KINGFISHER COUNTY COMMISSIONERS

Jeff Moss, District 1
Ray Alan Shimanek, District 2
Heath Dobrovolny, District 3

Phone: (405) 375-3808
Fax: (405) 375-2366

Kingfisher County Courthouse
101 S. Main, Room #9
Kingfisher, OK 73750

January 8, 2024

Bid #5

NOTICE TO BIDDERS

Notice is hereby given that the Board of County Commissioners of Kingfisher County and OSU Extension office will receive sealed bids for **labor and materials** for a new OSU Extension facility at the Kingfisher County Fair Ground. Bids will be accepted at the Kingfisher County Courthouse in the Office of the County Clerk until 4:00pm on the 2nd day of February, 2024 to be opened at their regular meeting of February 5th, 2024.

Specifications of the project and plans available at: https://kingfisher.okcounties.org/bids or to General Contractors----January 8th, 2024, 8:00 a.m.

1. Hard copy of construction documents will be available from Architect upon deposit of$150 per set
2.Digital copy will be available at construction news services. see Section 002113, Part 2.04, Examination • Item B.

These are also available from the purchasing agent located in the Kingfisher County Clerk's office. The non-mandatory pre bid will be held at the project location (Kingfisher County Fairgrounds) at 2:00 p.m. January 24th, 2024

The Board of County Commissioners reserves the right to reject any or all bids. All bidders must complete a statement of non-collusion. Please contact Kingfisher County Clerk's office for bid results at 405-375-3887.

Board of County Commissioners
Kingfisher County Courthouse
Kingfisher, Oklahoma

CHAIRMAN: _____
Heath Dobrovolny

MEMBER: _____
Jeff Moss

MEMBER: _____
Ray Shimanek

ATTEST:

Jeanne Bowers

COUNTY CLERK

COUNTY CLERK SEAL KINGFISHER COUNTY, OK

SECTION 002113
INSTRUCTIONS TO BIDDERS

INVITATION

1.01 BID SUBMISSION

A. Bids signed and under seal, executed, and dated will be received at the office of the Kingfisher County Commissioners at 101 South Main Street, Suite 9, Kingfisher Oklahoma, 73750 before 4:00 p.m. local standard time on February 2nd, 2024.

B. Offers submitted after the above time will be returned to the bidder unopened.

C. Offers will be opened at 9:00 a.m. on the 5th day of 2024, at the office of the Kingfsiher County Commissioners at 101 South Main Street, Suite 9. Kingfisher,Oklahoma 73750.

1.02 INTENT

A. The intent of this Bid request is to obtain an offer to perform work to complete project named Kingfisher County Extension Office 2023 for a Stipulated Sum contract, in accordance with Contract Documents.

1.03 CONTRACT TIME

A. Identify Contract Time in the Bid Form. The completion date in the Agreement shall be the Contract Time added to the commencement date.

BID DOCUMENTS AND CONTRACT DOCUMENTS

2.01 DEFINITIONS

A. Bid Documents: Contract Documents supplemented with Advertisememt for Bids, Instructions to Bidders, Bid Form Supplements To Bid Forms and Appendices identified.

B. Bid, Offer, or Bidding: Act of submitting an offer under seal.

C. Bid Amount: Monetary sum identified by the Bidder in the Bid Form.

2.02 CONTRACT DOCUMENTS IDENTIFICATION

A. Contract Documents are identified as Kingfisher County Extension Office 2023.

2.03 AVAILABILITY

A. Bid Documents may be obtained at the office of Architect.

B. Printed sets of Bid Documents can be obtained by general contract bidders free of charge upon receipt of a refundable deposit, by cash, in the amount of $150 for one set.

C. Deposit will be refunded if Bid Documents are returned complete, undamaged, unmarked and reusable, within 7 days of bid submission. Failure to comply will result in forfeiture of deposit.

D. Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not grant a license for other purposes.

2.04 EXAMINATION

A. Bid Documents may be viewed at the office of Architect.

B. Bid Documents are on display at the offices of the following construction plan rooms:
   1. Construction Market Data.
   2. Dodge Data and Analytics
   3. Eplan
   4. Construct Connect
   5. Southwest Construction News
   6. Autry Technology Center Plan Room of Enid, Oklahoma
   7. niksmith8812@pldi.com.

C. Upon receipt of Bid Documents verify that documents are complete. Notify Architect should the documents be incomplete.

D. Immediately notify Architect upon finding discrepancies or omissions in the Bid Documents.

2.05 INQUIRIES/ADDENDA

A. Direct questions to the office of the Architect, email; ken@corbinmerzhaney.com.

B. Addenda may be issued during the bidding period. All Addenda become part of Contract Documents. Include resultant costs in the Bid Amount.

C. Verbal answers are not binding on any party.

D. Clarifications requested by bidders must be in writing not less than 7 days before date set for receipt of bids. The reply will be in the form of an Addendum, a copy of which will be forwarded to known recipients and construction news services.

2.06 PRODUCT/ASSEMBLY/SYSTEM SUBSTITUTIONS

A. General Requirements for Substitution Requests:

B. Substitution Request Time Restrictions:
   1. Where the Bid Documents stipulate a particular product, substitutions will be considered up to 7 working days before receipt of bids.

C. Substitution Request Form:
   1. Submit substitution requests by completing CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage). See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

D. Review and Acceptance of Request:
   1. Architect may approve the proposed substitution and will issue an Addendum to known bidders.

SITE ASSESSMENT

3.01 SITE EXAMINATION

A. Examine the project site before submitting a bid.

3.02 PREBID CONFERENCE

A. A non mandatory pre-bid conference has been scheduled for 2:00 p.m. on the 24th day of January, 2024 at the the Kingfisher County Fairgrounds, , 300 South 13th Street, Kingfisher Oklahoma, 73750.

B. All general contract bidders and suppliers are invited.

C. Representatives of Architect will be in attendance.

D. Information relevant to the Bid Documents will be recorded in an Addendum, issued to Bid Document recipients.

QUALIFICATIONS

4.01 EVIDENCE OF QUALIFICATIONS

A. To demonstrate qualification for performing the Work of this Contract, bidders may be requested to submit AIA A305.

4.02 SUBCONTRACTORS/SUPPLIERS/OTHERS

A. Owner reserves the right to reject a proposed subcontractor for reasonable cause.

B. Refer to General Conditions.

BID SUBMISSION

5.01 SUBMISSION PROCEDURE

A. Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.

B. Submit one copy of the executed offer on the Bid Forms provided, signed and sealed with the required security in a closed opaque envelope, clearly identified with bidder's name, project name and Owner's name on the outside.

C. Improperly completed information, irregularities in security deposit, may be cause not to open the Bid Form envelope and declare the bid invalid or informal.

D. An abstract summary of submitted bids will be made available to all bidders following bid opening.

5.02 BID INELIGIBILITY

A. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, may at the discretion of the Owner, be declared unacceptable.

B. Bid Forms, Appendices, and enclosures that are improperly prepared may, at the discretion of Owner, be declared unacceptable.

BID ENCLOSURES/REQUIREMENTS

6.01 SECURITY DEPOSIT

A. Bids shall be accompanied by a security deposit as follows:
   1. Bid Bond of a sum no less than 5 percent of the Bid Amount.

B. Endorse the Bid Bond in the name of the Owner as obligee, signed and sealed by the principal (Contractor) and surety.

C. The security deposit will be returned after delivery to the Owner of the required Maintenance, Performance and Payment Bond(s) by the accepted bidder.

D. Include the cost of bid security in the Bid Amount.

E. After a bid has been accepted, all securities will be returned to the respective bidders and other requested enclosures.

F. If no contract is awarded, all security deposits will be returned.

6.02 PERFORMANCE ASSURANCE

A. Accepted Bidder: Provide Performance Bond, Statutory Payment Bond , and Maintenance Bond as required in 007300 Supplementary Conditions

6.03 INSURANCE

A. Provide an executed "Undertaking of Insurance" on the form provided stating their intention to provide insurance to the bidder in accordance with the insurance requirements of Contract Documents.

B. Cost of required insurance shall be included in bid sum.

6.04 BID FORM REQUIREMENTS

A. Complete all requested information in the Bid Form and Appendices.

B. Taxes: Refer to Supplementary Conditions for inclusion of taxes and products that are tax exempt.

6.05 PERMITS AND FEES

A. Include the cost of building permits, fees, licenses, and inspections by government agencies necessary for prior execusion and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received.

6.06 FEES FOR CHANGES IN THE WORK

A. Include the fees for overhead and profit on own Work and Work by subcontractors, identified in Document 007300 - Supplementary Conditions .

6.07 BID FORM SIGNATURE

A. The Bid Form shall be signed by the bidder, as follows:
   1. Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature. Affix seal.
   2. Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word "Partner" under each signature. Affix seal to each signature.

3. Corporation: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. Affix the corporate seal. If the bid is signed by officials other than the president and secretary of the company, or the president/secretary/treasurer of the company, a copy of the by-law resolution of their board of directors authorizing them to do so, must also be submitted with the Bid Form in the bid envelope.
4. Joint Venture: Each party of the joint venture shall execute the Bid Form under their respective seals in a manner appropriate to such party as described above, similar to the requirements of a Partnership.

6.08 SELECTION AND AWARD OF ALTERNATES

A. Indicate variation of bid price for Alternates listed on the Bid Form. Unless otherwise indicated, indicate Alternates as a difference in bid price by adding to or deducting from the base bid price.

OFFER ACCEPTANCE/REJECTION

7.01 DURATION OF OFFER

A. Bids shall remain open to acceptance and shall be irrevocable for a period of thirty (30) days after the bid closing date.

7.02 ACCEPTANCE OF OFFER

A. Owner reserves the right to accept or reject any or all offers.

B. After acceptance by Owner, Architect on behalf of Owner, will issue to the successful bidder, a written Notice To Proceed.

END OF SECTION

SECTION 004100
BID FORM

THE PROJECT AND THE PARTIES

1.01 TO:

A. The Kingfisher County Commissioners

1.02 FOR:

A. Project: Kingfisher County Extension Office 2023

B. Architect: Corbin Merz Haney Architeture and Interior Design

1.03 DATE: _____ (BIDDER TO ENTER DATE)

1.04 SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)

A. Bidder's Full Name .....
   1. Address.....
   2. City, State, Zip.....

1.05 OFFER

A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Bid Documents prepared by Corbin Merz Haney Architects and Interior Design for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Sum of:

B. _____
_____ dollars
($_____), in lawful money of the United States of America.

C. We have included the required security deposit as required by the Instruction to Bidders.

D. We have excluded from the Bid Sum all applicable federal and State of Oklahoma taxes.

1.06 ACCEPTANCE

A. This offer shall be open to acceptance and is irrevocable for thirty days from the bid closing date.

B. If this bid is accepted by Owner within the time period stated above, we will:
   1. Execute the Agreement within seven days of receipt of Notice of Award.
   2. Furnish the required bonds within seven days of receipt of Notice of Award.
   3. Commence work within seven days after written Notice to Proceed of this bid.

C. If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bond(s), the security deposit shall be forfeited as damages to Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.

D. In the event our bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

1.07 CONTRACT TIME

A. If this Bid is accepted, we will:

B. Complete the Work in _____ calendar weeks from Notice to Proceed.
(Bidder to enter number of weeks.)

1.08 ADDENDA

A. The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.
   1. Addendum # _____ Dated _____.
   2. Addendum # _____ Dated _____.

3. Addendum # _____ Dated _____.
4. Addendum # _____ Dated _____.
5. Addendum # _____ Dated _____.

1.09 BID FORM SUPPLEMENTS

A. The following information is included with Bid submission:

B. The following Supplements are completed and attached to this Bid Form and are considered an integral part of this Bid Form:
   1. Invitation to Bid and Terms and Conditions
   2. Certificate of Non-Discrimination
   3. Businesss Relationship Affidavit
   4. Non-Collusion Bidding Certification
   5. Bid Bond
   6. Certificates of intent to insure for insurance required in Section 07300 Supplementary General Conditions

1.10 BID FORM SIGNATURE(S)

A. The Corporate Seal of

B. _____

C. (Bidder - print the full name of your firm)

D. was hereunto affixed in the presence of:

E. _____

F. (Authorized signing officer, Title)

G. (Seal)

1.11 IF THE BID IS A JOINT VENTURE OR PARTNERSHIP, ADD ADDITIONAL FORMS OF EXECUTION FOR EACH MEMBER OF THE JOINT VENTURE IN THE APPROPRIATE FORM OR FORMS AS ABOVE.

END OF SECTION

S.A. & I. 425 (2000)

AFFIDAVIT FOR FILING WITH COMPETIVE BID

State of Oklahoma) SS

County of Kingfisher)

_____, lawful age, being first duly sworn, on oath says, that (s)he is the agent authorized by the bidder to submit the attached bid. Affiant further states that the bidder has not been a party to any collusion among bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding; or with any county official or employee as to quantity, quality or price in the prospective contract, or any other terms of said prospective contract; or in any discussions between bidders and any county official concerning exchange of money or other thing of value for special consideration in the letting of contract.

Bidder:

_____

Name:

_____

Address:

_____

Phone Number:

_____

Signature

Subscribed and sworn to before me the _____ day of _____, 20____.

_____

Notary Public (or Clerk or Judge)

My commission expires:_____

Note:

Each competitive bid submitted to a county, school district or municipality must be accompanied with the above Affidavit as required by 61 Okla. St. Ann. 138

KINGFISHER COUNTY
EXTENSION OFFICE
2023

KINGFISHER COUNTY FAIRGROUNDS
300 SOUTH 13TH STREET
KINGFISHER, OKLAHOMA

CORBIN ◆ MERZ ◆ HANEY
ARCHITECTURE INTERIOR DESIGN

302 NORTH INDEPENDENCE SUITE 206 ENID,OK 73703 PH: (580)233-2362 FAX: (580)233-2363 WWW.CORBINMERZ.COM

DATE ISSUED:
JANUARY 8, 2024

SECTION 000110
TABLE OF CONTENTS

2.07 DIVISION 08 -- OPENINGS

A. 081113 - Hollow Metal Doors and Frames
B. 081416 - Flush Wood Doors
C. 083613 - Sectional Doors
D. 084313 - Aluminum-Framed Storefronts
E. 087100 - Door Hardware
F. 088000 - Glazing
G. 088300 - Mirrors

2.08 DIVISION 09 -- FINISHES

A. 092116 - Gypsum Board Assemblies
B. 093000 - Tiling
C. 095100 - Acoustical Ceilings
D. 099113 - Exterior Painting
E. 099123 - Interior Painting
F. 099300 - Staining and Transparent Finishing

2.09 DIVISION 10 -- SPECIALTIES

A. 101416 - Plaques
B. 101419 - Dimensional Letter Signage
C. 101423 - Panel Signage
D. 102113.19 - Plastic Toilet Compartments
E. 102800 - Toilet, Bath, and Laundry Accessories
F. 104400 - Fire Protection Specialties
G. 107500 - Flagpoles

2.10 DIVISION 12 -- FURNISHINGS

A. 123600 - Countertops

2.11 DIVISION 13 -- SPECIAL CONSTRUCTION

A. 133419 - Metal Building Systems

2.12 DIVISION 15 -- MECHANICAL (REFER TO MECHANICAL DRAWINGS FOR SPECIFICATIONS)

2.13 DIVISION 16 -- ELECTRICAL (REFER TO ELECTRICAL DRAWINGS FOR SPECIFICATIONS)

2.14 DIVISION 21 -- FIRE SUPPRESSION

A. Entry riser location is shown on plans. Fire suppression system is to meet all applicable fire system requirements of NFPA 13 except as provided in SECTIONS 903.3.1.1.1 and 903.3.1.1.2 of IBC 2018

2.15 DIVISION 22 -- PLUMBING (REFER TO PLUMBING PLANS FOR SPECIFICATIONS)

2.16 DIVISION 31 -- EARTHWORK

A. 311000 - Site Clearing
B. 312200 - Grading
C. 312316 - Excavation
D. 312316.13 - Trenching
E. 312323 - Fill
F. 313116 - Termite Control

2.17 DIVISION 32 -- EXTERIOR IMPROVEMENTS

A. 323113 - Chain Link Fences and Gates
B. 329223 - Sodding

END OF SECTION

SECTION 001113
ADVERTISEMENT FOR BIDS

PART 1 PROJECT INFORMATION

1.01 PROJECT

A. Kingfisher County Extension Office 2023 Architect Project Number (2023 KCEO)

1.02 OWNER

A. Kingfisher County Commissioners
B. 101 South Main Street
C. Suite 9
D. Kingfisher, OK 73750

1.03 ARCHITECT

A. Corbin, Merz, & Haney Architects, Inc.
B. 302 North Independence, Suite 206
C. Enid, Oklahoma 73701
D. Contact: Ken Corbin AIA; e-mail--- ken@corbinmerzhaney.com

1.04 STRUCTURAL AND CIVIL ENGINEER

A. Holtzen Engineering Group
B. 302 North Independence, Suite 1100
C. Enid, OK 73701
D. Contact: Scott Holtzen; seh@holtzenengineering.com

1.05 MECHANICAL AND ELECTRICAL ENGINEER

A. Integrated Consulting Engineers, Inc.
B. 349 South Hydraulic
C. Wichita, KS 67211
D. Electrical Contact: Drew Rose; drose@iconengineers.net
E. Mechanical Contact: Joey Hrenchir; jhrenchir@iconengineers.net

1.06 TO: POTENTIAL BIDDERS

A. Refer to the attached Sections 0012113 Advertisement to Bidders, Section 002113 Instructions to Bidders, & Section 004100 Bid Form

1.07 BIDDING SCHEDULE

A. The following dates shall apply to the Bid:
   1. Plans available to General Contractors----January 8th, 2024, 8:00 a.m.
      a. Hard copy of construction documents will be available from Architect upon deposit of $150 per set
      b. Digital copy will be available at construction news services . see Section 002113, Part 2.04, Examination , Item B
   2. A non- mandatory pre bid will be held at the project location (Kingfisher County Fairgrounds) at 2:00 p.m. January 24th, 2024
   3. Sealed bids are due at Offices of Owner, Kingfisher County Commissioners, at 4:00 p.m. February 2nd, 2024. Bidding is closed at this time
   4. Sealed bids will be publicly opened ot Offices of Owner, Kingfisher County Commissioners, at 9:00 a.m. February 5th, 2024.
   5. Deadline for submitting questions or substitution requests: January 26th, 2024
   6. Final issue date for Addenda: January 30th, 2024

FROM

2.01 THE OWNER (HEREINAFTER REFERRED TO AS OWNER):

A. Kingfisher County Commissioners

B. Address:
101 South Main Street
Suite 9
Kingfisher , Oklahoma, 73750

C. Project Location:
1. Kingfisher County Fairgrounds, 300 South 13th Street, KIngfisher Oklahoma, 73750

2.02 AND THE ARCHITECT (HEREINAFTER REFERRED TO AS ARCHITECT):

A. Corbin Merz Haney Architecture and Interior Design

B. Address:
302 North Independence Street
Enid, Oklahoma 73750

2.03 DATE: JANUARY 8, 2024

2.04 TO: POTENTIAL BIDDERS

A. Your firm is invited to submit an offer under seal to for construction of a facility located at the project location. See attached bidding schedule and project location.

