTANGULAR DUCT/LONGITUDINAL SEAMS." TRANSITIONS, OFFSETS AND OTHER DUCT CONSTRUCTION: SELECT TYPES AND FABRICATE ACCORDING TO CHAPTER 4, "FITTINGS AND OTHER CONSTRUCTION. "SINGLE-WALL ROUND DUCTS AND FITTINGS TO COMPLY WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) CHAPTER 3, "ROUND, OVAL, AND FLEXIBLE DUCT," BASED ON INDICATED STATIC-PRESSURE CLASS, APPLICABLE SEALING REQUIREMENTS, MATERIALS INVOLVED AND OTHER PROVISIONS UNLESS OTHERWISE INDICATED., PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: LINDAB INC., MCGILL AIRFLOW LLC., SEMCO INCORPORATED.

2. COMPLY WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) FOR ACCEPTABLE MATERIALS, MATERIAL THICKNESSES, AND DUCT CONSTRUCTION METHODS UNLESS OTHERWISE INDICATED. SHEET METAL MATERIALS SHALL BE FREE OF PITTING, SEAM MARKS, ROLLER MARKS, STAINS, DISCOLORATIONS, AND OTHER IMPERFECTIONS, INCLUDING THOSE, WHICH WOULD IMPAIR PAINTING. GALVANIZED SHEET STEEL TO COMPLY WITH ASTM A 653/A 653M. COATING DESIGNATION: G60 (Z180).

3. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF DUCT SYSTEM. INDICATED DUCT LOCATIONS, CONFIGURATIONS, AND ARRANGEMENTS WERE USED TO SIZE DUCTS AND CALCULATE FRICTION LOSS FOR AIR-HANDLING EQUIPMENT SIZING AND FOR OTHER DESIGN CONSIDERATIONS. INSTALL DUCT SYSTEMS AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON SHOP DRAWINGS AND COORDINATION DRAWINGS. SIZES SHOWN ON DRAWINGS FOR RECTANGULAR DUCTS ARE AIR OPENING SIZES. INSTALL DUCTS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" UNLESS OTHERWISE INDICATED. FURNISH AND INSTALL ALL STEEL MEMBERS AND ACCESSORIES NECESSARY TO PROVIDE A COMPLETE AND FINISHED INSTALLATION. INSTALL ROUND DUCTS IN MAXIMUM PRACTICAL LENGTHS. INSTALL DUCTS WITH FEWEST POSSIBLE JOINTS. INSTALL FACTORY- OR SHOP-FABRICATED FITTINGS FOR CHANGES IN DIRECTION, SIZE, AND SHAPE AND FOR BRANCH CONNECTIONS. CONSTRUCT TEES, BENDS, AND ELBOWS WITH RADIUS MINIMUM 1-1/2 TIMES WIDTH OF DUCT ON CENTER LINE. USE RADIUS ELBOWS COMPLYING WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) FIGURE 4-2, "RECTANGULAR ELBOWS," OR FIGURE 3-4, "ROUND DUCT ELBOWS. "WHERE RADIUS ELBOWS DO NOT FIT IN THE SPACE AVAILABLE IN RECTANGULAR DUCT, PROVIDE SQUARE THROAT ELBOW COMPLYING WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) FIGURE 4-2, "RECTANGULAR ELBOWS," WITH SINGLE BLADE TYPE TURNING VANES COMPLYING WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) FIGURE 4-3, "VANES AND VANE RUNNERS," AND FIGURE 4-4, "VANE SUPPORT IN ELBOWS."

4. RECTANGULAR DUCT TO COMPLY WITH MECHANICAL DETAILS AND SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) FIGURE 4-2, "RECTANGULAR ELBOWS." VELOCITY 1500 FPM OR LOWER: RADIUS TYPE RE 1 WITH MINIMUM 1.5 RADIUS-TO-WIDTH RATIO. ONLY IF RADIUS ELBOWS DO NOT FIT IN THE SPACE AVAILABLE, MITERED TYPE RE 2 WITH VANES COMPLYING WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) FIGURE 4-3, "VANES AND VANE RUNNERS," AND FIGURE 4-4, "VANE SUPPORT IN ELBOWS," MAY BE USED. VELOCITY 1500 FPM NO GREATER THAN 12" IN WIDTH OR HEIGHT RADIUS TYPE RE 1 WITH MINIMUM 1.5 RADIUS TO DIAMETER RADIUS ELBOWS DO NOT FIT IN THE SPACE AVAILABLE, MITERED TYPE RE 2 WITH VANES COMPLYING WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) FIGURE 4-3, "VANES AND VANE RUNNERS," AND FIGURE 4-4, "VANE SUPPORT IN ELBOWS," MAY BE USED. RECTANGULAR DUCT: COMPLY WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) FIGURE 4-2, RECTANGULAR ELBOWS." FOR DUCTS NO GREATER THAN 12" IN WIDTH OR HEIGHT: RADIUS TYPE RE 1 WITH MINIMUM 1.5 RADIUS-TO-DIAMETER RATIO. RADIUS TYPE RE 3 WITH MINIMUM 1.0 RADIUS TO DIAMETER RATIO AND TWO VANES. ONLY IF RADIUS ELBOWS DO NOT FIT IN THE SPACE AVAILABLE, MITERED TYPE RE 2 WITH VANES COMPLYING WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) FIGURE 4-3, "VANES AND VANE RUNNERS," AND FIGURE 4-4, "VANE SUPPORT IN ELBOWS," MAY BE USED.

5. ROUND DUCT: COMPLY WITH MECHANICAL DETAILS AND SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) FIGURE 3-4, ROUND DUCT ELBOWS. MINIMUM RADIUS-TO-DIAMETER RATIO AND ELBOW SEGMENTS: COMPLY WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) TABLE 3-1, MITERED ELBOWS. ELBOWS WITH LESS THAN 90-DEGREE CHANGE OF DIRECTION HAVE PROPORTIONATELY FEWER SEGMENTS. RADIUS-TO DIAMETER RATIO: 1.5. ROUND ELBOWS, 12 INCHES AND SMALLER IN DIAMETER: STAMPED OR PLEATED.

6. TRANSITIONS IN DUCTWORK SHALL BE TAPERED TO AN ANGLE NOT TO EXCEED 15 DEGREES UNLESS DIMENSIONED OR APPROVED OTHERWISE. TRANSITIONS DOWNSTREAM OF TAKE-OFFS IN SUPPLY DUCTS SHALL OCCUR WITHIN ONE DUCT DIAMETER OF THE TAKE-OFF. PROVIDE OPENINGS IN DUCTWORK TO ACCOMMODATE THERMOMETERS AND CONTROLLERS. PROVIDE PITOT TUBE OPENINGS FOR TESTING OF SYSTEMS, COMPLETE WITH METAL CAN WITH SPRING DEVICE OR SCREW TO ENSURE AGAINST AIR LEAKAGE. WHERE OPENINGS PROVIDED IN INSULATED OR LINED DUCTWORK, INSTALL INSULATION MATERIAL INSIDE METAL RING. UNLESS OTHERWISE INDICATED, INSTALL DUCTS VERTICALLY AND HORIZONTALLY, AND PARALLEL AND PERPENDICULAR TO BUILDING LINES. THE COMPLETE INSTALLATION OF DUCT SYSTEMS SHALL PROVIDE A NEAT APPEARANCE, WITH DUCT RUNS HUNG LEVEL AND WITHOUT NOTICEABLE SAG OR MISALIGNMENT. LOCATE DUCTS WITH SUFFICIENT SPACE AROUND EQUIPMENT TO ALLOW NORMAL OPERATING AND MAINTENANCE ACTIVITIES TO THE GREATEST EXTENT POSSIBLE. INSTALL DUCTS CLOSE TO WALLS, OVERHEAD CONSTRUCTION, COLUMNS, AND OTHER STRUCTURAL AND PERMANENT ENCLOSURE ELEMENTS OF BUILDING. INSTALL DUCTS WITH A CLEARANCE OF 1 INCH (25 MM), PLUS ALLOWANCE FOR INSULATION THICKNESS.

7. ROUTE DUCTS TO AVOID PASSING THROUGH ELECTRICAL EQUIPMENT ROOMS AND ENCLOSURES. WHERE DUCTS PASS THROUGH NON-FIRE-RATED INTERIOR PARTITIONS AND EXTERIOR WALLS, THE SPACE BETWEEN THE DUCT AND THE OPENING SHALL BE CLOSED WITH A COMPACTED FILL OF 3/4 LB. DENSITY FIBERGLASS. WHERE EXPOSED TO VIEW, COVER THE OPENING BETWEEN THE PARTITION AND DUCT OR DUCT INSULATION WITH SHEET METAL FLANGES OF SAME METAL THICKNESS AS THE DUCT. OVERLAP OPENINGS ON FOUR SIDES BY AT LEAST 1-1/2 INCHES (38 MM). SEAL COLLARS AROUND DUCTWORK AND OPENING WITH SILICONE ELASTOMERIC SEALANT. PROTECT DUCT INTERIORS FROM MOISTURE, CONSTRUCTION DEBRIS AND DUST, AND OTHER FOREIGN MATERIALS. SEAL DUCTWORK AND ALL PLENUMS ACCORDING TO SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION).

8. DUCT SCHEDULE
    A. FABRICATE DUCTS WITH GALVANIZED SHEET STEEL PER SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION) EXCEPT AS INDICATED.
    B. SUPPLY DUCT PRESSURE CLASS:
        a. DUCTS BETWEEN VARIABLE-VOLUME AIR-HANDLING UNITS AND AIR OUTLETS: POSITIVE 2-INCH WG (500 PA) .
    C. INTERMEDIATE REINFORCEMENT:
        1. GALVANIZED-STEEL DUCTS: GALVANIZED STEEL.

23 33 00 DUCT ACCESSORIES

1. REMOTE DAMPER OPERATORS: 9-VOLT ELECTRONIC REMOTE DAMPER OPERATOR DESIGNED FOR REMOTE VOLUME DAMPER ADJUSTMENT; REQUIRED ACCESSORY FOR MANUAL VOLUME DAMPERS INSTALLED ABOVE AN INACCESSIBLE CEILING. INSTALL IN ACCORDANCE WITH MANUFACTURER-FURNISHED INSTRUCTIONS. CONTRACTOR TO PROVIDE CONTROLLER AND ASSOCIATED ACCESSORIES.
    A. WALL-BOX MOUNTING:
        a. MOUNTING: RECESSED ON WALL AT 48" AFF.
        b. COVER PLATE MATERIAL: STAINLESS STEEL
        c. CONSTRUCTION: ANTI-LIGATURE / TAMPER-PROOF

ABBREVIATIONS

A	AIR OR AMP (PER CONTEXT)
ACC	ACCESSORIES
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AFS	AIR FLOW SWITCH
AHRI	AIR CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE
AI	ANALOG SIGNAL INPUT
AMB	AMBIENT
AO	ANALOG SIGNAL OUTPUT
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
APLV	APPLICATION PART LOAD VALUE
APPROX	APPROXIMATE
ARCH	ARCHITECTURE/ARCHITECT
AUX	AUXILIARY
AV	AUTOMATIC VENT
AVG	AVERAGE
BDD	BACK DRAFT DAMPER
BFC	BELOW FINISHED CEILING
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BI	BINARY SIGNAL INPUT
BMS	BUILDING MANAGEMENT SYSTEM
BO	BINARY SIGNAL OUTPUT
BOB	BOTTOM OF BEAM
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BS	BEAM SPACE
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNITS PER HOUR
BWE	BAKED WHITE ENAMEL
CAP	CAPACITY
CAV	CONSTANT AIR VOLUME
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CI	CAST IRON
CLG	COOLING DUCT (COLD DUCT)
CO	CLEAN OUT
COMP	COMPRESSOR
CONC	CONCRETE
COND	CONDENSATE
CONN	CONNECTION
CORR	CORRIDOR
CV	CONTROL VALVE
D	DEPTH
DB	DRY BULB
DBA	A-WEIGHTED DECIBELS
DEFL	DEFLECTION
DEG	DEGREES
DEG F	DEGREES FAHRENHEIT
DES	DESIGN
DIA	DIAMETER
DIM	DIMENSION
DISCH	DISCHARGE
DIV	DIVISION
DN	DOWN
DP	DIFFERENTIAL PRESSURE SENSOR
DPS	DIFFERENTIAL PRESSURE SWITCH
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
DTL	DETAIL
DWG(S)	DRAWING(S)
EA	EXHAUST AIR OR EACH (PER CONTEXT)
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENT RATIO
EFF	EFFICIENCY
ELEC	ELECTRIC
ELEV	ELEVATION
EQ	EQUAL
ESP	EXTERNAL STATIC PRESSURE
EWB	ENTERING AIR WET BULB TEMPERATURE
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
(E)	EXISTING
EXT	EXTERNAL
F	FAHRENHEIT
F&T	FLOAT AND THERMOSTATIC
FC	FLEXIBLE CONNECTION
FLR	FLOOR
FPF	FINS PER FOOT
FPM	FEET PER MINUTE
FS	FLOW SWITCH
FT	FEET
FT-HD	HEAD IN FEET
GA	GAUGE
GAL	GALLONS
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
HD	HEAD
HP	HORSEPOWER
HVAC	HEATING, VENTILATING & AIR CONDITIONING
HW	HOT WATER
IN	INCH/INCHES
KW	KILOWATTS
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LVL	LEVEL
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MCA	MINIMUM CIRCUIT AMPS
MFR	MANUFACTURER
MIN	MINIMUM OR MINUTE (PER CONTEXT)
NC	NORMALLY CLOSED OR NOISE CRITERIA
NO	NORMALLY OPEN OR NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OA	OUTSIDE AIR
PD	PRESSURE DROP
PH	PHASE
QTY	QUANTITY
RA	RETURN AIR
REQ	REQUIRED
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SH	SENSIBLE HEAT
SP	STATIC PRESSURE
TC	TEMPERATURE CONTROL
TEMP	TEMPERATURE
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UC	UNDERCUT DOOR
UNO	UNLESS NOTED OTHERWISE
V	VOLTS
VFD	VARIABLE FREQUENCY DRIVE
W	WATT OR WIDTH (PER CONTEXT)
WB	WET BULB
WC	WATER COLUMN

DUCT SYSTEM SYMBOLS

MECHANICAL SYMBOLS

GENERAL NOTES

A. THESE PLANS ARE DIAGRAMMATIC IN NATURE. THE CONTRACTOR SHALL BE PREPARED TO MAKE SOME ALTERATIONS TO THE EXACT LOCATION OF DUCTWORK, PIPING AND EQUIPMENT FROM THE LOCATION INDICATED ON THESE DRAWINGS TO FIT ACTUAL JOB CONDITIONS.

B. ALL ELBOWS, FITTINGS, ETC., IN PIPING AND DUCTWORK REQUIRED TO CLEAR ALL JOB OBSTRUCTIONS ARE NOT NECESSARILY INDICATED. ALL NECESSARY TRANSITIONS, FITTINGS AND OFFSETS ARE REQUIRED WHETHER SHOWN OR NOT.

C. BECAUSE OF THE LIMITED SPACE AVAILABLE TO INSTALL ALL OF THE MECHANICAL WORK, COORDINATION BETWEEN THE VARIOUS TRADES IS OF THE UTMOST IMPORTANCE. SEE SPECIFICATION 230100 FOR REQUIRED COORDINATION DRAWINGS.

D. THE CONTRACTOR SHALL COORDINATE STAGING AND SCHEDULING WITH THE OWNER'S REPRESENTATIVE.

E. EXISTING CONDITIONS ARE BASED ON INFORMATION OBTAINED FROM PREVIOUS CONSTRUCTION DOCUMENTS AND INFORMAL FIELD OBSERVATION AND SHALL NOT BE CONSTITUTED AS "AS BUILT." THE CONTRACTOR SHALL FIELD-VERIFY EXISTING CONDITIONS BEFORE THE ONSET OF CONSTRUCTION.

F. DEMOLISH ALL PIPING, DUCTWORK EQUIPMENT, ETC., SHOWN TO BE REMOVED, IN ITS ENTIRETY, INCLUDING ALL HANGERS AND SUPPORTS.

G. WHERE CONTRACTOR IS REQUIRED TO CONCEAL NEW WORK, REMOVE OR MODIFY EXISTING CONSTRUCTION OR EQUIPMENT, OR ATTACH TO EXISTING CONSTRUCTION, THE CONTRACTOR SHALL REPAIR OR REPLACE EXISTING CONSTRUCTION AND MATERIALS TO MATCH CONDITIONS AT THE ONSET OF CONSTRUCTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REMOVE AND REPLACE EXISTING CEILINGS AND WALLS REQUIRED FOR INSTALLATION OF MECHANICAL SYSTEMS.

H. ALL WORK SHALL BE INSTALLED PER THE REFERENCE DETAILS, REGARDLESS OF WHETHER OR NOT THE DETAILS ARE CALLED OUT ON THE PLANS.

I. DO NOT SCALE THE LOCATION OF HVAC CEILING ELEMENTS, SUCH AS AIR INLETS AND OUTLETS, FROM THE M-SERIES DRAWINGS. SEE ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT HVAC CEILING ELEMENT LOCATIONS. REFLECTED CEILING PLANS GOVERN THE LOCATION OF DIFFUSERS, REGISTERS, AND GRILLES. M-SERIES DRAWINGS GOVERN TYPE, STYLE, AND SIZE OF DIFFUSERS, REGISTERS, AND GRILLES.

J. IT SHOULD BE NOTED THAT SOME SYSTEMS (I.E. GENERAL AND ISOLATION EXHAUST) ARE REQUIRED TO BE BALANCED MORE THAN ONCE TO ASSURE DESIGN AIRFLOWS ARE PROVIDED.

K. THESE PLANS ARE DIAGRAMMATIC IN NATURE. THE CONTRACTOR SHALL BE PREPARED TO MAKE SOME ALTERATIONS TO THE EXACT LOCATION OF DUCTWORK, PIPING AND EQUIPMENT FROM THE LOCATION INDICATED ON THESE DRAWINGS TO FIT ACTUAL JOB CONDITIONS.

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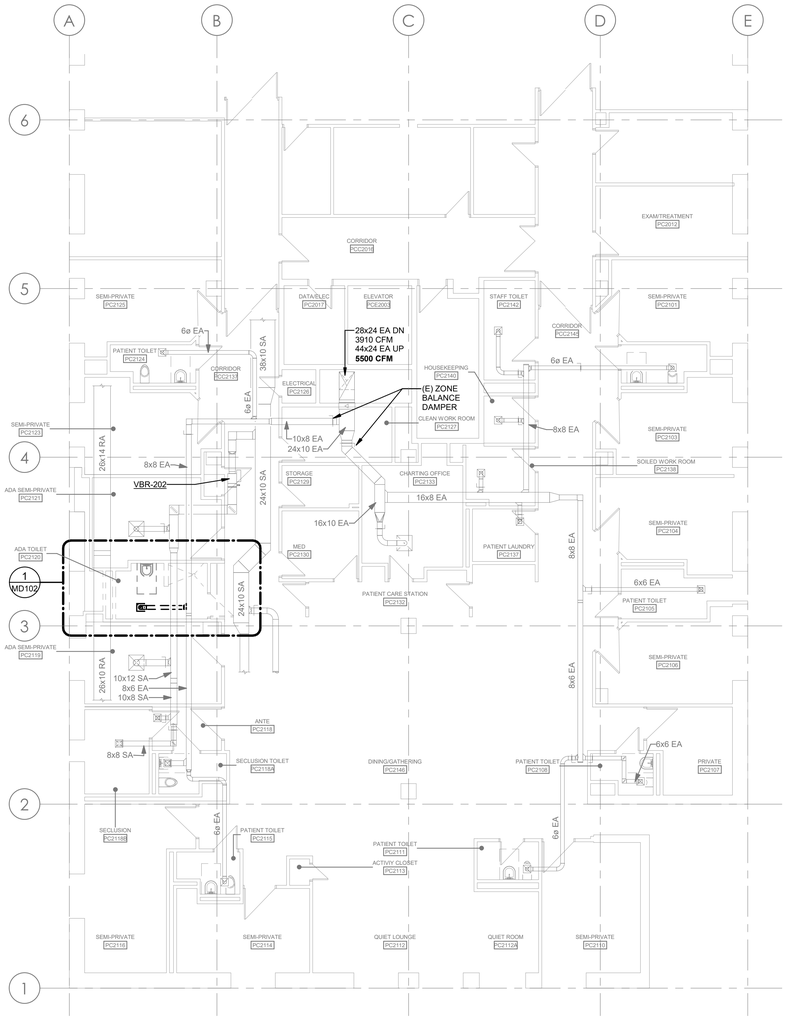
M000
MECHANICAL LEGEND AND SPECIFICATIONS

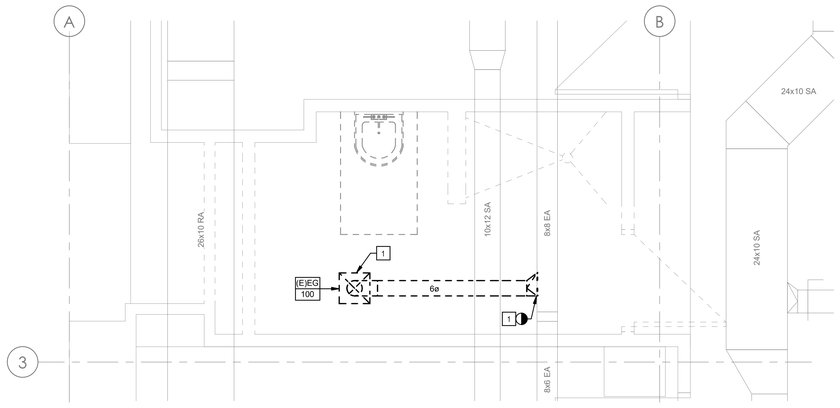
BID DOCUMENTS

KEYED NOTES

1. DEMOLISH EXHAUST AIR DEVICE AND ASSOCIATED BRANCH DUCTWORK AND ACCESSORIES AS SHOWN. PREPARE DUCT MAIN FOR NEW CONNECTION. SEE SHEET M102 FOR RELATED WORK.



