LEE'S SUMMIT FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082, Lee's Summit, MO, 64081

CONSTRUCTION DOCUMENTS I 06.03.2024

Sheet Index:

SHEET INDEX

Alternates:

ALTERNATE NO. ONE (1) - OFFICE TENANT IMPROVEMENT: The base bid should only include building a typical restroom in Unit 1. Provide alternate pricing to build out two meeting rooms, break area, restroom and shower in Unit 1 as indicated on the drawings.

ALTERNATE NO. TWO (2) - SITE FENCING AND GATE Provide alternate pricing for site fencing at the perimeter of the property and gates at each entry to the parking lot.

ALTERNATE NO. THREE (3) - AWNING: Provide alternate pricing for awnings where indicated in the drawings. Coordinate structural details with structural engineer.

PROJECT LOCATION (NTS):

60 SE Thompson Dr.

Lee's Summit, MO

Architect:

six twenty one

SixTwentyOne

1705 Summit St.
Kansas City, MO 64108
T: 816.694.1369

Contact:
Jacob Littrell

Civil Engineer:

Kimley Horn

805 Pennsylvania
Suite 150
Kansas City, Missouri 64105

Contact:
Patrick Joyce
816.281.7687

Structural Engineer:

Garver

7509 NW Tiffany Springs Parkway
Suite 200
Kansas City, Missouri 64153

Contact:
Zac Buckmiller
816.849.2010

MEP Engineer:

Garver

7509 NW Tiffany Springs Parkway
Suite 200
Kansas City, Missouri 64153

Contact:
Zac Buckmiller
816.849.2010

Landscape Architect:

Landworks Studio

102 S Cherry St.
Olathe, KS 66061

Contact:
Erica Flad
913.780.6707

Steel Building Manufacturer:

Ceco Building
Systems
7710 N Montgall Avenue
Kansas City, MO 64119

Contact:
Steve Shuck
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RELEASED FOR CONSTRUCTION
As Noted on Plans Review
Development Services Department
Lee's Summit, Missouri
08/20/2024

Joe Froggé

LEE'S SUMMIT FLEX SPACES
60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT:
Capital Builders

CONSTRUCTION DOCUMENTS

STATE OF MISSOURI
JACOB AARON LITTRELL
NUMBER A-2011037018
ARCHITECT
06.03.24

06.03.2024

Architect: _____
License: _____

REV.	DATE	ISSUE

ARCHITECT:

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COVER SHEET

Sheet: G000

Revision no.

CODE ANALYSIS::

PROJECT INFORMATION
PROJECT NAME: FLEX SPACES
OWNER: CAPITAL BUILDERS KC
LOCATION: LEE'S SUMMIT, MO
DESCRIPTION: NEW CONSTRUCTION OF TWO (2) SINGLE STORY WAREHOUSE BUILDINGS.

BUILDING A: 11,485 SF
BUILDING B: 11,485 SF

APPLICABLE DESIGN BUILDING CODES AND STANDARDS

2018:	INTERNATIONAL BUILDING CODE (IBC)
2018:	INTERNATIONAL FIRE CODE (IFC)
2017:	NATIONAL ELECTRIC CODE (NEC)
2018:	INTERNATIONAL FUEL GAS CODE (IFGC)
2018:	INTERNATIONAL PLUMBING CODE (IPC)
2018:	INTERNATIONAL MECHANICAL CODE (IMC)
2018:	INTERNATIONAL RESIDENTIAL CODE (IRC)
	ICC/ANSI A117.1-2009, ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES

PROJECT DATA SUMMARY
BUILDING A: NON SEPARATED MIXED USE

OCCUPANCY CLASSIFICATION:	S-1 / STORAGE, F-1 / FACTORY, B / BUSINESS
CONSTRUCTION TYPE:	IIB
SPRINKLERS:	NON-SPRINKLED
ALLOWABLE AREA:	15,500 SF (BASED ON MOST RESTRICTIVE OCCUPANCY: F-1)
ALLOWABLE STORIES:	2
ALLOWABLE HEIGHT:	55'-0"
USE:	STORAGE, INDUSTRIAL, WAREHOUSE, BUSINESS

BUILDING B: NON SEPARATED MIXED USE

OCCUPANCY CLASSIFICATION:	S-1 / STORAGE, F-1 / FACTORY, B / BUSINESS
CONSTRUCTION TYPE:	IIB
SPRINKLERS:	SPRINKLED
ALLOWABLE AREA:	62,000 SF (BASED ON MOST RESTRICTIVE OCCUPANCY: F-1)
ALLOWABLE STORIES:	3
ALLOWABLE HEIGHT:	75'-0"
USE:	STORAGE, INDUSTRIAL, WAREHOUSE, BUSINESS

FIRE RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HRS) - (TYPE IIB; IBC, TABLE 601)

STRUCTURAL FRAME (COLUMNS, GIRDERS, BEAMS, TRUSSES, ETC):	0 HRS
BEARING WALLS (EXTERIOR):	0 HRS
BEARING WALLS (INTERIOR):	0 HRS
NON-BEARING WALLS (EXTERIOR):	0 HRS
NON-BEARING WALLS (INTERIOR):	0 HRS
FLOOR CONSTRUCTION (BEAMS, JOISTS, DECKING):	0 HRS
ROOF CONSTRUCTION (BEAMS, JOISTS, DECKING):	0 HRS

OCCUPANCY LOAD CRITERIA (1004.5)
BUSINESS: 150 GROSS
INDUSTRIAL: 100 GROSS
WAREHOUSE: 500 GROSS
STORAGE: 300 GROSS

TYPICAL SINGLE UNIT = 939 SF
945 SF / 150 = 7 OCCUPANTS
945 SF / 100 = 10 OCCUPANTS
945 SF / 500 = 2 OCCUPANTS
945 SF / 300 = 4 OCCUPANTS

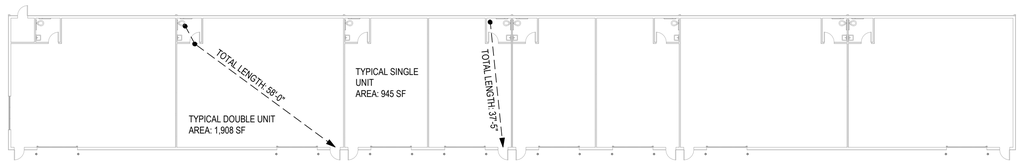
TYPICAL DOUBLE UNIT = 1,888 SF
1,908 SF / 150 = 13 OCCUPANTS
1,908 SF / 100 = 20 OCCUPANTS
1,908 SF / 500 = 4 OCCUPANTS
1,908 SF / 300 = 7 OCCUPANTS

COMMON PATH OF EGRESS TRAVEL (1006.2.1)
OCCUPANCY - B: 100'
OCCUPANCY - F: 75'
OCCUPANCY - S: 100'

EXIT ACCESS TRAVEL DISTANCE (1017.2)
OCCUPANCY - B: 200'
OCCUPANCY - F: 200'
OCCUPANCY - S: 200'

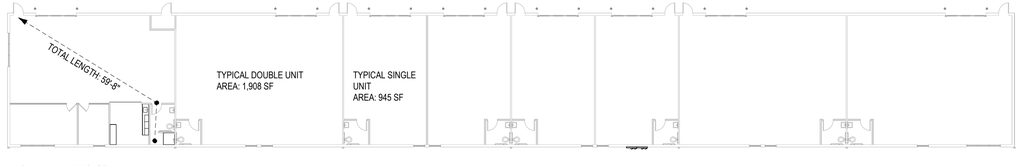
NUMBER OF EXITS PER OCCUPANT LOAD (1006)
OCCUPANCY - B: 1 EXIT PER 49 MAX
OCCUPANCY - F: 1 EXIT PER 49 MAX
OCCUPANCY - S: 1 EXIT PER 29 MAX

REQUIRED EGRESS WIDTH
13 OCCUPANTS (BASED ON HIGHEST POTENTIAL OCCUPANT LOAD - BUSINESS)
13 X 0.2 = 2.6" REQUIRED (36" PROVIDED)



TOTAL AREA: 11,485 SF

2 **CODE PLAN - BUILDING B**
3/64" = 1'-0"



TOTAL AREA: 11,485 SF

1 **CODE PLAN - BUILDING A**
3/64" = 1'-0"

GENERAL NOTES - PROJECT

1. BY ACCEPTING JOB - CONTRACTOR, SUB-CONTRACTORS, AND ALL TRADES AGREE TO ABIDE BY ALL SCOPE LAID OUT IN THESE DOCUMENTS AND ALL NOTES, SPECIFICATIONS, AND DETAILS ASSOCIATED.
2. GENERAL CONTRACTOR AND ALL OTHER CONTRACTORS WORKING ON THIS CONSTRUCTION PROJECT SHALL MEET ALL APPLICABLE CODE REQUIREMENTS AND REGULATIONS FROM LOCAL JURISDICTIONS. ALL CONSTRUCTION PRACTICES, MATERIALS AND PROCESSES SHALL COMPLY TO ANY AND ALL CODES, REGULATIONS, RESTRICTIONS, DIRECTIVES AND LAWS. CONTRACTOR SHALL BE KNOWLEDGABLE OF ALL STATE AND COUNTY REQUIREMENTS REGULATIONS AND CODE ISSUES. CONTRACTOR(S) SHALL NOTIFY ARCHITECT UPON DISCOVERY OF ANY DESCRIPANCIES ON THE DOCUMENTS OR CONDITIONS OF THE PROJECT SITE.
3. SUBSTANTIAL COMPLETION SHALL BE ESTABLISHED ON DELIVERY OF OCCUPANCY PERMIT. FINAL COMPLETION SHALL BE DEEMED COMPLETED WHEN ALL PUNCH LIST ITEMS ARE COMPLETED AND APPROVED, ALL EQUIPMENT INSTALLED AND RUNNING AND FINAL INSPECTIONS COMPLETE AND APPROVED. ULTIMATELY, OWNER TO DETERMINE FINAL COMPLETION.
4. THE RESPONSIBILITIES CONCERNING THE PREPARATION AND REVIEW OF THE APPLICATION FOR PAYMENT AND PAYMENT SCHEDULE SHALL BE ADDRESSED IN AGREEMENTS BETWEEN THE OWNER, ARCHITECT AND CONTRACTOR.
5. ARCHITECT WILL BE AVAILABLE TO THE OWNER AND CONTRACTOR DURING CONSTRUCTION. ARCHITECT WILL ASSIST THE OWNER AND/OR CONTRACTOR IN OBTAINING THE BUILDING PERMIT.
6. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR CONSTRUCTION PROCESSES, QUALITY OF WORK, FUNCTIONALITY, EFFICACY OF TECTONICS, MATERIAL VERIFICATION, AND WORKERS SAFETY.
7. THE CONTRACTOR SHALL VERIFY AND HOLD RESPONSIBILITY FOR CONSTRUCTION DETAILS, BUILDING ACCURACY, CONFIRMING QUANTITIES, DIMENSIONS AND TECHNIQUES OF ASSEMBLIES.
8. SUBSTITUTION PROCESS :: NO SUBSTITUTIONS OF MATERIALS, EQUIPMENT, DEFINED MANUFACTURER'S, FINISHES, CONSTRUCTION ITEMS WILL BE ALLOWED ***UNLESS*** SUBMITTED TO ARCHITECT / OWNER FOR APPROVAL. UPON WRITTEN CONSENT BETWEEN ALL PARTIES, SUITABLE SUBSTITUTIONS WILL BE ACCEPTED.
9. THE CONTRACTOR SHALL PROVIDE THE OWNER WITH SCHEDULING INFORMATION PRIOR TO CONSTRUCTION, WHICH WILL BE UPDATED IF CHANGES IN TIMELINE ARE EXPECTED.
10. ALL REQUIRED COMMUNICATION WILL BE THROUGH THE GENERAL CONTRACTOR, OWNER AND ARCHITECT.
11. INFORMATION CONTAINED IN THESE DRAWINGS ARE TO THE BEST UNDERSTANDING AND PRACTICES OF ARCHITECT. THE INFORMATION REQUIRED HEREIN MAY REQUIRE ADJUSTMENT OR MODIFICATIONS TO CONFORM WITH CONFLICTS IN TRADES OR EXISTING SITE CONDITIONS. COORDINATE WITH ARCHITECT AND OWNER SHOULD SUCH INSTANCES ARISE.
12. CONTRACTOR SHALL COMPLY WITH APPLICABLE LAWS, CODES AND ORDINANCES OF AUTHORITIES HAVING JURISDICTION (AHJ) AND WITH PRODUCT MANUFACTURER'S INSTALLATION REQUIREMENTS.
13. VERIFY ACTUAL CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION. COMMENCEMENT OF WORK INCLUDING APPLICATION OF A MATERIAL OR EQUIPMENT ITEM TO WORK INSTALLED BY OTHERS CONSTITUTES VERIFICATION AND ACCEPTANCE OF THAT WORK, AND ASSUMPTION OF RESPONSIBILITY FOR SUBSEQUENT SATISFACTORY INSTALLATION.
14. CONTRACTOR SHALL PROVIDE AND INSTALL ALL ITEMS IN DRAWINGS UNLESS SPECIFICALLY NOTED OTHERWISE.
15. CONTRACTOR SHALL COORDINATE ALL FLOOR FINISH MATERIALS TO ENSURE THAT TRANSITIONS BETWEEN FLOORING MATERIALS WILL BE SMOOTH AND IN ACCORDANCE WITH CONSTRUCTION DOCUMENTS.
16. UNLESS NOTED OTHERWISE, ALL FLOORING TRANSITIONS SHALL OCCUR AT CENTERLINE OF DOORS.
17. ALL STRUCTURE, STUDS, FRAMING AND FURRING MEMBERS SHALL BE PLACED AS TO AVOID INTERFERENCE WITH LOCATIONS OF CASEWORK, LIGHT FIXTURES, PIPING, DUCTWORK, ETC.
18. DO NOT SCALE DRAWINGS. CONTRACTOR TO VERIFY ALL DIMENSIONS AND CONDITIONS ON THE JOB. CONTRACTOR TO NOTIFY ARCHITECT OF ANY VARIATIONS FROM THE DIMENSIONS AND DETAILS IN DRAWINGS.
19. ALL CONTRACTORS SHALL GUARANTEE ALL WORK EXECUTED UNDER THIS CONTRACT, BOTH AS TO MATERIAL AND WORKMANSHIP FOR A PERIOD OF TWELVE (12) MONTHS AFTER DATE OF SUBSTANTIAL COMPLETION. ADDITIONALLY, ANY AND ALL DAMAGE TO ADJACENT AREAS / SURFACES CAUSED BY FAULTY MATERIALS AND/OR WORKMANSHIP SHALL ALSO BE REPAIRED TO THE OWNER'S SATISFACTION AT NO ADDITIONAL COST.
20. CONTRACTOR TO INSTALL ANY AND ALL ITEMS, MATERIALS, EQUIPMENT, ETC. PER MANUFACTURER'S SPECIFICATIONS, UL RATING REQUIREMENTS, SPECIFIC TRADE GUIDELINES, INDUSTRY STANDARDS AND PER BUILDING CODES.
21. THE CONTRACTOR MUST SUBMIT TO THE OWNER AND INSURANCE CERTIFICATE WITH A MINIMUM COVERAGE OF $1,000,000 IN GENERAL LIABILITY OR EQUAL.
22. CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING ALL SURFACES INCLUDING GLASS SURFACES PRIOR TO OCCUPANCY OF THE SPACES BY THE OWNER. THE CONTRACTOR, PRIOR TO OCCUPANCY, SHALL PERFORM A FINAL CLEAN CONSISTING OF THE FOLLOWING : - **1.** CLEAN SPACE OF ALL CONSTRUCTION DEBRIS, TRASH, MATERIALS, TOOLS, ETC. **2.** CLEAN AND SANITIZE ALL TOILET ROOMS. **3.** CLEAN ALL COUNTERTOPS, CASEWORK, ETC. **4.** CLEAN ALL INTERIOR AND EXTERIOR DOOR AND WINDOW SYSTEMS - INCLUDING FRAMES, GLASS, ACCESSORIES, ETC. **5.** CLEAN ALL FLOOR SURFACES. **6.** REMOVE ALL DUST FROM WOOD TRIM, LIGHT FIXTURES, FURNITURE, PLUMBING FIXTURES, FANS AND EQUIPMENT.
23. ALL CHANGES, DEVIATIONS, MODIFICATIONS, ADDITIONS OR DELETIONS FROM THE CONSTRUCTION DOCUMENTS AND/OR CONSTRUCTION CONTRACT OF APPROVED ARCHITECTURAL PLANS SHALL BE APPROVED BY ARCHITECT IN WRITING.
24. ALL DIMENSIONS ARE FROM FACE OF FRAMING TO FACE OF FRAMING (UNLESS NOTED AND/OR SHOWN OTHERWISE).
25. PROVIDE SPRAY FOAM INSULATION AT ALL EXTERIOR WALLS, FOUNDATION TRANSITIONS AND STRUCTURAL TRANSITIONS AS REQUIRED. ALL R VALUES AND MATERIAL PROPERTIES TO MEET CODE REQUIRED MINIMUMS AND REGULATIONS.
26. PROVIDE BATT INSULATION AT ALL BEDROOM WALLS AND RESTROOM WALLS FOR ACOUSTICAL PROPERTIES.
27. ALL MILLWORK + CASEWORK SHELVING TO BE ADJUSTABLE; TYPICAL; UNLESS NOTED OTHERWISE.
28. ABBREVIATIONS :
    - A. TYP :: TYPICAL
    - B. NIC :: NOT IN CONTRACT
    - C. OFCI :: OWNER FURNISHED, CONTRACTOR INSTALLED
    - D. FF :: FINISH FLOOR
    - E. AFF :: ABOVE FINISH FLOOR
    - F. WRB :: WEATHER RESISTIVE BARRIER
    - G. AHJ :: AUTHORITY HAVING JURISDICTION
    - H. FV :: FIELD VERIFY

PROJECT SYMBOLS

NEW CONSTRUCTION
ROOM NAME AND NUMBER (Room name / 101)
CENTER LINE
MATCH LINE
LEVEL IDENTIFIER (Name / Elevation)
DOOR INDICATION TAG (101)
PARTITION TYPE (##)
WINDOW TYPES (X)
PLAN KEYNOTES (?)
SPOT ELEVATION
DRAWING REVISION (1)
NORTH ARROW
EXTERIOR ELEVATION REFERENCE (Ref / 1 / A101)
INTERIOR ELEVATION REFERENCE (##Ref / ## / A101)
BUILDING SECTION REFERENCE TAG (SIM / 1 / A101)
WALL SECTION REFERENCE TAG (SIM / 1 / A101)
DETAIL SECTION REFERENCE TAG (SIM / 1 / A101)
VIEW TITLE (1 View Name 1/8" = 1'-0")
NEW GRID IDENTIFIER (##.#)
DOOR SWITCH (D)
SILENT SWITCH ($)
GAS POWER / CONTROL (G)
2-WAY / 3-WAY SWITCH ($2 $3)
DOOR CHIME (C)
GARAGE DOOR PUSH BUTTON (G)
DATA (D)
TELEPHONE (T)
THERMOSTAT (T)
QUADRUPLEX RECEPTACLE
DUPLEX RECEPTACLE
GFI DUPLEX RECEPTACLE (GFI)
ABOVE COUNTER DUPLEX RECEPT. (AC)
DUPLEX RECEPTACLE WITH USB (U)
OUTDOOR DUPLEX RECEPTACLE (O)
POP-UP RECEPTACLE (P)
TELEVISION (TV)
ALARM PAD (A)
SPEAKER (S)
HOSE BIB (H)

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600 SE Thompson Dr.
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PROJECT NUMBER: 23092
CLIENT: Capital Builders

CONSTRUCTION DOCUMENTS
06.03.2024

STATE OF MISSOURI
JACOB AARON LITTRELL
NUMBER A-2011037018
ARCHITECT
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GENERAL NOTES / CODE SUMMARY

Sheet: **G001**
Revision no.:

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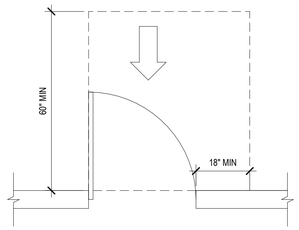
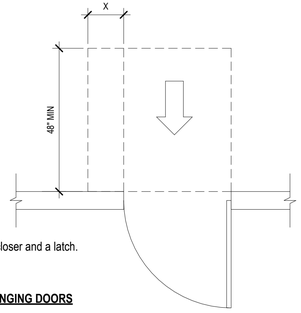
FRONT APPROACHES - SWINGING DOORS

PULL SIDE



PUSH SIDE

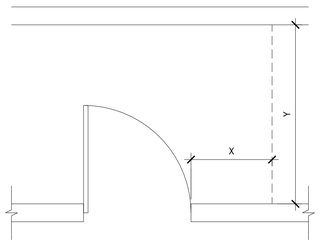


NOTE: x=12" if the door has both a closer and a latch.

HINGE-SIDE APPROACHES- SWINGING DOORS

NOTE: All doors in alcoves shall comply with clearances for front approaches.

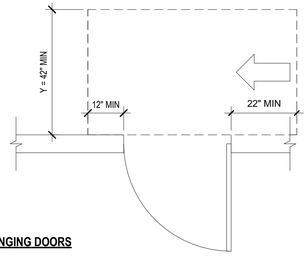
PULL SIDE



NOTE: x=36 in. minimum
if y=60 in.
x=42 in. minimum
if y=54 in.

PUSH SIDE

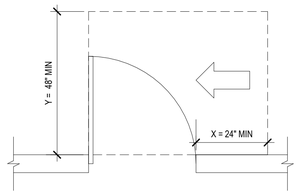
NOTE: y=48 in. minimum if door has both a latch and a closer.



LATCH-SIDE APPROACHES- SWINGING DOORS

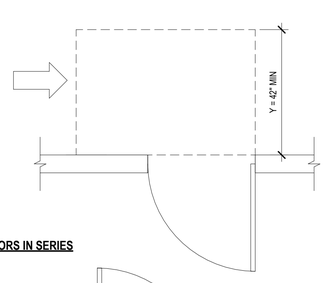
PULL SIDE

NOTE: y=54 in. minimum if door has a closer.

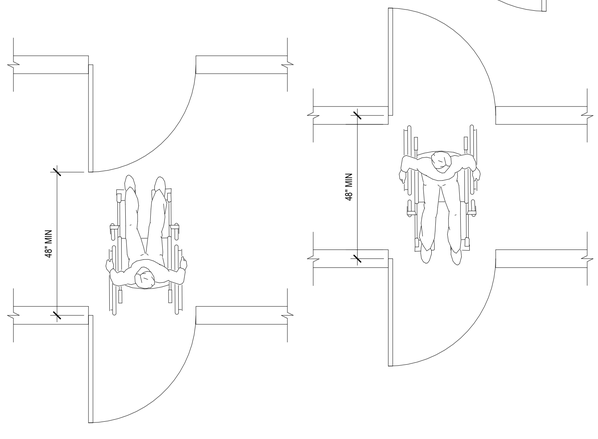


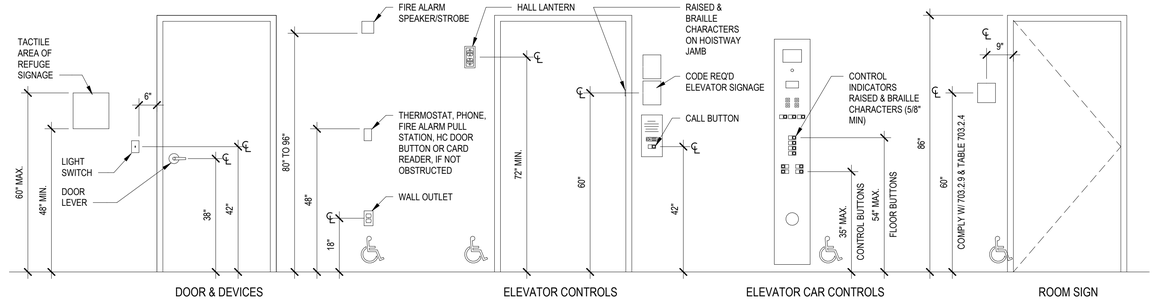
PUSH SIDE

NOTE: y=48 in. minimum if door has a closer.



TWO-HINGED DOORS IN SERIES



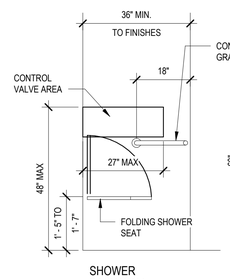


ACCESSIBILITY SHEET NOTES

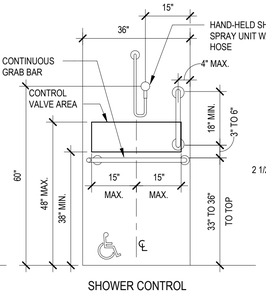
1. DIMENSIONS GIVEN ARE COMPLIANT WITH ANSI A117.1.
2. NOT ALL FIXTURES AND DEVICES INDICATED MAY BE USED IN THE PROJECT.
3. INSTALL GRAB BARS TO WITHSTAND A DOWNWARD LOAD OF 250 LBF WHEN TESTED ACCORDING TO METHODS IN ASTM F-446.
4. ACCESSORIES IN BATHING AREAS THAT PROJECT MORE THAN 1" BEYOND FINISHED SURFACES SHALL BE INSTALLED TO WITHSTAND A DOWNWARD LOAD OF 250 LBF WHEN TESTED ACCORDING TO METHODS IN ASTM F-446.
5. MOUNTING HEIGHTS INDICATED MAY BE SUPERCEDED BY MORE SPECIFIC INFORMATION ELSEWHERE IN THE DOCUMENTS.
6. ALL APPLIANCES AND PLUMBING FIXTURES MUST COMPLY WITH APPLICABLE ANSI REQUIREMENTS.
7. DOOR THRESHOLDS MUST NOT EXCEED A MAXIMUM HEIGHT OF 1/2" WITH A 1:2 BEVEL.
8. ALL ACCESSIBLE SINKS SHALL HAVE A MAXIMUM HEIGHT OF 34" TO THE RIM OR COUNTER (WHICHEVER IS HIGHER) AND PROVIDE A 27" MINIMUM HIGH KNEE SPACE.
9. PROVIDE AND INSTALL BLOCKING / REINFORCEMENT FOR ALL ACCESSORIES PER MANUFACTURER'S INSTRUCTIONS.
10. PROVIDE AND INSTALL BLOCKING IN ALL ADAPTIVE USE SPACES.

LEGEND

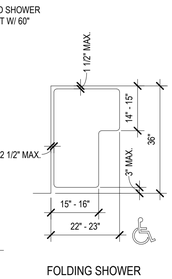
ACCESSIBLE



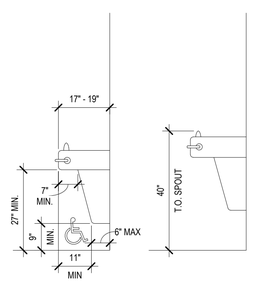
SHOWER BACK WALL



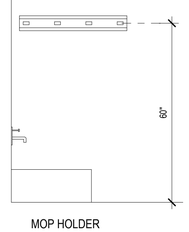
SHOWER CONTROL WALL



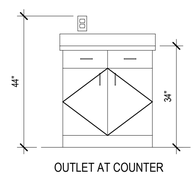
FOLDING SHOWER SEAT PLAN



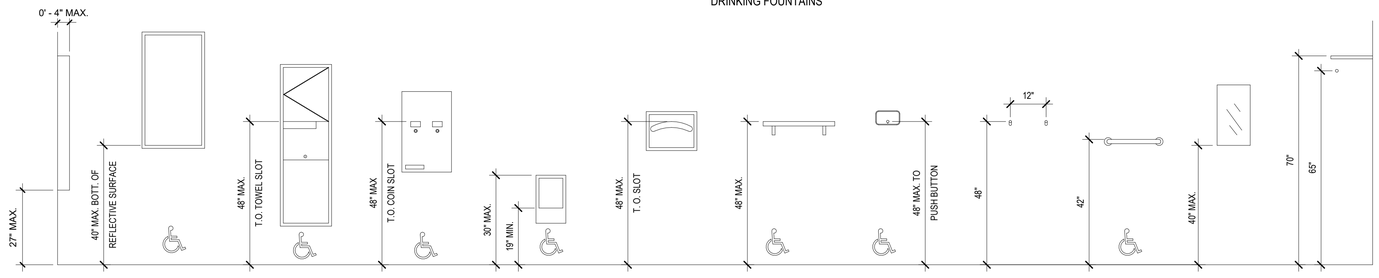
DRINKING FOUNTAINS

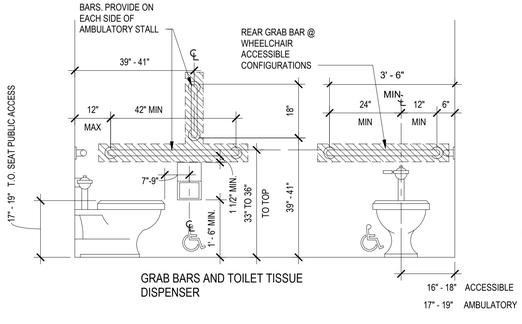


MOP HOLDER

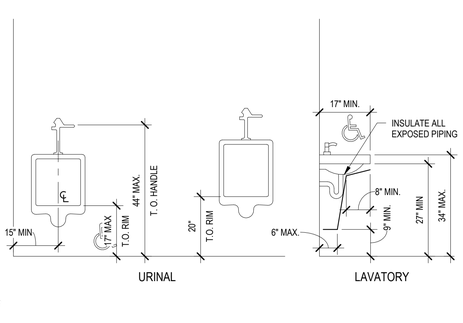


OUTLET AT COUNTER



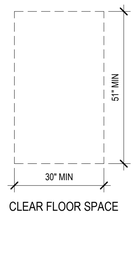


GRAB BARS AND TOILET TISSUE DISPENSER

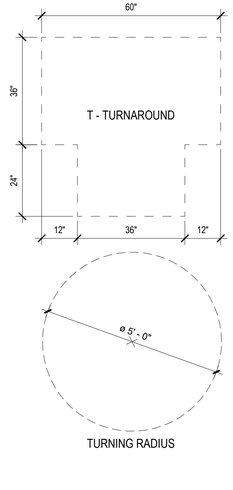


URINAL

LAVATORY



CLEAR FLOOR SPACE



TURNING RADIUS

RELEASED FOR CONSTRUCTION
As Noted on Plans Review
Development Services Department
Lee's Summit, Missouri
08/20/2024

LEE'S SUMMIT FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: Capital Builders

CONSTRUCTION DOCUMENTS

06.03.2024

STATE OF MISSOURI
JACOB AARON LITTRELL
NUMBER A-2011037018
ARCHITECT
06.03.24

Architect License

REV.	DATE	ISSUE

ARCHITECT:

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ACCESSIBILITY AND DIAGRAMS

Sheet: G002

Revision no.

Printed: 6/6/2024 9:09:58 AM

DIVISION-01: GENERAL REQUIREMENTS

SECTION 01 11 00 – SUMMARY OF WORK

THE WORK consists of Infill Exterior Construction and Interior-Finish Construction at the Project Site, including associated site, landscape, structural, mechanical, electrical, and plumbing (MEP) systems as indicated within the Construction Documents and as required by the existing site conditions. The Work will be constructed under a single (prime) general construction contract.

PROJECT INFORMATION

PROJECT LOCATION: 60 SE Thompson Drive, Lee's Summit, MO 64082

OWNER: Capital Builders, LLC, 1507 NE Wall St., Lee's Summit, MO 64086

ARCHITECT: SixTwentyOne, LLC

WORK COVERED BY CONTRACT DOCUMENTS: The Work of Project is defined by the Contract Documents and consts of the exterior remodel of the existing buildings and interior vestibule remodel of the Grocery Store tenant.

TYPE OF CONTRACT: Project will be constructed under a single prime contract.

WORK BY OWNER: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

ACCESS TO SITE:

GENERAL: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or retain other contractors on portions of the Project.

USE OF SITE: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

CONFINE stockpiling of materials and location of storage sheds, if any, to areas approved for such use. Do not unreasonably encumber the site with materials or equipment. If additional storage is necessary, obtain and pay for such storage areas off-site.

WORK RESTRICTIONS:

GENERAL: Comply with restrictions on construction operations. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

ON-SITE WORK HOURS: Limit work in the existing building to normal business working hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, unless otherwise indicated.

CONTROLLED SUBSTANCES: Use of tobacco products and other controlled substances on Project site is not permitted.

SPECIFICATION AND DRAWING CONVENTIONS

SPECIFICATION CONTENT: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These words "shall," "shall be," or "shall comply with," depending on the context are implied where a colon (:) is used within a sentence or phrase. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

DIVISION 01: Requirements of Division 01 apply to the Work of all Sections in the Specifications.

DRAWING COORDINATION: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.

Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

SECTION 01 23 00—ALTERNATES

PROVIDE ALTERNATES BID PROPOSALS for the following items that may be added to or deducted from the Base Bid Amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents. The cost or credit for each Alternate is the net addition to or deduction from the Contract Sum to incorporate the alternate into the Work. No other adjustments to be made to the Contract Sum for the described Alternate scope.

COORDINATION: Modify or adjust affected adjacent work to completely integrate work of the Alternate into the Project. Include as part of each Alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of the Alternate. Immediately following award of the Contract, notify each party involved, in writing, of the status of each Alternate. Indicate if Alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to Alternates. Execute accepted Alternates under the same conditions as other work of the Contract.

ALTERNATE NO. ONE (1) - OFFICE TENANT IMPROVEMENT: The base bid should only include building a typical restroom in Unit 1. Provide alternate pricing to build out two meeting rooms, break area, restroom and shower in Unit 1 as indicated on the drawings.

ALTERNATE NO. TWO (2) - SITE FENCING AND GATE Provide alternate pricing for site fencing at the perimeter of the property and gates at each entry to the parking lot.

ALTERNATE NO. THREE (3) - AWNING: Provide alternate pricing for awnings where indicated in the drawings. Coordinate structural details with structural engineer.

SECTION 01 25 00 – SUBSTITUTION PROCEDURES

SUBMIT ELECTRONIC SUBSTITUTION REQUESTS only from the Contractor, identifying the product, fabrication or installation method proposed to be changed.

SUBSTITUTION REQUEST FORM: CSI Form 13.1A – most recent edition (or equivalent electronic form approved for use by the Owner), fully completed and executed by the Contractor, certifying that the proposed substitution complies with requirements of the Contract Documents, that the product, material or equipment proposed is appropriate for the application and use intended, that cost and time adjustments proposed are complete, and waiving rights to additional payment or time due to failure of the proposed substitution to produce the indicated results. Document and substantiate, that the Substitution:
- Is consistent with the Contract Documents and will produce the indicated results, without extensive revision to the Contract Documents
- Will not adversely affect the Construction Schedule
- Has received necessary approvals of AHJ's
- Has been coordinated with other portions of the Work, and is compatible with other products or materials, and includes the same warranty provisions and term as the substituted Product.

SUBSTITUTIONS FOR CAUSE: Submit immediately upon discovery of the need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.

SUBSTITUTIONS FOR CONVENIENCE: Submit within thirty (30) days after award of contract or notice to proceed. After that period, requested will be considered at the sole discretion of the Owner. The proposed Substitution must provide a substantial advantage to the Owner in terms of cost, time, energy conservation or other considerations after deducting the potential added Owner's costs, including but not limited to additional compensation to the Architect for evaluation and redesign, increased cost of other construction, and similar considerations.

SECTION 01 26 13 –REQUESTS FOR INTERPRETATIONS (RFI's)

SUBMIT REQUEST FOR INTERPRETATION (RFI's) after review of the Contract Documents and the field conditions immediately on discovery of the need for a clarification. Include a detailed description of the problem encountered, together with recommendations for necessary changes to the Work scope. Submit requests on CSI Form 13.2A B "Request for Interpretation" or equivalent form approved for use in advance. Submit RFI's only from the Contractor — RFI's from subcontractors or suppliers must be forwarded though, approved by, and submitted from the Contractor.

SUBMIT RFI'S ONLY AFTER a thorough review of the applicable Contract Documents and the field-conditions encountered, and ONLY if the Contractor is still not able to resolve the problem or clarify the issue based on the information contained therein.

RESPONSIBILITY FOR ADDITIONAL COSTS: If the information requested by the Contractor is apparent from field observations, or is in fact contained within the Contract Documents, or is reasonably inferable from either, the Contractor will be responsible to the Owner for all reasonable costs expended by the Owner, including the added hourly costs for the Owner's Representative and/or the professional fees and expenses of the Architect / Engineer, for Additional Services required by them to provide such information.

RESPONSE TO RFI'S IS NOT AN AUTHORIZATION to proceed with additional or extra Work.

SECTION 01 29 00 – PAYMENT PROCEDURES

15 DAYS (MINIMUM) BEFORE SUBMITTAL OF THE INITIAL APPLICATION FOR PAYMENT, submit the following items:
(1) a listing of subcontractors and principal suppliers and fabricators,
(2) the progress schedule,
(3) the preliminary Schedule of Values,
(4) Performance and Payment Bonds (if required per the Alternate), and
(5) record copies of acquired building permits for performance of the Work.

SCHEDULE OF VALUES: Provide a breakdown of the Contract Sum, as required by the General Conditions. Coordinate preparation and correlate line item breakdown with Specification Sections, and as required to facilitate continued evaluation of payment requests and progress reports. Break down principal subcontract amounts into several line items, to the approval of the Owner and/or Architect. Provide a separate line-item for each allowance, or for each unit-cost allowance as a product of the unit cost multiplied by the measured quantity. Indicate temporary facilities or other major cost items that are not a direct cost of actual work-in-place as separate line items. Show overhead and profit as a separate line item amount - to facilitate review of lien-waivers from sub-contractors and material suppliers. Round-off individual amounts to the nearest whole dollar, but with the total equal to the Contract Sum.

Arrange the schedule with columns to indicate the generic name of the item, related specification sections, the subcontractor, supplier, manufacturer or fabricator, change orders (numbers) which have affected the value, the dollar value of the item, and the percentage of the Contract Sum to the nearest one- hundredth percent and adjusted to total 100 percent.

FORM AND QUANTITY OF APPLICATION: Submit an electronic media formatted version of AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet, or equivalent forms approved by the Architect.

APPLICATION PREPARATION: Complete every entry provided for on the form, including notarization and execution by authorized persons. Incomplete applications will be returned without action. Entries must match current data of the schedule of values, and must be correlated with previous applications. Listings must include amounts of change orders issued prior to the last day of the "period of construction" covered by application.

PARTIAL LIEN WAIVERS: At any time throughout the project, the Owner reserves the right to require submittal of partial lien waivers indicating that lien rights are "unconditionally released" for all amounts previously paid, and "conditionally released" or contingent only upon receipt and bank clearance of the current payment-application amounts then due. Unless otherwise required by the Owner, provide partial waivers from the Contractor, and for all subcontractors, sub-subcontractors, suppliers and any other entities lawfully entitled to file a lien in excess of One Thousand Dollars ($1,000.00) arising out of the Work of the Construction Contract. The Owner reserves the right to designate which entities involved in the Work must submit waivers. Submit waivers on the 1990 Edition of the "Waiver and Release of Lien" form as issued by the Construction Industry Affairs Council of Greater Kansas City Inc (CIAC) or other form provided or approved by the Owner, fully executed in a manner acceptable to Owner.

SECTION 01 31 00 – MANAGEMENT & COORDINATION

PRIOR TO SUBMITTAL OF INITIAL APPLICATION FOR PAYMENT, the following items must be submitted: (1) listing of subcontractors and principal suppliers and fabricators, (2) the progress schedule, (3) preliminary schedule of values, (4) performance and/or payment bonds, if required, and (5) copies of acquired building permits for performance of the Work.

SCHEDULE AND COORDINATE THE WORK of the complete Project to assure an efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later. Prepare general coordination drawings, schedules, and control site utilization, from beginning of construction throughout project close-out.

VERIFY AND UPDATE applicable Construction Documents and other required information at not less than weekly intervals, and provide hard-copy paper documents to the Project Site for field use and reference.

VERIFY LOCATIONS OF EXISTING UTILITY SERVICES serving the project before starting Work. Locations of existing utilities noted on the Drawings are approximate, and may be based on unverified information. Provide all connections required at the existing utility connection points at no additional cost to the Owner.

ROUGH-IN REQUIREMENTS: Verify final locations for mechanical, electrical and plumbing rough-ins with field measurements and with the requirements of the actual equipment to be connected, prior to start of installation.

COORDINATE SPACE REQUIREMENTS and installation of mechanical and electrical Work which are indicated diagrammatically on the Drawings. Follow routing shown for pipes, ducts, and conduits, as closely as practical; make runs parallel with lines of the building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, equipment operation and for repairs. Conceal pipes, conduits and similar elements whenever possible within the new construction, in finished areas.

MAINTAIN A RECORD-SET of Construction Documents indicating differences between Construction Documents and the actual installed Work. Mark revisions made during construction with colored pencil - do not conceal any Work before revisions have been recorded. Note actual routing of under-slab plumbing and utility lines, if different from design

CONSTRUCTION RESPONSIBILITY SCHEDULE	
EXTERIOR & INTERIOR SIGNAGE:	By Owner's signage contractor - with electrical power to signs by General Contractor

drawings. In addition, maintain copies of the following related drawings or documents prepared by others:
- Construction Requirements of the Landlord
- Casework shop drawings prepared by the Casework fabricator
- Signage shop drawings prepared by the Signage Contractor, and
- Sprinkler shop drawings

DO NOT construct or install any portion of the Work related to these drawings at any time without such drawings being available at the site.

SECTION 01 32 16 – CONSTRUCTION SCHEDULE

CONSTRUCTION SCHEDULE: Prepare and submit a bar-chart type progress schedule for the entire Project within fourteen (14) calendar days after award of Contract. Provide a separate line-item for each Work item listed in the Schedule of Values. Include appropriate time for project mobilization, procurement of products, review and approval of shop drawings, fabrication, installation, testing, and final cleanup. Identify each calendar day throughout the schedule. Highlight "critical path" elements of the schedule that are important to complete the Work on time. Correlate the schedule with critical "milestone dates" including but not limited to the Notice to Proceed, Substantial Completion, and the Final Completion dates.

SUBMITTAL SCHEDULE: Submit a schedule of planned submittals, arranged in chronological order by dates required by the Construction Schedule. Coordinate the Submittal Schedule with the Construction Schedule above, and include time required for review and re-submittal (if necessary) when establishing dates. Submit the Submittal Schedule concurrently with the Construction Schedule above - identifying any submittals required during the first sixty (60) calendar days of construction. List any submittals that are required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication. Failure to provide a Submittal Schedule relives the Architect and/or Engineer of responsibility for timely submittal review.

SECTION 01 32 33 – PHOTOGRAPHIC DOCUMENTATION

PROVIDE DIGITAL PHOTOGRAPHIC DOCUMENTATION of the work progress. Provide digital images in JPEG format, with minimum sensor size of 8.0 megapixels. Provide un-cropped digital images with date stamps typically. With each photo, digitally record the following information: Project Name, date, general description - indicating location and direction (by compass point).

PERIODIC CONSTRUCTION PHOTOGRAPHS: Take a minimum of TEN (10) photographs on a weekly basis. Select vantage points to best show status of construction and progress.

SUBMIT ELECTRONIC MEDIA FORMATTED (EMF) DIGITAL PHOTOS BY EMAIL on a weekly basis, and coinciding with cutoff date associated with each Application for Payment.

FINAL COMPLETION CONSTRUCTION PHOTOGRAPHS: Take a minimum of one (1) photo in each room or space and as many as are necessary to document finished conditions of the project before Owner occupancy. Take adequate exterior photos to indicate all areas of the outside of the completed building.

PROJECT RECORD PHOTOGRAPHS: Submit a complete set of EMF digital photo images with the final electronic Closeout Document sets.

SECTION 01 33 00 – SUBMITTAL PROCEDURES

SUBMITTAL REVIEW is a gratuitous assistance to the Contractor, to review intended conformance with the design intent of the Contract Documents. Review of submittals does not relieve the Contractor from responsibility for errors which may exist in the submitted data.

MAKE SUBMITTALS (when required by other "technical sections") of Product Data, Shop Drawings and Samples as required. Per the General Conditions, the Contractor is to "approve" submittals before forwarding them for review. Submittals may be returned and marked as "No Exceptions", "Exceptions Noted", "Make Corrections and Resubmit for Record", "Revise and Resubmit" or "Rejected." If errors or omissions in submittals are discovered after the review, revise and resubmit the revised submittals as expeditiously as necessary to not delay the Work progress.

COORDINATE individual submittals with other related submittals and procedures that require sequential activity. Group different kinds of submittals for the same unit of Work or assemblies so that information is available for checking each portion when it is received.

SUBMITTALS MUST INCLUDE the date submitted, Project Title; Contractor's name; sub-contractor / supplier or manufacturer's name; identification of the product being submitted; indication of field dimensions already made and verified by the Contractor; relationships to adjacent or critical features of the Work; applicable standards; identification of deviations from the Contract Documents; and a clear space for the Contractor's approval and Owner/Architect's review stamp.

ELECTRONICALLY STAMP submittals with the date, initialed or signed by the Contractor's Project Manager, certifying the Contractor's approval of the submittal, verification of the product being submitted, and verification that the product submitted complies with the requirements of the Contract Documents. Failure to properly verify conformance and conditions at the job site does not relieve the Contractor of responsibility to properly install the Work.

ELECTRONIC PRODUCT-DATA SUBMITTALS: In order to conserve paper, limit delivery/courier expenses, and to expedite the review process, provide electronic Product-Data and Shop Drawing submittals. Maintain one (1) set of printed, approved Product-Data and Shop-Drawing Submittals at the Project Site, complete with applicable review comments.

QUANTITY OF SAMPLES TO BE SUBMITTED: Submit three (3) samples of products when required by the Contract Documents, for return of one (1) sample to the Contractor. Costs for submittal and return of samples must be paid by the Contractor. Approval of samples does not imply acceptance of the finished in-place product. Color, texture, and pattern must conform to the samples submitted and if the range of texture, color or pattern varies, the work will be rejected.

PROCESSING TIME: Allow time for submittal review, and time for re-submittals, within the Construction Schedule. Allow additional time if processing must be delayed to permit coordination with subsequent submittals - until that information is submitted. If submittals are incomplete, the Architect will advise the Contractor as soon as possible, and the processing time will start when the additional information is received. No extension of the Contract Time will be authorized because of failure to transmit submittals in advance of the Work to permit processing.

ALLOW 10 BUSINESS DAYS for review of each submittal, and for review of resubmittals.

THE ARCHITECT'S SUBMITTAL REVIEW IS LIMITED to compliance with the design intent only, and does not relieve the Contractor from responsibility for errors which may exist in the submittal.

SECTION 01 35 16 – ALTERATION PROCEDURES

WHEN APPLICABLE, PERFORM ALTERATION WORK in a manner that will preserve the aesthetic and structural integrity of existing building construction intended to remain, including removal, refinishing and relocation of existing materials, systems and equipment.

PERFORM DISRUPTIVE, NOISE OR DUST PRODUCING WORK in occupied facilities only during non-business hours, and then only with the Owner's advance approval.

PERFORM ALTERATION WORK of existing operational "critical facilities" (including phone/ data equipment & IT closets) to minimize the risk of interruption of the Owner's ongoing operations, and to protect the existing critical equipment from damage by construction operations. A

ALTERATION DEFINITIONS:
- REMOVE: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- REMOVE AND SALVAGE: Detach items from existing construction and deliver them to Owner, ready for reuse.
- REMOVE AND REINSTALL: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- SALVAGE: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse. Include fasteners or brackets needed for reattachment elsewhere.
- RECYCLE: Recovery of demolition waste for subsequent processing in preparation for reuse.
- EXISTING TO REMAIN: Existing functional items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

JOB CONDITIONS: Visit the project site to determine by inspection the existing conditions, including site access, the nature and composition of construction elements, materials and equipment, and other salient characteristics affecting the Work indicated. Information regarding existing conditions indicated on the Drawings does not imply that other conditions will not be discovered or encountered in performance of the Work. Perform necessary alterations of exposed, obvious existing conditions, installations, and obstructions affecting the Work whether completely indicated or described in the Drawings.

CRITICAL SYSTEMS or EQUIPMENT include existing operational systems and equipment that must remain fully operational at all times to avoid financial loss to the Owner. Critical equipment includes electronic data / server equipment, the associated cabling systems, the phone/data "d-mark" equipment serving the facility, electrical power to such equipment, and HVAC (cooling) systems serving critical equipment. Critical facilities include existing occupied rooms or spaces that contain critical equipment or systems.
- NO DUST, WATER OR VIBRATION IS ACCEPTABLE within critical facilities from any source of construction operations. Provide temporary protection of critical facilities even when the risk of damage is minimal. Monitor conditions in adjacent spaces where Work is being performed that could adversely affect critical facilities, including temperature changes.
- TEMPORARY CRITICAL EQUIPMENT ENCLOSURES: Provide to prevent dust from construction operations to affect existing critical equipment. Construct with a framework of metal or fire-retardant wood studs with an 8 mil anti-static reinforced poly sheet (flame spread rating of 15 or less). Tape seal all internal joints. Maintain existing critical system cooling systems, or provide temporary cooling system with HEPA filters from the construction area, if necessary. Provide dustproof doors and walk-off mats.
- TEMPORARY OVERHEAD PLATFORMS: Provide when Work will be performed over critical equipment. Construct with mineral-fiber board or fire-retardant wood plywood decking over metal or fire-retardant wood framing with a minimum 8-mil anti-static reinforced poly sheet (with a flame spread rating of 15 or less) enclosure, and with a non-combustible work-platform surface above. Provide a toe-board on all sides to prevent tools and debris from falling onto critical equipment, and railings for worker's safety. Support platforms without affecting existing critical equipment, maintaining all existing environmental cooling and exhaust systems as applicable.

EXECUTION

PERFORM THE WORK so that disruption to occupied areas is minimized and to maintain the Owner's ongoing use during normal hours of operations to the greatest extent feasible.

CAREFULLY REMOVE AND REPLACE EXISTING CONSTRUCTION indicated to remain upon completion, but which require removal to complete the Work. Match condition of construction prior to the start of the Work unless otherwise required. Carefully remove and store items indicated for relocations in new Work, or to be retained by Owner, to avoid damage. Thoroughly clean and reinstall as indicated or as directed. Protect and store items identified for reuse. Deliver salvaged items to a facility as directed by the Owner within ten (10) miles of the Project site.

MAINTAIN EXISTING UTILITIES indicated to remain, and protect against potential damage during alteration operations. Do not interrupt existing utilities serving occupied facilities, except when so authorized by the Owner. When necessary, provide temporary services during interruptions of existing utilities, acceptable to the Owner and the AHJ.

CUT, MOVE, OR REMOVE ITEMS as necessary for access to alteration and renovation Work. Replace and restore at completion. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work. Remove debris and abandoned items from area and from concealed spaces. Prepare surface and remove surface finishes to provide for proper installation of new Work and finishes. Close openings in exterior surfaces to protect existing Work and salvageable items from weather and extremes of temperature and humidity. Insulate ductwork and piping to prevent condensation in exposed areas.

COORDINATE ALTERATION AND RENOVATION WORK to expedite completion, and in required sequences of Work to accommodate Owner occupancy, as applicable. Remove, cut and patch Work in a manner to minimize damage and to provide restoring products and finishes to original and or specified condition. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes. Restore existing operational plumbing, heating, ventilation, air conditioning, and electrical systems to full operational condition, when exists. Recover and refinish Work that exposes mechanical and electrical Work that is exposed accidentally during the Work. Install products and finish materials as indicated within individual Specification Sections.

TRANSITIONS: Where new Work abuts or aligns with existing construction, perform a smooth and even transition. Patch work to match existing adjacent Work in texture and appearance. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate the existing surface along a straight line at a natural line of division.

ADJUSTMENTS: Where removal of partitions or walls result in adjacent spaces becoming one, rework floors, walls, and ceiling surfaces to a smooth plane without breaks, steps, or bulkheads. Provide smooth transitions when a change of plane of 1/4 inch in twelve (12) inches occurs. Trim existing doors as necessary to clear new floor finish. Refinish trim as required. Fit Work at penetrations of surfaces to be flush and non-obtrusive.

PATCH OR REPLACE EXISTING SURFACES that are damaged, discolored, or hat show imperfections. Repair substrate prior to patching finishes.

FINISH SURFACES as indicated for new Work. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersection or change of plane.

SECTION 01 42 00 – REFERENCES

APPLICABILITY OF INDUSTRY STANDARDS: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference. Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

CONFLICTING REQUIREMENTS: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Owner or Architect for a decision before proceeding. The quantity or quality level shown or specified must be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum as applicable. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

COPIES OF STANDARDS: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available on request.

SECTION 01 50 00 – TEMPORARY FACILITIES

WORK INCLUDED: Provide temporary construction facilities and controls, and remove upon completion of the Work. Include all costs for temporary utilities, temporary facilities and temporary controls within the Contract Sum. Pay all costs of installation, maintenance, fuel, operation and removal. No costs or usage charges for temporary facilities or controls will be allowed as a claim for additional costs on change orders.

MATERIALS AND EQUIPMENT – GENERAL: Provide new or undamaged, previously used items in serviceable condition, suitable for use intended.

TEMPORARY EXTERIOR ENCLOSURE: Provide a temporary weather-resistant building enclosure when existing building enclosure elements are removed. Enclosure must consist of a minimum 10 mil polyethylene sheet attached to a solid sheathing panel (non-combustible if existing building is non-combustible) with the supporting framework filled with minimum 3-1/2 inch thick fiberglass insulation when exterior temperatures are typically below 40 degrees.

TEMPORARY INTERIOR ENCLOSURE SCREEN (when applicable): Provide a dust-proof enclosure/screen separating the construction area from existing occupied areas. Relocate as required to facilitate construction operations. Completely remove at completion of the Work and arrange for legal disposal. Comply with Landlord requirements, when applicable.
- Dust-resistant Barrier: Reinforced, fire-resistive 10-mil minimum thick polyethylene sheet, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

CONNECT to existing systems at the project site to provide for temporary water, electrical power, lighting and heat for construction operations, unless otherwise indicated.

TEMPORARY ELECTRICAL POWER: Provide a grounded power distribution system with overload protection, sufficient to accommodate construction operations requiring power, use of power tools, electrical heating, lighting, and start-up testing of permanent electric-powered equipment prior to its permanent connection to electrical system. Locate multiple outlets (minimum of 4-gang) spaced so that the entire area of construction can be reached by power tools on a single extension cord of 50' maximum length.

TEMPORARY LIGHTING: Provide temporary lighting fixtures in areas where ceilings and existing fixtures are removed. Re-use existing lighting fixtures when possible and suspend from the existing structure. Remove temporary lighting fixtures when permanent fixtures are operational.

TEMPORARY HEAT AND VENTILATION must be provided to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation and proper curing of materials, to protect materials and finishes from damage due to temperature or humidity, and to prevent hazardous accumulations of dust, fumes, vapors or gases. Once new systems are operational, they may be used for temporary heating and cooling only if: (1) all registers diffusers and filters are cleaned before substantial completion, and (2) warranty periods remain unchanged, starting from the date of Substantial Completion.

TEMPORARY FIRE EXTINGUISHERS: Provide Type ABC extinguishers at locations reasonably effective in extinguishing fires, by personnel at project site. Comply with NFPA No. 10. Post warning and quick-instructions at each extinguisher, and instruct personnel on proper use. Post fire department call number on each telephone at project site.

SCAFFOLDING: Provide all scaffolding and construction aids required, including guard rails, lights and platforms necessary for the completion of the Work, and for the protection of the workmen and the public.

PARKING for construction personnel will be limited to existing spaces approved for and/or designated for use by the Landlord.

PROGRESS CLEANING: At all times, keep the project site free from accumulation of waste materials or rubbish caused by construction operations. Provide suitable waste receptacles for trash and construction debris, and arrange for transportation and legal disposal of materials off site.

WASTE DISPOSAL: Provide dumpsters and collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.

PROTECT EXISTING CONSTRUCTION and adjacent properties from damage by construction operations, and repair any existing work that is damaged by construction operations. Where wet concrete or other large equipment or materials will pass through existing finished spaces, protect existing walls and floor surfaces with a minimum of 6 mil poly and all floors with 1/2" plywood or particle board panels.

SECTION 01 60 00 – PRODUCT REQUIREMENTS

PRODUCTS IN QUANTITIES must be alike and interchangeable. Where additional amounts of a product are likely to be needed by the Owner at a later date for maintenance or repair, provide standard products produced which are likely to be available to the Owner at a later date.

SUPPLY PRODUCTS COMPLETE with standard devices, trim finishes, and accessories indicated in the latest edition of the manufacturer's catalog or brochure published at the date of the award of the Contract. Furnish such items complete with component parts necessary for the obvious and intended use and installation, whether or not descriptions or catalog numbers contain the supplemental information and/or numbers of such components.

EQUIPMENT NAMEPLATES: Provide permanent nameplates on each item of service connected or power operated equipment. Indicate manufacturer, product name, model number, serial number, capacity, speed, rating, and similar essential operating data. Locate nameplates on an easily accessible surface.

LABELS: Locate required labels and stamps on an accessible surface which, in occupied spaces, is not conspicuous.

MANUFACTURER'S INSTRUCTIONS: Whenever products are required to be installed and/or perform in accordance with a specified manufacturer's instruction or procedure, procure, distribute and maintain at the site copies of such information. No allowance or consideration will be made for claimed ignorance as to what a cited standard contains, as each tradesman is considered to be experienced and familiar with the published standards of quality and workmanship for his own trade.

STORE PRODUCTS in accordance with manufacturer's instructions, maintaining sensitive materials within temperatures and humidity ranges required by the manufacturer. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; with ventilation to avoid condensation. Arrange storage to provide access for inspection.

EXTRA STOCK: After completion of the Work, furnish replacement finishes (including paints) of at least 5% of the quantity installed of each type, color and material provided, exclusive of accessory components. Deliver extra stock to Owner's designated space, properly packaged (paper wrapped) and identified.

SECTION 01 62 00 – PRODUCT OPTIONS

NAMED PRODUCTS are a single product, system or equipment item specifically approved for use in the Work, and are indicated by reference to a manufacturer's or supplier's name or product name, make or model number. When multiple named products are indicated, provide products only by one of the named manufacturers or vendors, unless a substitution request is approved by the Architect.

BASIS-OF-DESIGN PRODUCTS: When a product is indicated with the term: Basis-of-Design", that product establishes the significant salient characteristics of the product required in terms of type, function, dimension, in-service performance, physical properties, appearance, and other characteristics, for evaluating comparable products.

NO SUBSTITUTIONS of NAMED, OR BASIS-OF-DESIGN PRODUCTS IS PERMITTED, without submittal of a Substitution Request by the Contractor, and approval by the Architect.

COMPARABLE PRODUCT: A product demonstrated through the substitution process to equal or exceed the required characteristics of a named product, that is approved for use in the Work.

FOR "OR-EQUAL" or "PERFORMANCE-BASED" products (as indicated with performance requirements, characteristics, and/or referenced standards), provide products of any manufacturer or vendor meeting those requirements and characteristics, which will perform adequately the duties imposed by the specified item, and which will not cause a delay in the Construction Schedule due to procurement of such item. Such products not meeting the intent of the Construction Documents without an approved Substitution Request may be rejected.

SECTION 01 71 23 – FIELD ENGINEERING

VERIFY existing horizontal and vertical control points, grades, elevations, dimensions, and other figures as indicated on the Drawings. Report inconsistencies to the Architect for resolution before commencing work.

WORK LAYOUT: Establish and maintain chalk-lines and other markers necessary to locate all elements of the project, including partitions, casework, electrical and plumbing connections and fixtures. Calculate and measure required dimensions - DO NOT SCALE THE DRAWINGS to determine dimensions unless directed to do so.

ESTABLISH & MAINTAIN new benchmarks and other markers to set lines and levels for the Work as needed to properly locate all elements of the Project.

EXISTING UTILITIES AND EQUIPMENT: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning any work at the site, investigate and verify the existence and location of underground utilities and other construction. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping.

MARK CASEWORK & FIXTURE locations with ceiling light fixtures temporarily marked on the floor substrate before construction of any partitions. Coordinate with casework or fixture shop drawings for size of units and alignment to fit the space as indicated.

PREPARE EQUIPMENT AND CASEWORK-FIXTURE TEMPLATES cut from stiff cardboard for each size of equipment or fixture unit being installed. To verify layout of the project, place templates on the floor where indicated, and permanently mark their locations with paint or other removable markings as soon as existing construction is demolished.

TAKE FIELD MEASUREMENTS as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

SECTION 01 73 00 – EXECUTION REQUIREMENTS

INSTALLERS INSPECTION OF SUBSTRATE CONDITIONS: Before installation, inspect substrate material and the conditions under which the Work will be performed. Do not proceed with installation until unsatisfactory conditions have been corrected. Application of a material or equipment item to work installed by others constitutes acceptance of that Work and assumption of responsibility for satisfactory installation. Inspect each item of material or equipment immediately prior to installation. Reject damaged and defective items.

PERFORM INSTALLATION WORK by persons qualified to produce workmanship of specified quality, in accordance with manufacturer's printed installation recommendations and requirements. Install Work during conditions of temperature, humidity, exposure, forecasted weather, and status of the project completion which will ensure the best possible results for each unit of work.

PROVIDE ATTACHMENT AND CONNECTION devices and methods for securing the work properly as it is installed, true to line and level. Isolate each unit of work from non-compatible work, as required to prevent deterioration. Make allowance for expansion, contraction, and building movements. Coordinate closing-in of work with required inspections and tests, so as to minimize the necessity of uncovering completed work.

BRACE PARTITIONS, suspend ceilings or soffits, and brace platforms, suspended items or similar construction only to structural elements – even if not specifically noted. Do not brace elements to the roof deck, plumbing / sprinkler pipes, ductwork, electrical conduit or similar elements.

AT PROJECTIONS OF FINISHED SURFACES, including pilasters or thickened walls, return all exposed surface finishes back to the primary surface even if not specifically noted.

ALIGN SURFACES of new finishes with existing finishes and match existing finish-surface conditions except as otherwise indicated. Patch existing surfaces and refinish to match adjacent existing surfaces, as applicable.

VISUAL EFFECT Provide uniform joint widths in exposed work, organized for the best possible visual effect. . Recheck measurements and dimensions of the work, as an integral step of starting each installation. Refer questionable visual-effect choices to Owner for final decision of acceptability.

MOUNTING HEIGHTS: Where mounting heights are not indicated within the Drawings, mount at industry-recognized standard mounting heights for applications indicated. Refer questionable mounting height choices to Owner's representative for final decision.

AFTER INSTALLATION, provide coverings to protect installed products from damage from traffic and construction operations, remove when no longer required. Repair and replace damaged items, at no additional cost to the Owner. Additional time required to secure replacements and to make repairs will not be considered as justification for an extension of time to complete the Work.

SECTION 01 73 29 – CUTTING & PATCHING

DEFINITION: "Cutting and patching" includes cutting into construction elements (either new or existing) to provide for the installation or performance of other work and the subsequent fitting and patching required to restore surfaces to their original condition. "Cutting and patching" is performed for coordination of the Work, to uncover Work for access or inspection, to obtain samples for testing, to permit alterations to be performed, or for other similar purposes.

DO NOT cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio. Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety. Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

"CUTTING AND PATCHING" DOES NOT INCLUDE work performed during the manufacturing of products. It does not include the drilling of holes for installation of fasteners or similar operations. Demolition of selected portions of the building for alterations is included in Division-2 Specification Sections.

USE MATERIALS that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

INSPECTION: Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

PROVIDE TEMPORARY SUPPORT AND PROTECTION of Work to be cut. Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

TAKE ALL PRECAUTIONS necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them. Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

CUT existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition. Cut existing construction using methods least likely to damage elements to be retained or adjoining construction.

IN GENERAL, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.

BY-PASS UTILITY SERVICES such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

PATCH with durable seams that are as invisible as possible. Comply with specified tolerances. Where feasible, inspect and test patched areas to demonstrate integrity of the installation. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

THOROUGHLY CLEAN all areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

SECTION 01 77 00 – CLOSEOUT PROCEDURES

FINAL CLEANING:

PRIOR TO OWNER OCCUPANCY, clean all surfaces including fixtures and equipment, for use by the Owner. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to the condition expected from a normal, commercial building cleaning and maintenance program. Comply with the manufacturer's instructions for operations.

CLEAN TRANSPARENT MATERIALS, including mirrors and glass in doors and windows, to a polished condition. Remove putty and other substances which are noticeable as vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

CLEAN EXPOSED EXTERIOR and interior hard-surfaced finishes to a dust-free condition, free of dust, stains, films and similar noticeable distracting substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.

MECHANICAL AND ELECTRICAL EQUIPMENT must be wiped clean. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

CLEAN THE PROJECT SITE, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas to a broom clean condition; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

SUBSTANTIAL COMPLETION PROCEDURES:

SET thermostats and similar devices to the current local time. Provide a printed list of names, addresses and phone numbers of all sub-contractors and material suppliers used.

AFTER final cleaning operations have been completed, and when the Project is ready for owner occupancy, obtain an occupancy permit on behalf of the Owner, and approval by any other governmental authorities having jurisdiction over the Project.

SUBMIT a written request for inspection, stating that the Work is Substantially Complete and ready for the Owner's beneficial use and occupancy. Accompany notice with a listing of all items to be completed or corrected.

OWNER'S ACTION: Following observation of the Work, the Owner will either prepare the certificate of substantial completion, or will advise the Contractor of work which must be performed before the certificate will be issued. Results of the observation report will form the initial "punch-list" for final acceptance.

PREREQUISITES TO FINAL COMPLETION:

COMPLETE ALL WORK ITEMS as expeditiously as possible, providing labor at times when the facility is not in operation, if necessary. Coordinate with the Owner's representative and perform the Work so that it will not interfere with the Owner's operations.

COMPLETE FINAL TESTING of systems, and instruct Owner's personnel in the operation, adjustment, maintenance of all mechanical, plumbing, fire protection, monitoring and electrical systems.

REMOVE TEMPORARY FACILITIES and controls, and temporary utility services from the project site, along with construction tools, field office, mock-ups and similar elements.

TOUCH-UP AND REPAIR or restore marred exposed finishes. Deliver spare parts, tools, extra stock of materials and similar physical items.

INSTRUCTION OF OWNER'S PERSONNEL: Arrange for each installer of operating equipment and other work that requires regular or continuing maintenance, to meet at the site with the Owner's personnel to provide necessary basic instructions in the proper operation and maintenance of the entire Work. Where installers are not experienced in the required procedures, include instruction by the manufacturer's representatives.

OPERATION AND MAINTENANCE DATA: Include the following types of information in operation and maintenance manuals: emergency instructions, spare parts listings, copies of warranties, wiring diagrams, inspection procedures, shop drawings and product data.

SECTION 01 78 00 – FINAL CLOSEOUT SUBMITTALS:

ELECTRONIC CLOSEOUT SUBMITTALS: Provide two (2) sets of Electronic Media Formatted (EMF) Closeout Documents to the Owner before Final Completion, with contents prepared typically in PDF format. Save each set of documents on a single, USB type flash-drive of sufficient capacity to contain the entire closeout documents on a single EMF device. Attach a concise, clearly printed label or tag to identify the contents.

ORGANIZE CLOSEOUT DOCUMENTS into electronic directories of manageable content and size, and identified within the file structure with the title of the subject matter (such as "Operation and Maintenance Manual" or "Record Drawings" or "Warranties", as applicable), and include the Project name, Project address, the name of the Contractor, and the date prepared/submitted.

CLOSEOUT DOCUMENTS:

SUBMIT FINAL OCCUPANCY PERMIT, and other legal releases necessary for the Owner' complete and unrestricted use.

SUBMIT WARRANTIES, guarantees, maintenance bonds, maintenance agreements, final product certifications and similar documents.

SUBMIT MARKED-UP RECORD DRAWINGS, Product Data and shop-drawings (whether prepared by the GC or by the Owner's direct suppliers), Operations and Maintenance manuals, damage or settlement survey, extra copies of drawings and specifications, and similar final record information. Provide one-set of half-size drawings at the Project Site for the Owner's use.

SUBMIT A FINAL LISTING of all sub-contractors and material suppliers used on the project.

SUBMIT AN UPDATED FINAL STATEMENT accounting for additional changes (additions and deductions) to the Contract Sum. Identify amounts for change orders, liquidated damages (addition or deduction), deductions for uncorrected work, deductions for re-inspection payments, and previous payments.

SUBMIT FINAL PAYMENT REQUEST with final unconditional lien releases from all sub-contractors and material suppliers, and other supporting documentation not previously submitted or accepted.

SUBMIT FINAL LIEN WAIVERS indicating that lien rights are "unconditionally released" for all amounts previously paid by the Owner, and "conditionally released" or contingent only upon receipt and bank clearance of the final payment amount yet due. Unless otherwise required by the Owner, provide final waivers from the Contractor, and for all subcontractors, sub-subcontractors, suppliers and any other entities lawfully entitled to file a lien in excess of One Thousand Dollars ($1,000.00) arising out of the Work of the Construction Contract. The Owner reserves the right to designate which entities involved in the Work must submit waivers. Submit all waivers on the 1990 Edition of the "Waiver and Release of Lien" form as issued by the Construction Industry Affairs Council of Greater Kansas City Inc (CIAC) or other form provided or approved by the Owner, fully executed in a manner acceptable to Owner.

SUBMIT THE PUNCH-LIST(s) with the Contractor's signed statement indicating that all items have been completed or otherwise resolved for acceptance.

SUBMIT EVIDENCE OF CONTINUING INSURANCE COVERAGE complying with requirement of the Contract Documents. Include certificates of insurance for products and completed operations when required.

SUBMIT WRITTEN CERTIFICATION that: (1) the Contract Documents have been reviewed, (2) the Work has been inspected for compliance with the Contract Documents, (3) the Work has been completed in accordance with the Contract Documents, (4) equipment and systems have been tested in the presence of the Owner's representative and are operational, and (5) the Work is completed and ready for final inspection.

SECTION 02 41 19 – SELECTIVE DEMOLITION

REMOVAL AND LEGALLY DISPOSAL of existing construction as necessary to facilitate new construction Work, as indicated in the Drawings, and as indicated and required herein. The Owner assumes no responsibility for the condition of items or structures to be demolished.

REMOVE SALVAGEABLE ITEMS of value as work progresses - storage or sale of removed items on site is not permitted. The Owner reserves the right to retain any salvageable item.

PROVIDE TEMPORARY PROTECTION including barricades and other measures to assure safe passage of persons around areas of demolition work, and to protect people from injury.

INSPECT areas in which work will be performed prior to commencement of demolition work.

LOCATE, IDENTIFY, STUB OFF, AND DISCONNECT existing utility and service lines that are not to remain. Provide by pass connections as required to maintain continuity of service to other areas of the building, if necessary.

PERFORM demolition work in a systematic manner. Use such methods as required to complete the work required in accordance with requirements of governing regulations. Provide shoring, bracing, or support to prevent movement, settlement or collapse of adjacent construction to remain. Conduct operations by means and methods to prevent injury to persons or damage to adjacent buildings, structures, other facilities. Repair damage caused to adjacent construction at no additional cost to the Owner.

CUT EXISTING CONCRETE SLABS only with masonry or concrete saws (pneumatic jacks-hammers are not permitted to be used unless written permission is obtained from Owner).

IF UNANTICIPATED BUILDING ELEMENTS, utilities, or hazardous materials are encountered, investigate the nature and measure the extent of the conflict. Submit a written report to the Owner. Pending receipt of direction from the Owner, rearrange the demolition schedule as necessary to continue overall job progress without delay.

PROTECT WALLS, CEILINGS, FLOORS, and other existing finishes that are to remain and are exposed during demolition operations. Cover and protect furniture furnishings, and equipment that has or will not be removed. Protect air-handling equipment from dust or debris.

ERECT AND MAINTAIN DUSTPROOF PARTITIONS and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise. Construct dustproof partitions of not less than nominal 4-inch studs, 5/8-inch gypsum wallboard with joints taped on occupied side, and 2-inch fire-retardant plywood on the demolition side. Insulate partition to provide noise protection to occupied areas. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.

POLLUTION CONTROLS: Utilize water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations, as applicable. Do not create hazardous or objectionable conditions, such as ice, flooding, and pollution, when using water, and do not create objectionable odors from use of chemicals.

REMOVE AND TRANSPORT DEBRIS in a manner that will prevent spillage on adjacent surfaces and areas. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.

SELECTIVE DEMOLITION OPERATIONS: Demolish and remove existing construction elements only to the extent required by new construction or as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:

NEATLY CUT OPENINGS AND HOLES plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

CUT OR DRILL FROM THE EXPOSED OR FINISHED SIDE into concealed surfaces to avoid marring existing finished surfaces. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations. Maintain adequate ventilation when using cutting torches

REMOVE DECAYED, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

RETURN ELEMENTS OF CONSTRUCTION AND SURFACES TO REMAIN to condition existing before start of demolition operations.

DEMOLISH CONCRETE AND MASONRY in small sections. Cut concrete and masonry at junctures with construction to remain, using power-driven masonry saw or hand tools; do not use power-driven impact tools.

REMOVE RESILIENT FLOOR COVERINGS and adhesive according to recommendations of the Resilient Floor Covering Institute's (RFCI) "Recommended Work Practices for the Removal of Resilient Floor Coverings" and Addendum. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

REMOVE AIR-CONDITIONING EQUIPMENT without releasing refrigerants.

BELOW-GRADE DEMOLITION WORK: Demolish foundation walls and other below-grade construction, as follows:

REMOVE BELOW GRADE CONSTRUCTION, including foundation walls, to at least 12 inches below grade.

BELOW GRADE CONCRETE SLABS: break up and remove unless otherwise indicated to remain. Break into sections no larger than 24 inches square and leave in place.

PATCHING AND REPAIRS

PROMPTLY PATCH AND REPAIR holes and damaged surfaces caused to adjacent construction by selective demolition operations. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

RESTORE EXPOSED FINISHES of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.

PATCH AND REPAIR FLOOR AND WALL SURFACES in the new space where demolished walls or partitions extend one finished area into another. Provide a flush and even surface of uniform color and appearance. Closely match texture and finish of existing adjacent surface. Patch with durable seams that are as invisible as possible.

WHERE PATCHING SMOOTH PAINTED SURFACES, extend final paint coat over entire unbroken surface containing the patch after the surface has received primer and second coat

REMOVE EXISTING FLOOR AND WALL COVERINGS and replace with new materials, if necessary, to achieve uniform color and appearance.

DISPOSAL OF DEMOLISHED MATERIALS: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site. Do not burn demolished materials on-site. Transport demolished materials off the property and legally dispose of them.

CHANGE FILTERS ON AIR-HANDLING EQUIPMENT on completion of selective demolition operations.

CLEAN UP: Upon completion of demolition work, remove tools, equipment and demolished materials from the site.

DIVISION-06: WOOD PLASTICS & COMPOSITES

SECTION 06 10 00 – ROUGH CARPENTRY

PROVIDE nailers, blocking, backing, and plywood required for completion of the Work, which is generally not exposed; where noted on the Drawings, and as specified herein.
- In non-combustible construction (Type I & II) provide fire-retardant treated wood.

LUMBER: Comply with PS 20 of "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by the ALSC board of Review. Provide dressed lumber, S4S typically, seasoned with 19% moisture content for sizes 2" or less.

FIRE-RETARDANT TREATED WOOD: Provide fire-labeled wood with minimum flame spread rating of 25, at the following locations: (1) blocking concealed within metal framed drywall partitions in non-combustible construction; (2) framing & blocking located above finished ceilings; and (3) blocking within fire-rated demising walls.

PRESERVATIVE TREATMENT: Water borne preservatives complying with AWPB LP-2, kiln-dried to 19% maximum moisture content for lumber and 15% for plywood.
- Treat wood cants, nailers, curbs, blocking, stripping and similar members in connection with roofing, flashing, vapor barriers and waterproofing.
- Treat wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.

KILN-DRY WOOD MATERIALS AFTER TREATMENT to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not

RELEASED FOR CONSTRUCTION
As Noted on Plans Review

Development Services Department
Lee's Summit, Missouri
08/20/2024

LEE'S SUMMIT FLEX SPACES
60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: Capital Builders

CONSTRUCTION DOCUMENTS

06.03.2024

STATE OF MISSOURI
JACOB AARON LITTRELL
NUMBER A-2011037018
ARCHITECT
06.03.24

Architect: _
License: _

REV.	DATE	ISSUE

ARCHITECT:

six twenty one

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www.sixtwentyone.com

ARCHITECTURAL SPECIFICATIONS

Sheet | Revision no.

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comply with requirements for untreated material. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

PLYWOOD BACKING PANELS: For mounting electrical or telephone equipment, provide fire-retardant treated plywood, APA C-D PLUGGED INT with exterior glue, 3/4" thick. Provide minimum 3/4" plywood, or 2 x lumber material as a minimum for backing at grab bars.

FASTENERS AND ANCHORS: Provide size, type material and finish as recommended by applicable standards. Provide fasteners and anchorages with a hot-dip zinc coating meeting ASTM A-153.

DISCARD UNITS of material with defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.

SET rough carpentry Work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.

SECURELY attach carpentry Work to substrate by anchoring and fastening as required.

USE common wire nails, except as otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

PROVIDE FRAMING MEMBERS of sizes and on spacings shown, and frame openings as shown, or if not shown, comply with recommendations of "Manual for House Framing" of National Forest Products Association (NFPA). Do not splice structural members between supports.

ANCHOR AND NAIL as shown, and to comply with "Recommended Nailing Schedule" of "Manual for House Framing" and "National Design Specifications for Wood Construction" published by NFPA.

SECTION 06 16 00 – SHEATHING

SUBMIT PRODUCT DATA for each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

- Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.
- Indicate type of preservative used and net amount of preservative retained.
- Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.
- Include physical properties of treated materials.
- For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
- For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- Include copies of warranties from chemical treatment manufacturers for each type of treatment.

INFORMATIONAL SUBMITTALS:

EVALUATION REPORTS: For following products, from ICC-ES:

- Preservative-treated plywood.
- Fire-retardant-treated plywood.

QUALITY ASSURANCE:

TESTING AGENCY QUALIFICATIONS: For testing agency providing classification marking for fire retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

DELIVERY, STORAGE, AND HANDLING: Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PRODUCTS:

PERFORMANCE REQUIREMENTS

FIRE-TEST-RESPONSE CHARACTERISTICS: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction. Provide fire-resistance ratings as indicated by design designations from UL's "Fire Resistance Directory."

WOOD PANEL SHEATHING:

ACCEPTABLE WOOD SHEATHING TYPES: Except as otherwise indicated on the Structural Drawings, wood sheathing panels may be either plywood or oriented strand board, as long as they meet requirements for span, structural designation and exposure category.

EMISSIONS: Products shall meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

GYPSUM BOARD SHEATHING:
GYPSUM SHEATHING & SOFFIT BOARD WITH INTEGRAL WRB (Base-Bid exterior sheathing): Glass-mat Type-X fire-resistant gypsum board in compliance with ASTM C 1177 with glass mat facing both sides and on long edges, with a water-resistant treated gypsum core without organic materials (paper or wood fiber), and with a factory-applied water-resistant barrier (WRB) surface facing. Provide in 48 inch wide panels x maximum length feasible (up to 120 inches) to minimize joints, and in thickness indicated on Drawings, or as follows:

Typical wall and soffit panel thickness: 5/8 inch (except as otherwise indicated)

BASIS-OF-DESIGN: "DensElement Barrier System" by Georgia-Pacific (GP) Gypsum Corporation.

JOINT AND PENETRATION TREATMENT MATERIALS: Provide the following components as part of a tested, integrated water-resistant assembly to permanently flash and seal sheathing panel seams, building penetrations, window and door frame joints, transitions to other building materials, and to lap over and seal off edges of metal flashings from the sheathing surface, to permanently flash and seal all building penetrations and panel seams, for a complete, water-resistant barrier assembly sheding moisture to the exterior of the wall assembly:

LIQUID-APPLIED FLASHING MEMBRANE: Gun-grade, cold-applied, silyl-terminated polymer (STPE) liquid flashing membrane, tested to be compatible with the sheathing WRB surface, and with the associated flashing membrane material:

Basis-of-Design: R-Guard FastFlash by Prosoco, or sheathing mfgr approved equal.

MEMBRANE FLASHING Extruded, elastomeric, pre-cured silicone sheet, to be bonded to substrates on both sides of joints with liquid-flashing material.

Basis-of-Design Product: R-Guard SureSpan EX, by Prosoco, Inc.

GYPSUM SHEATHING & SOFFIT BOARDS: Glass-mat Type-X fire-resistant gypsum board in compliance with ASTM C 1177 with glass mat facing both sides and on long edges, and with a water-resistant treated gypsum core without organic materials (paper or wood fiber). Provide in 48 inch wide panels x maximum length feasible (up to 120 inches) to minimize joints, in thickness indicated on Drawings, or as follows:

Typical wall and soffit panel thickness: 5/8 inch

BASIS-OF-DESIGN: "Dens-Glass Gold" by Georgia-Pacific (GP) Gypsum Corporation. Pending compliance with requirements, equivalent inorganic products by National Gypsum (Gold Bond eXP Sheathing), USG (Securock), and CertainTeed/Saint-Gobain (GlasRoc Sheathing) are also acceptable.

GYPSUM ROOF-BOARD SHEATHING: (provide on back side of parapets in contact with roofing): Inorganic, glass-mat gypsum sheathing (per above requirements) with a non-asphaltic surfacing intended for direct application of roofing mastics and adhesives.

BASIS-OF-DESIGN: "Dens-Deck Prime" by G-P Gypsum Corporation, or equivalent, acceptable for direct-adhesion to roofing membrane by roofing manufacturer.

FASTENERS:

PROVIDE FASTENERS in size and type that comply with requirements specified in this Article for material and manufacture, with hot-dip zinc coating complying with ASTM A 153 typically, and as follows:

- Nails, Brads, and Staples: ASTM F 1667.
- Power-Driven Fasteners: NES NER-272.
- Wood Screws: ASME B18.6.1.

SCREWS FOR FASTENING WOOD SHEATHING: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened. Provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

SCREWS FOR FASTENING GYPSUM SHEATHING TO METAL FRAMING: Type S-12 bugle head self-tapping steel drill screws with fine thread for heavy-steel gage, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117. For steel framing less than 0.0329 inch thick (20 gage), use screws that comply with ASTM C 1002.For steel framing from 0.033 to 0.112 inch thick (20 to 10 gage), attach sheathing to comply with ASTM C 954.

ADHESIVES FOR FIELD GLUING PANELS TO FRAMING: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels. Adhesives must have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

FOAM SHEATHING FASTENERS: Sheathing manufacturer's recommended units with two (2) inch diameter washers with solid cap design (without keyholes) with pre-spotting prongs and stiffened center "bullseye" ring to prevent fastener pull-through, in length as recommended by manufacturer to securely anchor to the supporting framing:

FASTENER PERFORMANCE REQUIREMENTS: Attachment system must comply with the following:

Wind Load Performance: Both negative and positive pressure of 90 pound PSF for 60 seconds, and 135 PSF for 10 seconds, without failure of components or permanent distortion, when tested per ASTM E 330.

Water Penetration / Air Leakage Performance: No water leakage seen on tested attachment system, specifically including substrate fasteners when tested up to 20 pounds per square foot pressure differential., and less than 0.01 cubic feet per minute per square foot air leakage through entire tested system at 1.6 and 6.2 pounds per square foot, when tested per ASTM E 331 and ASTM E283.

Wind Cycling Performance: No damage or deformation observed after testing through 4,500 air pressure cycles, including 50 cycles at a maximum pressure of 90 pounds both positive and negative, with average cycle time not less than 3.25 seconds for both negative and positive cycles, when tested per ASTM E 1886.

BASIS-OF-DESIGN: "Thermal-Grip" Fasteners by Rodenhouse Inc., P: 616-454-3100, or equivalent product as recommended or otherwise approved for use by the sheathing panel manufacturer.

EXECUTION:

EXAMINE SUBSTRATES AND CONDITIONS for compliance with requirements for installation affecting performance of the Work. Verify that metal wall studs, opening framing, bridging, bracing and other framing support members and anchorage have been installed within necessary alignment tolerances and requirements. Verify that items required to penetrate the sheathing system are either installed or marked for future installation. Do not proceed with installation until unsatisfactory conditions have been corrected. Commencement of installation constitutes acceptance of existing conditions and acceptance of responsibility for satisfactory performance.

DO NOT USE MATERIALS WITH DEFECTS that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

CUT SHEATHING MATERIALS AT ALL PENETRATIONS, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

SECURELY ATTACH to substrate by fastening as indicated, complying with sheathing manufacturer's recommendations and with the following, as applicable:

- NES NER-272 for power-driven fasteners.
- Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."

COORDINATE SHEATHING INSTALLATION with flashing and joint-sealant installation requirements so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

WOOD STRUCTURAL PANEL INSTALLATION: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated. Fasten panels as indicated below:

COMBINATION SUBFLOOR-UNDERLAYMENT: Screw to framing. Space panels 1/8 inch apart at edges and ends.

SUBFLOORING: Screw to cold-formed metal framing. Space panels 1/8 inch apart at edges and ends.

WALL AND ROOF SHEATHING: Screw to cold-formed metal framing. Space panels 1/8 inch apart at edges and ends. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.

UNDERLAYMENT: Nail to subflooring. Space panels 1/32 inch (0.8 mm) apart at edges and ends. Fill and sand edge joints of underlayment receiving resilient flooring immediately before installing flooring.

GYPSUM SHEATHING & SOFFIT INSTALLATION: Comply with GA-253 and with manufacturer's written instructions. Fasten gypsum sheathing to wood framing with nails unless otherwise indicated on the Drawings. Fasten gypsum sheathing to metal framing with screws. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

HORIZONTAL INSTALLATION: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end joints of adjacent boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

VERTICAL INSTALLATION: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards. For sheathing under stucco cladding with metal lath, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

SEAL SHEATHING JOINTS according to sheathing manufacturer's written instructions. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

FINISH GLASS-MAT GYPSUM SOFFITS by applying joint tape over all joints and embed tape within setting-type joint compound as recommended by the manufacturer. Skim-coat the full exposed soffit area with setting-type joint compound for a smooth, flat, finish, ready for finishing.

INSTALLATION OF FOAM SHEATHING: Do not install more insulation than can be permanently fastened within the same day. Do not leave insulation temporarily installed overnight or for extended periods that is not permanently attached to the building substructure.

Install panels horizontally using maximum panel lengths to minimize number of joints. Locate edge joints parallel to and on framing members. Center end joints over supports and stagger in each course. Provide additional framing wherever panel joints do not bear directly onto framing, plates or sill members.

Fasten panels to each support with fasteners at each framing member and at spacing required by manufacturer to meet performance requirements indicated, if a cladding anchorage system will not be installed over the sheathing. Set back corner fasteners by 3/8 inch from edges and ends of panel units. Drive fasteners to bear tight and flush with surface of insulation. Do not overdrive or tear surface skin of sheathing. Perimeter fasteners may bridge gap of abutting board joints per large diameter of fastener/washers, with a maximum of two (2) board joints bridged per fastener.

Seal joints between panels and penetrations with seathing joint sealer per manufacturer's recommendations.

INSTALLATION OF FOAM SHEATHING FLASHING TAPE:

COORDINATE installation with window, door or storefront framing installations, and with locations of cladding anchorage systems, as applicable.

INSTALL using sufficient hand pressure to ensure that it is completely adhered and sealed to all substrate surfaces, and in accordance with sheathing manufacturer's joint sealing recommendations, and install as follows:

- At all end and edge joints of foam sheathing.
- At all wall openings or edges, install to cover full depth of wall substrate (including framing or blocking) plus four (4) inches minimum coverage onto surface of sheathing.
- Over all sheathing panel anchors, and where future masonry veneer ties or mechanical cladding system anchors will be installed (which will typically align with substructure framing locations).

FLASHING AT SILLS: Cut flashing a minimum of twelve (12) inches longer than opening width. Cover horizontal sill opening by aligning inside edge of flashing tape with inside edge of exterior wall assembly and adhere to rough opening across sill and up jambs a minimum of six (6) inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs. Fan flashing at bottom corners onto face of wall, and press firmly in place. Mechanically fasten fanned edges.

FLASHING OF JAMBS AND WALL EDGES: Cut flashing to same height of openings, and apply flashing by aligning inside edge with inside surface of wall assembly - starting at opening head and lapping over sill-flashing (if applicable) extending down to the sill or base of the opening.

FLASHING AT HEAD OF WINDOW OR DOOR OPENINGS WITHOUT LINTEL ABOVE: Cut flashing six (6) inches longer than the width of the opening. Apply flashing wall head substrate, and overlap jamb flashings a minimum of three (3) inches on both sides of openings.

AT SHELF-ANGLES OR LINTELS, extend flashing tape over sheet-metal flashing (if exists) or shelf angle / lintels approximately two (2) inches. Apply eight (8) inch width of flashing tape spaced equally over sheathing with bar and mechanical anchors and onto sheet-metal flashing or shelf angle / lintel, extending past shelf six (6) minimum or into an end-dam as applicable.

AT WINDOW OR DOOR HEADS (without shelf-angles or lintels above), place a "head-flap" of flashing tape across the head opening, extending onto sheathing above and each side by four (4) inches minimum, and cut to intersection at 45 degree angle. Cover both head and jamb intersection with a four (4) inch width of flashing tape over the 45-degree cut edges. Tape to top of window, storefront or door frame in accordance with manufacturer recommendations.

WINDOW or STOREFRONT SEALING: Install backer-rod in joint between window, door or storefront framing and flashed rough openings. Apply sealant all around, with "weeped" seals at all sill joint or shelf-angles, per requirements of Division-07 "Sealant" Section.

AT INTERIOR SIDE OF OPENINGS, install backer rod in joints between frame of window, door or storefront framing members and the flashed rough opening. Apply sealant around entire perimeter opening to create a complete air-seal from the inside.

INSTALLATION OF WRB MEMBRANE FLASHINGS (on sheathing materials with an integral WRB):

WINDOW, DOOR & STOREFRONT / CURTAINWALL COORDINATION: Install WRB joint and perimeter treatments before window, door, storefront or curtainwall members are installed.

SEAL JOINTS 1/4 inch and less with joint sealant material, between sheathing panels at fluid/liquid applied WRB, and at sheathing panels with integral WRB. Fill joints with approved sealant ensuring contact with all substrate edge, and strike flush excess sealant to form a continuous water-sealed surface over the joint.

SEAL GAPS AND VOIDS or irregular joints greater than 1/4 inch between sheathing panels, and cracks over 1/16 inch in masonry or concrete substrates with a strip of WRB membrane flashing lapped a minimum of 1-1/2 inch on both sides of the joint. Prime surfaces per WRB membrane flashing manufacturers' instructions and allow to dry. Align and position the WRB flashing membrane, remove any protective films, and press firmly into place for a water-tight joint seal. Ensure a minimum two (2) inch overlap at end and side laps of the WRB membrane flashing. Roll the WRB membrane flashing and laps to ensure a water-tight seal.

SEAL INSIDE AND OUTSIDE CORNERS of substrate materials or sheathing boards with a strip of WRB membrane flashing extending a minimum of three (3) inches on both sides of the corner. Prime surfaces per manufacturers' instructions and allow to dry. Align and position the WRB membrane flashing, remove any protective films, and press firmly into place. Ensure a minimum two (2) inch overlap at end and side laps of the WRB membrane flashing. Roll the WRB membrane flashing and laps to ensure a weather-tight seal.

TRANSITION AREAS: At sheathing material changes, and at tie-in's of sheathing to structural beams, columns, floor slabs or intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials, provide the seal method as indicated above for corners.

AT WALL OPENINGS OR EDGES, cut WRB membrane flashing to cover the full depth of the wall substrate (including sheathing and framing) plus four (4) inches minimum coverage onto the exterior side WRB surface.

AT DOOR OR WINDOW SILLS, cut WRB membrane flashing a minimum of twelve (12) inches longer than opening width and apply primer to substrate per primer manufacturer's requirements. Cover horizontal sill opening by aligning inside edge of flexible-flashing with inside edge of exterior wall assembly and adhere to the rough opening across the sill and up both jambs a minimum of six (6) inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs. Fan flexible-flashing at bottom corners onto face of wall, and press firmly in place – and mechanically fasten all fanned edges.

AT THROUGH-WALL SHEET-METAL FLASHINGS of shelf-angles, lintels, and at door or window sills, apply an eight (8) inch width of the WRB membrane flashing over and above the sheet-metal flashing, spaced equally onto the WRB sheathing and over the sheet metal flashing, extending not less than six (6) minimum past shelf-angles, or into an end-dam, as applicable.

AT JAMBS AND WALL EDGES, and after installation of sill flashing treatment, cut WRB membrane flashing to the same height as the rough-openings, apply flashing primer to substrate, and apply the WRB membrane flashing by aligning the inside edge with inside surface of the wall assembly - starting at opening head and lapping over the sill-flashing (as applicable), extending down to the sill or base of opening.

AT WINDOW OR DOOR HEADS with a lintel or shelf-angle above, cut the WRB membrane flashing six (6) inches longer than the width of the opening. Apply flashing primer and WRB membrane flashing onto the lintel or shelf-angle and inside into the head-surface substrate, overlapping the jamb side WRB membrane flashings a minimum of three (3) inches on both sides. When a lintel or shelf-angle does not exist, install a "head-flap" of WRB membrane flashing across the head of the opening, and cut and trim into the inside corners. Apply a four (4) inch width of WRB membrane flashing lapping over the 45-degree angled cut surfaces inside the jambs and head conditions, and apply an additional four (4) inch width of WRB membrane flashing lapping over both on a 45-degree angle, per WRB membrane flashing manufacturer's recommendations.