B. Architect's Project 2023 KCEO: Design Professional's Project Number.

C. Documents may be obtained only by General Contract Bidders. Others may view the Bid Documents at the construction news services or at the office of the Architect

D. Bidders will be required to provide Bid security in the form of a Bid Bond of a sum no less than 5 percent of the Bid Amount.

E. Refer to other bidding requirements described in Document 002113 - Instructions to Bidders and Document 003100 - Available Project Information.

F. Submit your offer on the Bid Form provided. Bidders may supplement this form as appropriate.

G. Your offer will be required to be submitted under a condition of irrevocability for a period of 30 days after submission.

H. The Owner reserves the right to accept or reject any or all offers.

2.05 SIGNATURE

A. The KIngfisher County Commissioners

B. By Heath Dobrovolny

END OF SECTION

SECTION 002113
INSTRUCTIONS TO BIDDERS

INVITATION

1.01 BID SUBMISSION

A. Bids signed and under seal, executed, and dated will be received at the office of the Kingfisher County Commissioners at 101 South Main Street, Suite 9, Kingfisher Oklahoma, 73750 before 4:00 p.m. local standard time on February 2nd, 2024.

B. Offers submitted after the above time will be returned to the bidder unopened.

C. Offers will be opened at 9:00 a.m. on the 5th day of 2024, at the office of the Kingfsiher County Commissioners at 101 South Main Street, Suite 9. Kingfisher Oklahoma 73750.

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A. Identify Contract Time in the Bid Form. The completion date in the Agreement shall be the Contract Time added to the commencement date.

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   1. Architect may approve the proposed substitution and will issue an Addendum to known bidders.

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A. Examine the project site before submitting a bid.

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A. The Bid Form shall be signed by the bidder, as follows:
   1. Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature. Affix seal.
   2. Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word "Partner" under each signature. Affix seal to each signature.

3. Corporation: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. Affix the corporate seal. If the bid is signed by officials other than the president and secretary of the company, or the president/secretary/treasurer of the company, a copy of the by-law resolution of their board of directors authorizing them to do so, must also be submitted with the Bid Form in the bid envelope.
4. Joint Venture: Each party of the joint venture shall execute the Bid Form under their respective seals in a manner appropriate to such party as described above, similar to the requirements of a Partnership.

6.08 SELECTION AND AWARD OF ALTERNATES

A. Indicate variation of bid price for Alternates listed on the Bid Form. Unless otherwise indicated, indicate Alternates as a difference in bid price by adding to or deducting from the base bid price.

OFFER ACCEPTANCE/REJECTION

7.01 DURATION OF OFFER

A. Bids shall remain open to acceptance and shall be irrevocable for a period of thirty (30) days after the bid closing date.

7.02 ACCEPTANCE OF OFFER

A. Owner reserves the right to accept or reject any or all offers.

B. After acceptance by Owner, Architect on behalf of Owner, will issue to the successful bidder, a written Notice To Proceed.

END OF SECTION

SECTION 003100
AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.01 EXISTING CONDITIONS

A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders and will be part of Contract Documents, as follows:

B. Site Topographic Survey: Entitled Topographic Survey Kingfisher County Extension Office, 300 South 13th Street, Part of NE/4, Section 21, T16N, R7W, 1 , M , Kingfisher , KIngfisher County, Oklahoma , dated 9/08/2023.

C. Geotechnical Report: Entitled Report of Subsurface Exploration, Foundation, and Paving Recommendations for Kingfisher County Extension Office 2023, Kingfisher Oklahoma as prepared by Burgess Engineering and Testing, dated October ??, 2023.
   1. The Report is attached at the end of this Section.
   2. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect.
   3. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in Contract Documents.
   4. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to Owner.

D. Drainage Study

END OF SECTION

S. 13TH ST.
METAL BUILDING
RAISED METAL BLDG. ON CONC. BLOCKS
FIN. FLOOR EL=1059.52
12" CULVERT NFL=1054.94 SFL=1054.91
33' STATUTORY RIGHT-OF-WAY
"NO PARKING" SIGN.
"4H" SIGN.
water meter
PIPE FENCE
FIBER OPTIC CABLE WARNING SIGN.
FIBER OPTIC BOX
? GAS METER HOOK-UP ?
light pole+em
light pole+siren
elec meter
ASPHALT
CONCRETE
GRAVEL
30" locust
28" locust
24" tree (dead)
18" elm
BENCHMARK No. 1–
Top of top bolt on Fire Hydrant.
Elev.=1060.61 (NAVD88)
EAST LINE NE/4 SEC. 24, T18N, R7W, I.M.
S00°28'28"E

BURGESS ENGINEERING AND TESTING

November 13, 2023

Holtzen Engineering Group
302 N. Independence Ste. 1100
Enid, OK 73701

Attention: Scott E. Holtzen, P.E., S.E.
President

Re: Report of Subsurface Exploration, Foundation
And Pavement Recommendations for
Kingfisher County Extension Office
At 300 S. 13th Street
Kingfisher, Oklahoma
Project No.: 731-23119

Dear Mr. Holtzen:

Burgess Engineering and Testing (BET) is pleased to submit this report of subsurface exploration for the above referenced project. Contained in this presentation are the results of the exploration and recommendations concerning the design and construction of the foundations, pavement and general site development.

We appreciate the opportunity to have provided you with our geotechnical engineering services, and look forward to working with you during the construction phase of this project. If you have any questions concerning this report or if we may be of further service in any manner please contact our office.

Respectfully,
Burgess Engineering And Testing

Abdelfatah Ali, Ph.D.
Project Manager

Ali H. Ebrahimi, Ph.D. P.E.
Manager

LICENSED PROFESSIONAL ENGINEER
ALI HONARNMAND-EBRAHIMI
16029
OKLAHOMA

AKA/ns

REPORT OF SUBSURFACE EXPLORATION, FOUNDATION
AND PAVEMENT RECOMMENDATIONS

KINGFISHER COUNTY EXTENSION OFFICE
AT 300 S. 13TH STREET
KINGFISHER, OKLAHOMA
PROJECT NO.: 731-23119

PREPARED FOR

HOLTZEN ENGINEERING GROUP
302 N. INDEPENDENCE STE. 1100
ENID, OK 73701

NOVEMBER 13, 2023

BY

BURGESS ENGINEERING AND TESTING
809 NW 34TH STREET
MOORE, OKLAHOMA 73160

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APPENDIX

1.0 INTRODUCTION AND RECOMMENDATION SUMMARY

1.1 Project Authorization

Burgess Engineering And Testing has completed a subsurface exploration and evaluation of foundation and pavement conditions for the Kingfisher County Extension Office, located at 300 S. 13th Street, in Kingfisher, Oklahoma. The work was authorized by Mr. Scott Holtzen, P.E., S.E. , President of Holtzen Engineering Group, and was performed in accordance with the BET proposal number 23273.

The purpose of this study was to explore the subsurface conditions at the site to facilitate the evaluation of possible foundation and pavement systems for the proposed project. This report briefly outlines the testing procedures, describes the site and subsurface conditions, and discusses the foundation and pavement recommendations.

The scope of services did not include any environmental assessment for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, ground water, or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors, colors, unusual or suspicious items or conditions are strictly for the information of the client.

1.2 Recommendation Summary

As requested, four (4) test borings were drilled in the area of the proposed project at locations specified by Holtzen Engineering Group. Borings' locations, numbers and their respective depths are presented in the following table:

Location	Boring Number	G.P.S.	Depth (ft)
New Office Building (5,000 Sq. Ft.) And Pavement	B-1	35.855420°, -97.942246°	20
	B-2	35.855507°, -97.942349°	20
	B-3	35.855612°, -97.942125°	20
	B-4	35.855700°, -97.942233°	20

Results from the test borings indicate the presence of medium plastic lean clay overlaying bedrock at the site. Bedrock consisting of weathered shale and shale was encountered at different elevations throughout the site. Water level observations were made during the field operations and are noted on the Log of Borings. At the completion of drilling, no groundwater was encountered within the test borings. The depths of bedrock of the test borings are presented in the following table:

Bore No.	Weathered Shale Depth (ft)	Shale Depth (ft)
B-1	-	2
B-2	2	5
B-3	2	10
B-4	-	5

A detailed report of subsurface conditions is presented in the attached Appendix "A" on the log of boring. Conditions that might affect the construction of the proposed facilities include:

1. In order to minimize the differential settlement, the footings are recommended to be supported on similar material.
2. Due to the presence of bedrock near the surface, more difficult excavation should be anticipated during the construction of the project. Additionally, due to the close proximity of bedrock to the ground surface, there is the probability of perched water table or springs at the site. Positive drainage should be provided to direct the runoff water away from the foundations.
3. Based on the field exploration, and review of the Google aerial photos, it appears that part of the new building will be constructed over demolished buildings. Although, construction debris was not encountered during the subsurface exploration, the excavation at the site during the construction phase may encounter basement, old foundation or septic tanks. If these structures are encountered, they should be removed and backfilled with structural fill materials. The structural fill materials should be compacted to ninety-right (98) percent of the maximum density as determined by Standard Proctor test in the building foot print areas, or ninety-five (95) percent of the maximum dry density as determined by Standard Proctor test in the other areas.

The recommended foundation systems for the proposed facilities are spread footings for building's columns and continuous footings for walls with conventional floor slabs. The recommended bearing capacities for the foundation systems are presented in the following table:

Foundation Type	Bearing Capacity Recommendation	Estimated Settlement
Spread Footings Supported on Properly Prepared Existing Subgrade	2,200 psf	1 inch
Continuous Footings Supported on Properly Prepared Existing Subgrade	1,540 psf	1 inch

Detailed analyses of subsurface conditions, and pertinent design recommendations for the construction of foundations are included herein. The final decision regarding which foundation type will be used should be based on the design parameters given, cost, risk of foundation movement, and other factors beyond the scope of this study.

Burgess Engineering and Testing cannot be responsible for the interpretation or implementation of this report by others. Burgess Engineering and Testing should be retained to perform services sufficient to determine compliance with its recommendations. If Burgess Engineering and Testing is not so retained, it will not accept any responsibility for the difficulties encountered during the construction or performance of the structure.

2.0 TESTING PROCEDURES

2.1 Field Operations

As requested, four (4) test borings were drilled in the area of the proposed project at locations specified by Holtzen Engineering Group. Borings' locations, numbers and their respective depths are presented in the following table:

Location	Boring Number	G.P.S.	Depth (ft)
New Office Building (5,000 Sq. Ft.) And Pavement	B-1	35.855420°, -97.942246°	20
	B-2	35.855507°, -97.942349°	20
	B-3	35.855612°, -97.942125°	20
	B-4	35.855700°, -97.942233°	20

Borings' locations are presented on the attached Boring Location Diagram presented in Appendix "A." The test borings were located by the client and drilled in field by BET personnel by providing G.P.S. coordinates of the test borings at locations. The elevations of the test borings will be determined by others during the design phase of the project.

The borings were advanced into the ground using hollow stem augers. At regular intervals throughout the boring depths, soil samples were obtained with a 1.4 inch I.D., and 2.0 inch O.D., split spoon sampler. When using the split spoon sampler, the sampler was first seated six (6) inches to penetrate any loose cuttings and then driven an additional foot with blows from a 140-pound hammer falling (30) inches. The number of hammer blows required to drive the sampler each six (6) inch increments are recorded in the field.

The penetration resistance, "N-value," is designated as the number of hammer blows required to drive the sampler the final one (1) foot. When properly evaluated, it is an indication of relative density for sands and to a lesser degree an index to cohesion for clays. The split spoon sampling procedures used during this exploration are in basic accordance with ASTM Designation D 1586. Split spoon samples are suitable for visual examination and classification tests, but generally are not sufficiently intact for quantitative laboratory Testing.

Records of subsurface exploration (Logs of Boring) containing soil descriptions, stratifications, penetration resistance, locations of the split spoon, and ground water levels are presented in Appendix "A." The stratifications shown on the boring logs represent the soil conditions at the actual boring locations. Variations may occur between borings. Lines of demarcation represent the approximate boundary between the soil types; however, the transition may be gradual.

2.2 Laboratory Testing

The soil samples obtained during the field exploration were transported to the laboratory and examined by a soil engineer. By visual inspection soil samples were approximately classified using the Unified Soil Classifications System (USCS).

Laboratory tests were performed on representative samples of the subsurface soils in substantial accordance with the applicable ASTM Designations or with other commonly accepted laboratory practice. The laboratory testing schedule included determination of the soils' natural moisture contents (ASTM D2216), Atterberg limits values (ASTM D4318), and grain size distributions (ASTM D421 and ASTM D422). These test results are presented in Appendix "B."

Samples not altered by laboratory testing will be retained at our office for sixty (60) days from the date of this report and then discarded unless we are otherwise instructed.

3.0 SITE AND SUBSURFACE CONDITION

3.1 Site Description and Subsurface Conditions

The proposed project is located at 300 S. 13th Street, in Kingfisher, Oklahoma. The surrounding area is developed with commercial and residential buildings. At the time of field exploration, the surficial soils were firm and the truck-mounted drilling rig encountered no difficulty moving about the site.

The subsurface conditions encountered at each boring location are indicated on the Log of Boring in Appendix "A." The stratification boundaries shown on the Log of Boring represent the approximate location of changes in geological material. The transition between material types may be gradual. For detailed information regarding test results at specific depths refer to Log of Boring and Summary of

Laboratory Test Results in Appendices "A" and "B," respectively.

3.2 Ground Water Conditions

Water level observations were made during the field operations and are noted on the Log of Borings. At the completion of drilling, no groundwater was encountered within the test borings.

In relatively impervious soils, the accurate determination of the groundwater elevation may not be possible even after several days of observation. However, in relatively pervious soils, such as sandy soils, the indicated elevations are considered reliable groundwater levels. Seasonal variations, temperature and recent rainfall conditions may influence the levels of the groundwater table and volumes of water will depend on the permeability of the soils.

4.0 STRUCTURAL INFORMATION

Limited structural information is available to us at this time. Based on the information provided by Mr. Scott Holtzen, P.E., S.E. , President of Holtzen Engineering Group, the proposed project will consists of constructing a new office building (5,000 sq. ft.) that is a PEMB with assumed column loads of 10 to 30 kips and continuous wall loads of less than 1 kip/ft for the Kingfisher County Extension Office, located at 300 S. 13th Street, in Kingfisher, Oklahoma. Relatively light structural loading is anticipated for this project.

Since a detailed grading plan has not been furnished, the amount of cuts and fills in the building areas is assumed to be limited to two (2) feet, to achieve the final grades. If the initial design parameters should change or be in error, it should be brought to our attention so that we may review the applicability of the recommendations made in this report.

5.0 FOUNDATION RECOMMENDATIONS

5.1 Discussion

The bearing capacity of the existing naturally occurring soils were evaluated based on the results of Standard Penetration Tests (SPT), Atterberg limits tests, and Unified Soil Classifications System (USCS). These test results suggest that the existing soils have medium bearing capacity with respect to shear strength, and medium expansion and shrinkage potential. In order to minimize the differential settlement, the footings are recommended to be supported on similar material. Due to the presence of bedrock near the surface, more difficult excavation should be anticipated during the construction of the project. Additionally, due to the close proximity of bedrock to the ground surface, there is the probability of perched water table or springs at the site. Positive drainage should be provided to direct the runoff water away from the foundations. Based on the field exploration, and review of the Google aerial photos, it appears that part of the new building will

be constructed over demolished buildings. Although, construction debris was not encountered during the subsurface exploration, the excavation at the site during the construction phase may encounter basement, old foundation or septic tanks. If these structures are encountered, they should be removed and backfilled with structural fill materials. The structural fill materials should be compacted to ninety-right (98) percent of the maximum density as determined by Standard Proctor test in the building foot print areas, or ninety-five (95) percent of the maximum dry density as determined by Standard Proctor test in the other areas.

The geologic materials at the site are classified as **Cedar Hills Unit (Pch)**, based on the Engineering Classification of Geological Materials for Kingfisher County, Division Four. Cedar Hills Unit "consists of predominantly reddish-brown silty, blocky shale and some massive, orange, silty sandstone and siltstone beds. A massive, orange, fine-grained sandstone about three feet thick, which weathers to a dark red and forms vertical cliffs along creeks, marks the base of the unit. The top of the unit is a greenish-gray siltstone bed about sixteen inches thick which serves as a good marker bed." A detail geological statement of the **Cedar Hills Unit (Pch)** is presented in Appendix "B."

The recommended foundation systems for the proposed facilities are spread footings for building's columns and continuous footings for walls with conventional floor slabs. The final selection of foundation type and depth should be based on the following criteria:

(1) The soils' properties including the strength properties, the expansive characteristics, and the settlement potential of subsurface materials; (2) the magnitude of structural loads; and (3) the design and economics. In the following sections each recommended foundation system is addressed with respect to the above criteria.