2 **MECHANICAL HVAC DEMOLITION PLAN - LEVEL 2 FLOOR PLAN**
1/8" = 1'-0"



1 **MECHANICAL ENLARGED DEMOLITION PLAN**
1/2" = 1'-0"

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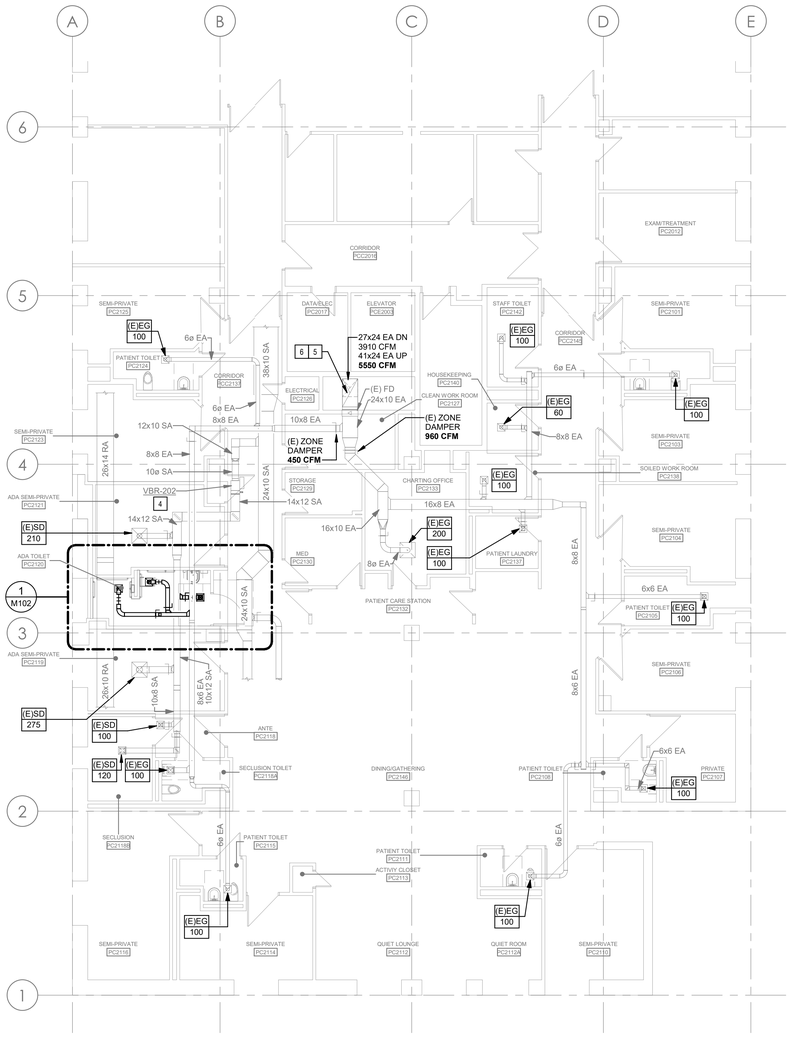
MD102
MECHANICAL DEMOLITION PLAN - LEVEL 2 FLOOR PLAN

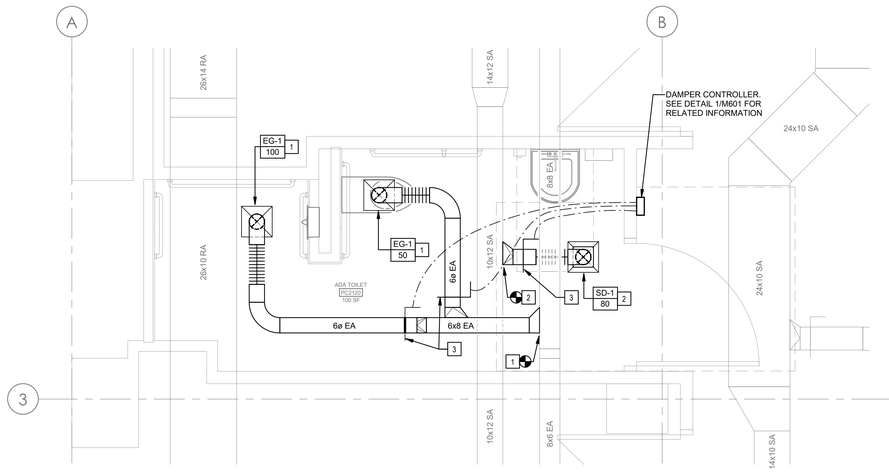
BID DOCUMENTS

KEYED NOTES

1. MODIFY EXISTING EXHAUST DUCT MAIN PENETRATION AS REQUIRED TO INSTALL NEW EXHAUST BRANCH DUCT CONNECTION. INSTALL ASSOCIATED AIR DEVICES AND ACCESSORIES AND BALANCE TO THE AIRFLOWS SHOWN.
2. PROVIDE NEW SUPPLY AIR BRANCH CONNECTION AND ASSOCIATED AIR DEVICE AND ACCESSORIES AND BALANCE TO THE AIRFLOW SHOWN.
3. PROVIDE REMOTE OPERATED ELECTRONIC 9V BALANCING DAMPER. THE DAMPER CONTROLLER SHALL BE WALL MOUNTED IN THE ADJACENT CORRIDOR WITH A STAINLESS STEEL, ANTI-LIGATURE FACE PLATE. SEE DETAIL 1/M601 FOR RELATED INFORMATION.
4. REBALANCE EXISTING AIR TERMINAL UNIT TO THE PERFORMANCE VALUES AS SHOWN IN THE MECHANICAL SCHEDULES ON SHEET M601.
5. THE DIFFUSER AND ZONE AIRFLOWS SHOWN ARE FOR REFERENCE ONLY. REBALANCE THE LEVEL 2 GENERAL EXHAUST SYSTEM PER THE AIRFLOWS DETERMINED DURING PRE-CONSTRUCTION TEST AND BALANCE AND THE MODIFICATIONS MADE AS PART OF THE SCOPE OF THIS PROJECT.
6. REBALANCE EXISTING EXHAUST FAN E-3 TO THE OPERATING VALUES AS SHOWN IN THE MECHANICAL SCHEDULES ON SHEET M601.



2 **MECHANICAL DESIGN PLAN - LEVEL 2 FLOOR PLAN**
1/8" = 1'-0"



1 **MECHANICAL ENLARGED DESIGN PLAN**
1/2" = 1'-0"

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M102

MECHANICAL DESIGN PLAN - LEVEL 2 FLOOR PLAN

BID DOCUMENTS

FAN SCHEDULE

MARK	LOCATION	SERVICE	MANUFACTURER	TYPE	MODEL	(E) DESIGN CFM	OPERATING CFM	(E) DESIGN ESP (IN)	OPERATING ESP (IN)	DRIVE (BELT/DIRECT)	MOTOR HP	(E) DESIGN FAN RPM	OPERATING FAN RPM	VFD (Y/N)	ELECTRICAL V/PH	NOTES
EXISTING																
E-3	MPC ROOF (SOUTH)	MPC SOUTH GEN EA	CLARAGE FAN CO.	UTILITY SET	5330	7625	6650	1.00	1.25	BELT	5	1825	1188	-	208/3	1, 2
REBALANCE																
E-3	MPC ROOF (SOUTH)	MPC SOUTH GEN EA	CLARAGE FAN CO.	UTILITY SET	5330	7625	**6700**	1.00	**NOTE 3**	BELT	5	1825	**NOTE 3**	-	208/3	1, 3, 4

NOTES:
1 EXISTING EXHAUST FAN DESIGN VALUES SHOWN ARE DERIVED FROM EXISTING DRAWINGS AND PROVIDED FOR REFERENCE ONLY.
2 EXISTING EXHAUST FAN OPERATING VALUES SHOWN ARE DERIVED FROM THE PRE-DESIGN TEST AND BALANCE SURVEY.
3 REBALANCE EXHAUST FAN TO THE AIRFLOW SHOWN.
4 VALUE TO BE DETERMINED DURING FINAL TEST & BALANCE OF THE ASSOCIATED EXHAUST SYSTEM AS REQUIRED TO PROVIDE THE MODIFIED AIRFLOW SHOWN.

VARIABLE AIR VOLUME TERMINAL UNIT - HYDRONIC HEAT

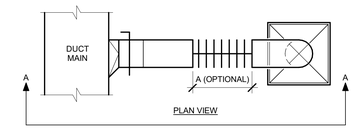
MARK	AHU NO.	SERVICE	MANUFACTURER	MODEL	INLET SIZE IN	OUTLET SIZE W" x H"	MAX COOLING CFM	MIN HEATING & COOLING CFM	HEATING COIL EAT	HEATING COIL LAT	HEATING COIL MBH	HEATING COIL EWT	HEATING COIL LWT	HEATING COIL GPM	HEATING COIL ROW	HEATING COIL WPD (FT)	CONTROL TRANSFORMER IN V/PH	CONTROL TRANSFORMER OUT VDC	NOTES
EXISTING																			
VBR-202	1	PC2118B / PC2118 / PC2119 / PC2121	TITUS	DESV	10	14 x 12	710	315	55.0	91.0	12.4	180.0	155.0	1.0	1	0.2	115/1	24	1
REBALANCE																			
VBR-202	1	PC2118B / PC2118 / PC2119 / PC2121 / **PC2120**	TITUS	DESV	10	14 x 12	**800**	**375**	55.0	91.0	**14.4**	180.0	155.0	**1.2**	1	0.2	115/1	24	1

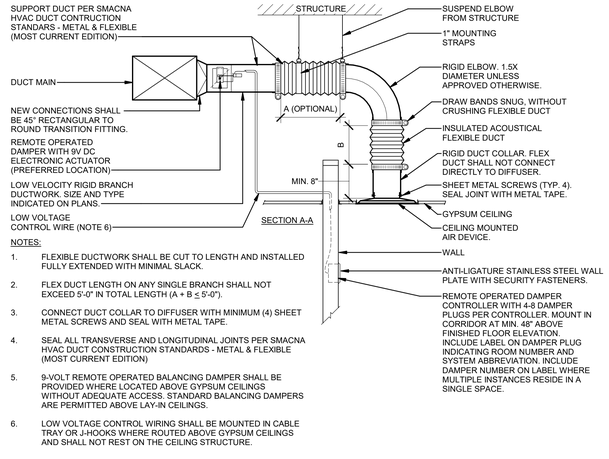
NOTES:
1 REBALANCE EXISTING AIR TERMINAL UNIT AND ASSOCIATED CONTROLS AS SHOWN.

DIFFUSER , REGISTER AND GRILLE SCHEDULE

MARK	MOUNTING LOCATION	SERVICE	MANUFACTURERS	MODEL	TYPE	FACE SIZE (IN)	NECK SIZE (IN)	MAX. NC	MAX. PRESS. DROP IN-WC	NOTES
SD-1	GYPSUM CEILING	SUPPLY	KEES	SDPC	ANTI-LIGATURE	12 x 12	8 x 8	30	0.1	1-8, 10
EG-1	GYPSUM CEILING	EXHAUST	KEES	SEG-13P	ANTI-LIGATURE	16 x 16	8 x 8	30	0.1	1-4, 7-10

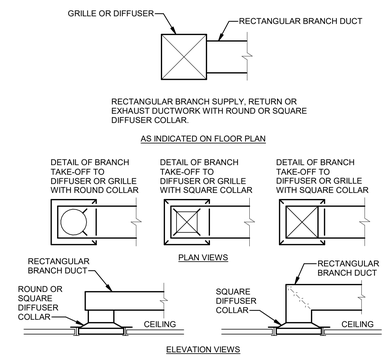
NOTES:
1 STEEL CONSTRUCTION
2 THE AIR DEVICE SHALL BE ANTI-LIGATURE & SUICIDE PREVENTION TYPE. SELECTION SHALL MEET OR EXCEED THE SCHEDULED BOD PERFORMANCE & CONSTRUCTION.
3 FINISH - BAKED ENAMEL FINISH, WHITE TO MATCH CEILING COLOR.
4 FRAME TYPE TO MATCH CEILING CONSTRUCTION, COORDINATE WITH ARCHITECTURAL REFLECTED CEILING PLAN.
5 4-WAY THROW PATTERN UNLESS OTHERWISE SHOWN ON DRAWINGS.
6 **ANTI-LIGATURE DIFFUSERS SHALL BE PROVIDED WITH CURVED BLADE PATTERN CONTROLLERS AND A FACE MOUNTED 18 GA. PERFORATED SECURITY PLATE BY THE MANUFACTURER.**
7 BRANCH DUCT SIZE SHALL BE SAME AS NECK SIZE UNLESS OTHERWISE SHOWN ON DRAWINGS.
8 PROVIDE NECK AND/OR TRANSITION FOR DUCT CONNECTION AS REQUIRED.
9 PROVIDE BORDER TYPE TO MATCH CEILING CONSTRUCTION WITH CONCEALED MOUNTING.
10 ANIT-LIGATURE RETURN / EXHAUST GRILLES SHALL BE PROVIDED WITH A PERFORATED BACKER BY THE MANUFACTURER.



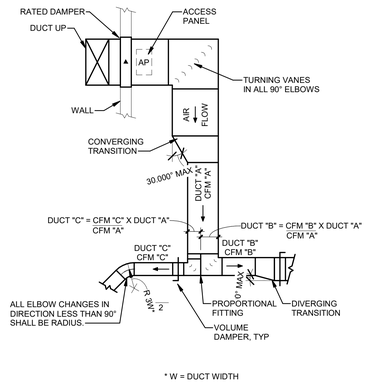


NOTES:
1. FLEXIBLE DUCTWORK SHALL BE CUT TO LENGTH AND INSTALLED FULLY EXTENDED WITH MINIMAL SLACK.
2. FLEX DUCT LENGTH ON ANY SINGLE BRANCH SHALL NOT EXCEED 5'-0" IN TOTAL LENGTH (A + B ≤ 5'-0").
3. CONNECT DUCT COLLAR TO DIFFUSER WITH MINIMUM (4) SHEET METAL SCREWS AND SEAL WITH METAL TAPE.
4. SEAL ALL TRANSVERSE AND LONGITUDINAL JOINTS PER SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE (MOST CURRENT EDITION)
5. 9-VOLT REMOTE OPERATED BALANCING DAMPER SHALL BE PROVIDED WHERE LOCATED ABOVE GYPSUM CEILINGS WITHOUT ADEQUATE ACCESS. STANDARD BALANCING DAMPERS ARE PERMITTED ABOVE LAY-IN CEILINGS.
6. LOW VOLTAGE CONTROL WIRING SHALL BE MOUNTED IN CABLE TRAY OR J-HOOKS WHERE ROUTED ABOVE GYPSUM CEILINGS AND SHALL NOT REST ON THE CEILING STRUCTURE.

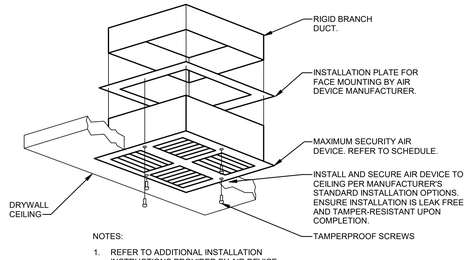
1 **BRANCH DUCT CONNECTION TO AIR OUTLET/INLET WITH REMOTE OPERATED DAMPER**
NTS



3 **RIGID DUCTWORK CONNECTION TO AIR OUTLET/INLET**
NTS



2 **TYPICAL DUCTWORK DETAIL**
1/4" = 1'-0"



NOTES:
1. REFER TO ADDITIONAL INSTALLATION INSTRUCTIONS PROVIDED BY AIR DEVICE MANUFACTURER.

4 **MAXIMUM SECURITY AIR DEVICE DETAIL (CEILING)**
NTS

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01/13/2022
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Issue Date: 01.13.2022

Issue:	Date:

Drawn by: JAD
MU Project #: CP212341

M601
MECHANICAL SCHEDULES

BID DOCUMENTS

ELECTRICAL SPECIFICATIONS:

REFER TO DIVISION 1 FOR ADDITIONAL REQUIREMENTS

260500 COMMON WORK RESULTS FOR ELECTRICAL

1. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID TO BE FAMILIARIZED WITH THE PROJECT AND ALL ASPECTS OF THE WORK TO BE PERFORMED.
2. ALL WORK SHALL CONFORM TO AND COMPLY WITH APPLICABLE BUILDING CODES: REFER TO ARCHITECTURAL COVER SHEET FOR A LIST OF CODES BEING USED ON THIS PROJECT. NOTE: CONTRACTOR SHALL ALSO VERIFY WITH LOCAL AUTHORITY HAVING JURISDICTION AND LOCAL FIRE MARSHAL FOR ANY REQUIREMENTS NOT LISTED IN REQUIRED CODES AND REFERENCES.
3. INSTALL ALL WORK IN A NEAT AND WORKMANLIKE MANNER.
4. GUARANTEE THE WORK FOR A PERIOD OF ONE YEAR.
5. SEISMICALLY BRACE ALL ELECTRIC WORK AS REQUIRED BY THE APPROPRIATE BUILDING CODE AND BY THE REQUIREMENTS OF THE LOCAL AUTHORITIES.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL PERMITS INCLUDING ARRANGING ALL INSPECTIONS REQUIRED FOR THE WORK TO BE UNDERTAKEN AND ACCEPTED.
7. CUT ALL SURFACES AS REQUIRED FOR THE INSTALLATION AND PATCH TO MATCH EXISTING CONDITIONS AND FINISH.
8. ALL MATERIALS AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE TESTED AND LISTED BY UNDERWRITERS LABORATORIES (UL).
9. ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED PER NEMA STANDARDS, APPLICABLE ANSI STANDARDS AND IEEE STANDARDS.
10. ALL TESTING SHALL BE IN ACCORDANCE WITH THE APPLICABLE INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA) STANDARDS.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL CONNECTIONS TO ALL EQUIPMENT REQUIRING POWER.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING SHOP DRAWINGS, PRODUCT DATA AND WIRING DIAGRAMS AS REQUIRED BY EACH SECTION. PRODUCT DATA SHALL BE MARKED TO IDENTIFY THE EXACT MODEL NUMBER AND OPTIONS THAT ARE TO BE PROVIDED. SHOP DRAWINGS SHALL BE SUBMITTED ELECTRONICALLY TO THE ARCHITECT FOR ENGINEER'S APPROVAL. ONCE THE ENGINEER RECEIVES THE SUBMITTAL, THE REVIEW PROCESS WILL REQUIRE FIVE (5) BUSINESS DAYS.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL CLEANING OF EQUIPMENT INSTALLED.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEMOLITION OF EXISTING ELECTRICAL EQUIPMENT TO BE REMOVED. ALL MATERIALS SHALL BE REMOVED FROM SITE AND DISPOSED OF PROPERLY BY CONTRACTOR.
15. ALL PENETRATIONS THROUGH FIRE WALLS SHALL BE PROPERLY FIRE SEALED TO CONFORM WITH UL SYSTEM NUMBERS AS LISTED IN VOLUME 2 OF THE UL FIRE RESISTANCE DIRECTORY FOR EACH DIFFERENT INTENDED PROJECT APPLICATION, SUCH AS CABLE TRAY PENETRATION AND CONDUIT PENETRATIONS.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ACCESS DOORS AND FRAMES AT LOCATIONS OF EQUIPMENT REQUIRING ACCESS WHICH IS CONCEALED IN WALLS OR CEILINGS.

260533 RACEWAYS

1. UNLESS NOTED OTHERWISE, USE EMT CONDUIT WITH STEEL COMPRESSION FITTINGS.
2. THE MINIMUM SIZE OF CONDUIT SHALL BE 3/4".
3. ALL RACEWAY SHALL BE CONCEALED UNLESS OTHERWISE NOTED.
4. HEAVY GAUGE RIGID OR IMC CONDUIT MAY BE USED IN LIEU OF ANY OF THE ABOVE.
5. HEAVY GAUGE RIGID OR IMC CONDUIT SHALL BE UTILIZED WHEN EXPOSED AND SUBJECT TO PHYSICAL DAMAGE OR WITHIN 7'-0" OF FINISHED FLOOR.
6. FLEXIBLE METAL CONDUIT SHALL BE USED FOR THE FINAL CONNECTIONS TO ROTATING MACHINERY, VIBRATING EQUIPMENT AND LIGHTING FIXTURES. 3/8" SIZE IS ALLOWED FOR CONNECTIONS TO LIGHTING FIXTURES. USE LIQUIDTIGHT FOR OUTDOOR USE OR FOR CONNECTIONS TO MOTORS OR EQUIPMENT IN AREAS WHERE THE RUPTURE OF A PIPE COULD MAY LEAK ON THE CONDUIT, SUCH AS IN MECHANICAL ROOMS.
7. PROVIDE PULL AND JUNCTION BOXES AS REQUIRED.
8. ALL OUTLET BOXES SHALL BE 4" SQUARE OR 4-11/16" SQUARE, GALVANIZED METAL. INSTALL TRUE AND PLUMB WITH THE BUILDING FINISH. INSTALL SECURELY AND INDEPENDENT OF RACEWAY. PROVIDE SINGLE OR MULTIGANG RINGS AS REQUIRED. LIGHTING FIXTURE BOXES MAY BE 4" OCTAGONAL.
9. INSTALL ALL RACEWAYS PARALLEL AND PERPENDICULAR TO THE BUILDING WALLS, FLOOR AND CEILING.
10. ALL BOXES FOR RECEPTACLES, TELEPHONE AND DATA OUTLETS SHALL BE MINIMUM 3-1/8" DEEP. ALL BOXES FOR SWITCHES, LOCAL LIGHT CONTROL, AND RECESSED LIGHT FIXTURES TO BE MINIMUM 1-1/2" DEEP.
11. ALL RACEWAY SHALL BE INDEPENDENTLY SUPPORTED FROM THE STRUCTURE USING APPROVED CLAMPS, RODS, FITTINGS, ETC. DO NOT SUPPORT FROM HUNG CEILING WIRES OR THE WORK OF OTHER TRADES. SUPPORT AT INTERVALS AS REQUIRED BY NEC.

260519 CONDUCTORS AND CABLE

1. ALL WIRE AND CABLE SHALL HAVE COPPER CONDUCTORS
2. USE NEC TYPE THHN/THWN OR XHHW INSULATION
3. USE MINIMUM #12 AWG SIZE. #14 AWG MAY BE USED FOR CONTROL WIRING. FOR OTHER SYSTEM, USE WIRING AS NOTED ON THE DRAWINGS AND AS RECEOMMENDED BY THE SYSTEM MANUFACTURER.