AT FASTENERS, MASONRY TIES, DUCTWORK MECHANICAL OR ELECTRICAL PENETRATIONS, and all other penetrations through the exterior WRB membrane, apply the WRB membrane flashing system to fully seal the building enclosure from water penetration, per requirements of the WRB membrane flashing manufacturer.

AT SUBSEQUENT BUILDING MATERIAL ATTACHMENTS, provide WRB membrane flashing material extending a minimum of three (3) inches beyond sides of planned anchor locations of subsequent building finishes or anchorage systems (including rain-screen assemblies and siding). Coordinate with installer(s) of subsequent systems for accurate location of supplemental WRB membrane flashing application. Prime substrate surfaces and apply WRB membrane flashing per manufacturers' instructions. Ensure a minimum two (2) inch overlap at all end and side laps of WRB membrane flashing.

ROLL AND PRESS the WRB membrane flashing material after installation with a hard rubber or metal roller to ensure full adhesion and sealing to all substrate surfaces.

WINDOW & DOOR FRAME SEALING: Install backer-rod within the shim space joint between window, door or storefront framing and the WRB membrane flashed rough openings. Apply backer and sealant all around the exterior joints, with "weeped" seals on the exterior sides of shelf-angles or sill surfaces. At interior side of opening joints, install backer rod and seal all around to create a complete air-seal from the inside. Comply with requirements of Division-07 "Joint Sealants" Section, as applicable.

06 64 10 – FIBERGLASS REINFORCED PLASTIC (FRP) PANELING

PROVIDE Fiberglass Reinforced Plastic (FRP) paneling, including surface preparation , as specified herein and as needed for a complete and proper installation.

APPLICATION: Provide up to 48-inch AFF on 3 sides of service/mop sink, and extending onto adjacent wall surfaces 2-feet beyond service/mop sink.

FRP PANELING: .090 inch thick x 4 feet wide 4 x 8, 10 or 12 ft high panels of semi-rigid fiberglass reinforced plastic meeting "Class A" flame-spread minimum per ASTM E-84:

BASIS-OF-DESIGN: Pebble-textured "Marlite FRP" # P100-Class A panels, white color unless otherwise indicated on the Drawings.

ACCEPTABLE ALTERNATIVE MANUFACTURERS: Subject to compliance with requirements including surface and patterns, as applicable, other manufacturers include: Crane Composites, Glasteel and Nudo Products, Inc.

FRP ACCESSORIES:

TRIM: Manufacturer's standard, color-matched one-piece vinyl extrusions, designed to retain and cover all edges of panels. Provide continuous trim units at all joints between panels (division bars), at top edge caps (when applicable), at inside and outside corners, and at top and bottom edges of panels typically.

EXPOSED FASTENERS: Nylon drive rivets recommended by panel manufacturer, color to match panel color.

ADHESIVE: Manufacturer's recommendation formulation in compliance with Project's VOC requirements.

SEALANT: Mildew-resistant, single-component, neutral-curing or acid-curing silicone sealant recommended by paneling manufacturer, and per requirements of Division-07 "Joint Sealant" Section.

EXECUTION

EXAMINE AREAS and conditions in which FRP will be installed. Complete all finishing operations, including prime coat of paint, before beginning installation of wall surface protection materials.

PREPARATION: Acclimate panels in temperature and humidity conditions approximating those at the project site for not less than 24 hours before application. Lay panels flat. Do not stack on fresh conc. floors or other surfaces that emit moisture. Walls must be dry and free from dirt, dust and grease. Remove switchplates, wall plates, and surface- mounted fixtures in areas where panels are to be applied.

PANEL FITTING: Position panels with 1/4-inch-wide gap at ceiling and floor, and 1/8-inch-wide gap between each panel and division bar of moldings, to allow for normal expansion and contraction. Allow not less than 1/8-inch-wide gap around pipes, electrical fittings, and other projections. Use carbide-tipped power saws to cut panels. Prefit each panel before installing.

INSTALL PANELS by using manufacturer's recommended adhesive applied to back of panels for 100% coverage, with a notched trowel. Before adhesive skins over, set panels in position and press against wall. Pull entire panel back from wall 8- to 10-inches to flash off any solvents, if applicable, and press back into place. Apply adequate, firm pressure to make full contact between panel and wall substrate.

PROVIDE EXPOSED PANEL FASTENERS when applied to FRT-plywood when chemical compatibility with panel adhesive is not known - or is known to be in-compatible, and when otherwise recommended by Manufacturer

PANEL MOLDINGS: Install one-piece color-matching trim and panel moldings at joints between panels, and at top and bottom edges of panels. Install moldings with continuous bead of silicone sealant during installation of panels. Seal joints between moldings and between molding and adjacent finish material. Remove excess sealant immediately.

CLEAN-UP: Remove excess adhesive and sealant while it is still wet. Replace removed plates and fixtures. Remove surplus materials and debris resulting from panel installation upon completion of Work, and leave areas of installation in clean condition

06 83 00 COMPOSITE PANELING

PART 1 GENERAL

SUMMARY

Section Includes: Composite siding.

Related Sections:

- Section 05 40 00 – Cold-Formed Metal Framing for wall framing.
- Section 06 10 00 – Rough Carpentry for wood furring.
- Section 06 16 13 – Insulating Sheathing for continuous insulation, structural sheathing, and weather resistant barrier.

1.2 REFERENCE STANDARDS:

ASTM International (ASTM):

- ASTM D2395 – Standard Test Methods for Specific Gravity of Wood and Wood-Based Materials.
- ASTM G154 – Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials.
- American Wood Protection Association (AWPA):
- AWPA E1-09 – Standard Method for Laboratory Evaluation to Determine Resistance to Subterranean Termites.
- AWPA E10-11 – Standard Method of Testing Wood Preservatives by Laboratory Soil-Block Cultures.

1.3 SUBMITTALS

Product Data: Standard specifications, and descriptive literature for primary and secondary products, including:

- Spec-Data product information sheets.
- Catalog cut-sheets.
- Color charts.
- Safety Data Sheets (SDS).
- Building code evaluation reports.
- Sample warranty forms.
- Shop Drawings: Graphic information specifically prepared for this Project, including:
- Dimensioned plans, elevations, and construction details indicating full extent of composite siding work complete with furring, attachments, accessories, conditions at adjacent materials, perimeters and penetrations.
- Verified field dimensions.

Selection Samples: Color chips for initial color selection prepared on same material as specified products.

Verification Samples: Actual siding and trim pieces, 12 inches (305 mm) long, illustrating color, texture and finish selected by Architect.

Manufacturer's Instructions, including:

- Delivery, storage and handling.
- Preparation and Installation.
- Maintenance.
- LEED Submittals: Manufacturer's sustainable design information for obtaining credits toward LEED Certification of this Project by use of specified products.
- Commercial Product Warranties: Manufacturer's commercial series of prorated limited warranties including; 10-years against manufacturing defects of composite siding, 20-years against manufacturing defects of metal clips, and 25-years against staining and fading of composite siding.
- Residential Product Warranties: Manufacturer's residential series of prorated limited warranties including; 25-years against manufacturing defects of composite siding, 20-years against manufacturing defects of metal clips, and 25-years against staining and fading of composite siding.

1.4 QUALITY ASSURANCE

Installer Qualifications: Manufacturer's authorized dealer-installer.

Installation Documents: Maintain manufacturer's installation instructions, approved submittals, and related documents on-site throughout construction period, to confirm proper installation, until Final Inspection and acceptance by Owner.

Mock-Up:

- At location directed by Architect, install minimum 48 inch (1219 mm) long by 48 inch (1219 mm) high, free-standing, sample wall panel using specified composite siding boards, trim, accessories and substrate construction to show:
- Substrate preparation.
- Blocking, furring and flashing.
- Attachment details.
  - Clearances and gaps between members.
  - Siding pattern, texture, and color.
  - Trim details.
  - Workmanship.
  - Prepare mock-up, for Architect's approval, before start of siding work. Prepare additional mock-ups, if required by Architect, until approved.
  - Maintain approved mock-up during construction to establish required standard of workmanship, and basis of comparison for installation of siding work. Do not remove approved mock-up until directed by Architect.

1.5 DELIVERY, STORAGE AND HANDLING

Deliver, store and handle composite siding in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 COMPOSITE SIDING BOARDS

Manufacturer: NewTechWood America, Inc.; 19111 Walden Forest Dr., Suite B; Humble, TX 77346; Tel: 281-570-645; Fax: 281-661-1167; Email: inquiry@newtechwood.com; Website: www.newtechwood.com.

- Single Source Responsibility: Furnish primary products, secondary products, and warranty for work of this Section from same source.
- Substitutions: Not allowed.
- Description: Ultrashield Naturale composite siding boards composed of recycled wood fiber and high-density polyethylene (HDPE) core, encased in 1⁄64 inch (0.5 mm) to 1⁄32 inch (0.7 mm) thick UV and stain resistant plastic shell; core and shell are coextruded under high temperature forming a single combined product.
- Board size: 51⁄2 inches (142 mm) wide by 1⁄2 inch (13 mm) thick by 16 feet (4.87 m) long.
- Profile: European Siding Norwegian Board.
- Color: Peruvian Teak; matte finish.
- Texture: Straight grain
- Properties: a. Density: 7.2 lb/ft3 (115.3 kg/m3); meeting ASTM D2395.
- Installation method: Rain screen; offset 1 inch (25.4 mm) from face of substrate; installed on furring with metal clips.

2.2 ACCESSORIES

Starter Strips: 19⁄32 inch (15 mm) by 9⁄16 inch (14 mm) by [36 inches (914 mm)] [108 inches (2743 mm)]; extruded aluminum; for attachment of bottom course of siding board to substrate.

Siding Clips: Extruded aluminum for attachment of siding boards to substrate.

End Plugs: 11⁄16 inch (18 mm) diameter by 5⁄16 inch (8 mm) thick, rubber spacers for providing 1 inch (25.4 mm) offset behind top course of siding board.

Trim: Fabricated from same material as siding boards; match siding color.

- End fascia: 113⁄16 inches (46 mm) by 111⁄16 inches (44 mm) by 96 inches (2438 mm) long; F-shaped; for wall openings, perimeters, and penetrations.
- Joint fascia: 37⁄64 inches (79 mm) by 11⁄16 inch (27 mm) by 96 inches (2438 mm) long; I-shaped; for vertical joints between adjacent rows of boards.
- Outside corner: 29⁄32 inches (58 mm) by 29⁄32 inches (58 mm) by 96 inches (2438 mm) long.
- Inside corner: 213⁄16 inches (71 mm) by 213⁄16 inches (71 mm) by 96 inches (2438 mm) long.

Fasteners: Type and size furnished or recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

Verify that conditions of work previously installed under other sections or contracts are acceptable for installation of composite siding in accordance with manufacturer's instructions and approved submittals.

- Notify [Architect] of unacceptable conditions upon discovery.
- Do not proceed with preparation and installation until unacceptable conditions have been corrected.

3.2 PREPARATION

Prepare substrate to receive composite siding in accordance with manufacturer's instructions, and approved submittals.

3.3 INSTALLATION

Install composite siding in accordance with manufacturer's instructions, and approved submittals.

CLEANING

Clean-up packaging, waste material, and construction debris daily during installation; legally dispose of in accordance with authorities having jurisdiction.

Upon completion, remove surplus materials, remaining debris, tools and equipment.

3.5 PROTECTION

Protect installed products from damage during subsequent construction until Final Inspection and acceptance by Owner.

Repair damage to adjacent materials caused by installation of composite siding.

SECTION-07: THERMAL & MOISTURE PROTECTION

SECTION 07 21 00—THERMAL INSULATION

WORK INCLUDED: Provide insulation work, as shown on the drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents. Applications of insulation specified in this section include the following: blanket-type building insulation and rigid-type building insulation at wall furring

THERMAL CONDUCTIVITY: Thicknesses indicated are for thermal conductivity (k-value at 75 degrees F or 24 degrees C) specified for each material. Provide adjusted thicknesses as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by "R" value, provide thickness required to achieve indicated value.

FIRE AND INSURANCE RATINGS: Comply with fire-resistance, flammability and insurance ratings indicated, and comply with regulations as interpreted by governing authorities.

SUBMIT PRODUCT DATA including manufacturer's product specifications and installation instructions for each type of insulation and moisture protection material required.

QUALITY ASSURANCE

FIRE-TEST-RESPONSE CHARACTERISTICS: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to AHJ representatives. Identify materials with appropriate markings of applicable testing and inspecting agency.

- Surface-Burning Characteristics: ASTM E 84.
- Fire-Resistance Ratings: ASTM E 119.
- Combustion Characteristics: ASTM E 136.

DELIVERY, STORAGE, AND HANDLING

PROTECT INSULATION MATERIALS from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PROTECT PLASTIC INSULATION as follows:

- Do not expose to sunlight, except to extent necessary for period of installation and concealment.
- Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
- Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PRODUCTS

PROVIDE PREFORMED UNITS, sized to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths, as appropriate for conditions of use indicated.

AT GRADE & BELOW GRADE EXTERIOR PERIMETER INSULATION

CEMENT-FACED PERIMETER INSULATION OVER DRAIN MAT: PREFINISHED WALL INSULATION PANELS SUITABLE FOR ABOVE OR BELOW GRADE APPLICATIONS, INSTALLED OVER AN OPEN-CELL NYLON OR POLYMER CORE MEMBRANE ENGINEERED TO DISSIPATE MOISTURE:

INSTALL DRAINAGE PLANE OVER DAMPROOFING OR WATERPROOFING MEMBRANE ACTING AS WEATHER-RESISTANT BARRIER, AND AS FOLLOWS:

DRAINAGE PLANE MEMBRANE:

BASIS-OF-DESIGN: "STO DRAINSCREEN" OR EQUAL 1/4 INCH THICK (NOMINAL) NYLON FILAMENT CORE DRAINAGE MAT

CEMENT-FACED PERIMETER INSULATION: FABRICATE PANELS FROM CLOSED CELL, EXTRUDED POLYSTYRENE INSULATION WITH A FACTORY APPLIED 5/16 INCH THICK LATEX-MODIFIED CONCRETE SURFACE TO BE EITHER EXPOSED OR FIELD-PAINTED, AND WITH TONGUE AND GROOVE EDGES (ON THE LONG DIMENSION). PANEL SIZE: 2 FEET WIDE X 4 FEET HIGH

BASIS-OF-DESIGN: "WALLGUARD WALL PANELS" BY T-CLEAR CORPORATION – WEBSITE: www.tclear.com

THICKNESS: 2-5/16 INCH, INCLUDING 2 INCH – R-10 INSULATION, OR AS OTHERWISE INDICATED

ACCESSORY ANCHOR CLIPS: "WALLGUARD CLIP SYSTEM" OF GALVANIZED STEEL MOUNTING CLIPS WITH NON-CORROSIVE ANCHORS – MINIMUM 2 PER PANEL

XPS PERIMETER INSULATION WITH DRAINAGE (integrated assembly of perimeter insulation, drainage plane, and below-grade protection): 2-1/4 inch thick R-10.6 extruded-polystyrene (XPS) board insulation complying with ASTM C 578; fabricated with tongue-and-groove edges, with the "outside" having grooved drainage channels and faced with manufacturer's standard, nonwoven geotextile filter fabric. Where occupied space exists, provide on exterior below-grade walls to not less than ten (10) feet below grade, or to the bottom of the slab-on-grade floor. Acceptable Products include:

"Insul-Drain" by Owens Corning

"ThermaDry 1250" by T. Clear Corporation, or equal

EXTRUDED POLYSTYRENE (XPS) INSULATION:

EXTRUDED-POLYSTYRENE (XPS) INSULATION: ASTM C 578 – Type IV (1.60 PCF – compressive strength of 25 PSI) with insulation value of R-5 per inch, maximum flame-spread and smoke-developed indexes of 75 and 450, respectively. Acceptable Manufacturers include: DiversiFoam Products, Dow Chemical Company, Owens Corning, or Pactiv Building Products Division.

UNDER-SLAB HIGH-DENSITY (HD) EXTRUDED-POLYSTYRENE (XPS) INSULATION FILL: ASTM C 578 – Type VII (2.20 PCF- 60 PSI minimum compressive strength), with insulation value of R-5 per inch, maximum flame-spread and smoke-developed indexes of 75 and 450, respectively. Acceptable Manufacturers include: DiversiFoam Products, Dow Chemical Company, Owens Corning, or Pactiv Building Products Division.EXTERIOR UNDER-SLAB EXTRUDED-POLYSTYRENE (XPS) INSULATION FILL WITH DRAINAGE: ASTM C 578 – Type VII (2.20 PCF) with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, with a pattern of drainage channels on the bottom surface and at all four (4) sides. Manufacturers include: DiversiFoam Products, Dow Chemical Company, Owens Corning, or Pactiv Building Products Division.

EXPANDED POLYSTYRENE (EPS) INSULATION:

EXPANDED POLYSTYRENE (EPS) INSULATION: Rigid, cellular polystyrene thermal insulation formed by expansion of polystyrene resin beads or granules in a closed mold to comply with ASTM C 578 for Type I, (0.9 PCF), 10 PSI compressive strength, and with maximum flame-spread and smoke-developed indices of 75 and 450, respectively.

UNDER-SLAB EXPANDED POLYSTYRENE (EPS) INSULATION FILL: Rigid, cellular polystyrene thermal insulation formed by expansion of polystyrene resin beads or granules in a closed mold to comply with ASTM C 578 for Type IX, (2.0 PCF), 25 PSI compressive strength, and with maximum flame-spread and smoke-developed indices of 75 and 450, respectively.

FOIL-FACED POLYISO INSULATION BOARDS: Provide foil-faced, polyisocyanurate boards meeting ASTM C 1289, Type I, Class 1, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, based on tests performed on unfaced core on thicknesses up to 4 inches. Subject to compliance with requirements, available manufacturers include: Atlas Roofing Corporation, Dow Chemical Company, and Rmax, Inc.

UN-FACED BATT or BLANKET INSULATION: Provide formaldehyde free, un-faced batts or blankets (without kraft-paper facings) consisting of fiberglass, or rock-wool meeting ASTM C 665, Type I (blankets without membrane facing) with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics. Subject to compliance with requirements, available manufacturers include but are not limited to:

GLASS-FIBER INSULATION:	ROCK-WOOL FIBER INSULATION:
CertainTeed Corporation.	Owens Corning / Thermafiber.
Guardian Building Products, Inc.	Roxul.
Johns Manville Corporation.	
Knauf Fiber Glass.	
Owens Corning.	

ROCK-WOOL INSULATION: Formaldehyde free, unfaced, rock-wool-fiber boards of 2.0 PCF minimum, with R-value of 4.2 per inch thickness, meeting ASTM C 665, Type I (blankets without membrane facing); consisting of mineral fibers with a maximum flame-spread and smoke-developed indexes of 0 and 0 respectively; and rated as non-combustible per ASTM E 136 / NFPA Standard 220. Approved Products / Manufacturers include:
Owens Corning / Thermafiber RainBarrier HD
Roxul CavityROCK DD

HIGH-DENSITY ROCK-WOOL INSULATION BOARD: Formaldehyde free, unfaced, rock-wool-fiber boards of 6.0 PCF minimum, with R-value of 4.2 per inch thickness, meeting ASTM C 665, Type I (blankets without membrane facing); consisting of mineral fibers with a maximum flame-spread and smoke-developed indexes of 0 and 0 respectively; and rated as non-combustible per ASTM E 136 / NFPA Standard 220. Approved Products / Manufacturers include:
Owens Corning / Thermafiber RainBarrier HD
Roxul CavityROCK DD

SILL SEALER (install below all bottom track or sill plates on concrete substrate): Glass fiber insulation in strip form, 1" nominal thickness compressible to 1/32"; selected from standard widths to suit width of sill members indicated.

LOOSE-FILL INSULATION: Glass-fiber ASTM C 764 Type I for pneumatic application, or Type II for poured application; with maximum flame-spread and smoke-developed indexes of 5 per ASTM E 84.

PROTECTION BOARD: Premolded, semirigid asphalt/fiber composition board, 1/4 inch thick, formed under heat and pressure, of standard sizes.

EAVE VENTILATION TROUGHS: Preformed, rigid plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

AUXILIARY INSULATING MATERIALS

ADHESIVE FOR BONDING INSULATION: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

MISCELLANEOUS INSULATION ANCHORS: Provide adhesively attached, spindle-type anchors (angle-shaped when required), insulation-retaining washers and insulation standoffs with suitable anchor adhesive with demonstrated capability to bond insulation anchors securely to substrates indicated where insulation is required in areas where metal framing or other insulation retention system is not indicated.

EXECUTION

EXAMINE SUBSTRATES AND CONDITIONS, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

INSTALLATION, GENERAL

CLEAN SUBSTRATES OF SUBSTANCES harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

COMPLY WITH INSULATION MANUFACTURER'S WRITTEN INSTRUCTIONS applicable to products and application indicated. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.

EXTEND INSULATION IN THICKNESS INDICATED to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

WATER-PIPING COORDINATION: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

APPLY SINGLE LAYER OF INSULATION to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

ON VERTICAL SURFACES, set units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer. If not indicated, extend insulation a minimum of 36 inches below exterior grade line.

PROTECT BELOW-GRADE INSULATION on vertical surfaces from damage during backfilling by applying protection board. Set in adhesive according to insulation manufacturer's written instructions.

PROTECT TOP SURFACE OF HORIZONTAL INSULATION from damage during concrete work by applying protection board.

INSTALLATION OF GENERAL BUILDING INSULATION

APPLY INSULATION UNITS TO SUBSTRATES by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

SEAL JOINTS BETWEEN CLOSED-CELL (NONBREATHING) INSULATION units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

INSTALL MINERAL-FIBER BLANKETS IN CAVITIES formed by framing members according to the following requirements:

- Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
- Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
- For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.

INSTALL BOARD INSULATION ON CONCRETE OR CMU SUBSTRATES by adhesively attached, spindle-type insulation anchors as follows:

RELEASED FOR CONSTRUCTION
As Noted on Plans Review

Development Services Department
Lee's Summit, Missouri
08/20/2024

LEE'S SUMMIT FLEX SPACES
60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: Capital Builders

CONSTRUCTION DOCUMENTS

06.03.2024

STATE OF MISSOURI
JACOB AARON LITTRELL
NUMBER A-2011037018
ARCHITECT
06.03.24

Architect: _
License: _

REV.	DATE	ISSUE

ARCHITECT:

six twenty one

SixTwentyOne

1705 SUMMIT ST.
KANSAS CITY, MO 64108
T: 816.694.1369

www.sixtwentyone.com

ARCHITECTURAL SPECIFICATIONS

Sheet: G004

Revision no.

Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

PLACE LOOSE-FILL INSULATION into spaces indicated, either by pouring or by machine blowing, to comply with ASTM C 1015. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively

PROTECT INSTALLED INSULATION FROM DAMAGE due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

SECTION 07 25 00 – FLUID-APPLIED WATER RESISTIVE BARRIER (WRB)

WORK INCLUDED: Provide a fluid-applied, vapor-permeable, air, moisture and weather-resistive barrier (WRB) system where indicated on the Drawings, as specified herein, and as necessary for a complete installation. The Work of this Section includes the primary membrane, through-wall flashing membranes, related accessories and joint treatments to bridge and seal the following air leakage pathways and gaps throughout the Project:

Joints and gaps in substrate material(s), and between dissimilar building envelope materials
Connections of the walls to the roof air barrier.
Connections of the walls to the foundations.
Seismic, expansion and control joints in the substrate material
Openings and penetrations at window and door frames, store front and curtain wall
Piping, conduit, duct and similar penetrations through the substrate
Ties, screws, bolts, anchorages and similar penetrations for subsequent insulation and finishes
Other air-leakage pathways into the building envelope.

BARRIER PERFORMANCE REQUIREMENTS: Provide a system capable of performing as a continuous vapor-permeable weather barrier, and as a liquid-water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. The system must be capable of accommodating substrate movement and sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration or leakage, and as follows:

AIR PERMEABILITY: 0.0016 CFM/SF at 1.6 PSF per ASTM E2178 and ASTM E283 with no increased air leakage when subjected to a sustained wind load of 10.5 PSF for 1 hour and gust wind load pressure of 62.8 PSF for 10 seconds when tested at 1.6 PSF per ASTM E331
WATER VAPOR PERMEANCE: 11.6 perms per ASTM E96 Method B when tested at 58 mils dry film thickness.
NO FUNGAL GROWTH when tested per ASTM D 5590
SURFACE BURNING: NFPA Class A, UBC Class 1, flame Spread 25, Smoke Developed 85 per ASTM E84
UV RESISTANCE: Passes 73 Cycles to ASTM D4799 Cycle B (Q-UV)
LOW TEMPERATURE FLEXIBILITY and crack bridging: Pass -4 degrees F per ASTM C836
LONG TERM FLEXIBILITY: Pass to CGSB 71-GP-24M
PASSING WATERTIGHTNESS test CGSB 37-GP-56M

REFERENCES

ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
ASTM E2178: Standard Test Method for Air Permeance of Building Materials.
ASTM E283: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
ASTM E1677 Specification for Air Retarder (AR) Material or System for Low-Rise Framed Building Walls.
ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
ASTM E96: Water Vapor Transmission of Materials.
CGSB 37-GP-56M: Membrane, Modified, Bituminous, Prefabricated, and Reinforced.
AMMA 2400: Standard Practice for Installation of Windows with a Mounting flange in Stud Frame Construction.
ASTM E 2112: Standard Practice for Installation of Exterior Windows, Doors and Skylights.
ASTM D 5590: Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay

SUBMITTALS

SUBMIT PRODUCT DATA for each component of the barrier system.
LABORATORY TEST DATA from an approved independent testing laboratory certifying the air leakage and vapor permeance rates of the air barrier membranes, including primary membrane and transition sheets, exceed the requirements of the Massachusetts Energy Code and in accordance with ASTM E2178. Include test reports on porous substrate and include sustained wind load and gust load air leakage results.
SUBMIT INSTALLER QUALIFICATIONS indicating training, qualifications, competencies and written approval by the primary system manufacturer for execution of the Work of this Section.

QUALITY ASSURANCES:

PERFORM WORK in accordance with manufacturer's written instructions and this specification. Maintain one copy of manufacturer's written instructions on site. Allow access to Work site by the air barrier membrane manufacturer's representative. Ensure continuity of the weather barrier throughout the Project.
PROVIDE MATERIALS from a single manufacturer regularly engaged in the manufacturing of such weather resistant membrane systems, including sheet membrane, air barrier sealants, primers, mastics, and adhesives.
COMPLY with all federal, state and local regulations controlling the use of volatile organic compounds (VOCs).

DELIVERY, STORAGE, AND HANDLING

DELIVER MATERIALS in original, unopened packages with manufacturers' labels intact and clearly identifying products.
STORE MATERIALS inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes. Complete installation as rapidly as possible in each area of construction.
WASTE MANAGEMENT AND DISPOSAL: Separate and recycle waste materials in accordance with requirements of Division-01 Sections and per the Construction Manager's Waste Reduction Work Plan. Verify compliance with VOC regulations and requirements herein for all products, and document to the Construction Manager.

PROJECT CONDITIONS - WEATHER LIMITATIONS: Maintain ambient temperatures above 40 deg F for a minimum of 24 hours before, during, and after coatings are applied. Do not apply air-moisture barrier coating during rainfall. Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air and substrate temperatures permit materials to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements.

COORDINATE INSTALLATION of barrier components with other trades to provide a continuous air-tight membrane.

PRODUCTS

FLUID-APPLIED WEATHER RESISTANT BARRIER (WRB):

BASIS-OF-DESIGN PRODUCT / MANUFACTURER: Air-Bloc 33MR as manufactured by Henry Company – or equal

PROVIDE AUXILIARY MATERIALS recommended by the prime barrier manufacturer for the intended use and compatible with the barrier membrane. Liquid-type auxiliary materials shall comply with VOC limits of AHJ representatives.

PRIMER: Liquid waterborne or solvent-borne primer recommended for substrate by manufacturer of barrier material.

WRB MEMBRANE FLASHING: For use at perimeter of window or storefront framing (head jamb or sills), transitions and joint treatments in substrates, inside or outside substrate corners, and at anchorage locations for subsequent framing or cladding materials, provide a self-adhering UV-resistant SBS modified-bitumen sheet membrane with a metallic aluminum film with the following physical properties:

Peel Adhesion to Primed Steel 15.0 per ASTM D 1000
Vapor permeance: less than 0.05 perms per ASTM E 96
Membrane Thickness: 0.0443 inch (40 mils)
Low temperature flexibility: -15 degrees F per ASTM D146 min
Elongation: 40% per ASTM D412-modifed min
Basis-of-Design Product / Manufacturer: Foilskin or HE200 AM Metal Clad Weatherbarrier by Henry Company – or equal

ADHESIVE WITH LOW VOC CONTENT: For self-adhering membranes at all temperatures, provide a synthetic rubber based adhesive, quick setting, having the following physical properties:

VOC: less than 240 g per L,
Solids by weight: 40%,
Drying time (initial set): 30 minutes.
Basis-of-Design Product / Manufacturer: Blueskin LVC Adhesive, as manufactured by Henry

PENETRATION & TERMINATION SEALANT: moisture cured, medium modulus polymer modified sealing compound having the following physical properties:

Compatible with sheet air barrier, roofing and waterproofing membranes and substrate,
Complies with Fed. Spec. TT-S-00230C, Type II, Class A
Complies with ASTM C 920, Type S, Grade NS, Class 25
Elongation: 450 – 550%
Remains flexible with aging and seals construction joints up to 1 inch wide
Basis-of-Design Product / Manufacturer: HE925 BES Sealant as manufactured by Henry

EXECUTION:

EXAMINE SUBSTRATES and conditions under which the Work of this Section is to be performed, and notify the Construction Manager in writing of unsatisfactory conditions. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints flush.

EXAMINE ROOF EDGES, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where materials will be installed.
VERIFY that concrete or masonry has cured and aged for minimum time period recommended by the barrier manufacturer. Verify that concrete or masonry surfaces are visibly dry and free of moisture.
VERIFY that masonry joints are flush and completely filled with mortar.
PROCEED WITH INSTALLATION only after unsatisfactory conditions have been corrected.

PROTECT CONTIGUOUS WORK from moisture deterioration and soiling caused by application of air-moisture barrier. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.

PROTECT SUBSTRATES AND WALL CONSTRUCTION behind them from inclement weather during installation. Prevent penetration of moisture behind sheathing and deterioration of substrates.

INSTALLTION OF BARRIER SYSTEM

JOINT TREATMENT

SEAL JOINTS 1/4 inch and less between panels of sheathing boards with joint treatment sealant. Fill joints with approved joint treatment sealant ensuring contact with all edges of substrate material. Strike flush any excess sealant over joint layer to form a continuous layer over the joint.
SEAL GAPS AND VOIDS or irregular joints greater than 1/4 inch between sheathing panels, and cracks over 1/16 inch in masonry or concrete with a strip of membrane flashing lapped a minimum of 1-1/2 inch on both sides of the joint. Prime surfaces per manufacturers' instructions and allow to dry. Align and position the flashing material, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of the flashing membrane joints. Roll all laps and membrane with a counter top roller to ensure a weather-tight seal.
SEAL INSIDE AND OUTSIDE CORNERS of substrate materials or sheathing boards with a strip of membrane flashing extending a minimum of three (3) inches on either side of the corner. Prime surfaces per manufacturers' instructions and allow to dry. Align and position membrane flashing, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of membrane flashing. Roll all laps and membrane with a counter top roller to ensure a weather-tight seal.
TRANSITON AREAS: At tie-in's to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials, provide the seal method as indicated above for corners.

ATTACHMENTS OF SUBSEQUENT BUILIDING MATERIALS: Provide membrane flashing material extending a minimum of three (3) inches on all sides of planned anchor locations of subsequent building systems or finishes (including rain-screen assemblies and siding). Coordinate with installer(s) of subsequent systems for accurate anchorage locations. Prime surfaces per manufacturers' instructions and allow to dry. Align and position membrane flashing, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of membrane flashing. Roll all laps and membrane with a counter top roller to ensure a weather-tight seal.

WINDOWS AND ROUGH OPENINGS: Wrap head and jamb of rough openings with membrane flashing. Place membrane flashing across sheet-metal flashings and end dam terminations. Prime surfaces as per manufacturers' instructions and allow to dry. Align and position membrane flashing, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps of flashing membrane, and roll all laps and he membrane with a counter top roller to ensure a weather-tight seal. Extend barrier to connect to the vapor retarder barrier, if exists.

APPLICATION OF PRIMARY WEATHER BARRIER: Apply by spray or flat trowel a complete and continuous unbroken film of liquid barrier membrane. For temperatures above 40 degrees F and rising, apply one component water based elastomeric emulsion air barrier membrane at a rate of 16.7 SF / gallon to a uniform wet film thickness of 100 mils to achieve an average dry film thickness of 58 mils. Spray apply or trowel around all projections and penetrations ensuring a complete and continuous barrier membrane. Lap liquid applied membrane 1 inch over self-adhering membranes to seal their leading edges. Allow barrier membrane to dry per manufacturers recommendations prior to placement of exterior wall finish materials.

APPLICATION OF TERMINATION SEALANT: Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the primary water resistive air barrier membrane and around the perimeter edge of membrane terminations at window and door frames with penetration and termination sealant.

FIELD QUALITY CONTROL: Make notification to manufacturer's representative and Construction Manager when sections of Work are complete, to allow review prior to covering the barrier system.

PROTECTION: Damp substrates must not be inhibited from drying out. Do not expose the backside of the substrate to moisture or rain. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane. Drying time varies depending on temperature and relative humidity. Protect air barrier Work against wet weather conditions for a minimum of 24 hours.

SECTION 07 54 23 – THERMOPLASTIC POLYOLEFIN (TPO) MEMBRANE ROOFING

WORK INCLUDED: Provide an integrated, membrane roofing system to include roof insulation and a single-ply roofing membrane, where indicated on the Drawings, as specified herein, and as necessary for complete installation. Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist uplift pressures, thermally induced movement, and exposure to weather without failure. The membrane roofing system includes the following:

Air-barrier sheet over roofing substrate
Tapered insulation to achieve positive slope to roof drains, scuppers or gutters, as applicable
Mechanically attached roof deck board
Mechanically-fastened thermoplastic roof membrane,
Installation of roofing system terminations and penetrations in accordance with manufacturer's recommendations
Roof protection pads around HVAC equipment, and at roof-mounted piping supports.

MATERIAL COMPATIBILITY: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

REFERENCED STANDARDS: In addition to compliance with Manufacturer's standards and recommended installation details, comply with the following unless more stringent details are indicated in the Drawings:
National Roofing Contractors Association (NRCA) Roofing Manual: Membrane Roof Systems – most recent edition.

PERFORMANCE REQUIREMENTS

PROVIDE INSTALLED ROOFING MEMBRANE AND BASE FLASHINGS that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

MATERIAL COMPATIBILITY: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

FM/GLOBAL LISTING: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings, and as follows:

Fire/Windstorm Classification: Class 1A-90
Hail Resistance: SH (Sever Hazard).

ENERGY PERFORMANCE REQUIREMENTS:
SOLAR REFLECTIVITY: Provide roofing system with initial Solar Reflectance Index not less than 78 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency. Provide roofing system that is listed on the DOE's Energy Star "Roof Products Qualified Product List" for low-slope roof products. Provide roofing system with initial solar reflectance not less than 0.70 and emissivity not less than 0.75 when tested according to CRRC-1.
LONG-TERM THERMAL RESISTANCE (LTTR): Comply with ASTM C 1289-11A for "aged" thermal-resistane values of roof insulation, equivalent to a time-weighted thermal design R-value for not less than 15 years.

INSTALLER QUALIFICATIONS: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

EXTERIOR FIRE-TEST CHARACTERISTICS: "Class B" per ASTM E-108 by testing identical products to the approval of AHJ representatives.

SUBMITTALS

SUBMIT PRODUCT DATA for each type of product indicated.

SHOP DRAWINGS: For roofing system. Include plans, elevations, sections, details, and attachments to other Work:

Base flashings and membrane terminations.
Tapered insulation, including slopes.
Insulation fastening patterns.
Membrane seaming plan (indicating additional perimeter and corner attachments)

INSTALLER CERTIFICATES: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

MANUFACTURER CERTIFICATES: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article. Submit evidence of meeting performance requirements.

QUALIFICATION DATA: For Installer and manufacturer.

MAINTENANCE DATA: For roofing system to include in maintenance manuals.

WARRANTIES: Special warranties specified in this Section.

INSPECTION REPORT: Copy of roofing system manufacturer's inspection report of completed roofing installation.

QUALITY ASSURANCE
INSTALLER QUALIFICATIONS: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
MANUFACTURER QUALIFICATIONS: A qualified manufacturer that has FMG approval for membrane roofing system identical to that used for this Project.
SOURCE LIMITATIONS: Obtain components for membrane roofing system either from or approved by the roofing membrane manufacturer.
FIRE-TEST-RESPONSE CHARACTERISTICS: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to AHJ representatives. Materials must be identified with appropriate markings of applicable testing and inspecting agency.
EXTERIOR FIRE-TEST EXPOSURE: Class B; ASTM E 108, for application and roof slopes indicated.
SURFACE-BURNING CHARACTERISTICS OF FOAM PLASTIC INSULATION: Provide materials that meet requirements of FM/Global 4450 or UL 1256 (provide written confirmation to AHJ representatives upon request).

PRE-INSTALLATION CONFERENCE: Conduct at the Project site. Comply with requirements in Division-01. Review methods and procedures related to roofing system including, but not limited to, the following:
Meet with Architect, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
Review methods and procedures related to roofing installation, including manufacturer's written instructions.
Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
Review structural loading limitations of roof deck during and after roofing.
Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
Review governing regulations and requirements for insurance and certificates if applicable.
Review temporary protection requirements for roofing system during and after installation.
Review roof observation and repair procedures after roofing installation.

DELIVERY, STORAGE, AND HANDLING
DELIVER ROOFING MATERIALS to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
STORE LIQUID MATERIALS in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
PROTECT ROOF INSULATION MATERIALS from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
HANDLE AND STORE ROOFING MATERIALS and place equipment in a manner to avoid permanent deflection of deck.

WARRANTY

SPECIAL ROOF SYSTEM AND FLASHING WARRANTY: Manufacturer's warranty to include labor and material payment without monetary limitation (NDL), in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, metal edge and associated sheet metal flashings, and other components of the membrane roofing system, and as follows:

Non-prorated, and fully transferable (not limited to original Owner)
Warranty limit up to 72 MPH wind speed (calculated at ground level)
No Owner's signature required for execution of warranty, and
Dispute settlement to be held in the state where the project is located
WARRANTY PERIOD: TWENTY (20) years from date of Substantial Completion.

MATERIALS:

AIR BARRIER: ASTM D 4397 polyethylene sheet, 6 mils thick minimum, with maximum permeance rating of 0.13 perm, applied over entire deck surface before insulation application.

TPO ROOF MEMBRANE: Uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced. Provide membrane as manufactured by Carlisle, Genflex, Firestone, GAF, Sarnafil, or Stevens, and as follows:

Nominal roof sheet thickness:	60 mils minimum
Roof Membrane surface color:	White
Roof Membrane parapet wall flashing color:	White

PROVIDE AUXILIARY MEMBRANE MATERIALS recommended by roofing system manufacturer for intended use and compatible with membrane roofing. Liquid-type auxiliary materials must meet VOC limits of AHJ representatives.

TYPICAL SHEET FLASHING: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as primary roofing sheet membrane.

BONDING ADHESIVE: Manufacturer's standard solvent-based bonding adhesive for membrane, and solvent-based bonding adhesive for base flashings.

METAL TERMINATION BARS: Manufacturer's standard predrilled stainless-steel, aluminum or polymer bars, approximately 1 by 1/8 inch thick; with anchors.

ROOF PROTECTION PADS: Provide non-porous protection pads consisting of a minimum 60 mil membrane matching primary roofing material and color, approved for use by membrane roofing system manufacturer, intended either for heat-welded or self-sticking application to the roof membrane, and as approved for use by membrane roofing system manufacturer, with factory-formed or field-cut with corners trimmed to a 2" radius minimum,

WALKWAYS: 24" x 24" minimum

PIPING SUPPORT REINFORCEMENT: size to extend 6" outside of all piping supports.

FASTENERS: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

MISCELLANEOUS ACCESSORIES: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories as recommended by the Manufacturer.

ROOF INSULATION:

PROVIDE PREFORMED ROOF INSULATION BOARDS that comply with primary roofing membrane manufacturer's requirements and referenced standards, selected from manufacturer's standard sizes.

REQUIRED MINIMUM INSULATION THICKNESS (roof insulation only – not including roof deck board, air-surfaces or other roofing or deck materials): Except for a 1 inch deep evenly tapered recess within two (2) feet of drains or scuppers, provide the following minimum thickness of insulation throughout the roof system. When the roof structure does not provide the minimum slope, increase the insulation thickness with tapered insulation, preformed saddles, valley crickets, tapered edge strips, and other insulation shapes to provide the required slope:
MINIMUM INSULATION VALUE: Not applicable

MINIMUM ROOF SLOPE (of field-areas): 1/4 inch per foot per AHJ requirements (with positive slope at vallies)

ROOF DECK COVER BOARD: Provide minimum 1/2 inch thick "high-density polyisocyanurate-roof board as a membrane substrate, installed per manufacturer's recommendations. and secure to substrate decking.

INSULATION ACCESSORIES

PROVIDE ACCESSORIES recommended by insulation manufacturer for intended use and compatible with membrane roofing.

MECHANICAL FASTENERS: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

COLD FLUID-APPLIED ADHESIVE: Manufacturer's standard cold fluid-applied adhesive formulated to adhere roof insulation to substrate.

EXECUTION

EXAMINATION
EXAMINE SUBSTRATES, AREAS, AND CONDITIONS, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
VERIFY THAT ROOF OPENINGS AND PENETRATIONS are in place and set and braced and that roof drains are securely clamped in place.
VERIFY THAT WOOD BLOCKING, CURBS, AND NAILERS are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
VERIFY THAT SURFACE PLANE FLATNESS and fastening of steel roof deck comply with requirements in Division 5 Section "Steel Deck."

PREPARATION
CLEAN SUBSTRATE of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
PREVENT MATERIALS FROM ENTERING AND CLOGGING roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
COMPLETE TERMINATIONS AND BASE FLASHINGS and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

TIE-INS TO EXISTING ROOFING: Install membrane roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty of existing membrane roofing system, if exists.

INSULATION INSTALLATION
COORDINATE INSTALLING MEMBRANE ROOFING system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
COMPLY WITH membrane roofing system manufacturer's written instructions for installing roof insulation.
INSTALL MULTIPLE LAYERS OF INSULATION under area of roofing to achieve required thickness, with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
TRIM SURFACE OF INSULATION where necessary at roof drains so completed surface is flush and does not restrict flow of water.
INSTALL INSULATION WITH LONG JOINTS of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

AIR BARRIER INSTALLATION: Loosely lay in a single layer, with sides and ends lapping a minimum of 6 inches.

FASTEN INSULATION PER FMG's "Approval Guide" for specified Windstorm Resistance Classification, including additional anchors at perimeters and building corners.

FULLY-ADHERED ROOFING MEMBRANE INSTALLATION
LAYOUT MEMBRANE SHEETS with primary seams perpendicular to ribs of metal decking, with side laps and seams shingled with slope of roof deck when possible.
INSTALL ROOFING MEMBRANE over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
APPLY BONDING-ADHESIVE TO SUBSTRATE and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
SEAMS: Clean entire seam area, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation. Probe all seams after welds have cooled to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane. Verify field strength of seams a minimum of twice daily and repair seam sample areas. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.
APPLY ADHESIVE AND MECHANICALLY FASTEN roofing membrane securely at terminations, penetrations, and perimeter of roofing, and seal all edges. Space fasteners for "Grade-C" metal deck unless otherwise indicated. Spread sealant or mastic bed over drain-flanges at deck-drains and securely seal membrane in place with clamping ring.

BASE FLASHING INSTALLATION
INSTALL SHEET FLASHINGS AND PREFORMED FLASHING ACCESSORIES and adhere to substrates according to membrane roofing system manufacturer's written instructions.
APPLY SOLVENT-BASED BONDING ADHESIVE to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
FLASH PENETRATIONS and field-formed inside and outside corners with sheet flashing.
CLEAN SEAM AREAS AND OVERLAP and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.
TERMINATE AND SEAL TOP OF SHEET FLASHINGS and mechanically anchor to substrate through termination bars.

INSTALL PROTECTION PADS by cleaning roofing of dirt and debris prior to installation. Apply pads securely to surface of roofing membrane, by heat welding to substrate or adhere with roofing system Manufacturer's approved compatible adhesive per their written instructions:
WALKWAY PADS: Provide at all traffic concentration points and where indicated on the Drawings. Place individual units with 6" minimum space between each pad. Install at the following locations:
Around all sides of HVAC equipment mounted on roof
Around all sides of skylights, roof hatches or access doors.
Provide path from roof hatch / access ladder to all HVAC equipment requiring periodic service.
PIPING SUPPORTS: Install below piping support units provided by others for rooftop mounted electrical conduits, gas piping, or for condensate piping, if provided. Coordinate with other trades for locations required.

FIELD QUALITY CONTROL
ROOF SYSTEM TESTING: Engage a qualified testing agency to inspect the substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to the Architect. The testing agency must survey the entire roof area for potential leaks using electric field vector mapping (EFVM).
OWNER'S TESTING: Owner reserves the right to engage a separate, qualified independent testing and roof inspecting entity to review test reports and to perform separate, roof tests and inspections.
TESTING AGENCY: Owner reserves the right to engage a qualified independent testing and roof inspecting entity to perform roof tests and inspections and to prepare test reports.
MANUFACTURER'S FINAL ROOF INSPECTION: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
REPAIR OR REMOVE AND REPLACE components of membrane roofing system that do not comply with specified requirements. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
PROTECT MEMBRANE ROOFING SYSTEM from damage and wear during remainder of construction period. Repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

PROTECTING AND CLEANING
PROTECT MEMBRANE ROOFING SYSTEM from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
CORRECT DEFICIENCIES in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

SECTION 07 62 00 – SHEET METAL FLASHING AND TRIM

PROVIDE SHEET METAL FLASHING and sheet metal trim, where indicated on the Drawings, as specified herein, and as required for the prevention of water penetration into the building.
This Section includes requirements for sheet metal work associated with roofing and siding Work of other Sections.

RELATED SECTIONS include the following:
Division-06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
Applicable Division-07 Sections for roofing Work
Division-07 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
Division-07 Section "Joint Sealants" for field-applied sealants to sheet metal flashing and trims.

PERFORMANCE REQUIREMENTS

INSTALL SHEET METAL FLASHING AND TRIM TO WITHSTAND wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

FABRICATE AND INSTALL ROOF EDGE FLASHING and copings capable of resisting forces according to recommendations in FMG Loss Prevention Data Sheet 1-49, for the following windstorm classification. Identify materials with nameof fabricator and design approved by FM Approvals.
Windstorm Classification: Class 1-90

THERMAL MOVEMENTS: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

SUBMITTALS
SUBMIT PRODUCT DATA including manufacturer's installation instructions and general recommendations for each specified sheet material and fabricated product.
SUBMIT SHOP DRAWINGS showing layout, joining, profiles, and anchorages of fabricated work, including major counter-flashings, trim/fascia units, expansion joint systems, etc., with plan & elevation layout at 1/4" scale, details at 3" scale. Show 3-dimensional details in shop drawings where different joint conditions connect so that tradespersons can clearly understand the intent and relationship of different materials and conditions.
SAMPLES FOR VERIFICATION: For each type of exposed finish required, prepare Samples of size indicated below:
Sheet Metal Flashing: 12 inches long for each color used.
Metal Roofing: 12 x 12 inch panel of each panel and finish

QUALITY ASSURANCES:

REFERENCED QUALITY STANDARD: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

MOCKUP:
PROVIDE MATERIALS for construction of a field mockup of each different color/finish and exposed application of sheet metal Work indicated, showing the full range of exposed color and finish textures to be expected in the completed construction.
BEFORE INSTALLING THE WORK OF THIS SECTION, build mockup to verify selections made under sample Submittals and to demonstrate aesthetic effects. Refer to Division-01 Section Quality Requirements for general requirements of Mockup.

DELIVERY, STORAGE, AND HANDLING
DELIVER SHEET METAL FLASHING MATERIALS and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
STACK MATERIALS on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

COORDINATE INSTALLATION of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PRODUCTS

TYPICAL PRE-FINISHED ALUMINUM SHEET: ASTM B 209, Alloy 3003, 3004, 3105, or 5005, Temper suitable for forming and structural performance required, but not less than H14, finished as follows:
Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
Color: As indicated on Drawings, in up to three (3) different colors throughout the project as selected by the Architect from the manufacturer's full range

UNDERLAYMENT MATERIALS

TYPICAL POLY UNDERLAYMENT: 10-mil thick polyethylene sheet complying with ASTM D 4397.

SYNTHETIC UNDERLAYMENT: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over 220 deg F; and complying with physical requirements of ASTM D 226 for Type I and Type II felts. Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

Atlas Roofing Corporation; Summit.
Engineered Coated Products; Nova-Seal II.
SDP Advanced Polymer Products Inc; Palisade.

SELF-ADHERING, HIGH-TEMPERATURE SHEET: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer. Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT.
Grace Construction Products, a unit of W. R. Grace & Co.-Conn.; Grace Ice and Water Shield HT
Metal-Fab Manufacturing, LLC; MetShield.
Owens Corning; WeatherLock Specialty Tile & Metal Underlayment.
Polyguard Products, Inc.; Deck Guard HT.
SDP Advanced Polymer Products Inc; Palisade SA-HT.

SLIP SHEET: Rosin-sized paper, minimum 3 lb/100 sq. ft.

MISCELLANEOUS MATERIALS

PROVIDE MATERIALS AND TYPES OF FASTENERS, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

FASTENERS: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads. At exposed fasteners, provide heads matching color of sheet metal by means of plastic caps or factory-applied coating. At flashing and trim, provide blind fasteners of high-strength aluminum or stainless-steel, or self-drilling screws, gasketed, with hex washer head.

SEALING TAPE: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

ELASTOMERIC SEALANT: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

BUTYL SEALANT: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.

BITUMINOUS COATING: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

REGLETS: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated.
Material: Stainless steel, 0.019 inch thick – mill finished
Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.
Available 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:

Cheney Flashing Company.
Fry Reglet Corporation.
National Sheet Metal Systems, Inc.
Sandell Manufacturing.

GENERAL FABRICATION
CUSTOM FABRICATE SHEET METAL flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
FABRICATE SHEET METAL flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
TYPICAL SEALED JOINTS: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
EXPANSION PROVISIONS: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
CONCEAL FASTENERS AND EXPANSION PROVISIONS where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
FABRICATE CLEATS AND ATTACHMENT DEVICES from same material as accessory being anchored or from compatible, noncorrosive metal. Fabricate in thickness as recommended by SMACNA's "Architectural Sheet Metal Manual" and FMG Loss Prevention Data Sheet 1-49 for application but not less than thickness of metal being secured.
PROTECT MECHANICAL AND PAINTED FINISHES on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

FABRICATED ITEMS:

THROUGH-WALL SHEET METAL (SM) FLASHINGS: Fabricate in sections not exceeding 12-foot- long (minimum 8-feet long at continuous units) at shelf angles in masonry construction, at head and sill openings in either masonry or frame construction, and at all locations where indicated on the Drawings. Fabricate discontinuous lintel, sill, and similar flashings to extend a minimum of four (4) inches beyond each side of wall openings. Form with 2-inch-high end dams where flashing is discontinuous. Fabricate with drip edge, by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees. Fabricate with preformed corners, end dams, other special shapes, and seaming materials at splices as applicable. Fabricate through-wall flashings from one of the following materials:

Stainless Steel: 0.016 inch thick.
Zinc-Tin Alloy-Coated Stainless Steel: 0.015 inch thick.

WALL-PANEL FLASHINGS: Provide "Z"-shaped units at exterior horizontal panel joints and other wall panel trims where indicated on the Drawings to match color of wall panels to greatest extent feasible:
Metal: 0.032 inch thick minimum "typical prefinished" aluminum

FLAT SEAM ROOF & WALL PANELS: Fabricate from 39 inch wide x 20 inch high (or as otherwise indicated on the Drawings) panels of 0.040 inch thick prefinished sheet metal, with 3/4 inch wide sealant-filled overlapping and interlocking hems on all edges. Provide 2 x 2 inch spaced cleats of same material for concealed mounting at spacing not to exceed 24 inch centers, and with one anchor within height of pan at each edge.

PANEL JOINT SEALANT: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal-panels and remain weathertight; and as recommended by metal-panel manufacturer.

SHEET METAL FASCIA: Provide flush faced finish of typical prefinished 0.040 inch thick sheet metal in lengths not to exceed ten (10) feet maximum, with flush sealed, butted 3/8 inch thick joints over six (6) inch wide plates. Install with continuous cleats for concealed anchorages as applicable.

BRAKE-METAL WINDOW & DOOR OPENING TRIMS: At window and door openings, provide anodized finished, flush fabricated metal brake-metal formed trims as indicated on the Drawings and as required herein:

Fabricate in one-piece units up to ten (10) feet maximum, with flush sealed, butted joints of 3/8 inch space over 6 inch wide joint plates of equal thickness, when required.

Provide continuous metal cleats of 0.040 inch thick aluminum sheet, attached through WRB typically @ 12 inch centers, and anchor to masonry when necessary at outside edges.
At sills, break-form outside edge to fit over continuous cleat and extend down to cover top edge of masonry or wall panel minimum of one (1) inch high. Fold-up (end dam) both sides to extend up behind wall trim not less than four (4) inches. Anchor and seal sill unit to substrate – lapping wall unit over end dam to drain
Install so that sealant between units will be concealed behind exposed opening trims to the greatest extent feasible.
At head and jamb trims, align outside edge to be flush with exterior wall finish typically.
At head trims, fold-down sides behind jamb trims not less than two (2) inches.
Apply jamb trims after installation of head and sill trims, over end dams of sills and turned-down edges of head trims.

THROUGH-WALL SHEET METAL (SM) FLASHINGS (typical at openings in masonry or frame construction): Fabricate in sections not exceeding 12-foot- long (minimum 8-feet long at continuous units) at shelf angles in masonry construction, at head and sill openings in either masonry or frame construction, and at all locations where indicated on the Drawings. Fabricate discontinuous lintel, sill, and similar flashings to extend a minimum of four (4) inches beyond each side of wall openings. Form with 2-inch-high end dams where flashing is discontinuous. Fabricate with drip edge, by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees. Fabricate with preformed corners, end dams, other special shapes, and seaming materials at splices as applicable. Fabricate from 0.016 inch thick (25 gage) minimum stainless-steel sheet meeting ASTM A 240 or ASTM A 666, Type 304, dead soft, fully annealed, in 2D (dull, cold-rolled) finish, unless otherwise noted.

LEE'S SUMMIT FLEX SPACES
60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: Capital Builders

CONSTRUCTION DOCUMENTS
06.03.2024

STATE OF MISSOURI
JACOB AARON LITTRELL
NUMBER A-2011037018
ARCHITECT
06.03.24

Architect: _
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ARCHITECTURAL SPECIFICATIONS

Sheet
Revision no.

G005

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METAL CRICKET AT SLOPED ROOF: .063" prefinished sheet aluminum in color to approximate roofing material color. Job-cut to extend not less than twelve (12) inches above low point of adjacent roof surface.

SLOPED-ROOF FLASHINGS & TRIMS: Fabricate from typical pre-finished sheet metal, to match color of shingles or roof tiles to the greatest extent feasible, with color/material samples submitted to Architect for selection/approval.

Apron Flashings: Fabricate with lower flange a minimum of four (4) inches over and four (4) inches beyond each side of downslope shingles or roofing tiles and six (6) inches up the vertical surface.

Open Valley Flashings: Fabricate in lengths not exceeding 10 feet, with a one (1)-inch high inverted-V profile at center of valley flashing unit and with equal side-flanges each of 12 inches wide.

Drip Edges: Fabricate in lengths not exceeding 10 feet with a two (2)-inch roof deck flange and a 1-1/2-inch fascia flange with a 3/8-inch drip at lower edge.

Vent Pipe Flashings: ASTM B 749, Type L51121 sheet lead, at least 1/16 inch thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof and extending at least 4 inches from pipe onto roof.

FABRICATE SCUPPERS of dimensions indicated with a closure flange trim at exterior side extending one (1) beyond face of wall, and with a fully welded (not seamed) wall flange returning on the roof side of the wall four (4) inches minimum, and a base flange on the interior extending 4 inches onto the field of the roof inside the exterior wall. Fabricate scupper from 0.024 inch thick (24 gage) stainless steel or TPO coated sheet metal. Fabricate exterior-side scupper trim-ring of minimum 2-1/2 inch width of pre-finished metal to match building standard material.

FABRICATE CONDUCTOR HEADS with flanged back and stiffened top edge of dimensions and in conformance with shape or profile as indicated on the Drawings. Provide angled bottom shape to prevent damage from freezing water typically, complete with outlet tube, exterior flange trim, downspout strainer, and built-in overflows of double the area of the downspout (except at open-topped conductor head not exceeding the primary drainage level). Fabricate conductor heads from 0.032 inch minimum thickness (20 gage) prefinished steel metal, unless otherwise indicated.

FABRICATE ROOF-EDGE to comply with requirements of SPRI/FM 4435 ES-1 Wind Design Standard, and provide verification of compliance by wind-testing to that standard with the shop-drawing submittal. Fabricate in eight (8) foot minimum to ten (10) foot maximum length units, with 1/2 inch wide joints between sections. Fabricate joint plates of same thickness as metal roof edge. Provide continuous cleat fastening bottom edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, seal, and solder or weld to be watertight.

Fascia Height: Four (4) inch minimum exposed face – or greater if indicated on the Drawings or as otherwise required to comply with referenced wind design standard.

Fascia Metal: Typical prefinished sheet metal of 0.024 inch thick (24 gage) galvanized steel sheet in color indicated on the Drawings or as selected by Architect from Manufacturer's full range of available options, including metallic finishes

Continuous Cleats: 0.0312 inch thick (20 gage) galvanized steel sheet

Fascia Metal: Typical prefinished "Kynar 500" aluminum sheet metal, in minimum 0.040 inch thicknes in color indicated on the Drawings or as selected by Architect from Manufacturer's full range of available options, including metallic finishes.

Continuous Cleats: 0.050 aluminum sheet metal

Joint Style: Butt, with 6-inch- wide cover plates

PRE-ENGINEERED ROOF-EDGE FASCIA: Provide a two-piece, pre-engineered roof-edge and fascia system meeting SPRI/FM 4435 ES-1 Wind Design Standard, consisting of a snap-on pre-finished sheet metal fascia cover in section lengths not exceeding 10 feet, and a continuous metal anchor bar with integral drip edge cleat to engage fascia cover. Provide matching mitered and welded/sealed corner units as applicable:

Fascia Height: Four (4) inch minimum exposed face – or greater if indicated on the Drawings or as otherwise required to comply with referenced wind design standard.

Fascia Metal: Typical prefinished sheet metal of 0.024 inch thick (24 gage) galvanized steel sheet in color indicated on the Drawings or as selected by Architect from Manufacturer's full range of available options, including metallic finishes

Continuous Cleats: 0.0312 inch thick (20 gage) galvanized steel sheet or as otherwise required by system design

Fascia Metal: Typical prefinished "Kynar 500" aluminum sheet metal, in minimum 0.040 inch thickness in color indicated on the Drawings or as selected by Architect from Manufacturer's full range of available options, including metallic finishes.

Continuous Cleats: 0.050 aluminum sheet metal or as otherwise required by system design

Fascia Joint Style: Butt type with six (6) inch wide concealed splice plates

APPROVED SYSTEMS / MANUFACTURERS:

"TerminEdge" by A. W. P. Hickman Company (Ph: 800-892-9173 - website: www.wph.com)

"Anchor-Tite Coping" by Metal-Era, Inc., (Ph: 262-549-6900 - website: www.metalera.com)

MANUFACTURED COPINGS: Provide pre-engineered coping system meeting SPRI/FM 4435 ES-1 Wind Design Standard, consisting of a continuous metal anchor system with an integrated drip edge cleat on both sides of the parapet wall to engage the coping, in section lengths not exceeding 10 feet. Provide matching mitered and welded corner units, and as follows:

Fascia Height: Four (4) inch minimum exposed faces – or greater if indicated on the Drawings or as otherwise required to comply with referenced wind design standard.

Fascia Joints: butt type with concealed splice plates.

Fascia Metal: Typical prefinished "Kynar 500" sheet metal, in minimum 0.050 sheet aluminum thickness, in color indicated on the Drawings or as selected by Architect from Manufacturer's full range of available options, including metallic finishes.

APPROVED SYSTEMS / MANUFACTURERS:

"PermaSnap 2" by A. W. P. Hickman Company (P: 800-892-9173 - web: www.wph.com)

"Perma-Tite Gold Coping" by Metal-Era, Inc., (P: 262-549-6900 - web: www.metalera.com)

Other manufacturers pre-approved by Architect

Coping (Type 1) – White, specific color TBD

Coping (Type 2) – Light Grey, specific color TBD

Coping (Type 3) – Dark Grey, specific color TBD

BASE FLASHINGS, COUNTER-FLASHINGS, & FLASHING RECEIVERS: Fabricate from pre-finished aluminum: 0.040 inch thick.

FABRICATE GUTTER UNITS from pre-finished .032 aluminum, to cross-section indicated on the Drawings, complete with end pieces, outlet tubes, and other accessories as required. Stiffen outer edge with hemmed return, and fabricate outer edge 1/2" below back edge. Fabricate in minimum 96-inch- long sections. Provide 1/4" x 2" aluminum gutter brackets bent to match shape of gutter profile. Furnish flat-stock gutter spacers fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters. Provide all gutters with screen of 1/4" aluminum hardware cloth in aluminum frame.

DOWNSPOUTS: At front façade: Provide 5 inch wide x 4 inch deep rectangular units typically, or in larger size as indicated on Drawings. Fabricate from minimum 0.032 pre-finished aluminum. Provide fabricated, telescoping elbows as required by building profile. Provide 1-1/4" x .050" thick (20 gage) downspout strap anchors at no more than eight (8) feet centers vertically, matching color of downspout material.

At back façade: Match existing size of downspouts that need to be replaced.

DOWNSPOUT GUARDS: Provide 48" x 11" x 8.5" heavy-duty, solid steel units at Loading Dock. Powder coated safety yellow for maximum visibility.

ROOF DRAIN LEADER / DOWNSPOUT NOZZLE: Cast bronze nozzle machined to slide over pipe extending past wall surface for set-screw anchorage, to discharge roof drain leader, with "lambs tongue" outfall extending not less than 5-1/2 inches beyond wall surface, in nominal unit size to match pipe leader, and with round cast bronze wall flange and optional bird screen:

Basis-of-Design: # 1771 Downspout Nozzle by J R Smith Mfg Co, www.jrsmith.com, or equal

MISCELLANEOUS SHEET METAL FABRICATIONS:

ROOF FLASHING TRANSITIONS: At roof and roof-to-wall transitions, roof-to-roof-edge flashings and fascia-cap transitions, shop-fabricate interior and exterior corners from 0.034 inch thick (20 gage) minimum galvanized steel sheet

AT ROOF BASE FLASHINGS, shop fabricate interior and exterior corners from 0.028 inch thick (22 gage) minimum galvanized steel sheet

AT COUNTERFLASHINGS, shop fabricate interior and exterior corners from 0.022 inch thick (24 gage) minimum galvanized steel sheet

FLASHING RECEIVERS: shop fabricate from 0.022 inch thick (24 gage) minimum galvanized steel sheet

ROOF-PENETRATION FLASHING: Fabricate from 0.019 inch thick (26 gage) stainless steel sheet minimum

METAL SPLASH PANS: Fabricate from 0.019 inch thick (26 gage) stainless steel sheet minimum

EXECUTION

ANCHOR SHEET METAL FLASHING AND TRIM and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system. Torch cutting of sheet metal flashing and trim is not permitted.

METAL PROTECTION: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals. Coat side of sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.

UNDERLAYMENT: Install all sheet metal flashing over a course of underlayment, and cover with a slip sheet. Install underlayment wrinkle free in accordance with its manufacturer's instructions, typically using adhesive to minimize mechanical fasteners under the sheet metal flashing and trim. Prime substrate when recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment material. Apply underlayment in a shingle fashion to shed water, with end laps not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Cover underlayment within fourteen (14) days. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trims.

INSTALL EXPOSED SHEET METAL FLASHING AND TRIM without excessive oil canning, buckling, and tool marks. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of sealant. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

INSTALL CONTINUOUS CLEATS anchored at 12" inch centers minimum at face.

EXPANSION PROVISIONS: Provide for thermal expansion of exposed flashing and trim, by spacing joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

FASTENERS: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws. With aluminum sheet metal, use aluminum or stainless-steel fasteners.

SEAL JOINTS WITH ELASTOMERIC SEALANT as required for watertight construction. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants." Rivet or weld joints in uncoated aluminum where necessary for strength.

ROOF FLASHING INSTALLATION

INSTALL SHEET METAL ROOF FLASHING AND TRIM to produce a complete roof drainage system, and to comply with SMACNA's "Architectural Sheet Metal Manual" as applicable. Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight. Coordinate installation of roof perimeter flashing with installation of roof drainage system items.

METAL ROOF EDGE FLASHING: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. When face of roof edge exceeds 4 inches in height, interlock exterior bottom edge of with a continuous cleats anchored to substrate at 6-inch centers. Anchor interior leg of coping with screw fasteners and washers at 3-inch OC in staggered rows (6 inch OC each row) or as otherwise required by Manufacturer's tested unit.

COPINGS: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. Interlock exterior bottom edge of coping with continuous cleats anchored to substrate at 16-inch centers. Anchor interior leg of coping with screw fasteners and washers at 24-inch centers.

ROOF-PENETRATION FLASHING: Seal units with elastomeric sealant and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.

PIPE OR POST COUNTERFLASHING: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

COUNTERFLASHING: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant.

HANGING GUTTERS: Join sections with riveted and soldered joints or with lapped joints sealed with elastomeric sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets straps spaced not more than 36 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts. Fasten gutter spacers to front and back of gutter. Loosely lock straps to front gutter bead and anchor to roof deck. Anchor and loosely lock back edge of gutter to continuous cleat, eave or apron flashing. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24 inches apart. Anchor gutter with spikes and ferrules spaced not more than 24 inches apart. Install gutter with expansion joints at locations indicated but not exceeding 50 feet apart. Install expansion joint caps.

Install continuous gutter screens on gutters with noncorrosive fasteners, removable for cleaning gutters.

INSTALL PARAPET SCUPPERS by continuously supporint unit, set to correct elevation for rainwater flow, and seal flanges to interior wall face, over tapered edge strips, and under roofing membrane. Anchor scupper closure trim flange to exterior wall and seal with elastomeric sealant to scupper. Loosely lock front edge of scupper with conductor head.

INSTALLATION OF DOWNSPOUTS: Telescope upper sections into lower section 1-1/2" minimum, rivet and seal. Elbow downspouts away from building at building offsets and toward building immediately below gutter connection. Attach to wall strap anchors at downspout top, bottom, horizontal joints and at 10 feet maximum centers. Secure straps to wall at masonry where downspouts are open ended, and extend 3" minimum into storm drain boot or underground drainage system, when indicated.

INSTALL SPLASH PANS where downspouts discharge on low-slope roofs, even if not so indicated in the Drawings. Set in elastomeric sealant compatible with the roofing substrate.

WALL FLASHING INSTALLATION

INSTALL SHEET METAL WALL FLASHING to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

WINDOW AND STOREFRONT OPENINGS: Install sill flashings with end-dams in framed wall systems. Install through-wall flashings to extend 4 inches beyond wall openings in masonry construction.

INSTALL EXPANSION JOINT COVERS at locations and of configuration indicated. Lap joints a minimum of four (4) inches in direction of water flow.

OVERHEAD-PIPING SAFETY PANS: Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

INSTALLATION TOLERANCES: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

CLEANING AND PROTECTION

CLEAN EXPOSED METAL SURFACES of substances that interfere with uniform oxidation and weathering.

REMOVE TEMPORARY PROTECTIVE COVERINGS and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

REPLACE SHEET METAL FLASHING AND TRIM that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

SECTION 07 92 00 – JOINT SEALANTS

PROVIDE sealants complying with requirements included herein, in order to establish and maintain airtight, vermin proof, and waterproof continuous seals on a permanent basis. Failures of installed sealants to comply with this requirement will recognized as failures of materials and workmanship.

EXTERIOR JOINTS in the following vertical or horizontal surfaces:

Pavement joints, construction joints in cast-in-place concrete. control and expansion joints in unit masonry, joints in exterior insulation and finish systems, perimeter joints between exterior cladding materials and frames of doors, windows, and louvers, control and expansion joints in soffits and other overhead surfaces.

INTERIOR JOINTS in the following vertical surfaces and horizontal nontraffic surfaces:

Control and expansion joints on exposed interior surfaces of exterior walls, perimeter joints of exterior openings where indicated, vertical joints on exposed surfaces of interior unit masonry concrete walls and partitions, perimeter joints between interior wall surfaces and frames of interior doors windows, joints at Tile Work, joints between plumbing fixtures and adjoining walls, floors, and counters.

VOC CONTENT OF INTERIOR SEALANTS: Sealants and sealant primers used inside the weatherproofing system must comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

Architectural Sealants: 250 g/L.

Sealant Primers for Nonporous Substrates: 250 g/L.

Sealant Primers for Porous Substrates: 775 g/L.

LOW-EMITTING INTERIOR SEALANTS: Sealants and sealant primers used inside the weatherproofing system must comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

ELASTOMERIC JOINT SEALANTS

ELASTOMERIC SEALANTS: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

STAIN-TEST-RESPONSE CHARACTERISTICS: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

URETHANE TRAFFIC-JOINT SEALANT: Comply with ASTM C 920 Type S (single component), grade P (pourable), class 25, use T (traffic). Available Products include but are not limited to the following:

BASF Building Systems; Sonolastic NP1.

May National Associates, Inc.; Bondaflex PUR 40 FC.

Pacific Polymers International, Inc.; Elasto-Thane 230 Type II.

Sika Corporation, Construction Products Division; Sikaflex - 1a.

Tremco Incorporated; Vulkem 116.

EXTERIOR SILICONE SEALANT: Comply with ASTM C 920 Type S (single component), grade NS (nonsag), class 100/50, Use NT (nontraffic) and use related to joint substrates of M, G, A, and, as applicable to joint substrates indicated, O. Available Products:Dow Corning Corporation; 790.

GE Silicones; SilPruf LM SCS2700.

Pecora Corporation; 890FTS.

Sika Corporation, Construction Products Division; SikaSil-C990.

Tremco Incorporated; Spectrem 1.

BUTYL-RUBBER SEALANT: Comply with ASTM C 1085. Available Products:

Bostik Findley; Bostik 300.

Fuller, H. B. Company; SC-0296.

Fuller, H. B. Company; SC-0288.

Pecora Corporation; BC-158.

Polymeric Systems Inc.; PSI-301

Sonneborn, Division of ChemRex Inc.; Sonneborn Multi-Purpose Sealant.

Tremco; Tremco Butyl Sealant.

LATEX INTERIOR JOINT SEALANTS: Comply with ASTM C 834, Type P, Grade NF. Available Products:

BASF Building Systems; Sonolac.

Bostik, Inc.; Chem-Calk 600.

Pecora Corporation; AC-20+.

Schnee-Morehead, Inc.; SM 8200.

Tremco Incorporated; Tremflex 834.

PREFORMED FOAM JOINT SEALANT: Preformed, pre-compressed, open-cell foam sealant manufactured from urethane foam with minimum density of 10 lb/cu. ft. and impregnated with a nondrying, water-repellent agent, factory produced in pre-compressed sizes in roll or stick form to fit joint widths indicated; coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.

ACCEPTABLE PRODUCTS: Subject to compliance with above requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

Dayton Superior Specialty Chemicals; Polytite Standard.

EMSEAL Joint Systems, Ltd.; Emseal 25V.

Sandell Manufacturing Co., Inc.; Polyseal.

Schul International, Inc.; Sealtite or Sealtite 50N, as appropriate.

Willseal USA, LLC; Willseal 150 or Willseal 250, as appropriate.

ACOUSTICAL JOINT SEALANT: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

ACCEPTABLE PRODUCTS: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

Pecora Corporation; AC-20 FTR OR AIS-919.

USG Corporation; SHEETROCK Acoustical Sealant.

ACRYLIC - LATEX SEALANT (typical interior joints – including door frames to walls): permanently flexible emulsion type, nonstaining and nonbleeding; recommended by manufacturer for general interior exposure.

MULTIPLE SEALANT COLORS: Match adjacent material colors typically, as approved by the Architect. The quantity of sealant colors is limited only by the number and color of adjacent materials indicated in the Drawings. Provide custom colors to match adjacent materials at no additional cost if manufacturer's "standard" colors do not match adjacent materials, in the professional opinion of the Architect Provide multiple-colors of sealant as required by field-conditions when adjacent materials and their colors change throughout the height or width of a sealant joint

JOINT BACKER: Use only those back-up materials which are specifically recommended for this installation by the manufacturer or the sealant used, and which are non-absorbent and non-staining.

INSTALLATION: Clean joint surfaces immediately before installation. Prime or seal joint surfaces as recommended by manufacturer. Comply with manufacturer's instructions. Fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a minimum 1/4" radius convex cove, so that joint will not trap moisture and dirt.

CLEAN UP: Do not allow sealants to overflow joints or to spill onto adjoining Work, or to migrate into voids of exposed finishes. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

CURE AND PROTECT: Cure sealants in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability. Replace or restore sealants which are damaged or deteriorated during construction period. Protect installed sealants from damage from construction operations until owner occupancy.

DIVISION-08: OPENINGS

SECTION 08 11 00 – METAL DOORS & FRAMES

PROVIDE metal door frames and hollow metal doors, where noted on the Drawings and as specified herein. Comply with applicable requirements of the Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames."

SUBMIT PRODUCT DATA for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

SUBMIT DOOR SCHEDULE indicating doors and frames with the same reference numbers for details and openings as those on Contract Drawings. Indicate coordination of glazing frames and stops with glass and glazing requirements.

EXTERIOR DOORS: 1-3/4" thick fully-welded insulating units meeting ANSI A250.4 - Level 2 and Physical Performance Level B (Heavy Duty) of 0.053 inch thick (16 gage) cold-rolled hot-dipped galvanized sheet steel faces both sides, flush type with top, bottom and all edges fully welded and ground smooth (seamless). Provide weep holes at bottom, to allow escape of entrapped moisture. Door panel shall provide thermal insulating resistance factor of not less than R-11.

EXTERIOR FRAMES: 0.053 inch thick (16 gage) hot-dipped galvanized cold-rolled steel, fully welded. Provide minimum of 4 galv. wire type, corrugated sheet metal, or expansion type anchors per jamb.

GENERAL FABRICATION: Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Where possible, fit and assemble units in manufacturer's plant. Shop prime all hollow metal doors and frames.

HARDWARE PREPARATION: Unless otherwise indicated, all doors and frames shall be mortised and reinforced for hardware in the factory.

PREFIT doors at factory with clearance of 1/8" at vertical edges and at top, 1/8" in 2" bevel at lock edge, bottom clearance: 3/8" without threshold, 3/4" with threshold.

INSTALL hollow metal doors and frames in accordance with manufacturer's recommendations. Set frames accurately in position, plumbed, aligned, and braced securely. Fit doors accurately within frames, in accordance with clearances indicated herein. Sand smooth all rust or damaged areas of prime coat and apply touch up coat of compatible primer.

HARDWARE REINFORCEMENT: Fabricate reinforcement plates from same material as frames to comply with the following minimum sizes:

Hinges: Minimum 0.123 inch (10 gage) thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.

Pivots: Minimum 0.167 inch (7 gage) thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.

Lock Face, Flush Bolts, Closers, and Concealed Holders: Minimum 0.067 inch (14 gage) thick.

All Other Surface-Mounted Hardware: Minimum 0.067 inch (14 gage) thick.

Supports and Anchors: Fabricated from electrolytic zinc-coated or metallic-coated steel sheet.

JAMB ANCHORS:

Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (18 gage) thick.

Compression Type for Slip-on Frames: Adjustable compression anchors.

Floor Anchors: Formed from same material as frames, not less than 0.042 inch (18 gage) thick, and as follows:

Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

DOOR SILENCERS: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.

FIXED FRAME MOLDINGS: Formed integral with standard steel frames, minimum 5.8 inch high, unless otherwise indicated.

GENERAL FABRICATION: Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Where possible, fit and assemble units in manufacturer's plant. Shop prime all hollow metal doors and frames.

EXPOSED FASTENERS: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

HARDWARE PREPARATION: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI 107 and ANSI A115 Series specifications for door and frame preparation for hardware.

REINFORCE DOORS AND FRAMES to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

LOCATE HARDWARE as indicated on Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

PREFIT doors at factory with clearance of 1/8" at vertical edges and at top, 1/8" in 2" bevel at lock edge, bottom clearance : 3/8" without threshold, 3/4" with threshold.

SHOP FINISHING:

SURFACE PREPARATION: Solvent-clean surfaces to comply with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel to comply with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling).

PRETREATMENT: Immediately after surface preparation, apply a conversion coating of type suited to organic coating applied over it.

AT GALVANIZED STEEL SHEET FINISHES, apply zinc-dust, zinc-oxide primer paint complying with performance requirements of FS TT-P-641, Type II for field painting.

FACTORY PRIMING FOR FIELD-PAINTED FINISH: Apply shop primer that complies with ANSI A224.1 acceptance criteria, is compatible with finish paint systems indicated, and has capability to provide a sound foundation for field-applied topcoats. Apply primer immediately after surface preparation and pretreatment.

INSTALLATION:

PLACING FRAMES: Comply with provisions of SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

In masonry construction, install at least 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.

In metal-stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.

At in-place gypsum board partitions, install knock-down, slip-on, drywall frames.

PRIME COAT TOUCHUP: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

PROTECTION REMOVAL: Immediately before final inspection, remove protective wrappings from doors and frames.

SECTION 08 41 13 – ALUMINUM ENTRANCE AND STOREFRONT

PROVIDE ALUMINUM-FRAMED entrance doors and storefront framing as shown on Drawings, as required herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

ACCESSIBLE ENTRANCES: Provide entrances in compliance with both the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG).", and ICC/ANSI A117.1.

QUALITY ASSURANCE: Drawings are based on one manufacturer's standard aluminum entrance and storefront system. Other standard systems of a similar and equivalent nature will be acceptable when differences do not materially detract from design concept or intended performances, as judged solely by the Architect.

SUBMITTALS

SUBMIT PRODUCT DATA to include manufacturer's specifications, standard details, and installation recommendations for components required, including test reports certifying compliance with performance requirements.

SUBMIT SHOP DRAWING for fabrication and installation, including elevations, detail sections of typical composite members, hardware mounting heights, anchorages, reinforcement, expansion provisions, and glazing.

PRODUCTS

SYSTEM STRUCTURAL CAPACITY (for exterior storefront / window framing):

MINIMUM EXTERIOR WIND LOAD: Design system to provide structural capacity to withstand a minimum inward and outward uniform pressure loading as indicated on the Drawing or as otherwise required below – whichever value is greater:

For clear spans up to 19 feet high: 25 PSF (per Exposure C w/ 90 MPH wind).

For clear spans between 19 to 25 feet high: 27 PSF

DEFLECTION LIMITS– NORMAL TO WALL PLANE: Limit to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch whichever is less.

DEFLECTION LIMITS OF FRAMING MEMBERS – PARALLEL TO GLAZING PLANE: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller

SYSTEM PERFORMANCE (for exterior storefront / window framing): Provide assemblies designed and fabricated to comply with the following, as demonstrated by testing corresponding stock systems:

THERMAL MOVEMENT: Allow for expansion and contraction resulting from ambient temperature range of 120 deg. F.

AIR & WATER LEAKAGES - FIXED FRAMING: Air infiltration of not more than 0.06 CFM per sq. ft. of fixed area per ASTM E 283 and no uncontrolled water penetration per ASTM E 331 at pressure differential of 6.24 PSF.

AIR & WATER LEAKAGES - ENTRANCES: Air infiltration per linear foot of perimeter crack of not more than 0.50 CFM for single doors and 1.0 CFM for pairs of doors per ASTM E 283 at pressure differential of 1.567.

ACCEPTABLE MANUFACTURERS: Subject to compliance with unit size of products indicated and other requirements specified herein, products of one of the following alternative manufacturers are also acceptable:

Arch Amarlite – Arch Aluminum and Glass Inc. (www.archamarlite.com)

EFCO Corporation (www.efcocorp.com)

Kawneer Company, Inc. (www.kawneer.com)

Tubelite Architectural Systems (www.tubeliteinc.com)

Vistawall Architectural Products (www.vistawall.com)

YKK AP America Inc. (www.ykkap.com)

EXTERIOR STOREFRONT, DOOR & WINDOW FRAMING: Fabricated system from minimum 1/8 inch thickness ASTM B 221 aluminum extrusions and ASTM B 209 sheet, with steel reinforcement as required to comply with wind-load and deflection limits indicated above, with integral "C" slot-type sections for glazing :

Typical member size: 2" wide/high x 6 inch deep

Glazing location: "front" plane

BASIS OF DESIGN: Kawneer Trifab 601, front set or approved equal at all interior storefront locations, finish: black

INTERIOR STOREFRONT, DOOR & WINDOW FRAMING: Fabricated system from minimum 1/8 inch thickness ASTM B 221 aluminum extrusions and ASTM B 209 sheet, , with integral "C" slot-type sections for glazing :

Typical member size: 2" wide/high x 4-1/2 inch deep

Glazing location: "centered"

BASIS-OF-DESIGN: Kawneer Trifab 601T, front set or approved equal at all exterior storefront locations, finish: black

FASTENERS: Aluminum, non-magnetic stainless steel, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum components. Exposed fasteners must match finish of members and hardware being fastened.

CONCEALED FLASHING: Dead-soft stainless steel, 26 gage minimum, or extruded aluminum, 0.062" minimum, as selected by manufacturer for compatibility with other components.

BRACKETS AND REINFORCEMENTS: Manufacturer's high-strength aluminum units where feasible; or non-magnetic stainless steel or hot-dipped galvanized steel complying with ASTM A-386.

CONCRETE/MASONRY INSERTS: Cast-iron, malleable iron, or hot-dipped galvanized steel complying with ASTM A-386.

BITUMINOUS COATINGS: Cold-applied asphalt mastic complying with SSPC-PS 12, compounded for 30-mil thickness per coat.

COMPRESSION WEATHERSTRIPPING: Manufacturer's standard replaceable stripping of either molded neoprene gaskets complying with ASTM D 2000 or molded PVC gaskets complying with ASTM D 2287.

GLAZING SYSTEM: Provide manufacturer's standard compression type molded or extruded glazing gaskets that maintain uniform pressure and watertight seal, inside-outside matched, with provisions for glass replacement. Provide elastomeric type spacers and setting blocks.

MAINTENANCE TOOLS AND INSTRUCTIONS: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.

PREFABRICATION: Complete fabrication, assembly, finishing, hardware application, and other work before shipment to project site. Disassemble components only as necessary for shipment and installation. Comply with AWS recommendations to avoid discoloration; grind exposed welds smooth and restore mechanical finish. Install reinforcing if required for performance requirements; separate dissimilar metals with bituminous paint or other separator which will prevent corrosion. Maintain accurate relation of planes and angles, with hairline fit of contacting members. Conceal fasteners wherever possible.

DOOR FABRICATION: Provide tubular frame members, fabricated with mechanical joints using heavy inserted reinforcing plates and concealed tie-rods or j-bolts, or fabricate with structurally welded joints, at manufacturer's option.

ALUMINUM TRIM: Fabricate flat aluminum sheet in profiles indicated on Drawings or as required to provide closure at adjacent construction elements.

ANODIZED ALUMINUM FINISH: Provide Class 1 "colored" anodized finish per AA-M12C22A42/A44 (Mechanical Finish: as fabricated, nonspecular; Chemical Finish: etched, medium matte; Anodic Coating: Class I Architectural, film thicker than 0.7 mil with integral color or electrolytically deposited) complying with AAMA 606.1 or AAMA 608.1.

COLOR: Black

TAKE FIELD MEASUREMENTS prior to fabrication, to ensure proper fitting of Work.

EXECUTION

EXAMINE AREAS with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.

INSTALLATION:

COMPLY with manufacturer's instructions and recommendations for installation of aluminum entrances and storefronts.

SET UNITS PLUMB, level, and true to line, without warp or rack of framing members, doors, or panels. Anchor securely in place, separating aluminum and other corrodible metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.

DRILL AND TAP frames and doors and apply surface-mounted hardware items, complying with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.

SET SILL MEMBERS in bed of sealant as indicated, or with joint fillers or gaskets as indicated to provide weathertight construction. Comply with requirements of Division 7 for sealants, fillers, and gaskets. Install glazing as required by Division-08 "Glazing" Section.

ADJUST OPERATING HARDWARE to function properly, without binding, and to prevent tight fit at contact points and weather-stripping.

ERECTION TOLERANCES: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

PLUMB: 1/8 inch in 10 feet; 1/4 inch in 40 feet.

LEVEL: 1/8 inch in 20 feet; 1/4 inch in 40 feet.

ALIGNMENT: Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.

LOCATION: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

FIELD QUALITY CONTROL – WATER-SPRAY TESTING: Before installation of interior finishes has begun, test representative areas as designated by the Architect according to AAMA 501.2, in the presence of the Architect and the Owner's representative. Tested areas must not show any evidence of water penetration. Perform a minimum of two tests in areas as directed by Architect.

CLEAN COMPLETED SYSTEM, inside and out, promptly after erection and installation of glass and sealants. Remove excess glazing and joint sealants, dirt, and other substances from aluminum surfaces.

INSTITUTE PROTECTIVE MEASURES and precautions required to assure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.

MAINTENANCE SERVICE FOR ENTRANCE DOOR HARDWARE: Beginning at Substantial Completion, provide maintenance service by skilled employees of the entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Use parts and supplies that are the same as those used in the manufacture and installation of original equipment.

INITIAL MAINTENANCE SERVICE PERIOD: twelve months after Substantial Completion

Comply with AAMA 2400 ("Mounting Flange Installation") and/or AAMA 2410 ("Flush Fin Installation"), as applicable.

CENTER UNITS in openings leaving a uniform interface caulking recess on all four sides. Use sealant selected for its adhesion compatibility with the specified exterior wood and adjacent wall materials, as recommended and approved by the window manufacturer.

SET SILL MEMBERS in bed of sealant or with gaskets, as indicated, for weathertight construction.

LEVEL UNITS with shims at bearing locations, anchors, and latchpoint, so they are not dislodged by subsequent operations. Test sash operation and sash alignment before permanently anchoring units.

INSTALL ANCHORS through frame centerline beside shims. Anchor units to wood blocking with wood screws and to metal framing with Tek screws; countersink anchor heads. All anchors must be concealed by closed sash or with wood plugs.

FIELD QUALITY CONTROL

THE OWNER MAY ENGAGE a qualified, independent testing agency to perform field tests and inspections. The testing and inspecting agency will determine whether the tested work complies with or deviates from the requirements indicated herein.

TESTING SERVICES: Testing and inspecting of installed units may take place as follows:

Testing Methodology: Testing of windows for air infiltration and water resistance will be performed according to AAMA 502.

Testing Extent: Two units of each type as selected by the Owner's Testing and Inspection Agency. Windows must be tested after perimeter sealants have cured.

REMOVE AND REPLACE noncomplying windows and retest as specified above. Additional testing and inspecting will continue at the Contractor's expense until compliance with requirements is achieved.

ADJUSTING, CLEANING, AND PROTECTION

Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances. Keep protective films and coverings in place until final cleaning. Monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

SECTION 08 80 00 – GLAZING

WORK INCLUDED: Provide glass and glazing as shown on the drawings, as specified herein, and as needed to meet the requirements of the construction.

1" insulating Glass Units: Viracon VE1-2M, or equal

For installation at aluminum storefront system and exterior entrance doors

GLAZING STANDARDS: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.

SAFETY GLAZING STANDARDS: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials.

FLOAT/PLATE GLASS: Type I, Quality q3, clear unless otherwise indicated,

TEMPERED GLASS: Provide prime glass of color and type indicated, which has been heat treated to strengthen glass in bending to not less than 4.5 times annealed strength.

GLAZING SEALANT: Elastomeric silicone sealant complying with ASTM C 920, Type S (single component), Grade NS (nonsag), Class 25, Use NT (non-traffic); specially compounded and tested to show a minimum of 20 years resistance to deterioration in normal glazing applications. Provide at exterior glazing. Available Products include: Dow Corning 790, GE Silicones Silpruf, Pecora Corporation 895, Tremco, Spectrum 2, and Sonneborn Omniplus.

GLAZING TAPE: Preformed, butyl-based elastomeric tape with solids content of 100%, complying with ASTM C 1281 and AAMA 800.

MISCELLANEOUS GLAZING MATERIALS: Provide cleaners, primers and sealers, setting blocks, spacers and edge blocks of size and shape complying with referenced glazing standards, and with requirements of glass manufacturer for application indicated.

INSTALLATION

WATERTIGHT AND AIRTIGHT INSTALLATION of each glass product is required, except as otherwise shown. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.

COMPLY with FGMA "Glazing Manual" and manufacturers instructions and recommendations. Use manufacturer's recommended spacers, blocks, primers, sealers, gaskets and accessories.

PROVIDE TEMPERED GLASS in all door openings, and within five (5) feet of any door opening, within 18 inches from finished floor, and where otherwise indicated to be provided by the Drawings, or as required by the standards indicated herein.

CLEAN GLAZING CHANNEL and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrate. Remove lacquer from metal surfaces where elastomeric sealants are used.

INSTALL glass with uniformity of pattern, draw, bow and roller marks. Install sealants to provide complete wetting and bond and to create a substantial wash away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

PROTECT GLASS FROM BREAKAGE immediately upon installation, by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces. Cure sealants for high early strength and durability.

REMOVE and replace damaged glass and glazing. Wash and polish glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion. Comply with glass product manufacturer's recommendations for final cleaning.

DIVISION-09: FINISHES

SECTION 09 21 16 – GYPSUM BOARD ASSEMBLIES

PROVIDE screw-type gypsum drywall with metal framing systems where indicated on the drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

PROVIDE SUPPLEMENTARY FRAMING, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

REFERENCED STANDARDS:

American Society of Testing Materials International (ASTM):

ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.

ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.

ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard . .

ASTM C1396 - Standard Specification for Gypsum Board.

ASTM C1629 - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels

Gypsum Association (GA): www.gypsum.org:

GA-201 - Gypsum Board for Walls and Ceilings.

GA-214 - Recommended Levels of Levels of Gypsum Board Finish.

GA-216 - Specifications for the Application and Finishing of Gypsum Board.

GA-226 - Application of Gypsum Board to Curved Surfaces.

GA-235 - Gypsum Board Typical Mechanical and Physical Properties.

GA-600 - Fire Resistance Design Manual.

GA-801 - Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors

Wall and Ceiling Bureau (WCB) - wallandceilingbureau.org

TB-52010 - Control Joints for Gypsum Board

UL Fire Resistance Directory (UL): Fire Resistance Volume 1 – with Hourly Ratings for Beams, Floors, Roofs, Columns, Walls and Partitions.

United States Gypsum's "Gypsum Construction Handbook."

DEFINITIONS - GYPSUM BOARD TERMINOLOGY: Refer to ASTM C 1396 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

SUBMIT PRODUCT DATA of each type of accessory product required, except for typical gypsum board panels, metal stud framing, and panel fasteners meeting requirements herein.

PRODUCTS

NON-STRUCTURAL METAL FRAMING: Provide ASTM C 645 metal studs of 0.015 minimum base-steel thickness (25 gage) 50 KSI units or "Equivalent Gage (EQ) thickness units with third-party testing verifying compliance with ICC ES AC86, in 1-1/4 inch wide flanges and in 3-5/8 inch depth typical unless otherwise noted. Provide runners matching studs, of type recommended by stud manufacturer for floor and ceiling support of studs, and for vertical abutment of drywall work at other work. Provide studs in unit size as indicated on the Drawings, and in compliance with the Steel Stud Manufacturer's Association (SSMA)'s limiting heights table for L/360 deflection at 5 PSF load, as summarized below:

MAXIMUM STUD HEIGHT PER UNIT SIZE, APPLICATION & SPACING:

Non-composite Assemblies (w/ studs braced at 48 inches OC vertically max)

3-5/8 inch x 25 gage studs at 12 inch centers: 12' – 6"
3-5/8 inch x 25 gage studs at 16 inch centers: 11' – 4" (max allowable)
3-5/8 inch x 20 gage studs at 12 inch centers: 14' – 10"
3-5/8 inch x 20 gage studs at 16 inch centers: 13' – 6" (max allowable)

Composite Drywall Assemblies (with gypsum board full-height each side to top of wall)

3-5/8 inch x 25 gage studs at 12 inch centers: 14' - 7"
3-5/8 inch x 25 gage studs at 16 inch centers: 13' – 3" (max allowable)
3-5/8 inch x 20 gage studs at 12 inch centers: 16' - 4"
3-5/8 inch x 20 gage studs at 16 inch centers: 14' 10" (max allowable)
6 inch x 25 gage studs at 12 inch centers: 19' – 11"
6 inch x 25 gage studs at 16 inch centers: 18' – 1" (max allowable)
6 inch x 20 gage studs at 12 inch centers: 23' – 8"
6 inch x 20 gage studs at 16 inch centers: 21' – 6" (max allowable)

TOP-OF-WALL DEFLECTION TRACK: Provide deflection track assembly at all interior partitions to prevent compression of stud framing or cracking of gypsum board resulting from deflection of the structure above. Provide ASTM C 645 steel-sheet top-runner units of base metal thickness matching stud thickness with minimum 2-inch deep flange legs or other equivalent system.