5.2 Conventional Spread and Continuous Wall Footings

The subsurface conditions encountered in the borings for the proposed project are adequate for shallow foundation. Spread footings for building columns and continuous footings for walls supported on properly prepared existing subgrade should be designed for maximum net allowable soil bearing pressures of 2,200 psf and 1,540 psf, respectively, based on dead loads plus design lives loads.

The settlement is expected to be limited to less than one (1) inch. The maximum differential settlement should be less than 0.5 inches. Minimum foundation widths for column footings should be twenty-four (24) inches and eighteen (18) inches for strip footings, despite any reduction in bearing pressure. The bottom of all footings and grade walls should be placed at least twenty-four (24) inches below the lowest adjacent final outside grades to resist frost penetration. To reduce any differential settlement, it is imperative to ensure that all the shallow foundations are constructed on similar materials.

The properties in the following table may be used to determine the sliding coefficient and lateral pressure at the footings and concrete interface.

Soil Parameters	Existing Soil
Wet Unit Weight (pcf)	110
Internal Friction Angle (φ)	17°
K_0	0.70
K_a	0.54
K_p	1.82
Interface Materials Friction Factor	0.30

Where K_o= Coefficient of at-rest earth pressure
K_a= Coefficient of active earth pressure
K_p= Coefficient of passive earth pressure
A safety factor of one and one half (1.5) should be used against foundation sliding.

Unsuitable bearing material when encountered in the foundation excavation should be removed and replaced with concrete (compressive strength of at least 1,000 psi). Extreme care should be taken to prevent the weakening of the foundation bearing materials due to prolonged atmospheric exposure, construction activity disturbance, or an increase in moisture content. To reduce the effect of differential movement that may occur due to variations in properties of supporting soils or in seasonal moisture contents, it is recommended that all continuous footings be suitably reinforced.

5.3 Conventional Floor Slab

A floor slab supported on properly prepared existing soil may be used for the proposed facility. Proof-rolling and visual inspection, as discussed later in this report, may be required to aid in identifying any soils that should be removed from the slab areas before slab construction.

The floor slab should be constructed on a compacted six-inch thick aggregate base placed on top of the existing soils. These aggregate base materials should be gravel, free of sharp corners or edges, natural stone, washed, free of clay, shale, organic matter, and with 1/4 inch minimum size, and 5/8 inch maximum size. Burgess Engineering and Testing recommends the placement of a vapor barrier of polyethylene sheeting. The location of the vapor barrier should be determined in accordance with the flow chart presented in ACI committee report 302.1R-015 or other current ACI reports. Adequate reinforcement and construction joints should be provided to limit cracking of the floor slab resulting from any differential movement or shrinkage. Where practical, the floor slab should not be rigidly connected to columns, walls, or foundations. Furthermore, consideration should be given to providing movement flexibility in the utility system of the

structure. Proof-rolling and visual inspection, as discussed later in this report, may be required to aid in identifying any soils that should be removed from the slab areas before fill placement and/or floor slab construction.

5.4 Seismic Information

Based on the International Building Code (IBC 2018), the site is classified as Site Class C. There is no slope instability, liquefaction, or surface displacements associated with faulting or seismically induced lateral flow. According to USGS for ground shaking intensity, the Modified mercalli Intensity for the area in question is within zone V or greater. The area is not subject to the New Madrid Fault Line.

6.0 PAVEMENT RECOMMENDATIONS

6.1 Design Considerations

A satisfactory pavement can be constructed on a properly prepared base. We have used the results of the test borings for the pavement design. Based on these tests, the type of pavement for the new paving is presented for the site:

1- Light Duty Asphaltic Concrete or Portland Cement Pavement (LD) for parking lots

2- Heavy Duty Asphaltic Concrete or Portland Cement Pavement (HD) for the approach to the site and dumpster pads.

Assumed Average Daily Traffic (ADT) for light and heavy duties are presented in the following table:

Axle Type	Number of Vehicles	
	Light Duty	Heavy Duty
Passenger Car	200	200
Delivery, Buses, 1 Axle	4	30
Delivery, Trash Trucks, 2 Axle	2	3
Delivery Trucks, 3 Axle	1	2

Should the assumed average daily traffic value be in error, please contact this office so that the pavement design recommendations can be re-evaluated.

The pavement section thicknesses reported herein are based on CBR value of 3.0. This CBR value should be confirmed by performing a field CBR or DCP test after the construction of the fill. We have assumed that any soft or loose surficial soils will be undercut to the level of firm to stiff soils and backfilled with adequately compacted structural fills. Additionally, the pavement recommendations are based on the

following parameters:

Light Duty Pavement (LD)

Pavement Type	Design Life (Years)	Terminal Serviceability	Reliability	ESAL
Asphaltic Concrete Pavements	20	2.5	80%	134,259
Portland Cement Pavements	20	2.5	80%	144,657

Heavy Duty Pavement (HD)

Pavement Type	Design Life (Years)	Terminal Serviceability	Reliability	ESAL
Asphaltic Concrete Pavements	20	2.5	80%	714,972
Portland Cement Pavements	20	2.5	80%	792,056

Should the assumed average daily traffic value be in error, please contact this office so that the pavement design recommendations can be re-evaluated.

6.2 Asphalt Pavement Recommendations

Based on the laboratory and field data, the recommended pavement sections are presented in the following tables:

Light Duty Asphaltic Concrete Pavement (LD Asphalt)

ASPHALTIC CONCRETE PAVEMENT	
TYPE	THICKNESS (IN)
Asphaltic Concrete Pavement	2" Type "S4" Surface Course
	3" Type "S3" Base Course
ODOT Non-recycled Aggregate Base Type "A"	6"

Heavy Duty Asphaltic Concrete Pavement (HD Asphalt)

ASPHALTIC CONCRETE PAVEMENT	
TYPE	THICKNESS (IN)
Asphaltic Concrete Pavement	2" Type "S4" Surface Course
	5" Type "S3" Base Course
ODOT Non-recycled Aggregate Base Type "A"	6"

The pavement should be placed on six (6) inches of adequately compacted ODOT non-recycled aggregate base type "A". Since the pavement serves as a parking lot mostly, proper asphalt cement type should be selected to reduce the damage of the load to the pavement. The grade shall be as smooth as practical and free of debris. The asphaltic concrete materials and construction methods should conform to ODOT Standard Specifications 2009.

6.3 Portland Cement Concrete Pavements

As an alternative to asphalt pavements, concrete may be used for this project. Based on the laboratory and field data, the recommended pavement sections are presented in the following tables:

Light Duty Portland Cement Pavement (LD Concrete)

PORTLAND CEMENT CONCRETE PAVEMENT	
TYPE	**THICKNESS**
Portland Cement Concrete Pavement	5"
ODOT Non-recycled Aggregate Base Type "A"	6"

Heavy Duty Portland Cement Pavement (HD Concrete)

PORTLAND CEMENT CONCRETE PAVEMENT	
TYPE	**THICKNESS**
Portland Cement Concrete Pavement	7"
ODOT Non-recycled Aggregate Base Type "A"	6"

This design requires the subgrade soils to be adequately compacted six (6) inches of ODOT non-recycled aggregate base type "A." The grade shall be as smooth as practical and free of debris.

We recommend that the pavements should have sufficient joints to control cracking. The joints should be properly sealed and maintained to prevent entry of moisture. Concrete joint patterns, slab reinforcements, and surface drainage should be designed by a structural engineer. If concrete is placed during cold weather, it should be protected from freezing during the first seven (7) days after placement. It should be noted that Continuously Reinforced Concrete Pavement (CRCP) should be considered for pavement sections ranging from seven (7) to thirteen (13) inches thick.

The concrete mix should be designed by a qualified engineer following the Portland Cement Association (PCA) and American Concrete Institute (ACI) recommendations for pavements. It is important that the concrete have a low water to cement ratio and that the concrete is placed at a relatively low slump. The pavement thickness recommendations assume that the concrete will have a minimum modules of rupture

of 600 psi and a 28-day compressive strength of at least 4,000 psi. Air entrainment of five (5) percent plus or minus one (1) percent should be used for the concrete pavement.

The subgrade should be as uniform as possible and shaped so that the finished pavement will be the required thickness throughout.

7.0 CONSTRUCTION CONSIDERATIONS

7.1 Site Preparation and Fill Requirements

For footings construction, we recommend that all topsoil, vegetation, roots, pavement and any soft soils in the addition area be stripped from the site and either wasted or stockpiled for later use in landscaping. Utilities should be located and rerouted as necessary.

After stripping, undercutting and before fill placement, the buildings' areas should be proof-rolled with a moderately heavy loaded pneumatic-tired vehicle such as a twenty (20) to twenty-five (25) ton dump truck or scraper. Soils that are observed to rut or deflect excessively under the moving loads should be undercut and replaced with properly compacted fills. All proof-rolling and undercutting activities should be witnessed by the Burgess Engineering and Testing and should be performed during a period of dry weather.

After stripping, excavating, and proof-rolling but before placing the fill, the exposed soils should be scarified and then processed at an optimum moisture content within three (3) percentage points above as determined by the Standard Proctor test. The subgrade soils should be recompacted to a dry density of at least ninety-five (95) percent of the Standard Proctor maximum dry density for a depth of at least six (6) inches below the surface.

After subgrade preparation and inspection have been completed, fill placement may begin. Structural fill materials used should be free of organic or other deleterious matters, have a maximum particle size of three (3) inches, and have a liquid limit less than thirty-five (35) and a plasticity index between five (5) and fifteen (15) and consist of sandy clays or clayey sands. Relatively clean sands are not recommended for use as structural fill in the building areas. Fine grained (silt or clay) soil used for the fill will require very close moisture content control to achieve the recommended degree of compaction. The fill should be placed in maximum lifts of nine (9) inches of loose material and should be compacted within the range of three (3) percentage points the optimum moisture content value as determined by the Standard Proctor test. Added water should be uniformly applied and thoroughly mixed into the soil by disking or scarifying. Fine-grained structural fills should be compacted to at least ninety-eight (98) percent of the soils Standard Proctor maximum dry density as determined by ASTM Designation D698 in the building areas. For all other areas,

fine-grained structural fills should be compacted to at least ninety-five (95) percent of the soils Standard Proctor maximum dry density as determined by ASTM Designation D698.

Each lift of compacted soil should be tested and approved by the Burgess Engineering and Testing prior to placement of subsequent lifts. As a guideline, it is recommended that field density tests be taken at a frequency of not less than one test per 1,000 or 5,000 square feet of surface area per lift of the fill in the building or pavement areas, respectively.

7.2 Stabilization Agent

A proper mix design should be determined prior to any soil stabilization. The mix design should also include testing the soil samples for soluble sulfates according to OHD L-49 to ensure the compatibility between the soil and the stabilizing agent.

7.3 Excavations

After excavating, footings should be inspected and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. If it is required that footing excavations be left open for more than one (1) day, they should be protected to reduce evaporation or entry of soil moisture. Adequate protection against sloughing of soil should be provided for workers and inspectors entering the footing excavations and undercut areas. This protection should meet the requirements of OSHA and applicable building codes.

7.4 Drainage

Water should not be allowed to collect near the foundations or floor slab areas of the buildings either during or after construction. Undercut or excavated areas should be sloping toward one corner to facilitate removal of any collected ground water or surface run-off. Proper drainage should be provided by sloping the ground surface away from the structures. Splash blocks may be helpful in directing water away from the foundations.

7.5 Weather Considerations

The upper fine-grained soils encountered at this site are expected to be relatively sensitive to disturbances caused by construction traffic and to changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils that become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather. Earthwork activities performed during wetter months will be more problematic than if performed during warmer, drier climatic periods.

8.0 GENERAL COMMENTS

The exploration and analysis of the foundations conditions reported herein are considered in sufficient detail and scope to form a reasonable basis for the foundation design. The recommendations submitted are based on the information provided by Mr. Scott Holtzen, P.E., S.E., President of Holtzen Engineering Group, for the proposed project. Burgess Engineering and Testing should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Burgess Engineering and Testing should also be retained to provide testing and observation during excavation, grading, foundation and construction phases of the project. Any revision of the plans for the proposed facility from those enumerated in this report should be brought to the attention of our geotechnical engineer in writing so that he may determine if changes in the foundation recommendations are required. If deviations from the noted subsurface conditions are encountered during construction, they should also be brought to the attention of the geotechnical engineer.

Burgess Engineering and Testing cannot be responsible for the interpretation or implementation of this report by others. Burgess Engineering and Testing should be retained to perform services sufficient to determine compliance with its recommendations. If Burgess Engineering and Testing is not so retained, it will not accept any responsibility. The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made after being prepared according to the generally accepted professional engineering practice in the fields of foundation and pavement engineering, soil mechanics, and engineering geology. No other warranties are implied or expressed. After the plans and specifications are complete, it is recommended that the geotechnical engineer be provided the opportunity to review the final design and specifications so that earthwork and foundation recommendations may be properly interpreted and implemented. At this time, it may be necessary to submit supplementary recommendations.

This report has been prepared for the exclusive use of Holtzen Engineering Group, for the specific application to the Kingfisher County Extension Office, located at 300 S. 13th Street, in Kingfisher, Oklahoma.

Respectfully,
Burgess Engineering and Testing

Abdelfatah Ali, Ph.D.
Project Manager

AKA/ns

Ali H. Ebrahimi, Ph.D., P.E.
Manager

APPENDIX A

BORING LOCATION DIAGRAM
BET PROJECT NO.: 731-23119

KINGFISHER COUNTY EXTENSION OFFICE
AT 300 S. 13TH STREET
KINGFISHER, OKLAHOMA

BURGESS ENGINEERING AND TESTING

GENERAL NOTES

DRILLING AND SAMPLING SYMBOLS

AB: After Boring
ACR: After Cassing Removal
AS: Auger Sample
BCR: Before Cassing Removal
CB: Carbide Bit
DB: Diamond Bit
DCI: Dry Cave In
HA: Hand Auger
HS: Hollow Stem Auger
PA: Power Auger
RB: Rock Bit
SS: Split Spoon 1 3/8" I.D., 2" OD
SH: California Sampler
ST: Shelby Tube 3" O.D.
TC: Texas Cone 3"
WB: Wash Boring
WCI: Wet Cave In
WD: While Drilling
WS: Washed Sample
WS: Washed Sample

RELATIVE DENSITY OF COHESIONLESS (SANDY & SILTY) SOILS

DESCRIPTION	SPLIT SPOON "N" BLOWS PER FOOT
Very Loose	0- 4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	>50

CONSISTENCY OF COHESIVE (CLAYEY) SOILS

DESCRIPTION	UNCONFINED COMPRESSION, PSF	PLASTICITY INDEX (PI)	DESCRIPTION
Very Soft	0-500	0	Non plastic
Soft	500-1,000	1-5	Slightly plastic
Medium Stiff	1,000-2,000	5-10	Low plasticity
Stiff	2,000-4,000	10-20	Medium plasticity
Very Stiff	4,000-8,000	20-40	High plasticity
Hard	>8,000	>40	Very high plasticity

ROCK STRENGTH CLASSIFICATION

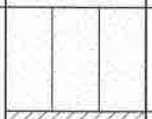
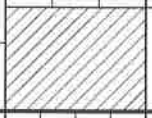
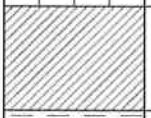
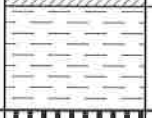
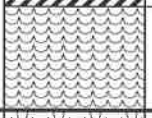
DESCRIPTION	APPROX. RANGE OF UNIAXIAL COMPRESSIVE STRENGTH, PSF
Extremely weak rock	8,000-20,000
Very weak rock	20,000-100,000
Weak rock	100,000-500,000
Medium strong rock	500,000-1,000,000
Strong rock	1,000,000-2,000,000
Very strong rock	2,000,000-5,000,000
Extremely strong rock	>5,000,000

Rock strength classification is not an indication of the Rippability

PARTICLE SIZE DESCRIPTION

Boulder	>12"	
Cobbles	>3" and <12"	
Gravel	<3" and >0.19"	3" to #4 sieve
Sand	<0.19" and >0.0030"	#4 to #200 sieve
Silt and clay	<.0030"	Passing #200 sieve

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

USCS_LEGEND 4/10/07

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

BURGESS ENGINEERING AND TESTING, INC.
LOG OF BORING B-1

Project Name: Kingfisher County Extension Office
Project Number: 731-23119
Site: at 300 S. 13th St., Kingfisher, Oklahoma
Architect/Engineer: Holtzen Engineering Group
Drilling Method: Hollow Stem Auger (CME 55HT)
Date Drilled: 10-9-2023
Elevation:
Water Level: Dry at completion of drilling
Remarks: G.P.S.: 35.855420, -97.942246

LITHOLOGY	DESCRIPTION	DEPTH (FT.)	SAMPLE TYPE	RECOVERY INCHES	BLOWS/FT.	MOISTURE, %	DRY DENSITY PCF	UNCONFINED STRENGTH PSF	REMARKS
	Approximately 8 to 9 inches of topsoil and grass	0							
	Light brown lean clay, damp (CL)								
	Bright brown to reddish brown shale, damp to moist, very weak rock		SS	6	50/6.0"	7.1			
		3.5	SS	18	50/6.0"	12.4			LL=32:PI=15 -#200=95.9%
		7							
		10.5	SS	11	50/5.0"	11.2			
		14							
			SS	18	50/6.0"	12.3			
		17.5							
			SS	4	50/4.0"				
	Test hole terminated at 20.3 feet	21							
		24.5							

Note: This boring log is based on field classification and visual soil description and is further modified to include results of laboratory clasification tests, where available. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented are a simplification of the actual conditions encountered. Lithologic patterns are generalizations and necessarily imprecise. Lithologic contacts indicated represent the approximate boundary between subsurface material types and the transition may be gradual.