265100 LED LIGHTING

1. PROVIDE MANUFACTURERS PRODUCT DATA CUT SHEET SUBMITTALS FOR ENGINEERS AND ARCHITECTS APPROVAL FOR ALL LUMINAIRES.
2. LUMINAIRE TYPES ARE AS SCHEDULED OR NOTED. REFER TO LUMINAIRE SCHEDULE AND LEGENDS ON ELECTRICAL AND ARCHITECTURAL DRAWINGS.
3. PROVIDE LUMINAIRES WITH THE NECESSARY FRAMES, FLANGES, FITTINGS, ETC. AS REQUIRED FOR INSTALLATION IN OR ON THE CEILING OR SURFACE IN OR ON WHICH THEY ARE TO BE INSTALLED AND TO ELIMINATE LIGHT LEAKAGE. CATALOG NUMBERS DO NOT NECESSARILY REFLECT THE TYPE OF CEILING IN WHICH THE FIXTURE IS TO BE INSTALLED.
4. COORDINATE FINAL LOCATIONS OF LUMINAIRES IN THE FIELD WITH ARCHITECTURAL REFLECTED CEILING PLANS AND EXISTING CEILING DEVICES TO REMAIN.
5. INSTALL LUMINAIRES WITH INDEPENDENT WIRES SUPPORTED FROM THE STRUCTURE AND WITH SCREWS SECURED TO THE CEILING TEE FOR SEISMIC SUPPORT. CONFORM TO THE SPECIFIC REQUIREMENTS OF LOCAL AUTHORITIES.

283111 FIRE ALARM SYSTEM

1. EXISTING FIRE ALARM DEVICES TO BE DISCONNECTED, REMOVED AND REINSTALLED IN NEW CEILING AS REQUIRED.
2. MODIFY FIRE ALARM CONDUIT AND WIRING AS REQUIRED PER MANUFACTURE REQUIREMENTS.
3. PERFORM REACCEPTANCE TESTING OF FIRE ALARM SYSTEM IN ACCORDANCE WITH NFPA 72 CHAPTER 14 AND LOCAL AUTHORITIES HAVING JURISDICTION.

FIRE ALARM SYSTEM

1. EXISTING CEILING MOUNTED FIRE ALARM DEVICE TO REMAIN.

NURSE CALL SYSTEMS

RESPONSIBILITIES: BACKBOXES AND CONDUITS: CONTRACTOR FURNISHED, INSTALLED
INTERCONNECTION WIRING AND TERMINATIONS: OWNER FURNISHED, INSTALLED
DEVICES: CONTRACTOR FURNISHED, INSTALLED
HEAD-END EQUIPMENT: OWNER FURNISHED, INSTALLED

1. REFER TO ARCHITECTURAL ELEVATIONS FOR EXACT MOUNTING HEIGHTS AND LOCATIONS. WHERE ELEVATIONS DO NOT SPECIFY, MOUNT DEVICES AS INDICATED.

NB EMERGENCY CALL BUTTON: EXISTING

ACCESS CONTROL SYSTEMS

KS KEYSWITCH : WALL MOUNT AT +48" A.F.F.

PUSHBUTTON : +48" A.F.F. OR AS NOTED

LIGHTING FIXTURES

1. "NL" INDICATES UNSWITCHED LUMINAIRE
2. WHERE TWO OR MORE SWITCHES ARE SHOWN ADJACENT TO EACH OTHER, PROVIDE A COMMON GANG BOX WITH A SINGLE, SEAMLESS FACEPLATE.

NO SHADING: NORMAL POWER

HALF-SHADING: LIFE-SAFETY

FULL-SHADING : CRITICAL

NOTE THAT THE SIZE AND SHAPE OF FIXTURES AND ASSOCIATED HALF-SHADING VARY BY FIXTURE TYPE

LIGHTING CONTROLS

LC0 CONTROL SCHEME TAG
REFER TO LIGHTING CONTROL SCHEDULE

ROOM NAME 101 LC0 — ROOM TAG; CONTROL SCHEME TAG

$ SWITCH
WALL-MOUNTED
FUNCTION IS INDICATED BY SUBSCRIPT(S)

$x — SUBSCRIPT

SUBSCRIPT LEGEND:
3 : 3-WAY SWITCH
4 : 4-WAY SWITCH
D : DIMMER
a, b, ... : LOWERCASE SUBSCRIPT INDICATES SWITCH LEG

DRAWING REFERENCES

1 TITLE / SCALE — PLAN DETAIL REFERENCE TITLE

— KEYED NOTE DESIGNATION

PLAN NORTH / TRUE NORTH — NORTH ARROW

AHU 1 — PLAN MARK; EQUIPMENT DESIGNATION REFER TO MEP SCHEDULE FOR CIRCUITING AND DEVICE REQUIREMENTS AND FLOOR PLANS FOR LOCATIONS; EQUIPMENT NUMBER

1 A101 SIM — PLAN MARK; ENLARGED PLAN REFERENCE; SHEET NUMBER

1 AD886 — SECTION

INTERFACE, EXISTING TO NEW

EXTENT OF DEMOLITION

MATCHLINE

1 REVISION TAG

LINE TYPE LEGEND

EXISTING TO REMAIN OR NEW WORK BY OTHERS (LIGHT, SOLID LINE)

NEW WORK BY THIS CONTRACTOR (DARK, SOLID LINE)

EXISTING TO BE REMOVED BY THIS CONTRACTOR (DARK, DASHED LINE, DEMOLITION PLANS)

WIRING DEVICES

START/STOP, MOMENTARY CONTACT PUSHBUTTON SWITCH

RECEPTACLES (NEMA 5-20 R, HOSPITAL GRADE, TAMPER-RESISTANT)

RECESSED SIMPLEX

RECESSED DUPLEX

GFI RECESSED DUPLEX

RECESSED QUAD

J JUNCTION BOX

E ELECTRICAL CONNECTION

JUNCTION AND PULL BOXES

SHADING INDICATES EMERGENCY POWER

J JUNCTION BOX : CEILING OR FLOOR MOUNTED. SIZE PER N.E.C. REQUIREMENTS.

J JUNCTION BOX : WALL MOUNTED. SIZE PER N.E.C. REQUIREMENTS.

P PULL BOX

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Owner
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STATE OF MISSOURI — ALLAN ROBERT HENDRIKSE — NUMBER PE-2004017185 — 1/13/22 — PROFESSIONAL ENGINEER

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PE-2004017185

Issue Date: 01.13.2022

Issue:	Date:

Drawn by: MJS

MU Project #: CP212341

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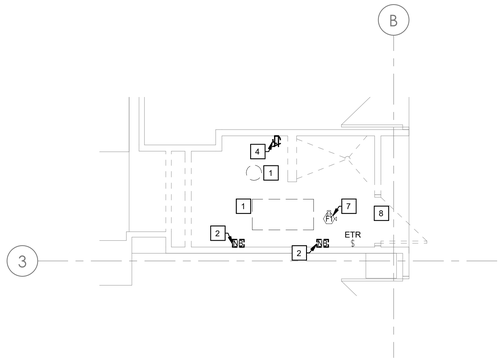
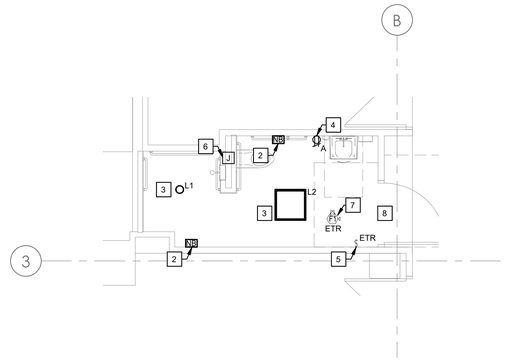
ELECTRICAL SYMBOLS AND ABBREVIATIONS

BID DOCUMENTS



1 ELECTRICAL SECOND LEVEL DEMOLITION PLAN

1/4" = 1'-0"



2 ELECTRICAL SECOND LEVEL NEW WORK PLAN

1/4" = 1'-0"

KEYED NOTES

1. INTERCEPT AND SALVAGE EXISTING CIRCUIT SERVING LIGHT FIXTURES TO BE REMOVED AND REPLACED WITH NEW.
2. EXISTING NURSE CALL DEVICES AND CABLING TO BE SALVAGED AND REINSTALLED IN NEW LOCATION IN NEW WORK. DISCONNECT AND SALVAGE EXISTING DEVICE AND INSTALL IN LOCATION SHOWN ON NEW WORK PLAN. ALL WORK ASSOCIATED WITH NURSE CALL SHALL BE BY OWNER. CONTRACTOR TO COORDINATE WORK ASSOCIATED WITH NURSE CALL RELOCATION WITH OWNER'S REPRESENTATIVE.
3. EXTEND EXISTING LIGHTING CIRCUIT SALVAGED DURING CONSTRUCTION TO NEW LIGHT FIXTURES INDICATED UTILIZING SAME QUANTITY AND TYPE OF CONDUCTORS AND RACEWAY. EXISTING TOGGLE SWITCH CONTROL DEVICE TO BE REUSED.
4. EXISTING RECEPTACLE TO BE REMOVED AND REPLACED WITH NEW. INTERCEPT EXISTING RACEWAY AND CONDUCTORS TO EXISTING DUPLEX LOCATION AND EXTEND TO NEW LOCATION SHOWN ON NEW WORK UTILIZING SAME QUANTITY AND TYPE OF CONDUCTORS AND RACEWAY. PROVIDE NEW GFCI, HOSPITAL-GRADE, TAMPER-RESISTANT RECEPTACLE, BACKBOX AND PSYCH-SAFE STAINLESS STEEL FACEPLATE WITH TORX FASTENERS.
5. LIGHTING CONTROL DEVICE SHALL ALSO CONTROL LOCAL SOLENOID VALVE TO SPACE. INTERCEPT EXISTING LIGHTING CIRCUIT AT LIGHTING CONTROL DEVICE AND MODIFY AS REQUIRED TO CONTROL BOTH LIGHTING AND SOLENOID VALVE ON/OFF OPERATION. REFER TO PLUMBING SHEETS FOR ACTUAL VALVE LOCATION.
6. EXTEND EXISTING LIGHTING CIRCUIT TO 120V ELECTRICAL CONNECTION FOR SHOWER CONTROL TRANSFORMER. MODIFY AND EXTEND EXISTING SWITCHED CIRCUIT AS REQUIRED TO CONTROL LIGHTING AND SOLENOID VALVE ON/OFF OPERATION FROM EXISTING LIGHTING CONTROL DEVICE. COORDINATE WIRING REQUIREMENTS WITH ACTUAL EQUIPMENT PROVIDED. REFER TO KEYED NOTE 5 FOR ADDITIONAL INFORMATION.
7. TEMPORARILY DISCONNECT, REMOVE AND SALVAGE EXISTING CEILING MOUNTED FIRE ALARM VISUAL/AUDIBLE NOTIFICATION DEVICE FOR REPLACEMENT OF CEILING WORK. REINSTALL EXISTING DEVICE IN NEW CEILING IN LOCATION SHOWN IN NEW WORK AND PERFORM FIRE ALARM REACCEPTANCE TEST UPON COMPLETION.
8. EXISTING DOOR TO BE REMOVED AND REPLACED WITH NEW. DISCONNECT AND SALVAGE EXISTING ANTI-LIGATURE DOOR ALARM SYSTEM DEVICES AND WIRING DURING DEMOLITION. REINSTALL DOOR ALARM DEVICES AND RECONNECT WIRING AS REQUIRED IN NEW WORK FOR NEW DOOR INSTALLATION.

LUMINAIRE SCHEDULE

LUMINAIRE SCHEDULE GENERAL NOTES:

1. ALL LUMINAIRES SHOWN ON THIS SCHEDULE MAY NOT BE USED ON THE VARIOUS PLANS. ALSO, THE USE OF ONLY CERTAIN NUMERICAL SUBSCRIPTS FOR LUMINAIRE TYPES (e.g. H2, H3, A2, A3, etc.) ON THIS PROJECT DOES NOT NECESSARILY MEAN THAT ON H1 OR A1 IS USED OR MISSING.
2. CONTRACTOR IS RESPONSIBLE FOR ALL MISCELLANEOUS HARDWARE, CLIPS, ANGLES, FRAMES, ETC. AS REQUIRED TO MOUNT THE LUMINAIRES IN OR ON THE SURFACES THEY ARE TO BE INSTALLED.
3. REFER TO ARCHITECTURAL DOCUMENTS FOR EXACT MOUNTING LOCATIONS OF LUMINAIRES AND CEILING TYPES.
4. WHEN INSTALLING LUMINAIRES, THE CONTRACTOR SHALL USE THE LUMINAIRE MANUFACTURER'S MOUNTING HARDWARE AND FOLLOW ALL MANUFACTURER'S INSTALLATION DIRECTIONS.
5. ALL RECESSED DOWNLIGHTS SHALL HAVE SELF-FLANGED REFLECTORS U.O.N. AND SHALL BE INSTALLED SO THAT THE BOTTOM OF THE THROAT IS EVEN WITH THE FINISHED CEILING PLANE. THE OVERLAPPING FLANGE MUST THEN FIT FLUSH TO THE CEILING PLANE/THROAT. NO LIGHT LEAK MUST BE VISIBLE. ALL MISCELLANEOUS HARDWARE ABOVE THE CEILING PLANE TO ACCOMPLISH THE ABOVE SHALL BE INCLUDED IN THE BASE BID.
6. ALL LUMINAIRES SHALL HAVE A U.L. LABEL.
7. ALL LUMINAIRES SHALL OPERATE AT 120V AS REQUIRED BY THE CIRCUITS AND/OR PANELS TO WHICH THEY ARE CONNECTED.
8. REFER TO E000 FOR ADDITIONAL INFORMATION CONCERNING LUMINAIRES, FINISHES, DRIVERS, ETC.
9. COMPLETE CATALOG NUMBER MAY NOT BE LISTED. ORDER LUMINAIRE BASED ON DESCRIPTION, PARTIAL CATALOG NUMBER AND SPECIFICATIONS. THE FIRST MANUFACTURER LISTED IS THE...
10. WHEN VARYING FROM BASIS-OF-DESIGN LUMINAIRE, PROVIDE A LUMINAIRE UTILIZING ±10% OF THE LED LUMENS INDICATED IN LUMINAIRE SCHEDULE.
11. LEDS SHALL HAVE A MINIMUM COLOR RENDERING INDEX (CRI) OF 80 AND SHALL HAVE COLOR TEMPERATURE OF 3500K, U.O.N.

(1) DRIVER LEGEND:
DM - DIMMING DRIVER (10-100%) PROVIDED STANDARD

PLAN MARK	DESCRIPTION	MANUFACTURER	REMARKS	LED LUMENS	DRIVER	WATTAGE	VOLTAGE
L1	6" DIAMETER BEHAVIORAL HEALTH DOWNLIGHT, ALUMINUM HOUSING AND INTEGRAL JUNCTION BOX, ALUMINUM REFLECTOR WITH HIGH EFFICIENCY DIFFUSE WHITE COATING, OVERLAPPING WHITE TRIM, TORX FASTENERS, WET LOCATION LISTED, U.L. LISTED.	KENALL BHDL6 SERIES OR APPROVED EQUAL	PROVIDE DRYWALL FRAMING KIT. 0.250" THICK POLYCARBONATE LENS.	1048	DM	24 W	120V
L2	2'X2' RECESSED BEHAVIOR HEALTH LUMINAIRE. ONE-PIECE DOOR FRAME, POLYESTER POWDER COAT FINISH, TORX FASTENERS, WET LOCATION LISTED.	KENALL MMAC22 SERIES OR APPROVED EQUAL	PROVIDE DRYWALL FRAMING KIT. 0.250" THICK POLYCARBONATE LENS.	4000	DM	49 W	120V

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Issue Date: 01.13.2022

Issue:	Date:

Drawn by: MJS

MU Project #: CP212341

E100

ELECTRICAL DEMOLITION & NEW WORK PLAN

BID DOCUMENTS

GENERAL NOTES

1. DUE TO THE LIMITED SPACE AVAILABLE FOR THE INSTALLATION OF ALL THE PLUMBING WORK, COORDINATION BETWEEN ALL OTHER TRADES IS OF UTMOST IMPORTANCE.
2. THIS CONTRACTOR SHALL VISIT THE PROJECT SITE AND VERIFY LOCATIONS, ELEVATIONS AND SIZES OF ALL UTILITIES AT SITE PRIOR TO PROCEEDING WITH WORK. EXISTING SYSTEMS AND STRUCTURE SHALL BE INVESTIGATED FOR BEST POSSIBLE ROUTING OF COLD WATER, HOT WATER, SANITARY WASTE AND VENT, STORM AND MEDICAL LABORATORY GAS PIPING.
3. THESE PLANS ARE DIAGRAMMATIC IN NATURE SINCE THE ONLY AVAILABLE INFORMATION HAS BEEN OBTAINED FROM EXISTING PLANS, SPECIFICATIONS, AND FIELD SURVEYS. THE EXACT LOCATION OF PIPING, FIXTURES AND EQUIPMENT MAY DEVIATE FROM THE LOCATION INDICATED ON THESE DRAWINGS. EXTREME ACCURACY IS NOT GUARANTEED. THIS CONTRACTOR SHALL BE PREPARE TO MAKE ALTERATIONS TO NEW AND/OR EXISTING SERVICES TO FIT JOB CONDITIONS. THIS CONTRACTOR SHALL FURNISH A COMPLETE CODE COMPLYING SYSTEM. THIS CONTRACTOR SHALL REPORT, IN WRITING, ANY DISCREPANCIES WHICH PREVENT THE INSTALLATION OF WORK AS SHOWN.
4. IF THIS CONTRACTOR DOES NOT CLEARLY UNDERSTAND THESE PLANS OR IS NOT COMPLETELY SURE OF THEIR MEANING, THIS CONTRACTOR SHOULD OBTAIN THE ENGINEER'S WRITTEN EXPLANATION AND/OR INTERPRETATION PRIOR TO SUBMITTING BIDS, SINCE THIS CONTRACTOR WILL BE HELD RIGIDLY TO THE INTERPRETATION OF THE ENGINEER.
5. IT IS THE RESPONSIBILITY OF THIS CONTRACTOR TO REPAIR THE EXISTING SURFACES TO REMAIN WHERE THEIR WORK HAS BEEN COMPLETED. REPAIR SHALL INCLUDE, BUT NOT LIMITED TO, ANY EXISTING WALL, CEILING OR FLOOR THAT IS SCHEDULED TO REMAIN. REPAIR, PAINTING, AND PATCHING SHALL BE COMPLETED BY AN APPROPRIATE CONTRACTOR QUALIFIED FOR THIS TYPE OF WORK.
6. THE OWNER SHALL MAINTAIN ALL SALVAGE RIGHTS OF FIXTURES, EQUIPMENT AND MATERIALS REMOVED, HOWEVER, ALL FIXTURES, EQUIPMENT AND MATERIALS NOT CLAIMED BY THE OWNER SHALL BE REMOVED FROM THE PREMISES AND PROPERLY DISPOSED OF THE BY THE DEMOLITION CONTRACTOR.
7. CEILING REMOVAL, STORAGE AND REPLACEMENT FOR NEW PIPING INSTALLATION SHALL BE BY THE GENERAL CONTRACTOR.
8. IF HAZARDOUS MATERIALS ARE ENCOUNTERED DURING DEMOLITION OPERATIONS, THE CONTRACTOR WILL NOTIFY BUILDING OWNER OF THE HAZARDOUS MATERIAL.
9. TEMPORARY CONNECTION SHALL BE PROVIDED BY RESPECTIVE PLUMBING AND FIRE PROTECTION CONTRACTORS WHEN EXTENDED INTERRUPTIONS OF SERVICES AND UTILITIES SUCH AS WATER, WASTE AND FIRE PROTECTION WHICH SERVE OTHER AREAS ARE NECESSARY.
10. COORDINATE WITH MAINTENANCE PERSONNEL AS TO SOURCE OF UTILITIES AND TEMPORARILY DISCONNECT OR SHUT OFF SERVICES OR UTILITIES AT NEAREST MAIN. TEMPORARY AND ACCESSIBLE ISOLATION VALVES SHALL BE INSTALLED CLOSE TO THIS POINT OF WORK.
11. IT IS ESSENTIAL THAT BUILDING OPERATIONS CONTINUE WITH MINIMAL INTERRUPTIONS. IT IS NECESSARY THAT OPERATION OF EXISTING SYSTEMS BE INTERFACED WITH AS LITTLE DISRUPTION AS POSSIBLE EXCEPT IN AREAS VACATED FOR CONSTRUCTION WORK. WORK WHICH WILL INTERFERE WITH OPERATION OF EXISTING FIRE SUPPRESSION AND PLUMBING SYSTEMS OR WHICH REQUIRE DOWNTIME WILL BE SCHEDULED ONLY AFTER CONSULTATION WITH AND PERMISSION GIVEN BY THE OWNER. ALLOW 10 DAYS PRIOR TO ANTICIPATED INTERRUPTION OF SYSTEMS. WORK MAY BE REQUIRED TO BE PERFORMED OUTSIDE NORMAL WORKING HOURS.
12. ARCHITECTURAL DEMOLITION DRAWINGS AND SPECIFICATIONS SHALL BE READ IN CONJUNCTION WITH THESE DRAWINGS.
13. ALL PIPING HANGERS AND SUPPORTS SHALL BE REMOVED ALONG WITH PIPING BEING REMOVED.
14. THE CONTRACTOR SHALL COORDINATE DEMOLITION WORK WITH PROJECT'S PHASING SCHEDULE PRIOR TO COMMENCEMENT OF ANY WORK.
15. WHEN PLACING NEW PLUMBING FIXTURES, CONTRACTOR SHALL VERIFY LOCATIONS OF PLUMBING VENTS. OFFSET VENTS THAT TERMINATE WITHIN 25 FEET OF HVAC UNITS OUTDOOR AIR INTAKES. CONTRACTOR SHALL FIELD VERIFY PRIOR TO BID WHERE THE INTERFERENCE'S ARE PRICE ACCORDINGLY OR MAKE ALLOWANCES IN BID.
16. USE CAUTION WHEN SAW-CUTTING THROUGH EXISTING CONCRETE FLOOR OR WALL CONSTRUCTION FOR THE INSTALLATION OF PLUMBING SYSTEMS TO AVOID CUTTING REBAR AT EDGE OF OPENING. LEAVE SUFFICIENT REBAR EXPOSED TO TIE NEW REINFORCING REPLACEMENT CONCRETE AND/OR OTHER STRUCTURAL ATTACHMENTS FOR NEW CONSTRUCTION.
17. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REVISIONS, TRANSITIONS, OFFSETS, ETC., TO AVOID DUCTWORK, PIPING, EQUIPMENT OR STRUCTURE NEW OR EXISTING AND TO MAKE A COMPLETE AND FUNCTIONING SYSTEM.