HAT-SHAPED FURRING CHANNELS: 7/8 inch minimum deep ASTM C-645 rigid units of 0.0312 inch (20 gage) minimum of commercial steel sheet with manufacturer's standard corrosion-resistant zinc coating. Provide stud manufacturer's standard clips, shoes, ties, reinforcements, fasteners and other accessories as needed for a complete stud system.

SUSPENDED CEILING/SOFFIT FRAMING: Comply with ASTM C 754 for conditions indicated, using steel members noted above, and as follows:

SUSPENSION WIRE (typical between hangers or structural steel framing units above to CRC's noted below): ASTM A 641/A soft-tempered carbon steel wire with Class 1 galvanized zinc coating, pre-stretched, with yield-stress load of at least four (4) times load of suspended materials, but not less than 0.1620 inch-diameter (# 8 ASWG) wire minimum (for up to 210 lbs material load per wire) – space not more than four (4) feet centers to CRC's below.

Cold Rolled Channels (CRC's): 0.0538-inch bare steel thickness (16 gage), with minimum 1/2-inch- wide flange, 1-1/2 inch deep or greater if indicated, suspended from above at four (4) feet centers unless otherwise noted.

Tie Wire: ASTM A 641/A (to connect CRC's to furring units), Class 1 zinc coating, soft temper, 0.0625-inch- diameter (# 16 ASWG) wire minimum, or double strand of 0.0475-inch- diameter (# 18 ASWG) wire minimum.

Furring Channels (hat-shaped typically) at 16 inch centers maximum, except where otherwise indicated, or where indicated to be resilient furring channels at acoustical ceiling assemblies.

LEE'S SUMMIT FLEX SPACES
60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: Capital Builders

CONSTRUCTION DOCUMENTS

06.03.2024

STATE OF MISSOURI
JACOB AARON LITTRELL
NUMBER
A-2011037018
ARCHITECT
06.03.24

Architect: _
License: _

REV.	DATE	ISSUE

ARCHITECT:

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ARCHITECTURAL SPECIFICATIONS

Sheet: **G006**

Revision no.

TYPICAL GYPSUM WALLBOARD: ASTM C 1396 compliant Type X (fire resistant) with tapered long edges, 5/8" thickness, except where otherwise indicated, in maximum length available which will minimize end joints.

TRIM ACCESSORIES: Provide manufacturer's standard trim accessories of types indicated for drywall work, formed of galvanized steel unless otherwise indicated, with either knurled and perforated or expanded flanges for nailing and beaded for concealment of flanges in joint compound. Provide corner beads, L-type edge trim-beads, U-type edge trim-beads, special L-kerf-type edge trim-beads. Stapling of trim accessories will not be permitted.

JOINT COMPOUND: ASTM C 475: On interior work provide single, multi-purpose grade, ready -mixed vinyl-type, with perforated type paper joint tape.

GYPSUM BOARD FASTENERS: Gypsum Board Screws: ASTM C 1002.

MISCELLANEOUS MATERIALS: Provide auxiliary materials for gypsum drywall work of the type and grade recommended by the manufacturer gypsum boards.

INSTALLATION

PREPARATION FOR METAL SUPPORT SYSTEMS: Coordinate work with structural ceiling work to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling hangers. Furnish steel deck hanger clips and similar devices to other trades for installation well in advance of time needed for coordination with other work.

INSTALLATION OF WALL PARTITION SUPPORT SYSTEMS: Install supplementary framing, blocking and bracing to support fixtures, equipment, services, heavy trim, furnishings and similar work which cannot be adequately supported on gypsum board alone.

ISOLATE STUD SYSTEM from transfer of structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support and avoid axial loading. Install runner tracks at floors, ceilings and structural walls and columns where gypsum drywall stud system abuts other work, except as otherwise indicated. Terminate partition stud system at ceilings, except where indicated to be extended to structural support or substrate above.

SPACE STUDS 16" O.C., except as otherwise indicated. Provide runner tracks of same material thickness as jamb studs. Space jack studs same as partition studs.

AT DOOR OPENINGS, frame with 2 each 0.032 inch (20 gage) studs extending to structural support above at both jambs, securely attached by screws either directly to door frames or to jamb anchor clips on door frame. Install runner track sections (for jack studs) at head and secure to jamb studs.

FRAME OPENINGS OTHER THAN DOOR OPENINGS in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.

INSTALL SUPPLEMENTARY FRAMING, runners, furring, blocking and bracing at opening and terminations in the work, and at locations required to support fixtures, equipment, services, heavy trim, furnishings and similar work which cannot be adequately supported directly on gypsum board alone.

GENERAL GYPSUM BOARD INSTALLATION REQUIREMENTS:

INSTALL insulation where indicated, prior to gypsum board unless readily installed after board has been installed. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 1'-0" in alternate courses of board. Install ceiling boards in the direction and manner which will minimize the number of end-butt joints, and which will avoid end joints in the central area of each ceiling. Stagger end joints at least 1'-0".

INSTALL WALL/PARTITION BOARDS vertically to avoid end-butt joints wherever possible. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs.

INSTALL EXPOSED GYPSUM BOARD with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16" open space between boards. Do not force into place.

LOCATE either edge or end joints over supports, except in horizontal applications or where intermediate supports or gypsum board black-blocking is provided behind end joints. Position boards so that both tapered edge joints abut, and mill-cut or field-cut end joints abut. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

ATTACH gypsum board to framing and blocking as required for additional support at openings and cutouts. Form control joints and expansion joints with space between edges of boards, prepared to receive trim accessories. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls which are properly braced internally.

ISOLATE perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 to 1/2 inch space and trim edge with J-type semi-finishing edge trim. Seal joints with acoustical sealant. Do not fasten drywall directly to stud system runner tracks.

SPACE FASTENERS in gypsum boards in accordance with referenced standards and manufacturer's recommendations. On partitions/walls apply gypsum board vertically (parallel), unless otherwise indicated, and provide sheet lengths which will minimize end joints. Fasten gypsum board supports with screws.

DIRECT-BONDING TO SUBSTRATE: Where necessary to install gypsum board adhered directly to a substrate (other than studs, joints, furring members or base layer of gypsum board), comply with gypsum board manufacturers recommendations, and temporarily brace or fasten gypsum board until fastening adhesive has set.

INSTALLATION OF DRYWALL TRIM ACCESSORIES: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges by nailing in accordance with manufacturer's instructions and recommendations. Install metal corner beads at external corners of drywall work.

INSTALL METAL EDGE TRIM wherever edge of gypsum board would otherwise be exposed or semi-exposed. Provide type with face flange to receive joint compound. Install L-type trim where work is tightly abutted to other work, and install special kerf-type where other work is kerfed to receive long leg of L- type trim. Install U-type where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).

INSTALLATION OF DRYWALL FINISHING: Apply treatment at gypsum board joints (both directions), flanges of trim accessories, penetrations, fasteners heads, surface defects and elsewhere as required to prepare work for decoration. Prefill open joints and rounded or beveled edges, using type of compound recommended by manufacturer. Apply joint tape at joints between gypsum boards, except where a trim accessory is indicated. Apply joint compound in three (3) coats (not including prefill of openings in base), and sand between last two (2) coats and after last coat. At water-resistant gypsum board base for ceramic tile, tape and finish joints with two (2) coats water-resistant joint material.

PARTIAL FINISHING: Omit third coat (if specified) and sanding on concealed drywall work which is indicated for drywall finishing or which requires finishing to achieve fire resistance rating, sound rating or to act as air or smoke barrier. Refer to sections on painting, coating and wall-coverings in Division 9 for decorative finishes to be applied to drywall work.

FINISH GYPSUM BOARD to levels indicated below, according to ASTM C 840, for locations indicated:

- LEVEL 1 FINISH (typical at concealed areas): Embed tape at joints in ceiling plenum or other concealed areas
- LEVEL 4: (typical exposed gypsum-board finish): Embed tape and apply separate first, fill and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.
- LEVEL 5 FINISH (where indicated). Embed tape in joint compound and apply first, fil (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories; and apply two (2) each thin, uniform skim coats of joint compound over entire surface. For skim coats, use joint compound specified for third coat, or a product specially formulated for this purpose and acceptable to gypsum board manufacturer. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects, tool marks, and ridges and ready for decoration.

PROTECTION OF WORK: Installer must advise Contractor of required procedures for protecting gypsum drywall work from damage and deterioration during remainder of construction period.

SECTION 09 30 00 – TILING

PROVIDE TILE WORK where indicated on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

SUBMIT PRODUCT DATA including manufacturer's technical information and installation instructions for materials required. Include certifications and other data to show compliance with these specifications.

SUBMIT SAMPLES FOR SELECTION of each type of tile and grout indicated. Include Samples of accessories involving color selection.

SEQUENCE OF FLOOR TILE INSTALLATION: Where integral tile-cove base is indicated, install tile work after installation of gypsum board, base cabinets, or other base substrate as applicable.

PROVIDE NON-SLIP TILE or non-slip coating (as applicable) at all walking areas of floor tile.

TILE TRIM UNITS: Provide units matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide manufacturer's standard shapes, including but not limited to coved base units, wainscot caps, external corner units and other trim units as applicable.

TILE-EDGE TRIM AT CONCRETE FLOORING: "Schluter – Reno-V – AEVT/B" (satin anodized aluminum) in height require to match tile thickness and with minimum 0.75 inch transition leg. Provide typically at edge of tile abutting exposed concrete or resilient flooring.

TYPICAL TILE-EDGE TRIM AT CARPETING: "Schluter – Schiene AE" (satin anodized aluminum) in height require to match tile thickness. Provide typically between tile and carpeting.

ACCEPTABLE MANUFACTURERS FOR TILE SETTING MATERIALS: Subject to compliance with requirements, provide tile-setting products as manufactured by one of the following:

- Custom Building Products.
- LATICRETE International Inc.
- MAPEI Corporation.
- H. B. Fuller Construction Products Inc. / TEC

EPOXY MORTAR & GROUT: ANSI A118.3 dual-use, three-part epoxy for extra heavy commercial use: Basis-of-Design: TEC AccuColor EFX Epoxy Special Effects Grout (TA-440) or approved equal. Color selected by Architect.

TILE GROUT SEALER: "Auqa-Mix Sealer's Choice 15 Gold" penetrating sealer or approved equal.

MORTAR AND GROUTING SYSTEMS:

EPOXY FLOOR TILE (Provide at tile areas of grocery entry): Thin-set in chemical-resistant epoxy grout with Chemical-resistant epoxy grout per TCA Method # F131.

INSTALLATION:

COMPLY WITH MANUFACTURER'S instructions for mixing and installation of materials.

EXTEND tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.

ACCURATELY form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, colors, or covers overlap tile.

JOINTING PATTERN: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise shown.

APPLICATION OF GROUT SEALER: Provide tile and grout seal coating in full strength (not diluted) in accordance with manufacturer's recommendations. Avoid overlapping, over-spraying, puddling and immediately wipe off all adjacent materials of overspray. Maintain sealed areas dry for not less than 12 hours after application.

CLEANING AND PROTECTION:

CLEANING: Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but not sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

FINISHED TILE WORK: Leave finished installation clean and free of cracked, chipped, broken un-bonded, or otherwise defective tile work.

PROTECTION: When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent damage and wear.

PROHIBIT foot and wheel traffic from using tiled floors for at least three (3) days after grouting is completed.

BEFORE FINAL INSPECTION remove protective coverings and rinse neutral cleaner from tile surfaces.

SECTION 09 51 00 – ACOUSTICAL CEILINGS

WORK INCLUDED: Provide acoustical ceilings as shown on the drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

SUBMIT PRODUCT DATA including Manufacturer's specifications and installation instructions for each acoustical ceiling material required, and for each suspension system, including certified laboratory test reports and other data as required to show compliance with these specifications.

- Include manufacturer's recommendations for cleaning and refinishing acoustical units, including precautions against materials and methods which may be detrimental to finishes and acoustical performance.

DELIVER MATERIALS in original unopened containers and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

SPACE ENCLOSURE: Do not install interior acoustical ceilings until work above ceilings is completed, wet-work is nominally dry, and only after ambient conditions of temperature and humidity will be continuously maintained at values near those of occupancy.

MAINTENANCE STOCK: At time of completing installation, deliver stock of maintenance material to Owner. Furnish full size units matching units installed, packaged with protective covering for storage, and identified with appropriate labels.

- Furnish amount equal to 2.0% of each type of the total acoustical panels installed.

PRODUCTS

CEILING SUSPENSION MATERIALS: Comply with ASTM C 635, as applicable to type of suspension system required for type of ceiling units indicated. Coordinate with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, and partition system (if any).

ATTACHMENT DEVICES: Size for five (5) times design load indicated in ASTM C 635, Table 1, Direct Hung.

HANGER WIRES: Galvanized carbon steel, ASTM A 641, soft temper, pre-stretched, yield-stress load of at least three (3) times design load, but not less than 12 gage (0.106").

EDGE MOLDINGS: Manufacturer's recessed channel molding for edges and penetrations of ceiling, with single flange of molding exposed, baked enamel finish to match balance of grid.

EXECUTION

MEASURE EACH CEILING AREA and establish layout of acoustical units to balance border widths at opposite edges of each ceiling, except as otherwise indicated on the Drawings. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans wherever possible.

COMPLY with manufacturer's printed instructions, and with governing regulations, fire-resistance rating requirements and with industry standards applicable to the Work.

ARRANGE acoustical units and orient directionally-patterned units in the manner shown by reflected ceiling plans, with pattern running in one direction.

INSTALL SUSPENSION SYSTEM to comply with ASTM C 636, with hangers supported only from building structural members. Locate hangers not less than 6" from each end and space 4'-0", along each carrying channel or direct-hung runner. Secure wire hangers by looping and wire tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate.

INSTALL ACOUSTICAL PANELS with undamaged edges throughout and fitted accurately into suspension system runners and edge moldings, with unfinished edges fully concealed by support of suspension members. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

AT CUT EDGES of reveal-edged panels exposed after installation, trim cut edges to match profile of un-cut edges, and paint exposed surfaces using coating recommended for this purpose by acoustical panel manufacturer.

INSTALL PANEL HOLD-DOWN CLIPS where indicated or as required for fire-resistance ratings, and in all vestibules with acoustical ceilings, and within a twenty (20) foot radius of any exterior door.

ADJUST AND CLEAN EXPOSED SURFACES of acoustical ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

SECTION 09 91 00 – PAINTING

WORK INCLUDES surface preparation and painting or finishing of surfaces exposed to view, throughout the Project and in accordance with requirements herein. Except where a natural finish or a material is specifically noted as a surface not to be painted, paint or finish all exposed surfaces whether or not painting is designated in the Drawings. Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas.

PAINTING NOT REQUIRED: Unless otherwise indicated, painting is not required on plastic laminate, prefinished sheet metal, plumbing fixtures, electrical equipment (excluding exposed distribution cabinet(s) or electrical devices. Painting is not required on surfaces such as walls or ceilings in concealed or inaccessible areas. Metal surfaces of anodized aluminum, stainless steel, chromium plate and similar finished materials will not require finish painting, except as otherwise indicated in the finish hardware schedule. Do not paint over code-required labels or equipment identification labels.

PROVIDE PRIMERS and undercoat paints produced by the same manufacturer as the finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.

PREPARE surfaces and apply coatings in strict accordance with the coating manufacturer's recommendations.

USE ONLY SKILLED painters for mixing and applying paint. Quality workmanship is required. In the acceptance or rejection of finish painting, no allowance will be made for the painters' lack of skill or in adequate lighting during painting operations.

DELIVER MATERIALS to job site in original, new and unopened packages and containers bearing manufacturer's name and label. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue. Keep storage area neat and orderly. Remove rags and water daily. Take all precautions to ensure that workmen and Work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

JOB CONDITIONS: Apply paints only when temperature of surfaces to be painted and surrounding air temperatures are within recommended range permitted by the paint manufacturer's printed instructions. Do not apply paint when relative humidity exceeds 85%, or to damp or wet surfaces.

MATERIAL QUALITY: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturers identification as a standard, best-grade product will not be acceptable.

SURFACE PREPARATION: Clean surfaces of dirt, rust, scale, grease, moisture, or other conditions otherwise detrimental to formation of a durable paint film. Perform preparation and cleaning procedures in accordance with paint manufacturer's printed instructions for each particular substrate condition.

REMOVE hardware, accessories, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.

CLEAN WOOD SURFACES of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer before application of primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.

PRIME, STAIN, OR SEAL WOOD to be painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling. When transparent finish is required, backprime with spar varnish. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately upon delivery or after installation, if unit is cut in the field.

CLEAN NONGALVANIZED FERROUS-METAL SURFACES that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council.

TOUCH UP SHOP-APPLIED PRIME COATS that have been damaged. Wire-brush, clean with solvents recommended by the paint manufacturer, and touch up with the same primer as the shop coat.

MATERIALS PREPARATION: Carefully mix and prepare paint materials in accordance with manufacturer's directions. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using. Use only thinners approved by the paint manufacturer, and only within recommended limits.

APPLICATION: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied. Use applicators and techniques best suited for substrate and type of material being applied. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

SCHEDULING: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

APPLY PAINT to completely cover previously painted surfaces, to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, lap marks, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.

THE NUMBER OF COATS and film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce an even smooth surface in accordance with the manufacturer's directions.

APPLY ADDITIONAL PAINT coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

PAINT INTERIOR SURFACES of ducts, where visible through registers or grilles with a flat, nonspecular black paint. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

MINIMUM COATING THICKNESS: Apply materials at not less than the manufacturer's recommended spreading rate. Provide a total dry film thickness of the entire system as recommended by the manufacturer.

PRIME COATS: Before application of finish coats, apply a prime coat of material as recommended by the manufacturer to material that is required to be painted or finished and has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to assure a finish coat with no burn through or other defects due to insufficient sealing.

PIGMENTED (OPAQUE) FINISHES: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

APPLY TRANSPARENT STAINS in accordance with the stain and substrate manufacturer's recommendations (when applicable) to ensure proper penetration of the stain, and to produce an an even, consistent, color that enhances the natural characteristics of the substrate material. Apply with spray and brush applicators using means and techniques best suited for the substrate and the type of stain being applied. Provide a consistent application of stain without color irregularities, brush marks, or other surface irregularities not inherent with the substrate material. Stain edges and ends of boards, and brush out excess stain that collects in surface textures or joints, as applicable. Do not apply stain on surfaces that are not sufficiently dry, or that are in direct sunlight.

TRANSPARENT (CLEAR) FINISHES: Use multiple coats to produce a glass-smooth surface film of even luster. Lightly sand the surface between each successive coat. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections. Typically, provide satin finish for final coats, unless noted otherwise.

COMPLETED WORK: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

FIELD QUALITY CONTROL: The Owner reserves the right to engage the services of an independent testing laboratory to sample the paint material being used. Samples of material delivered to the project may be taken, identified, sealed, and certified in the presence of the Contractor. The testing laboratory will perform appropriate tests as required by the Owner. If test results show material being used does not comply with specified requirements, the Contractor may be directed to stop painting, remove noncomplying paint, pay for testing, repaint surfaces coated with rejected paint, and remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are noncompatible.

CLEAN-UP: During the progress of the Work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day. Upon completion of painting Work, clean window glass and other paint-spattered surfaces. Remove spattered paint or otherwise damage finish surfaces. Touchup and restore all damaged or defaced painted surfaces after completion of Work of other trades.

PROTECT work of other trades, whether to be painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Owner. Provide "wet paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

PAINT MATERIALS SCHEDULE:
(RE: www.paintinfo.com for MPI's "Approved Product List")

EXTERIOR FINISHES:
- EXTERIOR NATURAL-FINISHED WOOD (AND DECKING): SEMI-TRANSPARENT OIL/ ALKYD STAIN FINISH:
  - One (1) Coat of "Cetol SRD" Semi-Transparent Stain by Sikkens.
  - Two (2) Finish Coats: "Penofin Verde (low VOC), Natural by Sikkens
- EXTERIOR PAINTED DRYWALL SOFFITS: FLAT ACRYLIC LATEX:
  - Primer: MPI # 6 X-Green - Primer, Latex for Exterior Wood
  - 2 Finish Coats: MPI # 10 - Latex, Exterior flat (MPI Gloss Level 1-2)
- EXTERIOR WOOD TRIM: EGGSHELL/SATIN ENAMEL:
  - Primer: MPI # 6 X-Green - Primer, Latex for Exterior Wood
  - Finish Coat: MPI # 15 - Latex, Exterior, Low Sheen (MPI Gloss Level 3-4)
- EXTERIOR WOOD TRIM: SEMI-GLOSS LATEX FINISH
  - Primer: MPI # 6 X-Green - Primer, Latex for Exterior Wood
  - 2 Finish Coats: MPI #11 - Latex, Exterior Semi-Gloss (MPI Gloss Level 5)
- EXTERIOR MASONRY OR CMU WALLS: SATIN ELASTOMERIC COATING:
  - Block Filler / Primer: Masonry primer or acrylic block filler
    - Benjamin Moore: Moore's High Build Acrylic Masonry Primer 068 or Latex Block Filler M88
    - Pittsburgh Paints; PERMA-CRETE High Build Acrylic Primer, 4-2 or PERMA-CRETE LTC Concrete Block/Masonry Surfacer, 4-100
    - Sherwin Williams; PrepRite Masonry Primer or PrepRite Block Sealer
  - Two (2) Finish Coats: Low-Luster water-based elastomeric paint:
    - Benjamin Moore; Moorlastic Acrylic Elastomeric Waterproof Coating - Low Lustre 055
    - Pittsburgh Paints; PERMA-CRETE PITT-FLEX Elastomeric Coating
    - Sherwin Williams; Sherlastic Elastomeric Coating Series A5-100
- EXTERIOR CMU WALLS: SATIN/EGGSHELL ENAMEL:
  - Block Filler: MPI # 4 X-Green - Block Filler, Latex, Interior/Exterior
  - Primer: MPI # 6 X-Green - Primer, Latex for Exterior Wood
  - 2 Finish Coats: MPI # 15 - Latex, Exterior, Low Sheen (MPI Gloss Level 3-4)
- EXTERIOR CMU WALLS: SEMI-GLOSS ACRYLIC LATEX ENAMEL:
  - Block Filler: MPI # 4 X-Green - Block Filler, Latex, Interior/Exterior
  - Primer: MPI #6 X-Green - Primer, Latex for Exterior Wood
  - 2 Finish Coats: MPI # 11 - Latex, Exterior Semi-Gloss (MPI Gloss Level 5)
- EXTERIOR FERROUS METAL: SEMI-GLOSS ALKYD
  - Primer: MPI # 23 - Primer, Metal, Surface Tolerant (w/ SSPC SP1 + SP 2 or SP3 prep)
    - Note: Primer not required to be applied in field on pre-primed items – verify compatibility
  - 2 Finish Coats: MPI # 94 - Alkyd, Exterior, Semi-Gloss (MPI Gloss Level 5), or MPI # 81 - Alkyd, Quick Dry, Semi-Gloss
- EXTERIOR ZINC-COATED (GALVANIZED) METAL: SEMI-GLOSS ALKYD:
  - Primer: MPI # 134 - Primer, Galvanized, Water Based
  - 2 Finish Coats: MPI # 94 - Alkyd, Exterior, Semi-Gloss (MPI Gloss Level 5), or MPI # 81 - Alkyd, Quick Dry, Semi-Gloss

INTERIOR FINISHES:

INTERIOR DRYWALL: EGGSHELL/SATIN LATEX ENAMEL (Class A: 5-5-0)
- Primer Coat: MPI # 50 - Interior Latex Primer Sealer
- 2 Finish Coats: MPI # 52 - Interior Latex "Eggshell-like" sheen
- Apply finish coats with roller, unless otherwise indicated

INTERIOR METAL: SEMI-GLOSS ALKYD ENAMEL (Class A: 5-5-0)
- First Coat: MPI # 79 – Alkyd Anti-Corrosive Metal Primer
- Note: Primer not required to be applied in field on pre-primed items
- 2nd & 3rd. Coats: MPI # 47 - Interior Alkyd - Semi-Gloss
- Brush apply finish coats unless otherwise indicated

PAINTED WOOD: EGGSHELL ALKYD ENAMEL (Class A: 5-5-0)
- Prime Coat: MPI # 45 - Interior Alkyd Primer Sealer
- 2nd & 3rd Coats: MPI # 51 - Interior Alkyd, Eggshell
- Brush apply finish coats unless otherwise indicated

INTERIOR EXPOSED STRUCTURE: DRY-FALL FLAT LATEX: (Class A, 5-5-0)
- Note: Primer not required to be applied in field on pre-primed items
- Verify compatibility of finish with existing primer(s) and adjust if necessary
- 2 Coats: MPI # 118 – Dry Fall Latex Flat

PAINTED WOOD: SEMI-GLOSS ALKYD ENAMEL (Class A: 5-5-0)
- Prime Coat: MPI # 45 - Interior Alkyd Primer Sealer
- 2nd & 3rd Coats: MPI # 47 - Semi-Gloss Interior Alkyd
- Brush apply finish coats unless otherwise indicated

DIVISION-10: SPECIALTIES

SECTION 10 14 00 – SIGNAGE

PROVIDE signage indicated herein as required for a complete and proper installation.

SEPARATE CONTRACT: The Owner will arrange for other signage to be provided by a separate contractor. Coordinate with that entity regarding field dimensions, shop drawings, site access, scheduling, power requirements, and other items necessary for timely installation of all project signs.

ACCESSIBLE DOOR SIGNAGE (per ANSI A117.1 & ADA): 6 x 8 inch minimum radius cornered Pictorial Symbol Signs, with 1/32" raised pictogram symbols, 1/32" x 5/8" high upper case raised letter text, and with 1/32" Grade II Braille text. Text and pictogram to be white on black colored sign panel with matte finish. Provide double sided 1/32" thick Scotchmount tape for attaching at 60" above floor to center of sign on the wall adjacent to the latch side of a door:

PRESSURE SENSITIVE VINYL (PSV): "220 Scotchcal" by 3M or equal 2 mil minimum thickness, opaque, non-reflecting, cast PVC film with pressure sensitive adhesive backing, suitable for exterior as well as interior applications, colors as noted in material-color schedule. Die-cut copy characters from PSV, and mount on paper backing sheet.

- BUILDING NUMBERS: 8" high white reverse-mount to interior side of glass facing main street (comply with local code and regulations)
- SERVICE DOOR SIGN: 1-1/2" High PSV letters reading:
  "(NAME OF BUSINESS)" (verify with Owner's representative)

INSTALL signage in accordance with the approved shop drawings, to be level, plumb, and at height indicated, free from distortion or other defects of appearance. Remove and reinstall signage materials that do not comply with these requirements.

MOUNT plastic laminate signs directly to face of door, except at "accessible doors, mount to side of door per ANSI / ADA requirements. Use double-sided foam tape to mount to smooth non-porous surfaces.

CLEAN soiled sign surfaces and protect units from damage unitl acceptance by the Owner.

SECTION 10 26 00—WALL PROTECTION

WORK INCLUDED: Provide wall protection systems, where indicated on the drawings, as specified herein and as needed for a complete and proper installation. Install stainless steel wall paneling, furnished by others.

- PRODUCT: MoCue, Stainless-Steel Cartstop Rail System

FASTENERS: Provide aluminum, nonmagnetic stainless steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with components, hardware, anchors, and other items being fastened. Use theft-proof fasteners where exposed to view. Provide inserts and other anchorage devices for connecting components to concrete or masonry. Fabricate anchoring devices to be capable of withstanding imposed loads. Coordinate anchoring devices with the supporting structure.

PROVIDE SURFACES free of evidence of wrinkling, chipping, uneven coloration, dents, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

EXECUTION

EXAMINE AREAS and conditions in which wall surface protection components and wall protection systems will be installed. Complete all finishing operations, including painting, before beginning installation of wall surface protection system materials.

PREPARATION: Prior to installation, clean substrate to remove dust, debris, and loose particles.

INSTALL WALL SURFACE PROTECTION UNITS plumb, level, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished work. Install retainers, mounting brackets, and other accessories in strict accordance with the manufacturer's instructions.

CLEANING: Immediately upon completion of installation, clean surface protection units and accessories using a standard ammonia based household cleaning agent. Clean metal components in accordance with the manufacturer's recommendations. Remove excess adhesive and sealant while it is still wet.

REMOVE SURPLUS materials, rubbish, and debris resulting from installation upon completion of work and leave areas of installation in neat, clean condition. Replace removed plates and fixtures.

END OF SPECIFICATIONS

RELEASED FOR CONSTRUCTION
As Noted on Plans Review

Development Services Department
Lee's Summit, Missouri
08/20/2024

LEE'S SUMMIT FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: Capital Builders

CONSTRUCTION DOCUMENTS

06.03.2024

STATE OF MISSOURI
JACOB AARON LITTRELL
NUMBER A-2011037018
ARCHITECT
06.03.24

Architect License

REV.	DATE	ISSUE

ARCHITECT:

six twenty one

SixTwentyOne
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ARCHITECTURAL SPECIFICATIONS

Sheet: G007

Revision no.:

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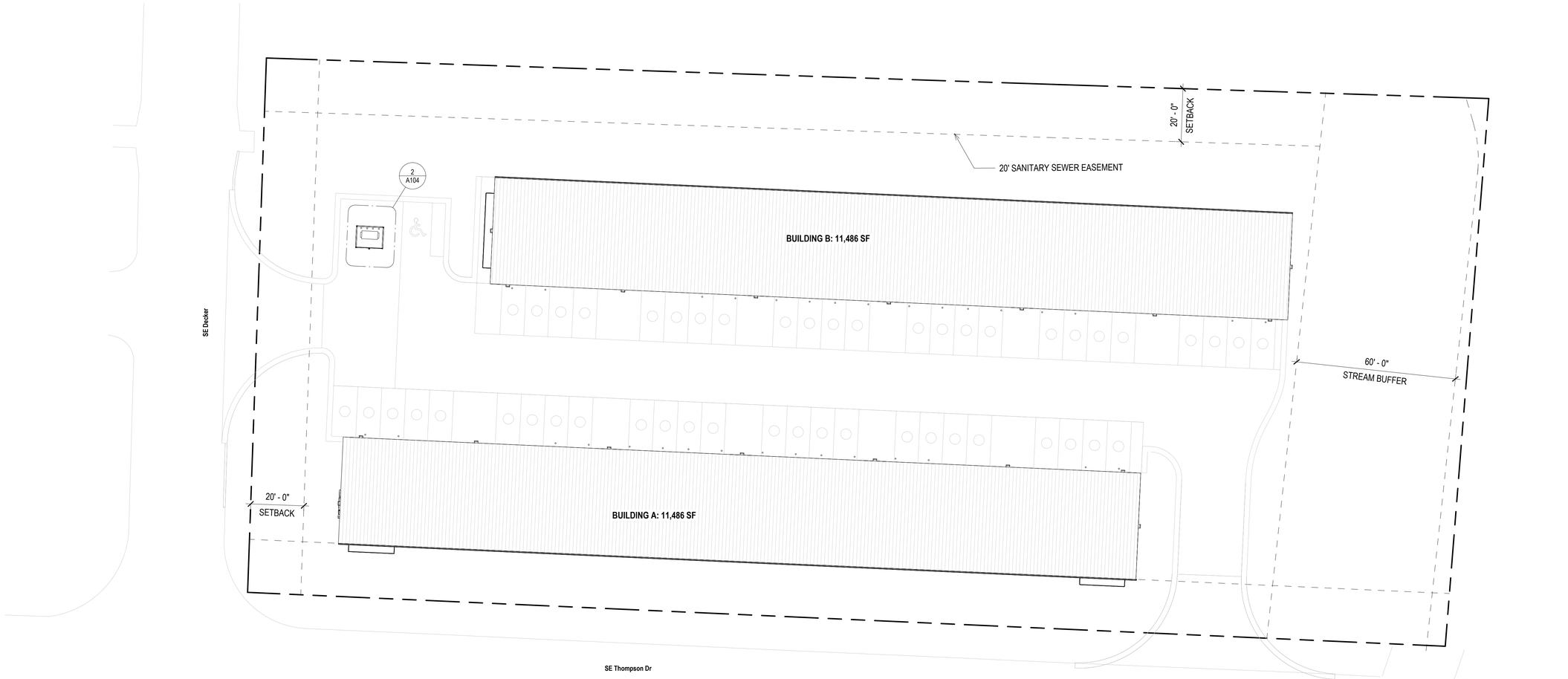

1 **SITE PLAN**
1" = 20'-0"

N

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Lee's Summit, Missouri
08/20/2024

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This drawing may be part of an integrated set of Construction Documents, including the Contract, the Conditions and the Specifications. The Contract Documents are complementary; what is required by one is as binding as if required by all. Application of a material or equipment item to Work installed by others constitutes acceptance of that Work. Calculate and measure dimensions – DO NOT SCALE DRAWINGS unless directed by the Architect to do so. Dimensions indicated are to the face of a material, unless noted otherwise.

SITE PLAN

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A100

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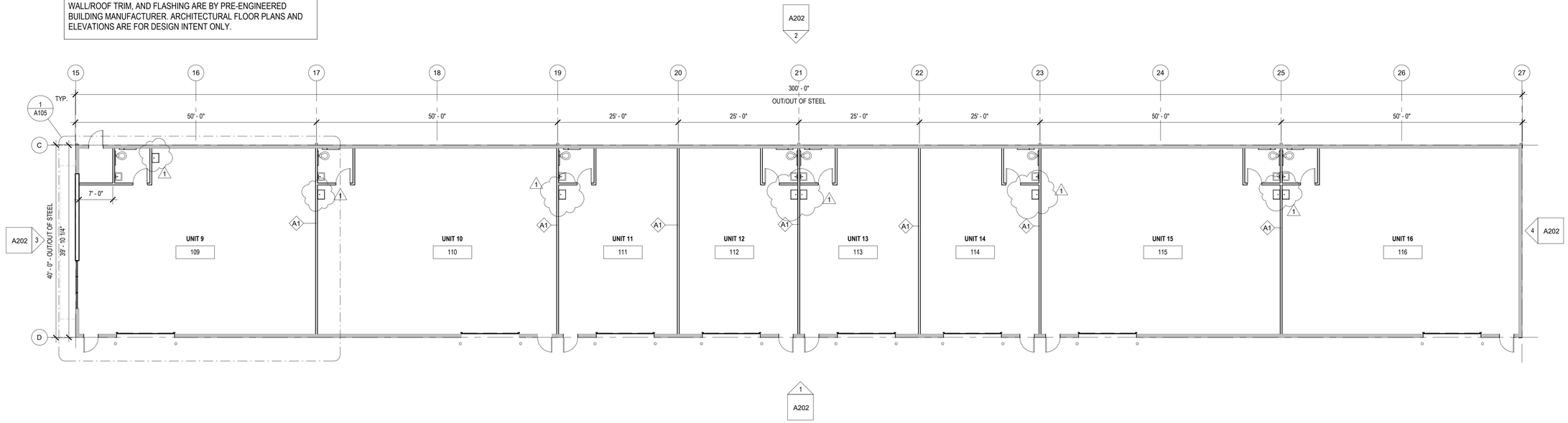
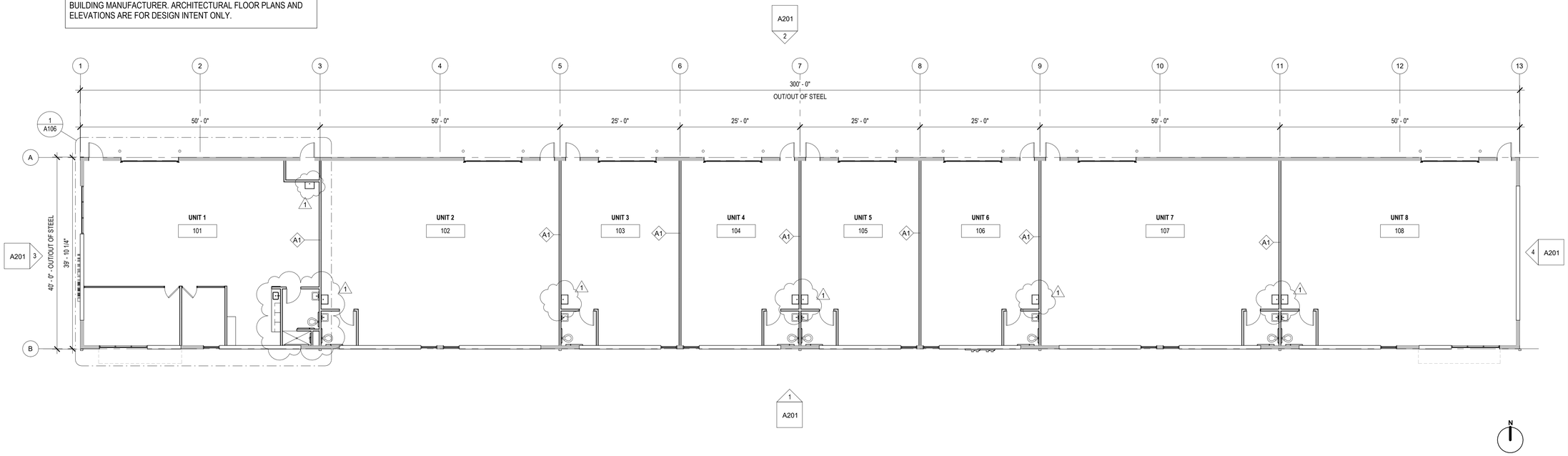
NOTE: BUILDING ENCLOSURE INCLUDING STRUCTURAL FRAME, EXTERIOR WALLS, ROOF, INSULATION, GUTTERS, DOWNSPOUTS, WALL/ROOF TRIM, AND FLASHING ARE BY PRE-ENGINEERED BUILDING MANUFACTURER. ARCHITECTURAL FLOOR PLANS AND ELEVATIONS ARE FOR DESIGN INTENT ONLY.



2 **FLOOR PLAN - BUILDING B**
3/32" = 1'-0"

NOTE: BUILDING ENCLOSURE INCLUDING STRUCTURAL FRAME, EXTERIOR WALLS, ROOF, INSULATION, GUTTERS, DOWNSPOUTS, WALL/ROOF TRIM, AND FLASHING ARE BY PRE-ENGINEERED BUILDING MANUFACTURER. ARCHITECTURAL FLOOR PLANS AND ELEVATIONS ARE FOR DESIGN INTENT ONLY.



1 **FLOOR PLAN - BUILDING A**
3/32" = 1'-0"

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Development Services Department
Lee's Summit, Missouri
08/20/2024

LEE'S SUMMIT FLEX SPACES

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Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: Capital Builders

CONSTRUCTION DOCUMENTS

STATE OF MISSOURI
JACOB AARON LITTRELL
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ARCHITECT
06.03.24

06.03.2024

Architect: License: –

REV.	DATE	ISSUE
1	07.15.24	Plan Review Comments

ARCHITECT:

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FLOOR PLANS

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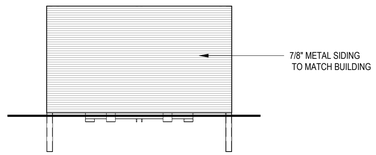
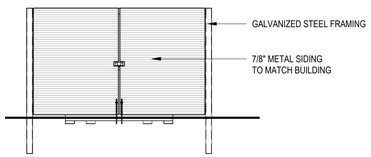
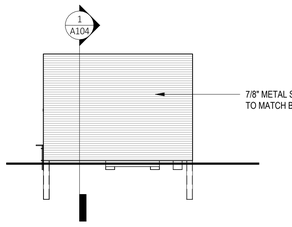
Revision no.



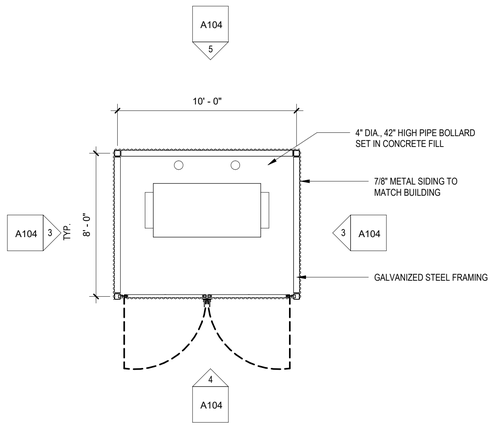
5 **ELEVATION - TRASH ENCLOSURE - NORTH**
1/4" = 1'-0"



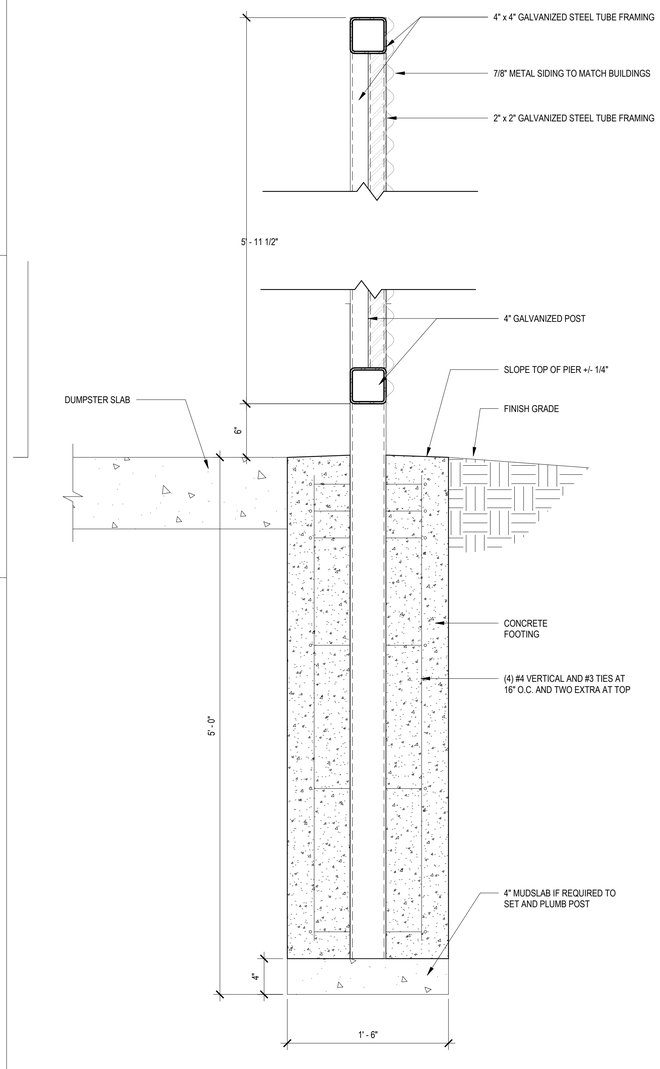
4 **ELEVATION - TRASH ENCLOSURE - SOUTH**
1/4" = 1'-0"



3 **ELEVATION - TRASH ENCLOSURE - EAST/WEST**
1/4" = 1'-0"



2 **FLOOR PLAN - TRASH ENCLOSURE**
1/4" = 1'-0"



1 **SECTION DETAIL - DUMPSTER ENCLOSURE**
1 1/2" = 1'-0"

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Development Services Department
Lee's Summit, Missouri
08/20/2024

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06.03.24

06.03.2024

Architect: _____
License: _____

REV.	DATE	ISSUE

ARCHITECT:

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TRASH ENCLOSURE PLAN & DETAILS

Sheet
A104

Revision no.

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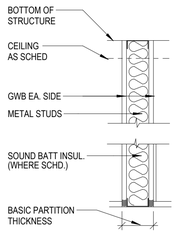
PARTITION IDENTIFICATION PLAN SYMBOL	A1	A2
BASIC PARTITION THICKNESS	A=4 7/8"	A=4 7/8"
STUD SIZE	3-5/8"	3-5/8"
GWB THICKNESS	GWB - 5/8" TYPE X	GWB - 5/8" TYPE X
STUD SPACING (0.C.)	16"	16"
FIRE RATING (HRS)	N.R.	N.R.
FIRE RETARDANT PLYWOOD SUBSTRATE	-	-
ACOUSTICAL TEST NUMBER	-	-
ACOUSTICAL TEST NUMBER	-	-
INSULATION THICKNESS	3 1/2" fiberglass	-
ACOUSTICAL JOINTS	-	-
FIRE-RESISTIVE JOINTS	-	-
METAL THICKNESS	20 GA.	20 GA.
GWB TO STRUCT ABOVE	YES	NOTE 1

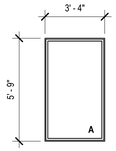
NOTES:
1. STUDS AND GWB SHOULD EXTEND UP TO 8'-6" AFF, BRACE STUDS AS NECESSARY



GENERAL NOTES:
1. WALLS ARE DIMENSIONED TO THE FINISH FACE OF WALL UNLESS NOTED OTHERWISE.
2. USE 12" SPACING ON ALL WALLS TALLER THAN 14'-10"
3. ALL NEW WALLS TO RECEIVE 4" VINYL COVE BASE.

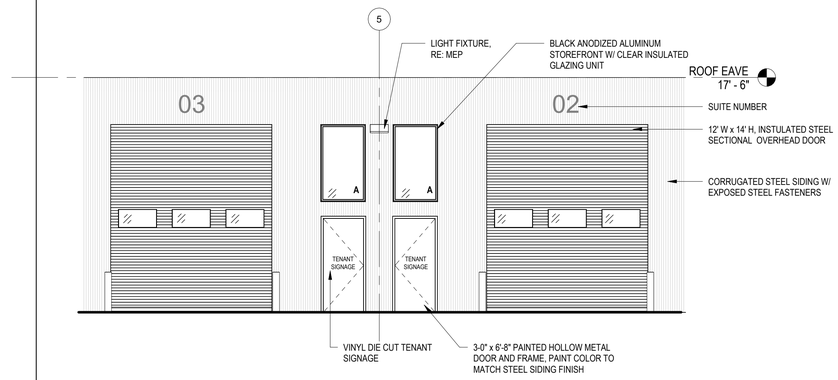
4 WALL TYPES
12" = 1'-0"

* ALL DOORS, WINDOWS AND ASSOCIATED FLASHING TO BE INSTALLED PER PRE-ENGINEERED METAL BUILDING MANUFACTURER'S STANDARD DETAILS.

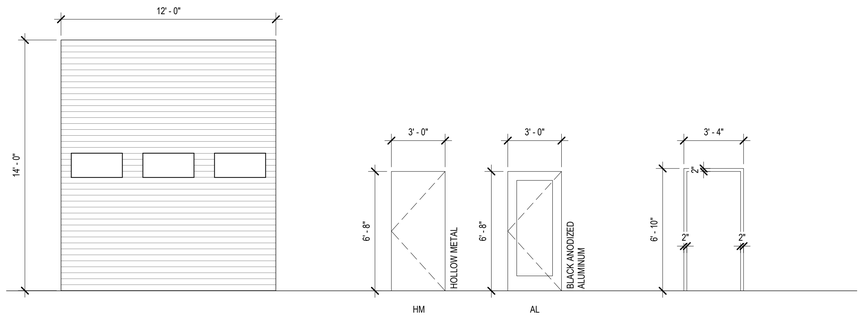


ALL WINDOWS TO BE BLACK ANODIZED STOREFRONT W/ INSULATED GLAZING UNIT

WINDOW TYPES LEGEND
1/4" = 1'-0"



3 ENLARGED ELEVATION
3/16" = 1'-0"

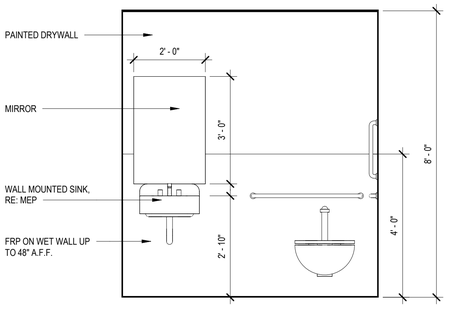


OVERHEAD GARAGE DOOR TO BE CLOPAY MODEL 3150 STEEL FRONT AND BACK GARAGE DOOR, R-6.5, CHARCOAL, MINOR RIBBED PANEL DESIGN, (3) 24" X 12" CLEAR INSULATED GLASS WINDOWS.

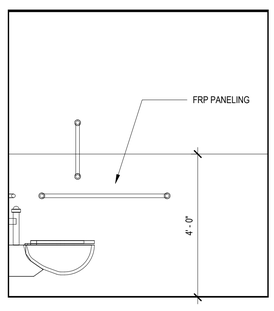
*DOOR TO MEET 115MPH ULTIMATE WIND SPEED AND 89MPH NOMINAL WIND SPEED

ALL DOORS TO BE PAINTED HOLLOW METAL DOOR WITH 2" HOLLOW METAL DOOR FRAME UNLESS NOTED OTHERWISE ON ELEVATION. DOOR AND FRAME COLOR TO MATCH EXTERIOR METAL PANEL.

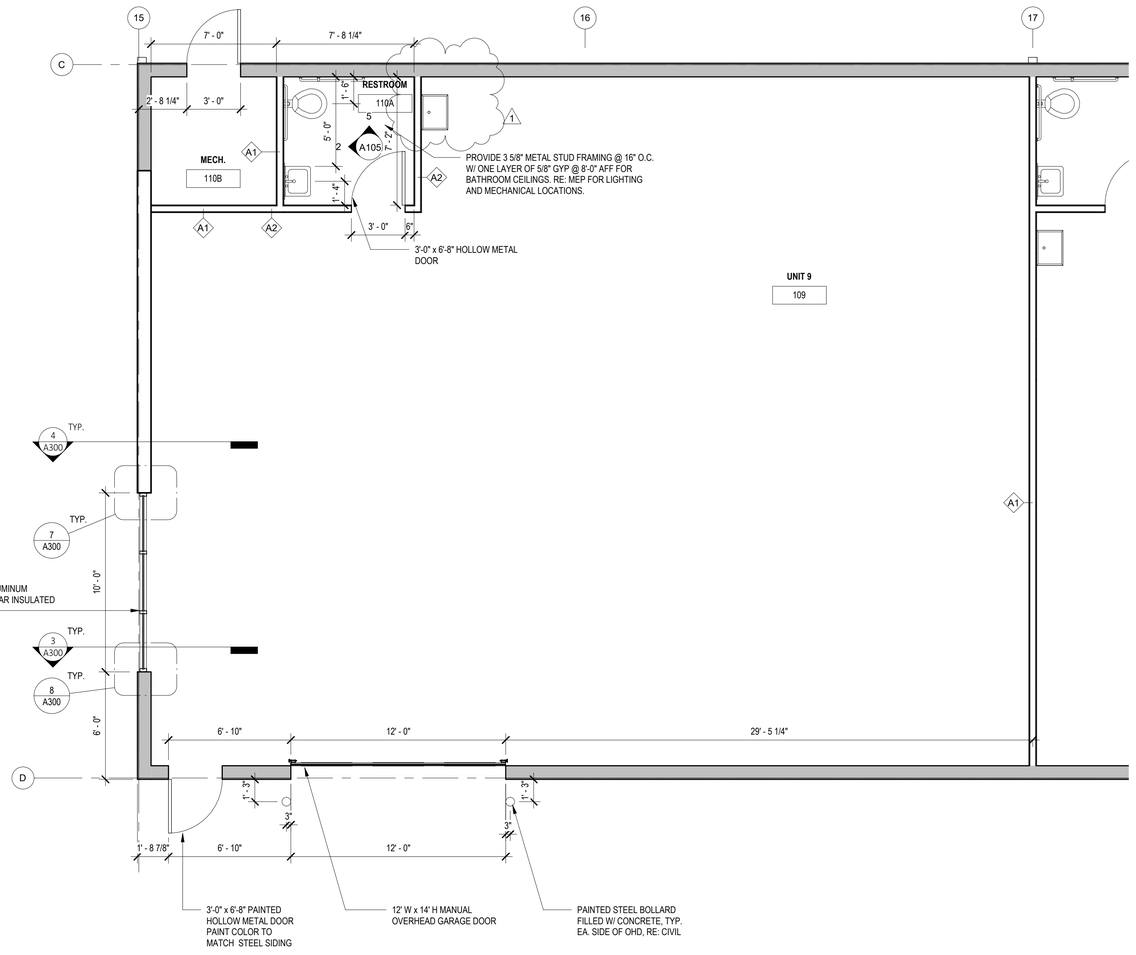
DOOR TYPES LEGEND
1/4" = 1'-0"



2 ELEVATION - TYPICAL RESTROOM N/S
1/2" = 1'-0"



5 ELEVATION - TYPICAL E/W
1/2" = 1'-0"



1 TYPICAL UNIT ENLARGED PLAN
1/4" = 1'-0"

N

LEE'S SUMMIT FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: Capital Builders

CONSTRUCTION DOCUMENTS

STATE OF MISSOURI
JACOB AARON LITTRELL
NUMBER A-2011037018
ARCHITECT
06.03.24

06.03.2024

Architect: License:

REV.	DATE	ISSUE
1	07.15.24	Plan Review Comments

ARCHITECT:

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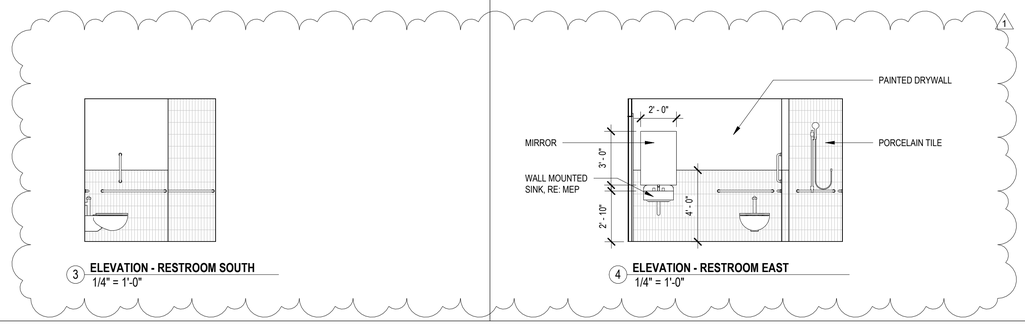
ENLARGED PLANS

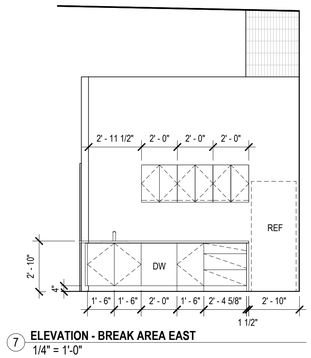
Sheet: A105

Revision no.

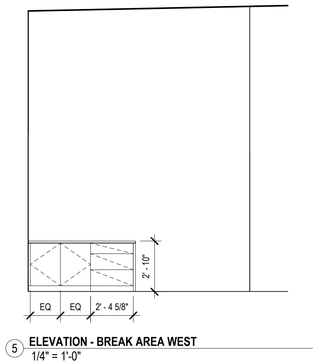


3 ELEVATION - RESTROOM SOUTH
1/4" = 1'-0"

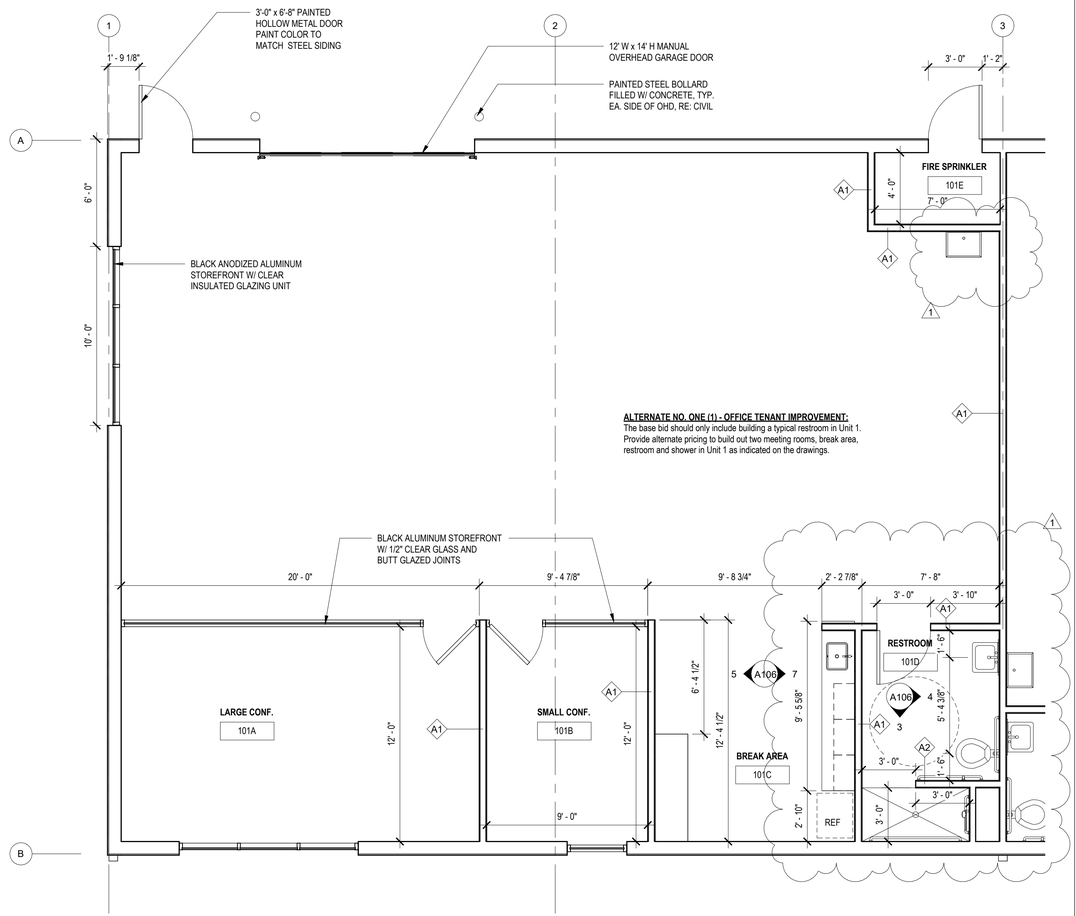
4 ELEVATION - RESTROOM EAST
1/4" = 1'-0"



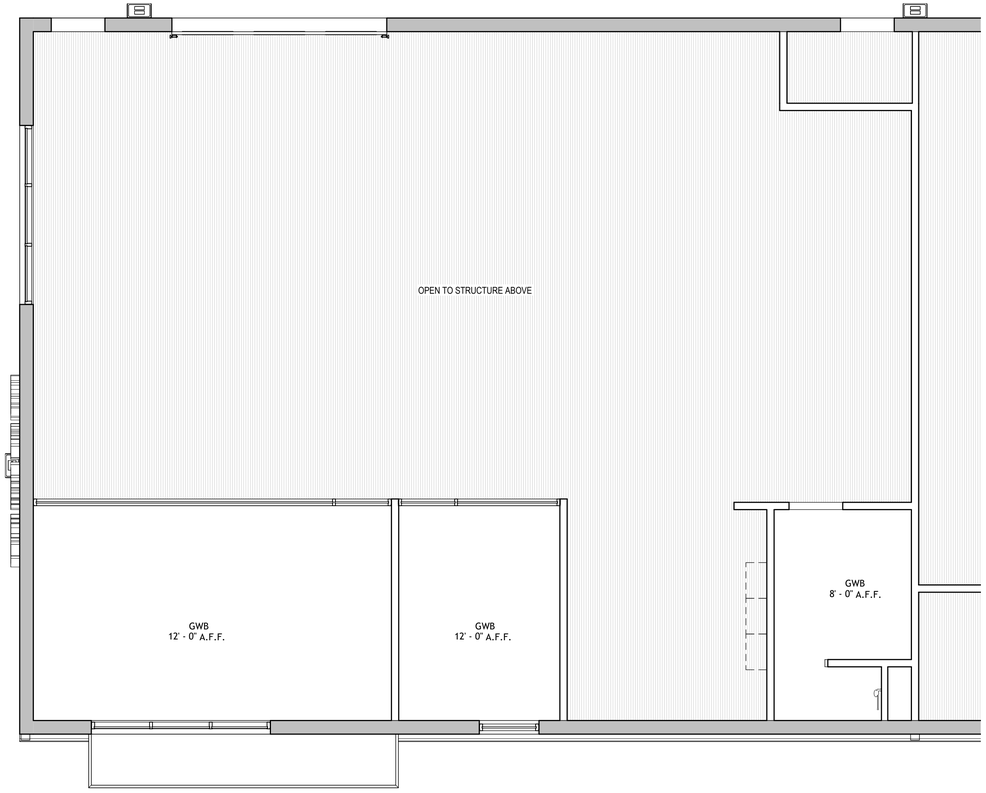
7 ELEVATION - BREAK AREA EAST
1/4" = 1'-0"



5 ELEVATION - BREAK AREA WEST
1/4" = 1'-0"



1 ENLARGED OFFICE PLAN
1/4" = 1'-0"



2 OFFICE RCP
1/4" = 1'-0"

RELEASED FOR CONSTRUCTION
As Noted on Plans Review
Development Services Department
Lee's Summit, Missouri
08/20/2024

LEE'S SUMMIT FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT:
Capital Builders

CONSTRUCTION DOCUMENTS

STATE OF MISSOURI
JACOB AARON LITTRELL
NUMBER A-2011037018
ARCHITECT
06.03.24

06.03.2024

Architect License

REV.	DATE	ISSUE
1	07.15.24	Plan Review Comments

ARCHITECT:

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ENLARGED OFFICE PLAN

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A106

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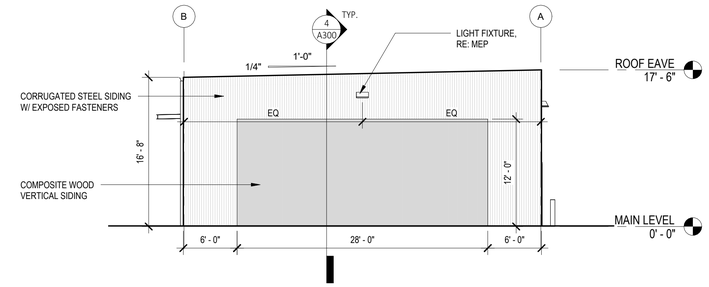
Development Services Department
Lee's Summit, Missouri
08/20/2024

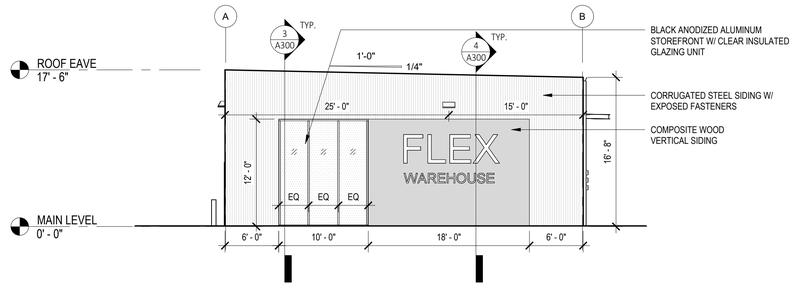
CORRUGATED STEEL SIDING: MBCI, PBC METAL WALL PANEL, MIDNIGHT BRONZE

COMPOSITE WOOD SIDING: NEWTECH WOOD, EUROPEAN SIDING, NORWEGIAN BOARD, PERUVIAN TEAK

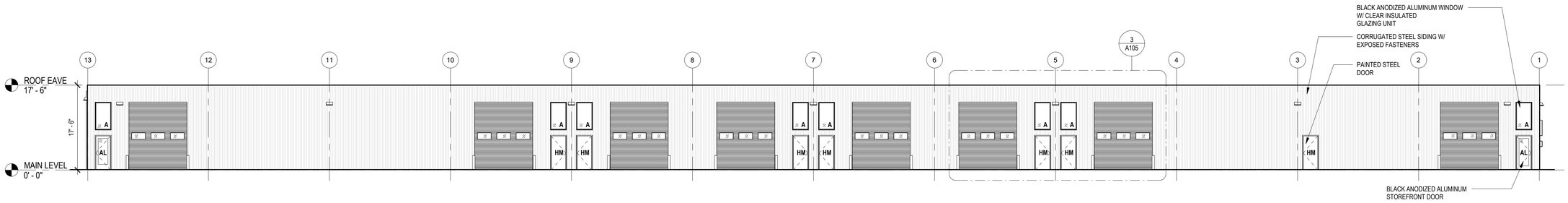
STEEL TRIM



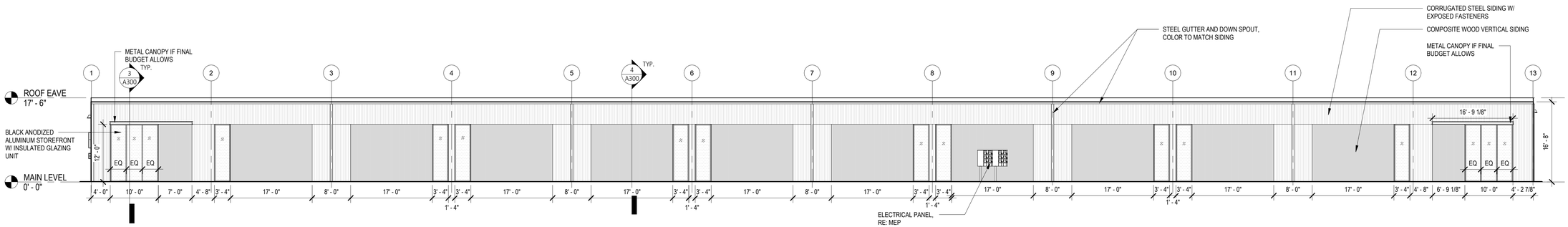
4 **ELEVATION - BUILDING A (EAST)**
1/8" = 1'-0"



3 **ELEVATION - BUILDING A (WEST)**
1/8" = 1'-0"



2 **ELEVATION - BUILDING A (NORTH)**
3/32" = 1'-0"



1 **ELEVATION - BUILDING A (SOUTH)**
3/32" = 1'-0"

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LEE'S SUMMIT FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

client: Capital Builders

CONSTRUCTION DOCUMENTS

STATE OF MISSOURI
JACOB AARON LITTRELL
NUMBER A-2011037018
ARCHITECT
06.03.24

06.03.2024

Architect: License: –

REV.	DATE	ISSUE

ARCHITECT:

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ELEVATIONS - BUILDING A

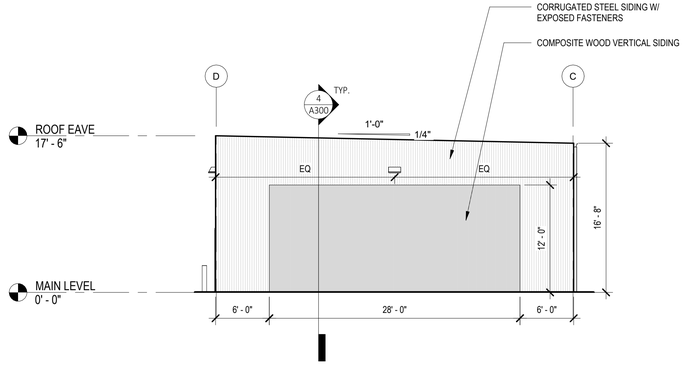
Sheet: A201

Revision no.

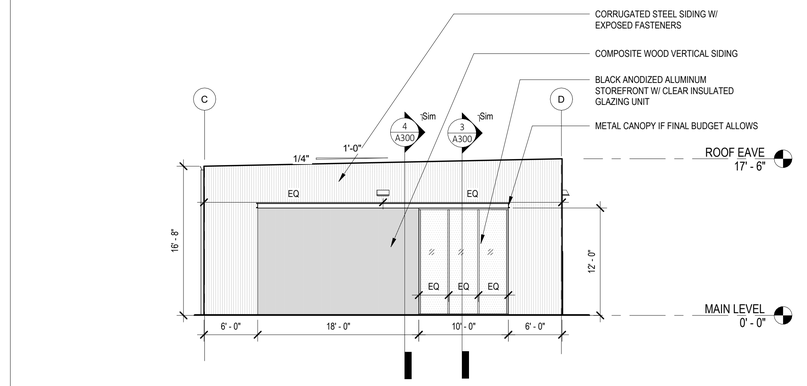
CORRUGATED STEEL SIDING: MBCI, PBC METAL WALL PANEL, MIDNIGHT BRONZE

COMPOSITE WOOD SIDING: NEWTECH WOOD, EUROPEAN SIDING, NORWEGIAN BOARD, PERUVIAN TEAK

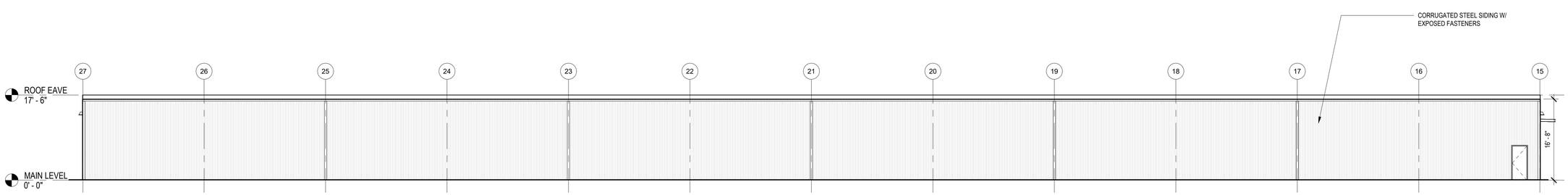
STEEL TRIM



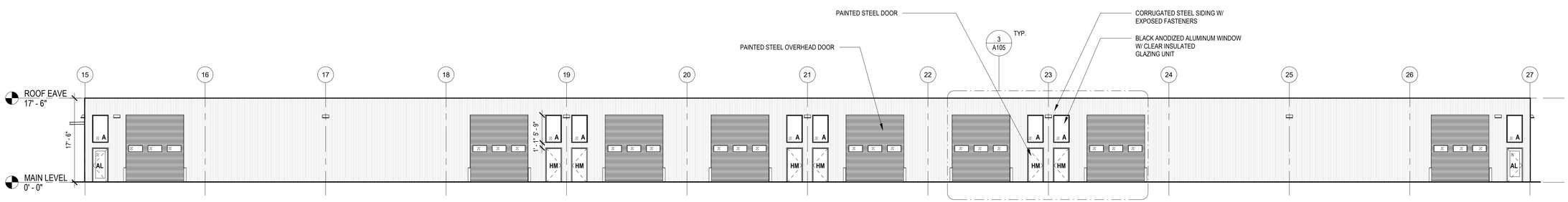
4 **ELEVATION - BUILDING B (EAST)**
1/8" = 1'-0"



3 **ELEVATION - BUILDING B (WEST)**
1/8" = 1'-0"



2 **ELEVATION - BUILDING B (NORTH)**
3/32" = 1'-0"



1 **ELEVATION - BUILDING B (SOUTH)**
3/32" = 1'-0"

LEE'S SUMMIT FLEX SPACES

60 SE Thompson Dr.
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CONSTRUCTION DOCUMENTS

STATE OF MISSOURI
JACOB AARON LITTRELL
NUMBER A-2011037018
ARCHITECT
06.03.24

06.03.2024

Architect: _____
License: _____

REV.	DATE	ISSUE

ARCHITECT:

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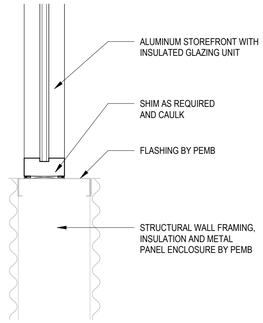
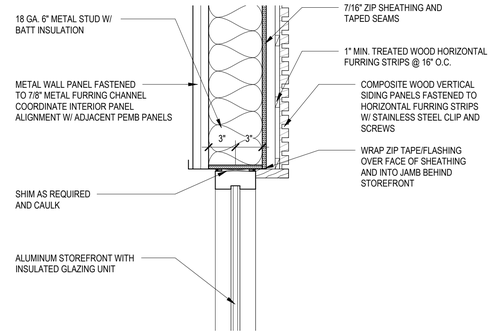
ELEVATIONS - BUILDING B

Sheet: A202

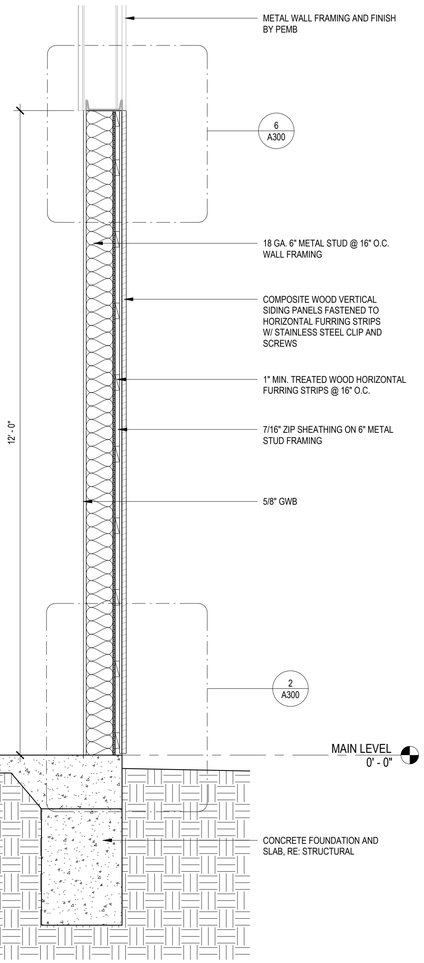
Revision no.



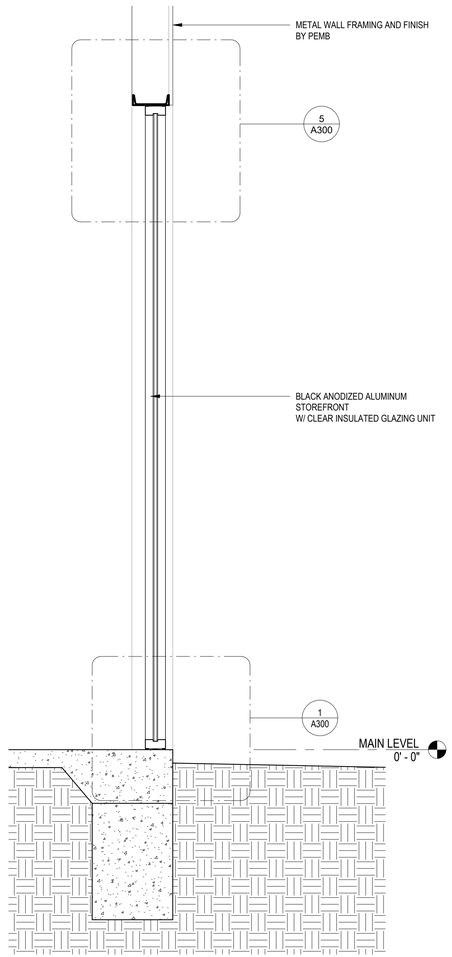
8 **DETAIL - STOREFRONT/METAL SIDING JAMB**
1 1/2" = 1'-0"



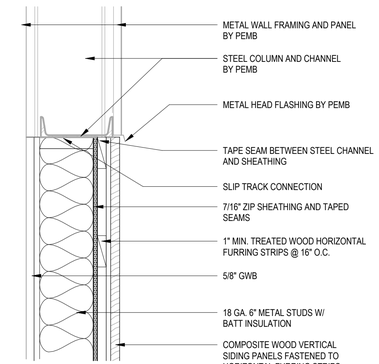
7 **DETAIL - STOREFRONT/WOOD SIDING JAMB**
1 1/2" = 1'-0"



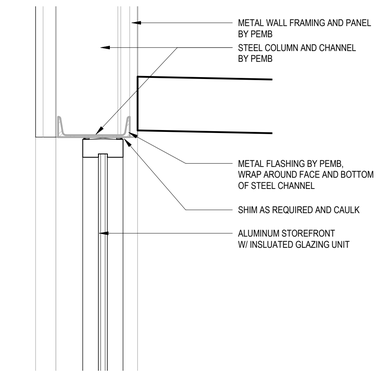
4 **WALL SECTION @ WOOD SIDING**
3/4" = 1'-0"



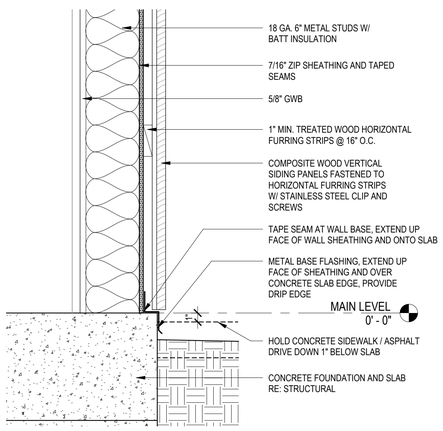
3 **DETAIL @ STOREFRONT GLASS1**
3/4" = 1'-0"



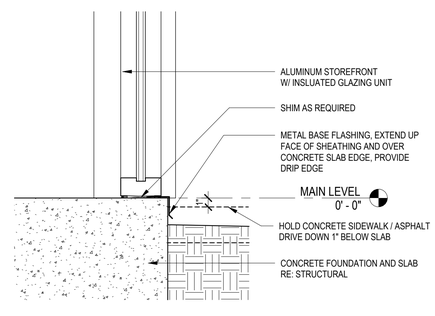
6 **DETAIL @ WOOD SIDING HEAD**
1 1/2" = 1'-0"



5 **DETAIL @ STOREFRONT GLASS**
1 1/2" = 1'-0"



2 **DETAIL @ WOOD SIDING BASE**
1 1/2" = 1'-0"



1 **DETAIL @ STOREFRONT GLASS SILL**
1 1/2" = 1'-0"

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Development Services Department
Lee's Summit, Missouri
08/20/2024

LEE'S SUMMIT FLEX SPACES

600 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: Capital Builders

CONSTRUCTION DOCUMENTS

STATE OF MISSOURI
JACOB AARON LITTRELL
NUMBER A-2011037018
ARCHITECT
06.03.24

06.03.2024

Architect: License:

REV.	DATE	ISSUE

ARCHITECT:

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WALL SECTIONS / DETAILS

Sheet: A300

Revision no.

GENERAL INFORMATION

1. THE STRUCTURAL DRAWINGS AND SPECIFICATIONS ARE PROTECTED BY U.S.A. COPYRIGHT LAWS. THESE STRUCTURAL DRAWINGS SHALL NOT BE USED FOR ANY PURPOSE OTHER THAN THE CONSTRUCTION OF THE STRUCTURE FOR THE BUILDING DESCRIBED IN THE ARCHITECTURAL DRAWINGS AT THE GEOGRAPHIC LOCATION SHOWN. THE DESIGN OF THE STRUCTURE REPRESENTED BY THESE DOCUMENTS IS NOT VALID FOR ANY OTHER GEOGRAPHIC LOCATION, PURPOSE OR USE.

2. THE STRUCTURAL GENERAL NOTES SHOWN ON THESE SHEET(S) SHALL APPLY TO ALL STRUCTURAL DRAWINGS UNLESS SPECIFICALLY SHOWN OR NOTED OTHERWISE.

3. THE DETAILS IN THESE STRUCTURAL DRAWINGS DESIGNATED AS "TYPICAL DETAILS", WHICH MAY OR MAY NOT BE SPECIFICALLY REFERENCED, ARE APPLICABLE TO THE CONSTRUCTION IN ALL LOCATIONS WHERE CONDITIONS ARE SIMILAR TO THOSE DESCRIBED IN THE TYPICAL DETAILS.

4. THE STRUCTURAL DRAWINGS SHALL NOT BE VIEWED AS STAND ALONE DRAWINGS WITH RESPECT TO PROJECT DIMENSIONS OR ANY OTHER COMPONENT OF THE CONSTRUCTION THAT CAN AND MAY BE IDENTIFIED IN OTHER PARTS OF THE CONTRACT DOCUMENTS.

5. IN CASE OF A CONFLICT BETWEEN THE GENERAL NOTES AND THE SPECIFICATIONS, CONSULT THE STRUCTURAL ENGINEER FOR CLARIFICATION PRIOR TO WORK.

6. THE STRUCTURAL DRAWINGS SHALL NOT BE VIEWED AS DETAILED SHOP OR ERECTION DRAWINGS.

7. THE STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. UNLESS SO STATED OR NOTED, THEY DO NOT INDICATE COMPONENTS THAT ARE NECESSARY FOR SUPPORTING AND STABILIZING THE WORK DURING CONSTRUCTION OR THE MEANS AND METHODS OF CONSTRUCTION, ALL OF WHICH ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE ADEQUATE SHORING OR BRACING WHERE THE STRUCTURE HAS NOT YET OBTAINED THE FINAL REQUIRED DESIGN STRENGTH.

8. ELEVATIONS PROVIDED IN THE STRUCTURAL DRAWINGS ARE RELATIVE ELEVATIONS AND ARE NOT INTENDED TO ESTABLISH THE ACTUAL SEA LEVEL ELEVATION OF ANY PORTION OF THE STRUCTURE. REFER TO THE ARCHITECTURAL AND CIVIL DRAWINGS FOR ACTUAL SEA LEVEL ELEVATIONS OF VARIOUS ELEMENTS OF THE BUILDING.

9. THE LOCATION AND DIMENSIONS OF ALL OPENINGS, DEPRESSIONS, RECESSES, SLOPES, BLOCKOUTS, CURBS, AND EMBEDMENTS SHOWN IN THE STRUCTURAL DRAWINGS WHICH ARE RELATED TO PURPOSES DEPICTED IN CONTRACT DOCUMENTS OTHER THAN THE STRUCTURAL DRAWINGS OR BY MANUFACTURERS AND INSTALLERS OF VARIOUS EQUIPMENT AND FINISHES SHALL BE VERIFIED BY THE CONTRACTOR TO BE SUITABLE FOR THE PURPOSES DEPICTED BY THE CONTRACT DOCUMENTS REQUIRING SUCH ITEMS OR TO BE SUITABLE FOR THE INSTALLATION OF VARIOUS EQUIPMENT AND FINISHES. ANY REQUIREMENT FOR RELOCATION OR CHANGE IN DIMENSIONS OF ANY OPENING, DEPRESSION, RECESS, SLOPE, BLOCKOUT, OR EMBEDMENT SHALL BE SUBMITTED TO THE ARCHITECT AND ENGINEER IN DRAWING FORM PRIOR TO THE FABRICATION OF MATERIALS OR CONSTRUCTION.

10. VARIOUS OPENINGS, DEPRESSIONS, RECESSES, SLOPES, BLOCKOUTS, CURBS, AND EMBEDMENTS NOT SHOWN IN THE STRUCTURAL DRAWINGS MAY BE REQUIRED IN THE STRUCTURE FOR PURPOSES DEPICTED IN CONTRACT DOCUMENTS OTHER THAN THE STRUCTURAL DRAWINGS OR BY THE MANUFACTURERS AND INSTALLERS OF VARIOUS EQUIPMENT AND FINISHES. THE CONTRACTOR SHALL INCORPORATE AND COORDINATE THE LOCATION AND DIMENSIONS OF ANY OPENING, DEPRESSION, RECESS, SLOPE, BLOCKOUT, OR EMBEDMENT INTO THE STRUCTURE AS REQUIRED TO BE SUITABLE FOR THE PURPOSES DEPICTED BY THE CONTRACT DOCUMENTS REQUIRING SUCH ITEMS OR TO BE SUITABLE FOR THE INSTALLATION OF VARIOUS EQUIPMENT AND FINISHES. THE SUITABLE LOCATION AND DIMENSIONS OF ALL OPENINGS, DEPRESSIONS, RECESSES, SLOPES, BLOCKOUTS, AND EMBEDMENTS SHALL BE SUBMITTED TO THE ARCHITECT AND ENGINEER IN DRAWING FORM PRIOR TO THE FABRICATION OF MATERIALS OR CONSTRUCTION.

11. THE DRAWINGS IN THE STRUCTURAL DOCUMENTS SHALL NOT BE SCALED FOR ANY PURPOSE, INCLUDING THE DETERMINATION OF QUANTITIES AND THE FIT UP OF MATERIALS.

12. THE CONTRACTOR SHALL INSPECT THE SITE DURING CLEARING AND EARTHWORK OPERATIONS FOR EXISTING FOUNDATION, UTILITIES, ETC. IF ANY UNKNOWN ITEMS ARE FOUND AND ALTER THE STRUCTURAL DRAWINGS, THE STRUCTURAL ENGINEER SHALL BE NOTIFIED IMMEDIATELY.

13. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO STARTING CONSTRUCTION. THE STRUCTURAL ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES.

14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE BUILDING DURING CONSTRUCTION, INCLUDING ALL SHORING, ERECTION, BRACING, ETC.; AND ALL JOB SITE SAFETY.

PRIMARY BUILDING CODES AND SPECIFICATIONS

1. GENERAL BUILDING CODES (LATEST EDITION UNO):
   A. 2018 INTERNATIONAL BUILDING CODE (IBC)
   B. 2016 AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) / STRUCTURAL ENGINEERING INSTITUTE (SEI) MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES (ASCE/SEI 7-16)

2. CONCRETE CODES (LATEST EDITION UNO):
   A. 2014 AMERICAN CONCRETE INSTITUTE (ACI) BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318-14)
   B. 2010 AMERICAN CONCRETE INSTITUTE SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS (ACI 301)

3. STEEL CODES (LATEST EDITION UNO):
   A. 2016 AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS (AISC 360-16)
   B. 2016 AMERICAN IRON AND STEEL INSTITUTE (AISI)
   C. 2017 AMERICAN WELDING SOCIETY (AWS) STRUCTURAL WELDING CODE (D1.4)

4. 2018 METAL BUILDING MANUFACTURER'S ASSOCIATION (MBMA) METAL BUILDING SYSTEMS MANUAL

STRUCTURAL DESIGN LOADS AND DESIGN DATA

1. COLLATERAL DEAD LOADS (IN ADDITION TO STRUCTURE SELF-WEIGHT)
   A. ROOF
      a. MECHANICAL, ELECTRICAL, AND PLUMBING. . . . . 5 PSF
      b. ROOF COLLATERAL . . . . . 3 PSF

2. LIVE LOADS
   A. ROOF . . . . . 20 PSF (REDUCIBLE)

3. SNOW LOAD DATA:
   A. GROUND SNOW LOAD, P_g . . . . . 20 PSF
   B. FLAT-ROOF SNOW LOAD, P_f 15.4
   C. SNOW EXPOSURE FACTURE, C_e 1.0
   D. SNOW LOAD IMORTANCE FACTOR, I_s 1.0
   E. THERMAL FACTOR, C_t 1.1

4. WIND LOAD DATA:
   A. RISK CATEGORY. II
   B. ULTIMATE DESIGN WIND SPEED, V_{ult} . . . . . 109 MPH
   C. NOMINAL DESIGN WIND SPEED, V_{asd} . . . . . 84.4 MPH
   D. WIND EXPOSURE CATEGORY C
   E. INTERNAL PRESSURE COEFFICIENT, GC_{pi} . . . . . ±0.55 (PARTIALLY ENCLOSED)

5. EARTHQUAKE LOAD DATA:
   A. RISK CATEGORY. II
   B. SEISMIC IMPORTANCE FACTOR, I_e 1.0
   C. MAPPED SPECTRAL RESPONSE ACCELERATION PARAMETERS
      a. S_S 0.1
      b. S_1 . . . . . 0.068
   D. SITE CLASS C
   E. DESIGN SPECTRAL RESPONSE ACCELERATION PARAMETERS
      a. S_{DS}. 0.087
      b. S_{D1}. 0.068
   F. SEISMIC DESIGN CATEGORY . . . . . B
   G. SEISMIC FORCE RESISTING SYSTEM . . . . . STRUCTURAL STEEL SYSTEMS NOT SPECIFICALLY DETAILED FOR SEISMIC RESISTANCE
   H. RESPONSE MODIFICATION COEFFICIENT, R 3.0
   I. SEISMIC FORCE RESISTING COEFFICIENT, C_s 0.029
   J. DESIGN BASE SHEAR, V 0.029*W
   K. ANALYSIS PROCEDURE USED . . . . . EQUIVALENT LATERAL FORCE ANALYSIS

6. RAIN LOADING
   A. 15-MINUTE. . . . . 7.48 IN/H
   B. 60-MINUTE. . . . . 3.5 IN/H

EXISTING CONDITIONS

1. IMMEDIATELY SUBMIT ANY MODIFICATIONS TO PLANS AND SPECIFICATIONS THAT ARE NECESSARY AS A RESULT OF FIELD VERIFICATIONS PERFORMED BY CONTRACTOR TO ARCHITECT FOR APPROVAL. UPON APPROVAL, INCORPORATE THESE MODIFICATIONS INTO SHOP DRAWINGS PRIOR TO SUBMITTING THEM TO ARCHITECT.

2. PERFORM DRILLING INTO EXISTING CONCRETE IN A MANNER WHICH AVOIDS DAMAGE TO EXISTING REINFORCEMENT. USE BAR DETECTION METHODS TO LOCATE REINFORCEMENT PRIOR TO DRILLING.

3. THOROUGHLY CLEAN FACE OF ALL CONCRETE SURFACES CUT FROM EXISTING CONCRETE. ALLOW SURFACE TO COMPLETELY DRY, COAT WITH AN APPROVED BONDING AGENT AND FINISH WITH AN APPROVED PATCHING COMPOUND. CUT EXPOSED REINFORCEMENT, GRIND FLUSH TO NEW CONCRETE SURFACE AND FINISH WITH AN EPOXY PAINT.

4. WHERE EXISTING CONCRETE REINFORCEMENT IS TO BE REUSED IN PLACE, REMOVE CONCRETE IN A MANNER WHICH MINIMIZES DAMAGE TO REINFORCEMENT. REPLACE DAMAGED REINFORCEMENT BY A METHOD APPROVED BY ARCHITECT.

GEOTECHNICAL REPORT

1. FOUNDATION DESIGN IS BASED ON THE SUBSURFACE INFORMATION AND RECOMMENDATIONS PROVIDED IN THE FOLLOWING GEOTECHNICAL INVESTIGATION REPORT PREPARED BY ALPHA-OMEGA GEOTECH, INC:
   A. REPORT TITLE . . . . . GEOTECHNICAL ENGINEERING REPORT
   B. REPORT LOCATION . . . . . 60 SE THOMPSON ROAD LEE'S SUMMIT, MISSOURI
   C. REPORT NUMBER . . . . . AOG 230271 E
   D. REPORT DATE . . . . . APRIL 7, 2023

2. THE PROJECT GEOTECHNICAL REPORT REFERENCED HEREIN IS NOT PART OF THE STRUCTURAL DOCUMENTS. HOWEVER, A COPY SHALL BE OBTAINED FOR REFERENCE DURING INSTALLATION OF FOUNDATIONS AND SUBGRADE PREPARATION.

DEFERRED STRUCTURAL SUBMITTALS

1. THE FOLLOWING DEFERRED STRUCTURAL SUBMITTALS SHALL BE SUBMITTED TO THE ARCHITECT-OF-RECORD AND STRUCTURAL ENGINEER-OF-RECORD FOR REVIEW AND APPROVAL:
   A. PRE-FABRICATED STEEL STAIRS, HANDRAILS, AND GUARDS
   B. PRE-ENGINEERED METAL BUILDING

2. DEFERRED STRUCTURAL SUBMITTALS SHALL BE SIGNED AND SEALED BY A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF MISSOURI.

3. DEFERRED STRUCTURAL SUBMITTALS SHALL BE SUBMITTED TO THE BUILDING OFFICIAL BY THE CONTRACTOR FOR REVIEW AND APPROVAL AFTER THEY HAVE BEEN REVIEWED AND APPROVED BY THE ARCHITECT-OF-RECORD AND STRUCTURAL ENGINEER-OF-RECORD.

4. DEFERRED STRUCTURAL SUBMITTAL ITEMS SHALL NOT BE FABRICATED OR INSTALLED UNTIL THEY HAVE BEEN REVIEWED AND APPROVED BY THE ARCHITECT-OF-RECORD, STRUCTURAL ENGINEER-OF-RECORD, AND BUILDING OFFICIAL.

CONCRETE MIXES

1. ALL CONCRETE CONSTRUCTION SHALL CONFORM TO THE LATEST EDITIONS OF THE BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, ACI 318, ACI 301, AND AS NOTED ON THE STRUCTURAL DRAWINGS AND SPECIFICATIONS.

2. ALL CONCRETE MIXES SHALL BE DESIGNED BY QUALIFIED TESTING LABORATORIES WITH PROPER DATES AND APPROVED STAMPS FOR THE PROJECT FOR WHICH THESE DRAWINGS WERE DESIGNED.

3. CONCRETE SHALL CONSIST OF THE FOLLOWING PROPERTIES:
   A. FOOTINGS
      a. MIN 28-DAY STRENGTH, f'c. . . . . 4,000 PSI
      b. MAX WATER-TO-CEMENT RATIO. 0.5
      c. MAX AGGREGATE SIZE. . . . . 1"
      d. TARGET AIR CONTENT. 6%
      e. SLUMP. . . . . 3" - 5"
   B. SLAB-ON-GRADE
      a. MIN 28-DAY STRENGTH, f'c. . . . . 4,000 PSI
      b. MAX WATER-TO-CEMENT RATIO. 0.50
      c. MAX AGGREGATE SIZE. . . . . 3/4"
      d. SLUMP. . . . . 3" - 5"

4. FINE AND COARSE AGGREGATES SHALL CONFORM TO C33 REQUIREMENTS AND TESTING PROCEDURES.

5. SLUMP SPECIFIED IS THE PLACEMENT SLUMP. WORKABILITY ADMIXTURES MAY BE REQUIRED TO ACHIEVE THE REQUIRED PLACEMENT SLUMP.

6. CONCRETE MIXING OPERATIONS, DELIVERY, ETC SHALL CONFORM TO ASTM C94.

7. CONCRETE MEASURING, MIXING, TRANSPORTING, AND PLACEMENT SHALL CONFORM WITH ACI 304.

8. CEMENT SHALL BE TYPE I OR TYPE II (ASTM C 150).

9. SECURELY POSITION ALL REINFORCING BARS, ANCHOR RODS, AND CONCRETE INSERT ITEMS PRIOR TO PLACING CONCRETE.

10. TARGET AIR CONTENT LISTED IS PLUS/MINUS 1.5%.

11. DO NOT AIR-ENTRAIN INTERIOR FLOOR SLAB THAT RECEIVE HARD TROWEL FINISH.

CONCRETE REINFORCING

1. PROVIDE SUITABLE WIRE SPACERS, CHAIRS, TIES, ETC FOR SUPPORTING REINFORCING STEEL IN THE PROPER POSITION WHILE PLACING CONCRETE.