BURGESS ENGINEERING AND TESTING, INC.
LOG OF BORING B-2

Project Name: Kingfisher County Extension Office
Project Number: 731-23119
Site: at 300 S. 13th St., Kingfisher, Oklahoma
Architect/Engineer: Holtzen Engineering Group
Drilling Method: Hollow Stem Auger (CME 55HT)
Date Drilled: 10-9-2023
Elevation:
Water Level: Dry at completion of drilling
Remarks: G.P.S.: 35.855507, -97.942349

LITHOLOGY	DESCRIPTION	DEPTH (FT.)	SAMPLE TYPE	RECOVERY INCHES	BLOWS/FT.	MOISTURE, %	DRY DENSITY PCF	UNCONFINED STRENGTH PSF	REMARKS
	Approximately 8 to 9 inches of topsoil and grass	0							
	Light brown lean clay, damp (CL)								
	Light brown weathered shale, damp, extremely weak rock		SS	18	32	9.0			LL=28:PI=11 -#200=91.3%
		3.5							
	Reddish brown shale, moist, very weak rock		SS	16	50/4.0"	15.3			
		7							
		10.5	SS	18	50/6.0"	12.7			
		14							
			SS	10	50/4.0"	13.6			
		17.5							
			SS	5	50/5.0"				
	Test hole terminated at 20.4 feet	21							
		24.5							

Note: This boring log is based on field classification and visual soil description and is further modified to include results of laboratory clasification tests, where available. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented are a simplification of the actual conditions encountered. Lithologic patterns are generalizations and necessarily imprecise. Lithologic contacts indicated represent the approximate boundary between subsurface material types and the transition may be gradual.

BURGESS ENGINEERING AND TESTING, INC.
LOG OF BORING B-3

Project Name: Kingfisher County Extension Office
Project Number: 731-23119
Site: at 300 S. 13th St., Kingfisher, Oklahoma
Architect/Engineer: Holtzen Engineering Group
Drilling Method: Hollow Stem Auger (CME 55HT)
Date Drilled: 10-9-2023
Elevation:
Water Level: Dry at completion of drilling
Remarks: G.P.S.: 35.855612, -97.942125

LITHOLOGY	DESCRIPTION	DEPTH (FT.)	SAMPLE TYPE	RECOVERY INCHES	BLOWS/FT.	MOISTURE, %	DRY DENSITY PCF	UNCONFINED STRENGTH PSF	REMARKS
	Approximately 8 to 9 inches of topsoil and grass	0							
	Light brown lean clay, damp (CL)								
	Light brown to reddish brown weathered shale, damp to moist, extremely weak rock		SS	18	42	7.1			
		3.5	SS	18	51	12.3			LL=31:PI=13 -#200=97.2%
		7							
	Reddish brown shale, damp to moist, very weak rock	10.5	SS	11	50/5.0"	9.5			
		14							
			SS	12	50/6.0"	10.3			
		17.5							
			SS	3	50/3.0"				
	Test hole terminated at 20.3 feet	21							
		24.5							

Note: This boring log is based on field classification and visual soil description and is further modified to include results of laboratory clasification tests, where available. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented are a simplification of the actual conditions encountered. Lithologic patterns are generalizations and necessarily imprecise. Lithologic contacts indicated represent the approximate boundary between subsurface material types and the transition may be gradual.

BURGESS ENGINEERING AND TESTING, INC.
LOG OF BORING B-4

Project Name: Kingfisher County Extension Office
Project Number: 731-23119
Site: at 300 S. 13th St., Kingfisher, Oklahoma
Architect/Engineer: Holtzen Engineering Group
Drilling Method: Hollow Stem Auger (CME 55HT)
Date Drilled: 10-9-2023
Elevation:
Water Level: Dry at completion of drilling
Remarks: G.P.S.: 35.855700, -97.942233

LITHOLOGY	DESCRIPTION	DEPTH (FT.)	SAMPLE TYPE	RECOVERY INCHES	BLOWS/FT.	MOISTURE, %	DRY DENSITY PCF	UNCONFINED STRENGTH PSF	REMARKS
	Approximately 8 to 9 inches of topsoil and grass	0							
	Light brown lean clay, damp, stiff (CL)		SS	18	12	8.8			LL=29:PI=12 -#200=90.5%
		3.5							
	Reddish brown shale, moist, very weak rock		SS	15	50/3.0	12.7			
		7							
		10.5	SS	8	50/3.0"	11.6			
		14							
			SS	16	50/6.0"	10.9			
		17.5							
			SS	6	50/6.0"				
	Test hole terminated at 20.5 feet	21							
		24.5							

Note: This boring log is based on field classification and visual soil description and is further modified to include results of laboratory clasification tests, where available. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented are a simplification of the actual conditions encountered. Lithologic patterns are generalizations and necessarily imprecise. Lithologic contacts indicated represent the approximate boundary between subsurface material types and the transition may be gradual.

APPENDIX B

MOISTURE, GRADATION AND ATTERBERG TESTS RESULTS
FOR KINGFISHER COUNTY EXTENSION OFFICE
AT 300 S. 13TH STREET
KINGFISHER, OKLAHOMA
PROJECT NO: 731-23119

BORE HOLE	SAMPLE DEPTH (FT)	MOISTURE (%)	%PASSING #10	%PASSING #40	%PASSING #200	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)
B-1	2	7.1					
	5	12.4	100	99.7	95.9	32	15
	10	11.2					
	15	12.3					
B-2	2	9.0	100	98.3	91.3	28	11
	5	15.3					
	10	12.7					
	15	13.6					
B-3	2	7.1					
	5	12.3	100	99.7	97.2	31	13
	10	9.5					
	15	10.3					
B-4	2	8.8					
	5	12.7	100	98.7	90.5	29	12
	10	11.6					
	15	10.9					

GEOLOGICAL STATEMENT
FOR KINGFISHER COUNTY EXTENSION OFFICE
AT 300 S. 13TH STREET
KINGFISHER, OKLAHOMA
PROJECT NO. 731-23119

The geologic materials at the site are classified as **Cedar Hills Unit (Pch),** based on the Engineering Classification of Geological Materials for Kingfisher County, Division Four.

Cedar Hills Unit (Pch)

"This unit consists of predominantly reddish-brown silty, blocky shale and some massive, orange, silty sandstone and siltstone beds. A massive, orange, fine-grained sandstone about three feet thick, which weathers to a dark red and forms vertical cliffs along creeks, marks the base of the unit. The top of the unit is a greenish-gray siltstone bed about sixteen inches thick which serves as a good marker bed.

The unit has a maximum thickness of an estimated 190 to 200 feet in Kingfisher County. It thins northward to about 180 feet in western Garfield County. Southward, across Canadian County, it thins tremendously to just a few feet near Bethany where it loses its identity beneath the thick terrace deposits of the North Canadian River.

The unit outcrops in Canadian , Garfield , and Kingfisher Counties of Division Four.

Topographically, the unit forms gently rolling hills. The base of the unit generally forms a gently rolling hill with a fair amount of relief which overlooks the underlying Hennessey unit. The slightly more rugged topography of the unit helps distinguish it from the underlying Hennessey and overlying Flowerpot units which are typically more flat lying."

APPENDIX C

WinPAS

Pavement Thickness Design According to

1993 AASHTO Guide for Design of Pavements Structures

American Concrete Pavement Association

ESAL Data by Vehicle Type

Agency:
Company: Burgess Engineering and Testing
Contractor: Holtzen Engineering Group
Project Description: Kingfisher County Extension Office ~ Light Duty
Location: At 300 S. 13th St., Kingfisher, OKlahoma

Traffic Factor

Estimated Rigid Thickness	6.00	**inches**
Estimated Structural Number	2.5	
Terminal Serviceability	2.5	
Design Life	20	**years**
Annual Growth Rate	0.00	**percent**
Traffic Input by	Day	

Traffic Input by

Design Lane

Vehicle	Axle Load	Axle Type	Number
	2.00	Single	
	0.00		
	2.00	Single	200
	10.00	Single	
	0.00		
	24.00	Single	5
	12.00	Single	
	0.00		
	34.00	Tandem	5

Vehicle	Axle Load	Axle Type	Number
	12.00	Single	
	16.00	Single	
	34.00	Tandem	2
	12.00	Single	
	34.00	Tandem	
	34.00	Tandem	0
	12.00	Single	
	34.00	Tandem	
	34.00	Tandem	
	34.00	Tandem	
	34.00	Tandem	0

Total Rigid ESALs **232,095**

Total Flexible ESALs **202,276**

WinPAS

Pavement Thickness Design According to

1993 AASHTO Guide for Design of Pavements Structures

American Concrete Pavement Association

Flexible Design Inputs

Agency:
Company: Burgess Engineering and Testing
Contractor: Holtzen Engineering Group
roject Description: Kingfisher County Extension Office ~ Light Duty
Location: At 300 S. 13th St., Kingfisher, OKlahoma

Flexible Pavement Design/Evaluation

Structural Number	3.04		**Soil Resilient Modulus**	4,118.20	**psi**
Design ESALs	202,276		**Initial Serviceability**	4.50	
Reliability	80.00	**percent**	**Terminal Serviceability**	2.50	
Overall Deviation	0.45				

Layer Pavement Design/Evaluation

Layer Material	Layer Coefficient	Drainage Coefficient	Layer Thickness	Layer SN
Asphalt Cement Concrete	0.44	1.00	6.00	2.64
Crushed Stone Base	0.12	0.90	6.00	0.65
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
			ΣSN	3.29

WinPAS

Pavement Thickness Design According to

1993 AASHTO Guide for Design of Pavements Structures

American Concrete Pavement Association

Rigid Design Inputs

Agency:
Company: Burgess Engineering and Testing
Contractor: Holtzen Engineering Group
Project Description: Kingfisher County Extension Office ~ Light Duty
Location: At 300 S. 13th St., Kingfisher, OKlahoma

Rigid Pavement Design/Evaluation

PCC Thickness	5.43	**inches**	**Load Transfer, J**	3.20	
Design ESALs	232,095		**Mod. Subgrade Reaction, k**	72	**psi/in**
Reliability	80.00	**percent**	**Drainage Coefficient, Cd**	1.00	
Overall Deviation	0.35		**Initial Serviceability**	4.50	
Modulus of Rupture	600	**psi**	**Terminal Serviceability**	2.50	
Modulus of Elasticity	4,050,000	**psi**			

Modulus of Subgrade Reaction (k-value) Determination

Resilient Modulus of the Subgrade	4,118.2	**psi**
Resilient Modulus of the Subbase	15,000.0	**psi**
Subbase Thickness	6.00	**inches**
Depth to Rigid Foundation	0.00	**feet**
Loss of Support Value (0,1,2,3)	1.0	

Modulus of Subgrade Reaction	71.90	**psi/in**

WinPAS

Pavement Thickness Design According to

1993 AASHTO Guide for Design of Pavements Structures

American Concrete Pavement Association

ESAL Data by Vehicle Type

Agency:
Company: Burgess Engineering and Testing
Contractor: Holtzen Engineering Group
Project Description: Kingfisher County Extension Office ~ Heavy Duty
Location: At 300 S. 13th St., Kingfisher, OKlahoma

Traffic Factor

Estimated Rigid Thickness	7.50	**inches**
Estimated Structural Number	4.0	
Terminal Serviceability	2.5	
Design Life	20	**years**
Annual Growth Rate	0.00	**percent**
Traffic Input by	Day	

Traffic Input by

Design Lane

Vehicle	Axle Load	Axle Type	Number
	2.00	Single	
	0.00		
	2.00	Single	200
	10.00	Single	
	0.00		
	24.00	Single	50
	12.00	Single	
	0.00		
	34.00	Tandem	5

Vehicle	Axle Load	Axle Type	Number
	12.00	Single	
	16.00	Single	
	34.00	Tandem	2
	12.00	Single	
	34.00	Tandem	
	34.00	Tandem	0
	12.00	Single	
	34.00	Tandem	
	34.00	Tandem	
	34.00	Tandem	
	34.00	Tandem	0

Total Rigid ESALs **1,293,947**

Total Flexible ESALs **1,171,985**

WinPAS

Pavement Thickness Design According to

1993 AASHTO Guide for Design of Pavements Structures

American Concrete Pavement Association

Flexible Design Inputs

Agency:
Company: Burgess Engineering and Testing
Contractor: Holtzen Engineering Group
roject Description: Kingfisher County Extension Office ~ Heavy Duty
Location: At 300 S. 13th St., Kingfisher, OKlahoma

Flexible Pavement Design/Evaluation

Structural Number	3.98		**Soil Resilient Modulus**	4,118.20	**psi**
Design ESALs	1,171,985		**Initial Serviceability**	4.50	
Reliability	80.00	**percent**	**Terminal Serviceability**	2.50	
Overall Deviation	0.45				

Layer Pavement Design/Evaluation

Layer Material	Layer Coefficient	Drainage Coefficient	Layer Thickness	Layer SN
Asphalt Cement Concrete	0.44	1.00	8.00	3.52
Crushed Stone Base	0.12	0.90	6.00	0.65
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
			ΣSN	4.17

WinPAS

Pavement Thickness Design According to

1993 AASHTO Guide for Design of Pavements Structures

American Concrete Pavement Association

Rigid Design Inputs

Agency:
Company: Burgess Engineering and Testing
Contractor: Holtzen Engineering Group
Project Description: Kingfisher County Extension Office ~ Heavy Duty
Location: At 300 S. 13th St., Kingfisher, OKlahoma

Rigid Pavement Design/Evaluation

PCC Thickness	7.17	**inches**	**Load Transfer, J**	3.20	
Design ESALs	1,293,947		**Mod. Subgrade Reaction, k**	72	**psi/in**
Reliability	80.00	**percent**	**Drainage Coefficient, Cd**	1.00	
Overall Deviation	0.35		**Initial Serviceability**	5.00	
Modulus of Rupture	600	**psi**	**Terminal Serviceability**	2.50	
Modulus of Elasticity	4,050,000	**psi**			

Modulus of Subgrade Reaction (k-value) Determination

Resilient Modulus of the Subgrade	4,118.2	**psi**
Resilient Modulus of the Subbase	15,000.0	**psi**
Subbase Thickness	6.00	**inches**
Depth to Rigid Foundation	0.00	**feet**
Loss of Support Value (0,1,2,3)	1.0	

Modulus of Subgrade Reaction	71.90	**psi/in**

DRAINAGE STUDY

KINGFISHER COUNTY EXTENSION OFICE

300 South 13th Street
Kingfisher, Oklahoma

Holtzen Engineering Group Project No.: 23.030

December 18 2023

Prepared for:

Corbin Merz Haney Architects
302 N. Independence St. 206
Enid, OK

Prepared by:

HOLTZEN ENGINEERING GROUP

302 N. Independence St., Suite 1100
Enid, OK 73701
P. 580.233.8533
www.HoltzenEngineering.com
CA 7050, Exp. 6/30/25

Table of Contents

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A. FEMA Mapping
B. ODOT Rainfall Coefficients for Zone IV
C. Existing Conditions: Existing Drainage Map & HydroCAD Results
D. Proposed Conditions: Post-Developed Drainage Map, Detention Calculations & HydroCAD Results

December 18, 2023

Jon Friesen
City of Kingfisher
301 N. Main St.
Kingfisher, OK 73750

RE: Drainage Report for Kingfisher County Extension Office, 300 S. 13th St., Kingfisher, OK

PROJECT LOCATION

This project is located in part of the NE/4, Section 21, Township 16N, Range 7W Indian Meridian, at 300 S. 13th St. within the City of Kingfisher, Kingfisher County, OK. Figure 1 below illustrates the project vicinity and Figure 2 show the project location.

Figure 1 – Project Site

PROJECT DESCRIPTION

This project consists of a new office building, new concrete parking area, and an on-site storm water detention pond and outlet structure on approximately 1.4 acres.

HYDROLOGY

The drainage study has been prepared based on the criteria.

- Rational Method for peak flows.
- Modified rational method for stormwater detention design using Hydrocad software

- Rainfall intensities determined with ODOT IDF Zone IV Coefficients
- Time of concentration using ODOT Roadway Design Manual (minimum TOC 5 minutes)
- Peak existing flows, and peak proposed flows for the 5-year, 10-year, 25-year, 50 year, and 100-year storms events at each structure and design points leaving the site.
- Storm water detention design, modeling the 2-year and 100-year storm events.

Below are the run-off coefficient values used for calculating the run-off:

- Impervious (Concrete, asphalt, and buildings) C= 0.95
- Unimproved areas (historical condition) C= 0.30
- Grass Areas in Developed condition C= 0.50

DRAINAGE BASINS

Design Points are denoted with a "DP#" and are at the same location for pre-developed conditions and post developed conditions. Pre-developed drainage basins are designated with an "E#" for existing. Post-developed drainage basins are denoted with a "DEV#" for developed.

EXISTING DRAINAGE BASINS

The existing project drainage area is comprised of approximately 1.43 acres. An existing building and paved sidewalks were demolished in the past and this is location of the new building. The impervious area of the building and sidewalks that were demolished is the basis of the historical condition. The project site consists of one drainage basin (E1). E1 slopes from southeast to northwest and discharges at the south boundary of the existing north parking. A more detailed summary of the existing site flow and characteristics are depicted in Exhibit A.

PROPOSED DRAINAGE BASINS

The proposed developed drainage basins are similar to the existing drainage basin and a more detailed summary of the developed conditions are depicted in Exhibit B. Below is a summary of the post-developed drainage basins:

- Drainage Basin (DEV1) consists of (2)-sub-basins. These sub-basins combine at DP1.
  - DEV1.1 consists of new concrete paving, half of the new building, and grassy areas. This basin bypasses the detention pond and discharges directly to DP1.
  - DEV1.2 consists of new concrete paving, half of the new building, a new stormwater detention pond, and grassy areas.

    The detention pond within DEV1.2 captures all the run-off in the sub-basin and discharges through an orifice attached to a new headwall. The run-off is routed through a new 12-inch HDPE pipe to an existing north-south earthen channel within DEV1.1. This channel discharges the runoff at DP1 approximately 50-feet north of the new HDPE outlet. If the outlet structure were to become plugged, the stored pond run-off would escape through the north end of the pond and discharge onto the existing parking lot and flow to DP1.