PLUMBING SYMBOLS & ABBREVIATIONS

NOT ALL SYMBOLS ARE USED FOR THIS PROJECT

	TRAPPED CONNECTION
	STRAINER
	BALANCING VALVE
	CLEANOUT (CO)
	OS & Y GATE VALVE
	TEMPERATURE GAUGE
	THERMOSTATIC MIXING VALVE
	REDUCED PRESSURE BACKFLOW PREVENTER
	HOSE BIBB/WALL HYDRANT
AV	ACID VENT
AW	ACID WASTE
D	DRAIN PIPING
DI	DEIONIZED WATER PIPING
RO	REVERSE OSMOSIS PIPING (RO)
	DOMESTIC COLD WATER PIPING (CW)
	DOMESTIC HOT WATER PIPING (HW)
	DOMESTIC HOT WATER RETURN PIPING (HWR)
NP	NON-POTABLE WATER PIPING
PD	PUMP DISCHARGE PIPING
S	SANITARY PIPING
SSD	SUBSOIL DRAINAGE PIPING
ST	STORM PIPING
OST	OVERFLOW STORM PIPING
TW	TEMPERED WATER
	VENT PIPING
	FLEXIBLE CONNECTION
	FLOOR DRAIN/FLOOR SINK (FD/FS)
	CIRCULATION PUMP

PROCESS PIPING SYMBOLS & ABBREVIATIONS

NOT ALL SYMBOLS ARE USED FOR THIS PROJECT

AR	ARGON PIPING
CA	COMPRESSED AIR PIPING (NON-MEDICAL)
CAI	COMPRESSED AIR INTAKE PIPING (NON-MEDICAL)
CO2	CARBON DIOXIDE PIPING
DA	DENTAL AIR PIPING
DAI	DENTAIL AIR INTAKE PIPING
DV	DENTAL VACUUM PIPING
DVE	DENTAL VACUUM EXHAUST PIPING
G	NATURAL GAS PIPING
LCW	LAB COLD WATER
LHW	LAB HOT WATER
LG	LAB GAS PIPING
LV	LAB VACUUM PIPING
MA	MEDICAL AIR PIPING
MAI	MEDICAL AIR INTAKE PIPING
MV	MEDICAL VACUUM PIPING
MVE	MEDICAL VACUUM EXHAUST PIPING
WAGD	WASTE ANESTHETIC GAS DISPOSAL PIPING
OX	OXYGEN PIPING
N2	NITROGEN PIPING
N2O	NITROUS OXIDE PIPING
	EXISTING GAS OUTLET
	NEW GAS OUTLET
	EXISTING ZONE VALVE DESIGNATION
	NEW ZONE VALVE DESIGNATION
	EXISTING AREA ALARM DESIGNATION
	NEW AREA ALARM DESIGNATION
	EXISTING MEDICAL GAS MASTER ALARM DESIGNATION
	NEW MEDICAL GAS MASTER ALARM DESIGNATION
AA	AREA ALARM
ESOV	EMERGENCY SHUT-OFF VALVE
ZV	ZONE VALVE

DRAWING REFERENCES

1 TITLE / SCALE	PLAN DETAIL REFERENCE TITLE
#	KEYED NOTE DESIGNATION
PLAN NORTH / TRUE NORTH	NORTH ARROW
AHU 1	PLAN MARK EQUIPMENT DESIGNATION REFER TO MEP SCHEDULE FOR CIRCUITING AND DEVICE REQUIREMENTS AND FLOOR PLANS FOR LOCATIONS
	EQUIPMENT NUMBER
1 SIM / A101	PLAN MARK ENLARGED PLAN REFERENCE SHEET NUMBER
1 / AD888	SECTION
	INTERFACE, EXISTING TO NEW
	EXTENT OF DEMOLITION
	MATCHLINE
1	REVISION TAG

LINE TYPE LEGEND

	EXISTING TO REMAIN OR NEW WORK BY OTHERS (LIGHT, SOLID LINE)
	NEW WORK BY THIS CONTRACTOR (DARK, SOLID LINE)
	EXISTING TO BE REMOVED BY THIS CONTRACTOR (DARK, DASHED LINE, DEMOLITION PLANS)

COMMON PIPING SYMBOLS & ABBREVIATIONS

NOT ALL SYMBOLS ARE USED FOR THIS PROJECT

	DIRECTION OF FLOW
	BRANCH CONNECTION, BOTTOM
	BRANCH CONNECTION, TOP
	ELBOW, TURNED DOWN
	ELBOW TURNED UP
	SHUTOFF VALVE
	CHECK VALVE
	PRESSURE REDUCING VALVE
	PRESSURE GAUGE
	UNION
	PIPING CAP
	CONCENTRIC REDUCER
	RISER DESIGNATION
AFF	ABOVE FINISH FLOOR
AHJ	AUTHORITIES HAVING JURISDICTION
AP	ACCESS PANEL
BOP	BOTTOM OF PIPE
DIA	DIAMETER
DN	DOWN
EX OR EXIST	EXISTING
FFE	FINISHED FLOOR ELEVATION
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
HP	HORSEPOWER
IE OR INV. ELEV	INVERT ELEVATION
NC	NORMALLY CLOSED
NTS	NOT TO SCALE
PSI	POUNDS PER SQUARE INCH
RPM	REVOLUTIONS PER MINUTE
RI	ROUGH-IN
SOV	SHUTOFF VALVE
TDH	TOTAL DYNAMIC HEAD
VIF	VERIFY IN FIELD

PLUMBING ABBREVIATIONS

NOT ALL SYMBOLS ARE USED FOR THIS PROJECT

ADA	AMERICANS WITH DISABILITIES ACT
AP	ACCESS PANEL
BP	BOOSTER PUMP
BT	BATHTUB
BTC	BRANCH TO CONNECTION
BV	BALANCE VALVE
CI	CAST IRON
CO	CLEANOUT
CSS	CLINICAL SERVICE SINK
DCVA	DOUBLE CHECK VALVE ASSEMBLY
DS	DOWNSPOUT
DW	DISHWASHER
DWH	DOMESTIC WATER HEATER
EEW	EMERGENCY EYE WASH
ESEW	EMERGENCY SHOWER & EYE WASH
ESH	EMERGENCY SHOWER
ET	EXPANSION TANK
EWC	ELECTRIC WATER COOLER
FCO	FLOOR CLEAN OUT
GCO	GRADE CLEANOUT
GD	GARBAGE DISPOSAL
HB	HOSE BIBB
HWRP	HOT WATER RETURN PUMP
HWST	HOT WATER STORAGE TANK
IM	ICE MAKER
IW	INDIRECT WASTE
LA	LAVATORY
MB	MOP BASIN
NIC	NOT IN CONTRACT
OB	OUTLET BOX
RD	ROOF DRAIN
RPZ	REDUCED PRESSURE BACKFLOW PREVENTER
S	SANITARY
SIS	STAINLESS STEEL
SH	SHOWER
SK	SINK
SP	SUMP PUMP
SS	SANITARY STACK
SSK	SHOP SINK
SW	SOFT WATER
TMV	THERMOSTATIC MIXING VALVE
UR	URINAL
V	VENT
VB	VACUUM BREAKER
VS	VENT STACK
VTR	VENT THRU ROOF
W	WASTE
WC	WATER CLOSET
WCO	WALL CLEANOUT
WD	WASHER DRAIN
WH	WALL HYDRANT
WHA	WATER HAMMER ARRESTOR
WM	WATER METER
WS	WASTE STACK
WSV	WASTE STACK VENT
YCO	YARD CLEANOUT

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Owner
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Tori Janelle Gillespie, P.E.
PE-2018000203

Issue Date: 01.13.2022

Issue:	Date:

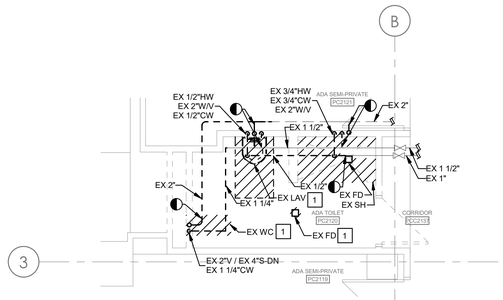
Drawn by: MAS

MU Project #: CP212341

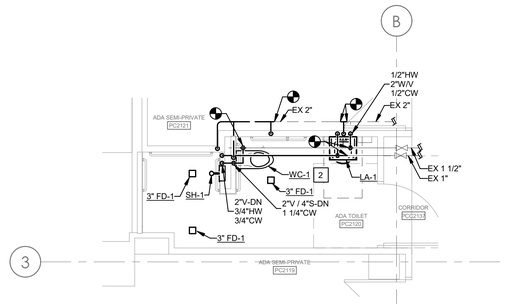
P000

PLUMBING SYMBOLS AND ABBREVIATIONS

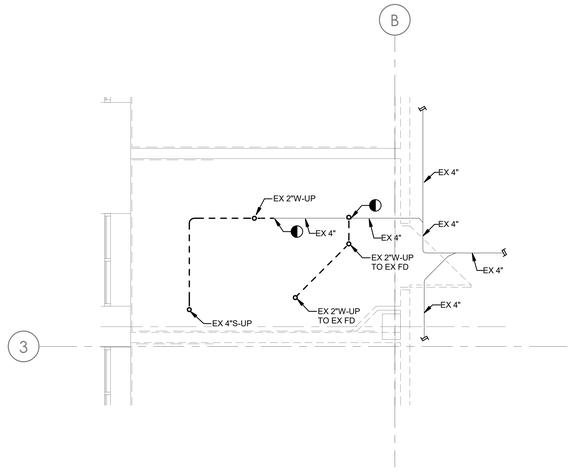
BID DOCUMENTS



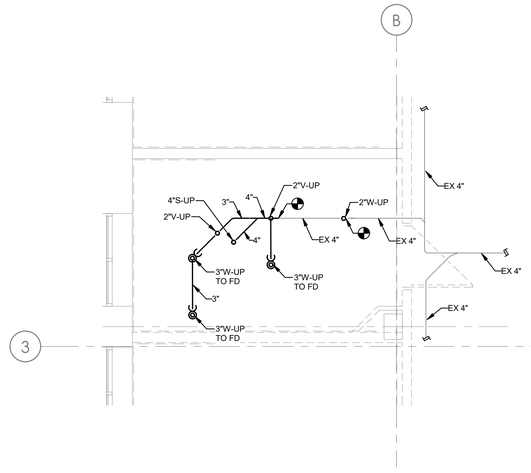
1 **PLUMBING SECOND LEVEL DEMOLITION PLAN**
1/4" = 1'-0"



2 **PLUMBING SECOND LEVEL NEW WORK PLAN**
1/4" = 1'-0"



3 **PLUMBING FIRST LEVEL - DEMOLITION PLAN**
1/4" = 1'-0"



4 **PLUMBING FIRST LEVEL - NEW WORK PLAN**
1/4" = 1'-0"

GENERAL NOTES

a. SEAL ALL WALL AND FLOOR PENETRATIONS.

KEYED NOTES

1. REMOVE EXISTING PLUMBING FIXTURE AND ALL ASSOCIATED DOMESTIC HOT, DOMESTIC COLD, SANITARY, AND / OR VENT PIPING BACK TO NEAREST MAIN / STACK AND CAP.
2. WC-1 FLUSH VALVE ACCESS PANEL WITH FLUSH VALVE CONTROLS TO BE MOUNTED JUST BELOW ADA GRAB BARS BEHIND WATER CLOSET.

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Issue:	Date:

Drawn by: Author
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PLUMBING

BID DOCUMENTS

SECTION 220100 – BASIC PLUMBING REQUIREMENTS

DEPARTMENT SUBMASTER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Specification Sections, apply to this and the other sections of Division 22.

1.2 SUMMARY

A. This Section includes general administrative and procedural requirements for plumbing installations. The following administrative and procedural requirements are included in this Section to expand the requirements specified in Division 01:

1. Submittals.
2. Record documents.
3. Maintenance manuals.

1.3 REFERENCED STANDARDS

A. International Plumbing Code **2018** (IPC)

1.4 CONTRACTOR'S SUBMITTAL REVIEW RESPONSIBILITIES

A. Operation and Maintenance Manuals: All items required for insertion into each Operation and Maintenance (O&M) Manual are called out in the submittals portion of each specification section or in a Submittal Log, if included within Division 01. It is the responsibility of the Contractor to ensure that the O&M submittal has been reviewed and includes all the requirements of the specifications. The Engineer of Record shall review the submittal for the Operation and Maintenance Manual one (1) time and return to the contractor with the appropriate disposition.

1. If the submittal is required to be reviewed a second time, it shall be done at the expense of the contractor. Charges for this additional submittal review shall be calculated based on the Engineer's standard hourly rates, as defined in their contract with the Owner.
2. Submittals for the Operation and Maintenance Manual must be original documentation.
3. Photo copies of marked up Operations and Maintenance submittals are not acceptable.

B. Refer to Division 01 and each individual Division 22 Section for additional submittal requirements.

C. Prepare maintenance manuals in accordance with Division 01. In addition to the requirements specified in Division 01, include the following information for equipment items:

1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
4. Servicing instructions and lubrication charts and schedules.
5. Facsimiles or photo copies are not allowed as submittals for operating and maintenance manuals. Submittals for operating and maintenance manuals must be on original manufacturer printed stock.

D. Comply with each individual Division 22 Section for additional submittal requirements.

E. Electronic Media and Files:

1. Electronic media files of the contract drawings in AutoCAD or PDF format and copies of the specifications in PDF format may be requested.
2. Complete and return a signed "Electronic File Transmittal" form provided by Ross & Baruzzini upon request for electronic media,
3. Obtain approval from the appropriate Design Professional for use of their part of the documents if the information requested includes information prepared by other than Ross & Baruzzini.
4. The electronic contract documents may be used for preparation of shop drawings and record drawings only. The information may not be used in whole or in part for any other project.
5. The drawings prepared by Ross & Baruzzini for bidding purposes may not be used directly for raceway layout drawings or coordination drawings.
6. The use of these documents does not allow relief from the responsibility for coordination of work with other trades and verification of space available for the installation.
7. The information is provided to expedite the project with no guarantee by Ross & Baruzzini as to the accuracy or correctness of the information provided. Ross & Baruzzini accepts no responsibility or liability for the use of the provided information.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

A. Protect stored on-site or installed absorptive materials from moisture damage. Materials directly exposed to moisture via precipitation, water leaks, or condensation shall be removed from the jobsite and replaced.

END OF SECTION 220100

SECTION 220500 – BASIC PLUMBING MATERIALS AND METHODS

DEPARTMENT SUBMASTER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 220100 "Basic Plumbing Requirements" apply to the work of this Section as if fully repeated herein.

1.2 SUMMARY

A. This Section includes the following basic plumbing materials and methods to complement other Division 22 Sections:

1. Materials and installation instructions common to plumbing systems.
2. Pipe joining materials and methods.
4. Flexible pipe connectors.
5. Plumbing sleeve seals.
6. Pipe sleeves.
7. Escutcheons.
8. Penetration firestopping of fire-resistance-rated assemblies and/or smoke barriers by plumbing piping or conduit.
9. Labeling and identifying plumbing systems and equipment.
10. Non-shrink grout for equipment installations.
11. Painting and finishing of plumbing work.
12. Concrete base construction requirements.
13. Coordination with Structural work.
14. Field-fabricated equipment supports.
15. Selective Demolition.
16. Cutting and patching.

B. Pipe and pipe fitting materials are specified in individual Division 22 piping system Sections.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

D. The following abbreviations are used throughout Division 22 Specification Sections:

1. ABS: Acrylonitrile-butadiene-styrene plastic.
2. CPVC: Chlorinated polyvinyl chloride plastic.
3. CR: Chlorosulfonated polyethylene synthetic rubber.
4. EPDM: Ethylene propylene diene terpolymer rubber.
5. NBR: Acrylonitrile-butadiene rubber.
6. NP: Nylon plastic.
7. PE: Polyethylene plastic.
8. PVC: Polyvinyl chloride plastic.

1.4 SUBMITTALS

A. Product Data: For dielectric fittings, transition couplings, flexible pipe connectors, plumbing sleeve seals, and identification materials and devices.

B. Shop Drawings: Detail fabrication and installation for supports and anchorage for plumbing materials and equipment.

C. Coordination Drawings: For access panel and door locations.

1.5 QUALITY ASSURANCE

A. Welding: Qualify welding processes and operators for structural steel according to AWS D1.1 "Structural Welding Code – Steel."

B. Welding: Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code," Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions of ASME B31 Series "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for the welding processes involved and that certification is current.
3. Contactor shall retain all welding certificates on file and produce them for review upon request by the Owner and/or Owner's representative.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and prevent entrance of dirt, debris, and moisture.

B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor or roof, if stored thereupon.

C. Protect flanges, fittings, and piping specialties from moisture and dirt.

D. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

E. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate plumbing equipment installation with other building components.

B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for plumbing installations.

C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.

D. Sequence, coordinate, and integrate installations of plumbing materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.

E. Coordinate connection of plumbing systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

F. Coordinate requirements for access panels and doors if plumbing items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Panels."

G. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and similar concealment.

H. Coordinate connection of electrical services.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following: Transition Couplings:

a. Dresser Industries, Inc.

b. or approved equal.

2. Flexible Pipe Connectors:

a. Flexicraft Industries, Inc.

b. Hyspan Precision Products, Inc.

c. Mason Industries, Inc.

d. The Metraflex Company

e. Proco Products, Inc.

3. Plumbing Sleeve Seals:

a. Advanced Products and Systems, Inc./Innerlynx

b. The Metraflex Company

c. Thunderline/Link-Seal.

4. Identifying Devices and Labels:

a. Brady USA, Inc., Signmark Div.

b. Brimar Industries, Inc.

c. Kolbi Industries, Inc.

d. Panduit Corp.

e. Seton Name Plate Co.

2.2 PIPE AND PIPE FITTINGS

A. Refer to individual Division 22 piping Sections for pipe and fitting materials and joining methods.

2.3 JOINING MATERIALS

A. Refer to individual Division 22 piping Sections for joining materials.

B. Solder Filler Metals: ASTM B32 lead-free alloys. Include water-flushable flux according to ASTM B813.

C. Solvent Cements: Manufacturer's standard solvent cements for the following:

1. ABS Piping: ASTM D2235.

D. Plastic Pipe Seals: ASTM F477, elastomeric gasket.

2.4 PIPE SLEEVES

A. The following sleeve materials are for wall, floor, slab, and roof penetrations.

B. Steel Pipe: ASTM A53, Type E, Grade A, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with setscrews.

2.5 ESCUTCHEONS

A. General: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Stamped-Steel Type: With spring clips and chrome-plated finish.

D. Split-Plate, Stamped-Steel Type: With concealed hinge, spring clips, and chrome-plated finish.

E. One-Piece, Floor-Plate Type: Cast-iron floor plate.

F. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.6 IDENTIFYING DEVICES AND LABELS

A. General: Manufacturer's standard products of categories and types required for each application as referenced in other Division 22 Sections. If more than one type is specified for application, selection is installer's option, but provide one selection for each product category.

B. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

C. Pressure-Sensitive Pipe Markers: Manufacturer's standard preprinted, permanent adhesive, color-coded, pressure-sensitive vinyl, complying with ASME A13.1.

1. Nomenclature: Domestic Cold Water, Domestic Hot Water, Domestic Hot Water Return, Natural Gas, etc. as required per service. Match name to the name given on Drawings (full names, not abbreviations).
2. Color: Per ASME A13.1 Standard per service, unless noted otherwise.
3. Flow Direction: Indicate flow direction via arrows on each label.

D. Engraved Plastic-Laminate Signs: ASTM D709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated.

1. Fabricate in sizes required for message.
2. Engraved with engraver's standard letter style, of sizes and with wording to match equipment identification.
3. Punch for mechanical fastening.
4. Thickness: 1/16-inch (1.6 mm), for units up to 20 sq. in. (130 sq. cm) or 8 inches (200 mm) long; 1/8-inch (3.2 mm) for larger units.
5. Fasteners: Self-tapping stainless-steel screws or contact-type permanent adhesive.

E. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in plumbing identification, with corresponding designations indicated. Use numbers, lettering, and wording indicated for proper identification and operation/maintenance of plumbing systems and equipment.

1. Multiple Systems: If multiple systems of same generic name are indicated, provide identification that indicates individual system number and service such as "Domestic Water Heater DWH1," "Hot Water Recirculation Pump HWRP1," or "Standpipe F12."

PART 3 - EXECUTION

3.1 GENERAL PLUMBING INSTALLATION REQUIREMENTS

A. Verify all dimensions by field measurements.

B. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.

C. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.

D. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.

E. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3.2 PIPE-PENETRATION INSTALLATION REQUIREMENTS

A. Install escutcheons for new piping penetrations of walls, ceilings, and floors according to the following:

1. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
2. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
3. Insulated Piping: One-piece, stamped-steel type with spring clips.
4. Uninsulated Piping in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
5. Uninsulated Piping in Unfinished Spaces: One-piece, cast-brass type.
6. Uninsulated Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

B. Install escutcheons for existing piping penetrations of new walls, ceilings, and floors. Match type, material, and finish as specified for new piping, except that split-casting or split-plate type will be accepted in lieu of one-piece.

C. Install sleeves for pipes passing through concrete and masonry walls, and concrete floor and roof slabs.

D. Cut sleeves to length for mounting flush with both surfaces. Exception: Extend sleeves installed in floors of mechanical/plumbing equipment areas or other wet areas 2 inches (50 mm) above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.

E. Build sleeves into new walls and slabs as work progresses.

F. Install sleeves large enough to provide ¼-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

1. Steel Pipe Sleeves: For pipes smaller than 6-inch NPS (DN150).
2. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Refer to Division 07 Section "Flashing and Sheet Metal" for flashing.
3. Seal space outside of sleeve fittings with non-shrink, nonmetallic grout.

G. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using elastomeric joint sealants. Refer to Division 07 Section "Joint Sealants" for materials. Use Type S, Grade NS, Class 25, Use O, neutral-curing silicone sealant, unless otherwise indicated.

H. Sleeves are not required for core-drilled holes.

I. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestopping materials. Refer to Division 07 Section "Penetration Firestopping" for materials.

3.3 LABELING AND IDENTIFYING

A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow. Use plastic markers, with application systems. Install on insulation segment if required for hot, uninsulated piping.

B. Locate pipe markers as follows if piping is exposed in finished spaces, machine rooms, and accessible maintenance spaces, such as shafts, tunnels, plenums, and exterior non-concealed locations:

1. Near each valve and control device.
2. Near each branch, excluding short takeoffs for fixtures and terminal units. Mark each pipe at branch, if flow pattern is not obvious.
3. Near locations where pipes pass through walls, floors, ceilings, or enter non-accessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum of 50-foot (15-m) intervals along each run. Reduce intervals to 25 feet (7.5 m) in congested areas of piping and equipment.
7. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

C. Adjusting: Relocate identifying devices as necessary for unobstructed view in finished construction.

3.4 COORDINATION WITH STRUCTURAL WORK

A. Concrete: Do not embed pipes, wires, tube, boxes, ducts or other cavity-creating elements in concrete work unless shown on or permitted by the structural drawings. Openings through concrete not shown on the structural drawings are subject to approval by the structural engineer of record. See coordination drawing requirements under Submittals.

B. Supported Slab: Do not suspend loads exceeding 500 pounds within any 100 square feet of contiguous area from concrete supported slab. Suspend such loads from structural steel only. Any "sub-framing" required is responsibility of Contractor or sub-contractor installing material requiring support.

1. Openings in concrete floor slabs not shown on structural drawings, such as openings required for stacks, pipes, ducts, plumbing vents, etc., shall be the responsibility of the trade requiring openings. Form block-outs in the slab, reinforcing deck, and cut openings after concrete has reached specified strength.
2. Where openings larger than 12-inches are required but not shown on structural drawings, secure written approval from Architect/Engineer prior to cutting deck.

3.5 ERECTION OF SUPPORTS AND ANCHORAGE

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

B. Field Welding: Comply with AWS D1.1, "Structural Welding Code – Steel."

3.6 SELECTIVE DEMOLITION

A. Disconnect, demolish, and remove plumbing work as indicated on the Drawings, and as required for installation of new work shown. Coordinate with Division 26 for disconnection of power to electrically-powered equipment prior to demolition.

B. Remove accessible work in its entirety. Repair cut surfaces to match adjacent surfaces. Abandon in place embedded or buried work, unless noted otherwise.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
3. Equipment to Be Removed: Disconnect and cap services and remove equipment.

C. Removal: Unless otherwise indicated, remove demolished pipe, and equipment from the Project site. Handle and dispose of in accordance with National, State, and Local regulations.

1. Relocation: Remove, store, clean, reinstall, reconnect, and make operational all work indicated for relocation.
2. Salvage: Remove and deliver to Owner all work indicated for salvage.

D. Refer to Division 01 Sections "Selective Demolition" and/or "Selective Structure Demolition" for additional requirements.

E. For selective demolition of any appliance or piece of equipment containing a CFC, HCFC, or HFC refrigerant: Prior to demolition, refrigerant shall be evacuated and captured in full compliance with the Clean Air Act; using only technicians with the proper refrigerant license as according to law, stored in approved containers, and shipped to a licensed refrigerant recycling facility all as required by the United States Environmental Protection Agency.

3.7 CUTTING AND PATCHING

A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay. Perform cutting and patching in accordance with the following:

B. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

C. Perform cutting, fitting, and patching of plumbing equipment and materials required to:

1. Uncover Work to provide for installation of ill-timed Work.
2. Remove and replace defective Work.
3. Remove and replace Work not conforming to requirements of the Contract Documents.
4. Install equipment and materials in existing structures.

D. Cut, remove and legally dispose of selected plumbing equipment, components, and materials as indicated, including but not limited to removal of plumbing piping, pumps, and other plumbing items made obsolete by the new Work.

E. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for plumbing installations. Perform cutting by skilled mechanics of trades involved.

F. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

G. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

H. Repair cut surfaces to match adjacent installations.

I. Repair any building insulation or building fireproofing materials, whether new or existing, that are removed or scraped away in order to make a plumbing installation, so as to maintain an equivalent insulation or fire rating as existed without said plumbing installation.

J. Refer to Division 01 Sections "Execution" and/or "Cutting and Patching" for additional requirements.

END OF SECTION 22 0500

SECTION 22 05 29 – HANGERS AND SUPPORTS

DEPARTMENT SUBMASTER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 220100 "Basic Plumbing Requirements," and Section 220500 "Basic Plumbing Materials and Methods" all apply to the work of this Section as if fully repeated herein.

1.2 SUMMARY

A. This Section includes hangers and supports for mechanical system piping and equipment, including but not limited to the following:

1. Metal pipe hangers and supports.
2. Thermal-hanger shield inserts.
3. Fastener systems.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

A. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

B. Do not suspend pipe hangers and supports from roof deck. Suspend such loads from structural steel only, and provide structural steel sub-framing as required.

C. Do not suspend piping loads exceeding 500 pounds within any 100 square feet of contiguous area from supported concrete floor slabs. Suspend such loads from structural members only, and provide structural steel sub-framing as required.

D. Structural Performance: Hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1.5 SUBMITTALS

A. Product Data: For each type of pipe hanger, channel support system component, and thermal-hanger shield insert indicated. Include:

1. Metal pipe hangers and supports.
2. Thermal-hanger shield inserts.
3. Fastener systems.

1.6 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code – Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Manufactured Pipe Hangers:

a. Anvil International, Inc.

b. Cooper B-Line, Inc.

c. Carpenter & Patterson, Inc.

d. Erico International Corp.

e. PHD Manufacturing, Inc.

f. Tolco division of Cooper B-Line, Inc.

2. Thermal-Hanger Shield Inserts:

a. Carpenter & Paterson, Inc.

b. Erico International Corp.

c. PHS Industries, Inc.

d. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.

3. Powder-Actuated Fastener Systems:

a. Hilti, Inc.

b. ITW Ramset/Red Head.

c. Simpson Manufacturing Co.; Strong-Tie Anchor Systems Div.

2.2 METAL PIPE HANGERS AND SUPPORTS

A. Application: Refer to "Hanger and Support Applications" Article in Part 3 for where to use specific hanger and support types.

B. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pre-galvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel unless noted otherwise.

C. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel unless noted otherwise.

2.3 THERMAL-HANGER SHIELD INSERTS

A. Insulation-Insert Material for Piping Below Ambient Temperature: ASTM C552, Type II cellular glass with 100-psig (688- kPa) or ASTM C591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength and vapor barrier.

B. Insulation-Insert Material for Piping At or Above Ambient Temperature: Water-repellent treated, ASTM C533, Type I calcium silicate with 100-psig (688-kPa) ASTM C552, Type II cellular glass with 100-psig (688-kPa) or ASTM C591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength.

C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

E. Insert Length: Extend 2-inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.4 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.5 MISCELLANEOUS MATERIALS

A. Structural and Miscellaneous Steel: As specified in Division 22 Section "Basic Plumbing Materials and Methods."

B. Grout: As specified in Division 22 Section "Basic Plumbing Materials and Methods."

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT SCHEDULE OF APPLICATIONS

A. Comply with MSS SP-69 for pipe hanger and trapeze selections and applications that are not specified in this Section.

B. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use copper-plated pipe hangers and copper or stainless-steel attachments, or use nonmetallic coatings on ttachments for electrolytic protection, where hangers are in direct contact with copper tubing.

F. Horizontal-Piping Hangers and Supports for individual, insulated pipe runs which are both 2½-inch diameter or larger and 20 feet or longer: Unless otherwise indicated, choose among the following types:

1. Single Pipe Rolls (MSS Type 41): For suspension of pipes from two rods.
2. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes from single rod.
3. Complete Pipe Rolls (MSS Type 44): Where vertical adjustment is not necessary.
4. Adjustable Pipe Roll and Base Units (MSS Type 46): For vertical and lateral adjustment.
5. For any of the above, include protection saddles and/or shields as applicable, and as further specified under the heading "Protection of Insulated Piping" elsewhere in this section.
6. Exception: Piping whose normal operating temperature is less than 150ºF (e.g., chilled water, condenser water) may be supported with static hangers specified in the next paragraph.

G. Horizontal-Piping Hangers and Supports for individual pipe runs less than 20 feet long and all piping 2-inch diameter or smaller, regardless of length: Unless otherwise indicated, choose among the following types:

1. Adjustable Steel Clevis Hangers (MSS Type 1).
2. Yoke-Type Pipe Clamps (MSS Type 2): For pipes NPS 4 and larger.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3).
4. Steel Pipe Clamps (MSS Type 4).

H. Horizontal-Piping Hangers and Supports for individual uninsulated pipe runs of any size or length: Unless otherwise indicated, choose among the following types:

1. Adjustable Steel Clevis Hangers (MSS Type 1).
2. Yoke-Type Pipe Clamps (MSS Type 2): For pipes NPS 4 and larger.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3).
4. Steel Pipe Clamps (MSS Type 4).
5. Adjustable Steel Band Hangers (MSS Type 7): For pipes up to NPS 2 only.
6. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For pipes up to NPS 2 only.
7. U-Bolts (MSS Type 24).

I. Vertical-Piping Hangers and Supports for individual, insulated pipe runs which are both 2½-inch diameter or larger and 20 feet or longer: Use spring hangers and supports. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports shall include the following types:

1. Horizontal (MSS Type 54): Mounted horizontally.
2. Vertical (MSS Type 55): Mounted vertically.
3. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

J. Vertical-Piping Hangers and Supports for individual pipe runs less than 20 feet long and all piping 2-inch diameter or smaller, regardless of length: Unless otherwise indicated, choose among the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8).
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): Where longer ends are required.

K. Vertical-Piping Hangers and Supports for individual uninsulated pipe runs of any size or length: Unless otherwise indicated, choose among the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8).
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): Where longer ends are required.

L. Hanger-Rod Attachments: Unless otherwise indicated, choose among the following types:

1. Steel Turnbuckles (MSS Type 13).
2. Steel Clevises (MSS Type 14).
3. Malleable-Iron Sockets (MSS Type 16).
4. Steel Weldless Eye Nuts (MSS Type 17).

M. Building Attachments: Unless otherwise indicated, choose among the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to concrete ceiling.
2. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
3. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams.
4. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
5. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:

a. Light (MSS Type 31): 750 lb.

b. Medium (MSS Type 32): 1500 lb.

c. Heavy (MSS Type 33): 3000 lb.

6. Side-Beam Brackets (MSS Type 34): For sides of steel beams.
7. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

3.2 HANGER AND SUPPORT MAXIMUM SPACING AND MINIMUM ROD SIZE

A. Install hangers and supports with the following maximum spacing and minimum rod sizes.

B. Drawn-Temper Copper Piping for any liquid-service piping systems:

1. NPS ½ (DN 15): Maximum span, 4 feet (1.2 m); minimum rod size, 3/8-inch (10 mm).
2. NPS ¾ (DN 20): Maximum span, 5 feet (1.5 m); minimum rod size, 3/8-inch (10 mm).
3. NPS 1 (DN 25): Maximum span, 6 feet (1.8 m); minimum rod size, 3/8-inch (10 mm).
4. NPS 1¼ (DN 32): Maximum span, 6 feet (1.8 m); minimum rod size, 3/8-inch (10 mm).
5. NPS 1½ (DN 40): Maximum span, 8 feet (2.4 m); minimum rod size, 3/8-inch (10 mm).

C. Cast Iron Piping: Install hangers at the same maximum spacing and with the same minimum rod sizes as for Steel Piping for hydronic system service, except that maximum spacing shall not exceed 12 feet and smallest rod size allowed is ½-inch.

1. Vertical piping: Shall be supported at each stack base and at each floor. Free standing vertical pipe should be adequately staked or braced during construction to maintain alignment.
2. Horizontal piping: Shall be supported within 18-inches of the coupling joint at maximum 10 foot intervals for 10 foot pipe lengths and at maximum 5 foot intervals for 5 foot pipe lengths. Support or hangers should be properly placed to maintain alignment and grade with provision made to prevent shear. Large diameter pipe should be braced at changes of direction to prevent horizontal movement.

D. Rod diameters may be reduced one size for double-rod hangers, with 3/8-inch (10 mm) minimum rods.

E. Hanger and support spacing for piping and tubing not listed above shall be according to MSS SP-69 and piping manufacturer's written instructions.

3.3 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

C. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

D. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

E. Install lateral bracing with pipe hangers and supports to prevent swaying.

F. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

H. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2½ (DN 65) and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

I. Repair any building insulation or building fireproofing materials, whether new or existing, that are removed or scraped away in order to attach hangers and supports, so as to maintain an equivalent insulation or fire rating as existed without said hanger or support attachment.

J. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4-inches (100 mm) thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

3.4 PROTECTION OF INSULATED PIPING:

A. Attach clamps and spacers to piping.

1. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
2. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.

B. Do not exceed pipe stress limits according to ASME B31.9.

C. Piping Operating above Ambient Air Temperature: Clevis- and clamp-type supports shall project through insulation, with pipe support making direct contact with pipe and with insulation applied in a manner that encapsulates the clevis or clamp. For piping on roller-type supports, install MSS SP-58, Type 39 protection saddles, and fill interior voids with insulation that matches adjoining insulation.

1. Contractor's Option: In lieu of the above paragraph, contractor has the option of complying with the same specifications as for "Piping Operating below Ambient Air Temperature" in the following paragraphs.

D. Piping Operating below Ambient Air Temperature: Clevis- and clamp-type supports shall be sized for the outside diameter of the insulation including jacket. Install MSS SP-58, Type 40 protective metal shields. Shields shall span an arc of 180 degrees.

1. Pipe Sizes NPS 4 and larger: Include thermal-hanger shield inserts. Insert shall be same thickness as adjoining pipe insulation and length shall be at least as long as the protective shield. Include steel weight-distribution plate if pipe is installed on rollers.
2. Metal Shield Dimensions for Pipe: Not less than the following:

a. NPS ¼ to NPS 3½: 12-inches long and 0.048-inch thick.

b. NPS 4: 12-inches long and 0.06-inch thick.

3.5 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1½-inches (40 mm).

END OF SECTION 220529

SECTION 22 07 00 -PLUMBING PIPE INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 22 01 00 "Basic Plumbing Requirements," and Section 22 0500 "Basic Plumbing Materials and Methods" all apply to the work of this Section as if fully repeated herein.

1.2 SUMMARY

A. This Section includes plumbing insulation for, equipment, piping, and other installations, including the following:

1. Insulation Materials:

a. Mineral fiber.

2. Protective shielding guards.

B. Related Sections include the following:

1.3 DEFINITIONS

A. SSL: Self-sealing lap.

B. Thermal Resistivity: "R-values" represent the reciprocal of thermal conductivity (k-value). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1-inch thick. Thermal resistivities are expressed by the temperature difference in degrees F between two exposed faces required to cause one BTU to flow through one square foot of material, in one hour, at a given mean temperature.

C. Refer to Division 22 Section "Basic Plumbing Materials and Methods" for definitions of finished, interior, exterior, exposed, and concealed locations.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, identify thermal conductivity, thickness, and jackets (both factory and field applied, if any).

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Fire-Test-Response Characteristics: Insulation and related materials shall have flame-spread index of 25 or less, and smoke-developed index of 50 or less, as determined by testing identical products per ASTM E84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 22 Section "Hangers and Supports."

B. Coordinate clearance requirements with piping Installer for piping insulation application, duct Installer for duct insulation application, and equipment Installer for equipment insulation application. Before preparing piping and ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Mineral-Fiber, Preformed Pipe Insulation:

a. Johns Manville.

b. Knauf Insulation.

c. Manson Insulation Inc.

d. Owens Corning.

2.2 INSULATION MATERIALS

A. Refer to Schedule in Part 3 for requirements about where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Mineral-Fiber, Preformed Pipe Insulation: Type I, 850ºF (454 C); mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C547, Type I, Grade A, with factory-applied jacket.

1. Thermal Conductivity: 0.26 average maximum at 75°F mean temperature.
2. Jacket: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C1136, Type I; with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip.
3. Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
4. Low emitting (VOC) adhesive.

2.3 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers.

1. Description: Manufactured plastic wraps for covering plumbing fixturehot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements. Retain paragraph below if using protective shielding enclosures.
2. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold- water supplies and trap and drain plumbing. Comply with ADA requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

1. Verify that systems and equipment to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

3.3 COMMON INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, fittings, and piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

J. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

K. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

L. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4-inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

M. At the following locations, omit jacket and provide a separate cutaway removable segment of insulation clearly labeled "Access." For below-ambient services, provide a design that allows access but maintains vapor barrier.

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Manholes.
5. Handholes.
6. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

B. Insulation Installation at Fire-Rated Wall and Partition Penetrations:

1. Install pipe insulation continuously through pipe penetrations of fire-rated walls and partitions.
2. Firestopping and fire-resistive joint sealers are specified in Division 07 Section "Penetration Firestopping."

C. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies according to Division 07 Section "Penetration Firestopping."

3.5 PIPE INSULATION INSTALLATION

A. Requirements in this Article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with tape or bands and tighten without deforming insulation materials. If furnished in half sections, orient longitudinal joints at 3 and 9 o'clock positions on the pipe.
2. All insulation shall be tightly butted and free of voids and gaps at all joints.
3. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
4. For insulation with factory-applied jackets on above ambient services, secure laps with outward clinched staples at 6-inches o.c.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

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Project Title:
MISSOURI PSYCHIATRIC CENTER - RENOVATE RESTROOM PC2120

Owner
UNIVERSITY OF MISSOURI HEALTHCARE

TORI JANELLE GILLESPIE
NUMBER
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PLUMBING SPECIFICATIONS

BID DOCUMENTS

3. Cut sectional pipe insulation to fit. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2-inches (50 mm) over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
2. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.
E. Special Requirements for Flexible Elastomeric Insulation Installation: Seal all transverse seams, longitudinal seams, end joints, and section joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
3.6 PIPING INSULATION SCHEDULE, GENERAL
A. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
1. Fire-suppression piping.
2. Drainage (sanitary/waste) piping located in crawl spaces.
3. Below-grade piping.
4. Chrome-plated pipes and fittings unless there is a potential for personnel injury.
B. Hot Surfaces: For piping services denoted all piping surfaces including but not limited to pipe, flanges, fittings, valves of every kind, strainers, unions, and other appurtenances shall be insulated to avoid potential for personnel injury via contact with hot surface.
C. Cold Surfaces: For piping surfaces operating below surrounding ambient temperature, all piping surfaces including but not limited to pipe, flanges, fittings, valves of every kind, strainers, unions, and other appurtenances shall be insulated and shall include uninterrupted vapor barrier to avoid potential condensation.
3.7 PIPE INSULATION SCHEDULE, INDOORS
A. Domestic Cold Water:
1. Insulation shall be any of the following:
a. Mineral-Fiber, Preformed Pipe, Type I: 1-inch (25 mm) thick.
B. Domestic Hot-Water Supply and Return, 140ºF and below:
1. NPS 1¼ and Smaller: Insulation shall be Mineral-Fiber, Preformed Pipe, Type I, 1-inch thick.
2. NPS 1½ and Larger: Insulation shall be Mineral-Fiber, Preformed Pipe, Type I, 1-1/2 inches thick.
C. Domestic Water Branch Piping to Fixtures within Walls/Chases (Hot and Cold; Non-Recirculated):
1. NPS 2 and Smaller: Insulation shall be Mineral-Fiber, Preformed Pipe, Type I, 1/2 -inch thick.
END OF SECTION 22 0700

SECTION 221116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
B. Section 200800 “Seismic Protection,” Section 220100 “Basic Plumbing Requirements,” and Section 220500 “Basic Plumbing Materials and Methods” all apply to the work of this Section as if fully repeated herein.

1.2 SUMMARY
A. Section Includes:
1. Copper tube and fittings.
2. Piping joining materials.
3. Dielectric fittings.

1.3 ACTION SUBMITTALS
A. Product Data: For transition fittings and dielectric fittings.

1.4 INFORMATIONAL SUBMITTALS
A. System purging and disinfecting activities report.
B. Field quality-control reports.

1.5 FIELD CONDITIONS
A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
1. Notify Construction Manager and Owner no fewer than fourteen days in advance of proposed interruption of water service.
2. Do not interrupt water service without Owner’s written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS
A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
B. Potable-water piping and components shall comply with NSF 14 and NSF 61 Annex G. Plastic piping components shall be marked with "NSF-pw."
C. Comply with NSF Standard 372 for low lead.

2.2 COPPER TUBE AND FITTINGS
A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
B. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
C. Copper Unions:
1. MSS SP-123.
2. Cast-copper-alloy, hexagonal-stock body.
3. Ball-and-socket, metal-to-metal seating surfaces.
4. Solder-joint or threaded ends.
D. Copper Pressure-Seal-Joint Fittings:
1. Fittings for NPS 2 (DN 50) and Smaller: Wrought-copper fitting with EPDM-rubber, O-ring seal in each end.
2. Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Cast-bronze or wrought-copper fitting with EPDM-rubber, O-ring seal in each end.
E. Copper-Tube, Extruded-Tee Connections:
1. Description: Tee formed in copper tube according to ASTM F 2014.

2.3 PIPING JOINING MATERIALS
A. Solder Filler Metals: ASTM B 32, lead-free alloys.
B. Flux: ASTM B 813, water flushable.

2.4 DIELECTRIC FITTINGS
A. See Section 220500 “Basic Plumbing Materials and Methods”.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION
A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
B. Install shutoff valve immediately upstream of each dielectric fitting.
C. Install domestic water piping level without pitch and plumb.
D. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices in Section 200800 "Seismic Protection."
E. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
F. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
G. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
H. Install piping to permit valve servicing.
I. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
J. Install piping free of sags and bends.
K. Install fittings for changes in direction and branch connections.
L. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
M. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 221123 "Domestic Water Pumps."
N. Install thermometers on[**inlet and**] outlet piping from each water heater. Comply with requirements for thermometers in Section 220519 "Meters and Gages."
O. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220500 “Basic Plumbing Materials and Methods."