2. REINFORCING SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615, GRADE 60.

3. FABRICATION OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH THE DETAILS OF ACI 315, "DETAILING OF CONCRETE REINFORCEMENT".

4. UNLESS OTHERWISE NOTED, LAP SPLICED OR EMBEDMENT LENGTHS SHALL CONFORM TO THE FOLLOWING AND ARE BASED ON MINIMUM CONCRETE COVER OF 1 1/2" AND AN AGGREGATE SIZE OF 1" MAXIMUM.

BAR SIZE	TOP BARS*	OTHER
#4	3'-3"	2'-6"
#5	4'-1"	3'-1"
#6	4'-10"	3'-9"
#7	8'-10"	6'-9"
#8	10'-1"	7'-9"
#9	11'-4"	8'-9"

* TOP BARS ARE HORIZONTAL BARS WITH MORE THAN TWELVE INCHES (12") OF CONCRETE CAST BELOW BARS

5. UNLESS NOTED OTHERWISE, PROVIDE CONCRETE COVER FOR CAST-IN-PLACE NON-PRESTRESSED STRUCTURAL BUILDING ELEMENTS AS NOTED BELOW:
   A. FOOTINGS
      a. BOTTOM . . . . . 3"
      b. SIDE . . . . . 3"
      c. TOP . . . . . 2"
   B. SLAB-ON-GRADE
      a. SIDE. . . . . 2"
      b. TOP . . . . . 1-1/2"
   C. WALL
      a. SIDE. . . . . 1-1/2"
      b. TOP . . . . . 2"

6. UNLESS OTHERWISE NOTED ON DRAWINGS, CONCRETE COVER OVER PRIMARY REINFORCEMENT, TIES, STIRRUPS, AND SPIRALS SHALL COMPLY WITH LISTED VALUES. COVER SHALL COMPLY WITH REQUIREMENTS OF ACI 318 FOR ELEMENTS NOT DESCRIBED.

CONCRETE FOOTING FOUNDATIONS

1. CONVENTIONAL SHALLOW CAST-IN-PLACE CONCRETE FOOTING FOUNDATIONS HAVE BEEN DESIGNED UTILIZING AN ALLOWABLE SOIL BEARING CAPACITY OF 2,000 PSF AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER-OF-RECORD.

2. FOOTINGS SHALL BEAR AT A MINIMUM OF 3.0 FEET BELOW FINISHED GRADE, OR DEEPER WHERE SHOWN ON THE DRAWINGS, ON UNDISTURBED, INORGANIC SOIL OR ENGINEERED FILL AS DESCRIBED IN THE EARTHWORK RECOMMENDATIONS SECTION OF THE GEOTECHNICAL REPORT.

3. PREPARE SUBGRADE FOR FOOTINGS AS OUTLINED IN THE GEOTECHNICAL REPORT.

4. FOOTING EXCAVATIONS SHALL BE INSPECTED AND APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACING CONCRETE AND REINFORCING, IN ORDER TO ASSURE THAT THE BEARING SURFACES ARE CONSISTENT WITH DESIGN RECOMMENDATIONS.

5. ALL BEARING SURFACES SHALL BE FREE OF SOFT OR LOOSE SOIL PRIOR TO PLACING CONCRETE.

6. CONCRETE SHALL BE PLACED THE SAME DAY THE EXCAVATIONS ARE COMPLETED AND BEARING MATERIALS VERIFIED BY THE GEOTECHNICAL ENGINEER-OF-RECORD. IF THE EXCAVATIONS ARE LEFT OPEN FOR AN EXTENDED PERIOD, OR IF THE BEARING SURFACES ARE DISTURBED AFTER THE INITIAL OBSERVATION, THEN THE BEARING SURFACES SHALL BE REEVALUATED PRIOR TO CONCRETE PLACEMENT.

7. WATER SHALL NOT BE ALLOWED TO POND IN FOUNDATION EXCAVATIONS PRIOR TO CONCRETE PLACEMENT OR ABOVE THE CONCRETE AFTER THE FOUNDATION IS COMPLETED.

8. WHEREVER POSSIBLE, THE FOUNDATION CONCRETE SHALL BE PLACED "NEAT", USING THE SIDES OF THE EXCAVATIONS AS FORMS. WHERE THIS IS NOT POSSIBLE, THE EXCAVATIONS CREATED BY FORMING THE FOUNDATIONS SHALL BE BACKFILLED WITH SUITABLE STRUCTURAL FILL AND PROPERLY COMPACTED.

9. PROVIDE PROPER SHORING FOR STRUCTURAL STABILITY AND SAFETY FOR EARTH RETENTION OF EARTH BANKS AND EXISTING STRUCTURES.

10. THE BUILDING PAD SHALL BE SLOPED TO DRAIN AWAY FROM THE BUILDING FOUNDATIONS.

11. ROOF DRAINS SHALL BE ROUTED AWAY FROM THE FOUNDATION SOILS.

12. NO PIPES OR CONDUITS SHALL PASS THROUGH CONCRETE FOOTINGS, UNO.

CONCRETE SLAB-ON-GRADE FLOORS

1. SUBGRADE BELOW BUILDING SLAB-ON-GRADE FLOORS SHALL BE PREPARED AS DESCRIBED IN THE GEOTECHNICAL REPORT.

2. SUBGRADE SOILS SHALL NOT BE DISTURBED BETWEEN INITIAL SITE GRADING AND SLAB-ON-GRADE CONSTRUCTION.

3. UNDER ALL BUILDING SLAB-ON-GRADE FLOORS, PLACE A MINIMUM 4" THICK GRAVEL MATERIAL BASE AS DEFINED IN THE GEOTECHNICAL REPORT, UNLESS OTHERWISE NOTED. THE SUBGRADE SOIL DIRECTLY BELOW THE GRAVEL MATERIAL BASE COURSE SHALL BE PREPARED AS SPECIFIED IN THE GEOTECHNICAL REPORT.

4. A MINIMUM 15-MIL THICK VAPOR RETARDER MEETING ASTM E 1745, CLASS C REQUIREMENTS SHALL BE PLACED DIRECTLY BELOW SLAB-ON-GRADE FLOORS. REFER TO ARCHITECTURAL DRAWINGS AND/OR SPECIFICATIONS FOR ADDITIONAL VAPOR RETARDER REQUIREMENTS.

5. SLAB CONTROL JOINTS SHALL BE PROVIDED, EACH WAY, AT A SPACING 24 TO 36 TIMES THE SLAB THICKNESS, BUT NO MORE THAN 15 FEET. REFER TO TYPICAL SLAB CONTROL JOINT DETAIL FOR ADDITIONAL INFORMATION.

ANCHOR RODS

1. UNLESS OTHERWISE NOTED, ANCHOR RODS SHALL MEET THE REQUIREMENTS OF ASTM F1554, GRADE 36.

2. ALL ANCHOR RODS SHALL BE FURNISHED WITH HEX NUTS AND WASHERS.

3. NUTS OR STEEL SHIMS SHALL BE PLACED BENEATH BASE PLATES FOR LEVELING PURPOSES.

4. SEE TYPICAL DETAILS FOR ANCHOR ROD DETAIL.

PRE-ENGINEERED METAL BUILDING

1. THE BUILDING SHALL BE A MANUFACTURER'S STANDARD PREFABRICATED METAL STRUCTURE OF THE APPROXIMATE INSIDE AREA SHOWN, EXCEPT AS NOTED. RIGID FRAMES SHALL BE SPACED AS SHOWN ON THE PLANS, BUT OVERALL DIMENSIONS AND CONSTRUCTION DETAILS MAY VARY TO SUIT MANUFACTURER'S STANDARD DESIGN. MINIMUM WEB THICKNESS OF RIGID FRAMES SHALL BE 3/16".

2. THE BUILDING SHALL BE DESIGNED AND FABRICATED ACCORDING TO AISC, MBMA AND AISI LATEST SPECIFICATIONS. THE DIMENSIONAL TOLERANCES OUTLINED IN THE AWS CODE UNDER WORKMANSHIP AND THE TOLERANCES APPLICABLE TO ROLL FORM STEEL UNDER THE AISC "STANDARD MILL PRACTICE" SECTION SHALL BE REQUIRED IN THE FABRICATION OF THE STEEL BUILDING FRAMES.

3. THE PURLINS AND BUILDING FRAMES SHALL BE DESIGNED TO LIMIT DEFLECTIONS TO THE DEFLECTION CRITERIA STATED BELOW.

4. A COMPLETE DESIGN ANALYSIS SHOWING ALL CALCULATIONS FOR THE RIGID FRAMES, PORTAL FRAMES, GIRTS, PURLINS AND X-BRACING FOR LATERAL LOADS AND LAYOUT OF ANCHOR BOLTS AND OTHER EMBEDDED ITEMS SHALL BE SUBMITTED FOR APPROVAL WITH THE SHOP DRAWINGS. SHOP DRAWINGS SHALL INCLUDE DETAILS OF ALL MAIN MEMBERS, TYPICAL CONNECTIONS (SHOWING BOLT HOLES AND WELDS), AND ERECTION DRAWINGS. THE SHOP DRAWINGS AND CALCULATIONS MUST BEAR THE SEAL OF A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF MISSOURI. APPLY SUPERIMPOSED COLLATERAL ROOF DEAD LOADS ACCORDING TO THE "STRUCTURAL DESIGN LOADS AND DATA" SECTION OF THE GENERAL NOTES.

5. THE BUILDING SHALL BE DESIGNED TO SUPPORT ALL MECHANICAL EQUIPMENT INCLUDING HEATERS, SPRINKLERS, EXHAUST SYSTEMS, SERVICE EQUIPMENT, AND ALL OTHER SUCH DEVICES. ADDITIONAL GIRTS OR PURLINS SHALL BE PLACED IN CONVENIENT LOCATIONS FOR ATTACHMENT OF ALL MECHANICAL EQUIPMENT.

6. COMBINATION DESIGN LOAD CONDITIONS SHOULD COMPLY WITH MBMA SPECIFICATIONS.

7. ALL COLUMN REACTIONS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD PRIOR TO FABRICATION.

8. THE PRE-ENGINEERED BUILDING COLUMNS SHALL HAVE PINNED BASES AND SHALL TRANSFER NO MOMENTS TO THE FOUNDATIONS.

9. DEFLECTION CRITERIA:
   A. DRIFT LIMITS FOR WIND LOAD. . . . . H/200 FOR 10-YEAR MRI AT SERVICE LEVEL
   B. DRIFT LIMIT SEISMIC 0.020H
   C. HORIZONTAL DEFLECTION LIMITS FOR GIRTS
      a. SUPPORTING MASONRY L/600
      b. SUPPORTING GYPSUM BOARD L/240
      c. SUPPORTING METAL PANELS L/180
   D. VERTICAL DEFLECTION LIMITS
      a. ROOF MEMBER SUPPORTING NON-PLASTERED CEILING . . . . . L/240 LL; L/180 DL + LL
      b. ROOF MEMBER SUPPORTING ALL OTHER OR NO FINISH . . . . . L/180 LL; L/120 DL + LL

10. ALL LOADS SHALL BE CALCULATED BASED UPON THE INFORMATION GIVEN IN THE "DESIGN LOADS AND DESIGN DATA" SECTION OF THE GENERAL NOTES.

11. PROVIDE Z-PURLINS WITH LIGHT GAUGE STRAP BRIDGING FOR PURLIN STRESS REVERSAL DURING WIND UPLIFT LOADING (SUPERIMPOSED DEAD LOAD NOT APPLIED FOR THIS CASE).

12. CONTRACTOR SHALL SUBMIT FINAL FOUNDATION REACTIONS FROM PEMB SUPPLIER TO THE STRUCTURAL ENGINEER-OF-RECORD FOR FOUNDATION DESIGN VERIFICATION PRIOR TO THE START OF FOUNDATION CONSTRUCTION. NO FOUNDATION CONSTRUCTION SHALL COMMENCE UNTIL THE PEMB FOUNDATION REACTIONS HAVE BEEN REVIEWED BY THE STRUCTURAL ENGINEER-OF-RECORD.

13. THE PRE-ENGINEERED METAL BUILDING (PEMB) IS TO BE DESIGNED, PROVIDED AND INSTALLED BY THE GENERAL CONTRACTOR AND/OR THE PEMB SUBCONTRACTOR. MANUFACTURER, SUPPLIER, AND/OR INSTALLER. THE PEMB INCLUDES (BUT IS NOT LIMITED TO) MAIN STRUCTURAL FRAME MEMBERS, PORTAL FRAME MEMBERS, WALL GIRTS, ROOF PURLINS, EAVE/RAKE GIRTS, EXTERIOR CANOPIES, EXTERIOR WALL OPENING SUPPORTS FOR HEAD, JAMB AND SILL CONDITIONS.

STRUCTURAL SHEET INDEX

FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: CAPITAL BUILDERS

CONSTRUCTION/ PERMIT DRAWINGS

06.03.2024

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STATE OF MISSOURI
IAN G. BABCOCK
NUMBER PE-2024007471
PROFESSIONAL ENGINEER
6/03/24

STRUCTURAL GENERAL NOTES

Sheet: S001

Revision no.

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STATEMENT OF SPECIAL INSPECTIONS

1. ALL REFERENCES TO INTERNATIONAL BUILDING CODE (IBC) WITHIN THIS DOCUMENT SPECIFICALLY REFER TO THE EDITION OF THE INTERNATIONAL BUILDING CODE AS SPECIFIED IN THE PRIMARY CODES AND SPECIFICATIONS SECTION OF THESE GENERAL NOTES.

2. THIS STATEMENT OF SPECIAL INSPECTIONS IS SUBMITTED IN ACCORDANCE WITH THE SPECIAL INSPECTIONS AND TESTS REQUIREMENTS LISTED IN SECTION 1704 OF THE INTERNATIONAL BUILDING CODE. IT INCLUDES A SCHEDULE OF SPECIAL INSPECTIONS AND TESTS APPLICABLE TO THIS PROJECT. IF APPLICABLE, IT ALSO INCLUDES REQUIREMENTS FOR SEISMIC RESISTANCE AND/OR REQUIREMENTS FOR WIND RESISTANCE.

3. SPECIAL INSPECTIONS AND STRUCTURAL TESTING SHALL BE PROVIDED FOR THE ITEMS IDENTIFIED IN THIS SECTION AND IN OTHER AREAS OF THE APPROVED CONSTRUCTION PLANS AND SPECIFICATIONS.

4. THE NAMES AND CREDENTIALS OF THE SPECIAL INSPECTORS TO BE USED SHALL BE SUBMITTED TO AUTHORITY HAVING JURISDICTION FOR APPROVAL.

5. DUTIES OF THE SPECIAL INSPECTOR:
   A. THE SPECIAL INSPECTOR SHALL REVIEW ALL WORK LISTED BELOW FOR CONFORMANCE WITH THE APPROVED CONSTRUCTION PLANS AND SPECIFICATIONS AND THE INTERNATIONAL BUILDING CODE.
   B. THE SPECIAL INSPECTOR SHALL FURNISH SPECIAL INSPECTION REPORTS TO THE EOR, CONTRACTOR, AUTHORITY HAVING JURISDICTION ON A WEEKLY BASIS, OR MORE FREQUENTLY AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION. ALL ITEMS NOT IN COMPLIANCE SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION, AND IF UNCORRECTED, TO THE EOR AND THE AUTHORITY HAVING JURISDICTION.
   C. ONCE CORRECTIONS HAVE BEEN MADE BY THE CONTRACTOR, THE SPECIAL INSPECTOR SHALL SUBMIT A FINAL SIGNED REPORT TO THE AUTHORITY HAVING JURISDICTION STATING THAT THE WORK REQUIRING SPECIAL INSPECTION WAS, TO THE BEST OF THE SPECIAL INSPECTOR'S KNOWLEDGE, IN CONFORMANCE WITH THE APPROVED CONSTRUCTION PLANS AND SPECIFICATIONS AS WELL AS THE APPLICABLE WORKMANSHIP PROVISIONS OF THE INTERNATIONAL BUILDING CODE.

6. DUTIES AND RESPONSIBILITIES OF THE CONTRACTOR:
   A. THE CONTRACTOR SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE AUTHORITY HAVING JURISDICTION PRIOR TO THE COMMENCEMENT OF WORK. IN ACCORDANCE WITH IBC 1704.4, THE STATEMENT OF RESPONSIBILITY SHALL CONTAIN ACKNOWLEDGEMENT OF THE SPECIAL INSPECTION REQUIREMENTS CONTAINED WITHIN THIS "STATEMENT OF SPECIAL INSPECTIONS".
   B. THE CONTRACTOR SHALL NOTIFY THE RESPONSIBLE SPECIAL INSPECTOR THAT WORK IS READY FOR INSPECTION AT LEAST ONE WORKING DAY (24 HOURS MINIMUM) BEFORE SUCH INSPECTION IS REQUIRED.
   C. ALL WORK REQUIRING SPECIAL INSPECTION SHALL REMAIN ACCESSIBLE AND EXPOSED UNTIL IT HAS BEEN OBSERVED BY THE SPECIAL INSPECTOR.

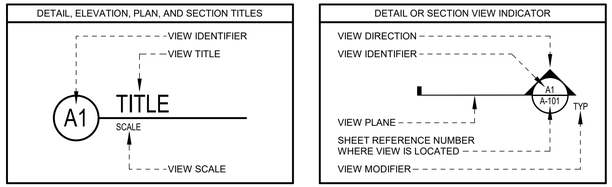
7. THE FOLLOWING TABLE TITLED "SPECIAL INSPECTIONS AND TESTS" IDENTIFIES THE MATERIALS, SYSTEMS, COMPONENTS, AND WORK REQUIRED TO HAVE SPECIAL INSPECTIONS OR TESTS BY THE BUILDING SPECIAL INSPECTOR RESPONSIBLE FOR EACH PORTION OF THE WORK. THE FREQUENCY OF EACH SPECIAL INSPECTION OR TEST SHALL BE PERFORMED IN ACCORDANCE WITH THE NOTATION USED IN THE REFERENCED STANDARD WHERE THE INSPECTIONS OR TESTS ARE DEFINED. REFER TO THE STRUCTURAL GENERAL NOTES AND PROJECTS SPECIFICATIONS FOR ADDITIONAL INSPECTION AND TESTING REQUIREMENTS. WHERE CONFLICTS OCCUR, THE MOST STRINGENT REQUIREMENT SHALL CONTROL.

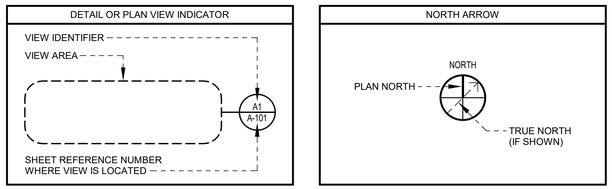
SPECIAL INSPECTIONS AND TESTS PER NOTE 1		
CHECKED IF APPLICABLE	MATERIALS, SYSTEMS, COMPONENTS AND WORK REQUIRED TO HAVE SPECIAL INSPECTIONS OR TESTS BY THE SPECIAL INSPECTOR RESPONSIBLE FOR EACH PORTION OF THE WORK	SPECIAL INSPECTIONS AND TESTS SHALL BE PREFORMED PER IBC SECTION
☐	STRUCTURAL STEEL	1705.2.1
☐	COLD-FORMED STEEL DECK	1705.2.2
☑	CONCRETE CONSTRUCTION	1705.3
☐	MASONRY CONSTRUCTION	1705.4
☑	SOILS	1705.6
☑	FABRICATED ITEMS	1705.10

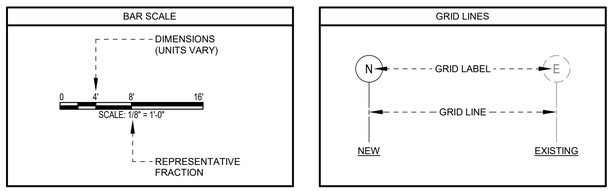
STRUCTURAL ABBREVIATIONS

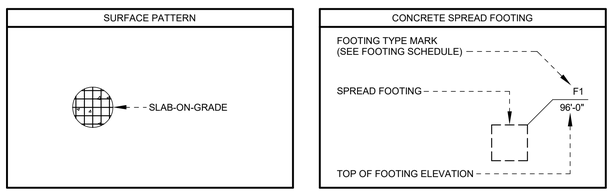
Ø	DIAMETER
AB	ANCHOR BOLT
ADDL	ADDITIONAL
AESS	ARCHITECTURAL EXPOSED STRUCTURAL STEEL
ALT	ALTERNATE
AR	ANCHOR ROD
ARCH	ARCHITECT(URAL)
BFB	BOTTOM FLANGE BRACE
BL	BUILDING LINE OR BRICK LEDGE
BP	BASE PLATE
BOD	BOTTOM-OF-DECK
BOS	BOTTOM-OF-STEEL
BOT	BOTTOM
BRG	BEARING
BTWN	BETWEEN
CFMF	COLD-FORMED METAL FRAMING
CFS	COLD-FORMED STEEL
CGS	CENTER OF GRAVITY OF STRAND
CIP	CAST-IN-PLACE
CJ	CONTROL JOINT
CJP	COMPLETE JOINT PENETRATION
CL	CENTERLINE
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONSTR	CONSTRUCTION
CONT	CONTINUOUS
DBA	DEFORMED BAR ANCHOR
DIA	DIAMETER
DIM	DIMENSION
DL	DEAD LOAD
DTL	DETAIL
DWG	DRAWING
DWL	DOWEL
EF	EACH FACE
EJ	EXPANSION JOINT
EL	ELEVATION
ENGR	ENGINEER
EOR	ENGINEER OF RECORD
EQ	EQUAL
EQL	EARTHQUAKE (SEISMIC) LOAD
EW	EACH WAY
EXP	EXPANSION
EXST	EXISTING
EXT	EXTERIOR
FDTN	FOUNDATION
FF	FINISH FLOOR
FIN GR	FINISH GRADE
FTG	FOOTING
FV	FIELD VERIFY
GA	GAGE, GAUGE
GALV	GALVANIZED
GB	GRADE BEAM
GC	GENERAL CONTRACTOR
GEN	GENERAL
H	HORIZONTAL
HORIZ	HORIZONTAL
HSA	HEADED STUD ANCHOR
INFO	INFORMATION
INT	INTERIOR
K-FT	KIP-FOOT
KIP	THOUSAND POUNDS
KSI	KIPS PER SQUARE INCH
LBS	POUNDS
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LSH	LONG SIDE HORIZONTAL
LSV	LONG SIDE VERTICAL
LWC	LIGHTWEIGHT CONCRETE
MAX	MAXIMUM
MC	MOMENT CONNECTION
MEP	MECHANICAL / ELECTRICAL / PLUMBING
MFR	MANUFACTURER
MIL	ONE-THOUSANDTH OF AN INCH
MIN	MINIMUM
MISC	MISCELLANEOUS
MPH	MILES PER HOUR
NSG	NON-SHRINK GROUT
NTS	NOT-TO-SCALE
NWC	NORMAL WEIGHT CONCRETE
OC	ON-CENTER
OPH	OPPOSITE HAND
OPNG	OPENING
PAF	POWDER-ACTUATED FASTENER
PCC	PRECAST CONCRETE
PCF	POUNDS PER CUBIC FOOT
PEMB	PRE-ENGINEERED METAL BUILDING
PF	PAN FORM
PL	PLATE
PLF	POUNDS PER LINEAR FOOT
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POST-TENSIONED
REF	REFER TO
REINF	REINFORCING
REQD	REQUIRED
RLL	ROOF LIVE LOAD
RTU	ROOFTOP UNIT
SCHED	SCHEDULE
SIM	SIMILAR
SL	SNOW LOAD
SPEC	SPECIFICATION
STD	STANDARD
STIF	STIFFENER
STIR	STIRRUP
T&B	TOP & BOTTOM
TOC	TOP-OF-CONCRETE
TOF	TOP-OF-FOOTING
TOS	TOP-OF-STEEL
TOW	TOP-OF-WALL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
V	VERTICAL
VERT	VERTICAL
W/	WITH
WL	WIND LOAD
WP	WORK POINT
WWR	WELDED WIRE REINFORCEMENT

STRUCTURAL SYMBOLOGY









RELEASED FOR CONSTRUCTION
As Noted on Plans Review

Development Services Department
Lee's Summit, Missouri
08/20/2024

FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: CAPITAL BUILDERS

CONSTRUCTION/ PERMIT DRAWINGS

06.03.2024

REV.	DATE	ISSUE

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STATE OF MISSOURI
IAN G. BABCOCK
NUMBER PE-2024007471
PROFESSIONAL ENGINEER
6/03/24

STRUCTURAL GENERAL NOTES

Sheet: S002

Revision no.

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03: CONCRETE

SECTION 031000 - CONCRETE FORMING AND ACCESSORIES
PART 1 - GENERAL
1.1SUMMARY
A. Section Includes:
1. Form-facing material for cast-in-place concrete.
2. Shoring, bracing, and anchoring.
1.2DEFINITIONS
A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.
B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.
1.3PREINSTALLATION MEETINGS
A. Preinstallation Conference: Conduct conference at project site.
1. Review the following:
a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction, movement, contraction, and isolation joints.
c. Forms and form-removal limitations.
d. Anchor rod and anchorage device installation tolerances.
1.4ACTION SUBMITTALS
A. Product Data: For each of the following:
1. Exposed surface form-facing material.
2. Concealed surface form-facing material.
3. Form ties.
4. Waterstops.
5. Form-release agent.
B. Shop Drawings:
1. For exposed vertical concrete walls, indicate dimensions and form tie locations.
2. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with ACI 301.
a. Location of construction joints is subject to approval of the Architect.
3. Indicate location of waterstops.
4. Indicate proposed schedule and sequence of stripping of forms and shoring removal.
1.5INFORMATIONAL SUBMITTALS
A. Qualification Data: For testing and inspection agency.
B. Field quality-control reports.
C. Minutes of preinstallation conference.
1.6QUALITY ASSURANCE
A. Testing and Inspection Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
1.7DELIVERY, STORAGE, AND HANDLING
A. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.
PART 2 - PRODUCTS
2.1PERFORMANCE REQUIREMENTS
A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and

construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.
2.2FORM-FACING MATERIALS
A. As-Cast Surface Form-Facing Material:
1. Provide continuous, true, and smooth concrete surfaces.
2. Furnish in largest practicable sizes to minimize number of joints.
3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete, and as follows:
a. Plywood, metal, or other approved panel materials.
b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
1) APA HDO (high-density overlay).
2) APA MDO (medium-density overlay); mill-release agent treated and edge sealed.
3) APA Structural 1 Plyform, B-B or better; mill oiled and edge sealed.
4) APA Plyform Class I, B-B or better; mill oiled and edge sealed.
B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.
1. Provide lumber dressed on at least two edges and one side for tight fit.
2.3WATERSTOPS
A. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer-modified chloroprene rubber, for adhesive bonding to concrete, 3/8 by 3/4 inch.
2.4RELATED MATERIALS
A. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
B. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
2. Form release agent for form liners shall be acceptable to form liner manufacturer.
C. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.

PART 3 - EXECUTION
3.1INSTALLATION OF FORMWORK
A. Comply with ACI 301.
B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes.
C. Limit concrete surface irregularities as follows:
1. Surface Finish-1.0: ACI 117 Class D, 1 inch.
2. Surface Finish-2.0: ACI 117 Class B, 1/4 inch.
3. Surface Finish-3.0: ACI 117 Class A, 1/8 inch.
D. Construct forms tight enough to prevent loss of concrete mortar.
1. Minimize joints.
2. Exposed Concrete: Symmetrically align joints in forms.
E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
3. Install keyways, recesses, and other accessories, for easy removal.
F. Do not use rust-stained, steel, form-facing material.
G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.
1. Provide and secure units to support screed strips
2. Use strike-off templates or compacting-type screeds.
H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.
1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
2. Locate temporary openings in forms at inconspicuous locations.
I. Chamfer exterior corners and edges of permanently exposed concrete.
J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.
K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.
L. Construction with Movement Joints:
1. Construct joints true to line with faces perpendicular to surface plane of concrete.
2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
3. Place joints perpendicular to main reinforcement.
4. Locate joints in the middle third of spans.
5. Locate horizontal joints in walls at underside of slabs and at the top of footings.
6. Space vertical joints in walls as indicated on Drawings.
M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.
1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.
N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.
3.2INSTALLATION OF EMBEDDED ITEMS
A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.
1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
3. Clean embedded items immediately prior to concrete placement.
3.3INSTALLATION OF WATERSTOPS
A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated on Drawings, according to manufacturer's written instructions, by adhesive bonding, mechanically fastening, and firmly pressing into place.
1. Install in longest lengths practicable.
2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
3. Protect exposed waterstops during progress of the Work.
3.4REMOVING AND REUSING FORMS
A. Formwork for sides of beams, walls, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
1. Leave formwork for slabs and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
B. Clean and repair surfaces of forms to be reused in the Work.
1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
2. Apply new form-release agent.
C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.
1. Align and secure joints to avoid offsets.
2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.
3.5FIELD QUALITY CONTROL
A. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
B. Inspections:
1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.
END OF SECTION 031000

SECTION 032000 - CONCRETE REINFORCING
PART 1 - GENERAL
1.1SUMMARY
A. Section Includes:
1. Steel reinforcement bars.
1.2PREINSTALLATION MEETINGS
A. Preinstallation Conference: Conduct conference at project site.
1. Review the following:
a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction contraction and isolation joints.
c. Steel-reinforcement installation.
1.3ACTION SUBMITTALS
A. Product Data: For the following:
1. Each type of steel reinforcement.
2. Bar supports.
3. Mechanical splice couplers.
B. Shop Drawings: Comply with ACI SP-066:
1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.
1. Location of construction joints is subject to approval of the Architect.
1.4INFORMATIONAL SUBMITTALS
A. Qualification Statements: For testing and inspection agency.
B. Welding certificates.
1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.
C. Material Test Reports: For the following, from a qualified testing agency:
1. Mechanical splice couplers.
D. Field quality-control reports.
E. Minutes of preinstallation conference.
1.5QUALITY ASSURANCE
A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.
1.6DELIVERY, STORAGE, AND HANDLING
A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
1. Store reinforcement to avoid contact with earth.
PART 2 - PRODUCTS
2.1STEEL REINFORCEMENT
A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.
B. Low-Alloy Steel Reinforcing Bars: ASTM A706/A706M, deformed at locations were reinforcing is indicated to be welded.
2.2REINFORCEMENT ACCESSORIES
A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars in place.
1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
B. Mechanical Splice Couplers: ACI 318 Type 1 or Type 2.
C. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.
2.3FABRICATING REINFORCEMENT
A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."
PART 3 - EXECUTION
3.1PREPARATION
A. Protection of In-Place Conditions:
1. Do not cut or puncture vapor retarder.
2. Repair damage and reseal vapor retarder before placing concrete.
B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
3.2INSTALLATION OF STEEL REINFORCEMENT
A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
B. Accurately position, support, and secure reinforcement against displacement.
1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2. Do not tack weld crossing reinforcing bars.
C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
D. Provide concrete coverage in accordance with ACI 318.
E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
F. Splices: Lap splices as indicated on Drawings.

1. Stagger splices in accordance with ACI 318.
2. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
3.3JOINTS
A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
1. Place joints perpendicular to main reinforcement.
2. Continue reinforcement across construction joints unless otherwise indicated.
3. Do not continue reinforcement through sides of strip placements of floors and slabs.
B. Comply with ACI 117.
3.4FIELD QUALITY CONTROL
A. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
B. Inspections:
1. Steel-reinforcement placement.
2. Steel-reinforcement mechanical splice couplers.
END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE
PART 1 - GENERAL
1.1SUMMARY
A. Section Includes:
1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.
1.2DEFINITIONS
A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.
1.3PREINSTALLATION MEETINGS
A. Preinstallation Conference: Conduct conference at project site.
1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.
d. Concrete Subcontractor.
2. Review the following:
a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction joints, control joints, isolation joints, and joint-filler strips.
c. Semirigid joint fillers.
d. Vapor-retarder installation.
e. Anchor rod and anchorage device installation tolerances.
f. Cold and hot weather concreting procedures.
g. Concrete finishes and finishing.
h. Curing procedures.
i. Forms and form-removal limitations.
j. Shoring and reshoring procedures.
k. Methods for achieving specified floor and slab flatness and levelness.
l. Floor and slab flatness and levelness measurements.
m. Concrete repair procedures.
n. Concrete protection.
o. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
p. Protection of field cured field test cylinders.
1.4ACTION SUBMITTALS
A. Product Data: For each of the following.
1. Portland cement.
2. Fly ash.
3. Aggregates.
4. Admixtures:
a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
5. Vapor retarders.
6. Floor and slab treatments.
7. Liquid floor treatments.
8. Joint fillers.
9. Repair materials.
B. Design Mixtures: For each concrete mixture, include the following:
1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.
5. Slump limit.
6. Air content.
7. Nominal maximum aggregate size.
8. Include manufacturer's certification that permeability-reducing admixture is compatible with mix design.
9. Include certification that dosage rate for permeability-reducing admixture matches dosage rate used in performance compliance test.
10.Intended placement method.
11.Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
C. Shop Drawings:
1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
a. Location of construction joints is subject to approval of the Architect.
D. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:
1. Concrete Class designation.
2. Location within Project.
3. Exposure Class designation.
4. Formed Surface Finish designation and final finish.
5. Final finish for floors.
6. Curing process.
7. Floor treatment if any.
1.5INFORMATIONAL SUBMITTALS
A. Qualification Data: For the following:
1. Installer: Include copies of applicable ACI certificates.
2. Ready-mixed concrete manufacturer.
3. Testing agency: Include copies of applicable ACI certificates.
B. Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Floor and slab treatments.
5. Bonding agents.
6. Adhesives.
7. Vapor retarders.
8. Semirigid joint filler.
9. Joint-filler strips.
10.Repair materials.
C. Material Test Reports: For the following, from a qualified testing agency:
1. Portland cement.
2. Fly ash.
3. Aggregates.
4. Admixtures:
a. Permeability-Reducing Admixture: Include independent test reports, indicating compliance with specified requirements, including dosage rate used in test.
D. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.
E. Research Reports:
1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
2. For sheet vapor retarder/termite barrier, showing compliance with ICC AC380.
F. Preconstruction Test Reports: For each mix design.
G. Field quality-control reports.
H. Minutes of preinstallation conference.
1.6QUALITY ASSURANCE
A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician.
B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.
1. Personnel performing laboratory tests shall be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.
D. Field Quality Control Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
1. Personnel conducting field tests shall be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with ACI CPP 610.1 or an equivalent certification program.
1.7PRECONSTRUCTION TESTING
A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.
1. Include the following information in each test report:
a. Admixture dosage rates.
b. Slump.
c. Air content.
d. Seven-day compressive strength.
e. 28-day compressive strength.
f. Permeability.
1.8DELIVERY, STORAGE, AND HANDLING
A. Comply with ASTM C94/C94M and ACI 301.
1.9FIELD CONDITIONS
A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
3. Do not use frozen materials or materials containing ice or snow.
4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
PART 2 - PRODUCTS
2.1CONCRETE, GENERAL
A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.
2.2CONCRETE MATERIALS
A. HYPERLINK "http://www.arcomnet.com/sustainable_design.aspx?topic=111"Regional Materials: Verify concrete is manufactured within 100 miles of Project site from aggregates that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.
B. Source Limitations:
1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
3. Obtain aggregate from single source.
4. Obtain each type of admixture from single source from single manufacturer.
C. Cementitious Materials:
1. Portland Cement: ASTM C150/C150M, Type I, Type II or Type I/II.
2. Fly Ash: ASTM C618, Class F.
D. Normal-Weight Aggregates: ASTM C33/C33M, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source.
1. Alkali-Silica Reaction: Comply with one of the following:
a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.
2. Maximum Coarse-Aggregate Size: 1 inch nominal.
3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
E. Air-Entraining Admixture: ASTM C260/C260M.
F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
7. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C494/C494M, Type C.
8. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
9. Permeability-Reducing Admixture: ASTM C494/C494M, Type S, hydrophilic, permeability-reducing crystalline admixture, capable of reducing water absorption of concrete exposed to hydrostatic pressure (PRAH).

a. Permeability: No leakage when tested in accordance with U.S. Army Corps of Engineers CRD C48 at a hydraulic pressure of 200 psi for 14 days.
G. Water and Water Used to Make Ice: ASTM C94/C94M, potable.
2.3VAPOR RETARDERS
A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A; not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
2.4LIQUID FLOOR TREATMENTS
A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, densifies, and seals concrete surfaces.
2.5CURING MATERIALS
A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
1. Color:
a. Ambient Temperature Below 50 deg F: Black.
b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
c. Ambient Temperature Above 85 deg F: White.
D. Curing Paper: Eight-feet-wide paper, consisting of two layers of fibered kraft paper laminated with double coating of asphalt.
E. Water: Potable or complying with ASTM C1602/C1602M.
F. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.
2.6RELATED MATERIALS
A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.
B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 in accordance with ASTM D2240.
C. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:
1. Types I and II, nonload bearing or Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete depending on condition of use.
2.7REPAIR MATERIALS
A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi at 28 days when tested in accordance with ASTM C109/C109M.
B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.
2.8CONCRETE MIXTURES, GENERAL
A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash: 25 percent by mass.
C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use corrosion-inhibiting admixture in concrete mixtures where indicated.
4. Use permeability-reducing admixture in concrete mixtures where indicated.
2.9CONCRETE MIXTURES
A. All concrete unless otherwise noted.
1. Exposure Class: ACI 318 F1 S0 W0 C0.
2. Minimum Compressive Strength: 4000 psi at 28 days.
3. Maximum w/cm: 0.50.
4. Slump Limit: 5 inches, plus or minus 1 inch.
5. Air Content:
a. Exposure Class F1: 4.5 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-inch nominal maximum aggregate size.
6. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.
B. Concrete used for interior slabs-on-ground.
1. Exposure Class: ACI 318 F0 S0 W0 C0.
2. Minimum Compressive Strength: 4000 psi at 28 days.
3. Maximum w/cm: 0.50.
4. Minimum Cementitious Materials Content: 470 lb/cu. yd.
5. Slump Limit: 5 inches, plus or minus 1 inch.
6. Air Content:
a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
7. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.
2.10 CONCRETE MIXING
A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and furnish batch ticket information.
PART 3 - EXECUTION
3.1EXAMINATION
A. Verification of Conditions:
1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
2. Do not proceed until unsatisfactory conditions have been corrected.
3.2PREPARATION
A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
1. Daily access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
4. Security and protection for test samples and for testing and inspection equipment at Project site.
3.3INSTALLATION OF EMBEDDED ITEMS
A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

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RELEASED FOR CONSTRUCTION
As Noted on Plans Review
Development Services Department
Lee's Summit, Missouri
08/20/2024

FLEX SPACES
60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: CAPITAL BUILDERS

CONSTRUCTION/ PERMIT DRAWINGS
06.03.2024

REV.	DATE	ISSUE

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STATE OF MISSOURI
IAN G. BABCOCK
NUMBER PE-2024007471
PROFESSIONAL ENGINEER
6/03/24

STRUCTURAL SPECIFICATIONS

Sheet: S003
Revision no.

03: CONCRETE

3.4INSTALLATION OF VAPOR RETARDER
A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
2. Face laps away from exposed direction of concrete pour.
3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
4. Lap joints 6 inches and seal with manufacturer's recommended tape.
5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
7. Protect vapor retarder during placement of reinforcement and concrete.
a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

3.5JOINTS
A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
2. Place joints perpendicular to main reinforcement.
a. Continue reinforcement across construction joints unless otherwise indicated.
b. Do not continue reinforcement through sides of strip placements of floors and slabs.
3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
4. Locate joints for beams and slabs at third points of spans.
5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
6. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.6CONCRETE PLACEMENT
A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
a. Do not use vibrators to transport concrete inside forms.
b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Do not place concrete floors and slabs in a checkerboard sequence.
2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.
4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.7FINISHING FORMED SURFACES
A. As-Cast Surface Finishes:
1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
b. Remove projections larger than 1 inch.
c. Tie holes do not require patching.
d. Surface Tolerance: ACI 117 Class D.
e. Apply to concrete surfaces not exposed to public view.
2. ACI 301Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
b. Remove projections larger than 1/4 inch.
c. Patch tie holes.
d. Surface Tolerance: ACI 117 Class B.
e. Locations: Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete.
B. Related Unformed Surfaces:
1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8FINISHING FLOORS AND SLABS
A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
B. Float Finish:
1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
3. Apply float finish to surfaces to receive a trowel finish.
C. Trowel Finish:
1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces exposed to view, to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system and all interior slabs on ground unless another finish is required to accommodate the floor covering or intended use.
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
a. Slabs on Ground:
1) Specified overall values of flatness, F_F 35; and of levelness, F_L 25; with minimum local values of flatness, F_F 24; and of levelness, F_L 17.
b. Suspended Slabs:
1) Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.
D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on Drawings and where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
1. Coordinate required final finish with Architect before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Architect before application.

3.9INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS
A. Filling In:
1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.
B. Equipment Bases and Foundations:
1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 6 inches high unless otherwise indicated on Drawings and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
3. Minimum Compressive Strength: 4000 psi at 28 days.
4. Prior to pouring concrete, place and secure anchorage devices.
a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
b. Cast anchor-bolt insert into bases.
c. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.10CONCRETE CURING
A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.
B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:
1. Cure formed concrete surfaces, including underside supported slabs and other similar surfaces.
2. If forms remain during curing period, moist cure after loosening forms.
3. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
b. Continuous Sprinkling: Maintain concrete surface continuously wet.
c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
1) Recoat areas subject to heavy rainfall within three hours after initial application.
2) Maintain continuity of coating and repair damage during curing period.
C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:
1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:
a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
a) Lap edges and ends of absorptive cover not less than 12-inches.
b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
b) Cure for not less than seven days.
3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
a) Water.
b) Continuous water-fog spray.
b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
a) Lap edges and ends of absorptive cover not less than 12 inches.
b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
b) Cure for not less than seven days.
3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
a) Water.
b) Continuous water-fog spray.
c. Floors to Receive Curing and Sealing Compound (Liquid Floor Treatment):
1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Repeat process 24 hours later and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.11 TOLERANCES
A. Conform to ACI 117.

3.12 APPLICATION OF LIQUID FLOOR TREATMENTS
A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions to all interior slabs on ground that are not receiving another treatment or floor covering.
1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than 7 days' old and as indicated in manufacturer's written instructions.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
4. Rinse with water; remove excess material until surface is dry.
5. Apply a second coat in a similar manner if surface is rough or porous.

3.13 JOINT FILLING
A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
1. Defer joint filling until concrete has aged at least one month(s).
2. Do not fill joints until construction traffic has permanently ceased.
B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.
D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS
A. Defective Concrete:
1. Repair and patch defective areas when approved by Architect.
2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
a. Limit cut depth to 3/4 inch.
b. Make edges of cuts perpendicular to concrete surface.
c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
d. Fill and compact with patching mortar before bonding agent has dried.
e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
b. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.
D. Repairing Unformed Surfaces:
1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
a. Correct low and high areas.
b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
3. After concrete has cured at least 14 days, correct high areas by grinding.
4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
a. Finish repaired areas to blend into adjacent concrete.
5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
b. Feather edges to match adjacent floor elevations.
6. Correct other low areas scheduled to remain exposed with repair topping.
a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
d. Place, compact, and finish to blend with adjacent finished concrete.
e. Cure in same manner as adjacent concrete.
8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
b. Dampen cleaned concrete surfaces and apply bonding agent.
c. Place patching mortar before bonding agent has dried.
d. Compact patching mortar and finish to match adjacent concrete.
e. Keep patched area continuously moist for at least 72 hours.
E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL
A. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
1. Testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
2. Testing agency shall immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
a. Test reports shall include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
1) Project name.
2) Name of testing agency.
3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
4) Name of concrete manufacturer.
5) Date and time of inspection, sampling, and field testing.
6) Date and time of concrete placement.
7) Location in Work of concrete represented by samples.
8) Date and time sample was obtained.
9) Truck and batch ticket numbers.
10) Design compressive strength at 28 days.
11) Concrete mixture designation, proportions, and materials.
12) Field test results.
13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
14) Type of fracture and compressive break strengths at seven days and 28 days.
B. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
C. Inspections:
1. Headed bolts and studs.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from beams and slabs.
6. Batch Plant Inspections: On a random basis, as determined by Architect.
D. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C143/C143M:
a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
b. Perform additional tests when concrete consistency appears to change.
3. Slump Flow: ASTM C1611/C1611M:
a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
b. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.
a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C1064/C1064M:
a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
6. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.
a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C31/C31M:
a. Cast, initial cure, and field cure two sets of three standard cylinder specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C39/C39M.
a. Test one set of two field-cured specimens at seven days and one set of two specimens at 28 days. Hold one set of two field-cured specimens in reserve.
b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10.Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
11.Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12.Additional Tests:
a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
1) Acceptance criteria for concrete strength shall be in accordance with ACI 301 section 1.6.6.3.
13.Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14.Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
E. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 72 hours of completion of floor finishing and promptly report test results to Architect.

3.16 PROTECTION
A. Protect concrete surfaces as follows:
1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 033000

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RELEASED FOR CONSTRUCTION
As Noted on Plans Review
Development Services Department
Lee's Summit, Missouri
08/20/2024

FLEX SPACES
60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: CAPITAL BUILDERS

CONSTRUCTION/ PERMIT DRAWINGS
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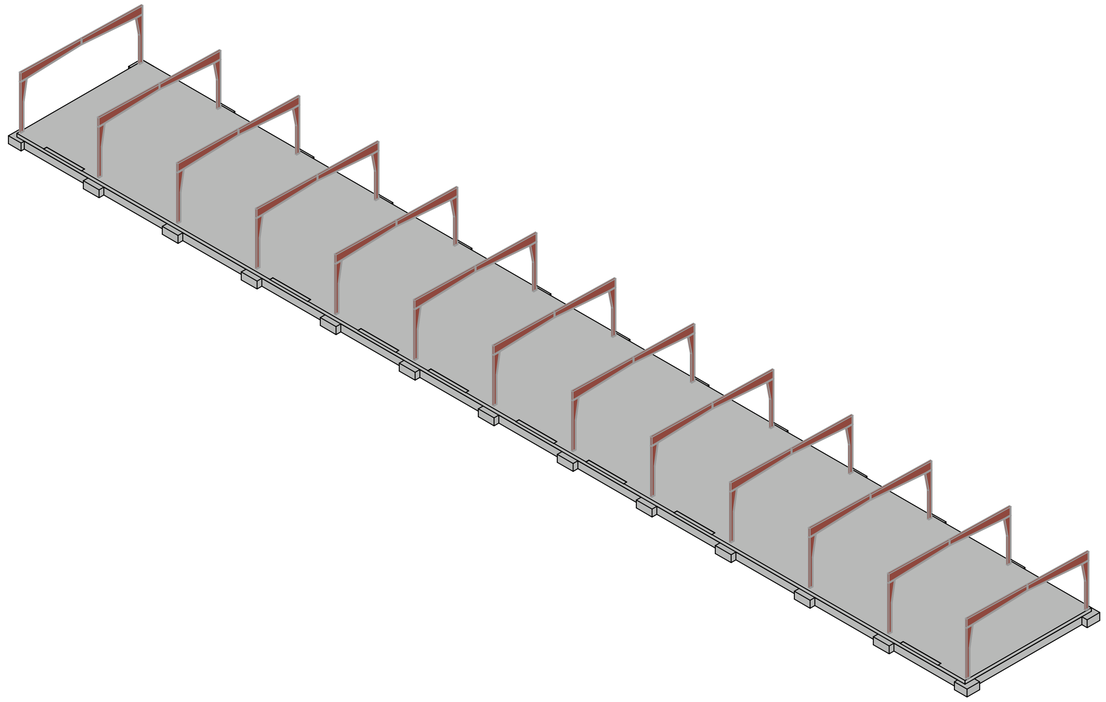
STATE OF MISSOURI
IAN G. BABCOCK
NUMBER PE-2024007471
PROFESSIONAL ENGINEER
6/03/24

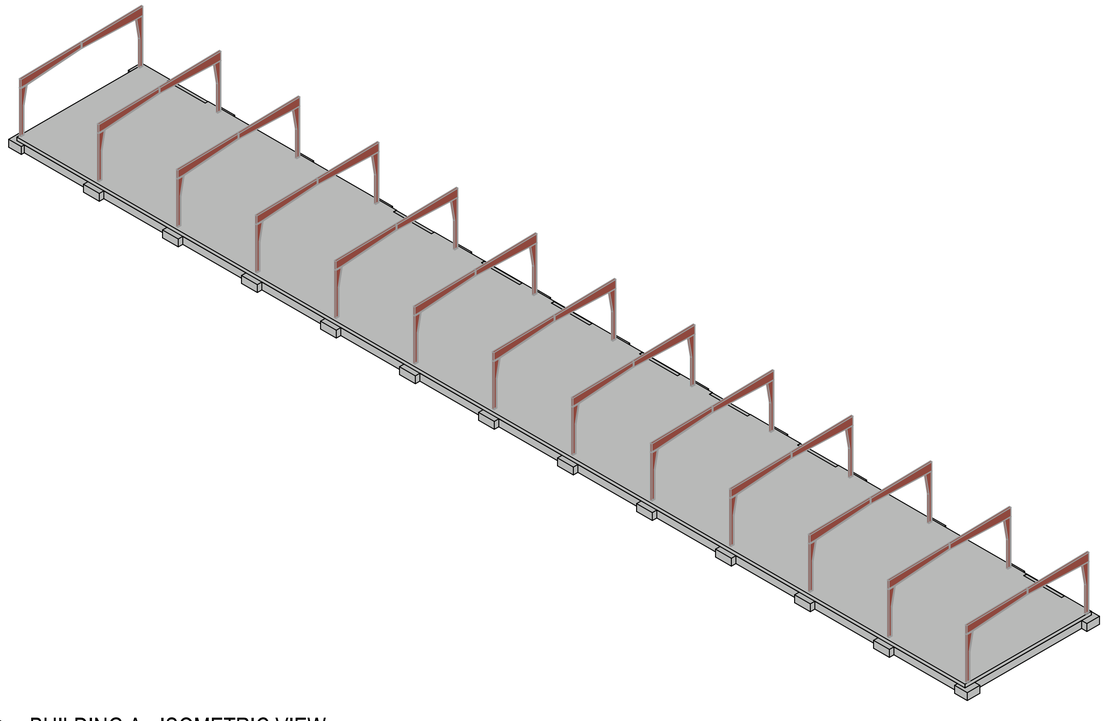
STRUCTURAL SPECIFICATIONS

Sheet: S004
Revision no.

NOTE:
ISOMETRIC VIEWS ARE NOT-TO-SCALE AND PROVIDED FOR ILLUSTRATIVE PURPOSES AND GENERAL UNDERSTANDING OF OVERALL STRUCTURAL SYSTEM. NOT ALL STRUCTURAL ELEMENTS ARE SHOWN. THESE VIEWS SHOULD NOT BE USED FOR BIDDING, DETAILING, FABRICATION, OR ERECTION.



1 BUILDING B - ISOMETRIC VIEW



2 BUILDING A - ISOMETRIC VIEW

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FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT:
CAPITAL BUILDERS

CONSTRUCTION/ PERMIT DRAWINGS

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IAN G. BABCOCK
NUMBER PE-2024007471
PROFESSIONAL ENGINEER

6/03/24

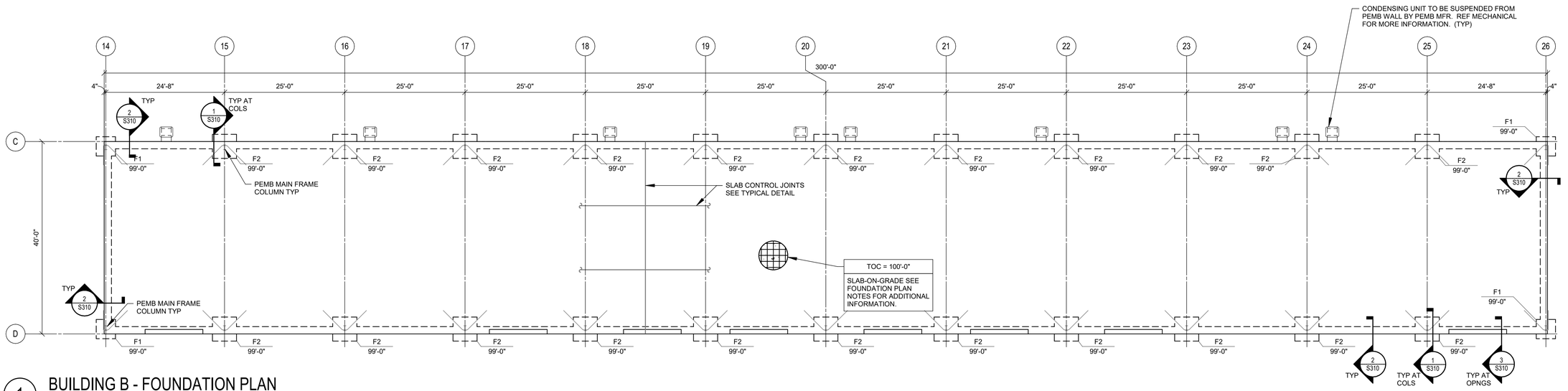
STRUCTURAL ISOMETRIC VIEWS

Sheet: S005

Revision no.

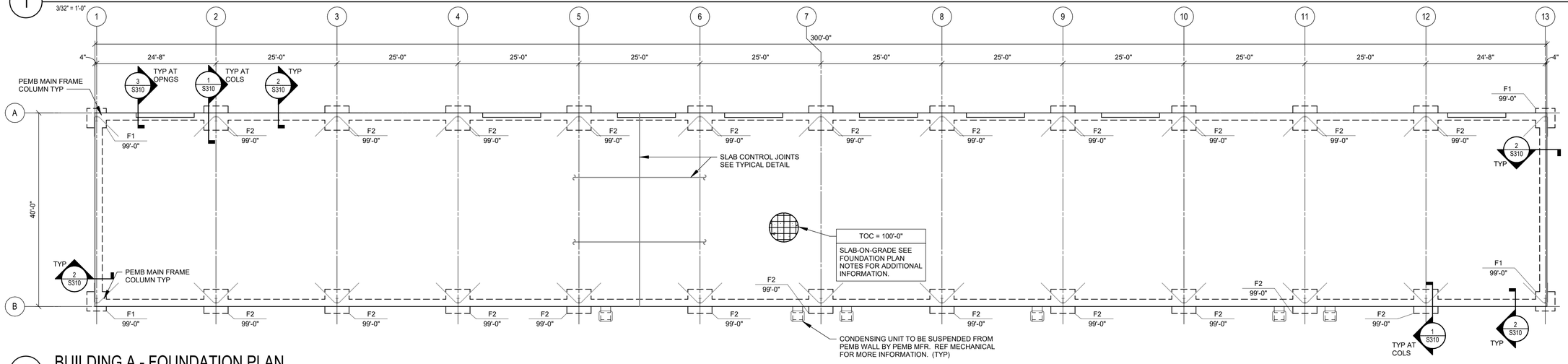
FOUNDATION PLAN NOTES

1. SEE PLAN FOR TOP OF CONCRETE ELEVATIONS (TOC). ALL ELEVATIONS SHOWN ON PLAN ARE BASED ON A FDN TOC = 100'-0". THIS REFERENCE ELEVATION IS EQUIVALENT TO LEVEL 1 MEAN SEA LEVEL ELEVATION SHOWN IN THE CIVIL DRAWINGS.
2. TOP OF CONCRETE ELEVATION IS EQUAL TO FINISH FLOOR ELEVATION UNLESS SHOWN OR NOTED OTHERWISE.
3. SLAB-ON-GRADE IS 5" THICK CONCRETE W/ #4@16" OC EW REINFORCING ON VAPOR BARRIER. SEE GENERAL NOTES AND GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION REQUIREMENTS (TYP UNO).
4. DEVIATIONS FROM CONSTRUCTION JOINT/CONTROL JOINT PATTERN SHOWN MUST BE APPROVED BY THE ENGINEER OF RECORD. ALL CONSTRUCTION JOINT LOCATIONS MUST BE SUBMITTED TO THE STRUCTURAL ENGINEER-OF-RECORD FOR REVIEW AND APPROVAL.
5. SEE SHEETS S001 AND S002 FOR STRUCTURAL GENERAL NOTES.
6. SEE SHEET S301 FOR FOOTING SCHEDULE AND TYPICAL CONCRETE DETAILS.



1 BUILDING B - FOUNDATION PLAN

3/32" = 1'-0"



2 BUILDING A - FOUNDATION PLAN

3/32" = 1'-0"

PLAN NORTH

0 8" 16" 32"

SCALE: 1/16" = 1'-0"

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6/03/24

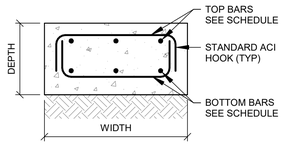
FOUNDATION PLANS

Sheet: S101

Revision no.

CONCRETE FOOTING SCHEDULE

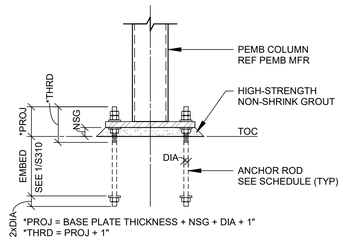
MARK	LENGTH	WIDTH	DEPTH	REINFORCING
F1	4'-0"	4'-0"	2'-2"	(5) #5 EW T&B
F2	5'-0"	5'-0"	2'-2"	(6) #5 EW T&B



NOTES:
1. SEE GENERAL NOTES FOR CLEAR DIMENSIONS.
2. SEE SECTIONS AND DETAILS FOR CONSTRUCTION ABOVE FOOTINGS.

1 FOOTING REINFORCING AND SCHEDULE
NTS | TYPICAL DETAIL

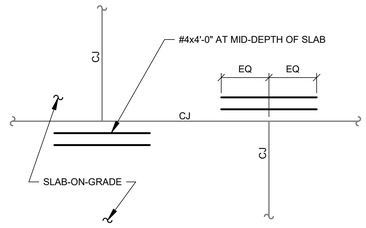
NOTES:
1. ANCHOR RODS SHALL MEET THE REQUIREMENTS OF ASTM F1554 GRADE 36 UNLESS NOTED OTHERWISE.
2. ALL ANCHOR RODS SHALL BE FURNISHED WITH HEX NUTS AND CUT WASHERS OF SPECIFICATIONS COMPATIBLE WITH THOSE OF THE THREADED SHANKS UNLESS NOTED OTHERWISE.
3. FOR PEMB COLUMNS, THE BASE PLATE MAY BE INSTALLED IN CONTACT WITH THE TOP OF CONCRETE AND THE NON-SHRINK GROUT AND LEVELING NUT MAY BE OMITTED.
4. HEADED BOLTS MAY BE SUBSTITUTED FOR BOLTS AS SHOWN.



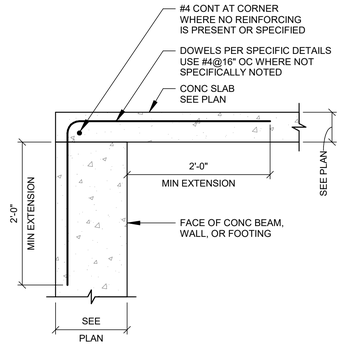
ANCHOR ROD SCHEDULE	
DIA	EMBED
BY PEMB MFR	1'-0"

*PROJ = BASE PLATE THICKNESS + NSG + DIA + 1"
*THRD = PROJ + 1"

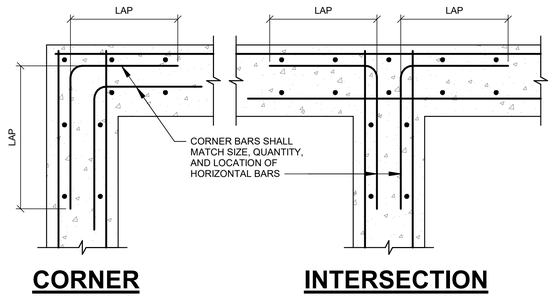
2 PEMB ANCHOR ROD DETAIL AND SCHEDULE
NTS | TYPICAL DETAIL



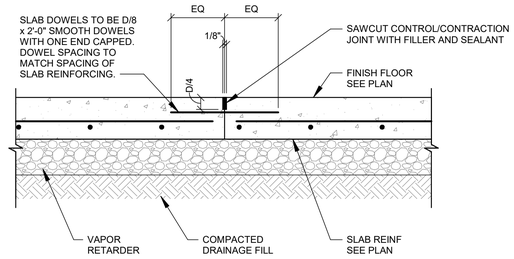
3 REINF AT CONST JOINT
NTS | TYPICAL DETAIL



4 SLAB DOWEL DETAIL
NTS | TYPICAL DETAIL

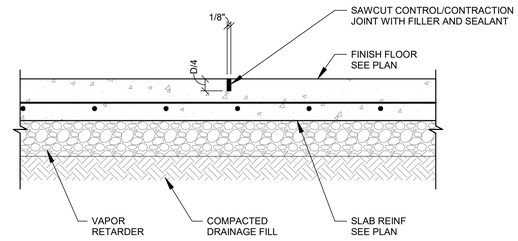


5 CORNER AND INTERSECTION REINFORCING
NTS | TYPICAL DETAIL



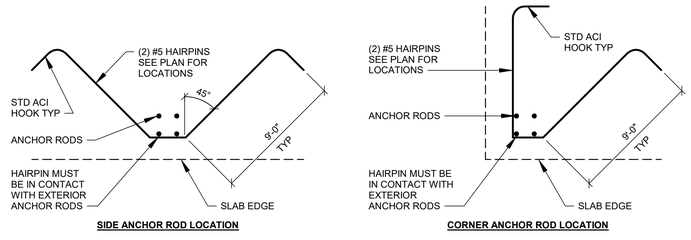
NOTES:
1. SEE FOUNDATION PLAN(S) FOR ADDITIONAL SLAB INFORMATION INCLUDING DEPTH AND REINFORCING.
2. CONSTRUCTION JOINTS SHALL BE BUTT JOINTS ONLY. DO NOT PROVIDE SHEAR KEY AT CONSTRUCTION JOINTS.
3. TERMINATE SLAB REINFORCING 3" CLEAR OF CONSTRUCTION JOINTS.
4. SLAB DOWELS MUST BE LEVEL AND SQUARE WITH CONSTRUCTION JOINT.
5. SAWCUTTING SHALL BE DONE AS SOON AS THE CONCRETE HAS HARDENED SUFFICIENTLY TO PERMIT CUTTING WITHOUT CHIPPING, SPALLING, OR TEARING, BUT NOT MORE THAN 8 HOURS AFTER CASTING.

6 SLAB CONSTRUCTION JOINT
NTS | TYPICAL DETAIL



NOTES:
1. SEE FOUNDATION PLAN(S) FOR ADDITIONAL SLAB INFORMATION INCLUDING DEPTH AND REINFORCING.
2. SAWCUTTING SHALL BE DONE AS SOON AS THE CONCRETE HAS HARDENED SUFFICIENTLY TO PERMIT CUTTING WITHOUT CHIPPING, SPALLING, OR TEARING, BUT NOT MORE THAN 8 HOURS AFTER CASTING.
3. CONTINUE ALL REINFORCING THROUGH SLAB CONTROL JOINTS.

7 SLAB CONTROL/CONTRACTION JOINT
NTS | TYPICAL DETAIL



8 HAIRPIN AT ANCHOR RODS
NTS | TYPICAL DETAIL

FLEX SPACES

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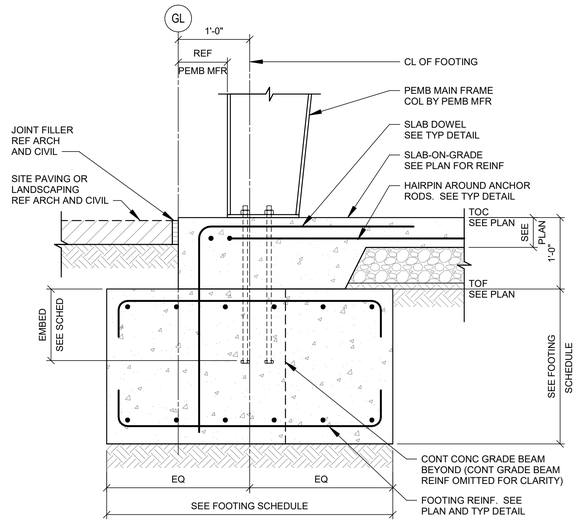
6/03/24

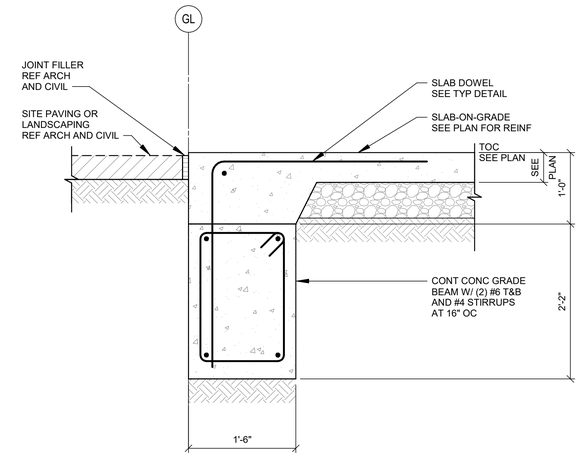
TYPICAL CONCRETE DETAILS

Sheet: S301

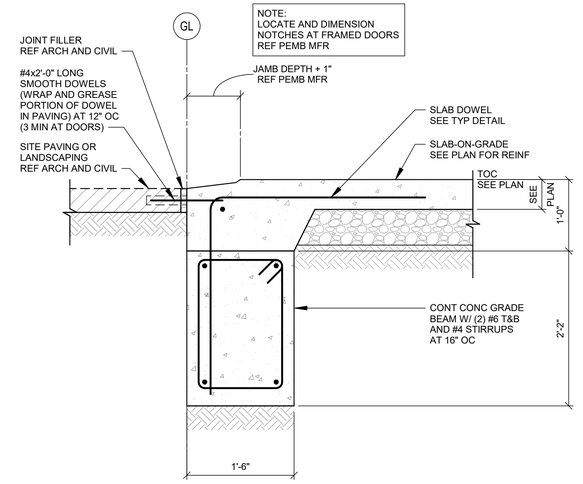
Revision no.



1 DETAIL
1" = 1'-0"



2 DETAIL
1" = 1'-0"



3 DETAIL
1" = 1'-0"

0 6" 1' 2'

SCALE: 1" = 1'-0"

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PROFESSIONAL ENGINEER
6/03/24

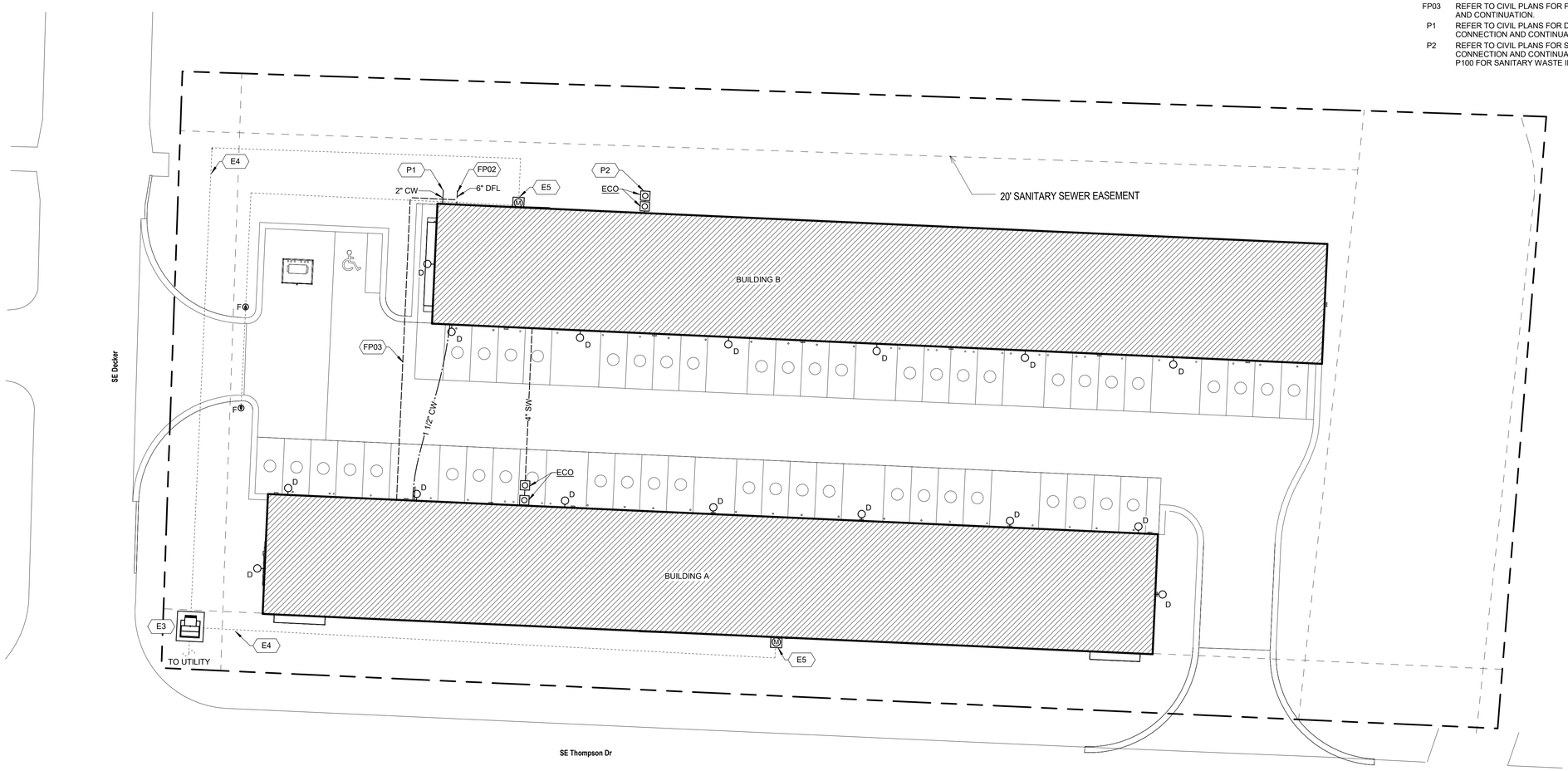
CONCRETE DETAILS

Sheet: S310

Revision no.

KEYED NOTES

E3	PROPOSED UTILITY TRANSFORMER LOCATION. COORDINATE LOCATION AND PRIMARY CONDUIT ROUTING WITH UTILITY PROVIDER PRIOR TO CONSTRUCTION.
E4	PROPOSED ELECTRIC SERVICE SECONDARY CONDUIT & CONDUCTOR ROUTING. REFER TO POWER RISER DIAGRAM ON SHEET E500 FOR MORE INFORMATION.
E5	PROPOSED ELECTRIC SERVICE ENTRANCE EQUIPMENT LOCATION. REFER TO POWER RISER DIAGRAM ON SHEET E500 FOR MORE INFORMATION.
FP02	SIAMESE FIRE DEPARTMENT CONNECTION. PROVIDE HORN AND STROBE ABOVE.
FP03	REFER TO CIVIL PLANS FOR FIRE SERVICE CONNECTION AND CONTINUATION.
P1	REFER TO CIVIL PLANS FOR DOMESTIC WATER SERVICE CONNECTION AND CONTINUATION.
P2	REFER TO CIVIL PLANS FOR SANITARY WASTE SERVICE CONNECTION AND CONTINUATION. REFER TO SHEET P100 FOR SANITARY WASTE INVERTS.



N

1 MEPF SITE PLAN

SCALE: 1" = 20'-0"

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MEPF SITE PLAN

Sheet

Revision no.

MEPF100

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00: GENERAL

1. GENERAL INSTRUCTIONS

A. GENERAL REQUIREMENTS

ALL REQUIREMENTS UNDER DIVISION 01 AND THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THESE SPECIFICATIONS APPLY TO THIS SECTION AND DIVISION. WHERE THE REQUIREMENTS OF THIS SECTION AND DIVISION EXCEED THOSE OF DIVISION 01, THIS SECTION AND DIVISION TAKE PRECEDENCE. BECOME THOROUGHLY FAMILIAR WITH ALL ITS CONTENTS AS TO REQUIREMENTS THAT AFFECT THIS DIVISION, SECTION, OR BOTH. WORK REQUIRED UNDER THIS DIVISION INCLUDES ALL MATERIAL, EQUIPMENT, APPLIANCES, TRANSPORTATION, SERVICES AND LABOR REQUIRED TO COMPLETE THE ENTIRE SYSTEM AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS, OR REASONABLY INFERRED TO BE NECESSARY TO FACILITATE THE FUNCTION OF EACH SYSTEM AS IMPLIED BY THE DESIGN AND EQUIPMENT SPECIFIED.

THE SPECIFICATIONS AND DRAWINGS FOR THE PROJECT ARE COMPLEMENTARY, AND ANY PORTION OF WORK DESCRIBED IN ONE SHALL BE PROVIDED AS IF DESCRIBED IN BOTH. IN THE EVENT OF DISCREPANCIES, NOTIFY THE ENGINEER AND REQUEST CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK INVOLVED.

DRAWINGS ARE GRAPHIC REPRESENTATIONS OF THE WORK UPON WHICH THE CONTRACT IS BASED. THEY SHOW THE MATERIALS AND THEIR RELATIONSHIP TO ONE ANOTHER, INCLUDING SIZES, SHAPES, LOCATIONS, AND CONNECTIONS. THEY CONVEY THE SCOPE OF WORK, INDICATING THE INTENDED GENERAL ARRANGEMENT OF THE SYSTEMS WITHOUT SHOWING ALL OF THE EXACT DETAILS AS TO ELEVATIONS, OFFSETS, CONTROL LINES, AND OTHER INSTALLATION REQUIREMENTS. USE THE DRAWINGS AS A GUIDE WHEN LAYING OUT THE WORK AND TO VERIFY THAT MATERIALS AND EQUIPMENT WILL FIT INTO THE DESIGNATED SPACES, AND WHICH WHEN INSTALLED PER MANUFACTURERS' REQUIREMENTS, WILL ENSURE A COMPLETE, COORDINATED, SATISFACTORY, AND PROPERLY OPERATING SYSTEM.

B. DEFINITIONS

FURNISH: "TO SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION AND SIMILAR OPERATIONS."

INSTALL: "TO PERFORM ALL OPERATIONS AT THE PROJECT SITE INCLUDING, BUT NOT LIMITED TO, THE ACTUAL UNLOADING, UNPACKING, ASSEMBLING, ERECTING, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, TESTING, COMMISSIONING, STARTING UP AND SIMILAR OPERATIONS, COMPLETE, AND READY FOR THE INTENDED USE."

PROVIDE: "TO FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE."

FURNISHED BY OWNER (OR OWNER-FURNISHED) OR FURNISHED BY OTHERS: "AN ITEM FURNISHED BY THE OWNER OR UNDER OTHER DIVISIONS OR CONTRACTS, AND INSTALLED UNDER THE REQUIREMENTS OF THIS DIVISION, COMPLETE, AND READY FOR THE INTENDED USE, INCLUDING ALL ITEMS AND SERVICES INCIDENTAL TO THE WORK NECESSARY FOR PROPER INSTALLATION AND OPERATION. INCLUDE THE INSTALLATION UNDER THE WARRANTY REQUIRED BY THIS DIVISION."

ENGINEER: WHERE REFERENCED IN THIS DIVISION, "ENGINEER" IS THE ENGINEER OF RECORD AND THE DESIGN PROFESSIONAL FOR THE WORK UNDER THIS DIVISION, AND IS A CONSULTANT TO, AND AN AUTHORIZED REPRESENTATIVE OF THE ARCHITECT, AS DEFINED IN THE GENERAL AND/OR SUPPLEMENTARY CONDITIONS. WHEN USED IN THIS DIVISION, ENGINEER MEANS INCREASED INVOLVEMENT BY AND OBLIGATIONS TO THE ENGINEER, IN ADDITION TO INVOLVEMENT BY AND OBLIGATIONS TO THE ARCHITECT.

AHJ: THE LOCAL CODE AND/OR INSPECTION AGENCY (AUTHORITY) HAVING JURISDICTION OVER THE WORK.

NRTL: NATIONALLY RECOGNIZED TESTING LABORATORY, AS DEFINED AND LISTED BY OSHA IN 29 CFR 1910.7 (E.G., UL, ETL, CSA), AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT. NATIONALLY RECOGNIZED TESTING LABORATORIES AND STANDARDS LISTED ARE USED ONLY TO REPRESENT THE CHARACTERISTICS REQUIRED AND ARE NOT INTENDED TO RESTRICT THE USE OF OTHER NRTLS THAT ARE ACCEPTABLE TO THE AHJ AND STANDARDS THAT MEET THE SPECIFIED CRITERIA.

THE TERMS "APPROVED EQUAL", "EQUIVALENT", OR "EQUAL" ARE USED SYNONYMOUSLY AND SHALL MEAN "ACCEPTED BY OR ACCEPTABLE TO THE ENGINEER AS EQUIVALENT TO THE ITEM OR MANUFACTURER SPECIFIED". THE TERM "APPROVED" SHALL MEAN LABELED, LISTED, OR BOTH, BY AN NRTL, AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.

THE TERM LEAD FREE REFERS TO THE WETTED SURFACE OF PIPE, FITTINGS AND FIXTURES IN POTABLE WATER SYSTEMS THAT HAVE A WEIGHTED AVERAGE LEAD CONTENT OF LESS THAN OR EQUAL TO 0.25% PER SAFE DRINKING WATER ACT AS AMENDED JANUARY 4, 2011 SECTION 1417.

C. MATERIAL AND WORKMANSHIP

PROVIDE NEW MATERIAL, EQUIPMENT, AND APPARATUS UNDER THIS CONTRACT UNLESS OTHERWISE STATED HEREIN, OF BEST QUALITY NORMALLY USED FOR THE PURPOSE IN GOOD COMMERCIAL PRACTICE, AND FREE FROM DEFECTS. MODEL NUMBERS LISTED IN SPECIFICATIONS OR SHOWN ON THE DRAWINGS ARE NOT NECESSARILY INTENDED TO DESIGNATE THE REQUIRED TRIM, WRITTEN DESCRIPTIONS OF THE TRIM GOVERN MODEL NUMBERS.

PIPE, PIPE FITTINGS, PIPE SPECIALTIES AND VALVES SHALL BE MANUFACTURED IN PLANTS LOCATED IN THE UNITED STATES OR CERTIFIED TO MEET THE SPECIFIED ASTM AND ANSI STANDARDS.

WORK PERFORMED UNDER THIS CONTRACT SHALL PROVIDE A NEAT AND "WORKMANLIKE" APPEARANCE WHEN COMPLETED, TO THE SATISFACTION OF THE ARCHITECT AND ENGINEER. WORKMANSHIP SHALL BE THE FINEST POSSIBLE BY EXPERIENCED MECHANICS. INSTALLATIONS SHALL COMPLY WITH APPLICABLE CODES AND LAWS.

THE COMPLETE INSTALLATION SHALL FUNCTION AS DESIGNED AND INTENDED WITH RESPECT TO EFFICIENCY, CAPACITY, NOISE LEVEL, ETC. ABNORMAL NOISE CAUSED BY RATTLING EQUIPMENT, PIPING AND SQUEAKS IN ROTATING COMPONENTS SHALL NOT BE ACCEPTABLE. MATERIALS AND EQUIPMENT SHALL BE OF COMMERCIAL SPECIFICATION GRADE IN QUALITY. LIGHT DUTY AND RESIDENTIAL GRADE EQUIPMENT SHALL NOT BE ACCEPTED UNLESS OTHERWISE INDICATED.

REMOVE FROM THE PREMISES WASTE MATERIAL PRESENT AS A RESULT OF HIS WORK, INCLUDING CARTONS, CRATING, PAPER, STICKERS, AND/OR EXCAVATION MATERIAL NOT USED IN BACKFILLING, ETC. CLEAN EQUIPMENT INSTALLED UNDER THIS CONTRACT TO PRESENT A NEAT AND CLEAN INSTALLATION AT THE TERMINATION OF THE WORK.

REPAIR OR REPLACE PUBLIC AND PRIVATE PROPERTY DAMAGED AS A RESULT OF WORK PERFORMED UNDER THIS CONTRACT TO THE SATISFACTION OF AUTHORITIES AND REGULATIONS HAVING JURISDICTION. PROVIDE ALL SAFETY LIGHTS, GUARDS, AND WARNING SIGNS REQUIRED FOR THE PERFORMANCE OF THE WORK AND FOR THE SAFETY OF THE PUBLIC.

D. MANUFACTURERS

IN OTHER ARTICLES WHERE LISTS OF MANUFACTURERS ARE INTRODUCED, SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE MANUFACTURERS SPECIFIED.

WHERE A LIST IS PROVIDED, MANUFACTURERS ARE LISTED ALPHABETICALLY AND NOT IN ACCORDANCE WITH ANY RANKING OR PREFERENCE.

WHERE MANUFACTURERS ARE NOT LISTED, PROVIDE PRODUCTS SUBJECT TO COMPLIANCE WITH REQUIREMENTS FROM MANUFACTURERS THAT HAVE BEEN ACTIVELY INVOLVED IN MANUFACTURING THE SPECIFIED PRODUCT FOR NO LESS THAN 5 YEARS.

E. COORDINATION

COORDINATE WORK WITH THAT OF OTHER TRADES SO THAT THE VARIOUS COMPONENTS OF THE SYSTEMS ARE INSTALLED AT THE PROPER TIME, WILL FIT THE AVAILABLE SPACE, AND WILL ALLOW PROPER SERVICE ACCESS TO THOSE ITEMS REQUIRING MAINTENANCE. COMPONENTS WHICH ARE INSTALLED WITHOUT REGARD TO THE ABOVE SHALL BE RELOCATED AT NO ADDITIONAL COST TO THE OWNER.

UNLESS OTHERWISE INDICATED, GENERAL CONTRACTOR SHALL PROVIDE CHASES AND OPENINGS IN BUILDING CONSTRUCTION REQUIRED FOR INSTALLATION OF THE SYSTEMS SPECIFIED HEREIN. CONTRACTOR SHALL FURNISH THE GENERAL CONTRACTOR WITH INFORMATION WHERE CHASES AND OPENINGS WHEN REQUIRED. CONTRACTOR SHALL KEEP INFORMED AS TO THE WORK OF OTHER TRADES ENGAGED IN THE CONSTRUCTION OF THE PROJECT AND SHALL EXECUTE HIS WORK IN SUCH A MANNER AS NOT TO INTERFERE WITH OR DELAY THE WORK OF OTHER TRADES.

FIGURED DIMENSIONS SHALL BE TAKEN IN PREFERENCE TO SCALED DIMENSIONS. CONTRACTOR SHALL TAKE HIS OWN MEASUREMENTS AT THE BUILDING, AS VARIATIONS MAY OCCUR. CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ERRORS WHICH COULD HAVE BEEN AVOIDED BY PROPER CHECKING AND VERIFICATION.

PROVIDE MATERIALS WITH TRIM THAT WILL PROPERLY FIT THE TYPES OF CEILING, WALL, OR FLOOR FINISHES ACTUALLY INSTALLED. MODEL NUMBERS LISTED IN THE SPECIFICATIONS OR SHOWN ON THE DRAWINGS ARE NOT INTENDED TO DESIGNATE THE REQUIRED TRIM.

F. ORDINANCES AND CODES

WORK PERFORMED UNDER THIS CONTRACT SHALL, AT A MINIMUM, BE IN CONFORMANCE WITH APPLICABLE NATIONAL, STATE AND LOCAL CODES HAVING JURISDICTION. EQUIPMENT FURNISHED AND ASSOCIATED INSTALLATION WORK PERFORMED UNDER THIS CONTRACT SHALL BE IN STRICT COMPLIANCE WITH CURRENT APPLICABLE CODES ADOPTED BY THE LOCAL AHJ, INCLUDING ANY AMENDMENTS AND STANDARDS AS SET FORTH BY THE FOLLOWING:

1. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
2. UNDERWRITERS LABORATORIES (UL)
3. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)
4. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
5. AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR CONDITIONING ENGINEERS (ASHRAE)
6. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
7. AMERICAN SOCIETY OF TESTING MATERIALS (ASTM)
8. OTHER NATIONAL STANDARDS AND CODES WHERE APPLICABLE.

WHERE THE CONTRACT DOCUMENTS EXCEED THE REQUIREMENTS OF THE REFERENCED CODES, STANDARDS, ETC., THE CONTRACT DOCUMENTS SHALL TAKE PRECEDENCE. WHERE CONFLICTS BETWEEN VARIOUS CODES, ORDINANCES, RULES, AND REGULATIONS EXIST, COMPLY WITH THE MOST STRINGENT.

PROMPTLY BRING ALL CONFLICTS OBSERVED BETWEEN CODES, ORDINANCES, RULES, REGULATIONS, REFERENCED STANDARDS, AND THESE DOCUMENTS TO THE ATTENTION OF THE ARCHITECT AND ENGINEER FOR FINAL RESOLUTION. CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY VIOLATION OF THE LAW.

PROCURE AND PAY FOR PERMITS AND LICENSES REQUIRED FOR THE ACCOMPLISHMENT OF THE WORK HEREIN DESCRIBED. WHERE REQUIRED, OBTAIN, PAY FOR, AND FURNISH CERTIFICATES OF INSPECTION TO OWNER.

G. PROTECTION OF EQUIPMENT AND MATERIAL

STORE AND PROTECT FROM DAMAGE EQUIPMENT AND MATERIAL AFTER DELIVERY TO JOB SITE. FOR MATERIALS AND EQUIPMENT SUSCEPTIBLE TO CHANGING WEATHER CONDITIONS, DAMPNESS, OR TEMPERATURE VARIATIONS, STORE INSIDE IN CONDITIONED SPACES. FOR MATERIALS AND EQUIPMENT NOT SUSCEPTIBLE TO THESE CONDITIONS, COVER WITH WATERPROOF, TEAR-RESISTANT, HEAVY TARP OR POLYETHYLENE PLASTIC AS REQUIRED TO PROTECT FROM PLASTER, DIRT, PAINT, WATER, OR PHYSICAL DAMAGE. EQUIPMENT AND MATERIAL DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE REJECTED AND CONTRACTOR SHALL FURNISH NEW EQUIPMENT AND MATERIAL OF A LIKE KIND AT HIS OWN EXPENSE.

KEEP PREMISES BROOM CLEAN OF FOREIGN MATERIAL CREATED DURING WORK PERFORMED UNDER THIS CONTRACT. PIPING, EQUIPMENT, ETC. SHALL HAVE A NEAT AND CLEAN APPEARANCE AT THE TERMINATION OF THE WORK.

PLUG OR CAP OPEN ENDS OF PIPING SYSTEMS WHILE STORED AND INSTALLED DURING CONSTRUCTION WHEN NOT IN USE TO PREVENT THE ENTRANCE OF DEBRIS INTO THE SYSTEMS.

KEEP THE MANUFACTURER-PROVIDED PROTECTIVE COVERINGS ON FLOOR DRAINS, FLOOR SINKS AND TRENCH DRAINS DURING CONSTRUCTION. REMOVE COVERINGS AT THE TERMINATION OF THE WORK AND POLISH EXPOSED SURFACES.

H. SUBSTITUTIONS

THE BASE BID SHALL INCLUDE ONLY THE PRODUCTS FROM MANUFACTURERS SPECIFICALLY NAMED IN THE DRAWINGS AND SPECIFICATIONS. NO SUBSTITUTION WILL BE CONSIDERED PRIOR TO RECEIPT OF BIDS UNLESS WRITTEN REQUEST FOR APPROVAL TO BID HAS BEEN RECEIVED BY THE ENGINEER AT LEAST TEN (10) CALENDAR DAYS PRIOR TO THE DATE FOR RECEIPT OF BIDS. EACH SUCH REQUEST SHALL INCLUDE THE NAME OF THE MATERIAL OR EQUIPMENT FOR WHICH SUBSTITUTION IS REQUESTED AND A COMPLETE DESCRIPTION OF THE PROPOSED SUBSTITUTION INCLUDING DRAWINGS, CUTS, PERFORMANCE AND TEST DATA, AND OTHER INFORMATION NECESSARY FOR AN EVALUATION. INCLUDE A STATEMENT SETTING FORTH CHANGES IN OTHER MATERIALS, EQUIPMENT OR OTHER WORK THAT INCORPORATION OF THE SUBSTITUTE WOULD REQUIRE. THE BURDEN OF PROOF OF THE MERIT OF THE PROPOSED SUBSTITUTE IS UPON THE PROPOSER. THE ENGINEER'S DECISION OF APPROVAL OR DISAPPROVAL TO BID OF A PROPOSED SUBSTITUTION SHALL BE FINAL.

COORDINATE AND VERIFY WITH OTHER TRADES WHETHER OR NOT THE SUBSTITUTED EQUIPMENT CAN BE INSTALLED AS SHOWN ON THE CONSTRUCTION DRAWINGS WITHOUT MODIFICATION TO ASSOCIATED SYSTEMS OR ARCHITECTURAL OR ENGINEERING DESIGN. INCLUDE ADDITIONAL COSTS FOR ARCHITECTURAL AND ENGINEERING DESIGN FEES IN BID IF DRAWING MODIFICATIONS ARE REQUIRED BECAUSE OF SUBSTITUTED EQUIPMENT.

IF THE PROPOSED SUBSTITUTION IS APPROVED PRIOR TO RECEIPT OF BIDS, SUCH APPROVAL WILL BE STATED IN AN ADDENDUM. BIDDERS SHALL NOT RELY UPON APPROVALS MADE IN ANY OTHER WAY. VERBAL APPROVAL WILL NOT BE GIVEN. NO SUBSTITUTIONS WILL BE CONSIDERED AFTER THE CONTRACT IS AWARDED UNLESS SPECIFICALLY PROVIDED IN THE CONTRACT DOCUMENTS.

THE TERMS "APPROVED", "APPROVED EQUAL", OR "EQUAL", REFER TO APPROVAL BY THE ENGINEER AS AN ACCEPTABLE ALTERNATE BID. NO SUBSTITUTIONS WILL BE CONSIDERED THAT ARE NOT BID AS AN ALTERNATE. NO MATERIAL SUBSTITUTIONS SHALL BE CONSIDERED FOR APPROVAL PRIOR TO AWARD OF CONTRACT.

I. SUBMITTALS

ASSEMBLE AND SUBMIT FOR REVIEW SHOP DRAWINGS, MATERIAL LISTS, MANUFACTURER PRODUCT LITERATURE FOR EQUIPMENT TO BE FURNISHED, AND ITEMS REQUIRING COORDINATION BETWEEN CONTRACTORS UNDER THIS CONTRACT. PROVIDE SUBMITTALS IN SUFFICIENT DETAIL SO AS TO DEMONSTRATE COMPLIANCE WITH THESE CONTRACT DOCUMENTS AND THE DESIGN CONCEPT. PRIOR TO TRANSMITTING SUBMITTAL, VERIFY THAT THE EQUIPMENT SUBMITTED IS MUTUALLY COMPATIBLE AND SUITABLE FOR THE INTENDED USE, WILL FIT THE AVAILABLE SPACE, AND MAINTAIN MANUFACTURER RECOMMENDED SERVICE CLEARANCES. IF THE SIZE OF EQUIPMENT FURNISHED MAKES NECESSARY ANY CHANGE IN LOCATION OR CONFIGURATION, SUBMIT A SHOP DRAWING SHOWING THE PROPOSED LAYOUT.

TRANSMIT SUBMITTALS AS EARLY AS REQUIRED TO SUPPORT THE PROJECT SCHEDULE. ALLOW FOR TWO WEEKS ENGINEER REVIEW TIME, PLUS TO/FROM MAILING TIME VIA THE ARCHITECT, PLUS A DUPLICATION OF THIS TIME FOR RESUBMITTAL, IF REQUIRED. ONLY RESUBMIT THOSE SECTIONS REQUESTED FOR RESUBMITTAL.

SUBMITTALS SHALL CONTAIN THE PROJECT NAME, APPLICABLE SPECIFICATION SECTION, SUBMITTAL DATE, EQUIPMENT IDENTIFICATION ACRONYM AS USED ON THE DRAWINGS, AND THE CONTRACTOR'S STAMP. THE STAMP SHALL CERTIFY THAT THE SUBMITTAL HAS BEEN CHECKED BY THE CONTRACTOR, COMPLIES WITH THE DRAWINGS AND SPECIFICATIONS, AND IS COORDINATED WITH OTHER TRADES. MANUFACTURER PRODUCT LITERATURE SHALL INCLUDE SHOP DRAWINGS, PRODUCT DATA, PERFORMANCE SHEETS, SAMPLES AND OTHER SUBMITTALS REQUIRED BY THIS DIVISION. HIGHLIGHT, MARK, LIST, OR INDICATE THE MATERIALS, PERFORMANCE CRITERIA, AND ACCESSORIES THAT ARE BEING PROPOSED. GENERAL PRODUCT CATALOG DATA NOT SPECIFICALLY NOTED TO BE PART OF THE SPECIFIED PRODUCT WILL BE REJECTED AND RETURNED WITHOUT REVIEW.

SUBMITTALS AND SHOP DRAWINGS SHALL NOT CONTAIN THE FIRM NAME, LOGO, SEAL, OR SIGNATURE OF THE ENGINEER. THEY SHALL NOT BE COPIES OF THE WORK PRODUCT OF THE ENGINEER. IF THE CONTRACTOR DESIRES TO USE ELEMENTS OF SUCH PRODUCT, REFER TO PARAGRAPH "ELECTRONIC DRAWING FILES" FOR PROCEDURES TO BE USED.