DRAINAGE VALUES

Below is a summary of the pre-developed and post developed runoff.

Table 1 – Existing basins hydrologic characteristics

Drainage Basin	Point of Discharge	Peak Discharge (cfs)					
		2-year	5-year	10-year	25-year	50-year	100-year
E1	DP1	2.56	3.28	3.73	4.38	4.93	5.40

Table 2 – Proposed basins hydrologic characteristics (Detention Considered)

Drainage Basin	Point of Discharge	Peak Discharge (cfs)					
		2-year	5-year	10-year	25-year	50-year	100-year
DEV1.1	DP1	1.79	2.29	2.60	3.05	3.43	3.75
DEV1.2	DP1	1.47	1.88	2.13	2.50	2.81	3.08
DEV1.2 (with detention)	DP1	0.87	0.98	1.03	1.10	1.15	1.19
DEV1 (Combined with detention)	DP1	2.51	3.10	3.45	3.95	4.37	4.72

Table 3 – Detention Pond Characteristics

Drainage Basin	**DEV1.2**					
Storm Frequency – years	2	5	10	25	50	100
Peak Pond Inflow (cfs)	1.47	1.88	2.13	2.50	2.81	3.08
Peak Pond Outflow (cfs)	0.87	0.98	1.03	1.10	1.15	1.19
Maximum Water Surface Elevation (ft)	1057.37	1057.60	1057.73	1057.89	1058.02	1058.12
Maximum Pond Storage (CF)	555	854	1055	1372	1651	1900

Table 4 – Existing -vs- Proposed hydrologic characteristics (Detention Considered)

Design Point - DP1			
Storm Frequency	**Existing Condition**	**Developed Condition**	**% of Existing Condition**
2-year	2.56	2.51	98%
5-year	3.28	3.10	95%
10-year	3.73	3.45	92%
25-year	4.38	3.95	90%
50-year	4.93	4.37	89%
100-year	5.40	4.72	87%

The increased run-off from the site has been detained and has not increased for the 2-year thru the 100-year storm events.

If you have any questions or request any additional information, please do not hesitate to contact me.

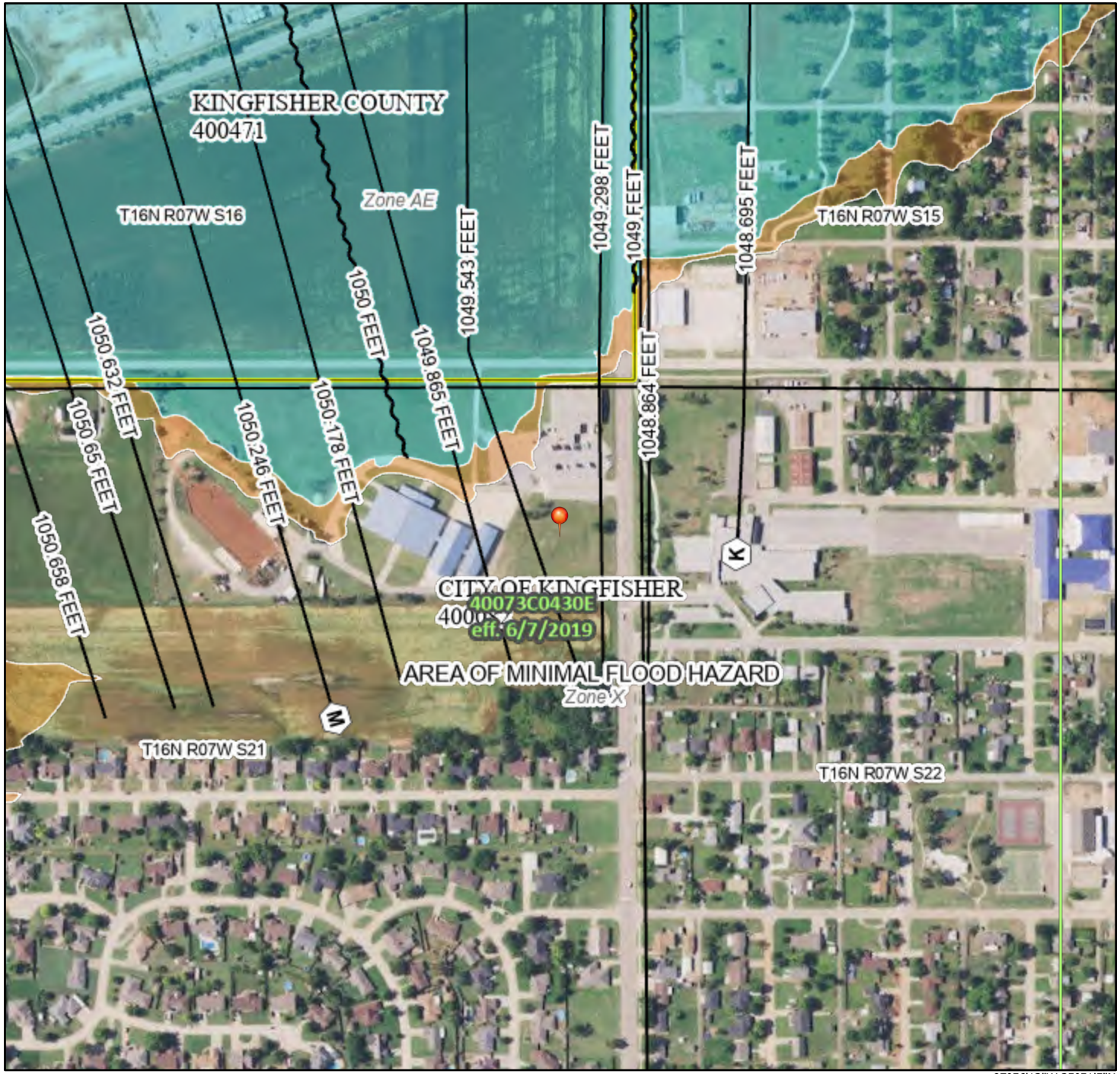
APPENDIX A

FEMA Mapping

National Flood Hazard Layer FIRMette

FEMA

97°56'51"W 35°51'35"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

97°56'13"W 35°51'5"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/6/2023 at 9:45 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX B

ODOT Rainfall Coefficients for Zone IV

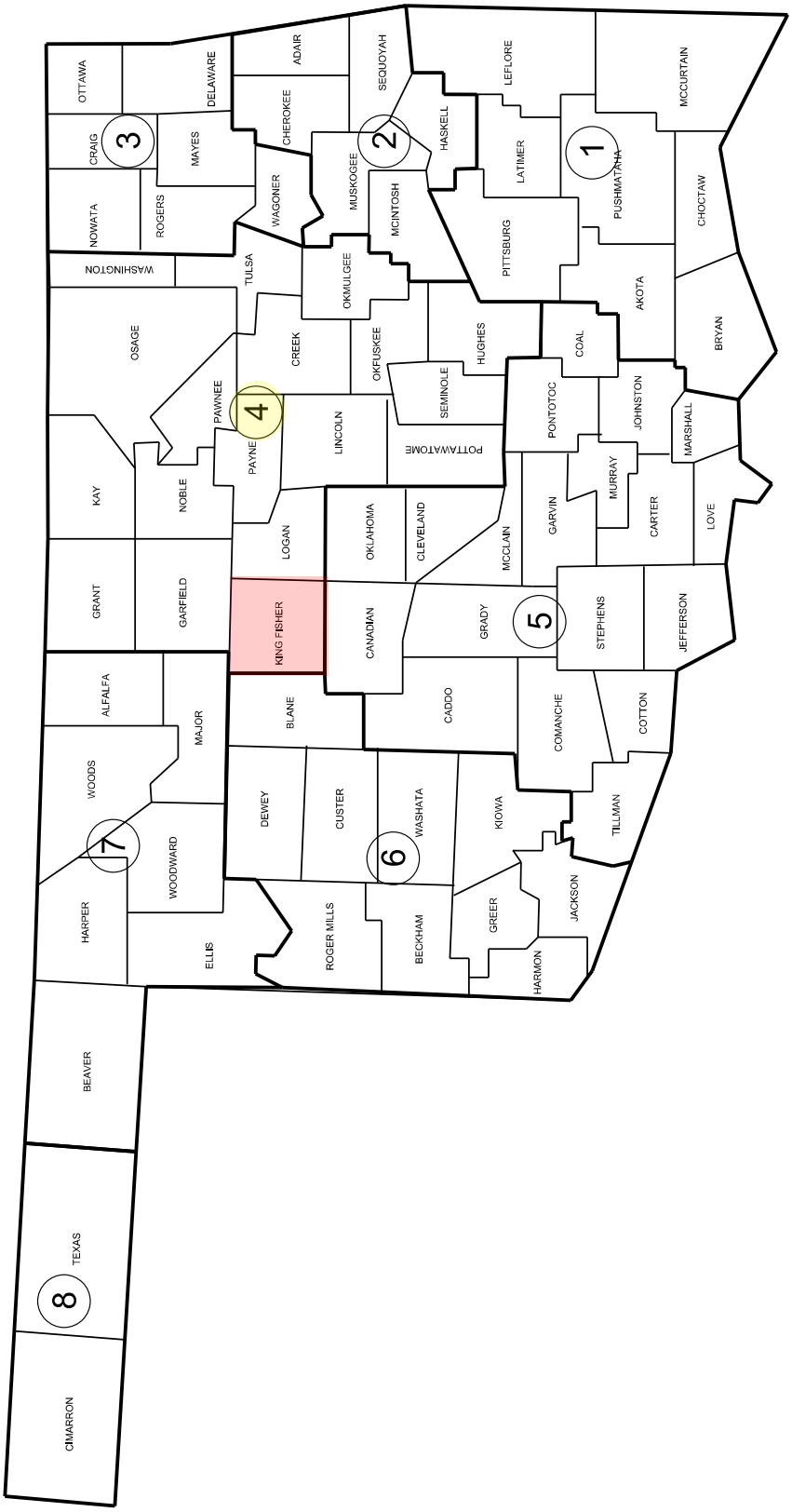


Figure 7.6-G — IDF CURVE ZONES IN OKLAHOMA

Zone	Values	2-year	5-year	10-year	25-year	50-year	100-year	500-year
1	a	43	47	58	70	77	91	126
	b	9	9	10	10	11	12	13
	c	0.76	0.73	0.74	0.74	0.74	0.75	0.76
2	a	42	45	49	67	70	83	120
	b	8	8	8	10	10	11	11
	c	0.78	0.74	0.73	0.75	0.74	0.75	0.78
3	a	41	45	53	71	91	126	169
	b	8	8	9	11	13	16	16
	c	0.77	0.74	0.74	0.76	0.78	0.82	0.83
4	a	46	59	69	81	106	116	153
	b	10	11	12	12	15	15	15
	c	0.79	0.78	0.78	0.78	0.80	0.80	0.80
5	a	53	64	74	93	104	108	130
	b	10	12	12	15	15	15	15
	c	0.82	0.79	0.79	0.79	0.79	0.77	0.75
6	a	40	53	67	81	88	104	148
	b	7	9	11	12	12	13	15
	c	0.79	0.78	0.79	0.79	0.78	0.79	0.80
7	a	44	59	75	90	98	110	129
	b	7	9	11	12	12	13	12
	c	0.83	0.82	0.83	0.83	0.82	0.82	0.80
8	a	64	97	113	140	160	205	240
	b	12	15	15	15	15	18	18
	c	0.93	0.93	0.93	0.93	0.93	0.94	0.92

Source: (4)

Figure 7.6-P — IDF CURVE COEFFICIENTS for $I = a/(t_c + b)^c$

APPENDIX C

Existing Conditions:
Existing Drainage Map & HydroCAD Results

PRE-DEVELOPED DRAINAGE SUMMARY (RATIONAL METHOD)

DRAINAGE BASIN	AREA (AC)	'C' VALUE	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
E1	1.430	0.49	2.56	3.28	3.73	4.38	4.93	5.40

DRAINAGE MAP LEGEND

- DRAINAGE AREA BOUNDARY
- L= 100' — FLOW PATH & FLOW LENGTH
- E1 — EXISTING DRAINAGE BASIN
- E2.1 — EXISTING DRAINAGE SUBBASIN
- DP1 — DESIGN POINT
- 1055 — ELEVATION ALONG FLOW PATH

DP1
1054.7
1057.2
L= 89'
E1
L= 172'
1060.5
L= 23'
1063.7
L= 64'
1066.8
12" CULVERT NFL=1054.94 SFL=1054.91
PREVIOUSLY DEMO'D BUILDING AND S/W
METAL BUILDING
FIN. FLOOR EL=1059.52
RAISED METAL BLDG. ON CONC. BLOCKS
"4H" SIGN.
"NO PARKING" SIGN.
"NO PARKING" SIGN.
PIPE FENCE
FIBER OPTIC CABLE WARNING SIGN.
FIBER OPTIC BOX
33.00' STAT. R.O.W.
S 13TH ST
EAST LINE NE/4 SEC. 24, T18N, R7W, I.M.
? GAS METER HOOK-UP
BENCHMARK No. 1

HOLTZEN ENGINEERING GROUP	**KINGFISHER COUNTY EXTENSION OFFICE** KINGFISHER COUNTY FAIRGROUNDS	**PRE-DEVELOPED** **DRAINAGE MAP**	0 40' 80' SCALE IN FEET N	EXHIBIT A PROJECT NO.: 23.030

WEIGHTED 'C' VALUE & TIME OF CONCENTRATION CALCULATIONS

Project Name: Kingfisher County Extension Office
Project No.: 23.030
Designer: SH
Date: 11/8/2023

Drainage Basin ID: **E1**

NOTES:		ODOT SEC.
	Overland Flow: Time of Concentration ($Tc=K(L^{0.37}/S^{0.20})$)	7.6.6.1
	Channel Flow: Time of Concentration ($Tc=K(L^{0.77}/S^{0.385})$)	7.6.6.2
	Min. Tc: 10 min.: Rural areas or well-developed, flat slopes (< 1.00%) urban areas	7.6.6.3

	Area (Acres)	'C'	C x A
Paving, Walks, Roofs:	0.424	0.95	0.403
Gravel:		0.75	0.000
Historic Unimproved Areas:	1.006	0.30	0.302
Grass in Developed Areas:		0.50	0.000
Commercial - Offices:		0.90	0.000
Shopping Centers:		0.95	0.000
Industrial:		0.95	0.000
Residential:			
- Single-family areas		0.70	0.000
- Duplex		0.75	0.000
- Quad-Plex		0.80	0.000
- Apartment complex		0.85	0.000
TOTALS:	1.430		0.705
Weighted "C":		**0.493**	

Flow Type	L (ft)	Surface Type	K	Start Elevation	End Elevation	Slope (ft/ft)	Tc (min)
Overland 1	64	Average Pasture	1.04	1068.80	1063.70	#####	8.0
Overland 2	23	Average Pasture	1.04	1063.70	1060.50	#####	4.9
Overland 3		-	0			#####	0.0
Overland 4		-	0			#####	0.0
Channelized 1	172	Few Weeds, Clean Bottom	0.00835	1060.50	1057.20	#####	2.0
Channelized 2	89	Straight Clean Channel	0	1057.20	1054.70	#####	0.0
Channelized 3		-	0			#####	0.0
Channelized 4		-	0			#####	0.0
						TOTAL	**14.9**

Overland Flow	K
-	0
Concrete, Asphalt	0.37200
Commercial	0.44500
Residential	0.51100
Rocy, Bare Soil	0.60400
Cultivated	0.77500
Woodlan, Thin Grass	0.94200
Average Pasture	1.04000
Tall Grass	1.11300

Channel Flow	K
-	0
Straight Clean Channel	0.00592
Few Weeds, Clean Bottom	0.00835
Meandering stream with pools	0.01020
V-Ditch	0.01252

Existing Conditions - DP1

Prepared by Holtzen Engineering Group

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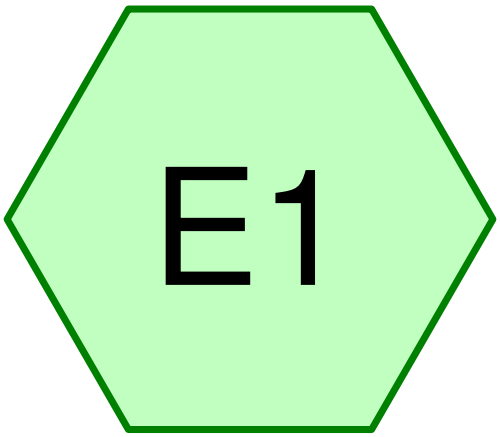


E1 to DP1

Subcat Reach Pond Link

Routing Diagram for Existing Conditions - DP1
Prepared by Holtzen Engineering Group, Printed 12/18/2023

Area Listing (all nodes)

Area (acres)	C	Description (subcatchment-numbers)
1.430	0.49	(E1)
1.430	**0.49**	**TOTAL AREA**

Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: E1 to DP1 Runoff Area=1.430 ac 0.00% Impervious Runoff Depth=0.66"
Tc=14.9 min C=0.49 Runoff=2.56 cfs 0.079 af

Total Runoff Area = 1.430 ac Runoff Volume = 0.079 af Average Runoff Depth = 0.66"
100.00% Pervious = 1.430 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E1: E1 to DP1