3.2 JOINT CONSTRUCTION
A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
C. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
D. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.
E. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.3 DIELECTRIC FITTING INSTALLATION
A. See section 220500 “Basic Plumbing Material and Methods”.

3.4 CONNECTIONS
A. Drawings indicate general arrangement of piping, fittings, and specialties.
B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
3. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.5 IDENTIFICATION
A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."
B. Label pressure piping with system operating pressure.

3.6 FIELD QUALITY CONTROL
A. Perform the following tests and inspections:
1. Piping Inspections:
a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
2. Piping Tests:
a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
f. Prepare reports for tests and for corrective action required.
B. Domestic water piping will be considered defective if it does not pass tests and inspections.
C. Prepare test and inspection reports.

3.7 ADJUSTING
A. Perform the following adjustments before operation:
1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
a. Adjust calibrated balancing valves to flows indicated.
4. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
6. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
7. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.8 CLEANING
A. Clean and disinfect potable domestic water piping as follows:
1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
b. Fill and isolate system according to either of the following:
1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
d. Repeat procedures if biological examination shows contamination.
e. Submit water samples in sterile bottles to authorities having jurisdiction.
B. Clean non-potable domestic water piping as follows:
1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:
a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
C. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.
D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.9 PIPING SCHEDULE
A. Aboveground domestic water piping, NPS 2 and smaller, shall be one of the following:
1. Hard copper tube, ASTM B 88, Type L; wrought-copper, solder-joint fittings; and soldered joints.
2. Hard copper tube, ASTM B 88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.
B. Aboveground domestic water piping, NPS 2-1/2 to NPS 4, shall be one of the following:
1. Hard copper tube, ASTM B 88, Type L; wrought-copper, solder-joint fittings; and soldered joints.
2. Hard copper tube, ASTM B 88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.

3.10 VALVE SCHEDULE
A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
1. Shutoff Duty: Use ball valves for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
2. Hot-Water Circulation Piping, Balancing Duty: Calibrated balancing valves.
3. Drain Duty: Hose-end drain valves.
B. Use check valves to maintain correct direction of domestic water flow to and from equipment.
END OF SECTION 221116

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
B. Section 22 0100 “Basic Plumbing Requirements,” and Section 22 0500 “Basic Plumbing Materials and Methods” all apply to the work of this Section as if fully repeated herein.
1.2 SUMMARY
A. Section Includes:
1. Water-hammer arresters.
2. Trap-seal primer valves.
B. Related Requirements:
1. Section 221116 "Domestic Water Piping" for water meters.
2. Section 224300 "Plumbing Fixtures" for thermostatic mixing valves for sitz baths, thermostatic mixing-valve assemblies for hydrotherapy equipment, and outlet boxes for dialysis equipment.
1.3 ACTION SUBMITTALS
A. Product Data: For each type of product.
B. Shop Drawings: For domestic water piping specialties.
1.4 INFORMATIONAL SUBMITTALS
A. Field quality-control reports.
1.5 CLOSEOUT SUBMITTALS
A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES
A. Potable-water piping and components shall comply with NSF 61 Annex G and NSF 14.
2.2 PERFORMANCE REQUIREMENTS
A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.
2.4 TEMPERATURE-ACTUATED, WATER MIXING VALVES
A. Individual-Fixture, Water Tempering Valves
1. Acceptable manufacturers: Leonard, Bradley, Zurn and Wilkins.
2. Standard: **ASSE 1016** (ASSE 1016 for Bath and Shower) **ASSE 1070** (ASSE 1070 for sinks lavatories and baths, required by UPC and IPC), thermostatically controlled, water tempering valve.
3. Pressure Rating: 125 psig (860 kPa) minimum unless otherwise indicated.
4. Body: Bronze body with corrosion-resistant interior components.
5. Temperature Control: Adjustable.
6. Inlets and Outlet: Threaded.
7. Finish: Rough or chrome-plated bronze.
8. Tempered-Water Setting: **105 °F (for showers and baths)**.
2.5 WATER-HAMMER ARRESTERS
A. Water-Hammer Arresters:
1. Acceptable manufacturers: PPP Inc., WATTS, Sioux Chief.
2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: **Copper tube with piston**.
4. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.
2.6 TRAP-SEAL PRIMER DEVICE
A. Supply-Type, Trap-Seal Primer Device (TP-“X”):
1. Acceptable manufacturers: PPP Inc., Sioux Chief and WATTS.
2. Standard: ASSE 1018.
3. Pressure Rating: 125 psig (860 kPa) minimum.
4. Body: Bronze.
5. Inlet and Outlet Connections: NPS 1/2 (DN 15) threaded, union, or solder joint.
6. Gravity Drain Outlet Connection: NPS 1/2 (DN 15) threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.
B. Drainage-Type, Trap-Seal Primer Device
1. Acceptable manufacturers: Mifab, Jay R. Smith and PPP Inc.
2. Standard: ASSE 1044, lavatory P-trap with NPS 3/8 (DN 10) minimum, trap makeup connection.
3. Size: NPS 1-1/4 (DN 32) minimum.
4. Material: Chrome-plated, cast brass.

PART 3 - EXECUTION

3.1 INSTALLATION
A. Install temperature-actuated, water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.
1. Install cabinet-type units recessed in or surface mounted on wall as specified.
B. Install water-hammer arresters in water piping according to PDI-WH 201.
C. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
D. Install drainage-type, trap-seal primer valves as lavatory trap with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting.
3.2 CONNECTIONS
A. Comply with requirements for ground equipment in Section 260526 "Grounding and Bonding for Electrical Systems."
B. Fire-retardant-treated-wood blocking is specified in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for electrical connections.
3.3 FIELD QUALITY CONTROL
A. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.
B. Prepare test and inspection reports.
3.4 ADJUSTING
A. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.
END OF SECTION 221119

SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
B. Section 220100 “Basic Plumbing Requirements,” and Section 220500 “Basic Plumbing Materials and Methods” all apply to the work of this Section as if fully repeated herein.
1.2 SUMMARY
A. Section Includes:
1. Cleanouts.
2. Through-penetration firestop assemblies.
3. Miscellaneous sanitary drainage piping specialties.
4. Floor drains.
1.3 DEFINITIONS
A. PVC: Polyvinyl chloride.
B. FRP: Fiberglass-reinforced plastic.
C. HDPE: High-density polyethylene.
D. PE: Polyethylene.
E. PP: Polypropylene.
1.4 ACTION SUBMITTALS
A. Product Data: For each type of product. Include rated capacities, operating characteristics, and accessories for the following:
B. Shop Drawings:
1. Show fabrication and installation details for frost-resistant vent terminals.
1.5 INFORMATIONAL SUBMITTALS
A. Field quality-control reports.
1.6 CLOSEOUT SUBMITTALS
A. Operation and Maintenance Data: For sanitary waste piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTIONS
A. Sanitary waste piping specialties shall bear label, stamp, or other markings of specified testing agency.
B. Comply with NSF 14 for plastic sanitary waste piping specialty components.
C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing, and marked for intended location and application.
2.2 CLEANOUTS
A. Cast-Iron Exposed Cleanouts:
1. manufacturers are J. R. Smith, Josam, and Zurn.
2. Standard: ASME A112.36.2M.
3. Size: Same as connected drainage piping
4. Body Material: **Hubless** as required to match connected piping.
5. Closure: **Countersunk or raised-head**, brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
B. 2.3 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES
A. Floor-Drain, Trap-Seal Primer Fittings:
1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
2. Size: Same as floor drain outlet with NPS 1/2 (DN 15) side inlet.
2.4 DRAIN ASSEMBLIES
A. Sanitary drains shall bear label, stamp, or other markings of specified testing agency.
B. Comply with NSF 14 for plastic sanitary piping specialty components.
2.5 FLOOR DRAINS
A. Cast-Iron Floor Drains:
1. manufacturers are Josam, J. R. Smith and Zurn.
2. Refer to drain schedule in drawing set.

PART 3 - EXECUTION

3.1 INSTALLATION
A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.
C. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
D. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
E. Install through-penetration firestop assemblies in plastic [**conductors**] [**and**] [**stacks**] at floor penetrations.
1. Comply with requirements in Section 078413 "Penetration Firestopping."
F. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
2. Size: Same as floor drain inlet.
G. Install fire-rated wood-blocking reinforcement for wall-mounting-type specialties.
H. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.
I. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
1. Position floor drains for easy access and maintenance.
2. Set floor drains below elevation of surrounding finished floor to allow floor drainage.
3. Set with grates depressed according to the following drainage area radii:
a. Radius, 30 Inches (750 mm) or Less: Equivalent to 1 percent slope, but not less than 1/4-inch (6.35-mm) total depression.
b. Radius, 30 to 60 Inches (750 to 1500 mm): Equivalent to 1 percent slope.
c. Radius, 60 Inches (1500 mm) or Larger: Equivalent to 1 percent slope, but not greater than 1-inch (25-mm) total depression.
4. Install floor-drain flashing collar or flange, so no leakage occurs between drain and adjoining flooring.
a. Maintain integrity of waterproof membranes where penetrated.
5. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
3.2 CONNECTIONS
A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.
B. Install piping adjacent to equipment to allow service and maintenance.
3.3 LABELING AND IDENTIFYING
A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign:
B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit.
1. Nameplates and signs are specified in Section 220500 Basic Plumbing Materials and Methods."
3.4 PROTECTION
A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
B. Place plugs in ends of uncompleted piping at end of each day or when work stops.
END OF SECTION 221319

SECTION 224300 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
B. Section 220100 “Basic Plumbing Requirements,” and Section 220500 “Basic Plumbing Materials and Methods” all apply to the work of this Section as if fully repeated herein.
1.2 SUMMARY
A. Section includes the following fixtures and specialties:
1. Water closets.
2. Flushometer valves.
3. Toilet seats.
4. Showers.
5. Supports.
6. Lavatories.
1.3 ACTION SUBMITTALS
A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fixtures.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
B. Shop Drawings: Include diagrams for power, signal, and control wiring.
1.4 CLOSEOUT SUBMITTALS
A. Operation and Maintenance Data: For plumbing fixtures and faucets to include in operation and maintenance manuals.
1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
a. Servicing and adjustments of **flushometer valves**, **electronic sensors**.

PART 2 - PRODUCTS

2.1 WATER CLOSETS
A. Water Closets.
1. Acceptable manufacturers: Kohler, American Standard and Sloan.
2.2 FLUSH VALVES
A. Flush valves.
1. Acceptable manufacturers: Sloan, Zurn and Moen.
2.3 LAVATORIES
A. Lavatories.
1. Acceptable manufacturers: Kohler, American Standard and Sloan.
2.4 LAVATORY FAUCETS
A. Lavatory faucets.
1. Acceptable manufacturers: Sloan, T&S, American Standard, Kohler, Delta, Zurn and Chicago Faucet.
2. For public lavatories include ASSE 1070 certified mixing device, see Section 221119 “Domestic Water Piping Specialties”.
2.5 TOILET SEATS
A. Toilet Seats.
1. Acceptable manufacturers: Bemis, Church, and Beneke.
2.6 SHOWERS
A. Showers.
1. Acceptable manufacturers: Best Bath, Aquarios and Aqua Bath.
2.7 BATHTUB & SHOWER FAUCETS
A. Bathtub & shower faucets.
1. Acceptable manufacturers: Powers, Symmons, Zurn, Acorn and Bradley

2.8 LAMINAR-FLOW, FAUCET-SPOUT OUTLETS
A. Description: Chrome-plated brass, faucet-spout outlet that produces non-aerating, laminar stream. Include external or internal thread that mates with faucet outlet for attachment to faucets where indicated and flow-rate range that includes faucet flow.
B. NSF Standard: Comply with NSF 61 Annex G, "Drinking Water System Components - Health Effects," for faucet-spout-outlet materials that will be in contact with potable water.
2.9 SUPPORTS (CARRIERS)
A. Supports (carriers).
1. Acceptable manufacturers: Zurn, Josam and Jay R. Smith.
2.10 SUPPLY FITTINGS
A. NSF Standard: Comply with NSF 61 Annex G, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.
B. Standard: ASME A112.18.1/CSA B125.1.
C. Supply Piping: Chrome-plated brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass or stainless-steel wall flange.
D. Supply Stops: Chrome-plated brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
E. Operation: Loose key.
F. Risers: NPS 1/2 **chrome-plated, rigid-copper pipe and brass straight or offset tailpieces**.
2.11 WASTE FITTINGS
A. Waste fittings
1. Acceptable manufacturers: Keeney Mfg, Wolverine Brass and Dearborn Brass.
2.12 GROUT
A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
B. Characteristics: Nonshrink; recommended for interior and exterior applications.
C. Design Mix: 5000-psi, 28-day compressive strength.
D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine roughing-in of water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before fixture installation.
B. Examine walls, floors, cabinets, and counters for suitable conditions where fixtures will be installed.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 INSTALLATION
A. Install plumbing fixtures level and plumb according to roughing-in drawings & manufacturer’s instructions.
B. Install supports, affixed to building substrate, for wall-mounted fixtures.
1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
C. Install floor-mounted water closets on bowl-to-drain, connecting fitting attachments to piping or building substrate.
D. Install counter-mounted fixtures in and attached to casework.
E. Install water-supply piping with stop on each supply to each fixture, including showers, to be connected to water-distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
1. Exception: Use ball or gate valve if supply stops are not specified with fixture. Comply with valve requirements specified in Section 220523 "Ball Valves.”
F. Install flushometer valves on water closets & urinals.
G. Install flushometer valves for accessible water closets & urinals with lever handle mounted on wide side of compartment.
H. Install toilet seats on water closets.
I. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts, if faucets are not available with required rates and patterns. Include adapters if required.
J. Install laminar-flow, faucet-spout fittings in faucet spouts where laminar-flow fittings are specified.
K. Install shower flow-control fittings with specified maximum flow rates in shower arms.
L. Install traps on fixture outlets.
1. Exception: Omit trap on fixtures with integral traps.
M. Set showers in leveling bed of cement grout.
N. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."
O. Seal joints between plumbing fixtures, counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."
P. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220500 “Valves.."
Q. Install accessible plumbing fixtures at handicapped/elderly mounting heights according to ICC/ANSI A117.1.
R. Install an ASSE 1070 mixing device at each point of use location for every public lavatory.
3.3 CONNECTIONS
A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
B. Comply with requirements for water piping specified in Section 221116 "Domestic Water Piping."
C. Comply with requirements for soil and waste drainage piping and vent piping specified in Section 221316 "Sanitary Waste and Vent Piping."
D. Comply with requirements for atmospheric vent piping specified in Section 221316 "Sanitary Waste and Vent Piping."
E. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."
3.4 ADJUSTING
A. Operate and adjust faucets and controls. Replace damaged and malfunctioning plumbing fixtures, fittings, and controls.
B. Adjust water pressure at [**faucets**] [**and**] [**flushometer valves**] to produce proper flow.
C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.
3.5 CLEANING AND PROTECTION
A. After installing plumbing fixtures, inspect and repair damaged finishes.
B. Clean plumbing fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
C. Provide protective covering for installed fixtures and fittings.
D. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.
END OF SECTION 224300

SECTION 221316 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
B. Section 220100 “Basic Plumbing Requirements,” and Section 220500 “Basic Plumbing Materials and Methods” all apply to the work of this Section as if fully repeated herein.
1.2 SUMMARY
A. Section Includes:
1. Pipe, tube, and fittings.
2. Specialty pipe fittings.
B. Related Requirements:
1.3 ACTION SUBMITTALS
A. Product Data: For each type of product.
1.4 INFORMATIONAL SUBMITTALS
A. Seismic Qualification Certificates: For waste and vent piping, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Detailed description of piping anchorage devices on which the certification is based and their installation requirements.
B. Field quality-control reports.
1.5 FIELD CONDITIONS
A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
1. Notify Construction Manager and Owner no fewer than two weeks in advance of proposed interruption of sanitary waste service.
2. Do not proceed with interruption of sanitary waste service without Owner's written permission.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS
A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:
1. Soil, Waste, and Vent Piping: 10-foot head of water.
B. Seismic Performance: Soil, waste, and vent piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
2.2 PIPING MATERIALS
A. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) ® and listed by NSF International.
B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
C. Pipe and Fittings shall be “Made In The U.S.A”.
2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS
A. Pipe and Fittings: ASTM A 74, **Extra Heavy** class(es).
B. Gaskets: ASTM C 564, rubber.
C. Tensile Strength: 21,000 psig minimum.
D. Each length of pipe and each fitting shall be plainly marked with size, country of origin, and name of manufacturer, or manufacturer’s registered trademark by which the manufacturer can be readily identified after installation.
2.4 SPECIALTY PIPE FITTINGS
A. Transition Couplings:
1. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
2. Unshielded, Non-pressure Transition Couplings:
a. Acceptable manufacturers; Fernco, Anaco-Huskey, and Joints Coupling.
b. Standard: ASTM C 1173.
c. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
d. End Connections: Same size as and compatible with pipes to be joined.
e. Sleeve Materials:
1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.
3. Shielded, Non-pressure Transition Couplings:
a. http://www.specagent.com/LookUp/?ulid=2174&mf=04&src=wdAcceptable manufacturers; Mission, MIFAB, or CREMCO.
b. Standard: ASTM C 1460.
c. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
d. End Connections: Same size as and compatible with pipes to be joined.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION
A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.
1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
2. Install piping as indicated unless deviations to layout are approved on coordination drawings.
B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
C. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
D. Install piping to permit valve servicing.
E. Install piping at indicated slopes.
F. Install piping free of sags and bends.
G. Install fittings for changes in direction and branch connections.
H. Install piping to allow application of insulation.
I. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 200800 “Seismic Protection”. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.
1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
2. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.
a. Straight tees, elbows, and crosses may be used on vent lines.
3. Do not change direction of flow more than 90 degrees.
4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.
a. Reducing size of waste piping in direction of flow is prohibited.
J. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:
1. Building Sanitary Waste: 2 percent downward in direction of flow for piping NPS 3 (DN 80) and smaller; **1**percent downward in direction of flow for piping NPS 4 (DN 100) and larger.
2. Horizontal Sanitary Waste Piping: **2** percent downward in direction of flow.
3. Vent Piping: **1** percent down toward vertical fixture vent or toward vent stack.
K. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
1. Install encasement on underground piping according to ASTM A 674 or AWWA C105/A 21.5.
L. Plumbing Specialties:
1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary waste gravity-flow piping.
a. Comply with requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."
2. Install drains in sanitary waste gravity-flow piping.
a. Comply with requirements for drains specified in Section 221319 "Sanitary Waste Piping Specialties."
M. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
N. Install sleeves for piping penetrations of walls, ceilings, and floors.
1. Comply with requirements for sleeves specified in Section 220500 “Basic Plumbing Material and Methods."
3.2 JOINT CONSTRUCTION
A. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
B. Plastic, Non-pressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 appendixes.
3.3 SPECIALTY PIPE FITTING INSTALLATION
A. Transition Couplings:
1. Install transition couplings at joints of piping with small differences in ODs.
2. In Waste Drainage Piping: Unshielded, non-pressure transition couplings.
3.4 CONNECTIONS
A. Drawings indicate general arrangement of piping, fittings, and specialties.
B. Connect waste and vent piping to the following:
1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
5. Comply with requirements for cleanouts and drains specified in Section 221319 "Sanitary Waste Piping Specialties."
3.5 IDENTIFICATION
A. Identify exposed sanitary waste and vent piping.
B. Comply with requirements for identification specified in Section 220500 "Basic Plumbing Materials and Methods"
3.6 FIELD QUALITY CONTROL
A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
D. Test sanitary waste and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.
a. Expose work that was covered or concealed before it was tested.
3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.
a. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water.
b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
c. Inspect joints for leaks.
4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight.
a. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg.
b. Use U-tube or manometer inserted in trap of water closet to measure this pressure.
c. Air pressure must remain constant without introducing additional air throughout period of inspection.
d. Inspect plumbing fixture connections for gas and water leaks.
5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.
3.7 CLEANING AND PROTECTION
A. Clean interior of piping. Remove dirt and debris as work progresses.
B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
C. Place plugs in ends of uncompleted piping at end of day and when work stops.
D. Repair damage to adjacent materials caused by waste and vent piping installation.
3.8 PIPING SCHEDULE
A. Aboveground, soil and waste piping NPS 4 and smaller shall be any of the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings and hubless, CISPI hubless-piping couplings; and coupled joints.
3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
B. Aboveground, vent piping NPS 4 and smaller shall be any of the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
END OF SECTION 221316

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Owner
UNIVERSITY OF MISSOURI HEALTHCARE

TORI JANELLE GILLESPIE
NUMBER PE-2018000203
1/13/2022

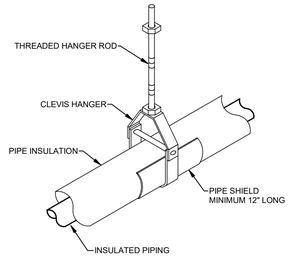
Tori Janelle Gillespie, P.E.
PE-2018000203

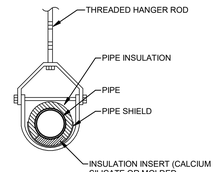
Issue Date: 01.13.2022
Issue: Date:

Drawn by: MAS
MU Project #: CP212341

P401
PLUMBING SPECIFICATIONS CONTINUED

BID DOCUMENTS



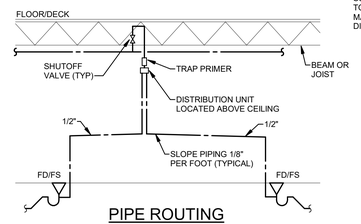


SECTION THRU HANGER

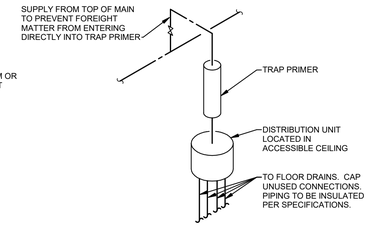
REFER TO SPECS FOR INSULATION AND HANGER SUPPORTS.