SEPARATE SUBMITTALS ACCORDING TO INDIVIDUAL SPECIFICATION SECTIONS. ILLEGIBLE SUBMITTALS WILL BE REJECTED AND RETURNED WITHOUT REVIEW. CATALOG DATA SHALL BE PROPERLY BOUND, IDENTIFIED, INDEXED AND TABBED IN A 3-RING BINDER. EACH ITEM OR MODEL NUMBER SHALL BE CLEARLY MARKED AND ACCESSORIES INDICATED. LABEL THE CATALOG DATA WITH THE EQUIPMENT IDENTIFICATION ACRONYM OR NUMBER AS USED ON THE DRAWINGS AND INCLUDE PERFORMANCE CURVES, CAPACITIES, SIZES, WEIGHTS, MATERIALS, FINISHES, WIRING DIAGRAMS, ELECTRICAL REQUIREMENTS AND DEVIATIONS FROM SPECIFIED EQUIPMENT OR MATERIALS. FOR EQUIPMENT WITH MOTOR STARTERS OR VFDS, INCLUDE SHORT CIRCUIT CURRENT RATINGS. MARK OUT INAPPLICABLE ITEMS. SHOP DRAWINGS WILL BE RETURNED WITHOUT REVIEW IF THE ABOVE MENTIONED REQUIREMENTS ARE NOT MET.

PROVIDE THE QUANTITY OF SUBMITTALS REQUIRED BY DIVISION 01. IF NOT INDICATED AND HARD-COPY SETS ARE PROVIDED, SUBMIT A MINIMUM OF SIX (6) COPIES. REFER TO DIVISION 01 FOR ACCEPTANCE OF ELECTRONIC SUBMITTALS FOR THIS PROJECT. FOR ELECTRONIC SUBMITTALS, CONTRACTOR SHALL SUBMIT THE DOCUMENTS IN ACCORDANCE WITH THE PROCEDURES SPECIFIED IN DIVISION 01. CONTRACTOR SHALL NOTIFY THE ARCHITECT AND ENGINEER THAT THE SUBMITTALS HAVE BEEN POSTED. IF ELECTRONIC SUBMITTAL PROCEDURES ARE NOT DEFINED IN DIVISION 01, CONTRACTOR SHALL INCLUDE THE WEBSITE, USER NAME, AND PASSWORD INFORMATION NEEDED TO ACCESS THE SUBMITTALS. FOR SUBMITTALS SENT BY E-MAIL, CONTRACTOR SHALL COPY THE DESIGNATED REPRESENTATIVES OF THE ARCHITECT AND ENGINEER. CONTRACTOR SHALL ALLOW FOR THE ENGINEER REVIEW TIME AS SPECIFIED ABOVE IN THE CONSTRUCTION SCHEDULE. CONTRACTOR SHALL SUBMIT ONLY THE DOCUMENTS REQUIRED TO PURCHASE THE MATERIALS AND/OR EQUIPMENT IN THE ELECTRONIC SUBMITTAL.

THE CHECKING AND SUBSEQUENT ACCEPTANCE OF SUBMITTALS BY THE ENGINEER AND/OR ARCHITECT SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR DEVIATIONS FROM THE DRAWINGS AND SPECIFICATIONS, ERRORS IN DIMENSIONS, DETAILS, SIZE OF MEMBERS, OR QUANTITIES, OMISSIONS OF COMPONENTS OR FITTINGS; COORDINATION OF ELECTRICAL REQUIREMENTS; AND NOT COORDINATING ITEMS WITH ACTUAL BUILDING CONDITIONS AND ADJACENT WORK. PROCEED WITH THE PROCUREMENT AND INSTALLATION OF EQUIPMENT ONLY AFTER RECEIVING APPROVED SHOP DRAWINGS RELATIVE TO EACH ITEM.

J. OPERATION AND MAINTENANCE INSTRUCTIONS

DURING THE COURSE OF CONSTRUCTION, COLLECT AND COMPILE A COMPLETE BROCHURE OF EQUIPMENT FURNISHED AND INSTALLED ON THIS PROJECT. INCLUDE OPERATIONAL AND MAINTENANCE INSTRUCTIONS, MANUFACTURER'S CATALOG SHEETS, WIRING DIAGRAMS, PARTS LISTS, APPROVED SUBMITTALS AND SHOP DRAWINGS, WARRANTIES, AND DESCRIPTIVE LITERATURE AS FURNISHED BY THE EQUIPMENT MANUFACTURER. INCLUDE AN INSIDE COVER SHEET THAT LISTS THE PROJECT NAME, DATE, OWNER, ARCHITECT, ENGINEER, GENERAL CONTRACTOR, SUB-CONTRACTOR, AND AN INDEX OF CONTENTS.

SUBMIT THREE COPIES OF LITERATURE BOUND IN APPROVED BINDERS WITH INDEX AND TABS SEPARATING EQUIPMENT TYPES TO THE ARCHITECT, FOR ENGINEER'S REVIEW, AT THE TERMINATION OF THE WORK. PAPER CLIPS, STAPLES, RUBBER BANDS, LOOSE-LEAF BINDING, AND MAILING ENVELOPES ARE NOT CONSIDERED APPROVED BINDERS. FINAL APPROVAL OF SYSTEMS INSTALLED UNDER THIS CONTRACT SHALL BE WITHHELD UNTIL THIS EQUIPMENT BROCHURE IS RECEIVED AND DEEMED COMPLETE BY THE ARCHITECT AND ENGINEER. INSTRUCT WORKMEN TO SAVE REQUIRED LITERATURE SHIPPED WITH THE EQUIPMENT ITSELF FOR INCLUSION IN THIS BROCHURE.

INCLUDE RECORD DRAWINGS AS DESCRIBED ABOVE.

REFER TO DIVISION 01 FOR ACCEPTANCE OF ELECTRONIC MANUALS FOR THIS PROJECT. FOR ELECTRONIC MANUALS, REFER TO PARAGRAPH "SUBMITTALS" FOR REQUIREMENTS.

K. SPARE PARTS

FURNISH TO OWNER, WITH RECEIPT, THE SPARE PARTS FOR FAUCET WASHERS AND O-RINGS, FLUSHOMETER REPAIR KITS, AND WATER CLOSET TANK REPAIR KITS FOR THE FIXTURES FURNISHED FOR THIS PROJECT.

L. WARRANTIES

WARRANT EACH SYSTEM AND EACH ELEMENT THEREOF AGAINST ALL DEFECTS DUE TO FAULTY WORKMANSHIP, DESIGN, OR MATERIAL FOR A PERIOD OF 12 MONTHS FROM DATE OF SUBSTANTIAL COMPLETION, UNLESS SPECIFIC ITEMS ARE NOTED TO CARRY A LONGER WARRANTY IN THE CONSTRUCTION DOCUMENTS OR MANUFACTURER'S STANDARD WARRANTY EXCEEDS 12 MONTHS. REMEDY ALL DEFECTS, OCCURRING WITHIN THE WARRANTY PERIOD(S), AS STATED IN THE GENERAL CONDITIONS AND DIVISION 01.

WARRANTY SHALL INCLUDE A GUARANTEE OF FREE CIRCULATION OF LIQUIDS THROUGHOUT THE SYSTEM AS INTENDED WITHOUT LEAKS, EXCESSIVE NOISE, OR WATER HAMMER.

WARRANTIES SHALL INCLUDE LABOR AND MATERIAL, INCLUDING TRAVEL EXPENSES. MAKE REPAIRS OR REPLACEMENTS WITHOUT ANY ADDITIONAL COSTS TO THE OWNER, AND TO THE SATISFACTION OF THE OWNER, ARCHITECT, AND ENGINEER.

PERFORM THE REMEDIAL WORK PROMPTLY, UPON WRITTEN NOTICE FROM THE ENGINEER OR OWNER.

AT THE TIME OF SUBSTANTIAL COMPLETION, DELIVER TO THE OWNER ALL WARRANTIES, IN WRITING AND PROPERLY EXECUTED, INCLUDING TERM LIMITS FOR WARRANTIES EXTENDING BEYOND THE ONE YEAR PERIOD AND ANY ACTIONS THE OWNER MUST TAKE IN ORDER TO MAINTAIN WARRANTY STATUS. EACH WARRANTY INSTRUMENT SHALL BE ADDRESSED TO THE OWNER AND STATE THE COMMENCEMENT DATE AND TERM.

2. GENERAL MATERIALS AND INSTALLATION

A. EXCAVATION AND BACKFILLING

PERFORM EXCAVATION AND BACKFILL REQUIRED FOR INSTALLATION OF UNDERGROUND WORK UNDER THIS CONTRACT. TRENCHES SHALL BE OF SUFFICIENT WIDTH. CRIB OR BRACE TRENCHES TO PREVENT CAVE-IN OR SETTLEMENT. DO NOT EXCAVATE TRENCHES CLOSE TO COLUMNS AND WALLS OF NEW BUILDING WITHOUT PRIOR CONSULTATION WITH THE ARCHITECT. USE PUMPING EQUIPMENT IF REQUIRED TO KEEP TRENCHES FREE OF WATER. BACKFILL TRENCHES IN MAXIMUM 6 INCH LAYERS OF WELL-TAMPED DRY EARTH IN A MANNER TO PREVENT FUTURE SETTLEMENT.

EXCAVATION AS SPECIFIED HEREIN SHALL BE CLASSIFIED AS COMMON EXCAVATION. COMMON EXCAVATION SHALL COMPRISE THE SATISFACTORY REMOVAL AND DISPOSITION OF MATERIAL OF WHATEVER SUBSTANCES AND OF EVERY DESCRIPTION ENCOUNTERED, INCLUDING ROCK, IF ANY, WITHIN THE LIMITS OF THE WORK AS SPECIFIED AND SHOWN ON THE DRAWINGS. EXCAVATION SHALL BE PERFORMED TO THE LINES AND GRADES INDICATED ON THE DRAWINGS. DISPOSE OF EXCAVATED MATERIALS THAT ARE CONSIDERED UNSUITABLE FOR BACKFILL AND SURPLUS OF EXCAVATED MATERIAL WHICH IS NOT REQUIRED FOR BACKFILL TO THE SATISFACTION OF THE ARCHITECT.

B. UTILITY CONNECTIONS

PROVIDE UTILITY CONNECTIONS REQUIRED AND INDICATED ON THE DRAWINGS. INSTALL INTERIOR AND EXTERIOR CONNECTIONS TO "MAINS" AND EXISTING SERVICE LINES COMPLETE AND FUNCTIONING, IN COMPLIANCE WITH THE REQUIREMENTS OF THE CODES HAVING JURISDICTION AND THE SERVING UTILITY INVOLVED. VERIFY THE EXACT LOCATION OF UTILITY MAINS, SERVICE LINES, AND CONNECTION POINTS REQUIRING CONNECTION IN THE FIELD PRIOR TO INSTALLATION. WORK IN CONJUNCTION WITH THE UTILITY INVOLVED IN THE INSTALLATION OF SERVICES. VERIFY THAT INSTALLATION WILL TIE INTO THE EXISTING UTILITY MAINS, SERVICE LINES, AND CONNECTION POINTS AT THE INDICATED INVERT ELEVATION POINT PRIOR TO INSTALLATION. IF THE INSTALLATION WILL NOT TIE INTO THE INDICATED INVERT ELEVATION POINT WHILE MAINTAINING PROPER FALL, NOTIFY THE ARCHITECT AND THE ENGINEER SO THAT AN ALTERNATIVE MAY BE DETERMINED.

PROVIDE SERVICE PIPING AND ACCESSORIES REQUIRED TO COMPLETE UTILITY CONNECTIONS THAT ARE NOT FURNISHED BY THE SERVING UTILITY. COORDINATE WITH THE SERVING UTILITY COMPANY REGARDING ITEMS FURNISHED, WORK PERFORMED, AND PERMITS AND INSPECTIONS REQUIRED. PAY ASSOCIATED FEES OR CHARGES.

C. EXTERIOR UTILITY CONNECTIONS

TERMINATE DOMESTIC WATER, STORM, AND SEWER LINES AT A POINT APPROXIMATELY FIVE FEET FROM THE BUILDING WALL, OR AS SHOWN ON THE DRAWINGS. MAKE CONNECTION TO THE VARIOUS SERVICES PROVIDED BY OTHERS AND COORDINATE CONNECTION REQUIREMENTS WITH CIVIL ENGINEER. VERIFY THAT INSTALLATION WILL TIE INTO THE VARIOUS SERVICES PROVIDED BY OTHERS AT THE INDICATED INVERT ELEVATION POINT PRIOR TO INSTALLATION. IF THE INSTALLATION WILL NOT TIE INTO THE INDICATED INVERT ELEVATION POINT WHILE MAINTAINING PROPER FALL, NOTIFY ARCHITECT AND CIVIL ENGINEER SO THAT AN ALTERNATIVE MAY BE DETERMINED.

PROVIDE SERVICE PIPING AND ACCESSORIES REQUIRED TO COMPLETE UTILITY CONNECTIONS THAT ARE NOT FURNISHED BY THE SERVING UTILITY.

D. COINCIDENTAL DAMAGE

REPAIR STREETS, SIDEWALKS, DRIVES, PAVING, WALLS, FINISHES, AND OTHER FACILITIES DAMAGED IN THE COURSE OF THE WORK. REPAIR MATERIALS SHALL MATCH EXISTING CONSTRUCTION. REPAIR WORK SHALL MEET ALL REQUIREMENTS OF THE OWNER, LOCAL AUTHORITIES HAVING JURISDICTION, AND MEET THE SATISFACTION OF THE ARCHITECT.

E. CUTTING AND PATCHING

CONFORM TO THE REQUIREMENTS IN DIVISION 01. CUT WALLS, FLOORS, CEILINGS, AND OTHER PORTIONS OF THE FACILITY AS REQUIRED TO INSTALL WORK UNDER THIS DIVISION. OBTAIN PERMISSION FROM THE ARCHITECT PRIOR TO CUTTING. DO NOT DISTURB STRUCTURAL MEMBERS WITHOUT PRIOR APPROVAL FROM THE ARCHITECT. CUT HOLES AS SMALL AS POSSIBLE. PATCH WALLS, FLOORS, AND OTHER PORTIONS OF THE FACILITY AS REQUIRED BY WORK UNDER THIS DIVISION. PATCHING SHALL MATCH ORIGINAL MATERIAL AND CONSTRUCTION INCLUDING FIRE RATINGS, IF APPLICABLE. REPAIR AND REFINISH AREAS DISTURBED BY WORK TO THE CONDITION OF ADJOINING SURFACES IN A MANNER SATISFACTORY TO THE ARCHITECT.

F. ROUGH-IN

COORDINATE WITHOUT DELAY ALL ROUGHING-IN WITH OTHER DIVISIONS. CONCEAL PIPING, CONDUIT, AND ROUGH-IN EXCEPT IN UNFINISHED AREAS AND WHERE OTHERWISE SHOWN.

G. CONCRETE BASES

PROVIDE CONCRETE BASES (E.G., HOUSEKEEPING PADS) FOR EQUIPMENT WHERE INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN. CONCRETE BASES SHALL HAVE CHAMFERED EDGES. SIZE OF BASE SHALL BE A MINIMUM OF 4 INCHES GREATER THAN THE FOOTPRINT OF THE EQUIPMENT THAT IT IS SUPPORTING AND SHALL HAVE A MINIMUM HEIGHT AS DESCRIBED BELOW.

CONSTRUCT EQUIPMENT BASES OF A MINIMUM 28 DAY, 4000 PSI CONCRETE CONFORMING TO AMERICAN CONCRETE INSTITUTE STANDARD BUILDING CODE FOR REINFORCED CONCRETE (ACI 318-99) AND THE LATEST APPLICABLE RECOMMENDATIONS OF THE ACI STANDARD PRACTICE MANUAL. CONCRETE SHALL BE COMPOSED OF CEMENT CONFORMING TO ASTM C150 TYPE I, AGGREGATE CONFORMING TO ASTM C33, AND POTABLE WATER. EXPOSED EXTERIOR CONCRETE SHALL CONTAIN 5 TO 7 PERCENT AIR ENTRAINMENT.

UNLESS OTHERWISE SPECIFIED OR SHOWN ON THE STRUCTURAL DRAWINGS, REINFORCE EQUIPMENT BASES AND HOUSEKEEPING PADS WITH NO. 4 REINFORCING BARS CONFORMING TO ASTM A615 OR 6X6 – W2.9 X W2.9 WELDED WIRE MESH CONFORMING TO ASTM A185. PLACE REINFORCING BARS 24 INCHES ON CENTER WITH A MINIMUM OF TWO BARS EACH DIRECTION.

PROVIDE GALVANIZED ANCHOR BOLTS FOR EQUIPMENT PLACED ON CONCRETE EQUIPMENT BASES AND HOUSEKEEPING PADS OR ON CONCRETE SLABS. ANCHOR BOLTS SIZE, NUMBER AND PLACEMENT SHALL BE AS RECOMMENDED BY THE MANUFACTURER OF THE EQUIPMENT.

CONCRETE EQUIPMENT BASES SHALL HAVE MINIMUM HEIGHTS IN ACCORDANCE WITH THE FOLLOWING:

1. FOR WATER HEATERS, WATER SOFTENERS AND OTHER EQUIPMENT NOT LISTED, MINIMUM HEIGHT IS 3-1/2 INCHES.
2. HEIGHT OF EQUIPMENT BASES APPLIES TO EQUIPMENT INSTALLED ON SLAB-ON-GRADE. FOR EQUIPMENT INSTALLED ON FLOORS ABOVE GRADE AND ON THE ROOF, REFER TO THE DRAWINGS.

H. SUPPORT SYSTEMS

STRUCTURAL STEEL USED FOR PIPE SUPPORTS, EQUIPMENT SUPPORTS, ETC., SHALL BE NEW AND CLEAN, AND SHALL CONFORM TO ASTM DESIGNATION A-36.

SUPPORT PLUMBING EQUIPMENT AND PIPING FROM THE BUILDING STRUCTURE. DO NOT SUPPORT PLUMBING EQUIPMENT AND PIPING FROM CEILINGS, OTHER MECHANICAL OR ELECTRICAL COMPONENTS, AND OTHER NON-STRUCTURAL ELEMENTS.

I. ACCESS DOORS

PROVIDE ACCESS DOORS FOR ALL CONCEALED EQUIPMENT WHERE INDICATED OR AS REQUIRED, EXCEPT WHERE ABOVE LAY-IN CEILINGS. ACCESS DOORS SHALL BE ADEQUATELY SIZED FOR THE DEVICES SERVED WITH A MINIMUM SIZE OF 18 INCHES X 18 INCHES. ACCESS DOORS MUST BE OF THE PROPER CONSTRUCTION FOR TYPE OF CONSTRUCTION IN WHICH IT IS INSTALLED. OBTAIN ARCHITECT'S APPROVAL OF TYPE, SIZE, LOCATION, AND COLOR BEFORE ORDERING. PROVIDE FACTORY-FABRICATED AND ASSEMBLED UNITS, COMPLETE WITH ATTACHMENT DEVICES AND FASTENERS READY FOR INSTALLATION, CONCEALED HINGES, FLUSH SCREWDRIVER-OPERATED CAM LOCK, AND ANCHOR STRAPS. PROVIDE ACCESS DOORS MANUFACTURED BY MILCOR, TITUS, ZURN, OR EQUAL.

J. PENETRATIONS

PROVIDE SLEEVES FOR PIPES PASSING THROUGH ABOVE GRADE CONCRETE OR MASONRY WALLS, CONCRETE FLOOR OR ROOF SLABS. SLEEVES ARE NOT REQUIRED FOR CORE DRILLED HOLES IN EXISTING MASONRY WALLS, CONCRETE FLOORS OR ROOFS. PROVIDE 10 GAUGE GALVANIZED STEEL SLEEVES FOR SLEEVES 6 INCHES AND SMALLER. PROVIDE GALVANIZED SHEET METAL SLEEVES FOR LARGER THAN 6 INCHES. SCHEDULE 40 PVC SLEEVES ARE ACCEPTABLE FOR INSTALLATION IN AREAS WITHOUT RETURN AIR PLENUMS.

SEAL ELEVATED FLOOR, EXTERIOR WALL AND ROOF PENETRATIONS WATERTIGHT AND WEATHERTIGHT WITH NON-SHRINK, NON-HARDENING COMMERCIAL SEALANT. PACK WITH MINERAL WOOL AND SEAL BOTH ENDS WITH MINIMUM OF 1/2 INCH OF SEALANT.

SEAL AROUND PENETRATIONS OF FIRE RATED ASSEMBLIES. COORDINATE FIRE RATINGS AND LOCATIONS WITH THE ARCHITECTURAL DRAWINGS. REFER TO ARCHITECTURAL SPECIFICATIONS FOR FIRE STOPPINGS. PROVIDE A PRODUCT SCHEDULE FOR UL LISTING, LOCATION, WALL OR FLOOR RATING AND INSTALLATION DRAWING FOR EACH PENETRATION FIRE STOP SYSTEM.

EXTEND PIPE INSULATION FOR INSULATED PIPE THROUGH FLOOR, WALL AND ROOF PENETRATIONS, INCLUDING FIRE RATED WALLS AND FLOORS. THE VAPOR BARRIER SHALL BE MAINTAINED. SIZE SLEEVE FOR A MINIMUM OF 1 INCH ANNULAR CLEAR SPACE BETWEEN INSIDE OF SLEEVE AND OUTSIDE OF INSULATION.

SEAL CONCRETE OR MASONRY EXTERIOR WALL PENETRATIONS BELOW GRADE WITH "WALL PIPES" AND MECHANICAL SLEEVE SEALS. PROVIDE CAST IRON "WALL PIPES" WITH INTEGRAL WATERSTOP RING MANUFACTURED BY JOSAM, JAY R. SMITH, WADE, WATTS OR ZURN. PROVIDE MODULAR MECHANICAL SLEEVE SEALS, MANUFACTURED BY THUNDERLINE / LINK SEAL, CALPICO, INC. AND METRAFLEX.

SEAL ELEVATED CONCRETE SLAB WITH WATER PROOF MEMBRANE PENETRATIONS WITH "WALL PIPES" AND WATER PROOF SEALANT. SECURE WATERPROOF MEMBRANE FLASHING BETWEEN "WALL PIPE" CLAMPING FLANGE AND CLAMPING RING. PROVIDE CAST IRON "WALL PIPES" WITH INTEGRAL WATERSTOP RING MANUFACTURED BY JOSAM, JAY R. SMITH, WADE, WATTS OR ZURN.

PROVIDE SLEEVES FOR HORIZONTAL PIPE PASSING THROUGH OR UNDER FOUNDATION. SLEEVES SHALL BE CAST IRON SOIL PIPE TWO NOMINAL PIPE SIZES LARGER THAN THE PIPE SERVED.

PROVIDE SCHEDULE 40 PVC PIPE SLEEVES FOR VERTICAL PRESSURE PIPE PASSING THROUGH CONCRETE SLAB ON GRADE. SLEEVES SHALL BE ONE NOMINAL PIPE SIZE LARGER THAN THE PIPE SERVED AND TWO PIPE SIZES LARGER THAN PIPE SERVED FOR DUCTILE IRON PIPES WITH RESTRAINING RODS. SEAL WATER-TIGHT WITH SILICONE CAULK.

PROVIDE 1/2 INCH THICK CELLULAR FOAM INSULATION AROUND PERIMETER OF NON-PRESSURE PIPE PASSING THRU CONCRETE SLAB ON GRADE. INSULATION SHALL EXTEND TO 2 INCHES ABOVE AND BELOW THE CONCRETE SLAB.

K. FIRESTOPPING

SEALANTS AND ACCESSORIES SHALL HAVE FIRE-RESISTANCE RATINGS INDICATED, AS ESTABLISHED BY TESTING IDENTICAL ASSEMBLIES IN ACCORDANCE WITH UL 2079 OR ASTM E 814, OR OTHER NRTL ACCEPTABLE TO AHJ.

MANUFACTURERS: HILTI, RECTORSEAL, SPECIFIED TECHNOLOGIES INC., UNITED STATES GYPSUM COMPANY, OR 3M CORP.

THROUGH AND MEMBRANE PENETRATION FIRESTOPPING SYSTEMS PRODUCT SCHEDULE: PROVIDE UL LISTING, LOCATION, WALL OR FLOOR RATING, AND INSTALLATION DRAWING FOR EACH PENETRATION FIRE STOP SYSTEM.

WHERE PROJECT CONDITIONS REQUIRE MODIFICATION TO QUALIFIED TESTING AND INSPECTING AGENCY'S ILLUSTRATIONS FOR A PARTICULAR FIRESTOPPING CONDITION, SUBMIT ILLUSTRATION, WITH MODIFICATIONS MARKED, APPROVED BY PENETRATION FIRESTOPPING MANUFACTURER'S FIRE-PROTECTION ENGINEER AS AN ENGINEERING JUDGMENT OR EQUIVALENT FIRE-RESISTANCE-RATED ASSEMBLY. INCLUDE QUALIFICATIONS DATA FOR TESTING AGENCY.

L. MOTORS AND STARTERS

PROVIDE MOTORS AND STARTING EQUIPMENT WHERE NOT FURNISHED WITH THE EQUIPMENT PACKAGE. MOTORS SHALL HAVE COPPER WINDINGS, CLASS B INSULATION, AND STANDARD SQUIRREL CAGE WITH STARTING TORQUE CHARACTERISTICS SUITABLE FOR THE EQUIPMENT SERVED. MOTORS CONTROLLED BY VARIABLE FREQUENCY DRIVES SHALL BE RATED FOR VOLTAGE PEAKS AND MINIMUM RISE TIMES IN ACCORDANCE WITH NEMA MG1, PART 31. EACH MOTOR SHALL BE CHECKED FOR PROPER ROTATION AFTER ELECTRICAL CONNECTION HAS BEEN COMPLETED. PROVIDE DRIPPROOF ENCLOSURE FOR LOCATIONS PROTECTED FROM WEATHER AND NOT IN AIR STREAM OF FAN; AND TOTALLY ENCLOSED FAN COOLED ENCLOSURE FOR MOTORS EXPOSED TO WEATHER. MOTORS SHALL BE MANUFACTURED BY CENTURY, GENERAL ELECTRIC, WESTINGHOUSE, LOUIS ALLIS, OR APPROVED EQUAL.

PROVIDE EVERY MOTOR, EXCEPT FRACTIONAL HORSEPOWER SINGLE PHASE MOTORS WITH AN APPROVED TYPE OF "BUILT-IN" THERMAL OVERLOAD PROTECTION, WITH A MOTOR STARTER. EACH STARTER SHALL BE PROVIDED WITH OVERLOAD HEATERS SIZED TO THE MOTOR RATING, AND EVERY THREE PHASE MOTOR STARTER SHALL HAVE OVERLOAD HEATERS IN EACH PHASE. AMBIENT COMPENSATED HEATERS SHALL BE INSTALLED WHEREVER NECESSARY. UNLESS NOTED OTHERWISE, MOTOR STARTERS SHALL BE FURNISHED BY THE DIVISION 15 CONTRACTOR FOR INSTALLATION AND CONNECTION BY THE DIVISION 16 CONTRACTOR. STARTERS SHALL BE ALLEN-BRADLEY, CLARK, FURNAS, SQUARE D, OR APPROVED EQUAL.

M. ELECTRICAL WIRING

LINE VOLTAGE WIRING SHALL BE PROVIDED BY DIVISION 16. LINE VOLTAGE CONTROL AND INTERLOCK WIRING FOR PLUMBING SYSTEMS SHALL ALSO BE PROVIDED BY DIVISION 16. LOW VOLTAGE CONTROL WIRING SHALL BE PROVIDED BY DIVISION 15. FURNISH WIRING DIAGRAMS TO DIVISION 16 AS REQUIRED FOR PROPER EQUIPMENT HOOKUP. COORDINATE WITH DIVISION 16 THE ACTUAL WIRE SIZING AMPS FOR PLUMBING EQUIPMENT (FROM THE EQUIPMENT NAMEPLATE) TO ENSURE PROPER INSTALLATION.

N. EQUIPMENT FURNISHED BY OTHERS

PROVIDE NECESSARY EQUIPMENT AND ACCESSORIES THAT ARE NOT PROVIDED BY THE EQUIPMENT SUPPLIER OR OWNER TO COMPLETE INSTALLATION OF EQUIPMENT FURNISHED BY OTHERS IN LOCATIONS AS INDICATED ON THE DRAWINGS, SPECIFIED HEREIN, OR BOTH. FURNISH AND INSTALL ROUGHED-IN WASTES, VENTS AND WATER SERVICES. PROVIDE FINAL CONNECTION TO KITCHEN EQUIPMENT, FURNISHED BY OTHERS, IN LOCATIONS AS INDICATED ON THE DRAWINGS. PROVIDE ACCESSORY ITEMS THAT ARE REQUIRED BUT NOT FURNISHED WITH THE EQUIPMENT INCLUDING TRAPS, STOP VALVES, PRVS, INDIRECT DRAIN FROM EQUIPMENT TO FLOOR DRAINS, AND ACCESSORY ITEMS INDICATED OR REQUIRED FOR THE PROPER OPERATION OF THE COMPLETE SYSTEM AT THE TERMINATION OF THE WORK.

CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECT ROUGH-IN DIMENSIONS AND SHALL VERIFY SAME WITH ARCHITECT A

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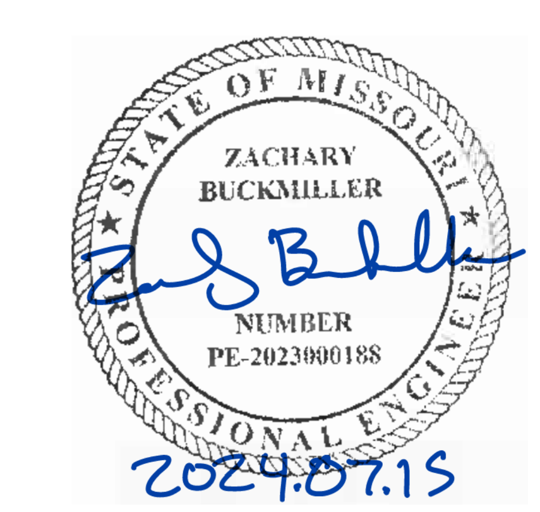

This drawing may be part of an integrated set of Construction Documents, including the Contract, the Conditions and the Specifications. The Contract Documents are complementary: what is required by one is as binding as if required by all. Application of a material or equipment item to Work installed by others constitutes acceptance of that Work. Calculate and measure dimensions – DO NOT SCALE DRAWINGS unless directed by the Architect to do so. Dimensions indicated are to the face of a material, unless noted otherwise.

SPECIFICATIONS

Sheet: **MEPF101**

Revision no.

21: FIRE PROTECTION

1. GENERAL INSTRUCTIONS

A. SCOPE

PROVIDE A WET-PIPE, AUTOMATIC FIRE SPRINKLER SYSTEM FOR THE BUILDING OR AREA OF WORK AS SHOWN ON THE DRAWINGS. CONTRACTOR SHALL BE APPROVED AND STATE LICENSED FOR DESIGN AND INSTALLATION OF FIRE PROTECTION SYSTEMS. THE WORK DONE UNDER THIS SECTION SHALL BE PERFORMED ONLY BY A CONTRACTOR WHOSE WORKMEN ARE EXPERIENCED AND REGULARLY ENGAGED IN THE INSTALLATION OF FIRE PROTECTION SYSTEMS. CONTRACTOR SHALL BE CAPABLE OF PREPARING HYDRAULIC CALCULATIONS AND SYSTEM LAYOUTS.

PROVIDE ALL FIRE SPRINKLER ALARM DEVICES INCLUDING WATERFLOW ALARM AND VALVE TAMPER SWITCHES FOR ALL SYSTEM CONTROL VALVES. PROVIDE A NOTIFICATION APPLIANCE ACCEPTABLE TO THE AHJ ON THE EXTERIOR OF THE BUILDING AT 8'-0" ABOVE FINISHED GRADE, ADJACENT TO THE FIRE DEPARTMENT CONNECTION. COORDINATE ALL WIRING AND CONDUIT FOR A COMPLETE AND FUNCTIONAL INSTALLATION.

SYSTEM SHALL, AT A MINIMUM, BE IN ACCORDANCE WITH THE LATEST EDITION OF NFPA 13, 24, UNDERWRITERS LABORATORIES (UL), AND MUST BE ACCEPTABLE TO THE OWNER'S INSURER, THE AHJ, AND ALL APPLICABLE LOCAL, STATE AND NATIONAL CODES AND STANDARDS. WHERE THE CONTRACT DOCUMENTS EXCEED THE REQUIREMENTS OF THE REFERENCED CODES, STANDARDS, ETC., THE CONTRACT DOCUMENTS SHALL TAKE PRECEDENCE.

WORK SHALL INCLUDE, BUT SHALL NOT NECESSARILY BE LIMITED TO THE FOLLOWING:

1. ALL UNDERGROUND PIPING (WHICH PERTAINS TO THE FIRE SPRINKLER SYSTEM) AS INDICATED ON THE DRAWINGS, INCLUDING ALL REQUIRED PIPE, VALVES, ETC., AS WELL AS THE REQUIRED PREPARATORY AND FINISHING WORK SUCH AS TRENCHING, BACKFILLING, AND PAVEMENT REPLACEMENT. PROVIDE THRUST BLOCKS, SUPERVISED POST INDICATING VALVE, AND VALVE PIT AS REQUIRED OR SHOWN ON DRAWINGS.

2. CONNECTION TO CITY MAIN SHALL BE A WET TAP AND SHALL INCLUDE ALL REQUIRED FITTINGS, VALVES, METER VAULTS, BACKFLOW PREVENTERS, BACKFLOW PREVENTER VAULT, ETC. PROVIDE BACKFLOW PREVENTION EQUIPMENT AS REQUIRED BY LOCAL CODES.

3. DESIGN AND INSTALLATION OF A COMPLETE WET-PIPE, AUTOMATIC FIRE SPRINKLER SYSTEM FOR THE AREA OF WORK SHOWN ON THE DRAWINGS OR SPECIFIED HEREIN.

4. PORTIONS OF SYSTEMS SUBJECT TO FREEZING OR TEMPERATURES BELOW 40 DEGREES F SHALL BE PROTECTED AGAINST FREEZING AS REQUIRED BY NFPA 13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRS AND ALL COSTS INCURRED FROM DAMAGE CAUSED BY FREEZING OF THE FIRE PROTECTION SYSTEM.

B. SYSTEM DESIGN

CONTRACTOR SHALL VERIFY DESIGN CRITERIA AND RATING HAZARDS WITH THE OWNER'S INSURER PRIOR TO DESIGNING THE SYSTEM. WATERFLOW AND PRESSURE TEST DATA SHALL BE ACQUIRED BEFORE SYSTEM IS CALCULATED AND BE DATED NOT MORE THAN 12 MONTHS PRIOR TO THE SUBMITTAL OF SPRINKLER SHOP DRAWINGS. ARRANGEMENTS FOR AND COST OF FLOW TESTS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

SUBMIT HYDRAULIC CALCULATIONS AND PLAN, INCLUDING A SUPPLY AND DEMAND GRAPH; ALL HYDRAULIC REFERENCE POINTS AND AREA OF APPLICATION SHALL APPEAR ON THE PLAN. CONTRACTOR SHALL VERIFY WITH AHJ ANY MINIMUM SAFETY FACTOR REQUIREMENTS. DEMAND SHALL NOT BE LESS THAN 10 PERCENT BELOW THE SUPPLY AT THE DEMAND POINT.

PROTECT ENTIRE BUILDING WITH A WET-TYPE SPRINKLER SYSTEM DESIGNED IN ACCORDANCE WITH NFPA 13 UNLESS NOTED OTHERWISE. DESIGN SYSTEM FOR ORDINARY HAZARD GROUP 2, 0.20 GPM/SF OVER THE HYDRAULICALLY REMOTE 1500 SF AREA. INCLUDE MINIMUM 250 GPM HOSE ALLOWANCE ADDED AT THE BASE OF RISER.

RESTAURANT SEATING AREAS MAY BE DESIGNED FOR LIGHT HAZARD DENSITY WITH THE APPROVAL OF THE AHJ.

THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE HYDRAULIC CALCULATIONS, THE FINAL SYSTEM DESIGN, AND THE LAYOUT OF ALL COMPONENTS OF THE SYSTEM AS REQUIRED FOR APPROVAL BY THE OWNER'S INSURER AND THE AHJ.

THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR COORDINATING SYSTEM LAYOUT WITH OTHER CONTRACTORS. CHANGES TO SYSTEM DESIGN DUE TO LACK OF COORDINATION SHALL BE PAID FOR BY THIS CONTRACTOR.

DESIGNS REQUIRING CUTTING OF STRUCTURAL MEMBERS FOR PASSAGE OF SPRINKLER PIPES OR HANGERS SHALL NOT BE ACCEPTED. WHEN DESIGN APPEARANCE OR SIMILAR ASPECTS REQUIRE CUTTING DUE TO ECONOMY, IT SHALL BE HELD TO AN ABSOLUTE MINIMUM AND DONE ONLY WITH THE ARCHITECT AND STRUCTURAL ENGINEER'S WRITTEN APPROVAL. ANY EXCESSIVE REQUIREMENTS OF THIS TYPE SHALL BE IDENTIFIED DURING THE BID PERIOD.

SPRINKLER SPACING SHALL CONFORM TO NFPA 13. EXTENDED COVERAGE SPRINKLERS SHALL NOT BE USED IN UNFINISHED (SHELL) SPACES.

THE HYDRAULIC AREA OF OPERATION SHALL NOT BE REDUCED AS ALLOWED BY NFPA 13 FOR AREAS UTILIZING QUICK RESPONSE SPRINKLERS.

2. MATERIALS AND INSTALLATION

A. PRODUCTS

ALL FIRE PROTECTION SYSTEM COMPONENTS SHALL BE UNDERWRITER'S LABORATORIES LISTED FOR THEIR INTENDED USE.

B. PIPING AND COMPONENTS

UNDERGROUND PIPING SHALL BE CEMENT LINED DUCTILE IRON OR OTHER APPROVED OR LISTED MATERIAL, INSTALLED IN ACCORDANCE WITH NFPA AND FM STANDARDS; FIRE MAIN SHALL INCLUDE ALL REQUIRED FITTINGS AND VALVES.

SPRINKLER PIPING 2-1/2 INCH AND LARGER SHALL BE SCHEDULE 10 OR SCHEDULE 40 BLACK STEEL. SPRINKLER PIPING 2 INCH AND SMALLER SHALL BE SCHEDULE 40. PIPES SHALL HAVE WELDED, THREADED, OR MECHANICALLY JOINED FITTINGS, BASED ON THE PIPE MATERIAL AND SIZE PER NFPA 13 REQUIREMENTS.

ACCEPTABLE ALTERNATIVES TO SCHEDULE 10 AND SCHEDULE 40 PIPE SHALL BE MANUFACTURED TO STANDARDS RECOGNIZED BY NFPA 13. PIPE SHALL HAVE A CORROSION RESISTANCE RATING OF 1.0 OR GREATER. CRIMP-TYPE COUPLINGS ARE NOT PERMITTED. THREADABLE THINWALL PIPE WITH CORROSION RESISTANCE RATING LESS THAN 1.0 IS NOT PERMITTED.

ALL PIPING ON THE EXTERIOR OF THE BUILDING AND/OR EXPOSED TO THE ELEMENTS SHALL BE EXTERNALLY GALVANIZED.

C. SPRINKLERS

SPRINKLERS IN AREAS WITH GYPSUM BOARD CEILINGS SHALL BE ONE OF THE FOLLOWING:

1. FULLY CONCEALED TYPE WITH WHITE COVER PLATES.

SPRINKLERS IN AREAS WITH SUSPENDED ACOUSTICAL CEILINGS SHALL BE ONE OF THE FOLLOWING:

1. FULLY CONCEALED TYPE WITH WHITE COVER PLATES.

SPRINKLERS IN AREAS WITH EXPOSED PIPING MAY BE PENDENT OR UPRIGHT TYPES WITH ROUGH BRASS FINISH.

PROVIDE QUICK RESPONSE SPRINKLERS IN ALL LIGHT HAZARD AREAS.

D. SERVICE ENTRANCE

LOCATE FIRE PROTECTION SERVICE ENTRANCE WHERE INDICATED ON THE DRAWINGS. EQUIP THE SERVICE WITH A UL LISTED BACKFLOW PREVENTER ASSEMBLY AS REQUIRED BY THE AHJ. SERVICE ENTRANCE ASSEMBLY SHALL INCLUDE APPROVED OUTSIDE SCREW AND YOKE (OS&Y) VALVES WITH TAMPER SWITCHES.

EQUIP SPRINKLER SYSTEM RISER WITH AN APPROVED INDICATING CONTROL VALVE WITH TAMPER SWITCH, WATERFLOW ALARM SWITCH, NOTIFICATION APPLIANCE, CHECK VALVE, SYSTEM DRAIN TERMINATING OUTDOORS, GAUGES, AND FIRE DEPARTMENT CONNECTION WITH CHECK VALVE. EACH RISER SHALL MEET NFPA 13 STANDARDS AND REQUIREMENTS FOR ACCEPTABLE VALVE ARRANGEMENTS. SEPARATE CONTROL VALVE AND CHECK VALVE MAY BE OMITTED IF BACKFLOW PREVENTER IS LOCATED AT THE SERVICE ENTRANCE AND BUILDING IS PROTECTED WITH A SINGLE RISER.

PROVIDE A PRINTED SHEET GIVING BRIEF INSTRUCTIONS REGARDING CONTROL, EMERGENCY PROCEDURE AND OTHER DATA AS REQUIRED BY NFPA NEXT TO THE SPRINKLER RISER. PROTECT SHEET WITH GLASS OR A TRANSPARENT PLASTIC COVER. PERMANENTLY ATTACH A PLACARD INDICATING THE LOCATION AND BASIS OF DESIGN (DISCHARGE DENSITY AND SYSTEM DEMAND) TO THE RISER FOR HYDRAULICALLY DESIGNED SYSTEMS.

PROVIDE ALL CONTROL VALVE SUPERVISORY SWITCHES, WATERFLOW ALARM SWITCHES, AND SPRINKLER SYSTEM EQUIPMENT PANELS REQUIRING INTERCONNECTION TO THE FIRE ALARM SYSTEM. PROVIDE A LINE SEIZURE TYPE AUTOMATIC DIALER (ADEMCO OR EQUAL) AND RELATED TELEPHONE WIRING FOR REMOTE MONITORING OF FIRE SPRINKLER ALARM DEVICES AND OPERATION OF THE NOTIFICATION APPLIANCE.

PROVIDE STORZ FIRE DEPARTMENT CONNECTION, UL LISTED, 4", 5" OR 6" WITH ROUGH BRASS CONNECTION AND DRAIN, LOCATED WHERE INDICATED ON DRAWINGS. FIRE DEPARTMENT CONNECTION SHALL BE COMPLETE WITH 30 DEGREE ELBOW AND HOSE INLET CAP WITH CHAIN. PROVIDE CHECK VALVE SIZED PER NFPA 13 WITH 3/4 INCH BALL DRIP DRAIN PIPED TO THE EXTERIOR OF THE BUILDING. FIRE DEPARTMENT CONNECTION SHALL BE PERMANENTLY LABELED "AUTOMATIC SPRINKLER FIRE DEPARTMENT CONNECTION".

PROVIDE A CABINET CONTAINING SPARE SPRINKLERS AND APPROPRIATE WRENCH(ES) PER NFPA 13 AT THE FIRE SPRINKLER SYSTEM SERVICE ENTRANCE AREA.

3. EXECUTION

A. PIPING AND FINISHES

EXCAVATION, TRENCHING AND BACKFILLING SHALL BE IN ACCORDANCE WITH REQUIREMENTS OF THE EXCAVATION AND BACKFILL SECTION OF THE PLUMBING SPECIFICATIONS.

CONCEAL PIPING IN AREAS HAVING CEILINGS, OTHER THAN THE UNDERSIDE OF THE ROOF DECK. PIPING IN AREAS WITHOUT CEILINGS MAY BE EXPOSED BUT KEPT AT A MINIMUM DISTANCE FROM THE DECK. ALL PIPING SHALL BE CLEAN AND FREE OF RUST. INSTALL SYSTEM SUCH THAT ALL PIPING IS RIGIDLY SECURED AND SUPPORTED. ALL DUCTWORK, LIGHTS, STRUCTURAL MEMBERS AND MAIN RUNS OF PIPING SHALL TAKE PRECEDENCE OVER SPRINKLER PIPING. CUTTING OF STRUCTURAL MEMBERS FOR PASSAGE OF SPRINKLER PIPES OR HANGERS SHALL NOT BE PERMITTED. ALL HORIZONTAL PIPING IN CEILING SPACE SHALL BE AT AN ELEVATION ABOVE THE TOP OF LIGHT FIXTURES AND AIR OUTLETS TO ALLOW FOR ACCESS TO LIGHT FIXTURES AND AIR OUTLETS WITHOUT REMOVING HORIZONTAL PIPING. ROUTE ALL SPRINKLER PIPING AND PROVIDE ALL OFFSETS, BENDS, AND ELBOWS AROUND ALL MECHANICAL, ELECTRICAL, AND STRUCTURAL MEMBERS AS REQUIRED.

WHERE EXPOSED PIPING PASSES THROUGH FINISH WORK, INSTALL CHROME PLATED (OR OTHER FINISH ACCEPTABLE TO THE ARCHITECT) SPLIT WALL PLATES OR ESCUTCHEONS TO FIT SNUGLY AROUND THE PIPING. PROVIDE AT EACH PENETRATION TO ASSURE EFFECTIVENESS OF CONSTRUCTION AS A FIRE STOP WHERE PIPING IS CONCEALED OR INSTALLED IN UNFINISHED AREAS.

ALL OPENINGS FOR PIPING SHALL BE ANTICIPATED AND INDICATED ON THE APPROVED SHOP DRAWINGS. ANY ADDITIONAL CUTTING OF OPENINGS MUST HAVE THE WRITTEN APPROVAL OF THE ARCHITECT.

ROUTE PIPING PARALLEL TO MAJOR BUILDING LINES.

INSTALLATION SHALL ALLOW FOR SUITABLE DRAINAGE OF SYSTEM TO MEET WITH THE APPROVAL OF THE AHJ. PROVIDE ACCESS PANELS AS REQUIRED. ALL DRAIN LOCATIONS REQUIRING ACCESS PANELS SHALL BE APPROVED BY THE ARCHITECT PRIOR TO INSTALLATION.

SPRINKLERS IN SUSPENDED CEILINGS SHALL BE NOT LESS THAN 6-INCHES FROM THE GRID IN ALL DIRECTIONS.

SPRINKLERS IN SUSPENDED CEILINGS SHALL BE 1 FOOT FROM THE GRID IN BOTH DIRECTIONS OR CENTERED IN CEILING TILES. SPRINKLER LOCATIONS IN FINISHED AREAS SHALL BE APPROVED BY ARCHITECT PRIOR TO INSTALLATION.

B. PENETRATIONS

SEAL ALL FIRE PROTECTION FLOOR, WALL AND ROOF PENETRATIONS WATERTIGHT AND WEATHERTIGHT. CAULK AROUND FIRE PROTECTION PENETRATIONS WITH 3M CP-25, OR APPROVED EQUAL FIRE BARRIER CAULK (THICKNESS AS REQUIRED AND RECOMMENDED BY MANUFACTURER) TO MAINTAIN FIRE RESISTANCE RATING OF FIRE-RATED ASSEMBLIES.

C. TESTING AND ACCEPTANCE

COMPLETE THE AUTOMATIC FIRE SPRINKLER SYSTEM, AS SOON AS POSSIBLE, WHEN BUILDING CONSTRUCTION ALLOWS. FOLLOWING SYSTEM INSTALLATION, PLACE THE SYSTEM IN SERVICE. AFTER THE SYSTEM HAS BEEN PLACED IN SERVICE FOR CONTINUOUS USE, WATER CHARGES, IF ANY, WILL BE PAID BY OWNER.

UPON COMPLETION OF THE SYSTEMS INSTALLATION, AND PRIOR TO ACCEPTANCE BY THE ENGINEER AND OWNER, THIS CONTRACTOR SHALL MAKE GENERAL OPERATING TESTS TO DEMONSTRATE THAT ALL EQUIPMENT AND SYSTEMS ARE IN PROPER WORKING ORDER, AND ARE FUNCTIONING IN CONFORMANCE WITH THE INTENT OF THE DRAWINGS AND SPECIFICATIONS.

PRIOR TO CONNECTING TO THE OVERHEAD SPRINKLER PIPING, FLUSH THE UNDERGROUND MAIN THOROUGHLY AND TEST IN ACCORDANCE WITH NFPA 24. SECURE ALL REQUIRED APPROVALS OF THE FLUSHING OPERATION. TEST ABOVE GROUND PIPING IN ACCORDANCE WITH NFPA 13, HYDROSTATICALLY TEST ALL SPRINKLER PIPING AT A MINIMUM PRESSURE OF 200 PSI FOR A MINIMUM 2-HOUR PERIOD OF TIME. CORRECT ANY FAULTY OR LEAKING JOINTS AND PIPE. THE USE OF ANY SUBSTANCE OR MATERIAL ADDED TO THE WATER TO CORRECT LEAKS SHALL NOT BE PERMITTED. CAULKING OF DEFECTIVE JOINTS, CRACKS OR HOLES SHALL NOT BE PERMITTED. REPEAT TESTS AFTER DEFECTS HAVE BEEN ELIMINATED. PERFORM ALL TESTS IN THE PRESENCE OF THE AHJ AND/OR THE OWNER'S AUTHORIZED REPRESENTATIVE.

UPON COMPLETION OF EACH PHASE OF THE INSTALLATION, TEST EACH SYSTEM IN CONFORMANCE WITH LOCAL CODE REQUIREMENTS. FURNISH ALL LABOR AND EQUIPMENT REQUIRED TO PROPERLY TEST ALL SPRINKLER EQUIPMENT INSTALLED UNDER THIS CONTRACT. ASSUME ALL COSTS INVOLVED IN MAKING THE TESTS AND REPAIR AND/OR REPLACE ALL DAMAGE RESULTING THEREFROM.

NOTIFY THE ARCHITECT AND THE AHJ THREE (3) WORKING DAYS PRIOR TO MAKING SPRINKLER SYSTEM TESTS. CONCEALED WORK SHALL REMAIN UNCOVERED UNTIL THE REQUIRED TESTS ARE COMPLETE. PORTIONS OF THE WORK MAY BE CONCEALED IF APPROVED BY THE AHJ OR IF NECESSARY DUE TO CONSTRUCTION PROCEDURE.

D. INSTRUCTIONS

AFTER COMPLETION OF ALL INSTALLATION, TESTS, ETC., AND PRIOR TO THE FINAL ACCEPTANCE DATE, INSTRUCT THE BUILDING OWNER AND HIS SELECTED PERSONNEL IN THE OPERATION OF THE SPRINKLER SYSTEM. INCLUDE IN THE TRAINING THE PROCEDURE TO CONDUCT QUARTERLY MAIN DRAIN TESTS AS REQUIRED BY NFPA 25. SPECIAL CARE SHALL BE TAKEN TO MAKE SURE THE BUILDING PERSONNEL WILL IMMEDIATELY RECOGNIZE WHETHER THE MAIN VALVE IS IN AN OPEN POSITION, KNOW HOW TO DRAIN THE SYSTEM, AND KNOW HOW TO TEST THE SYSTEM. THE BUILDING PERSONNEL SHALL ALSO BE MADE FAMILIAR WITH THE EXISTENCE AND CONTENTS OF THE SYSTEM MANUAL DESCRIBED IN THE OPERATION AND MAINTENANCE SECTION OF THIS SPECIFICATION.

END OF SECTION 21

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As Noted on Plans Review

Development Services Department
Lee's Summit, Missouri
08/20/2024

FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: Capital Builders

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PROFESSIONAL ENGINEER
2024.07.15

SPECIFICATIONS

Sheet

Revision no.

MEPF102

22: PLUMBING

1. PLUMBING PIPING

A. PIPING MATERIALS

MATERIALS SPECIFIED OR NOTED ON THE DRAWINGS ARE SUBJECT TO THE APPROVAL OF LOCAL CODE AUTHORITIES. VERIFY APPROVAL BEFORE INSTALLING ANY MATERIAL OR JOINING METHOD.

DOMESTIC WATER (COLD, HOT AND): DOMESTIC WATER PIPING INSTALLED ABOVE THE FLOOR SLAB INSIDE THE BUILDING SHALL BE TYPE "L" HARD TEMPER COPPER TUBE WITH WROUGHT COPPER FITTINGS AND SOLDERED CONNECTIONS MADE UP WITH 95/5 SOLDER. BRAZED MECHANICALLY FORMED TEE CONNECTIONS (T-DRILL) MAY BE USED IN COPPER LINES WHERE APPROVED BY CODE; CONNECTION SHALL BE MADE WITH BRAZED SILVER SOLDER (SIL-FOS) JOINTS IN CONFORMANCE WITH MANUFACTURER'S INSTRUCTIONS.

UNDERGROUND DOMESTIC WATER PIPING 2 INCH AND SMALLER SHALL BE TYPE "K" SOFT TEMPER COPPER TUBING WITH FLARED COPPER ALLOY FITTINGS AND CONNECTIONS, OR TYPE "K" HARD TEMPER COPPER TUBING WITH CONVENTIONAL WROUGHT COPPER FITTINGS AND SILVER SOLDER (SIL-FOS) JOINTS. INSTALL AS FEW UNDERGROUND COPPER PIPING JOINTS AS POSSIBLE. AT BUILDING SERVICE ENTRANCE, NO JOINTS SHALL BE INSTALLED UNDER OR WITHIN 5 FEET OF THE BUILDING. INSTALL DOMESTIC WATER PIPING BELOW GRADE OUTSIDE BUILDING AT ADEQUATE DEPTH TO PREVENT FREEZING.

UNDERGROUND DOMESTIC WATER PIPING 3 INCH AND LARGER SHALL BE CLASS 52 DUCTILE IRON MEETING THE REQUIREMENTS OF ANSI / AWWA STANDARD C151/A21.51. PIPING SHALL BE DOUBLE CEMENT LINED IN ACCORDANCE WITH ANSI / AWWA STANDARD C104/A21.4. FITTINGS SHALL HAVE MECHANICAL JOINTS. AT CONTRACTOR'S OPTION, PIPE JOINTS IN STRAIGHT RUNS (NOT AT FITTINGS) AND NOT INSTALLED UNDER OR WITHIN 5 FEET OF THE BUILDING SLAB MAY BE PUSH-ON JOINTS. JOINTS SHALL CONFORM TO THE REQUIREMENTS OF ANSI A21.11.

INTERIOR WASTE AND VENT BELOW SLAB: WASTE AND VENT PIPE BELOW SLAB INSIDE BUILDING SHALL BE SERVICE WEIGHT CAST IRON SOIL PIPE WITH HUB AND SPIGOT FITTINGS WITH NEOPRENE GASKET JOINTS, MEETING ASTM A74, MANUFACTURED BY AB & I FOUNDRY, CHARLOTTE OR TYLER PIPE AND BEARING THE TRADEMARK OF THE CISPI AND NSF. HUBLESS WASTE AND VENT PIPE IS NOT PERMITTED BELOW BASE SLAB. PVC SCHEDULE 40 DWV ASTM D2665 PIPE WITH PVC MEETING ASTM B1784, "SOLID WALL" CELL CLASS 12454-B WITH ASTM 2665 SOCKET FITTINGS WITH SOLVENT WELD JOINTS IS ALSO PERMITTED WHERE APPROVED BY CODE.

INTERIOR WASTE AND VENT ABOVE SLAB: WASTE AND VENT PIPE ABOVE SLAB INSIDE BUILDING SHALL BE HUBLESS CAST IRON SOIL PIPE AND FITTINGS, MEETING ASTM A888 AND CISPI 301, MANUFACTURED BY AB & I FOUNDRY, CHARLOTTE OR TYLER PIPE AND BEARING THE TRADEMARK OF THE CISPI AND NSF. PVC SCHEDULE 40 DWV ASTM D2665 PIPE WITH PVC MEETING ASTM B1784, "SOLID WALL" CELL CLASS 12454-B WITH ASTM 2665 SOCKET FITTINGS WITH SOLVENT WELD JOINTS IS ALSO PERMITTED WHERE APPROVED BY CODE,. (NOTE: PVC PIPING IS NOT ALLOWED IN CEILING RETURN AIR PLENUMS)

INTERIOR STORM: INSIDE BUILDING SHALL BE SAME AS SPECIFIED FOR INTERIOR WASTE AND VENT PIPE.

EXTERIOR SANITARY SERVICE: PIPING FROM POINTS NOTED FIVE FEET OUTSIDE THE BUILDING WALL SHALL BE SDR-26 PVC WITH DRAINAGE TYPE BELL AND SPIGOT FITTINGS AND NEOPRENE GASKET JOINTS.

CONNECTIONS TO PLUMBING FIXTURES AND EQUIPMENT: 1-1/4 INCH AND LARGER WASTE CONNECTIONS FROM FIXTURE TRAPS TO CAST IRON PIPE SHALL BE "DWV" COPPER WITH WROUGHT COPPER DRAINAGE PATTERN FITTINGS WITH COPPER SWEAT OR COMPRESSION JOINTS AT FIXTURE TRAP CONNECTIONS AND THREADED JOINTS AT CONNECTIONS TO CAST IRON PIPE.

INDIRECT AND CONDENSATE DRAIN INSIDE BUILDING: INDIRECT AND CONDENSATE DRAIN PIPE INSTALLED INSIDE THE BUILDING SHALL BE SCHEDULE 40 PVC PIPE AND FITTINGS WITH SOLVENT WELD JOINTS WHERE ALLOWED BY CODE. (NOTE: PVC PIPING IS NOT ALLOWED IN CEILING RETURN AIR PLENUMS). INSTALL CLEANOUTS AT ELBOWS GREATER THAN 45 DEGREES.

B. PIPING AND EQUIPMENT INSULATION

PROVIDE DOMESTIC COLD WATER, HOT WATER, INDIRECT AND CONDENSATE DRAIN PIPE (WITHIN BUILDING) INTERIOR HORIZONTAL STORM DRAIN PIPING ABOVE CEILING AND EXPOSED WITH ONE-PIECE FIBERGLASS INSULATION WITH ALL-SERVICE JACKET WITH SELF-SEALING LAP TO PROVIDE A CONTINUOUS VAPOR BARRIER BY CERTAINTEED, OWENS-CORNING OR ARMSTRONG. PROVIDE INSULATION THICKNESS AS FOLLOWS:

1" THICK FOR COLD PIPING

1" THICK FOR STORM PIPING AND OVERFLOW STORM PIPING

1" THICK FOR CONDENSATE AND AUXILIARY CONDENSATE PIPING

PROVIDE 1 INCH FIBERGLASS INSULATION ON VENT PIPING WITHIN SIX FEET OF VENT THROUGH THE OF ROOF.
PROVIDE FIBERGLASS INSULATION ON DOMESTIC COLD AND HOT WATER PIPES INSTALLED IN WALLS AND CHASES. PROVIDE FIBERGLASS INSULATION ON DOMESTIC COLD AND HOT WATER PIPES INSTALLED IN WALLS AND CHASES.

INSULATE WATER HEATERS, STORAGE TANKS, HOT WATER PUMPS, ETC. THAT ARE NOT FACTORY INSULATED.

FOR HOT PIPING, PROVIDE PIPE HANGERS AND RISER CLAMPS SIZED FOR THE OUTSIDE DIAMETER OF PIPING. BUTT INSULATION TO HANGER OR RISER CLAMP FOR VERTICAL PIPE. SEAL EXPOSED INSULATION WITH INSULATION SEALER. EXCEPTION FOR VERTICAL PIPING: PROVIDE CLAMPS SIZED FOR THE OUTSIDE DIAMETER OF THE VERTICAL PIPE AND EXTEND CLAMP THROUGH INSULATION. SEAL PENETRATIONS OF INSULATION AND VAPOR BARRIER WITH WET COAT OF VAPOR BARRIER LAP CEMENT. FOR 2-1/2" AND LARGER COLD PIPING AT HANGERS, PROVIDE 8 INCH LONG SECTIONS OF HIGH DENSITY, HIGH TEMPERATURE CALCIUM SILICATE BY JOHNS-MANVILLE, FIBERGLASS BY KNAUF OR FLEXIBLE UNICELLULAR PIPING INSULATION MEETING ASTM C 534-01A, TYPE I WITH INTEGRAL HIGH DENSITY PIPE SUPPORTS AND ENCASED IN STEEL INSULATION SHIELD BY COOPER B-LINE, ARMACELL, OR APPROVED EQUAL. INSULATION SHALL BE CONTINUOUS ALONG THE PIPE SURFACE, EXCEPT AT VALVES, UNIONS, AND WHERE PIPING IS EXPOSED AT FIXTURES. FOR PIPES 2 INCH AND SMALLER USING FIBERGLASS OR FLEXIBLE ELASTOMERIC INSULATION WITHOUT PRE-INSULATED SUPPORTS, PROVIDE INSULATION PROTECTION SHIELDS INSTALLED BETWEEN HANGER AND PIPE WHICH MEETS THE FOLLOWING MINIMUM LENGTH REQUIREMENTS:

PIPE SIZE (NPS)	INSULATION THICKNESS (IN)	MINIMUM SHIELD LENGTH, (IN) HANGER SPACING, (FT) 5	6	7	8	9	10
	0.5	5	6	8	-	-	-
	1	3	5	5	-	-	-
≤ 1	1.5	3	5	5	-	-	-
	2	3	3	3	-	-	-
	3	3	3	3	-	-	-
	0.5	8	8	11	11	12	14
	1	5	6	8	9	11	11
≤ 2	1.5	5	6	8	8	9	9
	2	5	5	6	6	8	8
	3	5	5	6	6	6	8

COVER FITTINGS WITH ZESTON, KNAUF, OR EQUAL ONE-PIECE PVC PREMOLDED INSULATING COVERS. FITTING COVERS, JACKETS AND ADHESIVES SHALL NOT EXCEED FLAME SPREAD RATING OF 25 AND SMOKE DEVELOPMENT RATING OF 50 PER ASTM E84. FILL VOIDS BETWEEN COVERS AND PIPING WITH FIBERGLASS INSULATION AND TAPE JOINTS AT ALL ELBOWS AND TEES. INSTALL PIPE INSULATION IN COMPLIANCE WITH MANUFACTURER'S RECOMMENDATIONS. WHERE PREMOLDED INSULATING FITTINGS ARE NOT APPROVED BY THE LOCAL AHJ, MITER INSULATION AT FITTINGS.

C. PIPING JOINTS

COPPER TUBING: JOINTS IN HARD TEMPER TUBING SHALL BE SOLDERED JOINTS USING LEAD-FREE 95/5 SOLDER EXCEPT WHERE TUBING IS INSTALLED BELOW GRADE OR BELOW THE BASE SLAB, IN WHICH CASE JOINTS SHALL BE SOLDERED WITH SILVER SOLDER (SIL-FOS). JOINTS IN SOFT TEMPER COPPER TUBING SHALL BE OF THE FLARED TYPE INSTALLED IN COMPLIANCE WITH THE FITTING MANUFACTURER'S RECOMMENDATIONS.

THREADED STEEL PIPE: THREADED JOINTS SHALL BE FULL AND CLEAN, CUT WITH NOT MORE THAN THREE (3) THREADS EXPOSED BEYOND THE FITTINGS. MAKE JOINTS TIGHT WITH GRAPHITE BASE PIPE JOINT COMPOUND AND PAINT EXPOSED THREADS OF FERROUS PIPE WITH ACID-RESISTING PAINT AFTER PIPING HAS BEEN TESTED AND PROVEN TIGHT. NO CAULKING, LAMP-WICK OR OTHER MATERIAL WILL BE PERMITTED FOR CORRECTION OF DEFECTIVE JOINTS.

WELDED STEEL PIPE: WELDED JOINTS SHALL BE OF THE BUTT WELDED SINGLE "VEE" TYPE. BEVEL PIPE AT A 45 DEGREE ANGLE TO WITHIN 1/16 INCH OF THE INSIDE WALL, AND BUILD UP THE WELD TO ONE FOURTH GREATER DEPTH THAN THE PIPE WALL THICKNESS. WELDING SHALL BE EITHER ELECTRIC OR OXY-ACETYLENE, PERFORMED IN CONFORMANCE WITH THE ASME CODE FOR PRESSURE PIPE WELDING, AND ONLY BY EXPERIENCED CERTIFIED WELDERS.

CAST IRON PIPE BELOW GRADE: JOINTS IN BELL AND SPIGOT CAST IRON WASTE AND VENT PIPE SHALL BE NEOPRENE COMPRESSION GASKETS, TYSEAL OR EQUAL.

PVC PIPE: CLEAN JOINTS FREE FROM DEBRIS AND MOISTURE. APPLY PVC PRIMER MEETING ASTM F656 TO EACH JOINT. APPLY SOLVENT CEMENT MEETING ASTM D2564 AND MAKE JOINT WHILE WET AND IN ACCORDANCE WITH ASTM D2855.

PIPE ADAPTERS: MAKE CONNECTION OF NEW WASTE PIPE TO NEW OR EXISTING DISSIMILAR WASTE PIPE USING ADAPTER COUPLINGS. PROVIDE FERNCO, PROFLEX 3000 SERIES OR MISSION FLEXSEAL MR56 SERIES WITH NEOPRENE ADAPTER GASKET WITH STAINLESS STEEL SHIELD AND HOSE CLAMPS FOR CONNECTING DISSIMILAR PIPES ABOVE GRADE. PROVIDE FERNCO, 1056 SERIES OR MISSION SEWER COUPLINGS WITH NEOPRENE ADAPTER GASKET AND HOSE CLAMPS FOR CONNECTING DISSIMILAR PIPES BELOW GRADE AND COAT STAINLESS STEEL BANDS WITH MASTIC.

D. PIPING INSTALLATION

GENERAL: CLEAN PIPE THOROUGHLY PRIOR TO INSTALLATION. REAM ENDS OF PIPE TO REMOVE BURRS. CUT PIPE ACCURATELY TO MEASUREMENTS TAKEN ON THE JOB. INSTALL WITH ADEQUATE CLEARANCE FOR INSTALLATION OF COVERINGS WHERE REQUIRED. PIPE SHALL NOT BE SPRUNG OR BENT. NEATLY ALIGN PIPE, CONNECT IT SECURELY, AND SUPPORT IT FROM THE BUILDING STRUCTURE WITH HANGERS AS SPECIFIED BELOW. PROVIDE CHROME-PLATED ESCUTCHEONS ON PIPES PASSING THROUGH CEILINGS, FLOORS OR WALLS OF FINISHED SPACES. RUN PIPES FREELY THROUGH FLOOR AND WALL PENETRATIONS USING PIPE SLEEVES. DO NOT GROUT IN PLACE UNLESS REQUIRED FOR STRUCTURAL FIRE INTEGRITY. INSTALL PIPE CONCEALED IN FINISHED SPACES WHEREVER POSSIBLE. USE A DIELECTRIC UNION WHERE FERROUS AND COPPER PIPE CONNECT. DIELECTRIC UNION SHALL HAVE A ZINC-PLATED STEEL BODY, A THREADED NYLON INSERT, AND INSULATING PRESSURE GASKET. NO FERROUS METAL-TO-COPPER CONNECTION MADE WITHOUT INSULATING UNIONS WILL BE ALLOWED.

HANGER & SUPPORTS: PIPE HANGERS SHALL BE AS DESCRIBED IN THE SPECIFICATIONS BY B-LINE OR EQUAL BY ANVIL, MICHIGAN, TRUSCON, OR UNISTRUT. CONNECT HANGERS TO THE STRUCTURE WITH SIDE BEAM CONNECTORS AND ALL THREAD HANGER RODS. PROVIDE ENGINEERED SUPPORT STRUTS BETWEEN JOISTS AND OTHER STRUCTURAL MEMBERS AS REQUIRED TO PROVIDE A RIGID HANGING INSTALLATION. DO NOT HANG PIPES FROM OTHER PIPES, CONDUIT OR DUCTWORK. PROVIDE HANGER RODS AND SPACE HANGERS AT INTERVALS AS SPECIFIED IN "HANGER SPACING". PROVIDE SUPPORT WITHIN 1 FOOT OF EACH ELBOW AND TEE. PROVIDE SUPPORTS WITHIN 1 FOOT OF EACH EQUIPMENT CONNECTION. PROVIDE TWO NUTS ON THREADED SUPPORTS TO SECURELY FASTEN THE SUPPORT. INSTALL HANGER TYPES OR SUPPORTS FOR VARIOUS PIPING AS FOLLOWS:

COPPER TUBE: ADJUSTABLE BAND HANGERS FOR BARE COPPER TUBE 3 INCHES AND SMALLER SHALL BE B-LINE #B3170 CT COPPER PLATED ADJUSTABLE BAND SWIVEL RING TYPE. ADJUSTABLE BAND HANGERS FOR INSULATED COPPER TUBE 3 INCHES AND SMALLER SHALL BE B-LINE #B3170 NF ADJUSTABLE BAND SWIVEL RING TYPE. CLEVIS HANGERS FOR INSULATED COPPER TUBE 4 INCHES AND LARGER SHALL BE B-LINE #B3100 GALVANIZED STEEL CLEVIS TYPE. SUPPORT EXPOSED COPPER TUBE 2 INCHES AND SMALLER TO WALLS OR IN CHASES WITH B-LINE #B3198RCT COPPER COATED EXTENSION SPLIT RING PIPE CLAMPS, 3/8 INCH THREADED ROD AND B-LINE #B3199CT CEILING FLANGES. SUPPORT COPPER TUBE IN CHASES AND WALLS AT PLUMBING FIXTURES WITH PLASTIC OR COPPER BRACKETS SECURED TO STRUCTURE AND U-BOLTS SIZED TO BARE ON THE PIPE. RISER CLAMPS TO SUPPORT VERTICAL COPPER TUBE SHALL BE B-LINE #B3373CT COPPER COATED STEEL, CUT INSULATION, SEAL VAPOR BARRIER, AND ATTACH TO BARE TUBE.

STEEL PIPE: ADJUSTABLE BAND HANGERS FOR 2 INCH AND SMALLER SHALL BE B-LINE #B3170 NF ADJUSTABLE BAND SWIVEL RING TYPE. CLEVIS HANGERS FOR 2-1/2 INCH AND LARGER SHALL BE B-LINE #B3100 GALVANIZED STEEL CLEVIS TYPE. RISER CLAMPS TO SUPPORT VERTICAL PIPE SHALL BE B-LINE #B3373 GALVANIZED STEEL.

PVC PIPE: ADJUSTABLE BAND HANGERS FOR 3 INCH AND SMALLER. CLEVIS HANGERS FOR 4 INCH AND LARGER SHALL BE B-LINE #B3100 GALVANIZED STEEL CLEVIS TYPE. RISER CLAMPS TO SUPPORT VERTICAL PIPE SHALL BE B-LINE #B3373 GALVANIZED STEEL.

INSULATION PROTECTION SHIELDS: B-LINE #B3151 OF 18 GAUGE GALVANIZED SHEET METAL. SHIELD SHALL COVER HALF OF THE CIRCUMFERENCE OF THE PIPE AND SHALL BE OF LENGTH INDICATED BY MANUFACTURER FOR PIPE SIZE AND THICKNESS OF INSULATION.

HANGER SPACING, ROD SIZES & CONNECTORS: CONNECT RODS TO STEEL BEAMS OR JOISTS WITH B-LINE #B3031 OR #B3033 BEAM CLAMPS AS REQUIRED. CONNECT RODS TO CONCRETE WITH B-LINE #3014 MALLEABLE IRON SINGLE TYPE INSERTS WITH MALLEABLE IRON NUT. CONNECT RODS IN WOOD CONSTRUCTION WITH B-LINE #B3058 SIDE BEAM CONNECTORS. HANG AND SUPPORT PIPING WITH SPACING AND ROD SIZES AS FOLLOWS:

COPPER TUBE: 1-1/2 INCH AND SMALLER - EVERY 6 FEET WITH 3/8 INCH HANGER RODS; 2 INCH - EVERY 10 FEET WITH 3/8INCH HANGER RODS; 2-1/2 INCH - EVERY 10 FEET WITH 3/8 INCH HANGER RODS; 3 INCH - EVERY 10 FEET WITH 1/2 INCH RODS, 4 INCH - EVERY 10 FEET WITH 5/8 INCH HANGER RODS. SUPPORT VERTICAL COPPER TUBE EVERY 10 FEET.

STEEL PIPE: 1 INCH AND SMALLER - EVERY 8 FEET WITH 3/8 INCH HANGER RODS; 1-1/4 INCH THROUGH 2 INCH - EVERY 10 FEET WITH 3/8 INCH HANGER RODS; 2-1/2 INCH AND 3 INCH - EVERY 10 FEET WITH 1/2 INCH HANGER RODS, 4 INCH - EVERY 10 FEET WITH 5/8 INCH HANGER RODS. SUPPORT VERTICAL STEEL PIPE EVERY 10 FEET.

CAST IRON PIPE: EVERY 10 FEET AND WITHIN 1 FOOT OF EACH JOINT. 2 INCH AND SMALLER WITH 3/8 INCH HANGER RODS; 3 INCH WITH 1/2 INCH HANGER RODS; 4 INCH WITH 5/8 INCH HANGER RODS; 6 INCH WITH 3/4 INCH HANGER RODS; 8 INCH AND LARGER WITH 7/8 INCH HANGER RODS. SUPPORT VERTICAL CAST IRON PIPE EVERY 15 FEET.

PVC PIPE: SUPPORT ALL PIPES SIZES EVERY 4 FEET. 1-1/2 INCH AND SMALLER WITH 3/8 INCH HANGER RODS; 2 INCH WITH 1/2 INCH HANGER RODS; 2-1/2 INCH AND 3 INCH WITH 1/2 INCH HANGER RODS, 4 INCH AND LARGER WITH 5/8 INCH HANGER RODS. SUPPORT VERTICAL PVC PIPE EVERY 4 FEET.

SUPPORTS ON FLOOR: SUPPORT PIPING FROM THE FLOOR WHERE REQUIRED FOR FERROUS PIPE OR INSULATED COPPER TUBE, SHALL BE B-LINE B3093 GALVANIZED STEEL WITH PIPE SADDLE, THREADED SHANK FOR HEIGHT ADJUSTMENT AND FLOOR STAND SECURED TO THE FLOOR.

UNDERGROUND WARNING TAPE: UNDERGROUND WARNING TAPE SHALL BE MARKING SERVICES INCORPORATED # 52205 FOR FERROUS SEWER PIPE AND # 52206 FOR DOMESTIC WATER PIPE OR EQUAL BY BRADY IDENTOLINE AND SETON. PROVIDE 4MIL THICK NON-ADHESIVE POLYETHYLENE TYPE TAPE. DETECTABLE UNDERGROUND WARNING TAPE SHALL BE MARKING SERVICES INCORPORATED # 52216 FOR PLASTIC GAS PIPE AND # 52218 FOR PLASTIC SEWER PIPE. PROVIDE NON-ADHESIVE 4MIL THICK TYPE TAPE WITH 18 AWG COPPER OR ALUMINUM TRACER WIRE SUITABLE FOR DETECTION UP TO 3'-0" OF BURIAL.

BELOW GROUND INSTALLATION FOR SOIL, WASTE, AND STORM: INSTALL SOIL AND WASTE PIPING TO A UNIFORM SLOPE OF NOT LESS THAN 1/8 INCH PER FOOT FOR PIPING 4 INCH OR LARGER, AND NOT LESS THAN 1/4 INCH PER FOOT FOR PIPING 3 INCH OR SMALLER. SLOPE STORM PIPING AT 1/8 INCH PER FOOT. LAY PIPE AT UNIFORM SLOPE, FREE FROM SAGS, WITH HUB END UPSTREAM. MAKE CHANGES IN DIRECTION FROM HORIZONTAL TO VERTICAL, AT FIXTURE BRANCHES AND OTHER BRANCH CONNECTIONS WITH SANITARY "TEES" OR SHORT SWEEP "ELLS". MAKE CHANGES IN DIRECTION FROM VERTICAL TO HORIZONTAL OR HORIZONTAL TO HORIZONTAL WITH LONG RADIUS FITTINGS, LONG SWEEPING "ELLS", COMBINATION "Y AND 1/8 BEND" FITTINGS, OR 45 DEGREE "ELLS" (1/8 BEND FITTINGS), 1/6 BEND OR 1/16 BEND AND "Y" FITTINGS. INSTALL PIPE WITH THE BARREL OF THE PIPE ON FIRM, SOLID EARTH FOR ITS ENTIRE LENGTH, AND EXCAVATE HOLES FOR THE PIPE BELLS. LAY PIPE IN A STRAIGHT LINE AND INSTALL WITH UNIFORM GRADE TO LINE WITH BATTEN BOARDS SET NOT MORE THAN 24'-0" APART. CLOSE OPEN ENDS OF PIPE WITH A STOPPER WHEN PIPE LAYING IS NOT IN PROGRESS. CENTER SPIGOTS ACCURATELY IN BELLS FOR UNIFORM CAULKING. PROVIDE A SMOOTH AND UNIFORM INVERT IN THE SYSTEM. DRILLING OR TAPPING OF SOIL AND WASTE LINES, AND SADDLE HUBS AND BANDS ARE NOT PERMITTED. LOCATE AND INSTALL SOIL AND WASTE LINES AS INDICATED ON THE DRAWINGS. DETERMINE EXACT LOCATIONS IN SUCH A MANNER AS TO MAINTAIN PROPER CLEARANCE. PRIOR TO INSTALLATION OF ANY BUILDING DRAIN PIPE, VERIFY ELEVATION OF CONNECTION POINT OF EXISTING SEWER, SERVICE LINE OR EXISTING TENANT CONNECTIONS INDICATED ON THE DRAWINGS. IF THE INSTALLATION WILL NOT TIE INTO THE INDICATED INVERT ELEVATION POINT WHILE MAINTAINING PROPER FALL, NOTIFY ARCHITECT SO THAT AN ALTERNATIVE MAY BE DETERMINED. INSTALL PLASTIC UNDERGROUND WARNING TAPE WITH NAME OF SERVICE INDICATED CONTINUOUSLY ALONG ITS LENGTH FOR BURIED SOIL, WASTE AND STORM PIPE FIVE FEET OUTSIDE THE BUILDING. INSTALL DETECTABLE PLASTIC UNDERGROUND WARNING TAPE WITH NAME OF SERVICE INDICATED CONTINUOUSLY ALONG ITS LENGTH OVER BURIED PLASTIC SOIL AND WASTE PIPE FIVE FEET OUTSIDE THE BUILDING.

ABOVE GROUND INSTALLATION FOR SOIL AND WASTE: INSTALL SOIL AND WASTE PIPING TO A UNIFORM SLOPE OF NOT LESS THAN 1/8 INCH PER FOOT FOR PIPING 4 INCH OR LARGER, AND NOT LESS THAN 1/4 INCH PER FOOT FOR PIPING 3 INCH OR SMALLER. SLOPE STORM PIPING AT 1/8 INCH PER FOOT. LAY PIPE AT UNIFORM SLOPE FREE FROM SAGS. SUPPORT PIPE WITHIN 12 INCHES OF EACH JOINT. MAKE CHANGES IN DIRECTION FROM HORIZONTAL TO VERTICAL, AT FIXTURE BRANCHES AND OTHER BRANCH CONNECTIONS WITH SANITARY "TEES" OR SHORT SWEEP "ELLS". MAKE CHANGES IN DIRECTION FROM VERTICAL TO HORIZONTAL OR HORIZONTAL TO HORIZONTAL WITH LONG RADIUS FITTINGS, LONG SWEEPING "ELLS", COMBINATION "Y AND 1/8 BEND" FITTINGS, OR 45 DEGREE "ELLS" (1/8 BEND FITTINGS), 1/6 BEND OR 1/16 BEND AND "Y" FITTINGS. PROVIDE A SMOOTH AND UNIFORM INVERT IN THE SYSTEM. DRILLING OR TAPPING OF SOIL AND WASTE LINES, AND SADDLE HUBS AND BANDS ARE NOT PERMITTED. LOCATE AND INSTALL SOIL AND WASTE LINES AS INDICATED ON THE DRAWINGS. DETERMINE EXACT LOCATIONS IN SUCH A MANNER AS TO MAINTAIN PROPER CLEARANCE.

PLUMBING VENT: CONNECT PLUMBING VENT PIPES TO FIXTURE DRAIN PIPES AS INDICATED ON THE DRAWINGS OR AS REQUIRED BY THE INSTALLATION PRACTICES ADOPTED AND ENFORCED BY LOCAL CODES OFFICIAL, AND EXTEND VENT PIPES FULL SIZE THROUGH THE ROOF LINE. GRADE PIPE TO A UNIFORM SLOPE SO AS TO DRAIN BACK BY GRAVITY TO THE DRAINAGE PIPING SYSTEM. VENTS PASSING THROUGH THE ROOF SHALL BE MINIMUM 3 INCH SIZE EXCEPT IN TROPICAL CLIMATES, PER LOCAL CODES. TURN FLASHING DOWN INTO STACKS AT LEAST 2 INCHES, AND EXTEND FLASHING 24 INCHES IN ALL DIRECTIONS FROM THE PIPE AT THE ROOF LINE. APPLY WHITE LEAD PIPE DOPE ON MALE STEEL PIPE THREADS. VENT LINES SHALL BE AIR AND WATER TIGHT. VENT FLOOR DRAINS INDIVIDUALLY OR CONNECT THEM TO A HORIZONTALLY VENTED LINE AS SHOWN ON THE DRAWINGS.

DOMESTIC WATER: ARRANGE COLD, HOT, AND HOT WATER RECIRCULATION PIPING TO DRAIN AT THE LOWEST POINT IN EACH SYSTEM. INSTALL AT LEAST ONE PIPE UNION ADJACENT TO ALL SHUTOFF VALVES, AT CONNECTION POINTS OF EACH PIECE OF EQUIPMENT, AND ELSEWHERE IN THE SYSTEM WHERE REQUIRED TO ALLOW PROPER MAINTENANCE. PROVIDE UNIONS OF THE GROUND JOINT TYPE. MAKE ALLOWANCE FOR EXPANSION AND CONTRACTION WHERE REQUIRED BY THE INSTALLATION. WHERE WATER PIPING OCCURS IN EXTERIOR WALLS, HOLD PIPE AS CLOSE AS POSSIBLE TO THE INTERIOR FACE OF WALL AND INSTALL INSULATION BATT OR OTHER INSULATION (MINIMUM R-8) BETWEEN PIPING AND THE EXTERIOR WALL FACE. INSTALL PLASTIC UNDERGROUND WARNING TAPE WITH NAME OF SERVICE INDICATED CONTINUOUSLY ALONG ITS LENGTH FOR DOMESTIC WATER PIPE FIVE FEET OUTSIDE THE BUILDING.

A. PIPING SANITIZATION

SANITIZE THE ENTIRE DOMESTIC WATER PIPING SYSTEM (COLD, HOT, AND HOT WATER RETURN) WITH A SOLUTION CONTAINING NOT LESS THAN 50 PPM AVAILABLE CHLORINE. KEEP SOLUTION IN THE SYSTEM FOR A MINIMUM OF 24 HOURS, WITH EACH VALVE BEING OPERATED SEVERAL TIMES DURING THE PERIOD. AFTER COMPLETION, FLUSH SYSTEM WITH CITY WATER UNTIL CHLORINE RESIDUAL IS LOWERED TO INCOMING CITY WATER LEVEL.

B. PIPE AND VALVE MARKERS

PROVIDE MANUFACTURER'S STANDARD PRE-PRINTED, SEMI-RIGID SNAP-ON OR PERMANENT ADHESIVE, PRESSURE-SENSITIVE VINYL PIPE MARKERS. PIPE MARKERS SHALL BE COLOR-CODED COMPLYING WITH ANSA A13.1.

INSTALL PIPE MARKERS ON EACH PLUMBING PIPING SYSTEM AND INCLUDE ARROWS TO SHOW NORMAL DIRECTION OF FLOW.

LOCATE PIPE MARKERS AND COLOR BANDS WHEREVER PIPING IS EXPOSED TO VIEW IN OCCUPIED SPACES, MACHINE ROOMS, ACCESSIBLE MAINTENANCE SPACES (SHAFTS, TUNNELS, PLENUMS) AND EXTERIOR NON-CONCEALED LOCATIONS.

PROVIDE PLASTIC LAMINATE OR BRASS VALVE TAG ON EVERY VALVE, COCK AND CONTROL DEVICE IN EACH PLUMBING PIPING SYSTEM; EXCLUDE CHECK VALVES, VALVES WITHIN FACTORY-FABRICATED EQUIPMENT UNITS, PLUMBING FIXTURE FAUCETS, CONVENIENCE AND LAWN-WATERING HOSE BIBBS, AND SHUT-OFF VALVES AT PLUMBING FIXTURES AND SIMILAR ROUGH-IN CONNECTIONS OF END-USE FIXTURES AND UNITS.

2. PLUMBING SPECIALTIES

A. AIR ADMITTANCE VALVES

PROVIDE AIR ADMITTANCE VALVES WHERE INDICATED ON DRAWINGS. AIR ADMITTANCE VALVES SHALL MEET ASSE 1050 OR 1051 WHERE APPLICABLE BY STUDOR, OATEY, PROSET, RECTORSEAL, OR EQUAL. INSTALL PER CODE AND MANUFACTURER REQUIREMENTS.

B. AIR CHAMBERS, WATER HAMMER ARRESTORS, AND TRAPS

PROVIDE WATER HAMMER ARRESTORS AT VALVES OR BATTERIES OF FIXTURES AS INDICATED ON THE DRAWINGS TO PREVENT WATER HAMMER. ARRESTORS SHALL BE JOSAM, SIOUX CHIEF, SMITH, PRECISION PLUMBING PRODUCTS, PROFLO, WADE, WATTS, OR ZURN, STAINLESS STEEL BELLOWS TYPE, OR O-RING SEALED AND LUBRICATED ACETAL PISTON. INSTALL WATER HAMMER ARRESTORS PER THE PLUMBING AND DRAINAGE INSTITUTE (PDI) WH-201 INSTALLATION INSTRUCTIONS. INSTALLATION OF ARRESTORS AT BATTERIES OF FIXTURES PRECLUDES THE REQUIREMENT FOR INDIVIDUAL AIR CHAMBERS AT EACH BATTERY FIXTURE. SUBMIT CERTIFICATION THAT WATER HAMMER ARRESTORS COMPLY WITH NSF 61 ANNEX G AND/OR NSF 372.

PROVIDE WATER-SEAL TRAPS ON FLOOR DRAINS, FIXTURES AND EQUIPMENT WITH DRAIN CONNECTIONS, INCLUDING TRAPS NOT FURNISHED IN COMBINATION WITH FIXTURES AND EQUIPMENT. PLACE TRAP AS CLOSE TO THE FIXTURE OR DRAIN AS POSSIBLE. EXPOSED TRAPS IN FINISHED SPACES SHALL BE CHROME-PLATED BRASS.

PROVIDE CONVENTIONAL "P" TYPE TRAP, WATER-SEALED SELF-CLEANING DESIGN. FULL "S" TRAPS OR TRAP STANDARDS SHALL BE USED ONLY WHERE SPECIFICALLY CALLED FOR ON THE DRAWINGS OR ELSEWHERE IN THIS SPECIFICATION. TRAP WATER SEALS SHALL NOT BE LESS THAN 2 INCHES, AND DEEP SEAL TRAPS SHALL BE PROVIDED WHERE SPECIFIED OR INDICATED. EACH TRAP NOT INTEGRAL WITH THE FIXTURE OR FLOOR DRAIN OR INSTALLED BELOW THE BASE SLAB SHALL BE PROVIDED WITH AN ACCESSIBLE CLEANOUT OF ADEQUATE SIZE. PROVIDE TRAP PRIMERS WHERE REQUIRED BY CODE AND WHERE INDICATED ON THE DRAWINGS.

C. CLEANOUTS, FLOOR DRAINS AND ROOF DRAINS

CLEANOUTS, FLOOR DRAINS AND ROOF DRAINS SHALL BE BY ONE MANUFACTURER IF POSSIBLE. ACCEPTABLE MANUFACTURERS ARE JOSAM, SIOUX CHIEF, SMITH, WADE, WATTS, AND ZURN. PROVIDE LONG SWEEP FITTINGS FOR CLEANOUT EXTENSIONS; SHORT SWEEPS AT START OF RUNS OR CHANGE IN DIRECTION AND COMBINATION WYE AND EIGHT BEND FITTINGS IN HORIZONTAL RUNS. INSTALL CLEANOUTS WITH A MINIMUM OF 18 INCHES CLEAR ALL AROUND, CONSULT LOCAL CODES FOR OTHER REQUIREMENTS, FOR EASY SYSTEM MAINTENANCE. INSTALL PLUG WITH TEFLON JOINT COMPOUND.

FLOOR DRAINS: AS SCHEDULED ON THE DRAWINGS.

FLOOR CLEANOUTS: AS SCHEDULED ON THE DRAWINGS. INSTALL CLEANOUTS AT POINTS AS NOTED ON THE DRAWINGS, AT THE BUILDING EXIT; AT A MINIMUM OF EVERY 50 FEET IN HORIZONTAL SOIL AND WASTE LINES; AND AT TURNS OF PIPE GREATER THAN 45 DEGREES CLEANOUTS SHALL BE FULL SIZE OF THE PIPE UP TO 4 INCHES, AND 4 INCH SIZE FOR PIPES LARGER THAN 4 INCHES. DETERMINE THE TYPE OF FLOOR COVERING TO BE USED AT EACH FLOOR CLEANOUT LOCATION AND PROVIDE TOP WITH VARIATIONS SUITABLE FOR FLOOR COVERING (CARPET MARKERS, RECESSED FOR TILE AND SCORIATED FOR UNFINISHED FLOOR). ROUGH-IN AND INSTALL EACH FLOOR CLEANOUT FLUSH WITH THE FINISHED FLOOR CONSTRUCTION.

EXTERIOR CLEANOUTS: AS SCHEDULED ON THE DRAWINGS. INSTALL CLEANOUTS AT POINTS AS NOTED ON THE DRAWINGS, AT THE BUILDING EXIT; AT A MINIMUM OF EVERY 100 FEET IN HORIZONTAL SOIL, WASTE AND STORM SERVICE LINES. EMBED EACH EXTERIOR CLEANOUT IN AN 18 INCH X 18 INCH X 8 INCH BLOCK OF CONCRETE, FLUSH WITH FINISHED GRADE.

WALL CLEANOUTS: AS SCHEDULED ON THE DRAWINGS. INSTALL WALL CLEANOUTS AT POINTS AS NOTED ON THE DRAWINGS; AT THE FOOT OF EACH SOIL, WASTE OR INTERIOR DOWNSPOUT STACK; AT HORIZONTAL SOIL AND WASTE BRANCHES LONGER THAN FIVE FEET NOT SERVED BY A FLOOR CLEANOUT; CONSULT LOCAL CODES FOR INSTALLATION AT SPECIFIC FIXTURE TYPES. INSTALL WALL CLEANOUTS ABOVE THE FLOOD RIM OF THE FIXTURE SERVED WITHIN FOUR FEET OF THE FLOOR AND INSTALL EXTENSIONS FROM THE CLEANOUT TEE TO THE WALL TO LOCATE THE PLUG WITHIN 2 INCH OF THE WALL WHERE REQUIRED. INSTALL CLEANOUTS ON URINALS AND SINKS WHERE REQUIRED BY CODE.

D. VALVES, STRAINERS, HOSE BIBBS, AND UNIONS

PLUMBING SYSTEM VALVES SHALL BE DESIGNED FOR 125 PSI STEAM WORKING PRESSURE AND 200 PSI COLD WATER PRESSURE. INSTALL VALVES ON THE HOT AND COLD WATER LINES AT THE WATER HEATER CONNECTIONS AND OTHER ITEMS OF EQUIPMENT, AT BRANCHES FROM MAINS SERVING GROUPS OF FIXTURES, AND AT OTHER PLACES INDICATED OR REQUIRED BY THE INSTALLATION TO ALLOW EASE OF FUTURE MAINTENANCE. SUBMIT CERTIFICATION THAT VALVES, FITTINGS AND SPECIALTIES COMPLY WITH NSF 61 ANNEX G AND / OR NSF 372. EXCEPT FOR THE FOLLOWING: HOSE BIBBS, HYDRANTS, BACKFLOW PREVENTERS ISOLATING IRRIGATION OR MECHANICAL MAKE-UP SYSTEMS, EMERGENCY MIXING VALVES AND TRAP PRIMERS.

BALL VALVES 2 INCH AND SMALLER (MAY BE USED IN LIEU OF GATE VALVES UP TO 2 INCH): CLASS 150, TWO PIECE LEAD FREE CAST BRONZE BODY, WITH SWEAT ENDS, CHROME PLATED BRONZE BALL WITH CONVENTIONAL PORT, 600 PSI, BLOW-OUT PROOF STEM BY APOLLO # 70-LF-200, HAMMOND # UP8501, MILWAUKEE # UPBA-150.

GLOBE VALVES 2 INCH AND SMALLER: CLASS 125, LEAD FREE CAST BRONZE BODY AND BRASS DISC, WITH SWEAT ENDS BY APOLLO # 102S-LF, HAMMOND # UP-688, MILWAUKEE # UP688 OR NIBCO # S-113-LF.

SWING CHECK VALVES 2 INCH AND SMALLER: CLASS 125, LEAD FREE CAST BRONZE BODY AND WITH SWEAT ENDS BY APOLLO # 163S-LF, MILWAUKEE #UP-1509, OR NIBCO # S-413-Y-LF. INSTALL IN HORIZONTAL PIPE RUNS.

WALL HYDRANTS: AS SPECIFED ON THE DRAWINGS BY PRIER OR EQUAL WOODFORD, JOSAM, PRIER, WADE, WATTS OR ZURN. PROVIDE ACCESSIBLE SHUTOFF VALVE AND WATER HAMMER ARRESTOR INSIDE BUILDING.