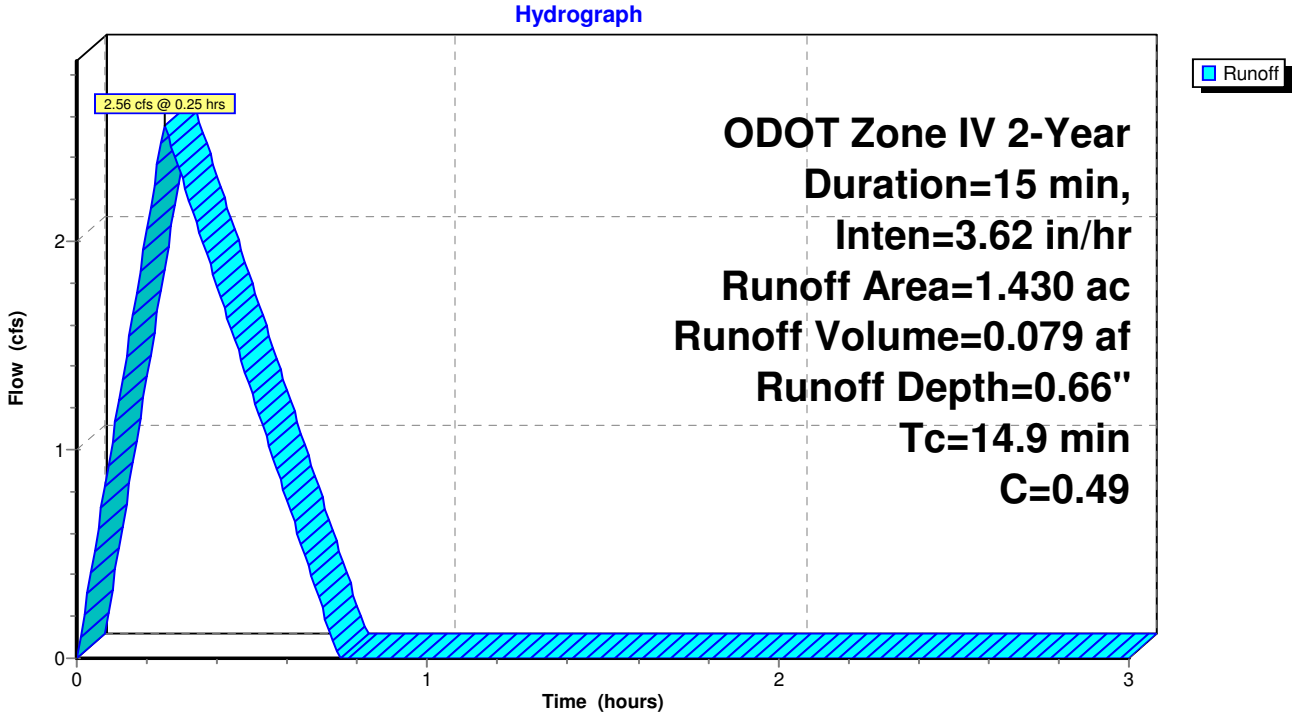
Runoff = 2.56 cfs @ 0.25 hrs, Volume= 0.079 af, Depth= 0.66"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 2-Year Duration=15 min, Inten=3.62 in/hr

Area (ac)	C	Description
1.430	0.49	
1.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9					**Direct Entry,**

Subcatchment E1: E1 to DP1



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: E1 to DP1 Runoff Area=1.430 ac 0.00% Impervious Runoff Depth=0.85"
Tc=14.9 min C=0.49 Runoff=3.28 cfs 0.102 af

Total Runoff Area = 1.430 ac Runoff Volume = 0.102 af Average Runoff Depth = 0.85"
100.00% Pervious = 1.430 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E1: E1 to DP1

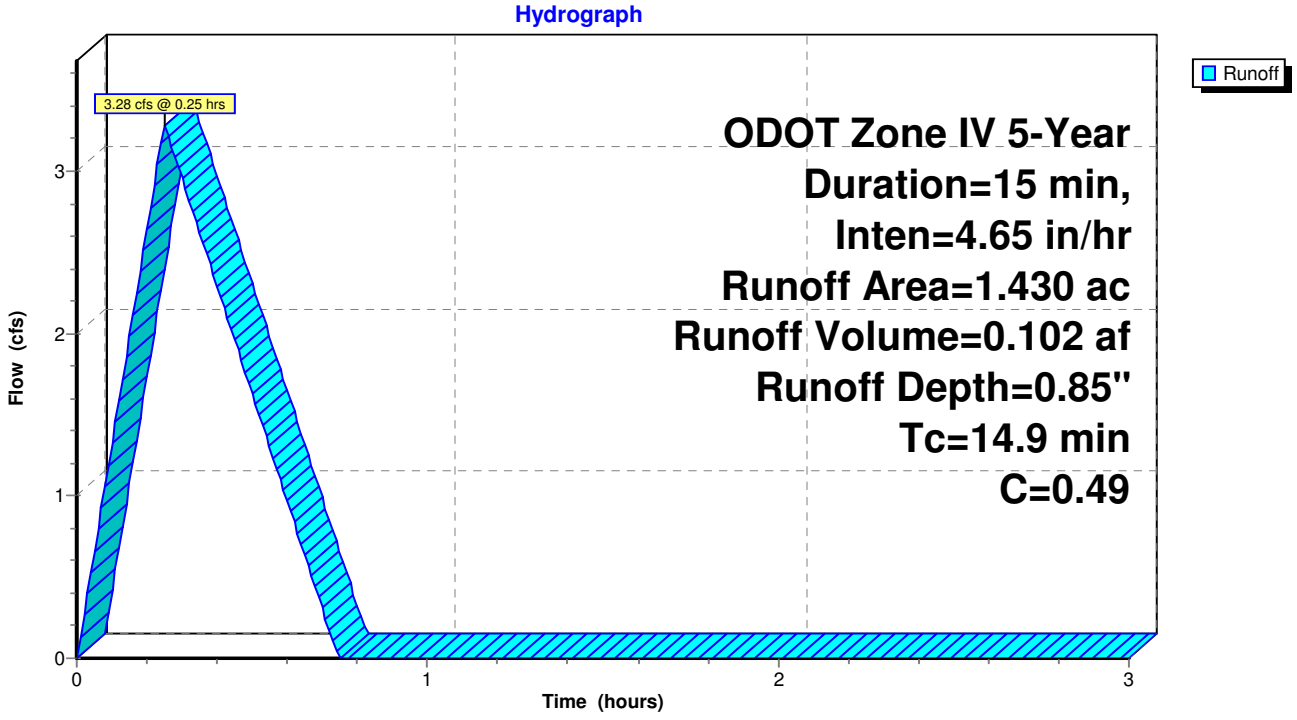
Runoff = 3.28 cfs @ 0.25 hrs, Volume= 0.102 af, Depth= 0.85"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 5-Year Duration=15 min, Inten=4.65 in/hr

Area (ac)	C	Description
1.430	0.49	
1.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9					**Direct Entry,**

Subcatchment E1: E1 to DP1



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: E1 to DP1 Runoff Area=1.430 ac 0.00% Impervious Runoff Depth=0.97"
Tc=14.9 min C=0.49 Runoff=3.73 cfs 0.115 af

Total Runoff Area = 1.430 ac Runoff Volume = 0.115 af Average Runoff Depth = 0.97"
100.00% Pervious = 1.430 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E1: E1 to DP1

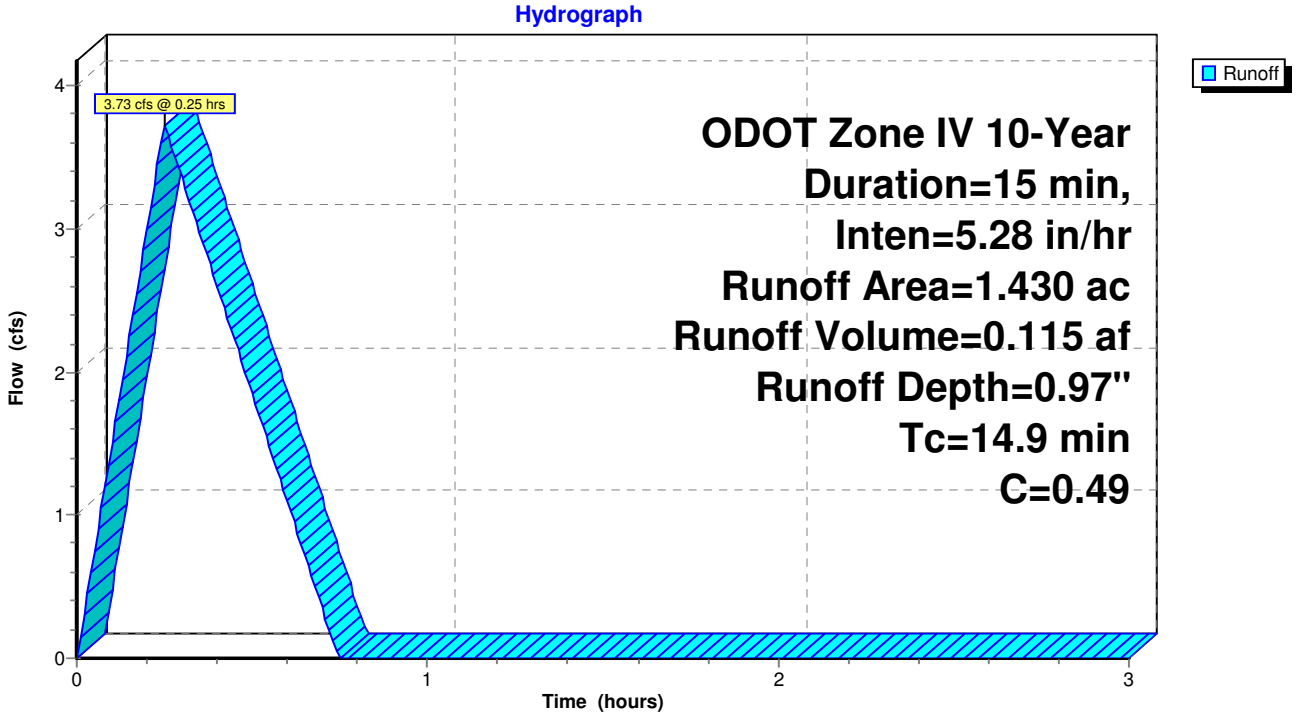
Runoff = 3.73 cfs @ 0.25 hrs, Volume= 0.115 af, Depth= 0.97"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 10-Year Duration=15 min, Inten=5.28 in/hr

Area (ac)	C	Description
1.430	0.49	
1.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9					**Direct Entry,**

Subcatchment E1: E1 to DP1



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: E1 to DP1 Runoff Area=1.430 ac 0.00% Impervious Runoff Depth=1.14"
Tc=14.9 min C=0.49 Runoff=4.38 cfs 0.135 af

Total Runoff Area = 1.430 ac Runoff Volume = 0.135 af Average Runoff Depth = 1.14"
100.00% Pervious = 1.430 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E1: E1 to DP1

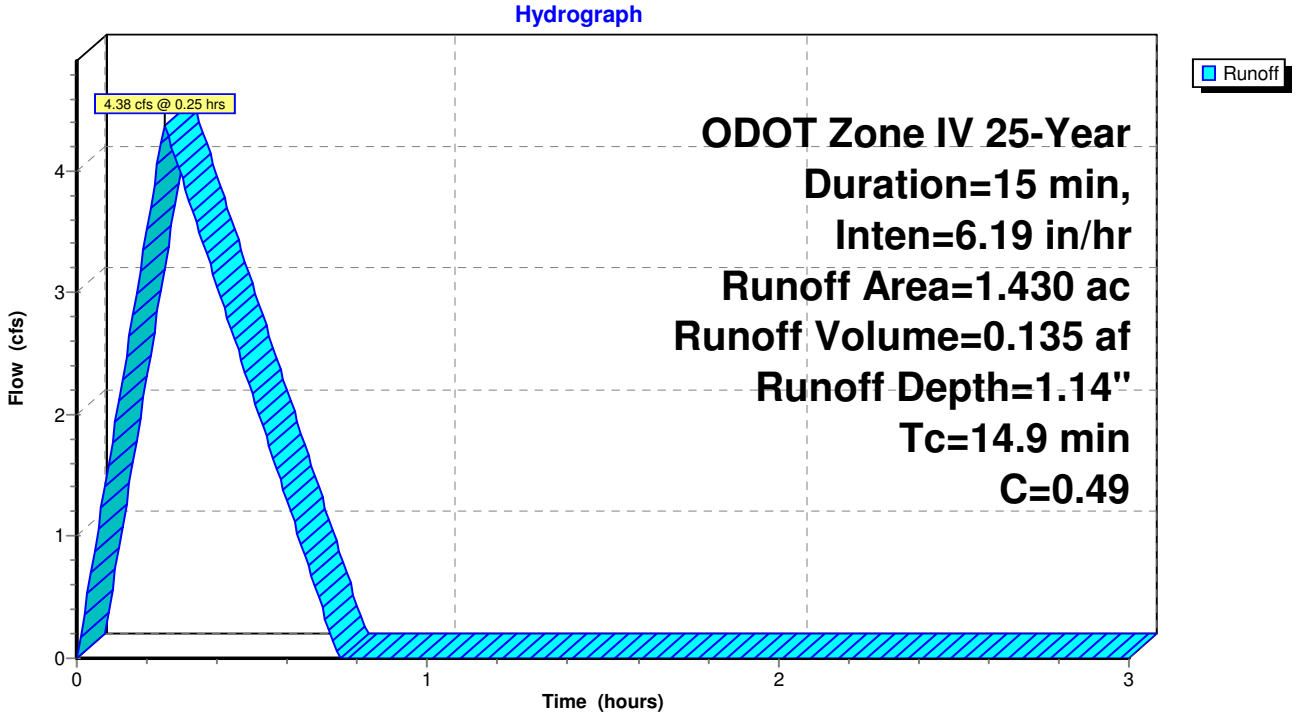
Runoff = 4.38 cfs @ 0.25 hrs, Volume= 0.135 af, Depth= 1.14"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 25-Year Duration=15 min, Inten=6.19 in/hr

Area (ac)	C	Description
1.430	0.49	
1.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9					**Direct Entry,**

Subcatchment E1: E1 to DP1



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: E1 to DP1 Runoff Area=1.430 ac 0.00% Impervious Runoff Depth=1.28"
Tc=14.9 min C=0.49 Runoff=4.93 cfs 0.152 af

Total Runoff Area = 1.430 ac Runoff Volume = 0.152 af Average Runoff Depth = 1.28"
100.00% Pervious = 1.430 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E1: E1 to DP1

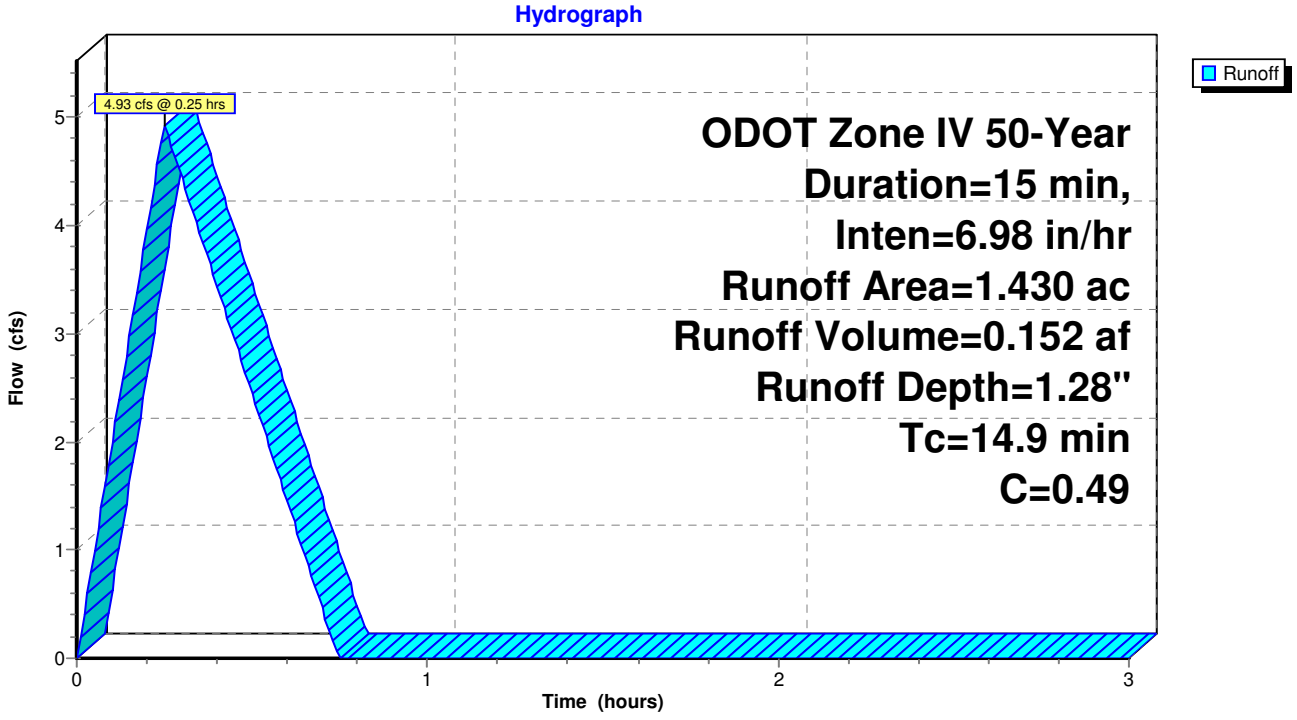
Runoff = 4.93 cfs @ 0.25 hrs, Volume= 0.152 af, Depth= 1.28"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 50-Year Duration=15 min, Inten=6.98 in/hr

Area (ac)	C	Description
1.430	0.49	
1.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9					**Direct Entry,**

Subcatchment E1: E1 to DP1



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: E1 to DP1 Runoff Area=1.430 ac 0.00% Impervious Runoff Depth=1.40"
Tc=14.9 min C=0.49 Runoff=5.40 cfs 0.167 af

Total Runoff Area = 1.430 ac Runoff Volume = 0.167 af Average Runoff Depth = 1.40"
100.00% Pervious = 1.430 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E1: E1 to DP1