1 INSULATED PIPE HANGER SUPPORT

NONE



PIPE ROUTING



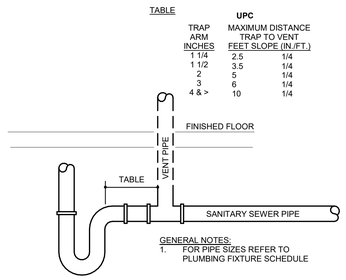
CONNECTION DETAIL

2 TRAP PRIMER

NONE

TABLE

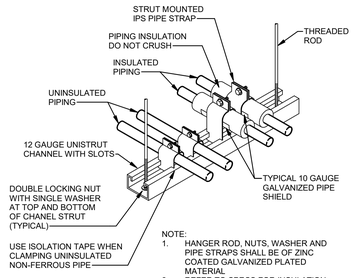
TRAP ARM INCHES	UPC MAXIMUM DISTANCE TRAP TO VENT FEET	SLOPE (IN./FT.)
1 1/4	2.5	1/4
1 1/2	3.5	1/4
2	5	1/4
3	6	1/4
4 & >	10	1/4



GENERAL NOTES:
1. FOR PIPE SIZES REFER TO PLUMBING FIXTURE SCHEDULE

3 TRAP TO VENT MAXIMUM DISTANCE

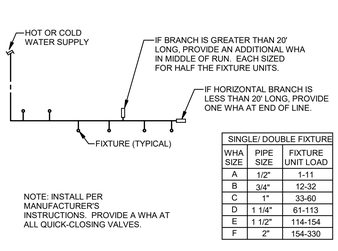
NONE



NOTE:
1. HANGER ROD, NUTS, WASHER AND PIPE STRAPS SHALL BE OF ZINC COATED GALVANIZED PLATED MATERIAL
2. REFER TO SPECS FOR INSULATION.

4 TRAPEZE PIPE SUPPORT

NONE

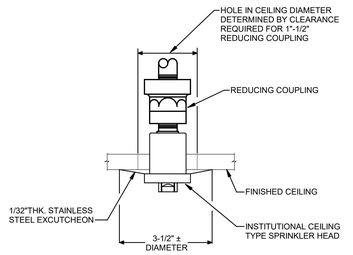


NOTE: INSTALL PER MANUFACTURER'S INSTRUCTIONS. PROVIDE A WHA AT ALL QUICK-CLOSING VALVES.

SINGLE/ DOUBLE FIXTURE		
WHA SIZE	PIPE SIZE	FIXTURE UNIT LOAD
A	1/2"	1-11
B	3/4"	12-32
C	1"	33-60
D	1 1/4"	61-113
E	1 1/2"	114-154
F	2"	154-330

5 WATER HAMMER ARRESTOR SCHEMATIC

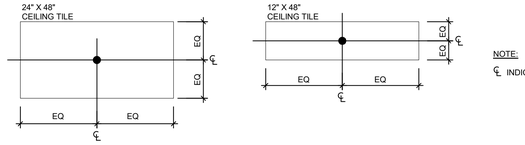
NONE

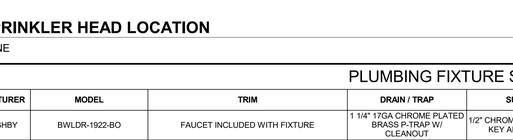


NOTE:
IF CEILING TEMPERATURE IS UNDER 100°F USE 165°F HEAD, IF OVER 100°F USE 212°F HEAD

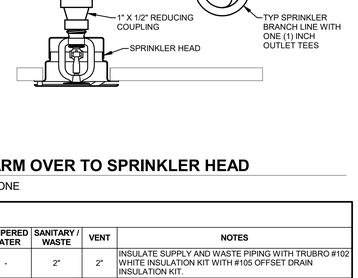
6 INSTITUTIONAL SPRINKLER HEAD

NONE





NOTE:
℄ INDICATES CENTERLINE OF SPRINKLER HEAD



7 SPRINKLER HEAD LOCATION

NONE

8 ARM OVER TO SPRINKLER HEAD

NONE

PLUMBING FIXTURE SCHEDULE

PLAN MARK	DESCRIPTION	MANUFACTURER	MODEL	TRIM	DRAIN / TRAP	SUPPLIES	CARRIER	SEAT	HOT WATER	COLD WATER	TEMPERED WATER	SANITARY / WASTE	VENT	NOTES
LA-1	LIGATURE RESISTANT WALL HUNG LAVATORY, ADA	WILLOUGHBY	BWLDR-1922-BO	FAUCET INCLUDED WITH FIXTURE	1 1/4" 17GA CHROME PLATED BRASS P-TRAP W/ CLEANOUT	1/2" CHROME PLATED LOOSE KEY ANGLE STOPS	JAY R. SMITH	-	1/2"	1/2"	-	2"	2"	INSULATE SUPPLY AND WASTE PIPING WITH TRUBRO #102 WHITE INSULATION KIT WITH #105 OFFSET DRAIN INSULATION KIT.
SH-1	LIGATURE RESISTANT SHOWER, ADA	BASIN BY OTHERS	-	WILLOUGHBY MODEL ASWRS-BF-FA-PZPB-CSH-ASFX-ASDV-AQBN-PT-K-17-TMV-TF24H	FD-1	INTEGRAL	-	-	1/2"	1/2"	-	2"	2"	
WC-1	LIGATURE RESISTANT, FLOOR MOUNTED WALL OUTLET WATER CLOSET, ADA	WILLOUGHBY	ASETWS-1490-FM-BS-HC-1.6-TWC4C-AP-DC-WUFCB-5200	INCLUDED WITH FIXTURE	INTEGRAL	-	-	INTEGRAL	-	1-1/4"	-	4"	2"	

DRAIN SCHEDULE

PLAN MARK	DESCRIPTION	MANUFACTURER	MODEL	BODY	STRAINER	NOTES
FD-1	LIGATURE RESISTANT FLOOR DRAIN	WILLOUGHBY	LRFD	CAST IRON	STAINLESS STEEL	PROVIDE TRAP PRIMER CONNECTION

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STATE OF MISSOURI
TORI JANELLE GILLESPIE
NUMBER PE-2018000203
01/13/2022
PROFESSIONAL ENGINEER

Tori Janelle Gillespie, P.E.
PE-2018000203

Issue Date: 01.13.2022

Issue:	Date:

Drawn by: MAS

MU Project #: CP212341

PFP600
PLUMBING & FIRE PROTECTION DETAILS & SCHEDULES

BID DOCUMENTS

FIRE PROTECTION GENERAL NOTES - EXISTING PROJECT

1. ALL WORK SHALL BE PERFORMED, INSTALLED, AND TESTED IN COMPLIANCE WITH THE CODES AND AMENDMENTS ADOPTED BY THE INSPECTION AUTHORITY. NOTHING IN THESE PLANS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THIS PROJECT:
   A. 2018 - IFC
   B. 2018 - IBC
   C. UFC 3-600-01
   D. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
   E. NATIONAL FIRE PROTECTION ASSOCIATION EDITIONS LISTED IN THE IBC OR MOST CURRENT EDITIONS OF THE FOLLOWING
      a. NFPA 13
      b. NFPA 14
      c. NFPA 20
      d. NFPA 24
      e. NFPA 25
2. THE WORK CONSISTS OF FURNISHING ALL LABOR AND MATERIALS NECESSARY TO INSTALL, COMPLETE AND READY CONTINUOUS OPERATION, THE FIRE PROTECTION SYSTEMS, APPARATUS AND EQUIPMENT FOR THIS PROJECT, AS SHOWN ON THE DRAWINGS, PLUS AS REQUIRED BY NFPA 13 AND THE AUTHORITY HAVING JURISDICTION (AHJ).
3. THE CONTRACTOR SHALL INCLUDE IN THEIR BID, A FULLY CODE COMPLIANT AND COORDINATED SPRINKLER SYSTEM. PROJECT SHALL BE DESIGNED, CONSTRUCTED, AND TESTED PER THE NFPA STANDARDS AND/OR FM GLOBAL REQUIREMENTS.
4. THESE DRAWINGS ARE ACCURATE TO THE BEST OF OUR KNOWLEDGE, HOWEVER, LOCATIONS, DEPTHS, ELEVATIONS AND SIZES WERE TAKEN FROM DIFFERENT SOURCES AND ARE SUBJECT TO DEVIATION. THE CONTRACTOR SHALL ASSUME SOME DEVIATIONS AND INCLUDE OFFSETS, ADDITIONAL PIPING, ETC AT THE TIME OF BID.
5. ALL SYSTEMS, EQUIPMENT, AND MATERIALS ARE TO BE INSTALLED IN A NEAT WORKMAN LIKE MANNER, WORK NOT DONE SO SHALL BE REMOVED AND REINSTALLED SATISFACTORILY.
6. THE FIRE PROTECTION BID IS A DESIGN/BUILD CONTRACT. BEFORE SUBMITTING THE BID, THE CONTRACTOR SHALL VISIT THE SITE AND BECOME THOROUGHLY FAMILIAR WITH ALL EXISTING CONDITIONS AND VERIFY LOCATIONS, ELEVATIONS, AND SIZES OF ALL UTILITIES AT SITE PRIOR TO PROCEEDING WITH WORK. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY ASSUMPTIONS, OMISSIONS, OR ERRORS MADE AS A RESULT OF THE FAILURE TO BECOME FULLY FAMILIAR WITH EXISTING CONDITIONS. EXISTING SYSTEMS AND STRUCTURE SHALL BE INVESTIGATED FOR BEST POSSIBLE ROUTING OF FIRE PROTECTION PIPING.
7. WHEN PLACING NEW SPRINKLERS AND ROUTING NEW SPRINKLER PIPING, CONTRACTOR SHALL VERIFY LOCATIONS OF POTENTIAL OBSTRUCTIONS FROM MECHANICAL EQUIPMENT AND ARCHITECTURAL FEATURES PRIOR TO BID AND PRICE ACCORDINGLY TO MAKE ALLOWANCES IN BID.
8. THE CONTRACTOR SHALL SUBMIT ALL DRAWINGS AND CALCULATIONS TO THE FIRE DEPARTMENT, GOVERNING AGENCIES, AND INSURING AGENCY AND RECEIVE APPROVAL PRIOR TO SUBMITTING DESIGN SHOP DRAWINGS.
9. SUBMIT ACCURATE AS-BUILT DRAWINGS TO THE ENGINEER AND OWNER.
10. IF THIS CONTRACTOR DOES NOT CLEARLY UNDERSTAND THESE PLANS OR IS NOT COMPLETELY SURE OF THEIR MEANING, THIS CONTRACTOR SHOULD OBTAIN THE ENGINEER'S WRITTEN EXPLANATION AND/OR INTERPRETATION PRIOR TO SUBMITTING BIDS, SINCE THIS CONTRACTOR WILL BE HELD RIGIDLY TO THE INTERPRETATION OF THE ENGINEER.
11. THESE PLANS ARE DIAGRAMMATIC IN NATURE SINCE THE ONLY AVAILABLE INFORMATION HAS BEEN OBTAINED FROM EXISTING PLANS, SPECIFICATIONS, AND FILED SURVEYS. THE EXACT LOCATION OF PIPING AND EQUIPMENT MAY DEVIATE FROM THE LOCATION INDICATED BY THESE DRAWINGS. EXTREME ACCURACY IS NOT GUARANTEED. THIS CONTRACTOR SHALL BE PREPARED TO MAKE ALTERATIONS TO NEW AND/OR EXISTING SERVICES TO FIT JOB CONDITIONS. THIS CONTRACTOR SHALL REPORT, IN WRITING, ANY DISCREPANCIES WHICH PREVENT THE INSTALLATION OF WORK AS SHOWN.
12. IT IS ASSUMED THAT AREAS OUTSIDE THE SCOPE OF WORK ARE TESTED, MAINTAINED, AND MEET THE CODE REQUIREMENTS WHEN IT WAS INSTALLED, AND THE EXISTING SYSTEM IS ACCEPTED BY THE LOCAL AHJ. WORK PERFORMED WITHIN SCOPE OF WORK WILL PROVIDE A SYSTEM TO MEET THE REQUIREMENTS SET BY THE AHJ LIMITED BY THE BOUNDARY OF WORK.
13. THE SPRINKLER CONTRACTOR PRIOR TO TIME OF BID SHALL EVALUATE THE SITE AND VERIFY ALL SPRINKLER PIPING AND EQUIPMENT THAT IS EXISTING TO REMAIN WITHIN OR SERVING THE SCOPE OF WORK, IS IN GOOD WORKING CONDITION.
14. FURNISH AND INSTALL TAMPER SWITCHES ON ALL INDICATING VALVES AND FLOW SWITCHES PER NFPA 13 REQUIREMENTS AND PER THE DESIGN DOCUMENTS BY THE CONTRACTOR.
15. THE CONTRACTOR SHALL FURNISH DRAIN VALVES AND INSPECTOR'S TEST CONNECTIONS AS REQUIRED BY NFPA 13 REQUIREMENTS AND AT THE DISCRETION OF THE FIRE MARSHAL, ENGINEER OR GOVERNING AGENCY.
16. ALL OPENINGS THROUGH FIRE RATED FLOORS, WALLS, OR PARTITIONS SHALL BE FIRE STOPPED WITH UL RATED ASSEMBLIES OF EQUAL OR GREATER FIRE RATING. REFER TO FIRE STOPPING NOTES FOR ADDITIONAL INFORMATION.
17. COORDINATE WITH STRUCTURAL ENGINEER WHEN SAW-CUTTING THROUGH CONCRETE FLOOR OR WALL CONSTRUCTION. LEAVE SUFFICIENT REBAR EXPOSED TO TIE NEW REINFORCING REPLACEMENT CONCRETE AND/OR OTHER STRUCTURAL ATTACHMENTS FOR NEW CONSTRUCTION.
18. VALVES, TAMPER SWITCHES, OR ANY MECHANICAL/ELECTRICAL ITEM SHALL NOT BE LOCATED ABOVE A HARD CEILING, UNLESS PROVIDED WITH EQUIVALENTLY RATED ACCESS AND SIGNAGE MEETING NFPA 13 REQUIREMENTS.
19. SPRINKLERS SHALL BE LOCATED IN THE CENTER OF CEILING TILES, COORDINATE FINAL LAYOUT WITH ARCHITECT, AND OTHER DISCIPLINES.
20. THE SPRINKLER CONTRACTOR SHALL OBTAIN AND UTILIZE THE ARCHITECTURAL REFLECTED CEILING PLAN FOR THE LOCATING OF SPRINKLER HEADS. REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR CEILING DEVICE LOCATIONS AND THE SPECIFICATIONS FOR COORDINATION DRAWING REQUIREMENTS.
21. PIPING SHALL BE INSTALLED AT LEAST 12" ABOVE FINISHED CEILING ELEVATION TO ALLOW FOR SUITABLE ACCESS ABOVE CEILING.
22. INSTALL NO PIPING IN A LOCATION OR MANNER WHICH WILL ALLOW FREEZING.
23. COORDINATE PIPE ROUTING NEAR ELECTRICAL EQUIPMENT PER NFPA 70. PIPING IS NOT TO BE ROUTED ABOVE ELECTRICAL PANELS, TRANSFORMERS, COMPUTER RACKS ETC. FIELD VERIFY AND COORDINATE WITH ELECTRICAL CONTRACTOR ALL EXISTING AND NEW ELECTRICAL LOCATIONS PRIOR TO DESIGN OF THE FIRE PROTECTION PLANS.
24. ROUTING OF SPRINKLER MAINS, BRANCHLINES, AND HEADS SHALL BE THOROUGHLY COORDINATED WITH ALL OTHER DISCIPLINES AND BUILDING STRUCTURE PRIOR TO SUBMISSION OF COORDINATED SHOP DRAWINGS. THIS IS OF THE UTMOST IMPORTANCE ESPECIALLY WHERE SPACE IS LIMITED. FIRE PROTECTION CONTRACTOR IS RESPONSIBLE FOR COORDINATING, PREPARING, AND SUBMITTING COORDINATION DRAWINGS FOR APPROVAL/REVIEW.
25. ADVISE THE ENGINEERS OF ANY CONFLICTS, ERRORS, OMISSIONS, ETC. AT LEAST 10 DAYS PRIOR TO BID DATE, TO ALLOW CLARIFICATION BY WRITTEN ADDENDUM.
26. IF SEISMIC BRACING IS REQUIRED, FIRE PROTECTION CONTRACTOR SHALL FURNISH AND INSTALL ALL END OF BRANCH LINE RESTRAINTS PER NFPA 13.
27. WHEN WORK REQUIRES TEMPORARY INTERRUPTIONS OF FIRE PROTECTION SERVICES OR UTILITIES THE FOLLOWING ACTIONS WILL BE TAKEN:
   A. COORDINATION WITH MAINTENANCE PERSONNEL TO SHUT OF SERVICES AT NEAREST MAIN.
   B. PROVIDE TEMPORARY AND ACCESSIBLE ISOLATION VALVES CLOSE TO THE POINT OF WORK.
   C. ENSURE BUILDING OPERATIONS CONTINUE WITH MINIMAL INTERRUPTIONS AND OPERATION OF EXISTING SYSTEMS BE INTERFACED WITH AS LITTLE DISRUPTION AS POSSIBLE EXCEPT IN VACATED AREAS.
   D. WORK INTERFERING WITH OPERATION OF DOWNTIME WILL BE SCHEDULED AFTER CONSULTATION WITH AND PERMISSION GIVEN BY OWNER **[10]** DAYS PRIOR TO ANTICIPATED INTERRUPTION OF SYSTEMS.
   E. SUCH WORK MAY BE REQUIRED TO BE PERFORMED OUTSIDE OF NORMAL WORKING HOURS.
   F. REFER TO FIRE WATCH NOTES FOR DISRUPTION OF FIRE SPRINKLER SYSTEMS IN OCCUPIED BUILDINGS WHEN DISRUPTION EXCEEDS 4 HOURS.

FIRE STOPPING NOTES

1. MATERIALS: USE ONLY FIRE STOP PRODUCTS THAT HAVE BEEN UL 1479, ASTM E-814, OR UL 2079 TESTED FOR SPECIFIC FIRE RATE CONSTRUCTION CONDITIONS CONFORMING TO CONSTRUCTION ASSEMBLY TYPE, PENETRATING ITEM TYPE, ANNULAR SPACE REQUIREMENTS, AND FIRE RATING INVOLVED FOR EACH SEPARATE INSTANCE.
2. FOR SINGLE PENETRATIONS: A READY-TO-USE LATEX BASED INTUMESCENT SEALANT IS REQUIRED TO MAINTAIN THE FIRE RATING OF THE ASSEMBLY PENETRATED. THE SEALANT MUST HAVE UL LISTING FOR BOTH SLEEVED AND NON-SLEEVED APPLICATIONS.
3. FOR LARGE OPENINGS: CONTAINING MULTIPLE PENETRATIONS (2 OR MORE), A READY-TO-USE FOAM INTUMESCENT BLOCK MATERIAL MUST BE ABLE TO BE REMOVED AND REINSTALLED WITHOUT COMPROMISING FIRE PROTECTION INTEGRITY. COMPLY WITH MANUFACTURER'S RECOMMENDED PROCEDURES AND PRECAUTIONS. DO NOT USE DAMAGED OR EXPIRED MATERIALS.
4. MANUFACTURERS: JOHNS MANVILLE INTERNATIONAL, 3M BRAND, CSD SEALING SYSTEMS, HILTI, CIBA-GEIGY, HEAVY-DUTY/NEALSON. REFER TO DIVISION 7 FOR FURTHER REQUIREMENTS.

FIRE PROTECTION DEMOLITION NOTES

1. PROTECT PIPING WHICH IS NOT TO BE REMOVED FROM DAMAGE, DIRT AND DEBRIS.
2. ALL FIRE EQUIPMENT AND MATERIALS NOT CLAIMED BY THE OWNER SHALL BE REMOVED FROM THE PREMISES AND PROPERLY DISPOSED OF BY THE DEMOLITION CONTRACTOR.
3. THE CONTRACTOR SHALL PLUG OR CAP ALL PIPING OUTLETS NOT INTENDED FOR REUSE.
4. CEILING REMOVAL, STORAGE, AND REPLACEMENT WILL BE MADE BY THE CONTRACTOR AND IT IS THE RESPONSIBILITY OF THIS CONTRACTOR TO REPAIR THE EXISTING SURFACES TO REMAIN WHERE THEIR WORK HAS BEEN COMPLETED. REPAIR INCLUDES BUT SHALL NOT BE LIMITED TO, ANY EXISTING WALL, CEILING, OR FLOOR THAT IS SCHEDULED TO REMAIN. REPAIR, PAINTING, AND PATCHING SHALL BE COMPLETED BY AN APPROPRIATE CONTRACTOR QUALIFIED FOR THIS TYPE OF WORK.
5. IF HAZARDOUS MATERIALS ARE ENCOUNTERED DURING DEMOLITION OPERATIONS, THE CONTRACTOR WILL NOTIFY BUILDING OWNER OF THE HAZARDOUS MATERIAL.
6. ARCHITECTURAL DEMOLITION DRAWINGS AND SPECIFICATIONS SHALL BE READ IN CONJUNCTION WITH THESE DRAWINGS.
7. THE CONTRACTOR SHALL COORDINATE DEMOLITION WORK WITH PROJECT'S PHASING SCHEDULE PRIOR TO ANY WORK

FIRE PROTECTION - FIRE WATCH

FIRE WATCH
BUILDING AND OCCUPANT SAFETY - INTERRUPTION OF FIRE PROTECTION SERVICE

1. DURING THE TIME THAT FIRE PROTECTION RENOVATION WORK IS BEING PERFORMED, AND THE FIRE PROTECTION SYSTEM IS DOWN AND OUT OF COMMISSION, THE FIRE PROTECTION CONTRACTOR SHALL HAVE SUFFICIENT PERSONNEL ONSITE TO KEEP A "FIRE WATCH" ON THE FACILITY.
2. A FIRE PROTECTION WATCH IS IMPLEMENTED TO ENSURE THE FIRE SAFETY OF A BUILDING IN THE EVENT OF ANY ACT, OR SITUATION INSTIGATING AN INCREASED RISK TO PERSONS OR PROPERTY. THE TERM "FIRE WATCH" IS USED TO DESCRIBE A DEDICATED PERSON OR PERSONS WHOSE SOLE RESPONSIBILITY IS TO LOOK FOR FIRES WITHIN AN ESTABLISHED AREA.
3. IN THE OPINION OF THE FIRE AND LIFE-SAFETY GROUP (FLS) OR FM GLOBAL (FM), ANY REQUIRED FIRE PROTECTION SYSTEM THAT IS OUT OF SERVICE FOR MORE THAN 4 HOURS AND OCCUPIED IS REQUIRED TO ESTABLISH A FIRE WATCH. FOR THE PERSON OR PERSONS ASSIGNED TO THE FIRE WATCH, THIS MUST BE THEIR ONLY JOB DUTY DURING THE TIME PERIOD OF THE FIRE PROTECTION RENOVATION WORK.
4. FIRE WATCH PERSONNEL ARE TO KEEP WATCH FOR FIRES IN THE GENERAL AREA OF PERFORMANCE, THE PERSONS PERFORMING THE FIRE WATCH ARE NOT PERMITTED TO PERFORM ANY OTHER DUTIES.
5. FIRE WATCH PERSONNEL ARE TO HAVE FIRE EXTINGUISHING EQUIPMENT READILY AVAILABLE AND TO BE TRAINED IN ITS USE.
6. THE QUANTITY OF PERSONNEL INVOLVED IN THE FIRE WATCH IS TO BE ADEQUATE SUCH THAT EACH FLOOR, LEVEL, AND ROOM OF THE FIRE AREA IS COVERED.
7. IN GENERAL, A FIRE WATCH IS TO FULFILL THE INTENT OF NFPA-72 AS FOLLOWS:
   A. NOTIFY OCCUPANTS TO EVACUATE WHEN THERE IS A FIRE IN THE BUILDING.
   B. NOTIFY THE CENTRAL MONITORING STATION TO INITIATE EMERGENCY PERSONNEL RESPONSE.
   C. ACTIVATE FIRE PROTECTION SYSTEMS IN ORDER TO RELEASE DOOR HOLDERS, CLOSE SMOKE DAMPERS AND SHUT DOWN FANS.
8. IF BUILDING OCCUPANTS ASSIST WITH FIRE WATCH DUTIES, THE PROCEDURES FOR CONTACTING EMERGENCY PERSONNEL AND EVACUATING THE BUILDING ARE TO BE DISTRIBUTED TO BUILDING OCCUPANTS. FOR PLANNED OUTAGES, THE PROCEDURES ARE TO BE SENT OUT TO THE BUILDING OWNER FOR DISTRIBUTION.