UNIONS: FERROUS UNIONS SHALL BE CRANE OR EQUAL, COMBINATION IRON AND BRASS, GROUND JOINT WITH SCREWED ENDS. COPPER UNIONS SHALL BE STREAMLINE OR EQUAL, CAST BRONZE SWEAT TYPE WITH GROUND JOINT. FERROUS TO COPPER UNIONS SHALL BE UNIVERSAL CONTROLS OR EQUAL, DIELECTRIC TYPE WITH THREADED NYLON INSERT.

PRESSURE REDUCING VALVES: SELF CONTAINED TYPE SHALL BE OF THE TYPE AS SCHEDULED AND INDICATED ON THE DRAWINGS BY WATTS OR EQUAL BY CASH-ACME OR WILKINS.

PRESSURE REDUCING VALVES: PILOT OPERATED TYPE SHALL BE AS SCHEDULED ON THE DRAWINGS BY WATTS OR EQUAL BY CLAY-VAL, OCV OR WILKINS.

BACKFLOW PREVENTERS: SHALL BE OF THE TYPE AS SCHEDULED AND INDICATED ON THE DRAWINGS BY WATTS, CONBRACO, FEBCO OR WILKINS.

E. WATER SERVICE ENTRANCE: PRESSURE REDUCING VALVE AND BACKFLOW PREVENTER

PROVIDE A BACKFLOW PREVENTER (BFP) OF TYPE REQUIRED BY LOCAL CODE, AND A PRESSURE REDUCING VALVE (PRV) IF REQUIRED BY WATER PRESSURE GREATER THAN 80 PSI, ON THE DOMESTIC WATER SERVICE IMMEDIATELY DOWNSTREAM OF THE BACKFLOW PREVENTER AT THE WATER SERVICE ENTRY. SET THE PRESSURE REDUCING VALVE AS INDICATED ON THE DRAWINGS. PROVIDE A PRESSURE GAUGE AND HOSE BIBB WITH ISOLATION VALVE DOWN STREAM OF THE BACKFLOW PREVENTER AND / OR PRV FOR SYSTEM DRAIN DOWN.
FOR WATER SERVICES 2 INCH AND SMALLER, PROVIDE A TYPE "K" SOFT COPPER TUBE THAT RUNS CONTINUOUSLY FROM FIVE FEET OUTSIDE THE BUILDING WITH SWEEPING BEND TO 12 INCHES ABOVE THE FLOOR SLAB. PROVIDE A SHUTOFF VALVE AT 12 INCHES ABOVE THE FLOOR. THERE SHALL BE NO FITTINGS UNDER THE FLOOR SLAB. PROVIDE A PVC SLEEVE TWO PIPE SIZES LARGER THAN THE WATER PIPE SERVED AND SEAL WITH CAULK.

FOR WATER SERVICES 3 INCH AND LARGER, PROVIDE DUCTILE IRON PIPE AND FITTINGS FROM FIVE FEET OUTSIDE THE BUILDING TO 12 INCHES ABOVE THE FLOOR. PROVIDE A SHUTOFF VALVE AT 12 INCHES ABOVE THE FLOOR. PROVIDE A PVC SLEEVE TWO PIPE SIZES LARGER THAN THE WATER PIPE SERVED AND SEAL WITH CAULK.

F. SYSTEM ACCESSORIES

THERMOMETERS SHALL BE AMERICAN 3 INCH BI-METAL DIAL TYPE WITH SEPARABLE SOCKET, AND SHALL BE INSTALLED WHERE INDICATED OR REQUIRED.

PRESSURE GAUGES SHALL BE ASHCROFT 3 INCH DIAL TYPE WITH SHUT-OFF COCK, AND SHALL BE INSTALLED WHERE INDICATED OR REQUIRED.

PROVIDE TRAP PRIMERS WHERE REQUIRED BY LOCAL AUTHORITIES. TRAP PRIMERS SHALL BE AS SPECIFIED ON THE DRAWINGS, PRECISION PLUMBING PRODUCTS "PRIME RITE" OR EQUAL BY MIFAB OR SIOUX CHIEF WITH BRASS BODY AND INTEGRAL VACUUM BREAKER. PROVIDE DISTRIBUTION BOX WHERE MORE THAN ONE TRAP IS INDICATED TO BE PRIMED ON THE DRAWINGS. PROVIDE ACCESS PANEL WHERE REQUIRED.

3. PLUMBING FIXTURES AND EQUIPMENT

A. PLUMBING FIXTURES

FURNISH AND INSTALL COMMERCIAL GRADE PLUMBING FIXTURES, SEE THE DRAWINGS FOR QUANTITIES AND DESCRIPTIONS. PROVIDE CHINA FIXTURES AS SCHEDULED BY AMERICAN-STANDARD OR APPROVED EQUAL BY GERBER, KOHLER, SLOAN VALVE CO, TOTO-KIKI OR ZURN. PROVIDE STAINLESS STEEL SINKS AS SCHEDULED BY ELKAY OR EQUAL BY JUST. PROVIDE ELECTRIC WATER COOLERS AS SCHEDULED BY ELKAY OR APPROVED EQUAL BY ACORN / AQUA, HALSEY TAYLOR OR HAWS. PROVIDE MOP SINKS AS SCHEDULED BY STERN-WILLIAMS OR EQUAL BY ACORN ENGINEERING CO., FIAT OR FLORESTONE. PROVIDE EMERGENCY EQUIPMENT AS SCHEDULED BY BRADLEY OR EQUAL BY CHICAGO, ENCON, GUARDIAN, HAWS OR SPEAKMAN. PROVIDE FIXTURES OF SAME MANUFACTURER WHERE POSSIBLE.

FIXTURES SHOWN ON THE DRAWINGS OR SPECIFIED HEREIN SHALL BE FURNISHED AND INSTALLED, SET FIRM AND TRUE, CONNECTED TO REQUIRED PIPING SERVICES, THOROUGHLY CLEANED, LEFT CLEAN AND READY FOR USE. EXPOSED FITTINGS AND PIPING AT THE FIXTURES SHALL BE CHROME-PLATED, AND WATER SUPPLY PIPING SHALL BE VALVED AT EACH FIXTURE.

VITREOUS CHINA FIXTURES SHALL BE OF THE BEST GRADE VITREOUS WARE, WITHOUT PIT HOLES OR BLEMISHES, AND THE OUTLINES SHALL BE GENERALLY TRUE. THE ENGINEER RESERVES THE RIGHT TO REJECT ANY PIECES WHICH, IN HIS OPINION, ARE FAULTY. FIXTURES SET AGAINST WALLS SHALL HAVE GROUND BACKS AND SHALL BE CAULKED WITH SILICONE SEALANT OF A MATCHING COLOR.

B. PLUMBING FIXTURE TRIM

SUBMIT CERTIFICATION THAT FAUCETS AND TRIM COMPLY WITH NSF 61 ANNEX G AND / OR NSF 372. EXCEPT FOR THE FOLLOWING: FAUCETS NOT USED FOR DRINKING WATER OR COOKING, SHOWER VALVES AND HEADS OR FLUSH VALVES.

FIXTURE TRIM SHALL HAVE THE MANUFACTURER'S NAME STAMPED CLEARLY AND VISIBLY ON EACH ITEM.

PROVIDE FAUCETS AS SCHEDULED ON DRAWINGS BY CHICAGO, DELTA-COMMERCIAL, SPEAKMEN, T&S BRASS OR ZURN.

PROVIDE SINGLE LEVER HANDLE FAUCETS AS SCHEDULED ON DRAWINGS BY CHICAGO, DELTA-COMMERCIAL, KOHLER OR SYMMONS.

PROVIDE ELECTRONIC FAUCETS AS SCHEDULED ON THE DRAWINGS BY SLOAN OR EQUAL BY ZURN.

PROVIDE SHOWER VALVES AS SCHEDULED ON THE DRAWINGS BY ACORN, BRADLEY, LAWLER, LEONARD VALVE, POWERS, SPEAKMAN OR SYMMONS.

FIXTURE P-TRAPS SHALL BE 17 GAUGE BRASS BODY WITH CLEANOUT, 17 GAUGE SEAMLESS TUBULAR WALL BEND WITH CAST BRASS SLIP NUT, SHALLOW STEEL FLANGE, ALL CHROME PLATED BY MCGUIRE, BRASS CRAFT, DEARBORN BRASS, EBC, PROFLO, WATTS BRASS AND TUBULAR OR ZURN.

LAVATORY, SINK, AND WATER CLOSET SUPPLIES SHALL BE SOLID BRASS ANGLE OR STRAIGHT TYPE WITH FULL TURN BRASS STEM, WHEEL HANDLE, OR LOOSE KEY TYPES AS NOTED ON DRAWINGS, SHALLOW STEEL FLANGE, 3/8 INCH COPPER RISER FLANGE, ALL CHROME PLATED, FINAL CONNECTION AS REQUIRED BY MCGUIRE, BRASS CRAFT, EBC, PROFLO OR ZURN.

LAVATORY DRAINS SHALL BE GRID TYPE CHROME PLATED 17 GAUGE BRASS OPEN GRID WITH 1-1/4 INCH X 6 INCH LONG SEAMLESS BRASS TAILPIECE AND BRASS LOCKNUT WITH HEAVY RUBBER BASIN WASHER AND FIBER FRICTION WASHER, BY MCGUIRE, BRASS CRAFT, DEARBORN BRASS, EBC, PROFLO, WATTS BRASS AND TUBULAR OR ZURN.

PROVIDE SHOWER VALVES AS SCHEDULED ON DRAWINGS BY SYMMONS, CHICAGO, LAWLER, LEONARD, OR POWERS.

SINK DRAINS SHALL BE BASKET TYPE WITH CHROME PLATED FORGED BRASS BASKET STRAINER AND STRAINER BODY WITH 1-1/2 INCH X 4 INCH LONG SEAMLESS BRASS TAILPIECE AND CAST BRASS LOCK AND COUPLING NUTS BY MCGUIRE, BRASS CRAFT, DEARBORN BRASS, EBC, PROFLO OR ZURN.

PROVIDE HANDICAP INSULATION KITS FOR LAVATORIES AND SINKS ON EXPOSED WATER AND WASTE PIPES AND FITTINGS, INCLUDING OFFSET DRAIN AND CONTINUOUS WASTE COVERS WHERE REQUIRED BY BROCAR, MCGUIRE, PLUMBEREX "PRO-2000", PROFLO, TRAP-WRAP OR TRU-BRO.

C. WATER HEATER

WATER HEATER SHALL BE BY A.O. SMITH, BRADFORD-WHITE, LOCHINVAR, STATE, RHEEM OR RUUD WITH CAPACITY AS SCHEDULED ON THE DRAWINGS. UNIT SHALL BE ELECTRIC GLASS-LINED TANK TYPE COMPLETE WITH STEEL JACKET, FIBERGLASS INSULATION, MAGNESIUM ANODE, INTEGRAL THERMOSTATS AND CONTROLS, AND TEMPERATURE & PRESSURE RELIEF VALVE. WATER HEATER SHALL BE UL LISTED AND MEET ASHRAE 90.1B STANDARDS FOR THERMAL EFFICIENCY AND STANDBY HEAT LOSS. [

RELIEF VALVE: WATER HEATER RELIEF VALVE SHALL BE OF THE TEST LEVER TYPE, WITH AUTOMATIC RESET, COMBINATION TEMPERATURE AND PRESSURE RELIEF, APPROVED AND STAMPED BY THE AMERICAN GAS ASSOCIATION. IT SHALL BE INSTALLED DIRECTLY ON THE HEATER TANK, OR IN THE HOT WATER OUTLET, NOT MORE THAN 3 INCHES FROM THE TANK. THE TEMPERATURE SHALL BE NORMALLY SET TO RELIEVE AT 210 F AND THE PRESSURE RELIEF SHALL BE AT 125 PSI. THE RELIEF VALVE DISCHARGE LINE SHALL BE PIPED DOWN AND TERMINATE 6 INCES ABOVE A FLOOR DRAIN.

VACUUM RELIEF VALVE: WATTS #N36 OR WILKINS #VR-10 WITH BRONZE BODY AND SILICON DISC. VALVE SHALL OPEN AT 0.5 INCHES HG VACUUM AND BE RATED FOR 200 PSIG WORKING PRESSURE AND 250 F TEMPERATURE. INSTALL IN COLD WATER SUPPLY TO EACH WATER HEATER DOWNSTREAM OF THE SHUTOFF AND CHECK VALVES.

EXPANSION TANK: EXPANSION TANK SHALL BE AMTROL "THERM-X-TROL" AS SCHEDULED ON THE DRAWINGS OR EQUAL BY ARMSTRONG, BELL & GOSSETT, PROFLO, TACO, OR WATTS. UNIT SHALL BE CONSTRUCTED OF WELDED CARBON STEEL LISTED FOR 150 PSIG WORKING PRESSURE, WITH A FDA APPROVED BUTYL RUBBER DIAPHRAGM, TAPS FOR PRESSURE GAGE, AIR CHARGING FITTING, AND DRAIN FITTING. SUPPORT AS DETAILED ON THE DRAWINGS. CHARGE TANK WITH AIR PRESSURE EQUAL TO THE STATIC WATER PRESSURE.

END OF SECTION 22

FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: Capital Builders

CONSTRUCTION / PERMIT DRAWINGS

06.03.2024

Architect: _
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REV.	DATE	ISSUE

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STATE OF MISSOURI
ZACHARY BUCKMILLER
NUMBER PE-2023000188
PROFESSIONAL ENGINEER
2024.07.15

SPECIFICATIONS

Sheet: MEPF103

Revision no.

23: HEATING, VENTILATING, AND AIR CONDITIONING

1. DUCT INSULATION, DUCTWORK, ACCESSORIES, FLUES AND FANS

A. DUCT INSULATION

PROVIDE FIBERGLASS DUCT LINER WITH FIBERS FIRMLY BONDED TOGETHER WITH A THERMOSETTING RESIN. LINER SURFACE SHALL SERVE AS A BARRIER AGAINST INFILTRATION OF DUST AND DIRT, SHALL MEET ASTM C1338 FOR FUNGI RESISTANCE, AND SHALL BE CLEANABLE USING DUCT CLEANING METHODS AND EQUIPMENT OUTLINED BY NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION (NAIMA) DUCT CLEANING GUIDE. INSTALL WITH LINER ADHESIVE AND MECHANICAL FASTENERS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. DUCTWORK SIZES SHOWN ON DRAWINGS ARE INSIDE CLEAR DIMENSIONS. INCREASE SHEET METAL BY LINER THICKNESS IN BOTH DIRECTIONS WHERE LINER IS INSTALLED.

PROVIDE RECTANGULAR LINER CONFORMING TO ASTM C1071, TYPE I OR II THAT IS 1 INCH THICK, 1-1/2 POUND DENSITY, MINIMUMR-6.0 CERTAINTEED CORP. "TOUGHGARD" OR EQUIVALENT, JOHNS MANVILLE, OWENS-CORNING, OR KNAUF.

PROVIDE LINER ON THE FOLLOWING INTERIOR AIR DUCTS AND WHERE SPECIFIED ON THE DRAWINGS:

1. EXPOSED ROUND AND RECTANGULAR SUPPLY DUCTWORK.

COVER CONCEALED, RIGID DUCTWORK WITH ASTM C553, TYPE II FLEXIBLE FIBERGLASS INSULATION. INSTALLED INSULATION SHALL BE 1-1/2 INCH3 INCH THICK, 3/4 POUND DENSITY, MINIMUM R-4.2 DUCT WRAP, CERTAINTEED OR EQUIVALENT JOHNS MANVILLE, OWENS-CORNING, OR KNAUF WITH HEAVY-DUTY FOIL-SCRIM-KRAFT FACING, AND WITH JOINTS TAPED WITH 3 INCH WIDE FOIL TAPE AS FOLLOWS:

1. UNLINED ROUND SUPPLY AND RETURN AIR DUCTWORK.
2. ROUND AND RECTANGULAR EXHAUST AND RELIEF AIR DUCTWORK WITHIN 10 FEET OF EXTERIOR DISCHARGE.

COVER OUTDOOR AIR, EXHAUST AIR AND RELIEF AIR PLENUMS CONNECTED TO EXTERIOR LOUVERS WITH 1-1/2 INCH THICK, 1.5 POUND DENSITY, RIGID FIBERGLASS INSULATION CONFORMING TO ASTM C612, CLASS 2.

INSULATING MATERIALS, ADHESIVES, COATINGS, ETC., SHALL NOT EXCEED FLAME SPREAD RATING OF 25 AND SMOKE DEVELOPED RATING OF 50 PER ASTM E84. CONTAINERS FOR MASTICS AND ADHESIVES SHALL HAVE U.L. LABEL.

B. PLENUM INSULATION

PROVIDE FYREWRAP 0.5 PLENUM INSULATION OR ETS SCHAEFER PLENUMSHIELD BLANKET TO ENCAPSULATE COMBUSTIBLE MATERIALS LOCATED WITHIN A FIRE-RATED RETURN AIR PLENUM WHERE PERMITTED BY AHJ. PLENUM INSULATION SHALL BE 1/2 INCH THICK, 6 TO 8 PCF DENSITY, CONSISTING OF A HIGH TEMPERATURE BIOSOLUBLE MATERIAL WITH ALUMINUM FOIL ENCAPSULATING MATERIAL AND FIBERGLASS REINFORCING SCRIM COVERING. PLENUM INSULATION SHALL BE RATED AND CERTIFIED PER UL 1887 (MODIFIED), ASTM E136 FOR NON-COMBUSTIBILITY AND ASTM E84/UL 723 FOR SURFACE BURNING CHARACTERISTICS. PROVIDE MINIMUM 1 INCH OVERLAP AT ALL SEAMS AND JOINTS AND SECURE INSULATION WITH STAINLESS STEEL BANDING AT LOCATIONS AND INTERVALS PER MANUFACTURER'S INSTRUCTIONS.

C. DUCTWORK

PROVIDE GALVANIZED STEEL DUCTWORK AND HOUSINGS AS SHOWN ON DRAWINGS. CONSTRUCT DUCTWORK INCLUDING FITTINGS AND TRANSITIONS IN CONFORMANCE WITH CURRENT SMACNA STANDARDS RELATIVE TO GAUGE, BRACING, JOINTS, ETC. MINIMUM THICKNESS OF DUCT SHALL BE 26-GAUGE SHEET METAL. REINFORCE HOUSINGS AND DUCTWORK OVER 30 INCHES WITH 1-1/4 INCH ANGLES NOT LESS THAN 5'-8" ON CENTERS, AND CLOSER IF REQUIRED FOR SUFFICIENT RIGIDITY TO PREVENT VIBRATION. SUPPORT HORIZONTAL RUNS OF DUCT FROM STRAP IRON HANGERS ON CENTERS NOT TO EXCEED 8'-0". DO NOT SUPPORT CEILING GRID, CONDUITS, PIPES, EQUIPMENT, ETC. FROM DUCTWORK. COORDINATE ROUTING OF DUCTWORK WITH OTHER CONTRACTORS SUCH THAT PIPING, ELECTRICAL CONDUIT, AND ASSOCIATED SUPPORTS ARE NOT ROUTED THROUGH THE DUCTWORK.

CONSTRUCT NON-VAV SUPPLY DUCTS TO MEET SMACNA POSITIVE PRESSURE OF 2 INCHES W.G. CONSTRUCT RETURN, OUTDOOR AND EXHAUST DUCTWORK UPSTREAM OF FANS TO MEET SMACNA NEGATIVE PRESSURE OF 1 INCH W.G. CONSTRUCT EXHAUST DUCTWORK DOWNSTREAM OF FANS TO MEET SMACNA POSITIVE PRESSURE OF 1 INCH W.G.

SEAL DUCTWORK WITH HEAVY LIQUID SEALANT, HARDCAST IRONGRIP 601, DESIGN POLYMER DP 1010 , UNITED MCGILL DUCT SEALER OR APPROVED EQUAL, APPLIED ACCORDING TO SEALANT MANUFACTURER'S INSTRUCTIONS. SEAL ALL LONGITUDINAL AND TRANSVERSE DUCTWORK JOINTS AIRTIGHT TO MEET SMACNA SEAL CLASS A. TAPES AND MASTICS SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 181A.

PROVIDE RADIUS ELBOWS, TURNS, AND OFFSETS WITH A MINIMUM CENTERLINE RADIUS OF 1-1/2 TIMES THE DUCT WIDTH. WHERE SPACE DOES NOT PERMIT FULL RADIUS ELBOWS, PROVIDE SHORT RADIUS ELBOWS WITH A MINIMUM OF TWO CONTINUOUS SPLITTER VANES. VANES SHALL BE THE ENTIRE LENGTH OF THE BEND. PROVIDE MITERED ELBOWS WHERE SPACE DOES NOT PERMIT RADIUS ELBOWS, WHERE SHOWN ON THE DRAWINGS, OR AT THE OPTION OF THE CONTRACTOR WITH THE ENGINEER'S APPROVAL. MITERED ELBOWS LESS THAN 45 DEGREES SHALL NOT REQUIRE TURNING VANES. MITERED ELBOWS 45 DEGREES AND GREATER SHALL HAVE SINGLE THICKNESS TURNING VANES OF SAME GAUGE AS DUCTWORK, RIGIDLY FASTENED WITH GUIDE STRIPS IN DUCTWORK. VANES FOR MITERED ELBOWS SHALL BE PROVIDED IN ALL SUPPLY AND EXHAUST DUCTWORK AND IN RETURN AND OUTSIDE AIR DUCTWORK THAT HAS AN AIR VELOCITY EXCEEDING 1000 FPM. DO NOT INSTALL VANES IN GREASE DUCTWORK.

DUCTS SHALL BE CONNECTED TO FANS, FAN CASINGS AND FAN PLENUMS BY MEANS OF FLEXIBLE CONNECTORS. FLEXIBLE CONNECTORS SHALL BE NEOPRENE COATED GLASS CLOTH CANVAS CONNECTIONS, DURO-DYNE, ELGEN, VENTFABRIC OR EQUAL. FLEXIBLE CONNECTORS SHALL HAVE A FLAME SPREAD OF 25 OR LESS AND SMOKE DEVELOPED RATING NOT HIGHER THAN 50. MAKE AIRTIGHT JOINTS AND INSTALL WITH MINIMUM 1-1/2 INCHES SLACK.

PROVIDE BALANCING DAMPERS, MANUFACTURED BY GREENHECK MODEL MBD SERIES, OR APPROVED EQUAL BY CESCO, LOUVERS & DAMPERS, NAILOR INDUSTRIES, POTTORFF, RUSKIN, OR TAMCO, WHERE SHOWN ON DRAWINGS AND WHEREVER NECESSARY FOR COMPLETE CONTROL OF AIR FLOW. DAMPERS SHALL HAVE LOCKING QUADRANT. PROVIDE STANDOFF BRACKET AND SHAFT EXTENSION AS REQUIRED FOR INSULATION REQUIREMENTS. SPLITTER DAMPERS SHALL BE CONTROLLED BY LOCKING QUADRANTS; PROVIDE YOUNG REGULATOR OR VENTLOK END BEARINGS FOR THE DAMPER ROD. RECTANGULAR VOLUME DAMPERS SHALL BE OPPOSED BLADE INTERLOCKING TYPE. ROUND VOLUME DAMPERS SHALL BE BUTTERFLY TYPE CONSISTING OF CIRCULAR BLADE MOUNTED TO A SHAFT. PROVIDE FLEXMASTER MODEL STO OR EQUAL 45 DEGREE RECTANGULAR/ROUND SIDE TAKEOFF FITTING WITH MODEL BO3 DAMPER WITH LOCKING QUADRANT AND INSULATION BUILD OUT FOR ROUND DUCTWORK BRANCH TAKEOFFS TO INDIVIDUAL AIR DEVICES. OMIT DAMPER AT TAKEOFF FITTING WHEN DAMPER IS LOCATED DOWNSTREAM OF TAKEOFF.

ROUND OR OVAL DUCTWORK SHALL BE SEMCO, UNITED, WESCO OR EQUAL, SHEETMETAL, WITH SMOOTH INTERIOR SURFACE, WITH LOW PRESSURE (DUCT PRESSURE CLASS UP TO AND INCLUDING 2 INCHES W.G.) ROUND DUCTWORK GAUGES PER THE FOLLOWING TABLE (REFERENCE SMACNA HVAC DUCT CONSTRUCTION STANDARDS FOR GAUGES WHEN PRESSURES EXCEED 2 INCHES W.G.):

SIZE	DUCT GAUGE	FITTING GAUGE
14" & UNDER	26	24
15" THRU 26"	24	22

LEWIS & LAMBERT, LINX INDUSTRIES LINDAB SAFE, OR APPROVED EQUAL FACTORY-MANUFACTURED ROUND DUCTWORK AND FITTINGS MAY BE SUBSTITUTED FOR SPECIFIED ROUND BRANCH DUCTWORK, AT CONTRACTORS OPTION. HEAVY LIQUID JOINT SEALANT MAY BE OMITTED ON FACTORY-MANUFACTURED ROUND DUCTWORK.

LOW PRESSURE (DUCT PRESSURE CLASS UP TO AND INCLUDING 2 INCHES W.G.) FITTINGS 24 INCHES IN DIAMETER AND LESS SHALL BE PREFABRICATED, SPOTWELDED AND INTERNALLY SEALED. CONTINUOUSLY WELD FITTINGS LARGER THAN 24 INCHES IN DIAMETER. FITTING GAUGE SHALL BE 22 GAUGE FOR 36 INCH FITTINGS AND UNDER, 20 GAUGE FOR LARGER SIZES. 90 DEGREE TEE'S SHALL BE CONICAL TYPE. SEAL LONGITUDINAL AND TRANSVERSE DUCTWORK JOINTS AIRTIGHT WITH HEAVY LIQUID SEALANT APPLIED ACCORDING TO MANUFACTURER'S INSTRUCTIONS. PROVIDE GAUGE THICKNESS IN MEDIUM PRESSURE (DUCT PRESSURE CLASS 3 INCHES TO 6 INCHES W.G.) DUCTWORK AS RECOMMENDED BY SMACNA.

AT CONTRACTORS OPTION, PROVIDE DUCTMATE, GRIPPLE, OR APPROVED EQUAL WIRE ROPE DUCT HANGING SYSTEM. PROVIDE DUCTMATE WR10 THROUGH WR40 OR GRIPPLE NO. 1 THROUGH NO. 5 WIRE ROPE USING 7X7 OR 7X19 AIRCRAFT QUALITY ZINC COATED CABLE OR GALVANIZED STEEL WIRE ROPE. SECURE WIRE ROPE TO DUCT USING DUCTMATE CLUTCHER OR GRIPPLE HANG FAST ADJUSTABLE ROPE ATTACHMENT. FOR SEISMIC APPLICATIONS, WIRE ROPE SYSTEMS SHALL BE SEISMIC TESTED, CONFORMING TO GR 63, LEVEL 4 SEISMIC. WHERE APPLICABLE FOR UPPER ATTACHMENT, PROVIDE DUCTMATE EZ-LOCK WIRE ROPE BEAM CLAMP WITH LOCKING NUT ADJUSTMENT OR GRIPPLE CEILING, BEAM, OR PURLIN CLIPS. WIRE ROPE, ADJUSTABLE DUCT ATTACHMENT, AND UPPER ATTACHMENT TO STRUCTURE SHALL EACH HAVE MINIMUM 5 TO 1 LOAD SAFETY FACTOR.

D. FLEXIBLE DUCT

LOW PRESSURE (DUCT PRESSURE CLASS UP TO AND INCLUDING 2 INCHES W.G.) AND MEDIUM PRESSURE (DUCT PRESSURE CLASS 2.1 INCH TO 6 INCHES W.G.) FLEXIBLE DUCT SHALL BE FLEXMASTER TYPE 8B, THERMAFLEX TYPE G-KM, M-KE, JPL TYPE SILVER JACKET, OR EQUAL (FIRE RETARDANT POLYETHYLENE) PROTECTIVE VAPOR BARRIER, U.L.181 CLASS 1, ACOUSTICAL INSULATED DUCT, R-6.0 FIBERGLASS INSULATION. PROVIDE CPE LINER WITH STEEL WIRE HELIX MECHANICALLY LOCKED OR PERMANENTLY BONDED TO THE LINER.

FLEXIBLE DUCT RUNS SHALL NOT EXCEED 5 FEET IN LENGTH, AND SHALL BE INSTALLED FULLY EXTENDED AND STRAIGHT AS POSSIBLE AVOIDING TIGHT TURNS. INSTALL FLEXIBLE DUCT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. SUPPORT FLEXIBLE DUCT AT MAXIMUM 5 FEET ON CENTER AND WITHIN 6 INCHES OF BENDS. BENDS SHALL NOT EXCEED A CENTERLINE RADIUS OF ONE DUCT DIAMETER. DUCT SAG SHALL NOT EXCEED 1/2 INCH. SUPPORTING MATERIAL IN DIRECT CONTACT WITH THE DUCT SHALL NOT BE LESS THAN 1-1/2 INCHES IN WIDTH.

CONNECT FLEXIBLE DUCT TO RIGID METAL DUCT OR AIR DEVICES AS RECOMMENDED BY THE MANUFACTURER. AT A MINIMUM, INSTALL TWO WRAPS OF DUCT TAPE AROUND THE INNER CORE CONNECTION AND A METALLIC OR NON-METALLIC CLAMP OVER THE TAPE AND TWO WRAPS OF DUCT TAPE OR A CLAMP OVER THE OUTER JACKET. DUCT CLAMPS SHALL BE LABELED IN ACCORDANCE WITH UL-181B AND MARKED 181B-C. DUCT TAPE SHALL BE LABELED IN ACCORDANCE WITH UL 181B AND MARKED 181B-FX.

E. AIR DEVICES

PROVIDE AIR DEVICES AS SCHEDULED ON DRAWINGS, MANUFACTURED BY CARNES, KRUEGER, METALAIRE, NAILOR INDUSTRIES, PRICE, TITUS, OR TUTTLE & BAILEY. SELECT AIR DEVICES TO LIMIT ROOM NOISE LEVEL TO NO HIGHER THAN NC-30 UNLESS OTHERWISE SHOWN. PROVIDE DEVICES WITH A SOFT PLASTIC GASKET TO MAKE AN AIRTIGHT SEAL AGAINST THE MOUNTING SURFACE. COORDINATE FINAL LOCATION, FRAME, AND MOUNTING TYPE OF AIR DEVICES WITH ARCHITECTURAL REFLECTED CEILING PLANS.

SUBMIT COMPLETE SHOP DRAWINGS INCLUDING INFORMATION ON NOISE LEVEL, PRESSURE DROP, THROW, CFM FOR EACH AIR DEVICE, STYLES, BORDERS, ETC. CLEARLY MARKED WITH SPECIFIED EQUIPMENT NUMBER. SUBMIT SAMPLES OF EACH AIR DEVICE AS REQUESTED BY THE ENGINEER.

PROVIDE WALL SUPPLY AIR REGISTERS WITH DOUBLE DEFLECTION BLADES AND OPPOSED BLADE DAMPERS. PROVIDE WALL RETURN AIR GRILLES AND EXHAUST AIR REGISTERS WITH HORIZONTAL 35 OR 45 DEGREE ANGLE VISION-PROOF BARS. PROVIDE CONCEALED FASTENERS FOR WALL MOUNTED REGISTERS AND GRILLES.

PROVIDE OPPOSED BLADE DAMPERS FOR SUPPLY AIR REGISTERS AND EXHAUST AIR REGISTERS UNLESS INDICATED OTHERWISE.

PROVIDE CEILING MOUNTED AIR DEVICES OF LAY-IN OR SURFACE MOUNTED TYPE AS REQUIRED TO BE COMPATIBLE WITH CEILING CONSTRUCTION. PROVIDE CEILING DIFFUSERS AND GRILLES WITH WHITE ENAMEL FINISH UNLESS NOTED OTHERWISE.

PROVIDE DROP BOX DIFFUSERS WITH MINIMUM 22 GAUGE GALVANIZED STEEL CONSTRUCTION, FACTORY ASSEMBLED AND WELDED, AND PROVIDED WITH STANDARD DUCT CONNECTIONS AND MOUNTING BRACKETS FOR FIELD INSTALLATION. DIFFUSERS SHALL HAVE DOUBLE DEFLECTION GRILLES OR DRUM LOUVERS THAT ARE INDIVIDUALLY ADJUSTABLE TO CUSTOMIZE HORIZONTAL AND VERTICAL THROWS AND FACTORY INSTALLED AIR DIVERTERS OR TURNING VANES. INSULATE DIFFUSERS WITH 1 INCH THICK, 1.5 LB DUCT LINER INSULATION. PROVIDE DROP BOX DIFFUSERS AS MANUFACTURED BY AES INDUSTRIES, CARNES, EP CUSTOM CURB, INC. OR PLENUMS INC.

F. FIRE DAMPERS

PROVIDE FIRE DAMPERS WHERE SHOWN ON DRAWINGS, AND AS REQUIRED BY CODE ENFORCING AUTHORITY. DAMPER RATINGS SHALL BE AS REQUIRED TO MAINTAIN THE FIRE AND/OR SMOKE RATINGS NOTED ON THE ARCHITECTURAL DRAWINGS. PROVIDE FIRE DAMPERS CONFORMING TO NFPA-90A AND UBC STANDARD 43-7 WITH RECOMMENDED STEEL SLEEVES OF LENGTH AS REQUIRED TO MEET THE INSTALLED LOCATION, 165 DEGREES FAHRENHEIT FUSIBLE LINK, SPRING CATCHES AND NON-CORROSIVE BEARINGS. DAMPERS SHALL BE UL LISTED, MANUFACTURED BY AIR BALANCE, CESCO, GREENHECK, NAILOR INDUSTRIES, RUSKIN, OR UNITED AIR.

PROVIDE ACCESS DOOR, SIZED PER SMACNA WITH MINIMUM SIZE OF 10 INCH BY 10 INCH, IN DUCT FOR INSPECTION AND SERVICE TO FIRE DAMPER AND FUSIBLE LINK. PROVIDE DUCT ACCESS DOOR(S) WITHIN 12 INCHES OF THE DEVICE TO ALLOW FOR TESTING AND MAINTENANCE. LABEL EACH DOOR (WITH MINIMUM 1 INCH LETTERING) INDICATING WHICH DAMPER TYPE IS SERVED. DOOR SHOULD BE CAPABLE OF BEING FULLY OPENED OR PROVIDE REMOVABLE DOOR. PROVIDE REMOVABLE SECTION OF DUCT WHERE DUCT SIZE IS TOO SMALL FOR 10 INCH BY 10 INCH ACCESS DOOR. PROVIDE ACCESS DOOR IN CEILING OR WALL AS REQUIRED TO ACCESS DAMPER.

G. LOUVERS, PLENUMS, SCREENS

PROVIDE INTAKE AND EXHAUST AIR LOUVERS BY RUSKIN MODEL ELF375X OR EQUAL AMERICAN WARMING & VENTILATING, CESCO, GREENHECK, INDUSTRIAL LOUVERS OR LOUVERS & DAMPERS AS SCHEDULED ON THE DRAWINGS. COORDINATE EXACT SIZE AND LOCATION WITH ARCHITECTURAL DRAWINGS. LOUVERS SHALL BE STATIONARY, WITH MILL FINISH. LOUVERS SHALL HAVE EXTRUDED ALUMINUM BLADES, 0.080 INCH WALL THICKNESS, 45 DEGREE BLADE ANGLE, BLADES ON 5 INCH CENTERS; FRAME SHALL BE EXTRUDED ALUMINUM, 0.080 INCH WALL THICKNESS; WITH EXPANDED FLATTENED ALUMINUM BIRDSCREEN. PROVIDE LOUVERS WITH A MINIMUM FREE AREA OF 45 PERCENT, WITH A MAXIMUM AIR PRESSURE DROP OF 0.1 INCH AT SCHEDULED AIRFLOW.

CONSTRUCT PLENUMS WITH GALVANIZED STEEL FRAMING MEMBERS AND GALVANIZED SHEET METAL, BRACED WITH GALVANIZED ANGLES. GAUGES AND BRACING SHALL CONFORM TO SMACNA RECOMMENDATIONS FOR DUCTWORK OF LIKE SIZES. WHERE ACCESS DOORS ARE SHOWN, PROVIDE HINGED DOORS WITH #202 VENTLOK LATCH. MAKE WATERTIGHT CONNECTIONS TO LOUVERS, SLOPING BOTTOM OF PLENUM TO DRAIN WATER TO WEEPHOLES IN BOTTOM OF LOUVER.

PROVIDE SCREENS ON LOUVERS, DUCTS, HOODS, FANS, AND OPENINGS TO THE OUTDOORS AS SCHEDULED AND/OR NOTED ON THE DRAWINGS. INSECT SCREENS SHALL BE 0.012-INCH THICKNESS, 1/4 INCH MESH, ALUMINUM WIRE. BIRD SCREENS SHALL BE 0.041-INCH, 1/2 INCH MESH GALVANIZED STEEL WIRE. PROVIDE MOTORIZED CONTROL DAMPERS OR BACKDRAFT DAMPERS WHERE SHOWN ON THE DRAWINGS.

H. EXHAUST AIR SYSTEMS

PROVIDE CEILING MOUNTED EXHAUST FANS AS SCHEDULED ON THE DRAWINGS, ACME, CARNES, COOK, GREENHECK, PENNBARRY, OR TWIN CITY FANS COMPLETE WITH ISOLATED BLOWER UNIT AND CEILING GRILLE. PROVIDE DISCONNECT SWITCH, BACKDRAFT DAMPER, DISCHARGE DUCT, WALL LOUVER, AND NEOPRENE VIBRATION ISOLATORS WITH ALL-THREAD HANGING RODS.

2. HVAC EQUIPMENT

A. CONDENSING UNITS 1.5-6 TONS

PROVIDE SPLIT SYSTEM, AIR COOLED CONDENSING UNITS AS SCHEDULED ON THE DRAWINGS, MANUFACTURED BY CARRIER, GOODMAN, LENNOX, TRANE, OR YORK, COMPLETE WITH FACTORY INSTALLED HERMETIC OR SEMI-HERMETIC MOTOR/COMPRESSOR ASSEMBLY WITH INTERNAL SPRING VIBRATION ISOLATION, BUILT-IN THERMAL OVERLOAD PROTECTION, AND CRANKCASE HEATER; TOP DISCHARGE CONDENSER FAN AND MOTOR LOW AMBIENT CONTROLS FOR OPERATION TO25 DEGREES FAHRENHEIT; ANTI-SHORT CYCLE TIMERS; TIME DELAY RELAYS; FACTORY INSTALLED LIQUID LINE DRIER AND LOW PRESSURE SWITCH; FULL REFRIGERANT HOLDING CHARGE; AND WEATHERTIGHT HOUSING CONSTRUCTED OF ZINC COATED, HEAVY GAUGE, GALVANIZED STEEL WITH WEATHER-RESISTANT BAKED ENAMEL FINISH AND FACTORY INSTALLED CONDENSER COIL HAIL GUARDS. UNIT SHALL CARRY A FIVE YEAR GUARANTEE ON THE COMPRESSOR AND REFRIGERANT CIRCUIT, AND A ONE YEAR GUARANTEE ON THE REMAINING COMPONENTS. PROVIDE REFRIGERANT PIPING SIZED AS RECOMMENDED BY EQUIPMENT MANUFACTURER WITH FOAMED PLASTIC INSULATION ON THE SUCTION LINE AS SPECIFIED IN THIS SECTION. FOR HEAT PUMP UNITS PROVIDE REVERSING VALVE, SUCTION LINE ACCUMULATOR, FLOW CONTROL CHECK VALVE, AND SOLID STATE DEFROST/TIMED-OFF CONTROL. MOUNT CONDENSING UNIT TO THE EXTERIOR WALL TO BE SUSPENDED UTILIZING STEEL "L" CHANNELS.

B. FAN COIL UNITS (DIRECT EXPANSION, 1.5-5 TONS)

PROVIDE SPLIT SYSTEM, FAN COIL UNITS AS SCHEDULED ON THE DRAWINGS, MANUFACTURED BY CARRIER, DAIKIN, LENNOX, JOHNSON CONTROLS, TRANE, HORIZONTAL CONFIGURATION COMPLETE WITH ZINC COATED, HEAVY GAUGE, GALVANIZED STEEL CABINET WITH WEATHER-RESISTANT BAKED ENAMEL FINISH; INTERNALLY INSULATED; ACCESS DOORS; DIRECT EXPANSION COOLING COIL SECTION OF ALUMINUM/COPPER CONSTRUCTION; CONDENSATE DRAIN PAN; STATICALLY AND DYNAMICALLY BALANCED CENTRIFUGAL FAN SECTION WITH BUILT-IN MOTOR THERMAL OVERLOAD PROTECTION; FACTORY INSTALLED AND WIRED CONTROLS AND SINGLE POINT ELECTRICAL POWER CONNECTION; MAGNETIC MOTOR STARTERS AND CONTACTORS AS REQUIRED; AIR FILTER RACK WITH 1 INCH THICK THROWAWAY FILTERS; FACTORY INSTALLED ELECTRIC HEATING COIL WITH CODE REQUIRED INTEGRAL SAFETY FEATURES AND CONTROLS. PROVIDE HONEYWELL OR EQUAL ELECTRONIC PROGRAMMABLE TYPE THERMOSTAT, SEVEN-DAY MODEL, MANUAL CHANGEOVER, SWITCHING SUBBASE, MULTI-STAGE AS REQUIRED TO MATCH UNIT COOLING/HEATING STAGING. DIVISION 26 CONTRACTOR SHALL PROVIDE AND WIRE UL LISTED DUCT TYPE SMOKE DETECTORS AS REQUIRED BY CODE TO SHUT DOWN FAN COIL UNIT UPON DETECTION OF SMOKE. PROVIDE NEOPRENE VIBRATION ISOLATION PADS AND 3-1/2 INCH THICK CONCRETE BASE UNDER UNITS FOR VERTICAL INSTALLATIONS. PROVIDE AN AUXILIARY DRAIN PAN FOR SUSPENDED UNITS WITH FLOOD DETECTOR SWITCH TO SHUT OFF UNIT WHEN WATER IS DETECTED IN AUXILIARY DRAIN PAN. FLOOD DETECTOR SWITCH SHALL BE DIVERSITECH WET SWITCH OR EQUIVALENT. DETECTOR SHALL SHUT SYSTEM DOWN WHEN WATER COMES IN CONTACT WITH THE HYDROPHILIC PAD OF THE DETECTOR. PLACE DETECTOR IN THE LOWEST LOCATION IN THE AUXILIARY DRAIN PAN.

C. ELECTRIC UNIT HEATERS

PROVIDE ELECTRIC UNIT HEATERS AS SCHEDULED ON THE DRAWINGS, MANUFACTURED BY BERKO, BRASCH, INDEECO, MARKEL, QMARK, OR RAYWALL, STANDARD TYPE PROPELLER UNIT HEATERS WITH SIDEWALL MOUNTING BRACKETS AND HARDWARE FOR HORIZONTAL AIRFLOW. FURNISH HEATER FAN MOTORS COMPLETE WITH A MANUAL MOTOR STARTER WITH AUTOMATIC THERMAL CUTOUTS SIZED TO THE MOTOR LOAD, DISCONNECT SWITCH, AND OTHER CODE REQUIRED SAFETY DEVICES. PROVIDE UNIT MOUNTED THERMOSTAT AND MANUAL SUMMER/WINTER CHANGEOVER SWITCH.

3. PIPING AND PIPING SPECIALTIES

A. REFRIGERANT PIPING AND INSULATION

COPPER TUBING: ASTM B 280, ALLOY C12200, TYPE ACR, HARD-DRAWN STRAIGHT LENGTHS, AND SOFT-ANNEALED COILS, SEAMLESS COPPER TUBING. TUBING SHALL BE FACTORY CLEANED, READY FOR INSTALLATION, AND HAVE ENDS CAPPED TO PROTECT CLEANLINESS OF PIPE INTERIORS PRIOR TO SHIPPING.

FITTINGS: WROUGHT-COPPER FITTINGS: ANSI B16.22, STREAMLINED PATTERN.

BRAZING FILLER METALS: BCUP - 5: COPPER (CU), PHOSPHORUS (P) 4.8 - 5.2 PERCENT, AND SILVER (AG) 14.5 - 15.5 FOR JOINING WROUGHT COPPER FITTINGS AND COPPER TUBING. BRAZE JOINTS WITH A SLOW STREAM OF DRY NITROGEN PASSING THROUGH THE PIPING.

INSULATE SUCTION LINES WITH1 INCH AND LIQUID LINES WITH 1/2 INCH FOAMED PLASTIC INSULATION, ARMAFLEX OR EQUAL. PIPING INSULATION SHALL HAVE A FLAME SPREAD OF 25 OR LESS, AND A SMOKE DEVELOPED RATING OF 50 OR LESS WHEN TESTED IN ACCORDANCE WITH ASTM E84. COAT INSULATION THAT IS EXPOSED TO THE ELEMENTS WITH A PROTECTIVE SEALER. INSTALL AND SUPPORT PIPING TO KEEP NOISE AND VIBRATION TO A MINIMUM. SUPPORT AND SECURE PIPING TO UNISTRUT TYPE SUPPORTS SO THAT NO VIBRATION PASSES TO THE BUILDING STRUCTURE. PIPE ATTACHMENTS SHALL BE COPPER-PLATED OR HAVE NONMETALLIC COATING FOR ELECTROLYTIC PROTECTION WHERE ATTACHMENTS ARE IN DIRECT CONTACT WITH COPPER TUBING. INSTALL A SUPPORT WITHIN ONE FOOT OF EACH CHANGE OF DIRECTION. MOUNT PIPE HANGERS AROUND THE OUTSIDE OF THE INSULATION WITH SADDLES TO PREVENT HANGERS FROM RUPTURING THE INSULATION. REPLACE INSULATION THAT IS CUT OR BROKEN BY THE HANGERS.

RUN REFRIGERANT LINES PARALLEL AND PERPENDICULAR TO WALL AND FLOOR LINES AND TO APPEAR STRAIGHT AND IN GOOD ORDER. PITCH SUCTION LINES DOWN SLIGHTLY (1 INCH IN 20 FEET) TOWARDS THE COMPRESSOR. PROVIDE OIL TRAPS AT THE BASE OF VERTICAL SUCTION RISERS OVER 6 FEET HIGH.

INSTALL LIQUID LINE SIGHT GLASSES IN LIQUID LINES NEAREST THE EXPANSION VALVE. FACTORY MOUNT EXPANSION VALVES WITH THE SENSING BULBS SHIPPED LOOSE. FIELD MOUNT EXPANSION VALVE BULB AFTER REFRIGERANT PIPING IS COMPLETE (DAMAGE MAY OCCUR IF BULBS COME IN CONTACT WITH HEAT).

FOR SYSTEMS OF 5 TON CAPACITY AND SMALLER, THE CONTRACTOR SHALL HAVE THE OPTION TO PROVIDE COPPER REFRIGERANT TUBING LINE SET SIZED AS RECOMMENDED BY EQUIPMENT MANUFACTURER AND OF LENGTH AS REQUIRED FOR THE INSTALLATION. PROVIDE 3/4 INCH THICK FOAMED PLASTIC INSULATION, ARMAFLEX OR EQUAL, ON THE SUCTION LINE. PROVIDE QUICK-CONNECT FLARE TUBING COMPRESSION FITTINGS OR SOLDER CONNECTIONS AS REQUIRED TO MATCH THE CONNECTIONS OF THE CONDENSING UNIT AND EVAPORATOR COIL.

B. SYSTEM EVACUATION AND CHARGING

BLOW OUT REFRIGERATION LINES WITH DRY NITROGEN AT A SUITABLE PRESSURE BEFORE MAKING FINAL CONNECTION AT THE CONDENSING UNIT OR COIL TO ENSURE AGAINST DIRT, SCALE, OR OTHER FOREIGN MATERIAL BEING IN THE LINES. DRAW A VACUUM TO 29 INCHES OF MERCURY. BREAK THIS VACUUM BY CHARGING DRY REFRIGERANT GAS INTO THE SYSTEM, RAISING THE PRESSURE TO 0 PSIG. REPEAT THE LATTER TWO STEPS FOR A TRIPLE EVACUATION BEFORE THE FINAL EVACUATION IS STARTED. MAKE FINAL EVACUATION BY REDUCING THE SYSTEM ABSOLUTE PRESSURE TO A MAXIMUM OF 0.5 MILLIMETERS (500 MICRONS) AND ALLOWING THE PUMP TO RUN AT THIS PRESSURE FOR A MINIMUM OF TWO HOURS.

REPEAT THE PROPER AMOUNT OF REFRIGERANT CHARGE PER THE MANUFACTURER'S RECOMMENDATIONS. RECORD THE AMOUNT OF REFRIGERANT BY WEIGHT CHARGED INTO THE SYSTEM FOR EACH CIRCUIT RECORDED TO THE NEAREST 1/4 POUND ON TAGS AND ATTACH TAGS TO THE LIQUID LINE NEAR THE CONDENSING UNIT. REFRIGERANT SHALL BE SUPPLIED BY THE HVAC CONTRACTOR.

END OF SECTION 23

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RELEASED FOR CONSTRUCTION
As Noted on Plans Review
Development Services Department
Lee's Summit, Missouri
08/20/2024

FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

client:
Capital Builders

CONSTRUCTION / PERMIT DRAWINGS

06.03.2024

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NUMBER PE-2023000188
PROFESSIONAL ENGINEER
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SPECIFICATIONS

Sheet | Revision no.

MEPF104

26: ELECTRICAL

PART 1 - GENERAL

NOTE: SOME ITEMS REFERENCED HEREIN MAY NOT APPLY TO THIS PROJECT. FOR ITEMS THAT ARE APPLICABLE, THIS OUTLINE IS INTENDED TO CONVEY THE MINIMUM REQUIREMENTS. IT IS NOT INTENDED TO PERMIT ANY VIOLATION (BY INCLUSION OF ALTERNATE MATERIALS OR DEVICES, OR EXCLUSION OF MATERIALS OR DEVICES) OF REQUIREMENTS OF THE LOCAL JURISDICTION OR APPLICABLE CODES.

1.1 DESIGN CRITERIA

A. THE PURPOSE OF THE SPECIFICATIONS ARE TO COMMUNICATE THE GENERAL INTENT OF THE DESIGN. THE LEVEL OF DETAIL IN THE SPECIFICATIONS ARE SCHEMATIC, HOWEVER, AND NO ATTEMPT HAS BEEN MADE TO SHOW OR DESCRIBE ALL ITEMS REQUIRED TO FORM COMPLETE AND OPERATIONAL SYSTEMS IN EVERY RESPECT. IT IS INTENDED THAT PRICING SUBMITTED WILL BE FOR A COMPLETE AND OPERATIONAL INSTALLATION AND WILL INCLUDE EVERYTHING REQUIRED TO MAKE IT SO, WHETHER SHOWN OR REFERENCED ON THE SCHEMATIC DRAWINGS AND SPECIFICATIONS OR NOT. INCLUDE THE COST OF RELOCATING EXISTING EQUIPMENT, WIRING, AND CONDUIT TO ALLOW FOR INSTALLATION OF NEW WORK. THE CONTRACTOR WILL UTILIZE AND ADHERE TO THE FOLLOWING CRITERIA TO ASSIST IN ESTABLISHING PRICING FOR THIS PROJECT.

B. ALL ELECTRICAL EQUIPMENT, EXTERIOR AND INTERIOR THAT IS PLACED ON GRADE OR ON A CONCRETE FLOOR SHALL BE ON A RAISED CONCRETE PAD. INTERIOR PADS SHALL BE A MINIMUM OF 4" HIGH, EXTEND 6" IN BACK OF EQUIPMENT, AND 4" AROUND FRONT AND SIDES WITH 2" CHAMFERED EDGES. EXTERIOR PADS SHALL BE A MINIMUM OF 6" HIGH, EXTEND 6" IN BACK OF EQUIPMENT, AND 4" AROUND FRONT AND SIDES WITH 2" CHAMFERED EDGES AND SHALL SLOPE AWAY FROM ANY BUILDINGS.

1.2 ELECTRICAL INSTALLATIONS

A. SEQUENCE, COORDINATE, AND INTEGRATE THE VARIOUS ELEMENTS OF ELECTRICAL SYSTEMS, MATERIALS, AND EQUIPMENT. COMPLY WITH THE FOLLOWING REQUIREMENTS:

1. ELECTRICAL COMPONENTS SHALL BE INSTALLED AND COMPLY WITH THE SAME SEISMIC DESIGN CATEGORY AS THAT OF THE STRUCTURE THAT THEY OCCUPY OR TO WHICH THEY ARE ATTACHED, AS DETERMINED BY THE STATE CODE/INTERNATIONAL BUILDING CODE.

2. COORDINATE ELECTRICAL SYSTEMS, EQUIPMENT, AND MATERIALS INSTALLATION WITH OTHER BUILDING COMPONENTS.

3. VERIFY ALL DIMENSIONS BY FIELD MEASUREMENTS.

4. ARRANGE FOR CHASES, SLOTS, AND OPENINGS IN OTHER BUILDING COMPONENTS DURING PROGRESS OF CONSTRUCTION, TO ALLOW FOR ELECTRICAL INSTALLATIONS.

5. COORDINATE THE INSTALLATION OF REQUIRED SUPPORTING DEVICES AND SLEEVES TO BE SET IN POURED-IN-PLACE CONCRETE AND OTHER STRUCTURAL COMPONENTS, AS THEY ARE CONSTRUCTED.

6. SEQUENCE, COORDINATE, AND INTEGRATE INSTALLATIONS OF ELECTRICAL MATERIALS AND EQUIPMENT FOR EFFICIENT FLOW OF THE WORK. GIVE PARTICULAR ATTENTION TO LARGE EQUIPMENT REQUIRING POSITIONING PRIOR TO CLOSING IN THE BUILDING.

7. WHERE MOUNTING HEIGHTS ARE NOT DETAILED OR DIMENSIONED, INSTALL SYSTEMS, MATERIALS, AND EQUIPMENT TO PROVIDE MAXIMUM HEADROOM POSSIBLE.

8. COORDINATE CONNECTION OF ELECTRICAL SYSTEMS WITH EXTERIOR UNDERGROUND AND OVERHEAD UTILITIES AND SERVICES. COMPLY WITH REQUIREMENTS OF GOVERNING REGULATIONS. PROVIDE REQUIRED CONNECTION FOR EACH SERVICE.

9. INSTALL SYSTEMS, MATERIALS, AND EQUIPMENT TO CONFORM WITH APPROVED SUBMITTAL DATA, INCLUDING COORDINATION DRAWINGS, TO GREATEST EXTEND POSSIBLE. CONFORM TO ARRANGEMENTS ONLY IN DIAGRAMMATIC FORM. WHERE COORDINATION REQUIREMENTS CONFLICT WITH INDIVIDUAL SYSTEM REQUIREMENTS, REFER CONFLICT TO THE ARCHITECT/ENGINEER.

10. INSTALL SYSTEMS, MATERIALS, AND EQUIPMENT LEVEL AND PLUMB, PARALLEL AND PERPENDICULAR TO OTHER BUILDING SYSTEMS AND COMPONENTS.

11. INSTALL ELECTRICAL EQUIPMENT TO FACILITATE SERVICING, MAINTENANCE, AND REPAIR OR REPLACEMENT OF EQUIPMENT COMPONENTS. AS PRACTICLE AS POSSIBLE, CONNECT EQUIPMENT FOR EASE OF DISCONNECTING, WITH MINIMUM INTERFERENCE WITH OTHER INSTALLATIONS.

12. INSTALL ACCESS PANELS OR DOORS WHERE UNITS ARE CONCEALED BEHIND FINISHED SURFACES.

13. INSTALL SYSTEMS, MATERIALS, AND EQUIPMENT GIVING RIGHT-OF-WAY PRIORITY TO SYSTEMS REQUIRED TO BE INSTALLED AS A SPECIFIED SLOPE.

14. ALL TERMINATIONS TO JUNCTION BOX, WIREWAY, STARTER, DISCONNECT, ETC. FOR MECHANICAL AND KITCHEN EQUIPMENT SHALL BE MADE BY THE ELECTRICAL CONTRACTOR.

15. ALL CONDUIT FOR ALL DISCIPLINES SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL.

16. ALL LOW-VOLTAGE WIRING REQUIRED FOR CONTROLS AND INSTRUMENTATION SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL UNLESS SPECIFICALLY NOTED OTHERWISE.

20. EXHAUST FAN AND UNIT HEATER DISCONNECT SWITCHES: ELECTRICAL TO PROVIDE WIRING/CONDUIT THRU THE DISCONNECT SWITCH TO THE EXHAUST FAN/HEATER.

21. THE SEQUENCE FOR CONTROL OF ALL EQUIPMENT SHALL BE AS INDICATED ON THE MECHANICAL DRAWINGS AND SPECIFIED IN THE MECHANICAL SPECIFICATIONS.

1.3 CONTRACT DOCUMENTS AND GENERAL REQUIREMENTS

A. REFER TO AND COMPLY WITH ALL OTHER SECTIONS OF THE PROJECT SPECIFICATIONS FOR THE INSTALLATION OF ALL ELECTRICAL WORK.

B. FOR THE PURPOSES OF THIS PROJECT, THE WORDS "MUST", "WILL", AND "SHALL" ARE MANDATORY TERMS. "PROVIDE" OR "INSTALL" MAY BE USED TO INDICATE THAT THE CONTRACTOR SHALL PROVIDE EQUIPMENT AND INSTALL.

1.4 CODES, ORDINANCES, INSPECTIONS AND PERMITS

A. ALL WORK, MATERIALS, METHODS AND EQUIPMENT FURNISHED AND INSTALLED FOR THIS PROJECT IS TO COMPLY WITH, BE EXECUTED, AND BE INSPECTED IN ACCORDANCE WITH LOCAL AND STATE CODES, LAWS, ORDINANCES, RULES AND REGULATIONS APPLICABLE TO PARTICULAR CLASS OF WORK. ANY FEES OR COSTS IN CONNECTION THEREWITH ARE TO BE PAID BY THE CONTRACTOR.

B. ARRANGE WITH CITY OR STATE IF CITY HAS NO ORDINANCES COVERING WORK, FOR COMPLETE INSPECTION, PAYING ALL CHARGES AND FEES PERTAINING THERETO.

1.5 SHOP DRAWINGS, SUBMITTALS AND SUBSTITUTIONS

A. WHERE EQUIPMENT SCHEDULES LIST ACCEPTABLE ALTERNATE MANUFACTURERS, ONLY PRODUCTS FROM THOSE MANUFACTURERS LISTED THAT EQUAL THE REFERENCE PRODUCT'S CAPACITY, FEATURES, OPTIONS, ELECTRICAL CHARACTERISTICS, WARRANTIES, QUALITY, ETC. WILL BE CONSIDERED.

B. SUBMIT MANUFACTURER'S CATALOG SHEETS AND/OR SHOP DRAWINGS COVERING ALL EQUIPMENT AND DEVICES INCLUDED IN THIS CONTRACT. INDICATE MODELS, CAPACITIES, WEIGHTS (SHIPPING, INSTALLED, OPERATING), FINISHES, FURNISHED SPECIALTIES, OPTIONS, WIRING DIAGRAMS, CONTROL DIAGRAMS AND SEQUENCES, AND ACCESSORIES.

C. ARRANGE SUBMITTALS IN AN ORGANIZED MANNER.

D. SUBMITTALS ARE REQUIRED EVEN THOUGH EQUIPMENT BEING FURNISHED IS EXACTLY AS SPECIFIED.

E. FINAL DECISION AS TO WHETHER OR NOT A SPECIFIC PIECE OF EQUIPMENT MEETS SPECIFICATIONS WILL REST WITH ARCHITECT/ENGINEER.

1.6 WARRANTY AND OPERATION INSTRUCTIONS

A. ALL MATERIALS, EQUIPMENT, AND WORK WILL CARRY, AS A MINIMUM, A FULL ONE (1) YEAR WARRANTY FROM TIME OWNER ACCEPTS BUILDING OR THE DATE OF SUBSTANTIAL COMPLETION, WHICHEVER IS EARLIER, REGARDLESS OF START-UP DATE OF EQUIPMENT.

B. A MINIMUM OF TWO (2) BOUND COPIES OF OPERATION AND MAINTENANCE MANUALS FOR THE ENTIRE ELECTRICAL SYSTEM (INCLUDING CONTROLS) WILL BE PREPARED BY THE CONTRACTOR AND PROVIDED TO THE OWNER. THE OWNER WILL BE FULLY INSTRUCTED IN THE OPERATION AND MAINTENANCE OF THE ENTIRE SYSTEM BY THE CONTRACTOR.

1.7 CUTTING AND PATCHING

A. PROVIDE ALL CUTTING AND PATCHING REQUIRED TO PERFORM THE ELECTRICAL WORK.

B. ALL CUTTING, PATCHING AND REPAIR WORK WILL BE DONE BY WORKMEN SKILLED IN THE TRADE REQUIRED.

1.8 EXCAVATION, TRENCHING AND BACKFILLING

A. ALL EXCAVATION, TRENCHING AND BACKFILLING IN CONNECTION WITH THE ELECTRICAL SYSTEM IS INCLUDED AS PART OF THIS DIVISION.

B. ALL EXCAVATION, TRENCHING AND BACKFILLING REQUIRED WILL BE DONE AS PART OF THE CONTRACT PRICE REGARDLESS OF ANY IMPLIED CONDITIONS ON THE DRAWINGS OR IN THESE SPECIFICATIONS.

C. HAVE ALL UNDERGROUND UTILITIES LOCATED AND MARKED BEFORE EXCAVATING.

D. WALLS OF TRENCHES SHALL BE MINIMUM 6" FROM SIDE OF NEAREST ELECTRICAL WORK.

1.9 BONDING

A. PROVIDE INSULATED GROUNDING CONDUCTORS IN ALL CONDUITS. GROUND WIRE TO BE SIZED IN ACCORDANCE WITH NEC ARTICLE 250-66.

B. BOND ALL NON-CURRENT CARRYING METAL PARTS TO PROVIDE GROUNDING OF ALL EQUIPMENT AND CONDUCTOR ENCLOSURES. PROVIDE INSULATED GROUND CONDUCTOR IN ALL CONDUITS AND RACEWAYS. SIZE CONDUCTOR IN ACCORDANCE WITH THE NEC ARTICLE 250-122 AND ARTICLE 250-66. INCREASE CONDUIT SIZES AS REQUIRED FOR GROUND WIRE.

C. BONDING OF RECEPTACLES AND SWITCHES SHALL BE MADE BY PROVIDING AN 8" LONG, GREEN, INSULATED, #12 MINIMUM (MATCH CIRCUIT WIRE SIZE) GAUGE COPPER WIRE FROM DEVICE GROUNDING LUG TO THE METALLIC BOX OR THE BRANCH CIRCUIT GROUNDING CONDUCTOR.

D. BONDING OF ITEMS CONNECTED BY FLEXIBLE METALLIC CONDUIT TYPE CONDUIT SHALL BE MADE BY PROVIDING A GREEN INSULATED COPPER CONDUCTOR, SIZED IN ACCORDANCE WITH NEC, IN THE CONDUIT AND BONDED AT EACH END.

E. PROVIDE ONE #6 GAUGE COPPER GROUND CONDUCTOR IN 1" CONDUIT FROM MAIN SERVICE TELEPHONE BACKBOARD TO MAIN BUILDING GROUND AT SERVICE ENTRANCE MAIN DISCONNECT DEVICE. PROVIDE ONE #6 GAUGE COPPER GROUND CONDUCTOR IN 1" PVC CONDUIT FROM EACH TELEPHONE SUB-BACKBOARD TO BUILDING STEEL. TERMINATE AT TELEPHONE BACKBOARD IN 4" SQUARE OUTLET BOX.

F. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES TO COMPLETE THE GROUNDING WORK, AS INDICATED ON THE DRAWINGS, AS SPECIFIED HEREIN OR BOTH.

G. NEUTRALS SHALL BE GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

H. ALL METAL RACEWAY SYSTEMS, INCLUDING CABINETS, CONDUIT AND BOXES, STEEL STRUCTURE, AND ROTATING AND STATIONARY EQUIPMENT SHALL BE GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

I. INSTALL A 3/4" X 10' GROUNDING ELECTRODE AND GROUNDING ELECTRODE CONDUCTOR AT EACH NEW DRY TYPE TRANSFORMER AND GROUND TO BUILDING STEEL.

J. GROUNDING CONDUCTORS SHALL BE INSTALLED AS TO PERMIT SHORTEST AND MOST DIRECT PATH FROM EQUIPMENT TO GROUND. ALL CONNECTIONS TO GROUND CONDUCTORS SHALL BE ACCESSIBLE FOR INSPECTIONS. ALL CONTACT SURFACES SHALL BE THOROUGHLY CLEANED BEFORE CONNECTIONS ARE MADE TO INSURE GOOD METAL-TO-METAL CONTACT.

1.10 CONDUIT SIZING, ARRANGEMENT AND SUPPORT

A. ALL RACEWAYS SHALL BE INSTALLED TO MEET ALL SEISMIC REQUIREMENTS.

B. BUILDING CONDUIT SIZE TO BE MINIMUM 3/4", UNLESS OTHERWISE NOTED. MINIMUM SIZE OF ALL SITE CONDUITS IS 1" (MINIMUM DEPTH IS 24" BELOW GRADE OR BELOW THE FROST LINE, WHICHEVER IS GREATEST.) SITE CONDUITS SHALL BE PVC SCHEDULE 40 (90 DEGREE ELBOWS INTO THE BUILDING SHALL BE GALVANIZED RIGID STEEL).

C. ARRANGE CONDUIT TO MAINTAIN HEADROOM AND PRESENT A NEAT APPEARANCE.

D. ROUTE EXPOSED CONDUIT PARALLEL AND PERPENDICULAR TO WALLS AND ADJACENT PIPING.

E. MAINTAIN MINIMUM 6" CLEARANCE BETWEEN CONDUIT AND PIPING. MAINTAIN 12" CLEARANCE BETWEEN CONDUIT AND HEAT SOURCES SUCH AS FLUES, STEAM PIPES, AND HEATING APPLIANCES. INSTALL CONDUIT ABOVE ALL STEAM AND WATER PIPING.

F. DO NOT FASTEN CONDUIT WITH WIRE OR PERFORATED PIPE STRAPS. REMOVE ALL WIRE USED FOR TEMPORARY CONDUIT SUPPORT DURING CONSTRUCTION BEFORE CONDUCTORS ARE PULLED.

G. INSTALL RIGID CONDUIT SUPPORTS ON 10' MAXIMUM INTERVALS ON CENTER AND WITHIN 3' OF EACH OUTLET BOX, JUNCTION BOX, CABINET OR FITTING. REFER TO NATIONAL ELECTRIC CODE: MC CABLE AND OTHER NON-RIGID CONDUIT REQUIREMENTS HAVE MORE STRINGENT REQUIREMENTS.

H. ATTACH SINGLE CONDUIT RUNS DIRECTLY TO STRUCTURE OR SUSPENDED FROM STRUCTURE WITH 1/4" THREADED ROD AND USE SPRING STEEL LATCHING CLAMPS OR BOLTED CLAMPS.

I. SUPPORT CONDUIT HANGERS FROM STRUCTURE USING BOLTS OR BEAM CLAMPS WITH BOLTS. COORDINATE WITH ARCHITECT PRIOR TO ANY DRILLING OF STRUCTURE.

J. SUPPORT CONDUIT HANGERS FROM CONCRETE STRUCTURE WITH EXPANSION ANCHORS WITH DESIGN SUPPORT OF 300% OR GREATER OF LOAD. COORDINATE WITH ARCHITECT PRIOR TO ANY DRILLING OF STRUCTURE.

K. CONDUIT SUPPORTED DIRECTLY FROM ROOF DECK SHALL NOT BE PERMITTED.

L. PROVIDE PULL STRINGS AND INSULATED BUSHINGS IN ALL EMPTY CONDUITS.

1.11 CONDUIT APPLICATION SCHEDULE

A. SCHEDULE 40 PLASTIC CONDUIT:

1. TELEPHONE SERVICE.

2. ALL CONDUITS OUTSIDE BUILDING LINE.

3. ALL CONDUITS UNDER SLAB.

4. GROUNDING ELECTRODE CONDUCTORS. WHEN GROUNDING ELECTRODE CONDUCTORS ARE RUN IN REFORM AIR PLENUM, PROVIDE FIRE WRAP AROUND CONDUIT.

B. ELECTRICAL METALLIC TUBING (EMT):

1. IN SLAB ABOVE GRADE.

2. CONCEALED DRY INTERIOR LOCATIONS.

3. EXPOSED IN DRY INTERIOR LOCATIONS 10' A.F.F. AND ABOVE.

4. USE COMPRESSION FITTINGS. (SET SCREW FITTINGS ARE PROHIBITED)

C. RIGID STEEL CONDUIT:

1. EXPOSED OUTDOOR LOCATIONS (INCLUDING EXPOSED ROOF-MOUNTED CONDUIT). ** PAINT WITH TWO COATS MARINE GRADE PAINT (COLOR BY ARCHITECT).

2. HAZARD LOCATIONS.

3. EXPOSED IN INTERIOR LOCATIONS BELOW 10' A.F.F.

D. FLEXIBLE METAL CONDUIT:

1. CONNECTIONS BETWEEN ACCESSIBLE JUNCTION BOXES AND LIGHTING FIXTURES.

2. MAXIMUM LENGTH OF 48" FOR LIGHT FIXTURES.

3. MAXIMUM LENGTH OF 36" FOR MOTORS AND TRANSFORMERS.

4. EQUIPMENT CONNECTIONS.

5. CONNECTIONS TO ALL VIBRATING EQUIPMENT.

1.12 WIRE AND CABLE

A. FEEDERS AND BRANCH CIRCUITS LARGER THAN 10 AWG: COPPER, STRANDED CONDUCTOR, 600 VOLT INSULATION, THHN/THWN OR XHHW/XHWN.

B. FEEDERS AND BRANCH CIRCUITS #12, #10 AWG: COPPER SOLID, 600 VOLT INSULATION, THHN/THWN OR XHHW/XHWN.

C. CONTROL CIRCUITS: COPPER, STRANDED CONDUCTOR 600 VOLT INSULATION, THHN/THWN.

1.13 WIRING CONNECTORS

A. ALL CABLE AND WIRE TERMINALS, TAPS AND SPLICES SHALL BE MADE SECURE WITH COMPRESSION TYPE CONNECTORS, APPROVED FOR THE SERVICE. CONNECTIONS SHALL BE INSTALLED WITH APPROVED TOOLS AND DIES TO ASSURE A PERMANENT SECURE JOINT. COMPRESSION JOINTS SHALL BE CLEANED, MADE SMOOTH WITH INSULATING COMPOUND, WRAPPED WITH VARNISH CAMBRIC AND INSULATED WITH APPROVED ELECTRICAL GRADE PLASTIC TAPE. WHERE CONDUCTORS ARE TO BE CONNECTED TO METALLIC SURFACES, THE COATED SURFACES OF THE METAL SHALL BE POLISHED BEFORE INSTALLING THE CONNECTOR. LACQUER COATING OF CONDUITS SHALL BE REMOVED WHERE GROUND CLAMPS ARE TO BE INSTALLED. PROVIDE ALL NECESSARY HANGERS, RACKS, CLEATS, AND SUPPORTS REQUIRED TO MAKE A NEAT INSTALLATION. WIRE CONNECTORS SHALL CONFORM TO UL 486.

B. INSTALL EXPANSION JOINTS WHERE CONDUIT CROSSES BUILDING EXPANSION OR SEISMIC JOINTS.

1.14 WIRING METHODS

A. THOROUGHLY CLEAN WIRES BEFORE INSTALLING LUGS AND CONNECTORS.

B. MAKE SPLICES, TAPS AND TERMINATIONS TO CARRY FULL AMPACITY OF CONDUCTORS WITHOUT PERCEPTIBLE TEMPERATURE RISE.

C. TERMINATE ENDS OF SPARE CONDUCTORS WITH ELECTRICAL TAPE.

D. ON THE LOAD SIDE OF GFCI CIRCUIT BREAKER, USE ONLY TYPE XHHW CONDUCTORS.

E. COLOR CODE CONDUCTORS AS FOLLOWS: (VERIFY COLOR CODE MATCHES EXISTING CIRCUITING IN BUILDING PRIOR TO INSTALLATION)

208Y120 VOLTS
PHASE A: BLACK
PHASE B: RED
PHASE C: BLUE
GROUND: GREEN
NEUTRAL: WHITE

1.15 INTERIOR OUTLET BOXES AND EXTENSIONS

A. GALVANIZED STEEL, UL LISTED FOR APPLICATION WITH CONDUIT KNOCKOUTS AND THREADED HOLES FOR MOUNTING DEVICES AND/OR COVERPLATES.

B. MINIMUM SIZES:

1. SINGLE DEVICE: 3"H X 2"W X 2"D.

2. GANG DEVICE: 3"H X 2"W (PER GANG) X 2"D.

3. OCTAGONAL: 4"W X 1-1/2"D.

4. SQUARE: 4" SQUARE X 1-1/2"D.

1.16 JUNCTION AND PULL BOXES

A. DRY LOCATIONS: GALVANIZED SHEET STEEL, NEMA 1, WELDED SEAMS AND COVER HELD BY STAINLESS STEEL SCREWS OR BOLTS.

B. DAMP OR WET LOCATIONS: CAST MALLEABLE IRON WITH CORROSION-RESISTANT FINISH, NEMA 3R, THREADED CONDUIT ENTRIES, NEOPRENE COVERPLATE GASKET, AND COVERPLATE HELD BY STAINLESS STEEL BOLTS.

1.21 FLOOR BOXES

A. PROVIDE FLOOR BOX AS INDICATED IN THE DRAWINGS.

B. WHERE FLOOR BOX IS NOT SPECIFICALLY CALLED OUT IN THE PLANS, PROVIDE FULLY ADJUSTABLE , WATERPROOF FOR FLUSH MOUNTING, RECTANGULAR BRASS FLOOR PLATE, GASKET, BRASS SCREWS, AND NUMBER OF GANGS REQUIRED. COVERS SHALL BE SCREW TYPE. USE CARPET FLANGES IN CARPETED AREAS.

1.17 WIRING DEVICES

A. SINGLE & DUPLEX RECEPTACLES (20 AMP ONLY):

1. SINGLE OR DUPLEX TYPE RECEPTACLE AS INDICATED.

2. 125V/20A/2P/3W/G RATING - NEMA - 5-20R TYPE.

3. UREA OR NYLON BODY.

4. FACE COLOR/TYPE SHALL MATCH EXISTING WITHIN THE BUILDING.

5. COVERPLATES SHALL BE STAINLESS STEEL MATCHING EXISTING.

B. GFCI DUPLEX RECEPTACLES:

1. DUPLEX, FEED-THRU TYPE GROUND FAULT CURRENT INTERRUPTER RECEPTACLE WITH TEST/RESET BUTTONS AND LED BUTTONS.

2. 125V/20A/2P/3W/G RATING - NEMA 5-2OR TYPE.

3. UL #498; UL #943 CLASS A; NEMA #WD1-4.02.

4. UREA OR NYLON BODY.

5. FACE COLOR/TYPE SHALL MATCH EXISTING WITHIN THE BUILDING.

6. COVERPLATES SHALL BE STAINLESS STEEL MATCHING EXISTING.

C. SWITCHES:

1. INDUSTRIAL GRADE AC TOGGLE SWITCHES. NUMBER OF POLES PER PLANS.

2. 120/277V/20A RATING

3. UL FED SPEC WS896E; NEMA WD-1 & WD-6; ANSI C-73; UL 20

1.18 EQUIPMENT WIRING SYSTEMS

A. DETERMINE CONNECTION LOCATIONS AND REQUIREMENTS.

B. SEQUENCE ROUGH-IN OF ELECTRICAL CONNECTIONS TO COORDINATE WITH INSTALLATION SCHEDULE FOR EQUIPMENT.

C. SEQUENCE ELECTRICAL CONNECTIONS TO COORDINATE WITH STARTUP SCHEDULE FOR EQUIPMENT.

D. APPLICATIONS OF ELECTRICAL POWER CONNECTIONS SPECIFIED IN THIS SECTION INCLUDE THE FOLLOWING:

1. TO RESISTIVE HEATERS

2. FROM ELECTRICAL SOURCE TO MOTOR STARTERS

3. TO LIGHTING FIXTURES

4. TO CONVERTERS, RECTIFIERS, TRANSFORMERS, INVERTERS, RHEOSTATS, AND SIMILAR CURRENT ADJUSTMENT FEATURES OF EQUIPMENT.

5. TO GROUNDS INCLUDING EARTHING CONNECTIONS.

6. TO KITCHEN EQUIPMENT.

E. REFER TO MECHANICAL SECTIONS FOR MOTOR STARTERS AND CONTROLLERS FURNISHED WITH EQUIPMENT (I.E. NOT WORK OF THIS SECTION). INDIVIDUAL MOTOR STARTERS PROVIDED WITH MECHANICAL EQUIPMENT SHALL BE INSTALLED BY ELECTRICAL.

F. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL CONDUIT REQUIREMENTS FOR THE BMS SYSTEM, FIRE ALARM SYSTEM, SOUND SYSTEM, WIRING BETWEEN THERMOSTATS AND MOTORS, AND ALL OTHER MECHANICAL CONTROL WIRING.

G. JUNCTION BOXES AND DISCONNECT SWITCHES REQUIRED FOR CONNECTING MOTORS AND OTHER ELECTRICAL EQUIPMENT THAT ARE SPECIFIED IN APPLICABLE ELECTRICAL SECTIONS, AND ARE WORK OF THIS SECTION.

H. WHERE ELECTRICAL WIRING IS REQUIRED BY TRADES OTHER THAN COVERED BY ELECTRICAL, SPECIFICATIONS FOR THAT SECTION SHALL REFER TO SAME WIRING MATERIALS AND METHODS AS SPECIFIED IN ELECTRICAL. NO EXCEPTIONS, ALL WIRING SHALL MEET THESE MINIMUM STANDARDS.

1.19 PANELBOARDS

A. GENERAL: EXCEPT AS OTHERWISE INDICATED, PROVIDE PANELBOARDS, ENCLOSURES AND ANCILLARY COMPONENTS, OF TYPES, SIZES, AND RATINGS INDICATED, WHICH COMPLY WITH MANUFACTURER'S STANDARD MATERIALS; WITH THE DESIGN AND CONSTRUCTION IN ACCORDANCE WITH PUBLISHED PRODUCT INFORMATION; EQUIP WITH PROPER NUMBER OF UNIT PANELBOARD DEVICES AS REQUIRED FOR COMPLETE INSTALLATION. WHERE TYPES, SIZES, OR RATINGS ARE NOT INDICATED, COMPLY WITH NEC, UL AND ESTABLISHED INDUSTRY STANDARDS FOR THOSE APPLICATIONS INDICATED. WHERE "SPACE" IS INDICATED ON PANEL SCHEDULES, THE PANELBOARD BUS SHALL BE EXTENDED BEHIND THE SPACES, AND PROVISION SHALL BE MADE FOR THE FUTURE INSTALLATION OF CIRCUIT BREAKERS WITHOUT THE REQUIREMENT OF ADDITIONAL MOUNTING HARDWARE.

B. INTERRUPTING CAPACITY: THE MINIMUM INTERRUPTING CAPACITY OF EACH PANELBOARD ASSEMBLY SHALL BE AS INDICATED ON THE DRAWINGS. NO SERIES RATINGS SHALL BE ACCEPTABLE.

C. LIGHTING AND APPLIANCE PANELBOARDS: PROVIDE DEAD-FRONT SAFETY TYPE LIGHTING AND APPLIANCE PANELBOARDS AS INDICATED WITH SWITCHING AND PROTECTIVE DEVICES IN QUANTITIES, RATINGS, TYPES AND ARRANGEMENTS SHOWN. PROVIDE ANTI-TURN SOLDERLESS PRESSURE TYPE LUG CONNECTORS APPROVED FOR USE WITH COPPER CONDUCTORS. SELECT UNIT WITH SUITABLE LUGS FOR CONNECTING FEEDERS AT TOP OR BOTTOM OF PANEL AS REQUIRED. PROVIDE BARE UNINSULATED COPPER GROUNDING BARS SUITABLE FOR BOLTING TO ENCLOSURES, WITH LUGS SUITABLE FOR INCOMING AND OUTGOING GROUNDING CONDUCTORS. SELECT ENCLOSURES FABRICATED BY SAME MANUFACTURER AS PANELBOARDS, WHICH MATE AND MATCH PROPERLY WITH PANELBOARDS.

D. PANELBOARD ENCLOSURES: PROVIDE GALVANIZED SHEET STEEL CABINET TYPE ENCLOSURES IN NEMA SIZE TYPES AS INDICATED, CODE-GAGE, MINIMUM 16-GAGE THICKNESS. CONSTRUCT WITH MULTIPLE KNOCKOUTS AND WIRING GUTTERS. PROVIDE FRONTS WITH ADJUSTABLE TRIM CLAMPS, AND DOORS WITH FLUSH LOCKS AND KEYS, ALL PANELBOARD ENCLOSURES KEYED ALIKE, WITH CONCEALED PIANO DOOR HINGES AND DOOR SWINGS AS INDICATED. EQUIP WITH INTERIOR CIRCUIT-DIRECTORY FRAME, AND CARD WITH CLEAR PLASTIC COVERING. PROVIDE BAKED GRAY ENAMEL FINISH OVER A RUST INHIBITOR COATING. DESIGN ENCLOSURES FOR RECESSED OR SURFACE MOUNTING AS INDICATED ON THE PLANS. PROVIDE ENCLOSURES WHICH ARE FABRICATED BY SAME MANUFACTURER AS PANELBOARDS, WHICH MATE AND MATCH PROPERLY WITH PANELBOARDS TO BE ENCLOSED.

E. MOLDED-CASE CIRCUIT BREAKERS: PROVIDE FACTORY-ASSEMBLED, BOLT-ON MOLDED-CASE CIRCUIT BREAKERS OF FRAME SIZES, CHARACTERISTICS, AND RATINGS INCLUDING RMS SYMMETRICAL INTERRUPTING RATINGS INDICATED. SELECT BREAKERS WITH PERMANENT THERMAL AND INSTANTANEOUS MAGNETIC TRIP, AND WITH FAULT-CURRENT LIMITING PROTECTION, AMPERE RATINGS AS INDICATED. CONSTRUCT WITH OVERCENTER, TRIP-FREE, TOGGLE-TYPE OPERATING MECHANISMS WITH QUICK-MAKE, QUICK-BREAK ACTION AND POSITIVE HANDLE TRIP INDICATION. CONSTRUCT BREAKERS FOR MOUNTING AND OPERATING IN ANY PHYSICAL POSITION, AND OPERATING IN AN AMBIENT TEMPERATURE OF 40 DEG C. PROVIDE BREAKERS WITH MECHANICAL SCREW TYPE REMOVABLE CONNECTOR LUGS, CU RATED.

F. GROUND FAULT CIRCUIT INTERRUPTING BREAKERS: PROVIDE AS INDICATED, CONFORMING TO THE NEC, AND UL LISTED, SHALL HAVE A "PUSH-TO-TEST" BUTTON AND VISIBLE INDICATION OF A TRIPPED CONDITION, AND SHALL DEDUCT A CURRENT IMBALANCE OF APPROXIMATELY 5 MILLIAMPERES. BREAKERS SHALL HAVE AN INTERRUPTING CAPABILITY AS INDICATED. BREAKERS SHALL BE DESIGNED TO ACCEPT COPPER CONDUCTORS.

G. ACCESSORIES: PROVIDE PANELBOARD ACCESSORIES AND DEVICES INCLUDING, BUT NOT NECESSARILY LIMITED TO, CARTRIDGE AND PLUG TIME-DELAY TYPE FUSES, GROUND-FAULT PROTECTION UNITS, ETC., AS RECOMMENDED BY PANELBOARD MANUFACTURER FOR RATINGS AND APPLICATIONS INDICATED.

H. UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS, PROVIDE 15% SPARE BREAKER CAPACITY (20 AMP/1 POLE) AND 15% SPACE ONLY CAPACITY IN EACH LIGHTING AND APPLIANCE PANELBOARD.

I. PREPARE AND AFFIX TYPEWRITTEN DIRECTORY TO INSIDE COVER OF PANELBOARD INDICATING LOADS CONTROLLED BY EACH CIRCUIT IN ACCORDANCE WITH NEC ARTICLE 408.4.

J. PROVIDE AN ENGRAVED NAMEPLATE ON EACH NEW PANELBOARD.

K. INSTALL PANELBOARDS AND ENCLOSURES AS INDICATED, IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS, APPLICABLE REQUIREMENTS OF NEC STANDARDS AND NECA'S "STANDARDS OF INSTALLATION", AND IN COMPLIANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PRODUCTS FULFILL REQUIREMENTS.

1.20 DISCONNECT SWITCHES

A. DISCONNECT SWITCHES SHALL BE SINGLE THROW, HEAVY DUTY, WITH QUICK-MAKE, QUICK-BREAK CONTACTS AND INTERLOCKING COVERS. THEY SHALL BE FUSIBLE OR NON-FUSIBLE AS INDICATED ON THE DRAWINGS, 600 VOLT, 3 POLE, EXCEPT WHERE SPECIFIED OTHERWISE.

B. ENCLOSURES SHALL BE NEMA 1 FOR INTERIOR LOCATIONS AND NEMA 3R (RAIN TIGHT) FOR DAMP LOCATIONS OR EXPOSED TO THE WEATHER. EXTERIOR NEMA 3R DISCONNECTS SHALL HAVE TWO COATS OF EXTERIOR PAINT (COLOR BY ARCHITECT).

C. NON-FUSED DISCONNECT SWITCHES SHALL BE HORSEPOWER RATED FOR THE MOTOR INSTALLED.

D. DISCONNECT SWITCHES FOR SINGLE PHASE MOTORS SIZED ½ HP AND BELOW SHALL BE ARROW-HART 6808 FOR DRY LOCATIONS AND 6808-W FOR DAMP LOCATIONS OR WHERE SWITCH WILL BE EXPOSED TO WEATHER. HUBBELL AND SQUARE D DEVICES ARE ACCEPTABLE.

1.21 SUPPORTING DEVICES

A. CONDUIT, CABLE AND EQUIPMENT SUPPORTS.

B. ANCHORS AND FASTENERS.

C. MATERIALS AND FINISHES: PROVIDE ADEQUATE CORROSION RESISTANCE.

D. PROVIDE MATERIALS, SIZES, AND TYPES OF ANCHORS, FASTENERS AND SUPPORTS TO CARRY THE LOADS OF EQUIPMENT AND CONDUIT. CONSIDER WEIGHT OF WIRE IN CONDUIT WHEN SELECTING PRODUCTS.

E. PERFORATED STRAP IRON ARE NOT ACCEPTABLE AS HANGER OR FASTENING MATERIAL.

F. PLASTIC TIE WRAPS ARE NOT ACCEPTABLE AS SUPPORT MATERIALS.

G. PROVIDE ANCHORS, FASTENERS, AND SUPPORTS IN ACCORDANCE WITH NECA "STANDARD OF INSTALLATION".

H. DO NOT FASTEN SUPPORTS TO PIPES, DUCTS, MECHANICAL EQUIPMENT, AND CONDUIT.

I. OBTAIN PERMISSION FROM THE ENGINEER BEFORE USING POWDER ACTUATED ANCHORS.

J. OBTAIN PERMISSION FROM THE ENGINEER BEFORE DRILLING OR CUTTING STRUCTURAL MEMBERS.

K. FABRICATE SUPPORTS FROM STRUCTURAL STEEL OR STEEL CHANNEL. RIGIDLY WELD MEMBERS OR USE HEXAGON HEAD BOLTS TO PRESENT NEAT APPEARANCE WITH ADEQUATE STRENGTH AND RIGIDITY. USE SPRING LOCK WASHERS UNDER ALL NUTS.

1.22 ELECTRICAL IDENTIFICATION

A. PROVIDE COLORED ADHESIVE MARKING TAPE FOR RACEWAYS, WIRES, AND CABLES: SELF-ADHESIVE VINYL TAPE NOT LESS THAN 3 MILS THICK BY 1 INCH TO 2 INCHES IN WIDTH.

B. UNDERGROUND LINE MARKING DETECTABLE WARNING TAPE:

1. 100% VIRGIN LOW DENSITY POLYETHYLENE FILM WARNING TAPE WITH ALUMINUM CENTER CORE MANUFACTURED FOR MARKING AND IDENTIFYING UNDERGROUND UTILITIES, 6 INCHES WIDE AND 5 MILS (0.123 MM) THICK, CONTINUOUSLY INSCRIBED WITH A DESCRIPTION OF THE UTILITY.

2. USE A.P.W.A. COLOR CODES: ORANGE - TELECOMMUNICATION LINES, BLUE - WATER LINES, GREEN - SEWER LINES, RED - ELECTRICAL LINES AND YELLOW - GAS LINES.

C. PROVIDE ENGRAVED, PLASTIC-LAMINATED LABELS, SIGNS, AND INSTRUCTION PLATES: ENGRAVING STOCK MELAMINE PLASTIC LAMINATE, 1/16-INCH MINIMUM THICK FOR SIGNS UP TO 20 SQUARE INCHES, OR 8 INCHES IN LENGTH; 1/8-INCH THICK FOR LARGER SIZES. ENGRAVED LEGEND IN ½-INCH HIGH BLOCK LETTERS ON SMOOTH FACE AND PUNCHED FOR MECHANICAL FASTENERS.

D. NAMEPLATE MATERIAL COLORS SHALL BE:

1. BLUE SURFACE WITH WHITE CORE FOR 120/208 VOLT EQUIPMENT.

2. BRIGHT RED SURFACE WITH WHITE CORE FOR ALL EQUIPMENT RELATED TO FIRE ALARM SYSTEM.

3. DARK RED (BURGUNDY) SURFACE WITH WHITE CORE FOR ALL EQUIPMENT RELATED TO SECURITY.

4. ORANGE SURFACE WITH WHITE CORE FOR ALL EQUIPMENT RELATED TO TELEPHONE SYSTEMS.

5. BROWN SURFACE WITH WHITE CORE FOR ALL EQUIPMENT RELATED TO DATA SYSTEMS.

E. FASTENERS FOR PLASTIC-LAMINATED AND METAL SIGNS: SELF-TAPPING STAINLESS STEEL SCREWS OR NUMBER 10/32 STAINLESS STEEL MACHINE SCREWS WITH NUTS AND FLAT AND LOCK WASHERS.

F. ALL EMPTY CONDUIT RUNS SHALL HAVE PULL STRINGS AND CONDUIT WITH CONDUCTORS FOR FUTURE USE, SHALL BE IDENTIFIED FOR USE, AND SHALL INDICATE WHERE THEY TERMINATE. IDENTIFICATION SHALL BE BY TAGS WITH STRING OR WIRE ATTACHED TO CONDUIT OR OUTLET.

G. ALL OUTLET BOXES, JUNCTION BOXES, AND PULL BOXES SHALL HAVE THEIR COVERS AND EXTERIOR VISIBLE SURFACES PAINTED WITH COLORS TO MATCH THE SURFACE COLOR SCHEME OUTLINED ABOVE. THIS INCLUDES COVERS ON BOXES ABOVE LIFT-OUT AND OTHER TYPE ACCESSIBLE CEILINGS.

H. PROVIDE TYPEWRITTEN DIRECTORY IN EACH PANELBOARD OF CIRCUIT DESIGNATIONS IN CLEAR/TRANSPARENT PROTECTIVE ENVELOPE ATTACHED TO INSIDE OF PANELBOARD DOOR.

1.23 LUMINAIRES

A. LUMINAIRES SHALL BE FURNISHED AND INSTALLED AS INDICATED IN THE DRAWINGS. INSTALL BALLAST, LAMPS AND SPECIFIED ACCESSORIES AT THE FACTORY. ALL FACTORY INSTALLED WIRING SHALL BE COPPER.

B. EXIT SIGNS SHALL BE FURNISHED AND INSTALLED AS INDICATED IN THE DRAWINGS. PROVIDE FACES AND ARROWS AS INDICATED.

C. OCCUPANCY SENSORS SHALL BE DUAL TECHNOLOGY TYPE. THE CONTRACTOR SHALL DETERMINE THE REQUIRED COVERAGE AREAS. PROVIDE ALL REQUIRED CONTROL WIRING, POWER PACKS, ETC AS REQUIRED FOR A COMPLETE AND OPERATIVE SYSTEM. COVERPLATES SHALL BE STAINLESS STEEL MATCHING EXISTING.

D. THE LIGHTING DESIGN FOR THIS PROJECT WAS BASED UPON LUMINAIRE TYPES AND MANUFACTURERS SPECIFIED. ANY SUBSTITUTIONS SHALL BE APPROVED BY THE ENGINEER.

E. REFER TO THE "LIGHTING FIXTURE SCHEDULE" FOR INDIVIDUAL LUMINAIRE DESCRIPTIONS AND MANUFACTURER TYPES.

F. LUMINAIRES SHALL BE SELECTED FROM THE FIXTURE SCHEDULE NOT ONLY BY CATALOG NUMBER BUT WITH CONSIDERATION TO MOUNTING, NUMBER , TYPES OF LAMPS, AND REFERENCE NOTES ALL AS CONTAINED IN THE "LIGHTING FIXTURE SCHEDULE" AND IN ACCORDANCE WITH THESE SPECIFICATIONS.

FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: Capital Builders

CONSTRUCTION / PERMIT DRAWINGS

06.03.2024

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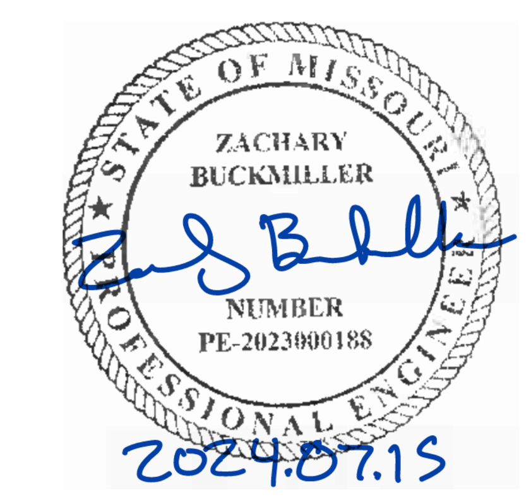

SPECIFICATIONS

Sheet: **MEPF105**

Revision no.