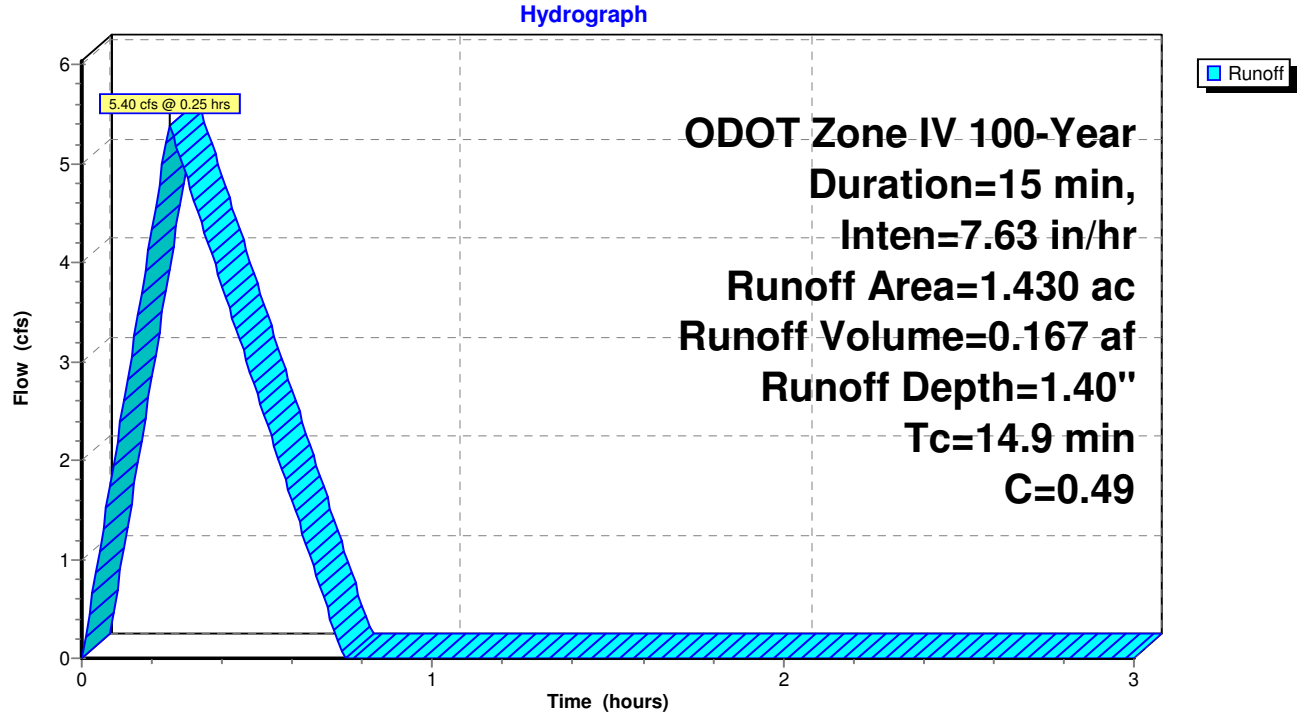
Runoff = 5.40 cfs @ 0.25 hrs, Volume= 0.167 af, Depth= 1.40"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 100-Year Duration=15 min, Inten=7.63 in/hr

Area (ac)	C	Description
1.430	0.49	
1.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9					**Direct Entry,**

Subcatchment E1: E1 to DP1



Events for Subcatchment E1: E1 to DP1

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-Year	0.90	2.56	0.079	0.66
5-Year	1.16	3.28	0.102	0.85
10-Year	1.32	3.73	0.115	0.97
25-Year	1.55	4.38	0.135	1.14
50-Year	1.74	4.93	0.152	1.28
100-Year	**1.91**	**5.40**	**0.167**	**1.40**

APPENDIX D

Proposed Conditions:
Post-Developed Drainage Map, Detention Calculations
& HydroCAD Results

POST-DEVELOPED DRAINAGE SUMMARY (RATIONAL METHOD)

DRAINAGE BASIN	AREA (AC)	'C' VALUE	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
DEV1.1	0.725	0.66	1.79	2.29	2.60	3.05	3.43	3.75
DEV1.2	0.705	0.57	0.87	0.98	1.03	1.10	1.15	1.19
DEV1.1 + DEV1.2	1.430	-	2.51	3.10	3.45	3.95	4.37	4.72

DRAINAGE MAP LEGEND

- DRAINAGE AREA BOUNDARY
- L= 100' — FLOW PATH AND FLOW LENGTH
- DEV1 — PROPOSED DRAINAGE BASIN
- DEV2.1 — PROPOSED DRAINAGE SUBBASIN
- DP1 — DESIGN POINT
- 1055 — ELEVATION ALONG FLOW PATH
- 100-YR. DETENTION POND WATER SURFACE ELEVATION

DP1
1054.7
DEV1.1
(BYPASS)
DETENTION POND
DEV1.2
1056.3
1056.8
1057.9
1063.7
1066.8
1060.7
1061.6
L= 192'
L= 184'
L= 78'
L= 16'
L= 64'
12" CULVERT NFL=1054.94 SFL=1054.91
FIN. FLOOR EL=1059.52
METAL BUILDING
RAISED METAL BLDG. ON CONC. BLOCKS
"NO PARKING" SIGN.
"4H" SIGN.
FIBER OPTIC CABLE W/WARNING SIGN.
FIBER OPTIC
33.00' STAT. R.O.W.
S. 15TH ST.
S0° 28' 28"E
EAST LINE NE/4 SEC. 24, T18N, R7W, I.M.
? GAS METER HOOK-UP ?
BENCHMARK No. 1– Top of top bolt on Fire Hydrant. Elev.=1060.61 (NAVD88)

HOLTZEN ENGINEERING GROUP

KINGFISHER COUNTY EXTENSION OFFICE

KINGFISHER COUNTY FAIRGROUNDS

POST-DEVELOPED

DRAINAGE MAP

0 40' 80'
SCALE IN FEET

EXHIBIT
B

PROJECT NO.: 23.030

WEIGHTED 'C' VALUE & TIME OF CONCENTRATION CALCULATIONS

Project Name: Kingfisher County Extension Office
Project No.: 23.030
Designer: SH
Date: 11/8/2023

Drainage Basin ID: **DEV1.1 (BYPASS)**

NOTES:		ODOT SEC.
	Overland Flow: Time of Concentration ($Tc=K(L^{0.37}/S^{0.20})$)	7.6.6.1
	Channel Flow: Time of Concentration ($Tc=K(L^{0.77}/S^{0.385})$)	7.6.6.2
	Min. Tc: 10 min.: Rural areas or well-developed, flat slopes (< 1.00%) urban areas	7.6.6.3

	Area (Acres)	'C'	C x A
Paving, Walks, Roofs:	0.265	0.95	0.252
Gravel:		0.75	0.000
Historic Unimproved Areas:		0.30	0.000
Grass in Developed Areas:	0.460	0.50	0.230
Commercial - Offices:		0.90	0.000
Shopping Centers:		0.95	0.000
Industrial:		0.95	0.000
Residential:			
- Single-family areas		0.70	0.000
- Duplex		0.75	0.000
- Quad-Plex		0.80	0.000
- Apartment complex		0.85	0.000
TOTALS:	0.725		0.482
Weighted "C":		**0.664**	

Flow Type	L (ft)	Surface Type	K	Start Elevation	End Elevation	Slope (ft/ft)	Tc (min)
Overland 1	16	Concrete, Asphalt	0.372	1061.60	1060.70	#####	1.8
Overland 2	78	Average Pasture	1.04	1060.70	1056.80	#####	9.5
Overland 3		-	0			#####	0.0
Overland 4		-	0			#####	0.0
Channelized 1	192	Few Weeds, Clean Bottom	0.00835	1056.80	1054.70	#####	2.7
Channelized 2		-	0			#####	0.0
Channelized 3		-	0			#####	0.0
Channelized 4		-	0			#####	0.0
						TOTAL	**14.0**

Overland Flow	K
-	0
Concrete, Asphalt	0.37200
Commercial	0.44500
Residential	0.51100
Rocy, Bare Soil	0.60400
Cultivated	0.77500
Woodlan, Thin Grass	0.94200
Average Pasture	1.04000
Tall Grass	1.11300

Channel Flow	K
-	0
Straight Clean Channel	0.00592
Few Weeds, Clean Bottom	0.00835
Meandering stream with pools	0.01020
V-Ditch	0.01252

WEIGHTED 'C' VALUE & TIME OF CONCENTRATION CALCULATIONS

Project Name: Kingfisher County Extension Office
Project No.: 23.030
Designer: SH
Date: 11/8/2023

Drainage Basin ID: **DEV1.2 (to Detention Pond)**

NOTES:				ODOT SEC.
	Overland Flow: Time of Concentration ($Tc=K(L^{0.37}/S^{0.20})$)			7.6.6.1
	Channel Flow: Time of Concentration ($Tc=K(L^{0.77}/S^{0.385})$)			7.6.6.2
	Min. Tc: 10	min.:	Rural areas or well-developed, flat slopes (< 1.00%) urban areas	7.6.6.3

	Area (Acres)	'C'	C x A
Paving, Walks, Roofs:	0.115	0.95	0.109
Gravel:		0.75	0.000
Historic Unimproved Areas:		0.30	0.000
Grass in Developed Areas:	0.590	0.50	0.295
Commercial - Offices:		0.90	0.000
Shopping Centers:		0.95	0.000
Industrial:		0.95	0.000
Residential:			
- Single-family areas		0.70	0.000
- Duplex		0.75	0.000
- Quad-Plex		0.80	0.000
- Apartment complex		0.85	0.000
TOTALS:	0.705		0.404
Weighted "C":		**0.573**	

Flow Type	L (ft)	Surface Type	K	Start Elevation	End Elevation	Slope (ft/ft)	Tc (min)
Overland 1	64	Average Pasture	1.04	1068.80	1063.70	#####	8.0
Overland 2	23	Average Pasture	1.04	1063.70	1057.90	#####	4.4
Overland 3		-	0			#####	0.0
Overland 4		-	0			#####	0.0
Channelized 1	130	Few Weeds, Clean Bottom	0.00835	1057.90	1056.28	#####	1.9
Channelized 2		-	0			#####	0.0
Channelized 3		-	0			#####	0.0
Channelized 4		-	0			#####	0.0
						TOTAL	**14.3**

Overland Flow	K
-	0
Concrete, Asphalt	0.37200
Commercial	0.44500
Residential	0.51100
Rocy, Bare Soil	0.60400
Cultivated	0.77500
Woodlan, Thin Grass	0.94200
Average Pasture	1.04000
Tall Grass	1.11300

Channel Flow	K
-	0
Straight Clean Channel	0.00592
Few Weeds, Clean Bottom	0.00835
Meandering stream with pools	0.01020
V-Ditch	0.01252

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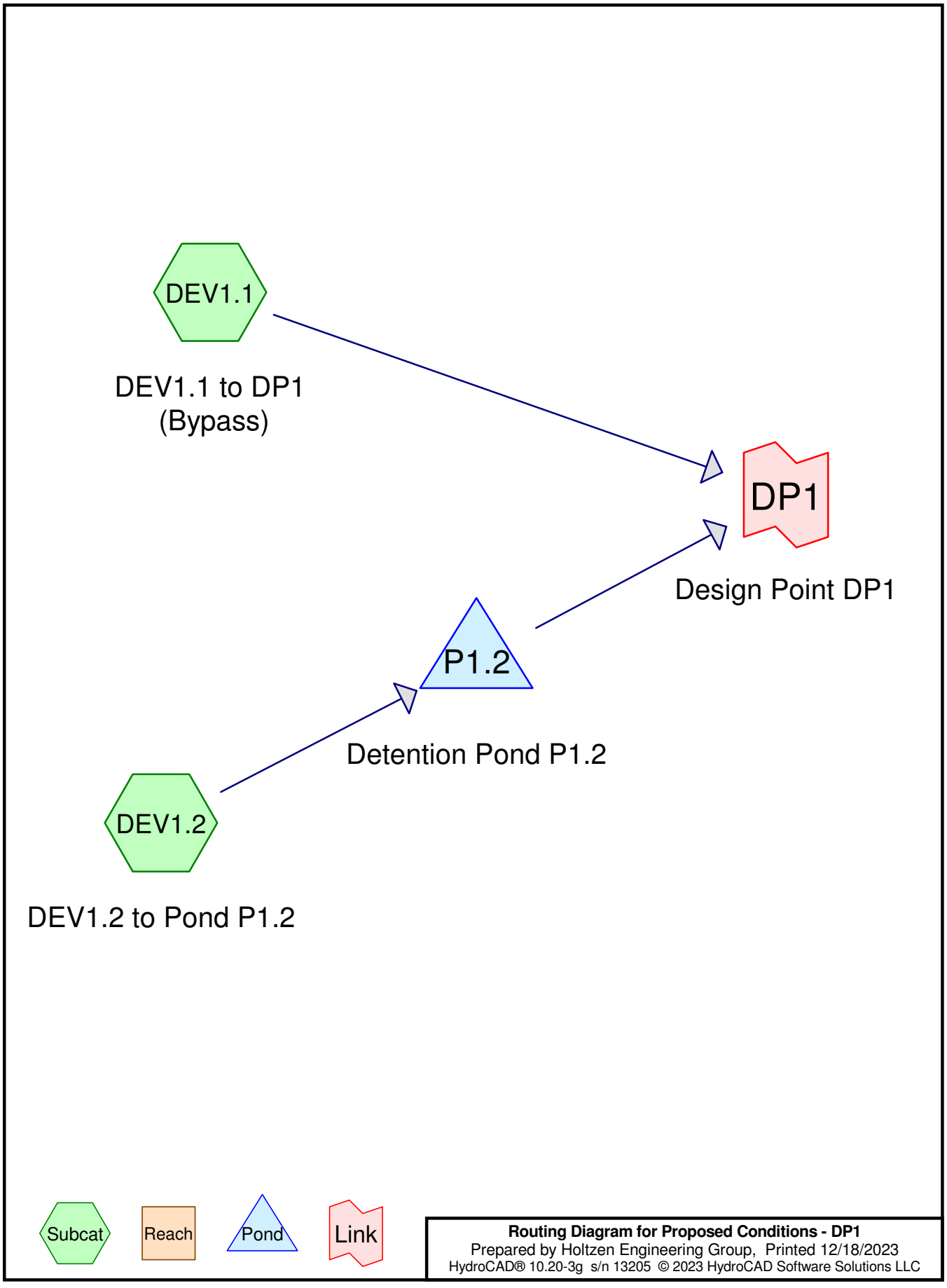


Routing Diagram for Proposed Conditions - DP1
Prepared by Holtzen Engineering Group, Printed 12/18/2023

Area Listing (all nodes)

Area (acres)	C	Description (subcatchment-numbers)
0.725	0.66	(DEV1.1)
0.705	0.57	(DEV1.2)
1.430	**0.62**	**TOTAL AREA**

Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DEV1.1: DEV1.1 to DP1 Runoff Area=0.725 ac 0.00% Impervious Runoff Depth=0.86"
Tc=14.0 min C=0.66 Runoff=1.79 cfs 0.052 af

Subcatchment DEV1.2: DEV1.2 to Pond P1.2 Runoff Area=0.705 ac 0.00% Impervious Runoff Depth=0.73"
Tc=14.3 min C=0.57 Runoff=1.47 cfs 0.043 af

Pond P1.2: Detention Pond P1.2 Peak Elev=1,057.37' Storage=555 cf Inflow=1.47 cfs 0.043 af
Outflow=0.87 cfs 0.043 af

Link DP1: Design Point DP1 Inflow=2.51 cfs 0.095 af
Primary=2.51 cfs 0.095 af

Total Runoff Area = 1.430 ac Runoff Volume = 0.095 af Average Runoff Depth = 0.80"
100.00% Pervious = 1.430 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DEV1.1: DEV1.1 to DP1 (Bypass)

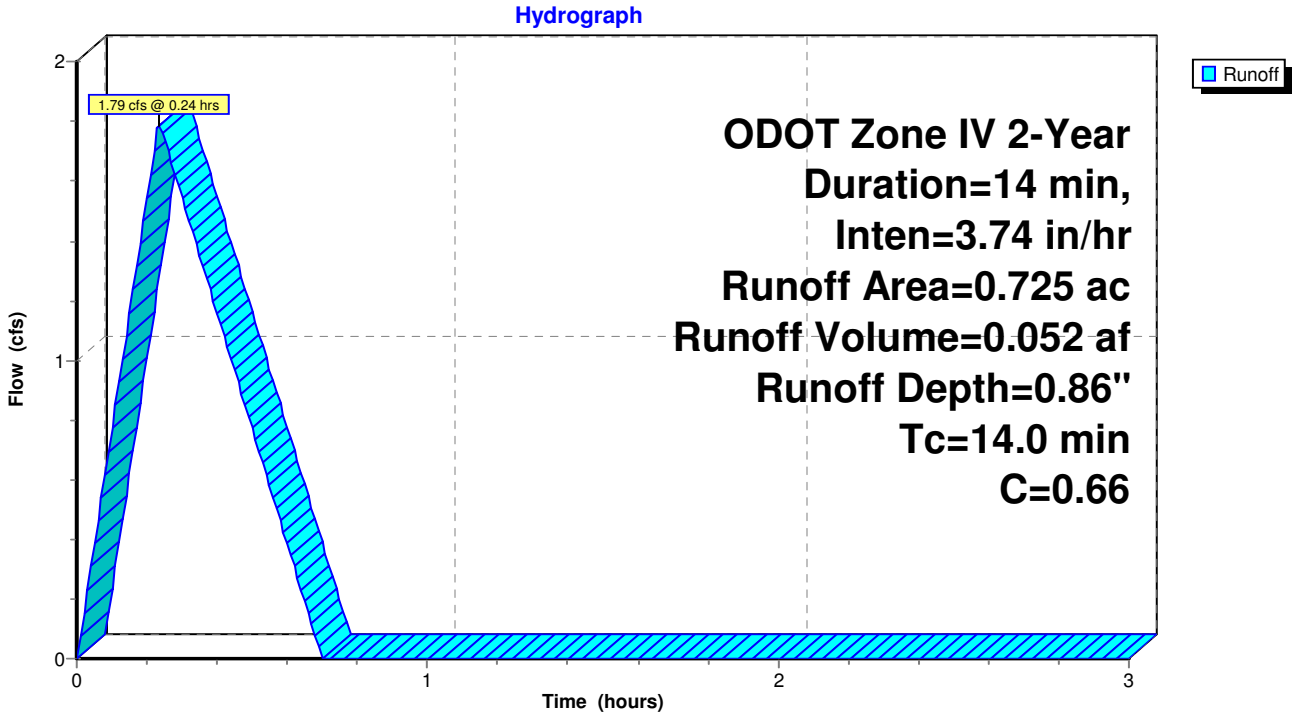
Runoff = 1.79 cfs @ 0.24 hrs, Volume= 0.052 af, Depth= 0.86"
Routed to Link DP1 : Design Point DP1