FIRE PROTECTION SYMBOLS & ABBREVIATIONS

NOT ALL SYMBOLS ARE USED FOR THIS PROJECT

	AIR VENT (AUTOMATIC)
	DOUBLE CHECK VALVE ASSEMBLY
	DRY PIPE VALVE
	ELECTRONIC SUPERVISED INDICATING VALVE
	FIRE DEPARTMENT VALVE (FDV)
	FLOW SWITCH
	PREACTION VALVE
	PRESSURE RELIEF VALVE
	SOLENOID VALVE
D	DRAIN LINE
DRY	DRY PIPE
F	FIRE MAIN (BULK)
SPR	SPRINKLER MAIN/BRANCH PIPING
	DRIP CONNECTION
	FIRE DEPARTMENT CONNECTION-FREE STANDING
	FIRE DEPARTMENT CONNECTION-WALL MOUNT
	FLUSH TYPE FIRE DEPARTMENT INLET CONNECTION
	FIRE PUMP TEST HEADER-WALL MOUNT
	FIRE PUMP TEST HEADER-FREE STANDING
EX	EXSTING SPRINKLER HEAD
EX	EXISTING SPRINKLER HEAD TO BE REMOVED
	SPRINKLER HEAD (SEE SCHEDULE FOR TYPE)
	SIDEWALL SPRINKLER HEAD (SEE SCHEDULE FOR TYPE)
AP	ACCESS PANEL
AC	AIR COMPRESSOR
AS	AUTOMATIC SPRINKLERS
BFP	BACKFLOW PREVENTER
BTC	BRANCH TO CONNECTION
CI	CAST IRON
DCVA	DOUBLE CHECK VALVE ASSEMBLY
DPV	DRY PIPE VALVE
DSP	DRY STANDPIPE PIPING
DSV	DRY STANDPIPE VALVE
FDC	FIRE DPARTMENT CONNECTION
FDV	FIRE DEPARTMENT VALVE
FEC	FIRE EXTINGUISHER CABINET
FHC	FIRE HOSE CABINET
FP	FIRE PUMP
FPC	FIRE PUMP CONTROLLER
FPTH	FIRE PUMP TEST HEADER
JP	JOCKEY PUMP
JPC	JOCKEY PUMP CONTROLLER
NAS	NO AUTOMATIC SPRINKLERS
NIC	NOT IN CONTRACT
PIV	POST INDICATOR VALVE
SP	SUMP PUMP
TS	TAMPER SWITCH

DRAWING REFERENCES

1 TITLE / SCALE	PLAN DETAIL REFERENCE TITLE
#	KEYED NOTE DESIGNATION
PLAN NORTH / TRUE NORTH	NORTH ARROW
AHU 1	PLAN MARK EQUIPMENT DESIGNATION REFER TO MEP SCHEDULE FOR CIRCUITING AND DEVICE REQUIREMENTS AND FLOOR PLANS FOR LOCATIONS
	EQUIPMENT NUMBER
1 SIM / A101	PLAN MARK ENLARGED PLAN REFERENCE SHEET NUMBER
1 / A0888	SECTION
	INTERFACE, EXISTING TO NEW
	EXTENT OF DEMOLITION
	MATCHLINE
1	REVISION TAG

LINE TYPE LEGEND

	EXISTING TO REMAIN OR NEW WORK BY OTHERS (LIGHT, SOLID LINE)
	NEW WORK BY THIS CONTRACTOR (DARK, SOLID LINE)
	EXISTING TO BE REMOVED BY THIS CONTRACTOR (DARK, DASHED LINE, DEMOLITION PLANS)

COMMON PIPING SYMBOLS & ABBREVIATIONS

NOT ALL SYMBOLS ARE USED FOR THIS PROJECT

	DIRECTION OF FLOW
	BRANCH CONNECTION, BOTTOM
	BRANCH CONNECTION, TOP
	ELBOW, TURNED DOWN
	ELBOW TURNED UP
	SHUTOFF VALVE
	CHECK VALVE
	PRESSURE REDUCING VALVE
	PRESSURE GAUGE
	UNION
	PIPING CAP
	CONCENTRIC REDUCER
	RISER DESIGNATION
AFF	ABOVE FINISH FLOOR
AHJ	AUTHORITIES HAVING JURISDICTION
AP	ACCESS PANEL
BOP	BOTTOM OF PIPE
DIA	DIAMETER
DN	DOWN
EX OR EXIST	EXISTING
FFE	FINISHED FLOOR ELEVATION
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
HP	HORSEPOWER
IE OR INV. ELEV	INVERT ELEVATION
NC	NORMALLY CLOSED
NTS	NOT TO SCALE
PSI	POUNDS PER SQUARE INCH
RPM	REVOLUTIONS PER MINUTE
RI	ROUGH-IN
SOV	SHUTOFF VALVE
TDH	TOTAL DYNAMIC HEAD
VIF	VERIFY IN FIELD

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Owner
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Issue Date: 01.13.2022

Issue:	Date:

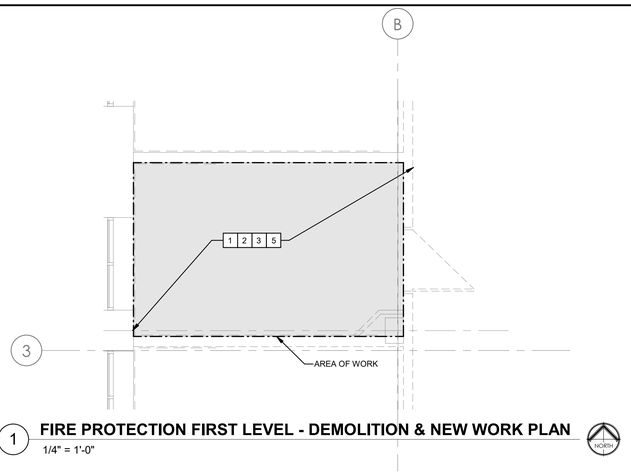
Drawn by: MAS

MU Project #: CP212341

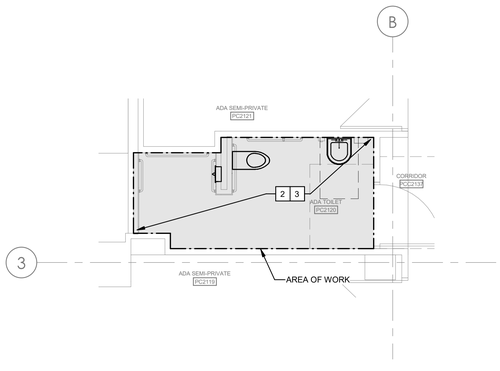
FP000

FIRE PROTECTION SYMBOLS AND ABBREVIATIONS

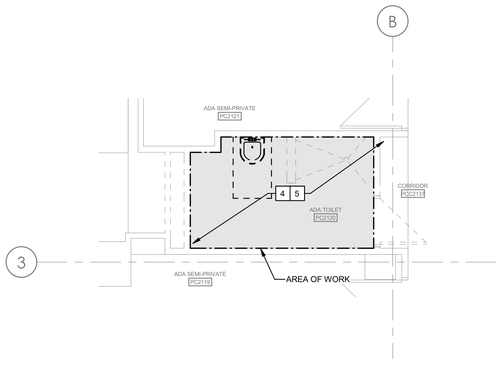
BID DOCUMENTS



1 **FIRST LEVEL - DEMOLITION & NEW WORK PLAN**
1/4" = 1'-0"



4 **SECOND LEVEL NEW WORK PLAN**
1/4" = 1'-0"



3 **SECOND LEVEL DEMOLITION PLAN**
1/4" = 1'-0"

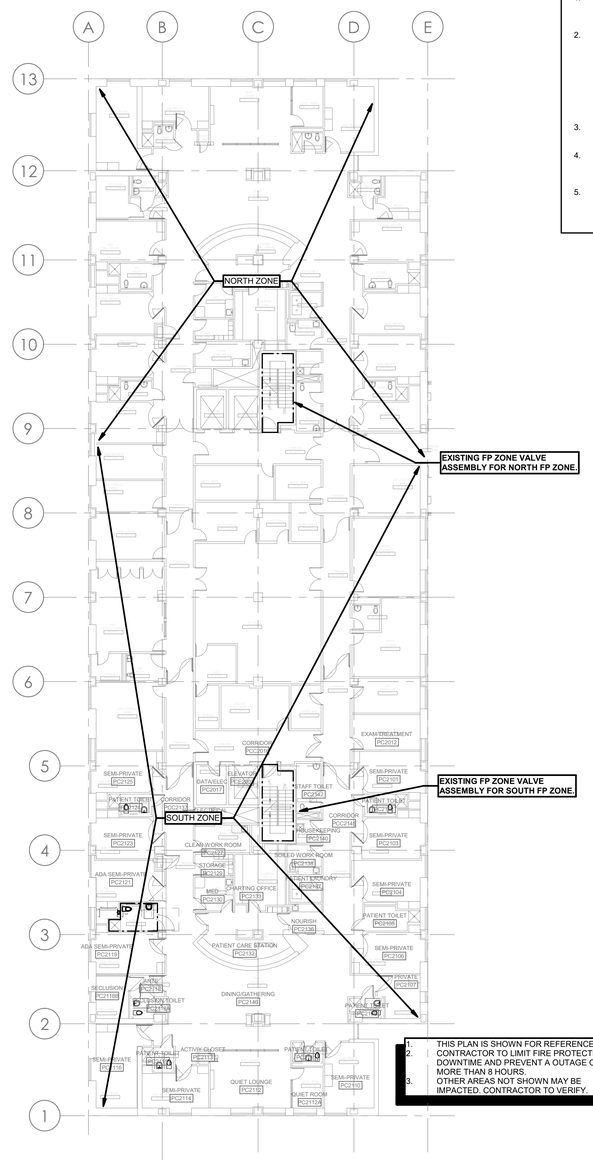
GENERAL NOTES

a. ALL NEW SPRINKLER HEADS TO BE QUICK RESPONSE.

b. FLEXIBLE SPRINKLER HEAD CONNECTIONS ARE NOT ACCEPTIBLE.

KEYED NOTES

1. ALL EXISTING SPRINKLER HEADS AND BRANCH PIPING TO BE REWORKED TO ACCOMODATE NEW SANITARY PIPING LAYOUT BEING INSTALLED.
2. FIRE PROTECTION CONTRACTOR SHALL PROVIDE A COMPLETE CODE COMPLIANT AND FACTORY MUTUAL (FM) APPROVED AUTOMATIC WET PIPE SYSTEM. ALL AREAS NOTED ARE TO BE CONSIDERED LIGHT HAZARD WITH A MINIMUM SPRINKLER DISCHARGE DENSITY OF 0.10 GPM/SQ. FT. FOR THE MOST HYDRAULICALLY REMOTE 1500 SQ. FT. AND A 100 GPM HOSE STREAM. SPRINKLER HEAD SPACING SHALL NOT EXCEED MAXIMUM SPACING DISTANCES SET FORTH BY NFPA 13 AND FM GLOBAL.
3. ALL SPRINKLERS IN THIS AREA TO BE LIGATURE RESISTANT TYPE.
4. ALL EXISTING SPRINKLER HEADS AND BRANCH PIPING TO BE REWORKED TO ACCOMODATE NEW CEILING LAYOUT UNLESS OTHERWISE NOTED.
5. ALL/ANY EXISTING SCHEDULE 10/GALVANIZED FIRE PROTECTION PIPING IN SCOPE OF WORK TO BE REMOVED AND REPLACED WITH SCHEDULE 40 PIPING. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.



5 **SECOND LEVEL CONTROL VALVE LOCATION**
1/16" = 1'-0"

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Issue Date: 01.13.2022

Issue:	Date:

Drawn by: MAS

MU Project #: CP212341

FP100
FIRE PROTECTION FIRST FLOOR DEMOLITION & NEW WORK PLAN

BID DOCUMENTS

SECTION 21 0500

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This Section includes the following:
1. Piping materials and installation instructions common to most piping systems.
2. Escutcheons.
3. Fire-suppression equipment and piping demolition.
4. Supports and anchorages.

1.3 DEFINITIONS
D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
E. The following are industry abbreviations for rubber materials:
1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

1.4 DELIVERY, STORAGE, AND HANDLING
A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

1.5 COORDINATION
A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for fire-suppression installations.
B. Prepare and submit Coordination Drawings as further described herein. The Engineer shall receive one copy of all coordination drawings supplied to the Owner as required in this specification. It is the responsibility of the Contractor to coordinate the work as outlined herein. Receipt by the Engineer of a copy of the coordination drawings is to verify conformance to the submittal requirements set forth in this specification section. It is not an admission by the Engineer as to the accuracy or completeness of the coordination proposed.
C. Coordination shall be drawn to a scale of ¼" = 1'0" or larger. Detail major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Indicate if sequence and coordination of installations are important to efficient flow of the Work. Include the following:
1. Planned piping layout, including valve and specialty locations and valve-stem movement. Include all piping including but not limited to Plumbing piping, HVAC piping, and fire protection piping. Include ceiling and wall-mounted access doors and panels required to provide access to valves and other operating devices.
D. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS
A. Refer to individual Division 21 piping Sections for pipe, tube, and fitting materials and joining methods.
B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS
A. Refer to individual Division 21, "Fire Protection" piping Sections for special joining materials not listed below.

PART 3 - EXECUTION

3.1 FIRE-SUPPRESSION DEMOLITION
A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.
B. Disconnect, demolish, and remove fire-suppression systems, equipment, and components indicated to be removed.
1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS
A. Install piping according to the following requirements and Division 21, "Fire Protection" Sections specifying piping systems.
B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
G. Install piping at indicated slopes.
H. Install piping free of sags and bends.
I. Install fittings for changes in direction and branch connections.
J. Select system components with pressure rating equal to or greater than system operating pressure.
L. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.

3.3 PIPING JOINT CONSTRUCTION
A. Join pipe and fittings according to the following requirements and Division 21, "Fire Protection" Sections specifying piping systems.
B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

3.4 CUTTING AND PATCHING
A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay. Perform cutting and patching in accordance with the following:
B. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
C. Perform cutting, fitting, and patching of fire protection equipment and materials required to:
1. Uncover Work to provide for installation of ill-timed Work.
2. Remove and replace defective Work.
3. Remove and replace Work not conforming to requirements of the Contract Documents.
4. Install equipment and materials in existing structures.
D. Cut, remove and legally dispose of selected fire protection equipment, components, and materials as indicated, including but not limited to removal of fire protection piping and other fire protection items made obsolete by the new Work.
E. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for fire protection installations. Perform cutting by skilled mechanics of trades involved.
F. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.
G. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
H. Repair cut surfaces to match adjacent installations.
I. Repair any building insulation or building fireproofing materials, whether new or existing, that are removed or scraped away in order to make a fire protection installation, so as to maintain an equivalent insulation or fire rating as existed without said fire protection installation

END OF SECTION 21 0500

SECTION 21 1100

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section Includes:
1. Pipes, fittings, and specialties.
2. Sprinklers.
3. Wet-pipe sprinkler systems.

1.3 DEFINITIONS
A. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175 psig maximum.

1.4 SYSTEM DESCRIPTIONS
A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply through alarm valve. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

1.5 PERFORMANCE REQUIREMENTS
A. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.
B. Sprinkler System: Modify existing sprinkler system to provide coverage for building areas noted.
C. The existing automatic sprinkler system within the area of work shall remain active and fully functional throughout the duration of construction, until such time as the new/modified automatic sprinkler system is activated and fully functional, except as deemed allowable by the Owner. If wholesale demolition of the existing automatic sprinkler system is allowed by the Owner, Contractor to limit fire protection downtime and prevent a fire watch of more than 8 hours. Area of work shall be either protected by automatic sprinklers or under firewatch at all times throughout the duration of construction.
D. Delegated Design: Design sprinkler system(s), including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
E. Sprinkler system design shall be approved by authorities having jurisdiction.
1. Sprinkler Occupancy Hazard Classifications:
e. Office and Public Areas: Light Hazard.
2. Minimum Density for Automatic-Sprinkler Piping Design:
a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.
3. Maximum Protection Area per Sprinkler:
a. Office Spaces: 225 sq. ft.
F. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13 and ASCE/SEI 7.

1.6 SUBMITTALS
A. Product Data: For each type of product indicated.
B. Shop Drawings: For wet-pipe and dry-pipe sprinkler systems. Include plans, elevations, sections, details, and attachments to other work.
C. Delegated-Design Submittal: For sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
D. Coordination Drawings: Sprinkler systems, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Items penetrating finished ceiling include the following:
a. Lighting fixtures.
b. Air outlets and inlets.
E. Qualification Data: For qualified Installer and professional engineer.
F. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.
G. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."
H. Field quality-control reports.
I. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE
A. Installer Qualifications:
1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer licensed in the Staet of Missouri.
C. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:
1. NFPA 13, "Installation of Sprinkler Systems."

1.8 PROJECT CONDITIONS
A. Interruption of Existing Sprinkler Service: Do not interrupt sprinkler service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary sprinkler service according to requirements indicated:
1. Notify Owner no fewer than two days in advance of proposed interruption of sprinkler service.
2. Do not proceed with interruption of sprinkler service without Owner's written permission.

1.9 COORDINATION
A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

1.10 EXTRA MATERIALS
A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS
A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

2.2 STEEL PIPE AND FITTINGS
A. Standard Weight, Black-Iron Schedule 40 Pipe: ASTM A 53/A 53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining method.
B. Black-Iron Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends.
C. Uncoated, Steel Couplings: ASTM A 865, threaded.
D. Uncoated, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
E. Malleable- or Ductile-Iron Unions: UL 860.
F. The following products are NOT acceptable:
1. Threaded lightwall piping.
2. Plain-end pipe fittings.
3. Flexible sprinkler head connections.

2.3 SPRINKLER SPECIALTY PIPE FITTINGS
A. Branch Outlet Fittings:
1. Standard: UL 213.
2. Pressure Rating: 175 psig minimum.
3. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
4. Type: Mechanical-T and -cross fittings.
5. Configurations: Bolted, ductile-iron housing with branch outlets.
6. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
7. Branch Outlets: Threaded.

2.7 SPRINKLERS
A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Tyco Fire & Building Products LP.
2. Reliable Automatic Sprinkler Co., Inc.
3. Viking Corporation.
B. General Requirements:
1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating for Automatic Sprinklers: 175 psig minimum.
C. Automatic Sprinklers with Heat-Responsive Element:
1. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.
D. Sprinkler types, features, and options as follows:
1. Quick-response sprinklers.

3.2 PIPING INSTALLATION
A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.
1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.
C. Install seismic restraints on piping. Comply with requirements for seismic-restraint device materials and installation in NFPA 13.
D. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
G. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.
H. Fill wet-pipe sprinkler system piping with water.

3.3 JOINT CONSTRUCTION
A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.
B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
C. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
F. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.4 SPRINKLER INSTALLATION
A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels.

3.5 IDENTIFICATION
A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

3.6 PIPING SCHEDULE
A. Sprinkler specialty fittings may be used, downstream of control valves, instead of specified fittings.
B. Standard-pressure, wet-pipe sprinkler system, NPS 2 and smaller, shall be the following:
1. Schedule 40, black-iron pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.

3.8 SPRINKLER SCHEDULE
A. Drawings indicate sprinkler types to be used. Where specific types are not indicated, use the following sprinkler types:
2. Rooms with Suspended Ceilings: Concealed sprinklers.
3. Sprinkler Finishes:
a. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.

3.9 CONNECTIONS
A. Install piping adjacent to equipment to allow service and maintenance.
D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
F. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.10 FIELD QUALITY CONTROL
A. Perform tests and inspections.
B. Tests and Inspections:
1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
2. Energize circuits to electrical equipment and devices.
3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
4. Coordinate with fire alarm tests. Operate as required.
C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.
D. Prepare test and inspection reports.

3.11 CLEANING AND PROTECTION
A. Clean dirt and debris from sprinklers.
B. Remove and replace sprinklers with paint other than factory finish.
C. Protect sprinklers from damage until Substantial Completion.

3.12 DEMONSTRATION
A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves.

END OF SECTION 21 1100

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FIRE PROTECTION SPECIFICATIONS

BID DOCUMENTS