ABBREVIATIONS

A	
A	AMPERES, AIR (COMPRESSED)
A/C	AIR CONDITION
A/E	ARCHITECT/ENGINEER
ACC	AIR COOLED CHILLER
ACCU	AIR COOLED CONDENSING UNIT
ADA	AMERICANS WITH DISABILITIES ACT
AF	AMPERE FUSE
AFC	ABOVE FINISHED CEILING
AFCI	ARC FAULT CIRCUIT INTERRUPTER
AFEA	AREA OF EVACUATION ASSISTANCE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AI	ANALOG INPUT
AIC	AMPERE INTERRUPTING CIRCUIT
AL	ALUMINUM
AO	ANALOG OUTPUT
AP	ACCESS PANEL, ACCESS POINT
APPROX	APPROXIMATE
AR	AS REQUIRED
ARCH	ARCHITECT
ATL	ACROSS-THE-LINE
ATS	AUTOMATIC TRANSFER SWITCH
AV	AUDIO VISUAL
AWG	AMERICAN WIRE GAUGE
B	
B	BOILER
BAS	BUILDING AUTOMATION SYSTEM
BB	BACKBONE
BD	BACKDRAFT DAMPER, BLOWDOWN, BUILDING DISTRIBUTOR
BDF	BUILDING DISTRIBUTION FRAME
BFF	BELOW FINISHED FLOOR
BFG	BELOW FINISHED GRADE
BI	BINARY INPUT
BKR	BREAKER
BLDG	BUILDING
BO	BINARY OUTPUT
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BOS	BOTTOM OF STRUCTURE
BTU	BRITISH THERMAL UNIT
C	
C	CONDUIT
CAT	CAEGORY
CATV	CABLE TELEVISION SYSTEM
CCTV	CLOSED CIRCUIT TELEVISION
CD	CANDELA, CAMPUS DISTRIBUTOR, CONSTRUCTION DOCUMENTS
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CHP	CHILLED WATER PUMP
CI	CAST IRON
CKT	CIRCUIT
CMP	COMMUNICATIONS PLENUM CABLE
CMR	COMMUNICATIONS RISER CABLE
CP	CONDENSATE PUMP
CPT	CONTROL POWER TRANSFORMER
CPVC	CHLORINATED POLYVINYL CHLORIDE
CRAC	COMPUTER ROOM AIR CONDITIONING UNIT
CRU	COMPUTER ROOM UNIT
CWP	COOLING TOWER PUMP
CU	COPPER, CONDENSING UNIT
CVD	CUMULATIVE VOLTAGE DROP
D	
DB	DECIBALS, DRY BULB
DDC	DIRECT DIGITAL CONTROL
DEMO	DEMOLITION
DEPT	DEPARTMENT
DET	DETAIL
DFU	DRAINAGE FIXTURE UNIT
DI	DIGITAL INPUT, DUCTILE IRON
DIA	DIAMETER
DIR	DIRECTION
DIST	DISTANCE
DN	DOWN
DOC	DOCUMENT
DPDT	DOUBLE-POLE, DOUBLE-THROW
DPI	DIFFERENTIAL PRESSURE INDICATOR
DPST	DOUBLE-POLE, SINGLE-THROW
DS	DOWNSPOUT, DUCT SILENCER
DX	DIRECT EXPANSION
E	
E	(EXISTING)
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EIA	ELECTRONIC INDUSTRIES ASSOCIATIONS
EL	ELECTRIFIED LOCK OR LATCH, ELEVATION
EM	EMERGENCY
EMI	ELECTROMAGNETIC INTEFERENCE
EMS	ENERGY MANAGEMENT SYSTEM
EPO	EMERGENCY POWER OFF
ER	EQUIPMENT ROOM
ESFR	EARLY SUPPRESSION FAST RESPONSE
ETR	EXISTING TO REMAIN
EWB	ENTERING WET BULB
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE
F	
FACP	FIRE ALARM CONTROL PANEL
FBO	FURNISHED BY OTHERS/OWNER
FCA	FAULT CURRENT AMPS
FCU	FAN COIL UNIT
FD	FLOOR DRAIN, FLOOR DISTRIBUTOR
FFA	FROM FLOOR ABOVE
FFB	FROM FLOOR BELOW
FF	FINISHED FLOOR
FHC	FIRE HOSE CABINET
FL	FLOW LINE
FLA	FULL LOAD AMPS
FLR	FLOOR
FU	FURNACE
FVNR	FULL-VOLTAGE, NON-REVERSING
G	
G	NATURAL GAS, GROUND
GC	GENERAL CONTRACTOR
GE	GROUNDING EQUALIZER
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFR	GROUND FAULT RELAY
GFRG	GLASS-FIBER-REINFORCED GYPSUM
GND	GROUND
GPM	GALLONS PER MINUTE
GRS	GALVANIZED RIGID STEEL
GYP	GYPSUM BOARD
H	
HC	HORIZONTAL CROSS-CONNECT
HD	HEAD, HUB DRAIN
HOA	HAND-OFF-AUTOMATIC
HTG	HEATING
HTR	HEATER
HVU	HEATING AND VENTILATING UNIT
HWP	HEATING WATER PUMP
HZ	HERTZ
I	
IC	INTERMEDIATE CROSS-CONNECT
IE	INVERT ELEVATION
IG	INSULATED GROUND
IMC	INTERMEDIATE METAL CONDUIT
IN W	INCHES OF WATER COLUMN
IP	INTERNET PROTOCOL
ISC	SHORT CIRCUIT CURRENT
ISDN	INTEGRATED SERVICES DIGITAL NETWORK
ISP	INTERNET SERVICE PROVIDER, INSIDE PLANT CABLE
J	
J	JUNCTION BOX
J-BOX	JUNCTION BOX
K	
KCMIL	1000 CIRCULAR MILS
KK	KIRK KEY
KV	KILOVOLT
KVA	KILOVOLT-AMPS
KVAR	KILOVOLT-AMPS REACTIVE
KW	KILOWATT
KWH	KILOWATT-HOUR
L	
L	LOUVER
LAN	LOCAL AREA NETWORK
LAT	LEAVING AIR TEMPERATURE
LCC	LIMITED COMBUSTIBLE CABLE
LDB	LEAVING DRY BULB
LEC	LOCAL EXCHANGE CARRIER
LED	LIGHT-EMITTING DIODE
LF	LINEAR FEET (FOOT)
LP	LOW PRESSURE
LRA	LOCKED ROTOR AMPS
LWB	LEAVING WET BULB
LWT	LEAVING AIR TEMPERATURE
M	
M-M	MULTIMODE
MAN	METROPOLITAN AREA NETWORK
MATV	MASTER ANTENNA TELEVISION SYSTEM
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MC	MAIN CROSS-CONNECT
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MD	MOTORIZED DAMPER
MDF	MAIN DISTRIBUTION FRAME
MDP	MAIN DISTRIBUTION PANEL
MFR	MANUFACTURER
MG	MOTOR GENERATOR
MH	MAINTENANCE HOLE, MANHOLE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MOCP	MAXIMUM OVERCURRENT PROTECTION
MPOE	MAIN POINT OF ENTRANCE
MPOP	MAIN POINT OF PRESENCE
MSB	MAIN SWITCHBOARD
MSWB	MAIN SWITCHBOARD
MS/TP	MASTER SLAVE/TOKEN PASSING COMMUNICATION TRUNK
MTD	MOUNTED
MU	MAKE-UP
N	
N/A	NOT APPLICABLE
N/C	NORMALLY CLOSED
N/O	NORMALLY OPEN
N	NORTH
NC	NOISE CRITERIA
NEC	NATIONAL ELECTRICAL CODE
NF	NON-FUSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NUMBER
NOM	NOMINAL
NM	NANO METER
O	
OA	OUTSIDE AIR
OC	ON CENTER
ORD	OVERFLOW ROOF DRAIN
OS	OCCUPENCY SENSOR
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OSP	OUTSIDE PLANT
P	
P	POLE
PBX	PRIVATE BRANCH EXCHANGE
PCR	PUMPED CONDENSATE RETURN
PDI	PLUMBING DRAINAGE INSTITUTE
PH	PHASE
PIV	POST INDICATOR VALVE
PNL	PANEL
PNLBD	PANELBOARD
POE	POWER OVER ETHERNET
POTS	STANDARD ANALOG TELEPHONE LINE PROVIDE FURNISH AND INSTALL
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSTN	PUBLIC SWITCHED TELEPHONE NETWORK
PT	POTENTIAL TRANSFORMER
PTP	POINT-TO-POINT
PTZ	PAN, TILT, ZOOM
PVC	POLYVINYL CHLORIDE
Q	
QTY	QUANTITY
R	
RA	RETURN AIR
RC	ROOM CRITERIA
RCP	REINFORCED CONCRETE PIPE
RCPT	RECEPTACLE
REV	REVISION
RF	RETURN FAN
RH	RELATIVE HUMIDITY, ROOF HOOD
RHG	REFRIGERANT HOT GAS
RLA	RUNNING LOAD AMPS
RMC	RIGID METAL CONDUIT
RPM	REVOLUTIONS PER MINUTE
RTU	ROOFTOP UNIT
RU	RACK UNIT
S	
SA	SUPPLY AIR
SATV	SYNCHRONOUS OPTICAL NETWORK
SCP	STEAM CONDENSATE PUMP
SD	SMOKE DETECTOR
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SF	SQUARE FOOT (FEET), SUPPLY FAN
SIM	SIMILAR
SP	STATIC PRESSURE, SUMP PUMP
SPDT	SINGLE-POLE, DOUBLE-THROW
SPST	SINGLE-POLE, SINGLE-THROW
SQ	SQUARE
SS	STAINLESS STEEL, SANITARY SEWER, SOIL STACK
ST	SHUNT TRAP, STEAM TRAP
STC	SOUND TRANSMISSION CLASS
STD	STANDARD
STM	STEAM
SWBD	SWITCHBOARD
T	
TBB	TELEVISION BONDING BACKBONE
TBD	TO BE DETERMINED
TC/C	TEMPERATURE CONTROLS CONTRACTOR
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPORARY
TFA	TO FLOOR ABOVE
TFB	TO FLOOR BELOW
TGB	TELECOMMUNICATIONS GROUND BUS BAR
TIA	TELECOMMUNICATIONS INDUSTRY ASSOCIATION
TL	TWIST LOCK
TMGB	TELECOMMUNICATIONS MAIN GROUND BUS BAR
TN	TRUE NORTH
TOD	TOP OF DUCT
TOP	TOP OF PIPE
TOS	TOP OF SLAB
TR	TAMPER RESISTANT, TELECOMMUNICATIONS ROOM
TT	TEMPERATURE TRANSMITTER
TWU	THROUGH WALL AIR CONDITIONING UNIT
TV	TELEVISION
TX	TRANSFORMER
TYP	TYPICAL
U	
U/F	UNDERFLOOR
U/G	UNDERGROUND
U/S	UNDERSLAB
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SUPPLY
UTP	UNSHIELDED TWISTED PAIR
V	
V	VOLTAGE (VOLTS)
VAC	VOLTS ALTERNATING CURRENT
VAV	VARIABLE AIR VOLUME
VCP	VITRIFIED CLAY PIPE
VD	VOLTAGE DROP
VDC	VOLTS DIRECT CURRENT
VFD	VARIABLE FREQUENCY DRIVE
VS	VENT STACK
VTR	VENT THROUGH ROOF
W	
W/	WITH
W/O	WITOUT
W	WIRE
WAN	WIDE AREA NETWORK
WAP	WIRELESS ACCESS POINT
WB	WET BULB
WC	WATER COLUMN
WG	WATER GONG
WP	WEATHER PROOF COVER
WPD	WATER PRESSURE DROP
WR	WEATHER RESISTANT
WS	WASTE STACK
WSFU	WATER SUPPLY FIXTURE UNIT
WT	WATERTIGHT, WEIGHT
X	
XP	EXPLOSION-PROOF

MECHANICAL GENERAL NOTES

1. ALL DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENTS OR GEOMETRICAL RELATIONSHIPS OF DUCTWORK, PIPING, AND EQUIPMENT. DO NOT SCALE DRAWINGS. THE EXACT LOCATION AND ROUTING OF EQUIPMENT DUCTWORK PIPING ETC. UNLESS SPECIFICALLY DIMENSIONED ON THE DRAWINGS, SHALL BE DETERMINED IN THE FIELD. THEY ARE NOT INTENDED TO SPECIFY OR SHOW EVERY OFFSET, SEQUENCE, DEVICE, OPTION, FITTING, OR COMPONENT. MAKE REASONABLE MODIFICATIONS IN THE INSTALLATION SO ALL DUCTWORK AND PIPING FITS PROPERLY AND EQUIPMENT CAN BE SERVICED.
2. MATERIALS AND EQUIPMENT SHALL BE NEW AND INSTALLED AS INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS. THEY SHALL BE INSTALLED PLUMB LEVEL AND TRUE-TO-LINE WITH ADJACENT WORK WHERE INSTALLATION METHODS ARE NOT SPECIFICALLY COVERED BY THE DRAWINGS AND/OR SPECIFICATIONS, FIRST CLASS TRADE PRACTICES AND MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS SHALL GOVERN.
3. CAREFULLY EXAMINE ALL ARCHITECTURAL, STRUCTURAL, PLUMBING, HVAC, FIRE PROTECTION, AND ELECTRICAL DRAWINGS PERTAINING TO CONSTRUCTION PRIOR TO BID. COOPERATE WITH OTHER TRADES IN LOCATING DUCTWORK, PIPING, EQUIPMENT, ETC. IN ORDER TO AVOID CONFLICT WITH OTHER TRADE'S WORK. NO CLAIM FOR COSTS WILL BE ALLOWED FOR RELOCATING EQUIPMENT, PIPING, DUCTWORK, ETC. WHICH INTERFERES WITH OTHER TRADE'S WORK.
4. HVAC EQUIPMENT, DUCTS AND INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION, BUILDING DEPARTMENTS, APPLICABLE TO THE LATEST EDITION OF THE APPROVED BUILDING CODES, APPLICABLE OSHA AND NFPA STANDARDS, COUNTRY AND CITY BUILDING REGULATIONS AND CODES.
5. FABRICATION AND INSTALLATION OF DUCTWORK SHALL BE IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS, STATE MECHANICAL CODE AND APPLICABLE NFPA STANDARDS.
6. ALL DUCT SIZES SHOWN ARE INSIDE CLEAR DIMENSIONS.
7. PROVIDE AIR TURNING VANES IN ALL SQUARE ELBOWS IN ALL SYSTEM TYPES, EXHAUST, SUPPLY AND RETURN.
8. REFER TO TYPICAL DETAILS FOR PIPING AND INSTALLATION OF EQUIPMENT.
9. PERSONNEL SHALL BE THOROUGHLY TRAINED AND EXPERIENCED IN THE PRODUCTS INVOLVED AND RECOMMENDED METHODS FOR THEIR FABRICATION AND INSTALLATION SHALL BE MADE FOR LACK OF SKILL ON THE PARK OF THE WORKMAN IN THE ACCEPTANCE AND/OR REJECTION OF COMPLETED WORK.
10. MECHANICAL CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, TOOLS, AND EQUIPMENT TO INSTALL ALL HVAC SYSTEMS AS INDICATED ON THESE DRAWINGS.
11. INFORMATION AND COMPONENTS SHOWN ON RISER DIAGRAMS OR DETAILS, BUT NOT SHOWN ON PLANS, AND VICE VERSA, SHALL BE PROVIDED AS IF EXPRESSLY REQUIRED BY BOTH.
12. MECHANICAL CONTRACTOR SHALL ARRANGE AND PAY FOR MECHANICAL PERMITS AND INSPECTIONS AS REQUIRED BY LOCAL ORDINANCES.
13. DELIVER MATERIALS TO PROJECT IN GOOD CONDITION. STORE MATERIALS OFF OF GROUND AND PROTECT FROM WEATHER AND THE ELEMENTS.
14. VERIFY DIMENSIONS IN THE FIELD. VERIFY STRUCTURAL DETAILS BEFORE INSTALLING DUCTWORK. NO EXTRA COMPENSATION WILL BE CONSIDERED BECAUSE OF DIFFERENCED BETWEEN ACTUAL MEASURED DIMENSIONS AND THOSE INDICATED ON THE DRAWINGS.
15. ALL PENETRATIONS THROUGH WALLS SHALL BE PROVIDED WITH PROPERLY SIZED SLEEVES. SEAL ALL PIPE SLEEVES WITH APPROPRIATE CAULKING. ALL PENETRATIONS THROUGH FIRE RATED WALLS AND/OR FLOORS SHALL BE INSTALLED IN ACCORDANCE WITH APPROPRIATE 3M FIRE STOP SYSTEM (OR APPROVED EQUAL). ALL PIPING SLEEVES SHALL BE SCHEDULE 40, CARBON STEEL ASTM A53, GRADE B.
16. ANY CUTTING OR PATCHING OF NEW OR EXISTING SURFACES THAT IS REQUIRED SHALL BE BY THIS CONTRACTOR AND SHALL BE REPLACED WITH MATERIAL OF THE SAME QUALITY AND THICKNESS AS THE EXISTING SURFACE. ANY DAMAGES TO EXISTING MATERIALS SHALL BE REPAIRED OR REPLACED TO MATCH EXISTING.
17. THERMOSTATS/HUMIDISTATS/CO2 SENSORS SHALL BE LOCATED AS PER PLANS 48 INCHES ABOVE FINISHED FLOOR. ANY THERMOSTAT THAT IS REQUIRED TO EB MOUNTED ON AN EXTERIOR WALL MUST BE MOUNTED ON AN INSULATED BASE. INSTALL WIRING IN CONDUIT PROVIDED BY DIVISION 26. AT A MINIMUM, PROVIDE CONDUIT IN THE WALL FROM THE JUNCTION BOX TO 6" ABOVE THE CEILING.
18. MECHANICAL CONTRACTOR SHALL HAVE THE FINAL START-UP OR ALL HVAC EQUIPMENT SUPERVISED AND MONITORED BY A FACTOR AUTHORIZED TECHNICIAN.
19. HOUSEKEEPING PADS: EXCEPT WHERE STRUCTURAL EQUIPMENT SUPPORT PADS ARE CALLED FOR ON THE PLANS, PROVIDE CONCRETE HOUSEKEEPING PADS FOR ALL GROUND AND/OR FLOOR MOUNTED EQUIPMENT. UNLESS OTHERWISE INDICATED, PADS MUST BE MINIMUM OF 6 INCHES THICK WITH CHAMFERED EDGES. WHERE PADS ARE INSTALLED ON CONCRETE FLOORS, DOWEL RODS PENETRATING INTO BOUT THE PAD AND THE FLOOR (MINIMUM 4 RODS PER PAD) MUST BE USED TO ANCHOR PADS IN POSITION.
20. ALL WIRING INSTALLED FOR CONTROLS, POWER, INTERLOCKS, ETC WHICH ARE TO BE INSTALLED IN OCCUPIED SPACES OR IN RETURN PLENUMS MUST BE PLENUM RATED OR INSTALLED IN CONDUIT UNLESS OTHERWISE INDICATED. ALL SUCH INSTALLATIONS MUST MEET NFPA AND NEC REQUIREMENTS AND LOCAL CODES.
21. SEAL ALL ROOF AND WALL PENETRATIONS. FLASH AND COUNTER-FLASH ALL ROOF PENETRATIONS. MINIMUM ACCEPTABLE HEIGHT OF FLASHING IS EIGHT (8) INCHES ABOVE ROOF.
22. MAINTAIN A MINIMUM OF 15'-0" BETWEEN ALL FRESH AIR INTAKES AND PLUMBING VENTS, EXHAUST FAN DISCHARGE FLUE, ETC. COORDINATE WITH ALL OTHER CONTRACTORS ON SITE.
23. EXTERIOR DUCTWORK EXPOSED TO WEATHER: CROWN TOP SURFACE FOR WATER RUNOFF AND COMPLETELY SEAL ALL JOINTS WITH UV RESISTANT WEATHERPROOF SEALANT.
24. DURING CONSTRUCTION, AFTER START-UP OF HVAC SYSTEMS, CONTRACTOR MUST MAINTAIN AND/OR REPLACE ON A REGULAR SCHEDULE ALL FILTERS IN THE HVAC SYSTEM. ON (1) WEEK BEFORE THE FACILITY IS OCCUPIED, THE CONTRACTOR MUST REPLACE ALL AIR FILTERS WITH NEW FILTERS. DO NOT OPERATE HVAC SYSTEMS WITHOUT FILTER.
25. INDOOR AIR QUALITY MEASURERS: PROTECT INSIDE OF (INSTALLED AND DELIVERED) DUCTWORK AND HVAC UNITS FROM EXPOSESURE TO DUST, DIRT, PAINT, AND MOISTURE. REPLACE INSULATION THAT HAS GOTTEN WET AT ANY TIME DURING CONSTRUCTION, DRYING THE INSULATION IS NOT ACCEPTABLE. SEAL ANY TEARS OR JOINTS OF INTERNAL FIBERGLASS INSULATION. REMOVE DEBRIS FROM CEILING/RETURN AIR PLENUM INCLUDING DUST.
26. COORDINATE LOCATION OF ROOF MOUNTED HVAC EQUIPMENT AND ROOF PENETRATIONS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS.
27. INSTALL DUCTWORK AND PIPING PARALLEL TO BUILDING COLUMN LINES UNLESS OTHERWISE SHOWN OR NOTED.
28. COORDINATE LOCATION OF EQUIPMENT SUPPORTS WITH LOCATION OF EQUIPMENT ACCESS PANELS/DOORS TO ENABLE SERVICE OF EQUIPMENT AND/OR FILTER REPLACEMENT.
29. PROVIDE WALL OR DUCT ACCESS PANELS OR DOOR FOR ACCESS TO FIRE AND FIRE/SMOKE DAMPERS. ACCESS PANEL OR DOOR SHALL BE MINIMUM SIZE OF 10"X10" AND SHALL BE INSTALLED WITHIN 12" OF DAMPER. PROVIDE A REMOVABLE DUCT SECTION WHERE DUCT SIZE IS TOO SMALL FOR A 10"X10" ACCESS DOOR.
30. PROVIDE A MANUAL BALANCING DAMPER IN EACH BRANCH DUCT TAKEOFF FROM MAIN SUPPLY, RETURN, OUTDOOR AND EXHAUST AIR DUCTS.
31. PROVIDE A PREFABRICATED 45 DEGREE, HIGH EFFICIENCY, RECTANGULAR/ROUND BRANCH DUCT TAKE-OFF FITTING WITH MANUAL BALANCING DAMPER AND LOCKING QUADRANT FOR BRANCH DUCT CONNECTIONS AND TAKE-OFFS TO INDIVIDUAL DIFFUSERS, REGISTERS AND GRILLES.
32. BRANCH DUCTWORK TO AIR OUTLETS SHALL BE SAME SIZE AS OUTLET NECK SIZE UNLESS OTHERWISE INDICATED.
33. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5'-0" IN LENGTH AND SHALL BE INSTALLED AND SUPPORTED TO AVOID SHARP BENDS AND SAGGING. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
34. SEE ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF ALL CEILING MOUNTED AIR DEVICES.
35. MECHANICAL CONTRACTOR SHALL SUPPLY SMOKE DETECTOR IN RETURN DUCT OF AIR HANDLERS OVER 2000 CFM AND FOR UNITS WHICH SERVE AREAS OF EGRESS FOR INSTALLATION BY ELECTRICAL CONTRACTOR. DETECTORS SHALL BE MOUNTED, PHOTOELECTRIC TYPE COMPATIBLE WITH EXISTING FIRE ALARM SYSTEM WITH INTEGRAL RELAY FOR SHUTDOWN OF UNIT UPON ACTIVATION OF DETECTOR.
36. ALL DUCT OFF-SETS ARE TO BE MADE WITH RADIUS ELBOWS.
37. PROVIDE TRANSITIONS FOR ALL EQUIPMENT CONNECTIONS.
38. THE CONTRACTOR SHALL COORDINATE AND VERIFY THE FOLLOWING DIVISIONS 23 AND 26 PRIOR TO BID:
DISCONNECTS:
WHERE NOT FURNISHED WITH EQUIPMENT: FURNISHED UNDER DIVISION 26, INSTALLED UNDER DIVISION 26. WHERE FURNISHED WITH EQUIPMENT: FURNISHED UNDER DIVISION 23, INSTALLED UNDER DIVISION 26.

FLEX SPACES

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MECHANICAL NOTES AND ABBREVIATIONS

Sheet: M001

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MECHANICAL SYMBOLS LEGEND

NOTE:THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS, ABBREVIATIONS, ETC. ARE NECESSARILY USED ON THE DRAWINGS.

ANNOTATION

- X1 — KEYNOTE TAG
- AHU-1 — EQUIPMENT DESIGNATION
- CONNECTION POINT OF NEW WORK TO EXISTING
- EXTENTS OF DEMO (DIRECTIONAL)
- 1 / P1 — DETAIL/SECTION REFERENCE; INDICATES DETAIL NUMBER; INDICATES SHEET NUMBER
- 1 / P1 — SECTION CUT DESIGNATION
- GRILLE/REGISTER/DIFFUSER LABEL; S1 -TYPE DESIGNATION; 500 -AIRFLOW (CFM)

HVAC EQUIPMENT & DUCTWORK

NOTE: ALL DUCT DIMENSIONS SHOWN ON DRAWINGS ARE INSIDE DIMENSIONS. SEE SECTION 15250 OF THE SPECIFICATION FOR DUCTWORK TO RECEIVE INSULATION OR LINER.

- SUPPLY AIR DIFFUSER - ARROWS INDICATE PATTERN. NO PATTERN INDICATES 4-WAY.
- RETURN AIR DIFFUSER
- EXHAUST AIR DIFFUSER
- 12" — ROUND DUCTWORK
- 20"x12" — RECTANGULAR DUCTWORK, FIRST NUMBER IS SIDE SHOWN, NET FREE AREA
- PRE-INSULATED FLEXIBLE DUCT
- EXISTING DUCTWORK OR EQUIPMENT TO REMAIN
- EXISTING DUCTWORK OR EQUIPMENT TO BE REMOVED
- LINEAR SLOT DIFFUSER
- BRANCH DUCT WITH 45~ RECTANGLE-ROUND BRANCH FITTING AND MANUAL VOLUME DAMPER
- ELBOW WITH TURNING VANES
- BRANCH DUCT WITH BELL-MOUTH FITTING & MANUAL VOLUME CONTROL DAMPER
- RETURN DUCT UP
- RETURN DUCT DOWN
- SUPPLY AIR OR OUTSIDE AIR DUCT UP
- SUPPLY AIR OR OUTSIDE AIR DUCT DOWN
- EXHAUST DUCT UP
- EXHAUST DUCT DOWN
- EQUIPMENT WITH FLEXIBLE DUCT CONNECTION
- MANUAL VOLUME DAMPER
- SQUARE TO ROUND TRANSITION
- RD — DUCT MOUNTED SMOKE DETECTOR (SD=SUPPLY/RD=RETURN)

- (#) RISER DESIGNATION
- FD FIRE DAMPER
- FSD FIRE SMOKE DAMPER
- SD SMOKE DAMPER
- VD VOLUME DAMPER
- M MOTORIZED DAMPER
- BD BACKDRAFT DAMPER
- H HUMIDISTAT
- T THERMOSTAT
- F FIRESTAT

- CO CARBON MONOXIDE SENSOR
- CO_2 CARBON DIOXIDE SENSOR
- NO_x NITROGEN DIOXIDE SENSOR
- FS FLOW SWITCH
- HS HUMIDITY SENSOR
- PS PULL STATION
- SP STATIC PRESSURE SENSOR
- TS TEMPERATURE SENSOR
- HS — DUCT MOUNTED HUMIDITY SENSOR
- TS — DUCT MOUNTED TEMPERATURE SENSOR

PIPING

- FOS — FUEL OIL SUPPLY (FOS)
- FOR — FUEL OIL RETURN (FOR)
- FOV — FUEL OIL VENT (FOV)
- HPS — HIGH PRESSURE STEAM SUPPLY (HPS)
- HPC — HIGH PRESSURE STEAM CONDENSATE (HPC)
- MPS — MEDIUM PRESSURE STEAM SUPPLY (MPS)
- MPC — MEDIUM PRESSURE STEAM CONDENSATE (MP
- LPS — LOW PRESSURE STEAM SUPPLY (LPS)
- LPC — LOW PRESSURE STEAM CONDENSATE (LPC)
- PD — CONDENSATE PUMP DISCHARGE (PD)
- HWS — HEATING HOT WATER SUPPLY (HWS)
- HWR — HEATING HOT WATER RETURN (HWR)
- CHWS — CHILLED WATER SUPPLY (CHWS)
- CHWR — CHILLED WATER RETURN (CHWR)
- HCS — HOT/CHILLED WATER SUPPLY (HCS)
- HCR — HOT/CHILLED WATER RETURN (HCR)
- CWS — CONDENSER WATER SUPPLY (CWS)
- CWR — CONDENSER WATER RETURN (CWR)
- HPWS — HEAT PUMP WATER SUPPLY (HPWS)
- HPSR — HEAT PUMP WATER RETURN (HPWR)
- RL — REFRIGERANT LIQUID (RL)
- RD — REFRIGERANT DISCHARGE (HOT GAS) (RD)
- RS — REFRIGERANT SUCTION (RS)
- RDB — REFRIGERANT DISCHARGE BYPASS (RDB)
- RV — REFRIGERANT VENT (RV)
- DIRECTION OF FLOW
- EXISTING PIPING TO BE REMOVED
- EXISTING PIPING TO REMAIN

PIPE FITTINGS

- UNION
- FLANGE CONNECTION
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- CAP
- REDUCER

VALVE AND SPECIALTIES

- CONTROL VALVE
- THREE-WAY CONTROL VALVE
- SHUTOFF VALVE
- CHECK VALVE
- BALANCING VALVE WITH PRESSURE PORTS
- TRIPLE DUTY VALVE WITH PRESSURE PORTS
- WATER METER
- STRAINER
- STRAINER WITH BLOWOFF
- RELIEF/SAFETY VALVE
- PRESSURE REDUCING VALVE
- GAS PRESSURE REGULATOR
- THERMOSTATIC MIXING VALVE
- PIPE ANCHOR / SUPPORT
- EXPANSION JOINT
- PIPE GUIDE
- F & T TRAP
- BUCKET TRAP
- THERMOSTATIC TRAP
- BACKFLOW PREVENTER
- PRESSURE GAUGE
- THERMOMETER
- PRESSURE AND TEMPERATURE TEST PLUG
- VACUUM RELIEF VALVE
- AV — AUTOMATIC AIR VENT
- MV — MANUAL AIR VENT
- A — WATER HAMMER ARRESTER (WHA) WITH PDI SIZES, (A, B, C, D, & E)
- RECIRCULATION PUMP
- GAS COCK
- FLEXIBLE CONNECTION
- THERMOMETER WELL
- BALL VALVE
- BUTTERFLY VALVE
- GATE VALVE
- GLOBE VALVE
- ANGLE GLOBE VALVE
- KNIFE VALVE
- NEEDLE VALVE
- PLUG VALVE
- PINCH VALVE
- PRESSURE REDUCING
- PRESSURE RELIEF
- VEEBALL VALVE
- S — SOLENOID VALVE

STANDARD MOUNTING HEIGHTS

(AFF, AFG, UNLESS NOTED OTHERWISE)

THERMOSTATS (USER ADJUSTABLE)(TOP OF DEVICE)	48"
CONTROLS (TOP OF DEVICE)	48"

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08/20/2024

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MECHANICAL LEGEND

Sheet: M002

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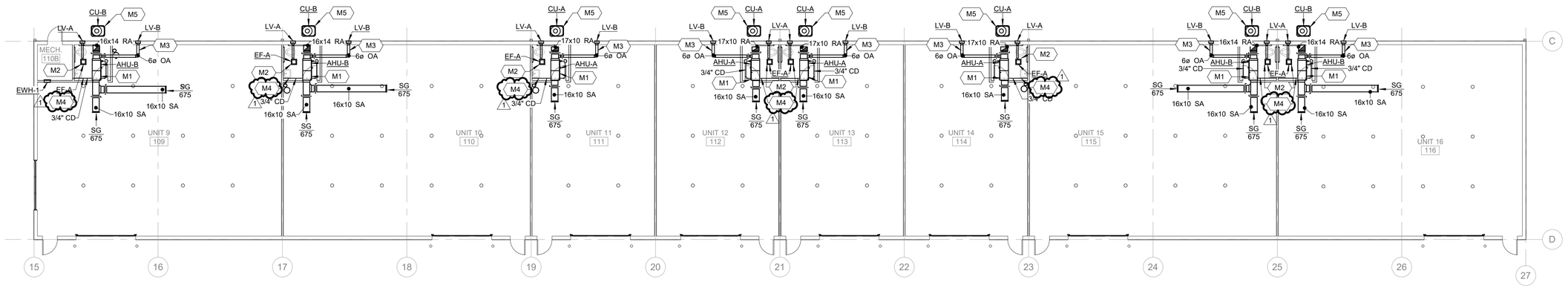


2 MECHANICAL FLOOR PLAN - BUILDING B

SCALE: 3/32" = 1'-0"

GENERAL NOTES

1. ALL WORK SHOWN IN UNIT 1 SHALL BE CONSIDERED ALTERNATE 1. BASE BID TO BE THE SAME AS THE DESIGN OF UNIT 2 SHOWN ON PLANS.

KEYED NOTES

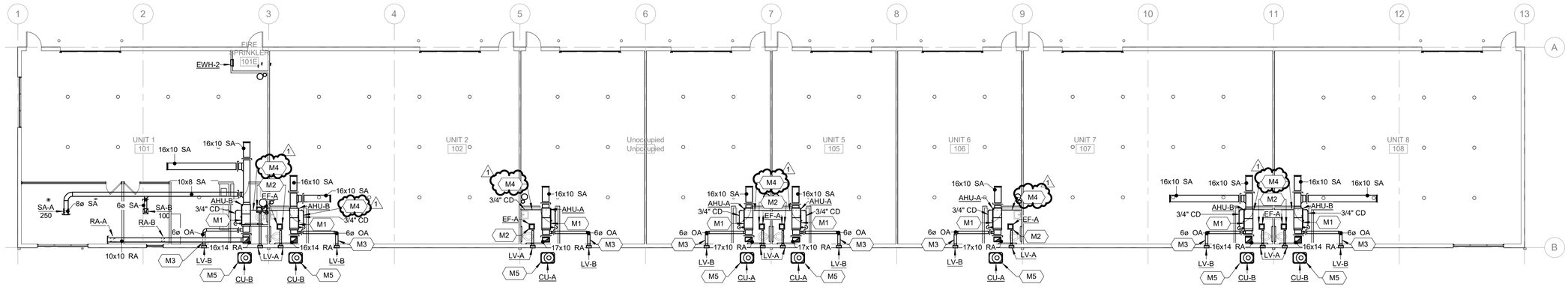
M1 HORIZONTAL AHU TO BE MOUNTED ABOVE BATHROOM. COORDINATE WITH MANUFACTURER INSTALLATION REQUIREMENTS.

M2 CEILING MOUNTED EXHAUST FAN. ROUTE 4" ROUND EXHAUST DUCT UP TO LOUVER. EXHAUST FAN TO BE CONTROLLED WITH LIGHT SWITCH.

M3 6" O.A. DUCT UP TO LOUVER. SEE M600 FOR O.A. BALANCING CFM.

M4 FULL SIZE CONDENSATE DRAIN CONNECTION TO MECHANICAL UNIT. ROUTE FULL SIZE CONDENSATE DRAIN PIPE TO HUB DRAIN BELOW SINK IN BATHROOM AND DISCHARGE WITH OPEN AIR GAP AT TERMINATION POINT PER REQUIREMENTS OF LOCAL CODE. (1)

M5 CONDENSING UNIT TO BE SUSPENDED 12" ABOVE GRADE FROM THE WALL USING UNISTRUT OR SIMILAR MOUNTING BRACKET. COORDINATE WITH PEMB CONTRACTOR AND GC ON INSTALL MEANS AND METHODS.



1 MECHANICAL FLOOR PLAN - BUILDING A

SCALE: 3/32" = 1'-0"

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MECHANICAL FLOOR PLANS

Sheet: M101

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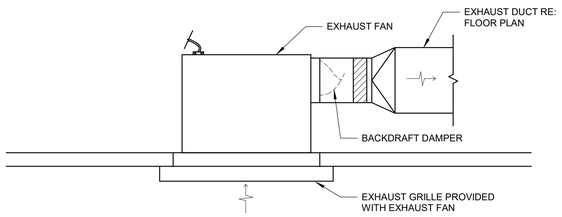
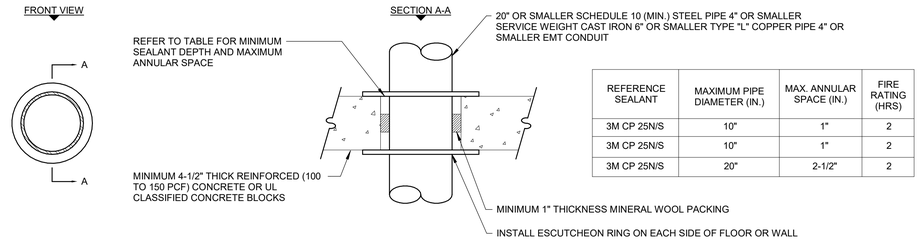


1 CEILING MOUNTED EXHAUST FAN

SCALE: NTS



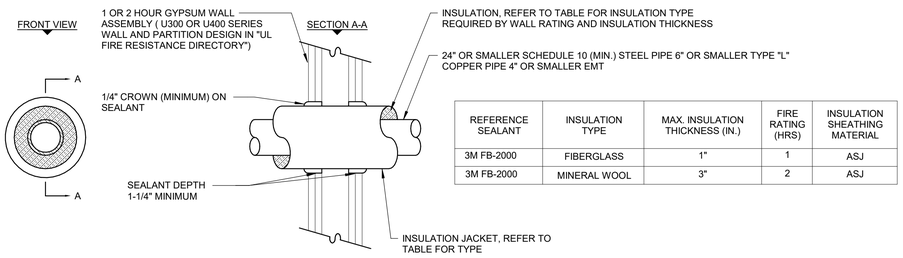
REFERENCE SEALANT	MAXIMUM PIPE DIAMETER (IN.)	MAX. ANNULAR SPACE (IN.)	FIRE RATING (HRS)
3M CP 25N/S	10"	1"	2
3M CP 25N/S	10"	1"	2
3M CP 25N/S	20"	2-1/2"	2

NOTE:

THIS DETAIL REPRESENTS ONE MANUFACTURER'S RECOMMENDATION FOR A WALL TYPE. THE CONTRACTOR SHALL CONSULT THE FIRE STOPPING MATERIALS MANUFACTURER FOR SPECIFIC INFORMATION AND SPECIFIC ISTALLATION INSTRUCTIONS FOR THE WALLS AND PARTITIONS.

2 METAL PIPE PENETRATION THRU RATED CONCRETE FLOOR OR WALL

SCALE: NOT TO SCALE:



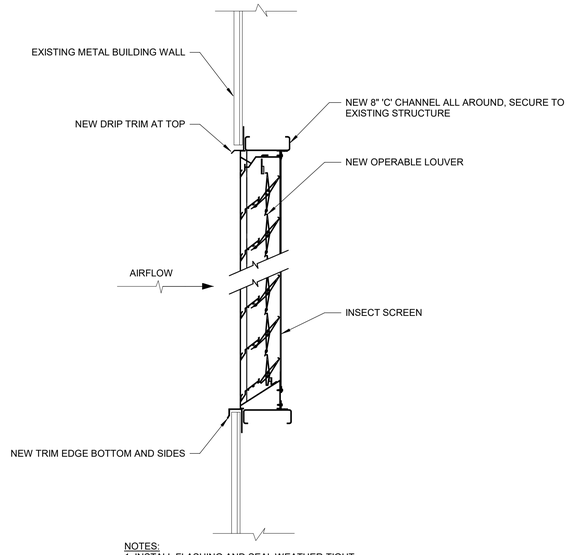
REFERENCE SEALANT	INSULATION TYPE	MAX. INSULATION THICKNESS (IN.)	FIRE RATING (HRS)	INSULATION SHEATHING MATERIAL
3M FB-2000	FIBERGLASS	1"	1	ASJ
3M FB-2000	MINERAL WOOL	3"	2	ASJ

NOTE:

THIS DETAIL REPRESENTS ONE MANUFACTURER'S RECOMMENDATION FOR A WALL TYPE. THE CONTRACTOR SHALL CONSULT THE FIRE STOPPING MATERIALS MANUFACTURER FOR SPECIFIC INFORMATION AND SPECIFIC INSTALLATION INSTRUCTIONS FOR THE WALLS AND PARTITIONS APPLICABLE TO THIS PROJECT.

6 INSULATED METAL PIPE PENETRATION THRU RATED GYPSUM WALL

SCALE: NOT TO SCALE:



NOTES:
1. INSTALL FLASHING AND SEAL WEATHER-TIGHT
2. INSTALL LOUVER PER MANUFACTER'S WRITTEN INSTALLATION INSTRUCTION.

5 EXTERIOR LOUVER WITH METAL BUILDING DETAIL

SCALE: NTS

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MECHANICAL DETAILS

Sheet

M500

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EXHAUST FAN SCHEDULE

SPECIFIC NOTES:
1. PROVIDE WITH FACTORY MOUNTED DISCONNECT SWITCH.
2. EXHAUST FAN SHALL BE LOCATED 10' MINIMUM AWAY FROM AIR INTAKE.
3. PROVIDE BIRDSCREEN AND GRAVITY BACKDRAFT DAMPER.
4. APPROVED MANUFACTURERS ARE: GREENHECK, COOK, NUTONE

TAG	MANUFACTURER	MODEL	AREA SERVES	FAN TYPE	DAMPER	DRIVE	AIR FLOW (CFM)	SP (in-wg)	WATTS	RPM	UNIT ELECTRICAL SERVICE		OPERATIONAL WEIGHT (LBS)	SPECIFIC NOTES
											VOLT	PH		
EF-A	GREENHECK	SP-LP0511-1	BATHROOM EXHAUST	CEILING MOUNTED	BACKDRAFT	DIRECT	50	0.1	4VA	685	120	1	15	1-4

STANDARD SPLIT EVAPORATOR SCHEDULE

SPECIFIC NOTES:
1. EQUIPMENT CONDENSER AND AHU COMPONENTS SHALL BE BY THE SAME MANUFACTURER.
2. HEAT PUMP HEATING CAPACITY SHALL BE BASED ON LISTED AMBIENT TEMPERATURE.
3. PROVIDE UNIT WITH FACTORY SUPPLIED CONCENTRIC VENT KIT.
4. PROVIDE 1" PANEL DISPOSABLE AIR FILTERS.
5. UNIT TO HANG FROM STRUCTURE IN HORIZONTAL POSITION WITH ALL THREAD RODS AND VIBRATION ISOLATION SPRINGS. REFER TO DETAIL.
6. INDOOR UNIT DISCONNECT SHALL BE PROVIDE AND WIRED BY DIVISION 26.
7. OUTDOOR UNIT DISCONNECT SHALL BE PROVIDE AND WIRED BY DIVISION 26.
8. PROVIDE 7-DAY PROGRAMMABLE THERMOSTAT WITH STAGED HEATING AND COOLING CAPABILITY.
9. APPROVED MANUFACTURERS ARE: TRANE, CARRIER, GOODMAN, RUNTRU, LENNOX

TAG	MANUFACTURER	MODEL	MIN. OA (CFM)	SUPPLY AIRFLOW	MOTOR			COOLING				ELECTRIC HEATING						HEAT PUMP			UNIT ELECTRICAL SERVICE					OPERATIONAL WEIGHT (LBS)	SPECIFIC NOTES
					HP	PHASE	FLA	TOTAL MBH	SENS. MBH	EAT (°F)		KW	EAT (°F)	LAT (°F)	Δ T (°F)	VOLT	PH	MIN. AMB. (°F)	EAT (°F)	Δ T (°F)	VOLT	PHASE	FLA	MCA	MOCP		
										DB	WB															
AHU-A	TRANE	TEM6A0B24H21	100	675	0.33	1	2.5	18.642	13.387	78	65.6	5.77	62.0	88.9	26.9	208	1	17	62.2	20.2	208	1	2.8	3	15	117	1-9
AHU-B	TRANE	TEM6A0C48H41	200	1,350	0.5	1	4.3	36.708	29.751	78	65.6	10.8	62.0	87.2	25.5	208	1	17	62	14.8	208	1	4.3	5	15	144	1-9

AIR COOLED CONDENSING UNIT SCHEDULE

SPECIFIC NOTES:
1. OUTDOOR UNIT DISCONNECT SHALL BE PROVIDED AND WIRED BY DIVISION 26.
2. UNIT SHALL BE PROVIDED WITH HAIL GAURDS.
3. APPROVED MANUFACTURERS ARE: TRANE, CARRIER, GOODMAN, RUNTRU, LENNOX

TAG	MANUFACTURER	MODEL	NOMINAL CAPACITY (BTU/H)	SEER (EER)	UNIT ELECTRICAL SERVICE				OPERATIONAL WEIGHT (LBS)	SPECIFIC NOTES
					VOLT	PH	MCA	MOCP		
CU-A	TRANE	4TWR5018	1.5	15	208	1	9	20	136	1-3
CU-B	TRANE	4TWA7036A3000A	3	15	208	1	15	20	200	1,2

CABINET/UNIT HEATER SCHEDULE

SPECIFIC NOTES:
1. UNIT SHALL BE RESCESSED IN WALL PROVIDE REQUIRE MOUNTING BRACKETS AND FLANGES.
2. PROVIDE UNIT WITH UNIT MOUNTED THERMOSTAT.
3. PROVIDE FACTORY MOUNTED DISCONNECT.
4. APPROVED MANUFACTURERS ARE: QMARK, MERKLE, TRANE

TAG	MANUFACTURER	MODEL	FAN	ELECTRIC HEAT		UNIT ELECTRICAL SERVICE			SPECIFIC NOTES
			WATTS	KW	BTU/HR	VOLT	PHASE	AMPS	
EWH-1	QMARK	LFK204F	1500VA	4	1705	208	1	7.2	1-4
EWH-2	QMARK	LFK204F	1500VA	4	1705	208	1	7.2	1-4

GRILLE/REGISTER/DIFFUSER SCHEDULE

SPECIFIC NOTES:
1. DUCT BRANCH SIZE SHALL MATCH DIFFUSER NECK SIZE
2. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

TAG	MANUFACTURER	MODEL	TYPE	MOUNTING LOCATION	BORDER TYPE	MATERIAL	NECK SIZE	SPECIFIC NOTES
SUPPLY								
SA-A	PRICE	SCD	LOUVERED	LAY-IN/GYP CEILING	T-BAR/FRAMED	Aluminum	8"	1,2
SA-B	PRICE	SCD	LOUVERED	LAY-IN/GYP CEILING	T-BAR/FRAMED	Aluminum	6"	1,2
SG	PRICE	610	RECTANGULAR DUCT GRILLE	DUCT MOUNTED	FRAMED	Aluminum	16" X 10"	1,2
RETURN								
RA-A	PRICE	500	GRILLE	SIDEWALL	FRAMED	STEEL	10" X 10"	1,2
RA-B	PRICE	500	GRILLE	SIDEWALL	FRAMED	STEEL	8" X 8"	1,2
EXHAUST								
LV-A	FSH INDUSTRIES LLC	SLIM-6-S	LOUVERED	WALL MOUNTED	FLANGED	WHITE PLASTIC	6"	
LV-B	FSH INDUSTRIES LLC	SLIM-4-S	LOUVERED	WALL MOUNTED	FLANGED	WHITE PLASTIC	8"	

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FLEX SPACES

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Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT:
Capital Builders

CONSTRUCTION / PERMIT DRAWINGS

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PROFESSIONAL ENGINEER
2024.07.15

MECHANICAL SCHEDULES

Sheet: M600

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PLUMBING SYMBOLS LEGEND

ANNOTATION

- X1 — KEYNOTE TAG
- WH-1 — EQUIPMENT/FIXTURE DESIGNATION
- CONNECTION POINT OF NEW WORK TO EXISTING
- EXTENTS OF DEMO (DIRECTIONAL)
- 1 / P1 — DETAIL/SECTION REFERENCE; INDICATES DETAIL NUMBER; INDICATES SHEET NUMBER
- 1 / P1 — SECTION CUT DESIGNATION

PIPE FITTINGS

- UNION
- FLANGE CONNECTION
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- CAP

PLUMBING FIXTURES

- FLOOR CLEANOUT (FCO)
- EXTERIOR CLEANOUT (ECO)
- FLOOR SINK (FS), SIZE & TYPE
- FLOOR DRAIN (FD), SIZE & TYPE
- ROOF DRAIN (RD), SIZE & TYPE
- HOSE BIBB (HB)
- NON-FREEZE WALL HYDRANT (WH)
- CLEANOUT (CO)
- WALL CLEANOUT (WCO)

PIPING

- CW — DOMESTIC COLD WATER
- HW — DOMESTIC HOT WATER
- HWR — DOMESTIC HOT WATER RECIRC.
- T — TRAP PRIMER LINE
- SS — SANITARY SEWER
- SS — SANITARY PIPING - BELOW GRADE
- ST — STORM DRAIN
- CD — CONDENSATE DRAIN
- SPD — SUMP OR SEWAGE PUMP DISCHARGE
- V — SANITARY VENT
- DIRECTION OF FLOW

METERS AND EQUIPMENT

- M — WATER METER

VALVES AND ASSEMBLIES

- TWO-WAY CONTROL VALVE
- SHUTOFF VALVE
- CHECK VALVE
- THERMOSTATIC MIXING VALVE
- PIPE ANCHOR / SUPPORT
- BACKFLOW PREVENTER
- PRESSURE GAUGE
- P-TRAP
- TRAP PRIMER

STANDARD MOUNTING HEIGHTS

(AFF, AFG, UNLESS NOTED OTHERWISE)

INSTALL PLUMBING FIXTURES WITH THE MOUNTING HEIGHTS GIVEN BELOW UNLESS NOTED OTHERWISE (UNO) ON THE ARCHITECTURAL DRAWINGS. FINAL APPROVAL OF MOUNTING HEIGHTS SHALL BE BY THE ARCHITECT.

LAVATORY OR SINK	
STANDARD HEIGHT	31" FLOOR TO RIM
ADA ACCESSIBLE	34" FLOOR TO RIM
WATER CLOSET	
STANDARD HEIGHT	15" FLOOR TO RIM
ADA ACCESSIBLE	17" TO 19" FLOOR TO TOP OF SEAT

ABBREVIATIONS

A ----------	
ADA	AMERICANS WITH DISABILITIES ACT
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
AHU	AIR HANDLING UNIT
B ----------	
B	BATHTUB
BFF	BELOW FINISHED FLOOR
BFG	BELOW FINISHED GRADE
BOP	BOTTOM OF PIPE
BOS	BOTTOM OF STRUCTURE
BP	BOOSTER PUMP
BTU	BRITISH THERMAL UNIT
C ----------	
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CO	CLEANOUT
CP	CONDENSATE PUMP
CPVC	CHLORINATED POLYVINYL CHLORIDE
CTL	COUNTERTOP LAVATORY
D ----------	
DCV	DOUBLE CHECK VALVES
DF	DRINKING FOUNTAIN
DFU	DRAINAGE FIXTURE UNITS
DIA	DIAMETER
DN	DOWN
DS	DOWNSPOUT
E ----------	
EES	EMERGENCY EYEWASH AND SHOWER
EEW	EMERGENCY EYEWASH
EMV	EMERGENCY MIXING VALVE
ESH	EMERGENCY SHOWER
ESP	ELEVATOR SUMP PUMP
ET	EXPANSION TANK
ETR	EXISTING TO REMAIN
EWC	ELECTRIC WATER COOLER
F ----------	
FFA	FROM FLOOR ABOVE
FFB	FROM FLOOR BELOW
FFE	FINISHED FLOOR ELEVATION
FF	FINISHED FLOOR
FL	FLOW LINE
FLA	FULL LOAD AMPS
FLR	FLOOR
G ----------	
GD	GARBAGE DISPOSAL
GI	GREASE INTERCEPTOR
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GT	GREASE TRAP
H ----------	
HD	HEAD, HUB DRAIN
HI	HAIR INTERCEPTOR
I ----------	
IE	INVERT ELEVATION
IMB	ICE MAKER BOX
IN WC	INCHES OF WATER COLUMN
J ----------	
JB	JUNCTION BOX
J-BOX	JUNCTION BOX
JS	JANITOR'S SINK (MOP SINK)
K ----------	
kW	KILLOWATT
L ----------	
LAV	LAVATORY
M ----------	
MAX	MAXIMUM
MBH	1000 BTU PER HOUR
MH	MANHOLE
MIN	MINIMUM
N ----------	
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
O ----------	
ORD	OVERFLOW ROOF DRAIN
O ----------	
ORD	OVERFLOW ROOF DRAIN
P ----------	
PDI	PLUMBING DRAINAGE INSTITUTE
PVC	POLYVINYL CHLORIDE
Q ----------	
QTY	QUANTITY
R ----------	
RH	ROOF HYDRANT
RP	RECIRCULATION PUMP
RPM	REVOLUTIONS PER MINUTE
RPZ	REDUCED PRESSURE ZONE BACKFLOW PREVENTER
RT	REMOTE TOTALIZER
S ----------	
SF	SQUARE FEET
SH	SHOWER
SK	SINK
SP	SUMP PUMP
SS	STAINLESS STEEL, SANITARY SEWER, SOIL STACK, SHOWER STALL
SV	SHOWER VALVE, SOLENOID VALVE
T ----------	
TD	TRENCH DRAIN
TDH	TOTAL DYNAMIC HEAD
TFA	TO FLOOR ABOVE
TFB	TO FLOOR BELOW
TMV	THERMOSTATIC MIXING VALVE
TOP	TOP OF PIPE
TP	TRAP PRIMER
TS	TIME SWITCH, TRAP SEAL
TYP	TYPICAL
U ----------	
UCL	UNDER COUNTER LAVATORY
UL	UNDERWRITERS LABORATORY
UNO	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
UR	URINAL
V ----------	
V	VOLTAGE
VCP	VITRIFIED CLAY PIPE
VS	VENT STACK
VTR	VENT THROUGH ROOF
W ----------	
W/	WITH
W/O	WITHOUT
WC	WATER COLUMN, WATER CLOSET
WF	WASH FOUNTAIN, WATER FILTER
WH	WATER HEATER
WM	WATER METER
WMB	WASHING MACHINE BOX
WS	WASTE STACK
WSFU	WATER SUPPLY FIXTURE UNIT

PLUMBING GENERAL NOTES

1. REVIEW ALL GENERAL NOTES, SPECIFICATIONS, DRAWINGS AND DOCUMENTS FOR ADDITIONAL REQUIREMENTS AND INFORMATION THAT MAN NOT BE INDICATED ON DRAWINGS.
2. DRAWINGS ARE DIAGRAMMATIC ONLY AND INDICATE THE GENERAL ARRANGEMENT OF ALL MATERIALS, PIPING AND EQUIPMENT. DRAWINGS ARE NOT INTENDED TO SPECIFY OR SHOW EVERY OFFSET, SEQUENCE, DEVICE, OPTION, FITTING, OR COMPONENT. DO NOT SCALE THE DRAWINGS.
3. THE CONTRACTOR SHALL VISIT AND EXAMINE THE JOB SITE SO AS TO ASCERTAIN, PRIOR TO BIDDING, THE EXISTING CONDITIONS. NO CLAIM FOR COSTS WILL BE ALLOWED FOR LACK OF KNOWLEDGE OF THESE CONDITIONS.
4. THE INTENTION OF SPECIFICATIONS AND DRAWINGS IS TO CALL FOR FINISHED WORK. WHEREVER THE WORD "PROVIDE" IS STATED, IT SHALL MEAN TO "FURNISH AND INSTALLED COMPLETE AND READY FOR USE".
5. WORK SHALL COMPLY WITH THE REQUIREMENTS OF ANY AUTHORITIES HAVING JURISDICTION, BUILDING DEPARTMENTS, APPLICABLE TO THE LATEST EDITION OF THE APPLICABLE BUILDING CODE, PROVINCIAL FIRE CODE, APPLICABLE OSHA AND NFPA STANDARD, COUNTY AND CITY BUILDING REGULATIONS AND CODES.
6. WORK SHALL BE INSPECTED. CONTRACTOR SHALL PAY ANY FEES REQUIRED BY ANY AUTHORITIES HAVING JURISDICTION.
7. DRAWINGS AND SPECIFICATIONS SHALL GOVERN WHEN EXCEEDING CODE REQUIREMENTS.
8. SUBMIT TO THE ARCHITECT A CONSTRUCTION RECORD SET OF AS BUILT DRAWINGS. INDICATE ALL INSTALLED PIPING AND EQUIPMENT LOCATIONS THAT DIFFER FROM THE ORIGINAL CONSTRUCTION DOCUMENTS. REFER TO THE SPECIFICATIONS FOR MORE INFORMATION.
9. SUBMIT TO THE ARCHITECT A COPY OF ALL INSPECTION REPORTS AND APPROVAL CERTIFICATES ISSUED BY THE LOCAL AUTHORITY HAVING JURISDICTION AND/OR STATE INSPECTIONS. REFER TO THE SPECIFICATIONS FOR MORE INFORMATION.
10. SUBMIT TO THE ARCHITECT IN ELECTRONIC FORMAT, ALL SHOP DRAWINGS AND DESCRIPTIVE EQUIPMENT DATA/SUBMITTALS REQUIRED FOR THE PROJECT. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
11. NOTIFY THE ARCHITECT OF ANY CONFLICT OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
12. COORDINATE, VERIFY, AND CAREFULLY EXAMINE ALL ARCHITECTURAL, STRUCTURAL, PLUMBING, HVAC, FIRE PROTECTION, AND ELECTRICAL DRAWINGS PERTAINING TO CONSTRUCTION. COORDINATE IN FULL COOPERATION WITH OTHER TRADE CONTRACTORS IN LOCATING DUCTWORK, PIPING, EQUIPMENT, STRUCTURAL MEMBERS, ETC., IN ORDER TO AVOID CONFLICT WITH OTHER TRADE WORK. NO CLAIM FOR COSTS WILL BE ALLOWED FOR THE RELOCATING EQUIPMENT, PIPING, DUCTWORK, ETC. ANY CONFLICTS SHALL BE RESOLVED AT NO EXPENSE TO THE OWNER.
13. COORDINATE PIPING INSTALLATION WITH STRUCTURAL CONCRETE GRADE BEAMS, FOOTINGS, COLUMN PIERS, ETC. PIPING PASSING THROUGH STRUCTURAL CONCRETE GRADE BEAMS OR FOOTINGS SHALL BE SLEEVED WITH A STEEL PIPE OF ONE PIPE SIZE LARGER. COORDINATE SLEEVE INSTALLATIONS WITH THE ARCHITECT, STRUCTURAL ENGINEER, STRUCTURAL CONTRACTOR AND GENERAL CONTRACTOR BEFORE CONCRETE INSTALLATION. AVOID INTERRUPTING REBAR WHEN ROUTING THRU FOOTINGS.
14. VERIFY ALL ROUGH IN LOCATIONS. REFER TO THE ARCHITECTURAL DRAWINGS FOR THE EXACT LOCATION AND MOUNTING HEIGHTS OF ALL PLUMBING FIXTURES.
15. VERIFY ALL INVERT ELEVATIONS BEFORE SANITARY OR STORM PIPING IS INSTALLED. ALL UTILITY CONNECTIONS SHOWN ON DRAWINGSS ARE TO BE CONNECTED AT A POINT OF 5'-0" EXTERIOR TO THE BUILDING WITH AN EXTERIOR CLEANOUT AS INDICATED ON DRAWINGS.
16. REFER TO THE ARCHITECTURAL DRAWINGS FOR AESTHETIC FINISHES OF ALL PLUMBING FIXTURES.
17. CONTRACTOR SHALL PROVIDE REQUIRED PIPES, FITTINGS, VALVES, HANGERS, SUPPORTS, SLEEVES, INSERTS, TRAPS AND OTHER ASSOCIATED EQUIPMENT, ITEMS AND DEVICES, AS REQUIRED FOR A COMPLETE AND OPERATING SYSTEMS, INCLUDING ALL POINTS AUXILIARY TO THE SYSTEM OR SYSTEMS WHETHER OR NOT SPECIFICALLY SET FORTH HEREIN AND/OR SHOWN ON THE DRAWINGS.
18. CONTRACTOR SHALL PROVIDE ALL ITEMS INDICATED ON DRAWINGS UNLESS OTHERWISE NOTED.
19. INSTALL DRAINAGE PIPING WITH MINIMUM 1/4" PER FOOT (2%) DOWNWARD SLOP IN DIRECTION OF DRAIN FOR 3" AND SMALLER, UNLESS OTHERWISE STATED ON DRAWINGS. INSTALL PLUMBING PIPING WITH MINIMUM 1/8" PER FOOT (1%) DOWNWARD SLOPE IN DIRECTION OF DRAIN FOR 4" AND LARGER, UNLESS OTHERWISE STATED ON DRAWINGS.
20. AFTER INSTALLATION IS COMPLETE, CLEAN FAUCET AERATORS AND PIPE STRAINERS PRIOR TO TURNING THE BUILDING OVER THE OWNER. REFER TO THE SPECIFICATION FOR MORE INFORMATION.
21. MATERIAL AND EQUIPMENT SHALL BE NEW AND INSTALL AS INDICATED ON THE DRAWINGS AND SPECIFICATIONS. MATERIALS SHALL BE INSTALLED PLUMB, LEVEL AND TRUE TO LINE WITH ADJACENT WORK. WHERE INSTALLATION METHODS ARE NOT SPECIFIED ON THE DRAWINGS, FIRST CLASS TRADE PRACTICES AND MANUFACTURER'S RECOMMENDATIONS SHALL GOVERN.
22. NEATLY AND CONTINUOUSLY SEAL AROUND ALL LAVATORIES, URINALS, AND WATER CLOSETS ADJACENT TO WALLS OR FLOORS WITH USDA APPROVED, SANITARY TYPE, ONE PART, MILDEW RESISTANT SILICONE SEALANT. COORDINATE SEALANT COLOR WITH THE ARCHITECT .
23. NEATLY AND CONTINUOUSLY SEAL UNDER RIM OF ANY NEW STAINLESS STEEL SINK INSERTS WITH USDA APPROVED, SANITARY TYPE, ONE PART, MILDEW RESISTANT SILICONE SEALANT. COORDINATE SEALANT COLOR WITH THE ARCHITECT.
24. FIRESTOP ANY PENETRATIONS THROUGH RATED WALLS, FLOORS AND PARTITIONS. PROVIDE FIRESTOP DEVICE OR SYSTEM THAT COMPLIES WITH ASTM E814 AND INSTALL IN ACCORDANCE WITH THE CONDITIONS OF THEIR LISTING. PROVIDE DEVICE OR SYSTEM WITH AND 'F' RATING EQUAL TO THE RATING OF THE ASSEMBLY BEING PENETRATED. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF ALL RATED AND NON-RATED WALL, FLOOR AND PARTITION LOCATIONS.
25. SEAL ANY NEW EXTERIOR WALL PENETRATIONS WATER-TIGHT.
26. INSTALL CONCEALED PIPING TIGHT TO THE STRUCTURE AND AS HIGH AS POSSIBLE. INSTALL EXPOSED PIPING TIGHT TO THE STRUCTURE, WALL OR CEILING AND AS HIGH AS POSSIBLE.
27. DO NOT INSTALL PLASTIC PIPE IN RETURN AIR PLENUMS.
28. DO NOT INSTALL PIPING OVER ELECTRICAL EQUIPMENT.
29. PAINT ALL EXPOSED GAS AND WATER PIPING WITH RUST INHIBITOR PAINT. COORDINATE ALL PAINT COLORS WITH THE ARCHITECT. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
30. LABEL ALL PLUMBING PIPING WITH ADHESIVE PIPE LABELS INDICATION SERVICE AND DIRECTION OF FLOW. PIPE LABELS SHALL BE LOCATED NEAR ALL BRANCH CONNECTIONS, NEAR ALL FLOOR AND WALL PENETRATIONS, AND AT MAXIMUM INTERVALS OF 10 FEET ALONG EACH RUN. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
31. ROOF PENETRATIONS SHALL MAINTAIN 10'-0" MINIMUM CLEARANCE FROM ALL AIR INTAKES AND MAINTAIN 2'-0" CLEARANCE FROM ALL EQUIPMENT. VERIFY ALL FINAL EXACT LOCATIONS OF ROOF PENETRATIONS WITH THE ARCHITECT.
32. ALL ROOF PENETRATIONS SHALL BE SEALED WATER TIGHT. PROVIDE FLASHING AND COUNTER FLASHING AS REQUIRED.
33. INSULATE DOMESTIC WATER PIPING ABOVE GRADE WITH 1" ENGINEERED POLYMER FOAM INSULATION, OR MINERAL FIBER PREFORMED INSULATION WITH FACTORY APPLIED ALL SERVICE JACKET. DO NOT INSULATE EXPOSED CONNECTIONS TO PLUMBING FIXTURES, EXCEPT WHERE REQUIRED FOR ADA COMPLIANCE.
34. DOMESTIC WATER PIPING INSULATION, JACKETS, COVERINGS, SEALERS, MASTICS AND ADHESIVES, SHALL NOT EXCEED A FLAME SPREAD RATING OF 25 AND A SMOKE DEVELOP RATING OF 50 IN ACCORDANCE WITH ASTM E 84.
35. INSULATE PIPING ROUTED IN BUILDING EXTERIOR WALLS WITH 2" MINIMUM ARMA FLEX INSULATION.
36. ALL PIPING INSULATION SHALL RUN CONTINUOUSLY THROUGH WALLS, FLOORS AND PARTITIONS.
37. PROVIDE SHUT OFF VALVES AND UNIONS OR FLANGES WHERE INDICATED ON DRAWINGS AND DETAILS TO ISOLATE EACH ITEM OF EQUIPMENT OR FIXTURE.
38. INSTALL VALVES IN A LOCATION THAT PERMITS ACCESS FOR SERVICE AND OPERATION WITHOUT DAMAGE TO THE BUILDING FOR FINISHED MATERIALS. PROVIDE ACCESS DOORS AND PANELS IF REQUIRED. VERIFY ALL FINAL EXACT LOCATIONS OF ACCESS DOORS AND PANELS WITH ARCHITECT PRIOR TO CONSTRUCTION.
39. VALVES SHALL BE INCOMING PIPE LINE SIZE UNLESS OTHERWISE NOTED.
40. FLOW CONTROL VALVES SHALL BE 1/2" AND SET AT 0.5 GPM UNLESS OTHERWISE NOTED.
41. PROVIDE TRAP PRIMERS WHERE REQUIRED BY LOCAL AUTHORITIES.
42. INSTALL CLEANOUTS IN A LOCATION THAT PERMITS ACCESS FOR SERVICE WITHOUT DAMAGE TO THE BUILDING OR FINISHED MATERIALS.
43. NO SANITARY PIPING BELOW GRADE SHALL BE LESS THE 2".
44. WATER HAMMER ARRESTORS SHALL BE SIZE "A" UNLESS OTHERWISE NOTED ON DRAWINGS.

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client:
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PLUMBING LEGEND, NOTES AND ABBREVIATIONS

Sheet: P001

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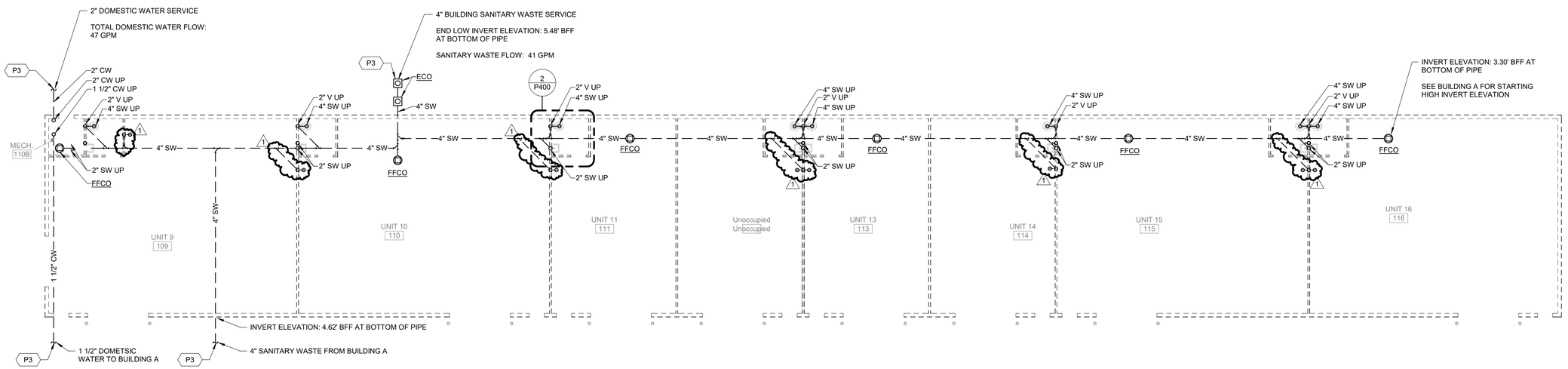


2 BELOW GRADE PLUMBING PLAN - BUILDING B

SCALE: 3/32" = 1'-0"

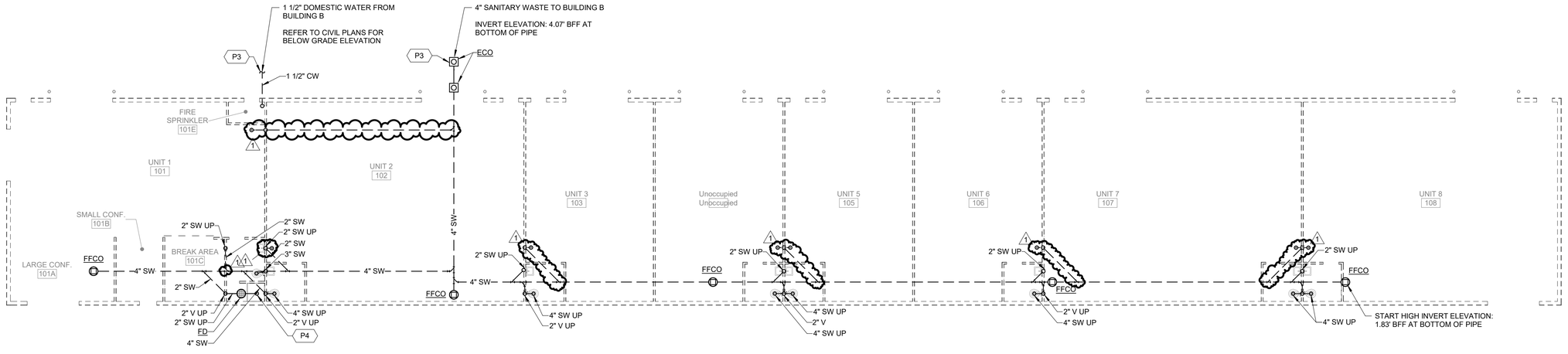
GENERAL NOTES

1. REFER TO SHEET P001 FOR ADDITIONAL GENERAL NOTES.
2. WATER PIPE SIZES ARE BASED ON A MINIMUM WORKING PRESSURE OF 60 PSI AT A FLOW RATE OF 47 GPM AT THE LOCATION WHERE THE MAIN SERVICE ENTERS THE BUILDING.
3. WALLS SHOWN DASHED ON THIS SHEET INDICATE WALL LOCATIONS ON LEVEL/FLOOR ABOVE.

KEYED NOTES

P3 REFER TO SHEET MEPF 100 FOR CONTINUATION.

P4 2" SANITARY UP TO SHOWER DRAIN ON FLOOR ABOVE. REFER TO WASTE AND VENT RISER DIAGRAMS FOR MORE INFORMATION.



1 BELOW GRADE PLUMBING PLAN - BUILDING A

SCALE: 3/32" = 1'-0"

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FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

client: Capital Builders

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06.03.2024

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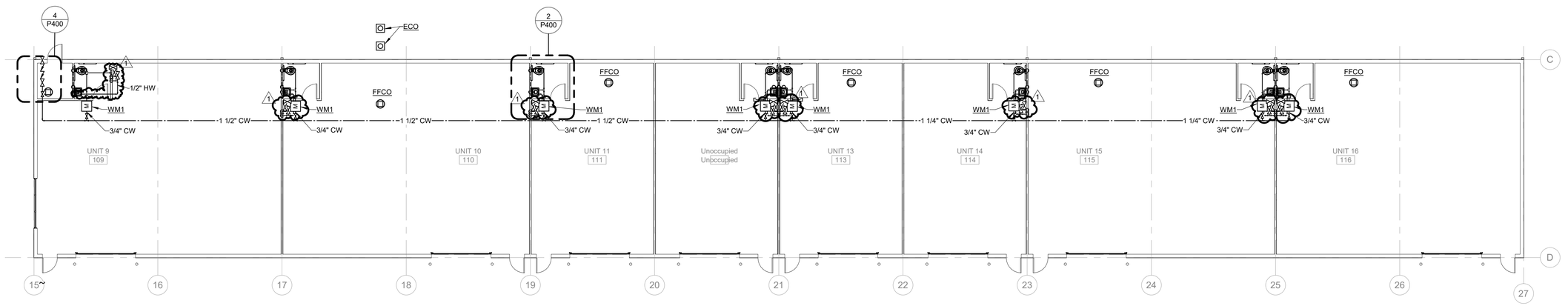
2024.07.15

PLUMBING BELOW GRADE PLANS

Sheet: P100

Revision no.



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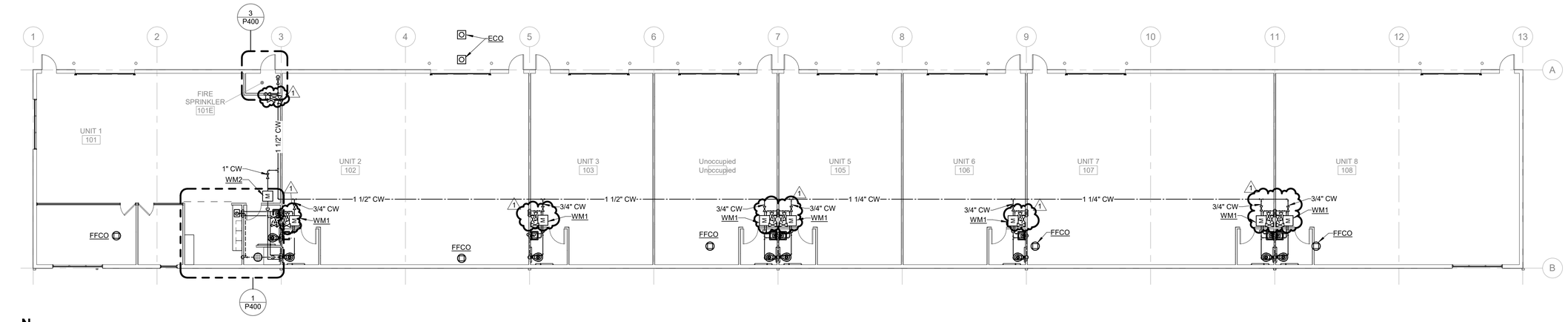
1 LEVEL 1 PLUMBING PLAN - BUILDING B

SCALE: 3/32" = 1'-0"

GENERAL NOTES

1. REFER TO SHEET P001 FOR ADDITIONAL GENERAL NOTES.
2. WATER PIPE SIZES ARE BASED ON A MINIMUM WORKING PRESSURE OF 60 PSI AT A FLOW RATE OF 47 GPM AT THE LOCATION WHERE THE MAIN SERVICE ENTERS THE BUILDING.
3. ALL WORK SHOWN IN UNIT 1 SHALL BE CONSIDERED ALTERNATE 1. BASE BID TO BE THE SAME AS THE DESIGN OF UNIT 2 SHOWN ON PLANS.



N

2 LEVEL 1 PLUMBING PLAN - BUILDING A

SCALE: 3/32" = 1'-0"

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Development Services Department
Lee's Summit, Missouri
08/20/2024

FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT:
Capital Builders

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NUMBER PE-2023000188
PROFESSIONAL ENGINEER
2024.07.15

PLUMBING FLOOR PLANS

Sheet: P101

Revision no.:

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GENERAL NOTES

1. REFER TO SHEET P001 FOR ADDITIONAL GENERAL NOTES.
2. WATER PIPE SIZES ARE BASED ON A MINIMUM WORKING PRESSURE OF 60 PSI AT A FLOW RATE OF 47 GPM AT THE LOCATION WHERE THE MAIN SERVICE ENTERS THE BUILDING.
3. ALL WORK SHOWN IN UNIT 1 SHALL BE CONSIDERED ALTERNATE 1. BASE BID TO BE THE SAME AS THE DESIGN OF UNIT 2 SHOWN ON PLANS.

KEYED NOTES

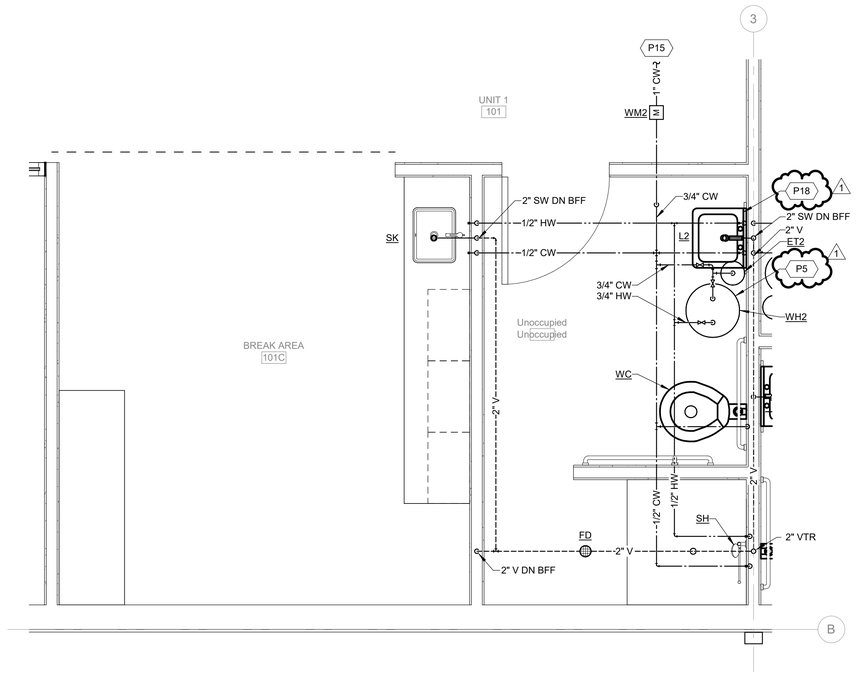
P3 REFER TO SHEET MEPF 100 FOR CONTINUATION.

P5 WATER HEATER ON PLATFORM ON WALL ABOVE CEILING. FURNISH WITH GALVANIZED WALL HUNG WATER HEATER PLATFORM WITH INTEGRAL DRAIN PAN AND TREATED WOOD BLOCKING BETWEEN STUDS AT WALL HUNG PLATFORM MOUNTING POINTS. FURNISH WITH EXPANSION TANK ON DOMESTIC COLD WATER INLET AND BRACKETED TO WALL ADJACENT TO WATER HEATER. FURNISH WITH DI-ELECTRIC UNIONS. FURNISH WITH TEMPERATURE & PRESSURE RELIEF VALVE, BRASS DRAIN VALVE, AND VACUUM RELIEF VALVE. ROUTE FULL SIZE TEMPERATURE & PRESSURE RELIEF DRAIN PIPE AND FULL SIZE DRAIN PAN DRAIN PIPE SEPARATELY TO HUB DRAIN BELOW SINK IN BATHROOM AND DISCHARGE WITH OPEN AIR GAP AT TERMINATION POINT PER REQUIREMENTS OF LOCAL CODE. SECURE ALL PIPES TO WALL. SET WATER HEATER OUTLET TEMPERATURE AS INDICATED ON THE SCHEDULE. REFER TO WATER HEATER DETAIL, WATER HEATER SCHEDULE, EXPANSION TANK DETAIL, AND EXPANSION TANK SCHEDULE FOR MORE INFORMATION.

P15 REFER TO OVERALL PLANS FOR CONTINUATION.

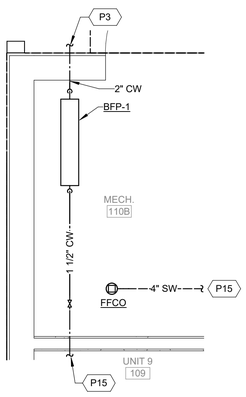
P16 WATER HEATER ON WALL. FURNISH WITH GALVANIZED WALL HUNG WATER HEATER PLATFORM WITH INTEGRAL DRAIN PAN AND TREATED WOOD BLOCKING BETWEEN STUDS AT WALL HUNG PLATFORM MOUNTING POINTS. FURNISH WITH EXPANSION TANK ON DOMESTIC COLD WATER INLET AND BRACKETED TO WALL ADJACENT TO WATER HEATER. FURNISH WITH DI-ELECTRIC UNIONS. FURNISH WITH TEMPERATURE & PRESSURE RELIEF VALVE, BRASS DRAIN VALVE, AND VACUUM RELIEF VALVE. ROUTE FULL SIZE TEMPERATURE & PRESSURE RELIEF DRAIN PIPE AND FULL SIZE DRAIN PAN DRAIN PIPE SEPARATELY TO HUB DRAIN BELOW SINK IN BATHROOM AND DISCHARGE WITH OPEN AIR GAP AT TERMINATION POINT PER REQUIREMENTS OF LOCAL CODE. SECURE ALL PIPES TO WALL. SET WATER HEATER OUTLET TEMPERATURE AS INDICATED ON THE SCHEDULE. REFER TO WATER HEATER DETAIL, WATER HEATER SCHEDULE, EXPANSION TANK DETAIL, AND EXPANSION TANK SCHEDULE FOR MORE INFORMATION.

P18 INSTALL HUB DRAIN AND PTRAP ON SANITARY WASTE BELOW SINK.



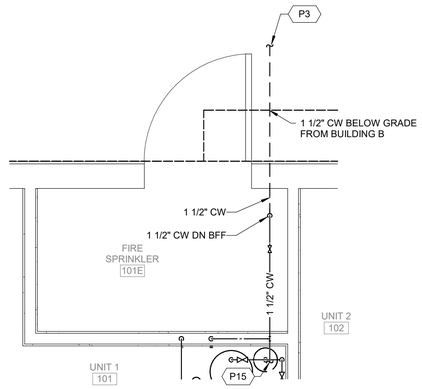
1 BUILDING A UNIT 1 101 ENLARGED PLUMBING PLAN

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



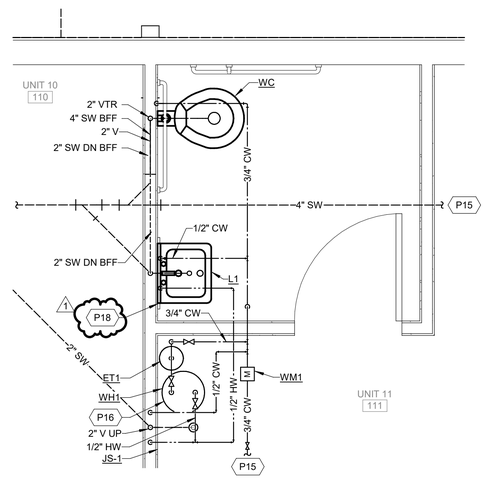
4 BUILDING B ENLARGED WATER SERVICE ENTRANCE

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



3 BUILDING A ENLARGED WATER SERVICE ENTRANCE

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



2 TYPICAL ENLARGED UNIT PLUMBING PLAN

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

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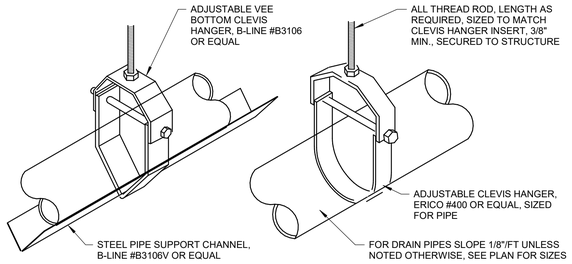
ENLARGED PLUMBING PLANS

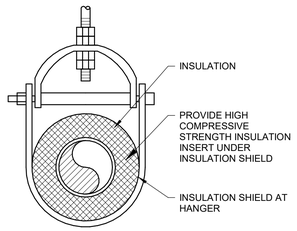
Sheet: P400

Revision no.



PVC OR CPVC PIPE

METALLIC PIPE



INSULATED PIPE

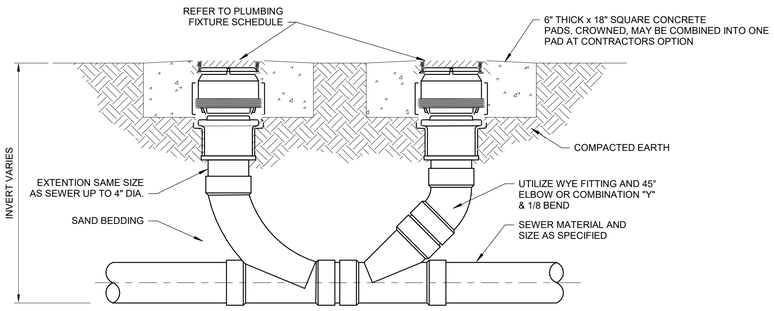
MINIMUM SUPPORT ALL THREAD ROD SIZE										
PIPE SIZE	1/2"	3/4"	1"	1-1/2"	2"	2-1/2"	3"	4"	5"	6"
ALL THREAD	3/8"	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"	5/8"	5/8"	3/4"

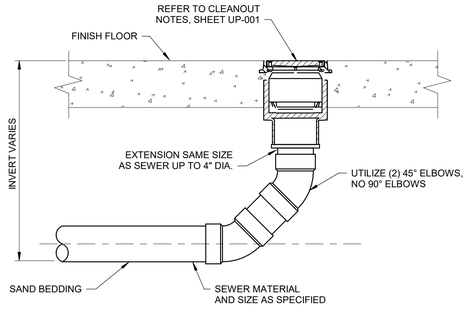
MAX. PIPE/TUBING SUPPORT SPACING, FEET											
NOM. SIZE	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"
STEEL PIPE	7'	7'	7'	7'	9'	10'	11'	12'	14'	16'	17'
COPPER TUBING	5'	5'	6'	7'	8'	8'	9'	10'	12'	13'	14'
PVC PIPE	7'-10"	7'-10"	7'-10"	7'-10"	7'-10"	7'-10"	9'-10"	9'-10"	9'-10"	-	-

NOTES:
1. FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.
2. UTILIZE PURLIN BEAM CLAMPS OR OTHER APPROVED METHOD FOR ATTACHMENT TO STRUCTURE.
3. WHEN UTILIZING VEE BOTTOM HANGERS AND STEEL SUPPORT CHANNEL, INSTALL HANGERS AS CLOSE AS POSSIBLE TO THE CHANNEL JOINTS. LAP SUPPORT CHANNELS 2" BOTH ENDS.

3 PIPE HANGER DETAILS

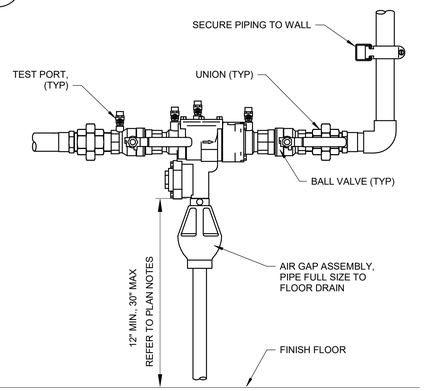
SCALE: NONE

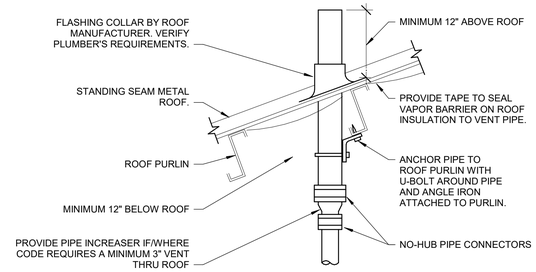




2 SLAB ON GRADE FLOOR CLEANOUT DETAIL

SCALE: NONE

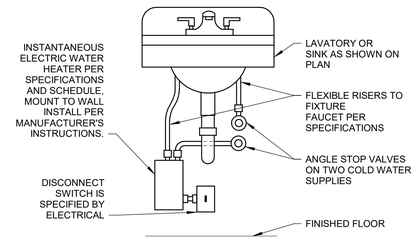




REFER TO PLANS FOR VTR PIPE SIZES AND LOCATIONS. VTR SHALL BE LOCATED A MINIMUM OF TEN FEET HORIZONTAL FROM OR THREE FEET VERTICAL ABOVE ANY BUILDING OPENING OR FRESH AIR INTAKE. LOCATE VTR A MINIMUM OF ONE FOOT FROM ANY VERTICAL SURFACE. OFFSET IN CEILING SPACE WHERE REQUIRED TO MEET THESE CONDITIONS.

1 VENT THRU METAL SEAM ROOF DETAIL

SCALE: 12" = 1'-0"



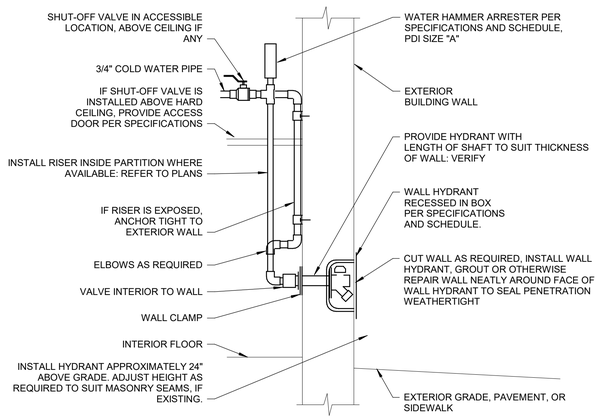
REFER TO SPECIFICATIONS, SCHEDULES, AND NOTES FOR MORE INFORMATION. PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. VERIFY CONNECTION SIZES AND LOCATIONS PER MANUFACTURER'S REQUIREMENTS, AND INSTALL PER MANUFACTURER'S INSTRUCTIONS. REFER TO FLOOR PLANS FOR PIPE SIZES. INSTALL WATER HEATER CLEAR OF ADA REQUIRED SPACE FOR ADA COMPLIANT LAVATORY OR SINK. PROVIDE T&P RELIEF VALVE ON WATER HEATER OUTLET ONLY IF REQUIRED BY LOCAL AUTHORITIES, AND DISCHARGE WERE DIRECTED BY AUTHORITIES.

6 TWO-WAY CLEANOUT TO GRADE DETAIL

SCALE: NONE

5 HORIZONTAL BACKFLOW PREVENTER DETAIL

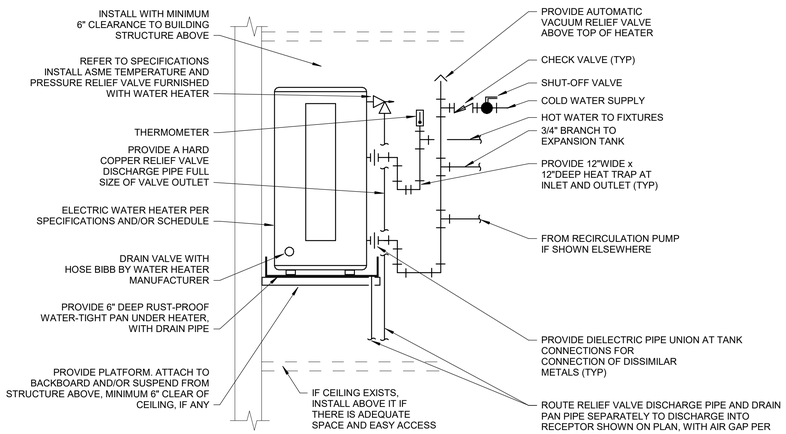
SCALE: NTS



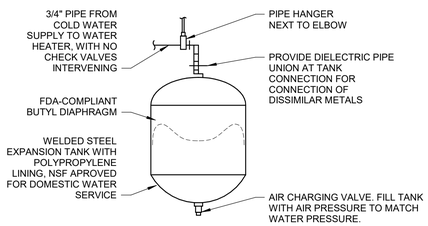
ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST AS REQUIRED TO SUIT FIELD CONDITIONS. INSTALL PER MANUFACTURER'S INSTRUCTIONS. IN NON-FREEZING CLIMATES, PIPE MAY BE INSTALLED CONCEALED IN EXTERIOR WALL RATHER THAN EXTERIOR TO WALL AS SHOWN. REFER TO PLANS FOR LOCATION.

4 INSTANTANEOUS HOT WATER HEATER AT SINK

SCALE: 12" = 1'-0"



REFER TO SPECIFICATIONS, SCHEDULES AND NOTES FOR MORE INFORMATION. PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. VERIFY CONNECTION SIZES AND LOCATIONS WITH WATER HEATER FURNISHED. REFER TO FLOOR PLANS FOR PIPE SIZES. PROVIDE SEISMIC BRACE WHERE REQUIRED. PROVIDE WATER HEATER PLATFORM ATTACHED TO WALL AND/OR SUSPENDED FROM STRUCTURE ABOVE. INSTALL BOTTOM OF PLATFORM AT MINIMUM 6'-6" ABOVE FLOOR IF ABOVE JANITOR'S SINK; OTHERWISE HIGH AS POSSIBLE. POWER WIRING AND DISCONNECT INTERLOCK OF AQUASTAT WITH RECIRCULATION PUMP IS SPECIFIED BY ARE SPECIFIED BY ELECTRICAL.



PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. FOLLOW MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION PROCEDURE. VERIFY PROPER OPERATION WHEN INSTALLED. PROVIDE SEISMIC STRAP OR BRACING WHEN REQUIRED BY LOCAL AUTHORITIES.

9 PIPE MOUNTED EXPANSION TANK DETAIL

SCALE: 12" = 1'-0"

8 EXTERIOR RECESSED WALL HYDRANT/HOSE BIBE DETAIL

SCALE: 12" = 1'-0"

7 LOW BOY HOT WATER HEATER ABOVE CEILING

SCALE: 12" = 1'-0"

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PLUMBING DETAILS

Sheet: P500

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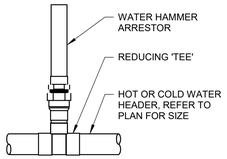
PDI SIZING AND SELECTION TABLE				
PIPE SIZE	FIXTURE UNITS	PDI CROSS REFERENCE	OVERALL LENGTH	CONNECTION N.P.T.
1/2"	1 - 11	A	6-1/4"	1/2"
3/4"	12 - 32	B	7-1/4"	3/4"
1"	33 - 60	C	9-1/4"	1"
1-1/4"	61 - 113	D	9-1/2"	1"
1-1/2"	114 - 154	E	11-1/4"	1"
2"-3"	155 - 330	F	12"	1"

NOTES:
1. PLACE ARRESTOR AT END OF HEADER WITHIN SIX (6) FEET OF LAST FIXTURE.
2. PLACE ADDITIONAL ARRESTORS AT TWENTY (20) FOOT INTERVALS.
3. INSTALL ARRESTORS ON ALL HOT AND COLD WATER HEADERS THAT HAVE FAST ACTINGS VALVES LIKES FLUSHOMETERS AND SOLENOID VALVES.



1 WATER HAMMER ARRESTOR DETAIL

SCALE: NONE

PLUMBING FIXTURE SCHEDULE

ALL PLUMBING FIXTURE SELECTIONS SHALL BE SUBMITTED FOR THE BUILDING OWNER'S AND ARCHITECT'S APPROVAL PRIOR TO CONTRACTOR'S PURCHASE ORDER

GENERAL NOTES:
1. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION AND INSTALLATION REQUIREMENTS.
2. VERIFY ROUGH-IN REQUIREMENTS WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
3. REFER TO THE ARCHITECTURAL DRAWINGS AND STANDARD MOUNTING HEIGHT LEGEND ON PLUMBING LEGENDS SHEET FOR MOUNTING HEIGHT.

SPECIFIC NOTES:
1. SET THERMOSTATIC MIXING VALVE TO 110°F.
2. SET THERMOSTATIC MIXING VALVE TO 120°F.

TAG	TYPE	DESCRIPTION	FIXTURE CONNECTION SIZES				SPECIFIC NOTES
			W	V	CW	HW	
ECO	EXTERIOR GRADE CLEANOUT	FIXTURE: JAY R. SMITH # 4261L SERIES DUCO CAST IRON DOUBLE FLANGED HOUSING WITH HEAVY DUTY SECURED SCORIATED CAST IRON COVER WITH LIFTING DEVICE AND CLEANOUT BODY WITH ABS PLASTIC PLUG WITH GASKET SEAL AND PUSH-ON JOINT.	4"				
FD	GENERAL FLOOR DRAIN WITH TRAP SEAL (6" ROUND)	FLOOR DRAIN: JAY R .SMITH # 2005, DUCO CAST IRON BODY, FLASHING COLLAR, ADJUSTABLE STRAINER HEAD, 6" ROUND NICKEL BRONZE STRAINER HEAD, QUAD TRAP SEAL.	2"				
FFCO	NTERIOR FINISHED FLOOR CLEANOUT	FIXTURE: ZURN # EZC-PV, SOLVENT WELD BODY, GAS AND WATER TIGHT ABS THREADED TAPER PLUB AND TOP ASSEMBLY.	4"				
JS-1	JANITOR SINK	SERVICE BASIN WITH CAP ON TWO SIDES, WITH CHROME PLATED 3" DRAIN AND CAST IRON TRAP. FAUCET SHALL INCLUDE PAIL HOOK AND ATMOSPHERIC VACUUM BREAKER SPOUT. FURNISH 5'-0" LENGTH OF 5-PLY GARDEN HOSE AND FITTINGS.	3"	2"	3/4"	3/4"	
L1	WALL MOUNTED LAVATORY WITH MANUAL FAUCET (0.5 GPM)	BOWL: ZURN # 25340 , 20" X 18" RECTANGULAR FIXTURE, WALL MOUNTED, WHITE VITREOUS CHINA, FRONT OVERFLOW, FAUCET LEDGE. FAUCET: PFISTER # LJ142-800C, 1.2 GPM, 4" CENTER, STAINLESS STEEL BALL VALVE. CARRIER: CONCEALED ARM CARRIER WITH STANCHIONS TO FLOOR. TRIM: GRID DRAIN WITH TAILPIECE, ANGLE STOP VALVES WITH RISERS AND ESCUTCHEONS, ADJUSTABLE P-TRAP AND WASTE ARM WITH CLEANOUT PLUG AND ESCUTCHEON, INSULATION KIT FOR WATER AND WASTE PIPES.	2"	1 1/2"	1/2"	1/2"	
L2	WALL MOUNTED LAVATORY WITH MANUAL FAUCET (0.5 GPM) (TMV)	BOWL: ZURN # 25340 , 20" X 18" RECTANGULAR FIXTURE, WALL MOUNTED, WHITE VITREOUS CHINA, FRONT OVERFLOW, FAUCET LEDGE. FAUCET: PFISTER # LJ142-800C, 1.2 GPM, 4" CENTER, STAINLESS STEEL BALL VALVE. CARRIER: CONCEALED ARM CARRIER WITH STANCHIONS TO FLOOR. TRIM: GRID DRAIN WITH TAILPIECE, ANGLE STOP VALVES WITH RISERS AND ESCUTCHEONS, ADJUSTABLE P-TRAP AND WASTE ARM WITH CLEANOUT PLUG AND ESCUTCHEON, INSULATION KIT FOR WATER AND WASTE PIPES. THERMOSTATIC MIXING VALVE: POWERS # LFG480, MINIMUM FLOW RATE 0.25 GPM AND MAXIMUM FLOW RATE 2.6 GPM AT 35 PSI DIFFERENTIAL, LOCKNUT ADJUSTABLE TEMPERATURE, LEAD FREE BRASS BODY, CORROSION RESISTANT INTERNAL COMPONANTS, INTEGRAL CHECKS. COMPLIANCE: ASSE 1070.	2"	1 1/2"	1/2"	1/2"	1
SH	SHOWER STALL (36" X 36" X 75 1/4") (ADA ACCESSIBLE)	SHOWER STALL (ADA ACCESSIBLE): AQUATIC # 1363BFSD, 36"W x 36"D x 75 1/4"H, ROLL IN THRESHOLD, ACRYLIC SURFACE, 1 PIECE, PRE-LEVELED BASE, 3/4" SKIRT, 1/4" BEVELED THRESHOLD, SLIP-RESISTANT TEXTURED FLOOR, SMOOTH WALL FINISH, CENTER BRASS DRAIN WITH STAINLESS STEEL STRAINER, PROVIDE WITH TWO HORIZONTAL STAINLESS STEEL GRAB BARS, L-SHAPED FOLD UP CUSHIONED SEAT (OPPOSITE SIDE OF SHOWER VALVE), RH OR LH FIXTURE WALL. SHOWER VALVE: SYMMONS # 9605-X-PLR, 1.5 GPM WALL MOUNTED SHOWER HEAD, 2 GPM HAND SHOWER, PRESSURE BALANCING MIXING VALVE, DUAL OUTLET DIVERTER VALVE, ADJUSTABLE STOP SCREW TO LIMIT HANDLE TURN, METAL LEVER HANDLE, DUAL CHECK VALVES, SHOWER SYSTEM TRIM, ADA 36" GRAB BAR, 60" FLEXIBLE HOSE.	2"	1 1/2"	1/2"	1/2"	
SK	SELF RIMMING SINK (ONE 19-1/2"L X 19"W X 5-1/2"D COMPARTMENT) WITH DECK MOUNTED FAUCET (SINGLE HOLE) (1.5 GPM) (ADA ACCESSIBLE) (TMV)	SINK: ELKAY # LRAD191955, 19-1/2"L X 19"W X 5-1/2"D, SINGLE COMPARTMENT, SELF-RIMMING, 18 GAUGE TYPE 304 STAINLESS STEEL, REAR CENTER DRAIN. FAUCET: CHICAGO FAUCET # 434-ABCP, 1.5 GPM, DECK MOUNTED, SINGLE HOLE, GOOSENECK, PULL DOWN SPOUT, CERAMIC OPERATING CARTRIDGE, VOLUME CONTROL, WATER LIMIT STOPS. TRIM: MCGUIRE # LF2165CC LEAD FREE CHROME PLATED STOP VALVES WITH RISERS AND ESCUTCHEONS, MCGUIRE # 151M BASKET STRAINER WITH TAILPIECE, MCGUIRE # B8912CF CHROME PLATED ADJUSTABLE P-TRAP WITH CLEANOUT AND ESCUTCHEON, PLUMBEREX # X-4333 INSULATION KIT. THERMOSTATIC MIXING VALVE: POWERS # LFG480, MINIMUM FLOW RATE 0.25 GPM AND MAXIMUM FLOW RATE 2.6 GPM AT 35 PSI DIFFERENTIAL, LOCKNUT ADJUSTABLE TEMPERATURE, LEAD FREE BRASS BODY, CORROSION RESISTANT INTERNAL COMPONANTS, INTEGRAL CHECKS. COMPLIANCE: ASSE 1070, NSF61-G.	2"	1 1/2"	1/2"	1/2"	2
WC	FLOOR MOUNTED TANK TYPE WATER CLOSET (1.28 GPF)	FLOOR MOUNTED CLOSET (ADA ACCESSIBLE): TOTO # CST244EF(R), 1.28 GPF, TANK TYPE, ELONGATED BOWL, CHROME TRIP LEVER, 12" ROUGH IN. SEAT: BEMIS # 1055SSC, HEAVY DUTY, ELONGATED, PLASTIC, OPEN FRONT, LESS COVER.	4"	2"	1/2"		

SPECIALTY VALVES AND ASSEMBLIES SCHEDULE

SPECIFIC NOTES:
1. INSTALL AT 24" AFF AND MINIMUM 12" SURROUNDING CLEARANCE.
2. ATTACH AIR GAP TO RELIEF VALVE WATER OULET.

TAG	TYPE	DESCRIPTION	SERVICE	SPECIFIC NOTES
BFP-1	2" BACKFLOW PREVENTER	REDUCED PRESSURE ZONE ASSEMBLIES: WATTS # LF009QT-FS-QT-S, 2" LEAD FREE CAST COPPER SILCON ALLOY BODY, TEST COCKS, INDEPENDENT CHECK MODULES, DIFFERENTIAL PRESSURE RELIEF VALVE, INTEGRATED FLOOD SENOR, QUARTER TURN BALL VALVES, BRONZE STRAINER. COMPLIANCE: ASSE 1013. AIR GAP FITTING: WATTS # 909AG.	DOMESTIC WATER	1,2

WATER HEATER SCHEDULE

SPECIFIC NOTES:
1. PROVIDE WITH 3/4" TEMPERATURE & PRESSURE RELIEF VALVE, BRASS DRAIN VALVE, DI-ELECTRIC UNIONS, AND VACUUM RELIEF VALVE ON COLD WATER INLET SUPPLY.
2. PROVIDE WITH HOLDRITE GALVANIZED WALL HUNG WATER HEATER STAND WITH INTEGRAL DRAIN PAN AND DRAIN PIPE CONNECTION.
3. SET WATER HEATER LEAVING WATER TEMPERATURE AS INDICATED ON THE SCHEDULE.
4. ROUTE PRESSURE RELEIF VALVE DRAIN PIPE AND DRAIN PAN DRAIN PIPE SEPARATELY TO DISCHARGE POINT.

TAG	MANUFACTURER	MODEL	TYPE	STORAGE CAPACITY (GAL.)	DOMESTIC WATER CHARACTERISTICS				DIMENSIONS (IN.)		UNIT ELECTRICAL SERVICE			SPECIFIC NOTES
					RECOVERY	TEMP RISE (°F)	EWT (°F)	LWT (°F)	D	H	KW	VOLTS	PH	
WH1	A.O. SMITH	DEL-10-2	ELECTRIC STORAGE	6	16	78	57	135	14 1/4"	15 1/2"	1.5	208	1	1,2,3,4
WH2	A.O. SMITH	DEL-10-2	ELECTRIC STORAGE	10	18	78	57	135	18"	18 1/4"	2	208	1	1,2,3,4

WATER METER SCHEDULE

SPECIFIC NOTES:
1. PROVIDE CONTROL WIRING FROM PULSE GENERATOR TO TOTALIZER PER MANUFACTURERS INSTALLATION INSTRUCTIONS.

TAG	TYPE	DESCRIPTION	SPECIFIC NOTES
WM1	WATER METER WITH REMOTE TOTALIZER (DISPLACEMENT) (3/4")	WATER METER: BADGER METER # 35, 3/4", LEAD FREE BRONZE ALLOY HOUSING AND BOTTOM PLATE, ENGINEERED POLYMER CHAMBER, STAINLESS STEEL TRIM, THERMOPLASTIC STRAINER. COMPLIANCE: ANSI / AWWA C700. REMOTE TOTALIZER: BADGER METER # ER-6, DIGITAL RESETTABLE TOTALIZER, LCD DISPLAY WITH 8 DIGITS, 10 YEAR 3V REPLACEABLE LITHIUM BATTERY POWER.	1
WM2	WATER METER WITH REMOTE TOTALIZER (DISPLACEMENT) (1")	WATER METER: BADGER METER # 55, 1", LEAD FREE BRONZE ALLOY HOUSING AND BOTTOM PLATE, ENGINEERED POLYMER CHAMBER, STAINLESS STEEL TRIM, THERMOPLASTIC STRAINER. COMPLIANCE: ANSI / AWWA C700. REMOTE TOTALIZER: BADGER METER # ER-6, DIGITAL RESETTABLE TOTALIZER, LCD DISPLAY WITH 8 DIGITS, 10 YEAR 3V REPLACEABLE LITHIUM BATTERY POWER.	1

DOMESTIC WATER EXPANSION TANK SCHEDULE

SPECIFIC NOTES:
1. CHARGE TANK WITH AIR TO IDENTICAL PRESSURE AS STATIC DOMESTIC WATER PRESSURE.
2. EXPANSION TANK BRACKETED TO WALL ADJACENT TO WATER HEATER. CONNECT EXPANSION TANK TO COLD WATER INLET PIPING. SECURE PIPING TO WALL.

TAG	MANUFACTURER	MODEL	TANK SIZE (GAL)	MIN. ACCEPTANCE VOLUME (GAL.)	DIMENSIONS (IN)			SERVICE	OPERATIONAL WEIGHT (LBS)	SPECIFIC NOTES
					DIA.	H	INLET SIZE			
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET1	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2
ET2	AMTROL	ST-5	2	0.9	8"	13"	3/4"	DOMESTIC HOT WTAER	50	1,2

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FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT:
Capital Builders

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06.03.2024

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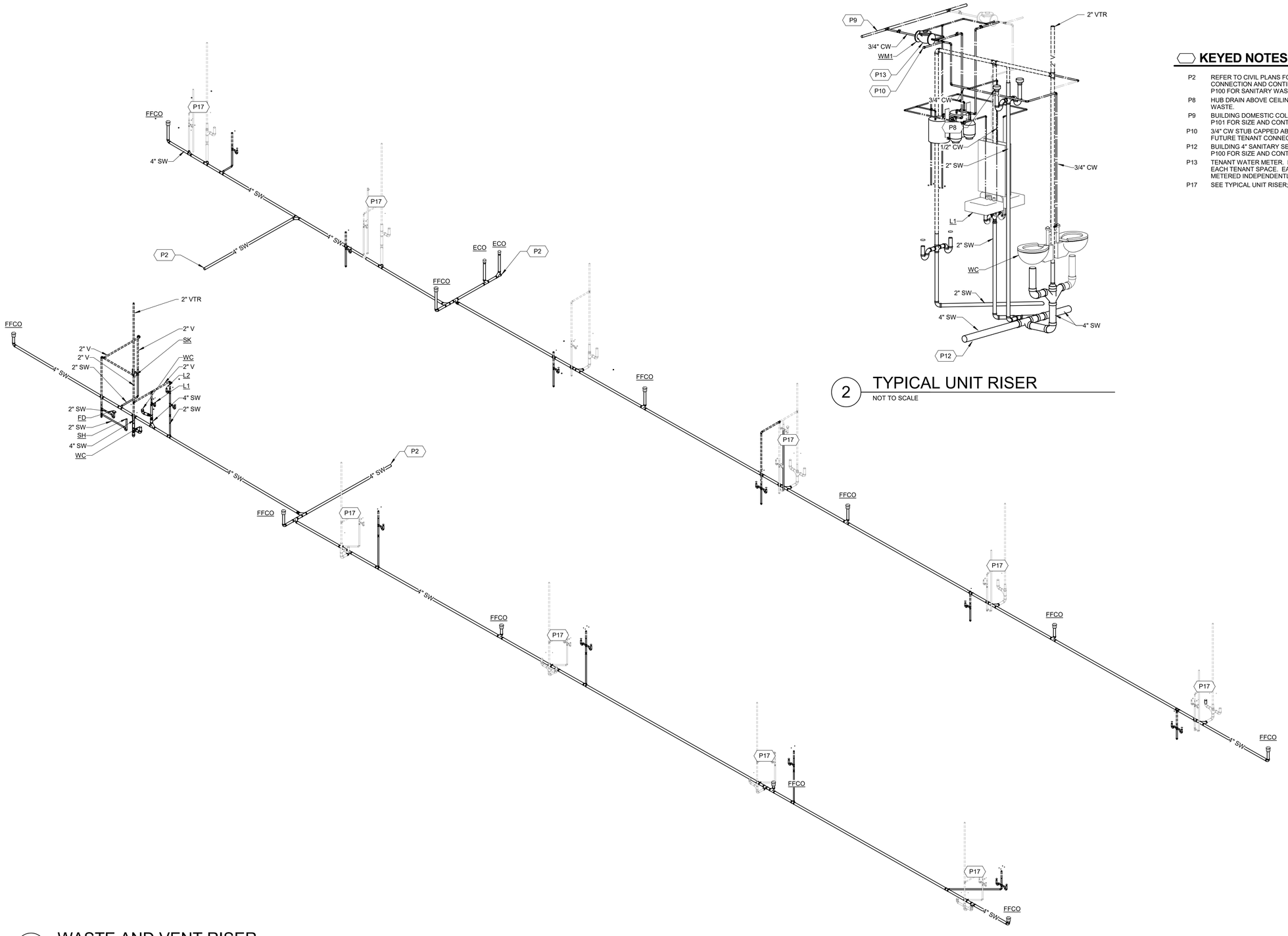
PLUMBING SCHEDULES

Sheet

Revision no.

P600



1 WASTE AND VENT RISER
NOT TO SCALE

2 TYPICAL UNIT RISER
NOT TO SCALE

GENERAL NOTES

1. REFER TO SHEET P001 FOR ADDITIONAL GENERAL NOTES.
2. WATER PIPE SIZES ARE BASED ON A MINIMUM WORKING PRESSURE OF 60 PSI AT A FLOW RATE OF 47 GPM AT THE LOCATION WHERE THE MAIN SERVICE ENTERS THE BUILDING.

KEYED NOTES

P2	REFER TO CIVIL PLANS FOR SANITARY WASTE SERVICE CONNECTION AND CONTINUATION. REFER TO SHEET P100 FOR SANITARY WASTE INVERTS.
P8	HUB DRAIN ABOVE CEILING WITH PTRAP ON 2" SANITARY WASTE.
P9	BUILDING DOMESTIC COLD WATER MAIN. REFER TO P101 FOR SIZE AND CONTINUATION.
P10	3/4" CW STUB CAPPED ABOVE RESTROOM CEILING FOR FUTURE TENANT CONNECTION.
P12	BUILDING 4" SANITARY SEWER. REFER TO MEP201 AND P100 FOR SIZE AND CONTINUATION.
P13	TENANT WATER METER. PROVIDE WATER METER FOR EACH TENANT SPACE. EACH TENANT SHALL BE METERED INDEPENDENTLY.
P17	SEE TYPICAL UNIT RISER; P900/2.

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Lee's Summit, Missouri
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3D PLUMBING RISERS

Sheet
P900

Revision no.

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HAZARD CLASSIFICATION LEGEND - NFPA 13

LIGHT HAZARD
DESIGN DENSITY: 0.10 GPM/S.F
DESIGN AREA: 1,500 S.F.
HYDRANT FLOW: 250 GPM

CHARACTERISTICS:
SPACES WITH LOW QUANTITY AND LOW COMBUSTIBILITY OF CONTENTS

ORDINARY HAZARD 1:
DESIGN DENSITY: 0.15 GPM/S.F
DESIGN AREA: 1,500 S.F.
HYDRANT FLOW: 250 GPM

CHARACTERISTICS:
SPACES WITH MODERATE QUANTITY AND LOW COMBUSTIBILITY OF CONTENTS. STOCKPILES OF CONTENTS WITH LOW COMBUSTIBILITY DO NOT EXCEED 8 FT.

ORDINARY HAZARD 2
DESIGN DENSITY: 0.2 GPM/S.F
DESIGN AREA: 1,500 S.F.
HYDRANT FLOW: 250 GPM

CHARACTERISTICS:
SPACES WITH MODERATE TO HIGH QUANTITY AND MODERATE TO HIGH COMBUSTIBILITY OF CONTENTS. STOCKPILES OF CONTENTS WITH MODERATE TO HIGH COMBUSTIBILITY DO NOT EXCEED 12 FT.

EXTRA HAZARD 1
DESIGN DENSITY: 0.3 GPM/S.F
DESIGN AREA: 2,500 S.F.
HYDRANT FLOW: 500 GPM

CHARACTERISTICS:
SPACES WITH VERY HIGH QUANTITY AND VERY HIGH COMBUSTIBILITY OF CONTENTS. SPACES WHERE DUST, LINT, OR OTHER MATERIAL ARE PRESENT, INTRODUCING THE PROBABILITY OF RAPIDLY DEVELOPING FIRES.

EXTRA HAZARD 2
DESIGN DENSITY: 0.4 GPM/S.F
DESIGN AREA: 2,500 S.F.
HYDRANT FLOW: 500 GPM

CHARACTERISTICS:
SPACES WITH VERY HIGH QUANTITY AND VERY HIGH COMBUSTIBILITY OF CONTENTS. SPACES WITH SUBSTANTIAL AMOUNTS OF COMBUSTIBLE OR FLAMMABLE LIQUIDS. SPACES WHERE SHIELDING OF COMBUSTIBLES IS EXTENSIVE.

NOT IN SCOPE

SEISMIC GENERAL NOTES

A. SEISMIC-RESTRAINT LOADING BASED 0N ASCE 7-10:

1. SITE CLASS
2. OCCUPANCY CATEGORY OF BUILDING OR STRUCTURE
3. SEISMIC DESIGN CATEGORY C.
4. DESIGN SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS (0.2 SECOND): (Sds) = XG (WHERE G IS THE FORCE OF GRAVITY).
5. DESIGN SPECTRAL RESPONSE ACCELERATION AT 1-SECOND PERIOD: (Sd1) = XG (WHERE G IS THE FORCE OF GRAVITY).
6. COMPONENT IMPORTANCE FACTOR: (Ip) = 1.5.
7. Fpw = Y X WEIGHT OF WATER FILLED PIPE (THIS IS THE HORIZONTAL FORCE ACTION ON THE BRACE, AS DEFINED BY NFPA 13 (2016), 9.3.5.9.3.

B. INSTALL SEISMIC RESTRAINTS IN ACCORDANCE WITH NFPA 13:

1. INSTALL LATERAL BRACES ON ALL FEED AND CROSS MAIN LINES, REGARDLESS OF PIPE DIAMETER.
2. INSTALL LATERAL BRACES ON BRANCH LINES LARGER THAN 2-INCH DIAMETER. (EXCEPT THAT IF THE BRANCH LINE DOES NOT EXCEED 12 FT IN LENGTH, BRACING MAY BE OMITTED.)
3. LATERAL BRACES ARE TO BE INSTALLED WITHIN 6 FT FROM THE ENDS OF PIPES
4. LATERAL BRACES ARE TO BE INSTALLED AT 40 FT MAXIMUM INTERVALS.
5. WHERE HANGER RODS DO NOT EXCEED 6 INCHES LONG, LATERAL BRACING MAY BE OMITTED.
6. A LONGITUDINAL BRACE MAY SERVE AS A LATERAL BRACE IF IT IS WITHIN 24 INCHES OF THE CENTERLINE OF THE PIPE BRACED LONGITUDINALLY.
7. INSTALL LONGITUDINAL BRACES ON ALL FEED AND CROSS MAIN LINES, REGARDLESS OF PIPE DIAMETER.
8. LONGITUDINAL BRACES ARE TO BE INSTALLED WITHIN 40 FT FROM THE ENDS OF PIPES.
9. LONGITUDINAL BRACES ARE TO BE INSTALLED AT 80 FT MAXIMUM INTERVALS
10. A LATERAL BRACE MAY SERVE AS A LONGITUDINAL BRACE IF IT IS WITHIN 24 INCHES OF THE CENTERLINE OF THE PIPE BRACED LATERALLY.

C. INSTALL SEISMIC-RESTRAINT DEVICES USING METHODS APPROVED BY OSHPD PROVIDING REQUIRED SUBMITTALS FOR COMPONENT

D. ATTACHMENT TO STRUCTURE: IF SPECIFIC ATTACHMENT IS NOT INDICATED, ANCHOR BRACING TO STRUCTURE AT FLANGES OF BEAMS, AT UPPER TRUSS CHORDS OF BAR JOISTS, OR AT CONCRETE MEMBERS

E. DRILLED-IN ANCHORS:

1. IDENTIFY POSITION OF REINFORCING STEEL AND OTHER EMBEDDED ITEMS PRIOR TO DRILLING HOLES FOR ANCHORS. DO NOT DAMAGE EXISTING REINFORCING OR EMBEDDED ITEMS DURING CORING OR DRILLING. NOTIFY THE STRUCTURAL ENGINEER IF REINFORCING STEEL OR OTHER EMBEDDED ITEMS ARE ENCOUNTERED DURING DRILLING. LOCATE AND AVOID PRESTRESSED TENDONS, ELECTRICAL AND ENCOUNTERED DURING DRILLING. LOCATE AND AVOID PRESTRESSED TENDONS, ELECTRICAL AND TELECOMMUNICATIONS CONDUIT, AND GAS LINES.
2. DO NOT DRILL HOLES IN CONCRETE OR MASONRY UNTIL CONCRETE, MORTAR, OR GROUT HAS ACHIEVED FULL DESIGN STRENGTH.
3. WEDGE ANCHORS: PROTECT THREADS FORM DAMAGE DURING ANCHOR INSTALLATION. HEAVY-DUTY SLEEVE SHALL BE INSTALLED WITH SLEEVE FULLY ENGAGED IN THE STRUCTURAL ELEMENT TO WHICH ANCHOR IS TO BE FASTENED.
4. SET ANCHORS TO MANUFACTURER'S RECOMMENDED TORQUE, USING A TORQUE WRENCH.
5. INSTALL ZINC-COATED STEEL ANCHORS FOR INTERIOR AND STAINLESS-STEEL ANCHORS FOR EXTERIOR APPLICATIONS.

F. ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION: INSTALL FLEXIBLE CONNECTIONS IN ACCORDANCE WITH NFPA 13 IN PIPING WHERE:

1. PIPING 2-1/2 INCH OR LARGER CROSSES SEISMIC JOINTS, WHERE ADJACENT SECTIONS OR BRANCHES ARE SUPPORTED BY DIFFERENT STRUCTURAL ELEMENTS, AND WHERE THE CONNECTIONS TERMINATE WITH CONNECTION TO EQUIPMENT THAT IS ANCHORED TO A DIFFERENT STRUCTURAL ELEMENT FROM ONE SUPPORTING THE CONNECTIONS AS THEY APPROACH EQUIPMENT.
2. WITHIN 24 INCHES OF THE TOP AND BOTTOM OF ALL RISERS 2-1/2 INCH OR LARGER (IN RISERS LESS THAN 3 FT IN LENGTH, FLEXIBLE COUPLINGS MAY BE OMITTED; IN RISERS 3 FT TO 7 FT, ONE FLEXIBLE COUPLING IS ADEQUATE).
3. WITHIN 12 IN ABOVE AND WITHIN 24 IN BELOW THE FLOOR IN MULTI FLOOR BUILDINGS FOR PIPING 2-1/2 INCH OR LARGER.
4. ON BOTH SIDES OF CONCRETE OR MASONRY WALLS WITHIN 1 FT OF FACE OF WALL FOR PIPING 2-1/2 INCH OR LARGER, UNLESS CLEARANCE IS PROVIDED PER NFPA 13.
5. WITHIN 24 INCHES OF BUILDING EXPANSION JOINTS FOR PIPING 2-1/2 INCH OR LARGER.
6. WITHIN 24 INCHES OF THE TOP OF DROPS EXCEEDING 15 FEET IN LENGTH TO PORTIONS OF SYSTEMS SUPPLYING MORE THAN ONE SPRINKLER, REGARDLESS OF PIPE SIZE.
7. WITHIN 24 INCHES ABOVE AND 24 INCHES BELOW ANY INTERMEDIATE POINTS OF SUPPORT FOR A RISER OR OTHER VERTICAL PIPE FOR PIPING 2-1/2 INCH OR LARGER.
8. WHEN THE FLEXIBLE COUPLING BELOW THE FLOOR IS ABOVE THE TIE-IN TO THE MAIN SUPPLYING THAT FLOOR, A FLEXIBLE COUPLING SHALL BE INSTALLED EITHER ON THE HORIZONTAL PORTION WITHIN 24 INCHES OF THE TIE-IN WHERE THE TIE-IN IS HORIZONTAL OR ON THE VERTICAL PORTION OF THE TIE-IN WHERE THE TIE-IN INCORPORATES A RISER FOR PIPING 2-1/2 INCH OR LARGER.
9. FOR DROPS TO HOSE LINES, RACK SPRINKLERS, MEZZANINES AND FREE STANDING STRUCTURES, INSTALL FLEXIBLE COUPLINGS REGARDLESS OF PIPE SIZE WITHIN 24 INCHES OF THE TOP OF THE DROP, WITHIN 24 INCHES ABOVE THE UPPERMOST DROP SUPPORT ATTACHMENT, WHERE DROP SUPPORTS ARE PROVIDED TO THE STRUCTURE, RACK, OR MEZZANINE, AND WITHIN 24 INCHES ABOVE THE BOTTOM OF THE DROP WHERE NO ADDITIONAL DROP SUPPORT IS PROVIDED.

G. ADJUSTING:

1. ADJUST RESTRAINTS TO PERMIT FREE MOVEMENT OF EQUIPMENT WITHIN NORMAL MODE OF OPERATION.

WET SPRINKLER GENERAL NOTES

ALL PIPE, DEVICES, AND INSTALLATION SHALL FULLY COMPLY WITH NFPA 13, AND ALL REQUIRED AUTHORITIES HAVING JURISDICTION.

REFER TO NOTES ON DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. REFER TO STRUCTURAL AND ARCHITECTURAL DRAWINGS FOR BUILDING DETAILS.

PROVIDE A COMPLETE, HYDRAULICALLY CALCULATED, FULLY AUTOMATIC WET PIPE SPRINKLER SYSTEM THROUGHOUT THE BUILDING. FIRE PROTECTION CONTRACTOR SHALL INSTALL THE FIRE PROTECTION SYSTEM IN ACCORDANCE WITH ALL APPLICABLE NFPA STANDARDS, JOB SPECIFICATIONS, AND LOCAL CODE.

FIRE PROTECTION SYSTEM(S), PIPING, VALVES AND APPURTENANCES INDICATED ON THE DRAWING ARE DIAGRAMMATIC ONLY IN THAT ALL FITTINGS AND OFFSETS MAY NOT BE SHOWN. FIRE PROTECTION CONTRACTOR SHALL VERIFY EQUIPMENT SELECTIONS, PIPE ROUTING, ETC. FOR CODE COMPLIANCE, COMPLIANCE, AND ARCHITECTURAL AND STRUCTURAL CONFORMITY. FIRE PROTECTION CONTRACTOR SHOULD THOROUGHLY SURVEY THE PROPERTY AND REVIEW ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL AND PLUMBING (M.E.P.) CONSTRUCTION DOCUMENTS PRIOR TO BID.

FIRE PROTECTION SHOP DRAWINGS SHALL HAVE COMPLETE REFLECTED CEILING PLANS INDICATING LOCATION OF EACH SPRINKLER HEAD, AS WELL AS PIPING LAYOUTS. PROVIDE ADDITIONAL SPRINKLER HEADS (OVER CODE MINIMUM), IF REQUESTED BY THE ARCHITECT, TO OBTAIN SYMMETRICAL CEILING LAYOUTS.

FIRE PROTECTION SYSTEM SHALL BE COMPLETE WITH BACKFLOW PREVENTER, FIRE DEPARTMENT CONNECTION, STANDPIPES, CONTROL VALVES, SPRINKLER PIPING AND HEADS, ELECTRONIC SUPERVISION AND APPURTENANCES AS REQUIRED BY NFPA AND AUTHORITIES HAVING JURISDICTION.

GENERAL CONTRACTOR SHALL CONDUCT A COORDINATION MEETING WITH THE SUBCONTRACTORS TO ESTABLISH CLEARANCE REQUIREMENTS NEEDED FOR M.E.P. WORK PRIOR TO FABRICATION OF THE SPRINKLER SYSTEM. ANY RELOCATION OF FIRE SPRINKLER SYSTEM REQUIRED FOR PROPER INSTALLATION OF M.E.P. SYSTEMS SHALL BE AT THE FIRE PROTECTION CONTRACTOR'S EXPENSE.

FIRE PROTECTION CONTRACTOR SHALL BASE BID ON CAREFUL COORDINATION OF MECHANICAL DUCT, MECHANICAL AND PLUMBING PIPING, ELECTRICAL, AND STRUCTURAL SYSTEMS IN THE BUILDING.

HYDRAULIC CALCULATIONS SHALL BE BASED ON A WATER FLOW TEST OBTAINED FROM THE CITY OF **LEE'S SUMMIT** BY THE FIRE PROTECTION CONTRACTOR. CONTRACTOR SHALL VERIFY FLOW TEST DATA WITH LOCAL AUTHORITIES. IF A CURRENT TEST IS NOT AVAILABLE, CONTRACTOR SHALL CONDUCT A PROPER FLOW TEST PRIOR TO PREPARATION OF SHOP DRAWINGS. PROVIDE A MINIMUM OF 10 PSI SAFETY FACTOR FOR ALL HYDRAULIC CALCULATIONS. PIPE SIZING INDICATED ON THE DRAWINGS IS FOR INFORMATIONAL PURPOSES ONLY. PIPE SIZING SHALL BE ESTABLISHED BY THE FIRE PROTECTION CONTRACTOR. EXCEPTION: STANDPIPES SHALL BE SIZED AS INDICATED ON THE DRAWINGS OR LARGER. NOTE: AVOID SYSTEM PRESSURES EXCEEDING 175 PSI.

PROVIDE A REDUCED PRESSURE ZONE (R.P.Z.) BACKFLOW PREVENTER TO ISOLATE THE SPRINKLER SYSTEM FROM THE MAIN SUPPLY. COORDINATE REQUIREMENTS WITH THE CITY OF **LEE'S SUMMIT** AND THE STATE OF **MISSOURI**.

FIRE PROTECTION SYSTEM SHALL INTERFACE WITH THE BUILDING FIRE ALARM SYSTEM. REFER TO ELECTRICAL.

ALL CONTROL VALVES SHALL HAVE ELECTRONIC SUPERVISION.

SPECIAL CONSIDERATION SHALL BE GIVEN TO AREAS THROUGHOUT THE BUILDING SUCH AS DROPPED SOFFITS, RAISED CEILINGS AND LIGHTING SOFFITS THAT NECESSITATE ADDITIONAL SPRINKLER HEADS. REFER TO ARCHITECTURAL DRAWINGS FOR REFLECTED CEILING PLANS AND BUILDING DETAILS.

ALL SPRINKLER HEADS FOR LIGHT HAZARD AND ALL STANDARD SPRAY SPRINKLER HEADS FOR ORDINARY HAZARD SHALL BE QUICK RESPONSE.

ALL CEILING MOUNTED SPRINKLER HEADS SHALL BE CHROME WITH CHROME RECESSED ESCUTCHEONS, UNLESS NOTED OTHERWISE ON FIRE PROTECTION PLANS OR SPECIFICATIONS.

ALL SPRINKLER HEADS INSTALLED IN EXPOSED STRUCTURE SHALL BE BRASS UPRIGHT, UNLESS NOTED OTHERWISE ON FIRE PROTECTION PLANS OR SPECIFICATIONS.

ALL CEILING MOUNTED SPRINKLER HEADS SHALL BE LOCATED IN THE CENTER OF CEILING TILES IN ALL PUBLIC AREAS. BRAIDED FLEXIBLE SPRINKLER DROP CONNECTIONS MAY BE USED FOR EASE OF INSTALLATION, SPECIFIC SPRINKLER HEAD LOCATION OR SPECIFIC OWNER REQUIREMENTS. EXCEPTION: CLOSETS, STORAGE ROOMS, EQUIPMENT ROOMS AND OTHER SIMILAR NON-PUBLIC AREAS ARE NOT REQUIRED TO BE CENTER OF TILE BUT SHALL BE NO CLOSER THAN 6" TO CEILING GRID.

ROOMS AND OTHER SIMILAR NON-PUBLIC AREAS ARE NOT REQUIRED TO BE CENTER OF TILE BUT SHALL BE NO CLOSER THAN 6" TO CEILING GRID.

PROVIDE SPRINKLER SYSTEM MAIN DRAIN IN ACCORDANCE WITH NFPA 13.

PROVIDE AUXILIARY DRAINS FOR ALL TRAPPED PIPING SECTIONS IN ACCORDANCE WITH NFPA 13.

ALL DRAIN PIPING SHALL TERMINATE AT THE EXTERIOR WITH 45 DEGREE ELBOW DOWN. INSTALL THE DRAIN IN A MANNER TO PREVENT FLOODING OR DAMAGE TO LANDSCAPING, AND TO PREVENT WETTING OF WALKWAYS. EXCEPTION: DRAIN PIPING MAY TERMINATE AT INTERIOR FLOOR DRAINS IF THE DRAIN HAS BEEN SIZED APPROPRIATELY. COORDINATE WITH PLUMBING CONTRACTOR FOR LOCATION OF FLOOR DRAIN.

INSTALL PIPING HORIZONTALLY AND AT RIGHT ANGLES TO WALLS AND CEILINGS.

ALL SPRINKLER MAIN PIPING SHALL BE SCHEDULE 10 WITH ROLL GROOVED AND WELDED OUTLETS, UNLESS NOTED OTHERWISE. FITTINGS AND COUPLINGS SHALL BE STANDARD GROOVED, UNLESS NOTED OTHERWISE.

ALL SPRINKLER BRANCH LINE PIPING SHALL BE BLACK SCHEDULE 40, UNLESS NOTED OTHERWISE. FITTINGS SHALL BE STANDARD "BLACK" GRADE CAST IRON, DUCTILE IRON OR MALLEABLE IRON, UNLESS NOTED OTHERWISE.

ALTERNATIVE STEEL PIPE SCHEDULES ALLOWED BY NFPA 13 ARE NOT ACCEPTABLE ON THIS PROJECT.

ALL FIRE PROTECTION PIPING, FITTINGS, SUPPORTS AND ACCESSORIES IN EXPOSED AREAS SHALL BE PREPARED FOR FINISH PAINTING. PIPING, FITTINGS, SUPPORTS AND ACCESSORIES IN MECHANICAL ROOMS SHALL BE PAINTED OSHA RED. ALL PAINTING SHALL BE PERFORMED BY OTHERS.

FIRE PROTECTION CONTRACTOR SHALL PROVIDE PROTECTION FOR SPRINKLER HEADS IN AREAS WHERE THE CEILING AND SURROUNDING AREAS ARE TO BE PAINTED. FIRE PROTECTION CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF SPRINKLER PROTECTION AFTER PAINTING WORK IS COMPLETE. ANY SPRINKLER HEAD WITH PAINT OR TEXTURE OVERSPRAY SHALL BE REPLACED BY THE FIRE PROTECTION CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER.

PROVIDE HEAD GUARDS ON ALL SPRINKLER HEADS AT OR BELOW AN ELEVATION OF 7'-0" AFF, OR THAT OTHERWISE MAY BE SUBJECT TO MECHANICAL DAMAGE, SUCH AS IN THE MECHANICAL ROOMS.

SEISMIC BRACING/ RESTRAINT IS NOT REQUIRED FOR THIS PROJECT.

FIRE PROTECTION PLANS SHALL BE SUBMITTED TO ALL REQUIRED LOCAL AND STATE AUTHORITIES.

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FIRE SUPPRESSION NOTES, LEGENDS AND SPECIFICATIONS

Sheet

F001

Revision no.

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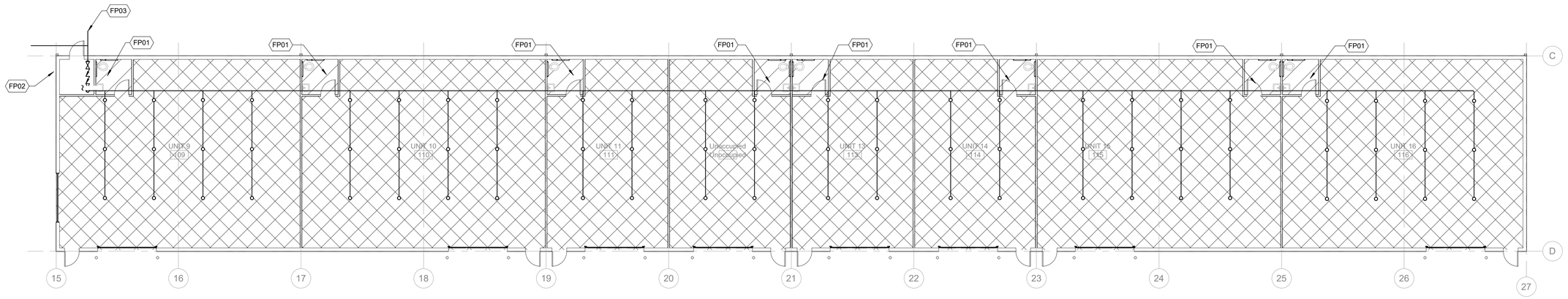


2 FIRE SUPPRESSION FLOOR PLAN - BUILDING B

SCALE: 3/32" = 1'-0"

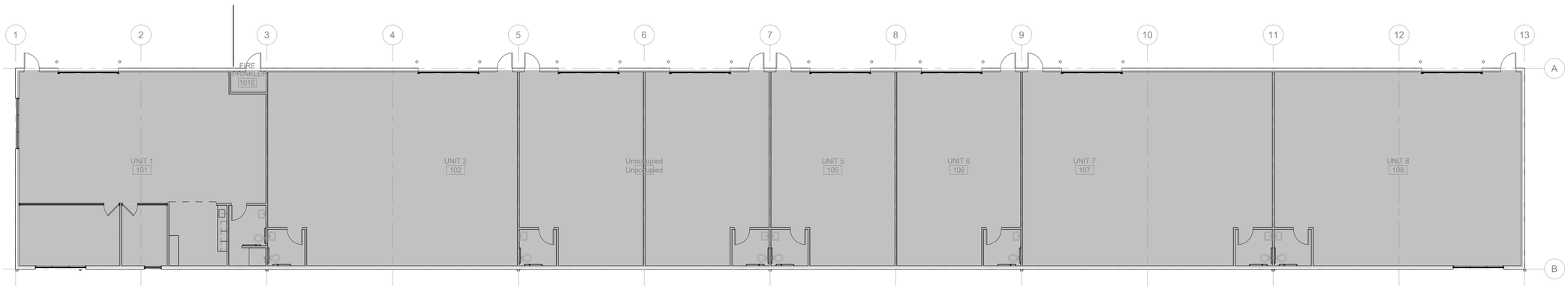
GENERAL NOTES

1. ALL WORK SHOWN IN UNIT 1 SHALL BE CONSIDERED ALTERNATE 1. BASE BID TO BE THE SAME AS THE DESIGN OF UNIT 2 SHOWN ON PLANS.

KEYED NOTES

FP01	PROVIDE FIRE PROTECTION HEADS ABOVE CEILING SPACED BASED ON ORDINARY HAZARD 1
FP02	SIAMESE FIRE DEPARTMENT CONNECTION. PROVIDE HORN AND STROBE ABOVE.
FP03	REFER TO CIVIL PLANS FOR FIRE SERVICE CONNECTION AND CONTINUATION.

N



1 FIRE SUPPRESSION FLOOR PLAN - BUILDING A

SCALE: 3/32" = 1'-0"

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Lee's Summit, Missouri
08/20/2024

FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT:
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06.03.2024

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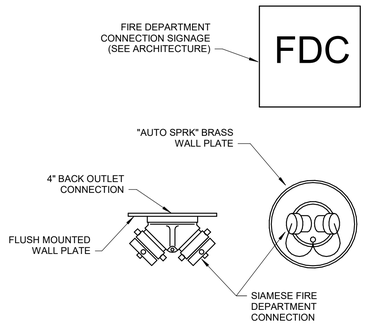
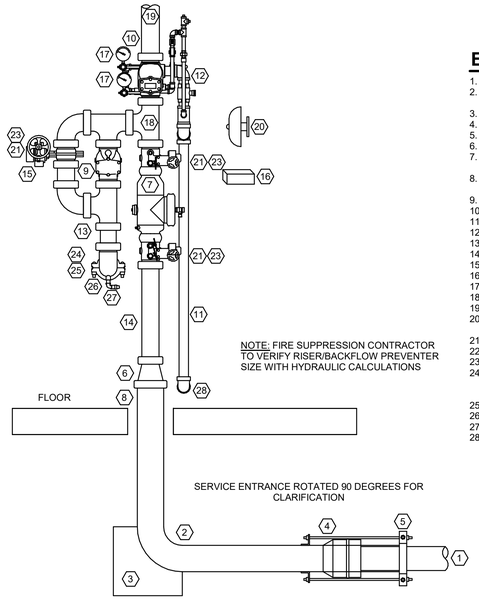
FIRE SUPPRESSION FLOOR PLANS

Sheet	Revision no.
F101	



1 FDC DETAIL
NOT TO SCALE

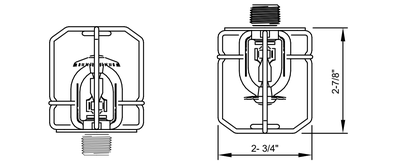


EQUIPMENT NOTES

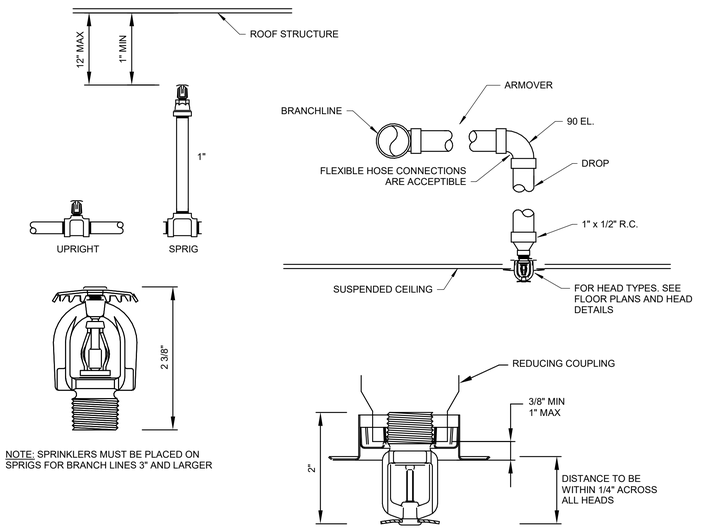
1. 6" UTILITY FIRE MAIN
2. 6" STAINLESS STEEL ONE PIECE RISER (SHOWN MFxGROOVE CONFIGURATION)
3. CONCRETE THRUST BLOCK (PER NFPA-24)
4. CORROSION RESISTANT THREADED ROD THRUST RESTRAINT
5. 6" GALVANIZED PIPE CLAMP
6. 6" X 4" G X G REDUCER
7. AMES C200 (OR EQUAL) 4" (GxG) DOUBLE CHECK ASSEMBLY WITH INDICATING BFG VALVES
8. SLEEVE WITH NOMINAL 4-INCH ANNULAR CLEARANCE AND FILL WITH FLEXIBLE MATERIAL
9. 4" GROOVED SWING CHECK VALVE
10. 4" ALARM CHECK VALVE WITH TRIM
11. 2" SCH. 40 THREADED DRAIN PIPE
12. MAIN DRAIN VALVE
13. 4" SCH. 40 GROOVED PIPE TO FIRE DEPARTMENT CONNECTION
14. 4" SPOOL PIECE.
15. 4" GROOVED BUTTERFLY TEST VALVE
16. SPARE HEAD BOX (STOCKED WITH HEADS & WRENCH)
17. 3" WATER PRESSURE GAUGE
18. HYDRAULIC DATA PLATE
19. 4" SCH. 40 PIPE (SYSTEM FEED)
20. WEATHERPROOF EXTERIOR BELL (BY FIRE ALARM CONTRACTOR)
21. SUPERVISORY CIRCUIT (BY OTHERS)
22. NOT USED
23. VALVE SUPERVISORY "TAMPER" SWITCH
24. 4" SCH. 40 GxG SPOOL (2.5" x2.5" SIAMESE FIRE DEPARTMENT CONNECTION). COORDINATE FINAL FDC LOCATION WITH FIRE DEPARTMENT.
25. "FDC" SIGNAGE. 18"x18" MINIMUM SIZE
26. 4" GROOVED DRAIN ELBOW
27. AUTOMATIC BALL DRIP VALVE
28. EXTEND 1.25" DRAIN PIPE TO EXTERIOR DRAIN (INSTALL 1.25" GALVANIZED 45 ELBOW WITH WALL PLATE)

NOTE: FIRE SUPPRESSION CONTRACTOR TO VERIFY RISER/BACKFLOW PREVENTER SIZE WITH HYDRAULIC CALCULATIONS

2 FIRE SUPPRESSION RISER DETAIL
NOT TO SCALE

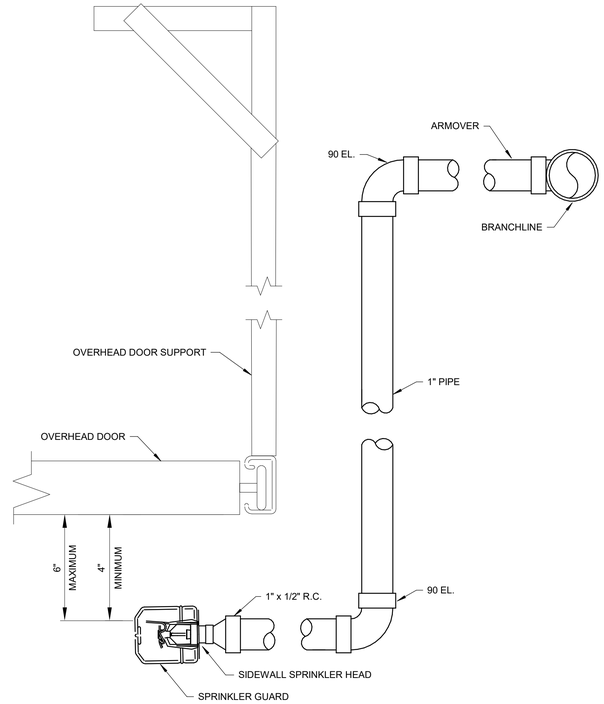


3 SPRINKLER GUARD DETAIL
NOT TO SCALE



NOTE: SPRINKLERS MUST BE PLACED ON SPRIGS FOR BRANCH LINES 3" AND LARGER

4 TYPICAL SPRINKLER DETAILS
NOT TO SCALE



5 OVERHEAD DOOR SPRINKLER DETAIL
NOT TO SCALE

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FIRE SUPPRESSION DETAILS

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ELECTRICAL GENERAL NOTES

1. CIRCUITS OF DIFFERENT PHASES MAY SHARE THE SAME EQUIPMENT GROUND. THE EQUIPMENT GROUNDING CONDUCTOR SIZE SHALL NOT BE LESS THAN #12 AWG OR AS INDICATED ON THE DRAWINGS.
2. ALL CONDUCTORS SHALL BE COPPER THHN/THWN. ALL CONDUCTORS #10 AWG AND SMALLER SHALL BE SOLID COPPER. ALL CONDUCTORS #8 AWG AND LARGER SHALL BE STRANDED COPPER USING BOLTED LUGS AT TERMINALS.
3. ALL POWER CONDUCTORS SHALL BE ROUTED IN CONDUIT. CONDUITS SHALL BE CONCEALED UNLESS INDICATED OTHERWISE.
4. THE MINIMUM CONDUIT SIZE SHALL BE 3/4" INSIDE OF THE BUILDING. THE MINUMUM BELOW GRADE CONDUIT SHALL BE 1".
5. EMT CONDUIT SHALL BE USED INDOORS IN CONCEALED LOCATION. IMC CONDUIT SHALL BE USED IN LOCATIONS SUBJECT TO PHYSICAL DAMAGE. GRS CONDUIT SHALL BE USED ABOVE GRADE IN OUTDOOR LOCATIONS. SCH 40 PVC CONDUIT SHALL BE USED BELOW GRADE.
6. MINIMUM WIRE SIZE SHALL BE #12 AWG UNLESS OTHERWISE NOTED.
7. THE CONTRACTOR SHALL ADJUST CONDUCTOR SIZE BASED ON VOLTAGE DROP CALCULATIONS FOR ALL ELECTRICAL CIRCUITS IN EXCESS OF 100' OF LENGTH.
8. ALL WORK SHALL COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE.
9. ALL ELECTRICAL EQUIPMENT (CONDUIT, BOXES, SUPPORTS, ETC.) INSTALLED IN EXPOSED CEILING AREAS SHALL BE PAINTED AS DIRECTED BY THE ARCHITECT.
10. ELECTRICAL CONTRACTOR SHALL CLOSELY COORDINATE WITH MECHANICAL AND PLUMBING CONTRACTORS FOR EXACT LOCATION OF HVAC AND PLUMBING EQUIPMENT.
11. COMPRESSION FITTINGS SHALL BE USED ON ALL EMT CONDUIT. SET SCREW FITTINGS ARE NOT ALLOWED.
12. ALL CIRCUITS SHALL BE LABELED ON PANEL SCHEDULES. PANEL SCHEDULES SHALL BE TYPED. HAND WRITTEN PANEL SCHEDULES ARE NOT ACCEPTABLE.
13. FLEXIBLE CONNECTIONS AT EQUIPMENT AND TRANSFORMERS SHALL BE 6'-0" MAX. OUTDOOR CONNECTIONS SHALL BE WEATHERTIGHT FLEXIBLE CONDUIT. INDOOR CONNECTIONS SHALL BE STANDARD FLEXIBLE CONDUIT.
14. ANY PENETRATIONS MADE THROUGH FIRE RATED PARTITIONS SHALL BE FIRE STOPPED WITH APPROVED U.L. LISTED SYSTEM.
15. ALL DEVICES SHALL BE RATED 20A MINIMUM. 15A DEVICES ARE NOT ACCEPTABLE.
16. PROVIDE PULL STRING AND PROTECTIVE BUSHING IN ALL SPARE CONDUITS.
17. SCREW-IN TYPE FLEXIBLE CONDUIT FITTINGS SHALL NOT BE USED. FLEXIBLE CONDUIT FITTINGS SHALL BE SQUEEZE TYPE CONNECTORS WITH SINGLE SCREW CLAMP.
18. SNAP-IN CABLE FITTINGS SHALL NOT BE USED. CABLE FITTINGS SHALL BE CLAMP TYPE CONNECTORS WITH LOCKRING AT JUNCTION BOXES.
19. PROVIDE ALL LABOR AND MATERIALS REQUIRED TO PERFORM AND DOCUMENT AN ARC FAULT HAZARD ANALYSIS FOR ALL EQUIPMENT AND ELECTRICAL PANELS. ANALYSIS SHALL BE PERFORMED BY THE ELECTRICAL GEAR MANUFACTURER AND SHALL INCLUDE THE UTILITY SERVICE TRANSFORMER, ALL ELECTRICAL PANELBOARDS, AND MOTORS. FAULTS FOR BOTH UTILITY SOURCE AND EMERGENCY POWER SHALL BE ANALYZED. ARC FLASH HAZARD ANALYSIS SHALL BE PERFORMED PER NFPA 70E.
    AT A MINIMUM, THE DELIVERABLES SHALL BE AS FOLLOWS:
    - EXECUTIVE SUMMARY EXPLAINING THE RESULTS AND ANY CONCLUSIONS OR RECOMMENDATIONS.
    - ARC FLASH INCIDENT ENERGY AND RESULTING PPE LEVELS
    - SINGLE-LINE SYSTEM DIAGRAM INCLUDING AMP RATINGS, AIC, FRAME SIZE, TRIP SETTINGS GROUND FAULT SETTINGS, AND CABLE INFORMATION (TYPE, SIZE, LENGTH)
    - SHORT CIRCUIT ANALYSIS
    - ANSI COMPLIANT EQUIPMENT WARNING LABELS INDICATING PPE LEVELS, INCIDENT ENERGY, FLASH BOUNDARY, AND AVAILABLE FAULT CURRENT.
20. AN UNSWITCHED HOT CONDUCTOR SHALL BE RUN TO ALL LIGHTING FIXTURES EQUIPPED WITH SELF-CONTAINED EMERGENCY BATTERY PACKS. LAMPS SHALL BE SWITCHED, BATTERY BACKS SHALL BE UNSWITCHED.
21. POWER ALL EXIT AND EMERGENCY FIXTURES FROM AN UNSWITCHED CIRCUIT SERVING THE SAME SPACE, UNLESS NOTED OTHERWISE.
22. FIELD ADJUST THE EXACT LOCATION OF ALL LIGHTING FIXTURES SHOWN CHAIN HUNG IN ELECTRICAL, MECHANICAL, AND SERVICES SPACES AS REQUIRED TO AVOID CONFLICTS WITH EXPOSED EQUIPMENT, DUCTWORK, PIPING, ETC. DO NOT ATTACH CHAINS OR MOUNT FIXTURES TO DUCTWORK OR PIPING.
23. FIELD VERIFY THE EXACT LOCATION AND ELEVATION OF ALL WALL MOUNTED FIXTURES AND DEVICES.
24. PROVIDE A FLEXIBLE WHIP TO EACH LAY-IN LIGHTING FIXTURE. WHIPS SHALL NOT EXCEED 6'-0" IN LENGTH.
25. THE CONTRACTOR SHALL VERIFY DIMMING CONTROLS COMPATIBILITY BETWEEN LIGHTING FIXTURES AND DIMMING SYSTEM PRIOR TO ORDERING FIXTURES OR CONTROLS.

ABBREVIATIONS

A ----------	
AC	ABOVE COUNTER or ALTERNATING CURRENT
ACP	ACCESS CONTROL PANEL
AFF	ABOVE FINISH FLOOR
AFCI	ARC FAULT CIRCUIT INTERRUPTING
AFG	ABOVE FINISH GRADE
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ATS	AUTOMATIC TRANSFER SWITCH
A/V	REFERS TO AUDIO/VIDEO
AWG	AMERICAN WIRE GAUGE
C ----------	
C	CONDUIT
CCTV	CLOSED CIRCUIT TELEVISION
CKT or CIR	CIRCUIT
CU	COPPER
D ----------	
db	DECIBEL
DC	DIRECT CURRENT
DIA	DIAMETER
E ----------	
EF	EXHAUST FAN
EMT	ELECTRICAL METALLIC TUBING
EP	EXPLOSION PROOF
EPO	EMERGENCY POWER OFF
ERV	ENERGY RECOVERY VENTILATOR
F ----------	
FA	FIRE ALARM
FLA	FULL LOAD AMPS
G ----------	
GFCI	GROUND FAULT CIRCUIT INTERRUPTING
GRD	GROUND
GRS	GALVANIZED RIGID STEEL
I ----------	
IMC	INTERMEDIATE METAL CONDUIT
K ----------	
KCMIL	THOUSAND CIRCULAR MILS
KVA	KILOVOLT AMPS
L ----------	
LTG	LIGHTING
LRA	LOCKED ROTOR AMPS
M ----------	
MCC	METAL CLAD CABLE
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MTD	MOUNTED
MTS	MANUAL TRANSFER SWITCH
N ----------	
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NF	NON-FUSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NO	NORMALLY OPEN
NS	NON-SWITCHED
P ----------	
P	POLE
PC	PHOTOELECTRIC CELL
PNL	PANELBOARD
PWR	POWER
Q ----------	
QTY	QUANTITY
R ----------	
REQ	REQUIRED
RMS	ROOM MEAN SQUARED
RTU	ROOF TOP UNIT
S ----------	
SD	SMOKE DAMPER
SP	SURGE PROTECTION
ST	SHUNT TRIP
SPD	SURGE PROTECTIVE DEVICE
SW	SWITCH
T ----------	
TC	TIME CLOCK
TEL	TELEPHONE
TYP	TYPICAL
U ----------	
UC	DENOTES UNDER COUNTER - VERIFY LOCATION
UL	UNDERWRITERS LABORATORY
UNO	UNLESS OTHERWISE NOTED
V ----------	
V	VOLTAGE
VA	VOLT AMPS
VEP	VOICE EVACUATION PANEL
VFD	VARIABLE FREQUENCY DRIVE
W ----------	
W	WATT OR WIRE
WH	WATER HEATER
WP	WEATHERPROOF
X ----------	
XFMR	TRANSFORMER

LIGHTING AND POWER LEGEND

- SIMPLEX RECEPTACLE
- DUPLEX RECEPTACLE AT 18" A.F.F.
  - GFI - GROUND FAULT CIRCUIT INTERRUPTER
  - TP - TAMPER PROOF RECEPTACLE
  - AC - MOUNTED 1" ABOVE COUNTER, TYPICALLY 44" A.F.F.
  - WP - PROVIDED WITH WEATHERPROOF IN-USE TYPE COVER
  - ICE - DEDICATED ICE MAKER RECEPTACLE
  - EWC - DEDICATED WATER COOLER RECEPTACLE FED FROM GFCI CIRCUIT BREAKER, COORDINATE EXACT MOUNTING WITH COOLER PROVIDED
  - REF - DEDICATED REFRIGERATOR RECEPTACLE
  - RANGE - DEDICATED RANGE RECEPTACLE
  - W - DEDICATED WASHING MACHINE RECEPTACLE
  - TV - DEDICATED TELEVISION RECEPTACLE, COORDINATE EXACT MOUNTING HEIGHT WITH OWNER, TYPICALLY 72" A.F.F.
  - DIS - DEDICATED GARBAGE DISPOSER RECEPTACLE BELOW COUNTER, SWITCHED ABOVE COUNTER (SWITCHES NOT SHOWN)
  - COPY - DEDICATED COPIER RECEPTACLE
- QUADRUPLEX RECEPTACLE
- CEILING MOUNTED RECEPTACLE
- SPECIAL PURPOSE RECEPTACLE, NEMA COFIGURATION AS INDICATED.
- FLOOR DUPLEX RECEPTACLE
- FLOOR QUADRUPLEX RECEPTACLE
- FLOOR DATA RECEPTACLE
- FLOOR DATA QUAD RECEPTACLE
- PANELBOARD
- DISCONNECT SWITCH
- MOTOR STARTER/DISCONNECT SWITCH
- MOTOR STARTER
- VFD — VARIABLE FREQUENCY DRIVE
- BRANCH CIRCUIT HOMERUN, HOT-NEUTRAL-GROUND, PANEL AND CIRCUIT NUMBER INDICATED ON PLAN
- T — DRY-TYPE TRANSFORMER
- ELECTRIC METER
- JUNCTION BOX
- $ — SINGLE POLE TOGGLE SWITCH AT 48" A.F.F
  - 2 - INDICATES 2-POLE TOGGLE
  - 3 - INDICATES 3-WAY TOGGLE
  - 4 - INDICATES 4-WAY TOGGLE
  - D - INDICATES DIMMER
  - K - INDICATES KEY OPERATED
  - LV - LOW VOLTAGE, CONFIGURATION INDICATED ON PLAN
  - M - MOTOR RATED TOGGLE
  - OC - DUAL TECHNOLOGY OCCUPANCY SENSOR SWITCH
  - WP - WEATHERPROOF COVER
- OC — CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR
- DL — DAYLIGHTING SENSOR
- PP — OCCUPANCY SENSOR POWER PACK
- RC — LIGHTING ROOM CONTROLLER
- 1'x4' RECESSED LIGHTING FIXTURE
- 2'x4' RECESSED LIGHTING FIXTURE
- 2'x2' RECESSED LIGHTING FIXTURE
- STRIP LIGHTING FIXTURE
- STRIP LIGHTING FIXTURE WITH EMERGENCY BATTERY PACK
- DOWNLIGHT
- WALL MOUNTED LINEAR LIGHTING FIXTURE
- WALL MOUNTED LIGHTING FIXTURE
- CEILING MOUNTED EXIT SIGN, SHADING INDICATES FACES
- WALL MOUNTED EXIT SIGN, SHADING INDICATES FACES
- WALL MOUNTED EMERGENCY LIGHITNG FIXTURE

TELECOMMUNICATION AND SECURITY LEGEND

- WALL MOUNTED CAMERA
- C — CEILING MOUNTED CAMERA
- S — CEILING MOUNTED PUBLIC ADDRESS
- K — KEY CARD READER
- PUSH BUTTON SWITCH
- MD — MOTION DETECTOR
- DATA OUTLET AT 18" A.F.F., ONE CAT6 CABLE AT EACH LOCATION UNLESS INDICATED OTHERWISE
- ∇^2 — DATA OUTLET WITH TWO DROPS AT 18" A.F.F., TWO CAT6 CABLE AT EACH LOCATION UNLESS INDICATED OTHERWISE
- TV — COAXIAL TV OUTLET AT 5'-0" A.F.F. UNLESS INDICATED OTHERWISE
- W — WIRELESS ACCESS POINT

FLEX SPACES

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ELECTRICAL LEGENDS, NOTES AND ABBREVIATIONS

Sheet
E001

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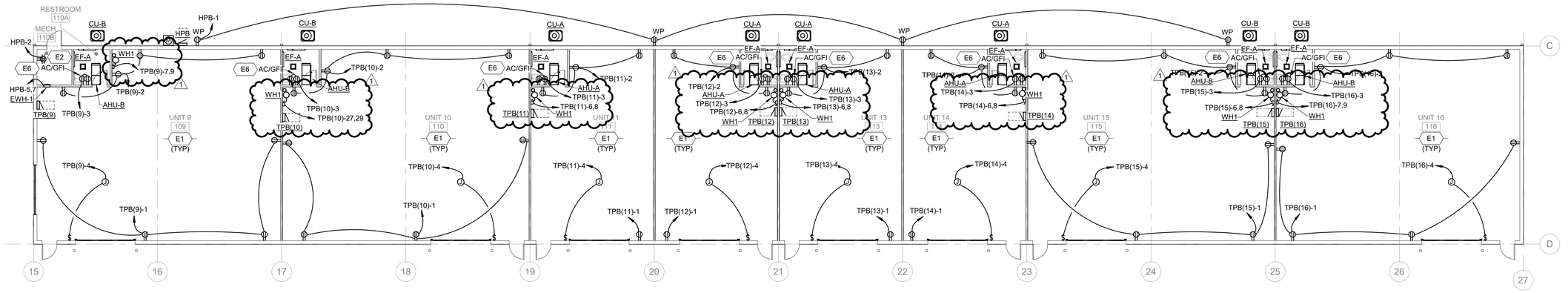
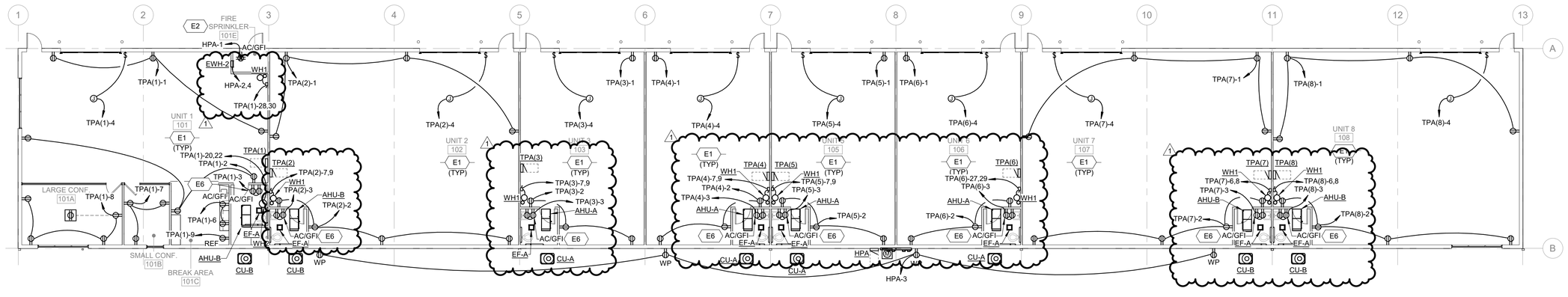


2 POWER AND SYSTEMS PLAN - BUILDING B

SCALE: 3/32" = 1'-0"



1 POWER AND SYSTEMS FLOOR PLAN - BUILDING A

SCALE: 3/32" = 1'-0"

GENERAL NOTES

1. ALL WORK SHOWN IN UNIT 1 SHALL BE CONSIDERED ALTERNATE 1. BASE BID TO BE THE SAME AS THE DESIGN OF UNIT 2 SHOWN ON PLANS.

KEYED NOTES

- E1 REFER TO PANELBOARD SCHEDULES AND EQUIPMENT CONNECTION SCHEDULE FOR ELECTRICAL CONNECTION INFORMATION TO MECHANICAL/PLUMBING EQUIPMENT. MAKE ALL CONNECTIONS PER MANUFACTURER'S LITERATURE AND NEC REQUIREMENTS.
- E2 CIRCUIT IN THIS ROOM TO SERVE BOTH LIGHTING AND CONVENIENCE RECEPTACLES. WIRE RECEPTACLES AHEAD OF CONTROL DEVICES.
- E6 PROVIDE ADDITIONAL RECEPTACLE ABOVE CEILING FOR MECHANICAL EQUIPMENT MAINTENANCE. WORE DOWNSTREAM OF RESTROOM AC/GFI RECEPTACLE.

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POWER AND SYSTEMS FLOOR PLANS

Sheet: E101

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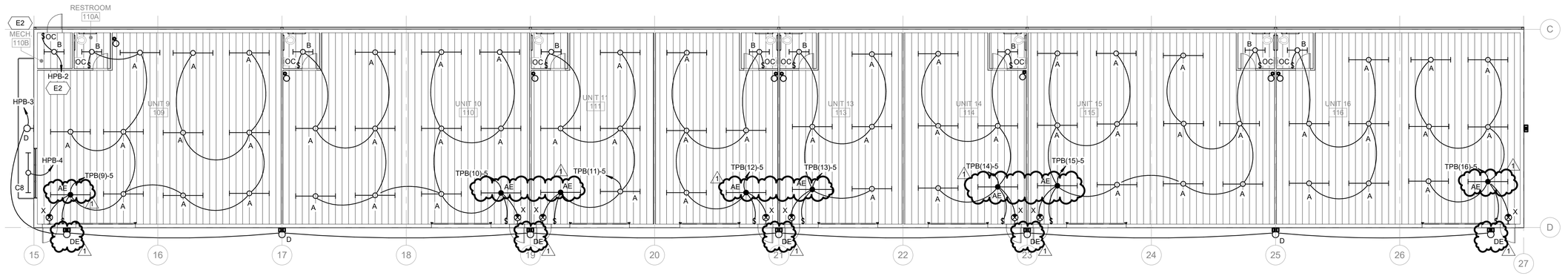

2 LIGHTING REFLECTED CEILING PLAN - BUILDING B

SCALE: 3/32" = 1'-0"

GENERAL NOTES

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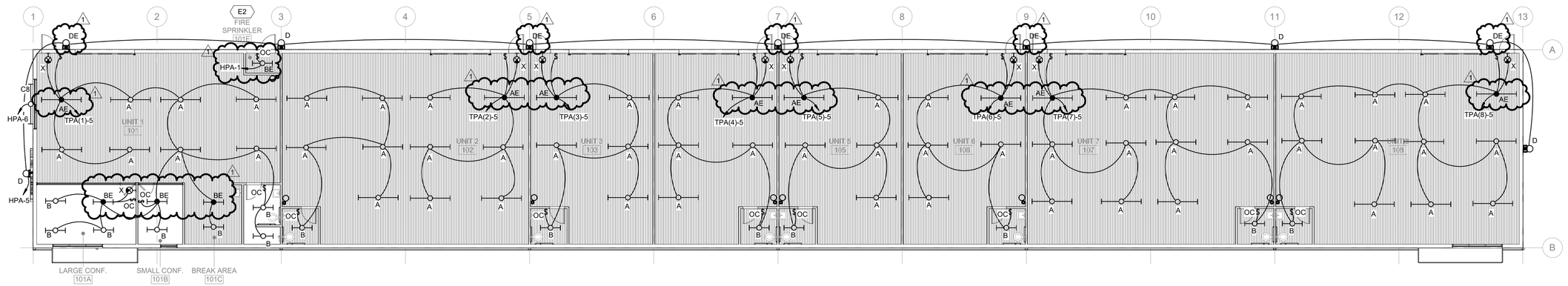
KEYED NOTES

E2 CIRCUIT IN THIS ROOM TO SERVE BOTH LIGHTING AND CONVENIENCE RECEPTACLES. WIRE RECEPTACLES AHEAD OF CONTROL DEVICES.



1 LIGHTING REFLECTED CEILING PLAN - BUILDING A

SCALE: 3/32" = 1'-0"

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LIGHTING REFLECTED CEILING PLANS

Sheet: E201

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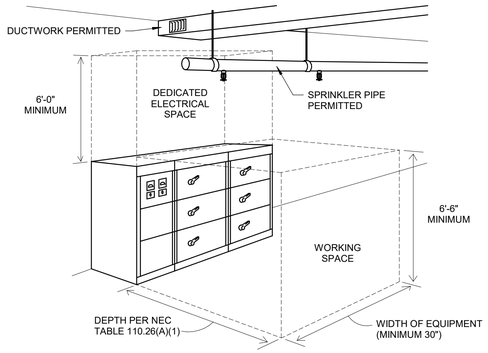
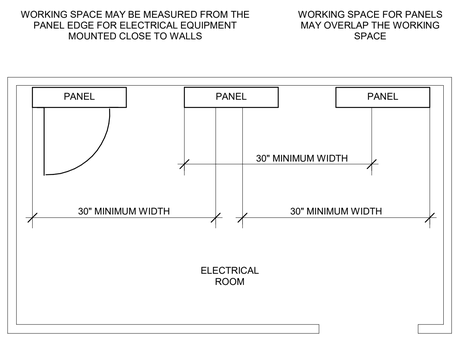


1 ELECTRICAL CLEARANCE DETAIL

NOT TO SCALE



2 ELECTRICAL WORKING SPACE

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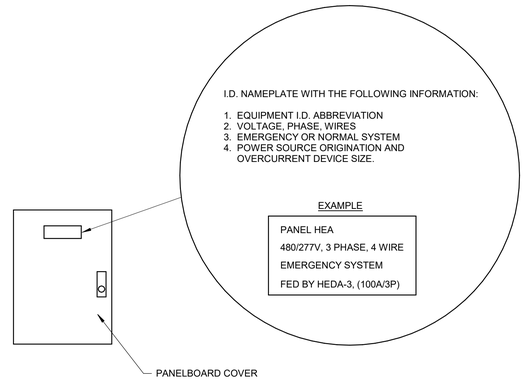
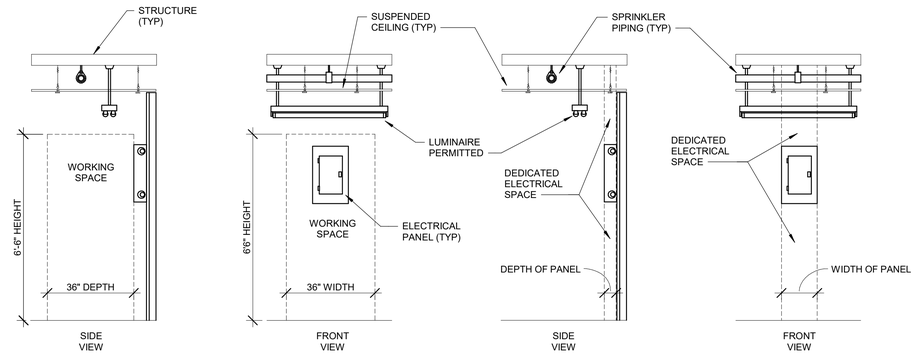


3 PANEL IDENTIFICATION DETAIL

NOT TO SCALE

PANEL IDENTIFICATION NOTES:

1. SIMILAR FOR DISCONNECTS, MOTOR CONTROLLERS, TRANSFORMERS, LIGHTING CONTROL PANEL, AUTOMATIC TRANSFER SWITCHES, ETC.
2. PROVIDE PANEL IDENTIFICATION FOR ALL NEW PANELS AND FOR ALL EXISTING REWORKED PANELS THAT DO NOT CURRENTLY HAVE IDENTIFICATION TAGS IN PLACE.

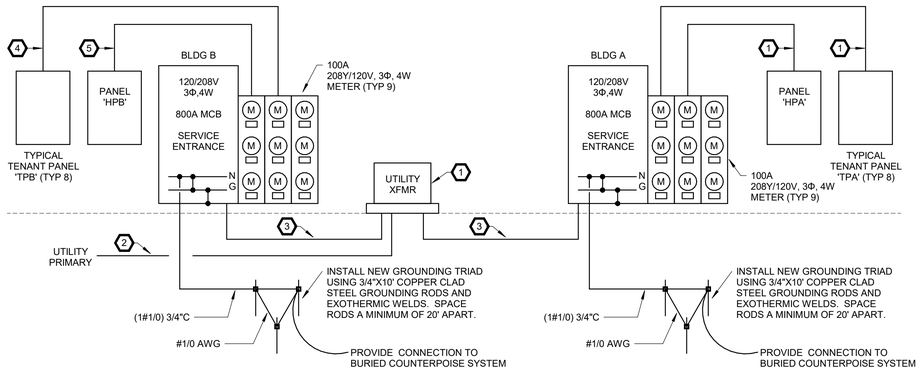


4 ELECTRICAL PANEL CLEARANCE

NOT TO SCALE

ONE-LINE DIAGRAM KEYED NOTES:

1. UTILITY PAD MOUNT TRANSFORMER WITH 208Y/120V, 3Φ, 4W SECONDARY. PROVIDE CONCRETE PAD PER UTILITY COMPANY STANDARDS.
2. PROVIDE MINIMUM (1) 4" PVC CONDUIT FOR PRIMARY SERVICE CABLES AND TERMINATE AS DIRECTED BY LOCAL UTILITY COMPANY.
3. 800A SERVICE FEEDER: (3) SETS OF 4-#500KCM AL, 3" CONDUIT (AA-8000)
4. 100A TENANT FEEDER: 4-#1/0AWG AL, #6G, 1-1/2" CONDUIT (AA-8000)
5. 60A FEEDER: 4-#8(G) 1-1/4" CONDUIT (CU)



5 POWER RISER DIAGRAM

NOT TO SCALE

NOTE:
ALL BONDING CONNECTIONS SHALL BE MADE AT ACCESSIBLE LOCATIONS. USE EXOTHERMIC CONNECTIONS WHERE CONNECTED TO BUILDING STEEL, RE-BAR, AND GROUND RODS. USE CLAMP CONNECTIONS FOR PIPING SYSTEMS.

6 SERVICE GROUNDING DETAIL

NOT TO SCALE

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Lee's Summit, Missouri
08/20/2024

FLEX SPACES

60 SE Thompson Dr.
Lee's Summit, MO 64082

PROJECT NUMBER: 23092

CLIENT: Capital Builders

CONSTRUCTION / PERMIT DRAWINGS

06.03.2024

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07.15.2024

ELECTRICAL DETAILS & POWER RISER DIAGRAM

Sheet: E500

Revision no.

PANEL NAME:	VOLTAGE:	PHASE:	WIRE:	NEUTRAL RATING:	PANEL DESCRIPTION:
HPA	208/120 Wye	3	4	100.00%	22
MAINS:	**MOUNTING:**	**MAX NO. OF CIRCUITS**	**MANUFACTURER:**	**PANEL AIC RATING:**	**LOCATION:**
100 A MLO	SURFACE	30	SQAURE D	AIC RATING	

CKT	DESCRIPTION	BRKR	A		B		C		BRKR	DESCRIPTION	CKT
1	RCPT/LTG - SPRINKLER ROOM	20	393	2000					25	PWR - EWH-2 (HACR)	2
3	RCPT - EXTERIOR MAINTENANCE	20			720	2000					4
5	***LTG - EXTERIOR	20					630	96	20	***LTG - SIGNAGE	6
7	SPACE		--	--						SPACE	8
9	SPACE				--	--				SPACE	10
11	SPACE						--	--		SPACE	12
13	SPACE		--	--						SPACE	14
15	SPACE				--	--				SPACE	16
17	SPACE						--	--		SPACE	18
19	SPACE		--	--						SPACE	20
21	SPACE				--	--				SPACE	22
23	SPACE						--	--		SPACE	24
25	SPACE		--	--						SPACE	26
27	SPACE				--	--				SPACE	28
29	SPACE						--	--		SPACE	30
		Total Load:	2393 VA		2720 VA		726 VA				
		Total Amps:	22.1 A		24.8 A		6.1 A				

NOTES:
*** = PROVIDE (2) CIRCUIT CONTACTOR, 24-HR TIMECLOCK, AND PHOTOCELL FOR AUTOMATIC OVERRIDE OF LIGHTING/SIGNAGE CIRCUIT. COORDINATE SCHEDULE WITH OWNER.

PANEL NAME:	VOLTAGE:	PHASE:	WIRE:	NEUTRAL RATING:	PANEL DESCRIPTION:
TPA(TYP)	208/120 Wye	3	4	100.00%	13
MAINS:	**MOUNTING:**	**MAX NO. OF CIRCUITS**	**MANUFACTURER:**	**PANEL AIC RATING:**	**LOCATION:**
100 A MLO	SURFACE	30	SQAURE D	AIC RATING	UNIT 6 106

CKT	DESCRIPTION	BRKR	A		B		C		BRKR	DESCRIPTION	CKT
1	(GFCI) RCPT - UNIT GEN		180	540					20	(GFCI) RCPT - UNIT GEN 2	2
3	RCPT - RESTROOM GFI				360	500			20	PWR - UNIT CEILING FAN	4
5	LTG - UNIT GEN						313	--		SPACE	6
7	SPACE		--	--						SPACE	8
9	SPACE				--	--				SPACE	10
11	SPACE						--	--		SPACE	12
13	SPACE		--	--						SPACE	14
15	SPACE				--	--				SPACE	16
17	SPACE						--	--		SPACE	18
19	SPACE		--	--						SPACE	20
21	SPACE				--				20		22
23	PWR - AHU-A (HACR)	20					312	936	15	PWR - CU-A (HACR)	24
25			312	936							26
27	PWR - WH1	30			1000	--				SPACE	28
29							1000	--		SPACE	30
		Total Load:	1867.3 VA		1860 VA		2439.3 VA				
		Total Amps:	15.6 A		15.5 A		20.3 A				

NOTES:
(GFCI) = GFCI-TYPE BREAKER

PANEL NAME:	VOLTAGE:	PHASE:	WIRE:	NEUTRAL RATING:	PANEL DESCRIPTION:
HPB	208/120 Wye	3	4	100.00%	19
MAINS:	**MOUNTING:**	**MAX NO. OF CIRCUITS**	**MANUFACTURER:**	**PANEL AIC RATING:**	**LOCATION:**
100 A MLO	SURFACE	30	SQAURE D	10K	

CKT	DESCRIPTION	BRKR	A		B		C		BRKR	DESCRIPTION	CKT
1	RCPT - EXTERIOR MAINTENANCE	20	720	393					20	RCPT - QUADPLEX MECH 110B	2
3	***LTG - EXTERIOR	20			560	96			20	***LTG - EXTERIOR SIGN	4
5	PWR - EWH-1 (HACR)	25					2000	--		SPACE	6
7			2000	--						SPACE	8
9	SPACE				--	--				SPACE	10
11	SPACE						--	--		SPACE	12
13	SPACE		--	--						SPACE	14
15	SPACE				--	--				SPACE	16
17	SPACE						--	--		SPACE	18
19	SPACE		--	--						SPACE	20
21	SPACE				--	--				SPACE	22
23	SPACE						--	--		SPACE	24
25	SPACE		--	--						SPACE	26
27	SPACE				--	--				SPACE	28
29	SPACE						--	--		SPACE	30
		Total Load:	3113 VA		656 VA		2000 VA				
		Total Amps:	27.7 A		5.5 A		18.4 A				

NOTES:
*** = PROVIDE (2) CIRCUIT CONTACTOR, 24-HR TIMECLOCK, AND PHOTOCELL FOR AUTOMATIC OVERRIDE OF LIGHTING/SIGNAGE CIRCUIT. COORDINATE SCHEDULE WITH OWNER.

PANEL NAME:	VOLTAGE:	PHASE:	WIRE:	NEUTRAL RATING:	PANEL DESCRIPTION:
TPA(1)	208/120 Wye	3	4	100.00%	14
MAINS:	**MOUNTING:**	**MAX NO. OF CIRCUITS**	**MANUFACTURER:**	**PANEL AIC RATING:**	**LOCATION:**
100 A MLO	SURFACE	30	SQUARE D	AIC RATING	UNIT 1 101

CKT	DESCRIPTION	BRKR	A		B		C		BRKR	DESCRIPTION	CKT
1	(GFCI)RCPT - UNIT GEN	20	540	540					20	(GFCI)RCPT - UNIT GEN 2	2
3	RCPT - RESTROOM GFI	20			360	0			20	PWR - UNIT CEILING FAN	4
5	LTG - UNIT GEN	20					778	360	20	RCPT - BREAK AREA GEN	6
7	RCPT - SMALL CONFERENCE ROOM	20	540	720					20	RCPT - LARGE CONFERENCE ROOM	8
9	(GFI)RCPT - BREAK AREA FRIDGE	20			800	--				SPACE	10
11	SPACE						--	--		SPACE	12
13	SPACE		--	--						SPACE	14
15	SPACE				--	--				SPACE	16
17	SPACE						--	--		SPACE	18
19	SPACE		--	1000					20	PWR - WH2 (HACR)	20
21	SPACE				--	1000					22
23	PWR - AHU-B (HACR)	20					520	1560	25	PWR - CU-B (HACR)	24
25			520	1560							26
27	PWR - AHU-B ELEC HEAT (HACR)	60			5400	1000			30	PWR - WH1	28
29							5400	1000			30
		Total Load:	5193 VA		8560 VA		9353 VA				
		Total Amps:	43.3 A		75.6 A		82.3 A				

NOTES:
(GFCI) = GFCI-TYPE BREAKER

LIGHTING FIXTURE SCHEDULE

MARK	MANUFACTURER	MODEL	ELECTRICAL DATA	DESCRIPTION
A	LITHONIA	UFIT-L96-8000LM-SEF-MVOLT-GZ10-35K-80CRI-HC36M12	120 V/1-56 VA	8 FOOT STRIPLIGHT - CHAIN HUNG LOWBAY LED LIGHT FIXTURE, WHITE HOUSING. "AE" = PROVIDE WITH "ILB-CP10-HE-A" EMERGENCY BATTERY PACK; PROVIDE EMERGENCY BATTERY PACK FIXTURES WITH "SPD" SURGE PROTECTIVE DEVICE ACCESSORY.
B	HE WILLIAMS	75S-4-L50-8-35-AC-DRV-UNV	120 V/1-33 VA	NOMINAL 4' LONG LINEAR LED INDUSTRIAL STRIP FIXTURE, WHITE FINISH, SQUARE ACRYLIC DIFFUSE LENS, NON-DIMMING DRIVER. "BE" = PROVIDE FIXTURE WITH "EM/10WLP" EMERGENCY BATTERY PACK.
C8	STARTEK LIGHTING AMERICA	HYDROD-8'-625-SD-35K-80-PBR-WM-U-TC	120 V/1-96 VA	3.6" TALL X 4.4" WIDE X 8' LONG WALL MOUNT EXTERIOR LINEAR LED DOWNLIGHT WITH POWDER COAT BRONZE FINISH
D	HE WILLIAMS	VWPH-L60-7-30-T3-DBZ-CGL-PCDIM-UNIV	120 V/1-70 VA	LED WALL PACK WITH DARK BRONZE HOUSING - FLUSH LENS; "DE" = PROVIDE WITH "EM/10WC" EMERGENCY BATTERY PACK OPTION
E	LUMENPULSE	LIB-120-SSL-RO-35K-CRI 70-4-BRZ-NO	120 V/1-50 VA	LED BOLLARD - CONTROL VIA PHOTOCELL
X	HE WILLIAMS	EXIT/EM/LED	120 V/1-1.3 VA	LED SINGLE FACE EDGE-LITE EXIT SIGN ON CLEAR BACKING, EXTRUDED BRUSHED ALUMINUM FINISH, RED LETTERS, ARROWS AS INDICATED

PANEL NAME:	VOLTAGE:	PHASE:	WIRE:	NEUTRAL RATING:	PANEL DESCRIPTION:
TPB(TYP)	208/120 Wye	3	4	100.00%	11
MAINS:	**MOUNTING:**	**MAX NO. OF CIRCUITS**	**MANUFACTURER:**	**PANEL AIC RATING:**	**LOCATION:**
100 A MLO	SURFACE	30	SQAURE D	AIC RATING	UNIT 10 110

CKT	DESCRIPTION	BRKR	A		B		C		BRKR	DESCRIPTION	CKT
1	(GFCI) RCPT - UNIT GEN	20	720	720					20	(GFCI) RCPT - UNIT GEN 2	2
3	RCPT - RESTROOM GFI	20			360	500			20	PWR - UNIT CLG FAN	4
5	LTG - UNIT GEN	20					649	--		SPACE	6
7	SPACE		--	--						SPACE	8
9	SPACE				--	--				SPACE	10
11	SPACE						--	--		SPACE	12
13	SPACE		--	--						SPACE	14
15	SPACE				--	--				SPACE	16
17	SPACE						--	--		SPACE	18
19	SPACE		--	--						SPACE	20
21	SPACE				--				20		22
23	PWR - AHU-B (HACR)	15					520	1560	25	PWR - CU-B (HACR)	24
25			520	1560							26
27	PWR - WH1	30			1000	--				SPACE	28
29							1000	--		SPACE	30
		Total Load:	3341.8 VA		1860 VA		3542.9 VA				
		Total Amps:	29.7 A		15.5 A		31.4 A				

NOTES:
(GFCI) = GFCI-TYPE BREAKER

Electrical Connections Schedule

ELEC CONNECTION	FAMILY	TYPE	TAG	DESCRIPTION	MOTOR, HP/VA	LOAD, A	VA	VOLTS	PH	OCPD SIZE	BRANCH CIRCUIT CONDUCTORS	DISCONNECT	ELECTRIC HEAT VOLTS	ELECTRIC HEAT PHASE	ELECTRIC HEAT WATTAGE	ELECTRIC HEAT OCPD
Yes	ACCU - GBT	1.5 Tons	CU-A	AIR COOLED CONDENSING UNIT		9	1872	208	1	20	(2-12 & 1-12GND) 3/4"C	BY ELEC				
Yes	ACCU - GBT	4 TONS	CU-B	AIR COOLED CONDENSING UNIT		15	3120	208	1	20	(2-12 & 1-12GND) 3/4"C	BY ELEC				
Yes	Fan - Bathroom Exhaust - GBT	50 CFM	EF-A	BATHROOM EXHAUST FAN	4VA	0	4.8	120	1	15	(2-12 & 1-12GND) 3/4"C	BY ELEC				
Yes	Standard Split Evaporator - GBT	Indoor AHU	AHU-A	AIR HANDLING UNIT	1/2HP	2.8	624	208	1	15	(2-12 & 1-12GND) 3/4"C	BY ELEC	208 V	1	5770 W	40A/2P
Yes	Standard Split Evaporator - GBT	Indoor AHU 4 ton	AHU-B	AIR HANDLING UNIT	1/2HP	4.3	1040	208	1	15	(2-12 & 1-12GND) 3/4"C	BY ELEC	208 V	1	10800 W	60A/2P
Yes	Wall Heater - Electric - GBT	Electric Wall Heater	EWH-1	RECESSED WALL HEATER	1500VA	16.7	4000	208	1	35	(2-8 & 1-10GND) 3/4"C	BY FACTORY				
Yes	Wall Heater - Electric - GBT	Electric Wall Heater	EWH-2	RECESSED WALL HEATER	1500VA	16.7	4000	208	1	35	(2-8 & 1-10GND) 3/4"C	BY FACTORY				
Yes	Water Heater - Electric - GBT	DEL-6-1.5	WH1	ELECTRIC WATER HEATER		9.6	2000	208	1	25	(2-10 & 1-10GND) 3/4"C					
Yes	Water Heater - Electric - GBT	DEL-10-2	WH2	ELECTRIC WATER HEATER		9.6	2000	208	1	25	(2-10 & 1-10GND) 3/4"C	BY ELEC				

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ELECTRICAL SCHEDULES

Sheet: E600

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