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 2-Year Duration=14 min, Inten=3.74 in/hr

Area (ac)	C	Description
0.725	0.66	
0.725		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0					**Direct Entry,**

Subcatchment DEV1.1: DEV1.1 to DP1 (Bypass)



Summary for Subcatchment DEV1.2: DEV1.2 to Pond P1.2

[48] Hint: Peak<CiA due to short duration

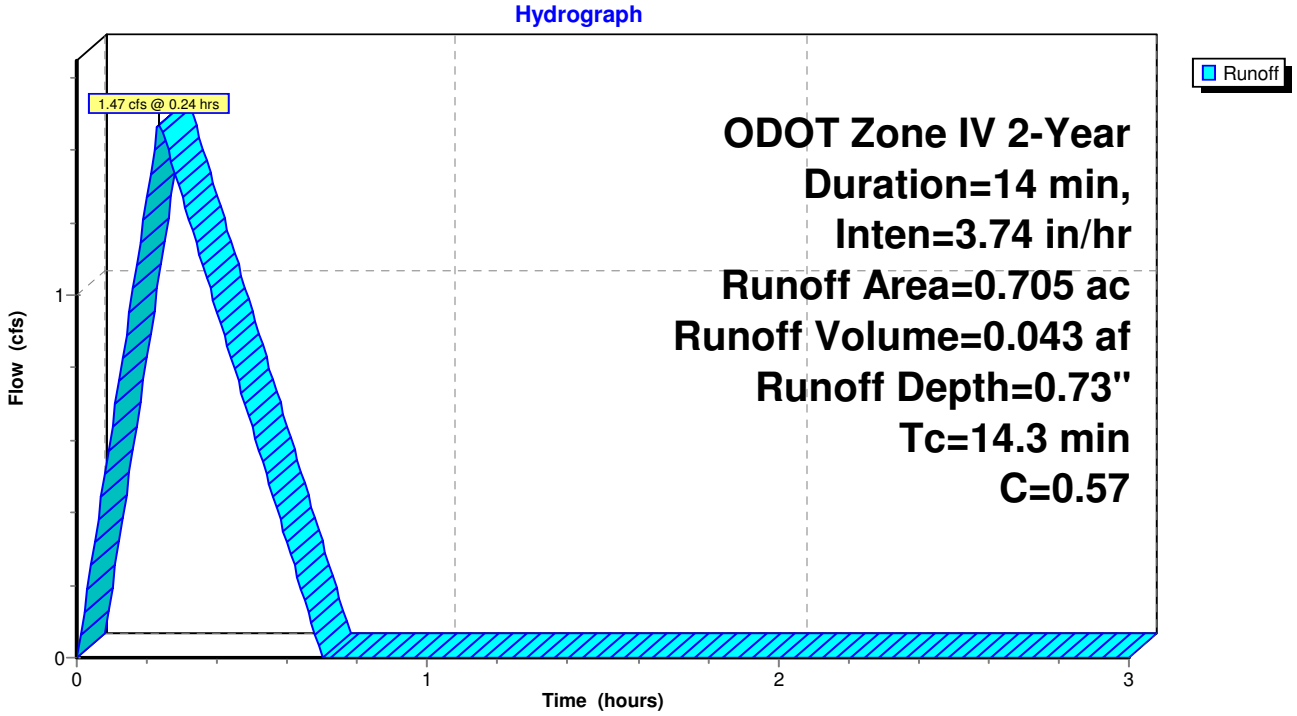
Runoff = 1.47 cfs @ 0.24 hrs, Volume= 0.043 af, Depth= 0.73"
Routed to Pond P1.2 : Detention Pond P1.2

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 2-Year Duration=14 min, Inten=3.74 in/hr

Area (ac)	C	Description
0.705	0.57	
0.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3					**Direct Entry,**

Subcatchment DEV1.2: DEV1.2 to Pond P1.2



Summary for Pond P1.2: Detention Pond P1.2

Inflow Area = 0.705 ac, 0.00% Impervious, Inflow Depth = 0.73" for 2-Year event
Inflow = 1.47 cfs @ 0.24 hrs, Volume= 0.043 af
Outflow = 0.87 cfs @ 0.43 hrs, Volume= 0.043 af, Atten= 41%, Lag= 11.5 min
Primary = 0.87 cfs @ 0.43 hrs, Volume= 0.043 af
Routed to Link DP1 : Design Point DP1

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Peak Elev= 1,057.37' @ 0.43 hrs Surf.Area= 1,115 sf Storage= 555 cf

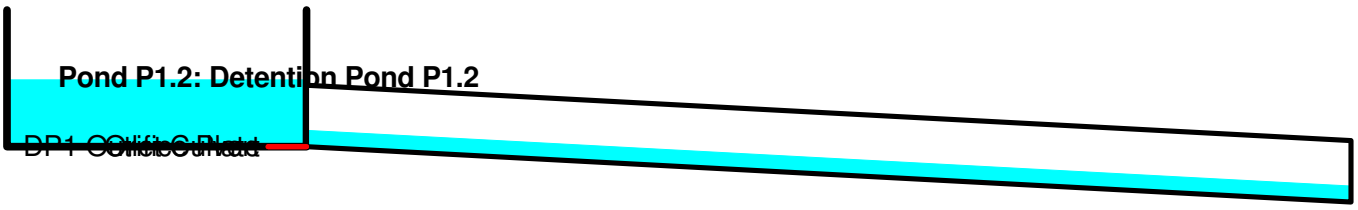
Plug-Flow detention time= 8.2 min calculated for 0.043 af (100% of inflow)
Center-of-Mass det. time= 8.0 min (26.7 - 18.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,056.28'	3,081 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

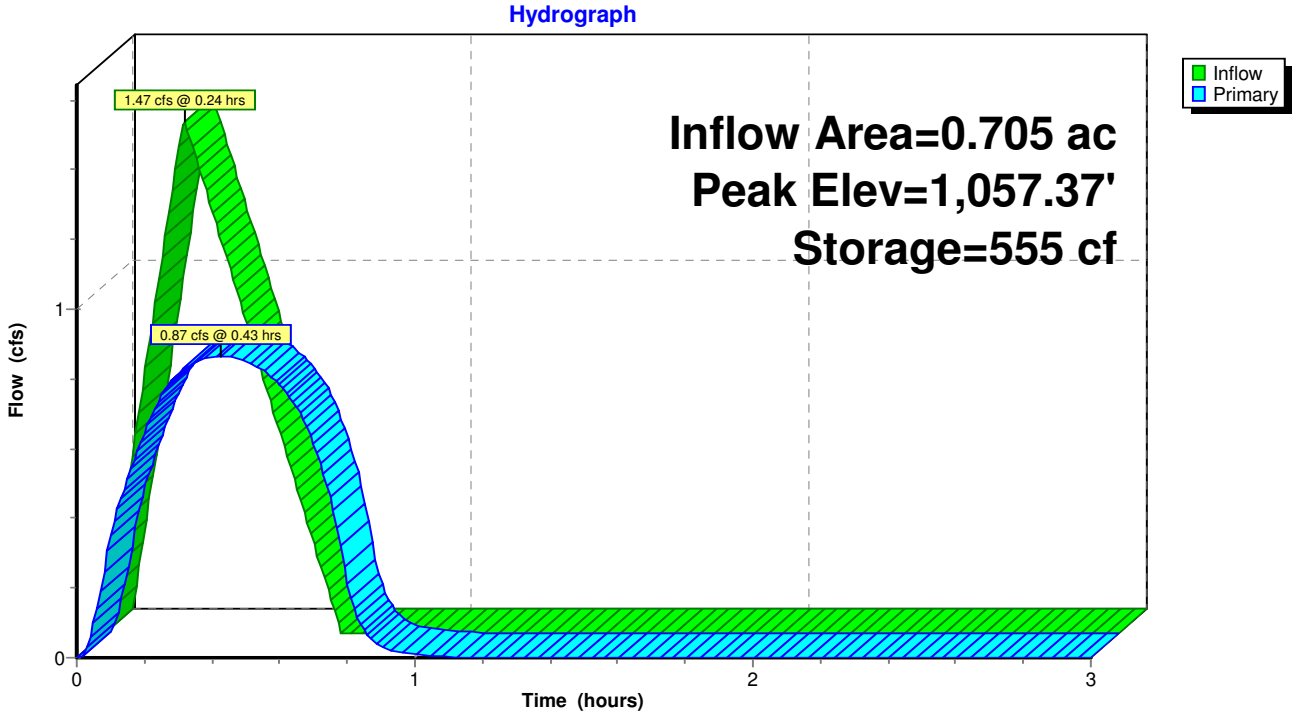
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,056.28	0	0	0
1,056.50	197	22	22
1,057.00	642	210	231
1,057.50	1,284	482	713
1,058.00	2,276	890	1,603
1,058.25	2,915	649	2,252
1,058.50	3,717	829	3,081

Device	Routing	Invert	Outlet Devices
#1	Primary	1,056.28'	**12.0" Round DP1 Outlet Culvert** L= 120.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,056.28' / 1,055.38' S= 0.0075 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,056.28'	**6.0" Vert. Orifice Plate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.87 cfs @ 0.43 hrs HW=1,057.37' TW=1,056.28' (Fixed TW Elev= 1,056.28')
↑—**1=DP1 Outlet Culvert** (Passes 0.87 cfs of 2.88 cfs potential flow)
↑—**2=Orifice Plate** (Orifice Controls 0.87 cfs @ 4.41 fps)



Pond P1.2: Detention Pond P1.2

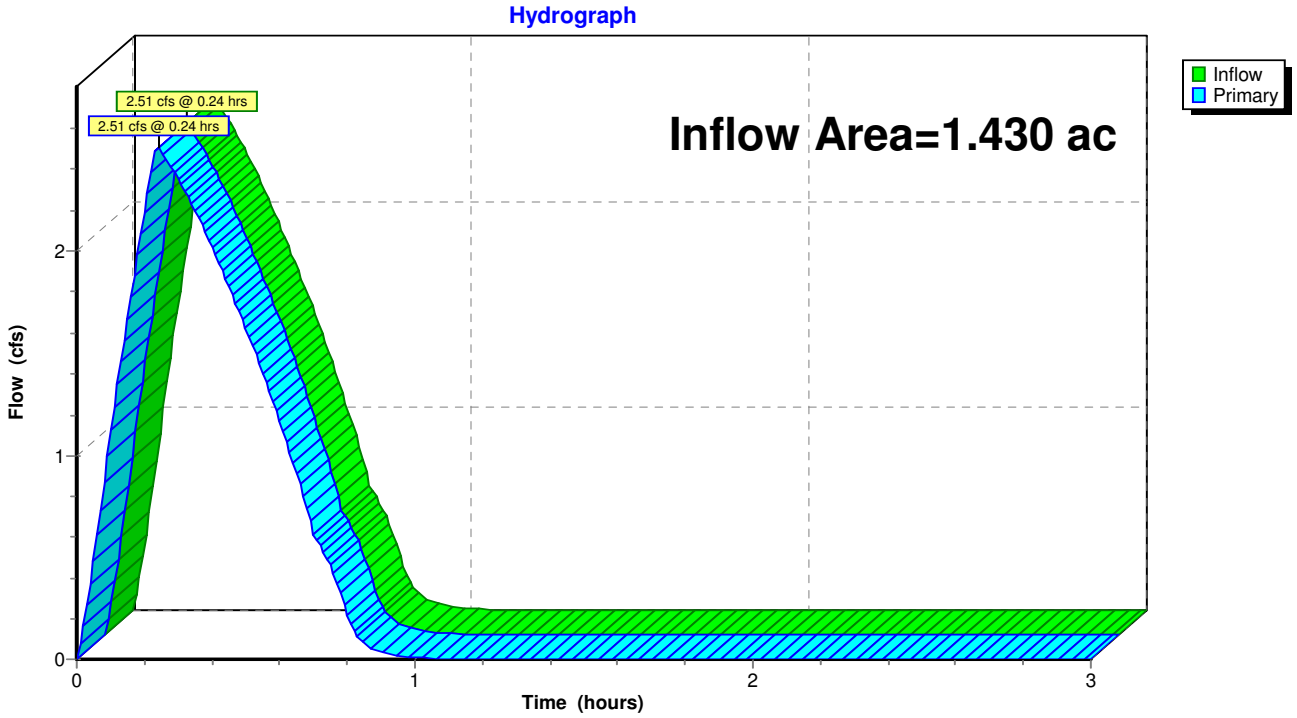


Summary for Link DP1: Design Point DP1

Inflow Area = 1.430 ac, 0.00% Impervious, Inflow Depth = 0.80" for 2-Year event
Inflow = 2.51 cfs @ 0.24 hrs, Volume= 0.095 af
Primary = 2.51 cfs @ 0.24 hrs, Volume= 0.095 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link DP1: Design Point DP1



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DEV1.1: DEV1.1 to DP1 Runoff Area=0.725 ac 0.00% Impervious Runoff Depth=1.11"
Tc=14.0 min C=0.66 Runoff=2.29 cfs 0.067 af

Subcatchment DEV1.2: DEV1.2 to Pond P1.2 Runoff Area=0.705 ac 0.00% Impervious Runoff Depth=0.94"
Tc=14.3 min C=0.57 Runoff=1.88 cfs 0.055 af

Pond P1.2: Detention Pond P1.2 Peak Elev=1,057.60' Storage=854 cf Inflow=1.88 cfs 0.055 af
Outflow=0.98 cfs 0.055 af

Link DP1: Design Point DP1 Inflow=3.10 cfs 0.122 af
Primary=3.10 cfs 0.122 af

Total Runoff Area = 1.430 ac Runoff Volume = 0.122 af Average Runoff Depth = 1.02"
100.00% Pervious = 1.430 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DEV1.1: DEV1.1 to DP1 (Bypass)

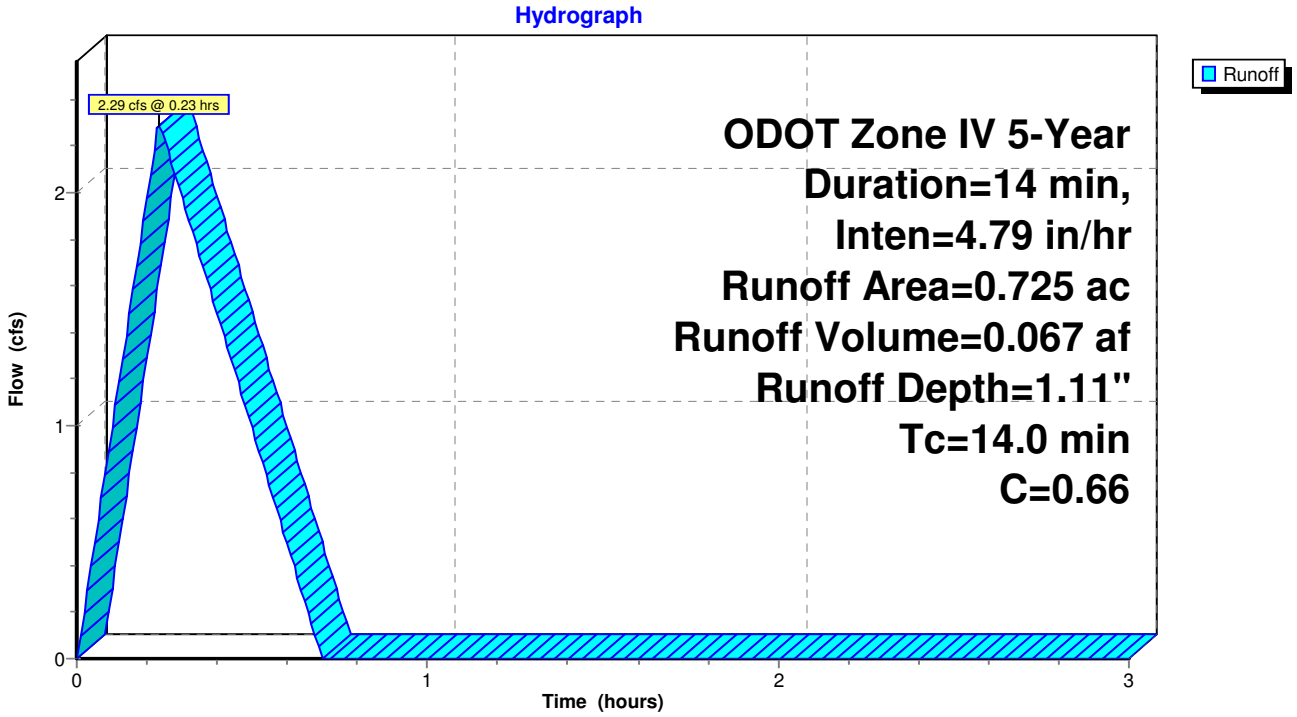
Runoff = 2.29 cfs @ 0.23 hrs, Volume= 0.067 af, Depth= 1.11"
Routed to Link DP1 : Design Point DP1

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 5-Year Duration=14 min, Inten=4.79 in/hr

Area (ac)	C	Description
0.725	0.66	
0.725		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0					**Direct Entry,**

Subcatchment DEV1.1: DEV1.1 to DP1 (Bypass)



Summary for Subcatchment DEV1.2: DEV1.2 to Pond P1.2

[48] Hint: Peak<CiA due to short duration

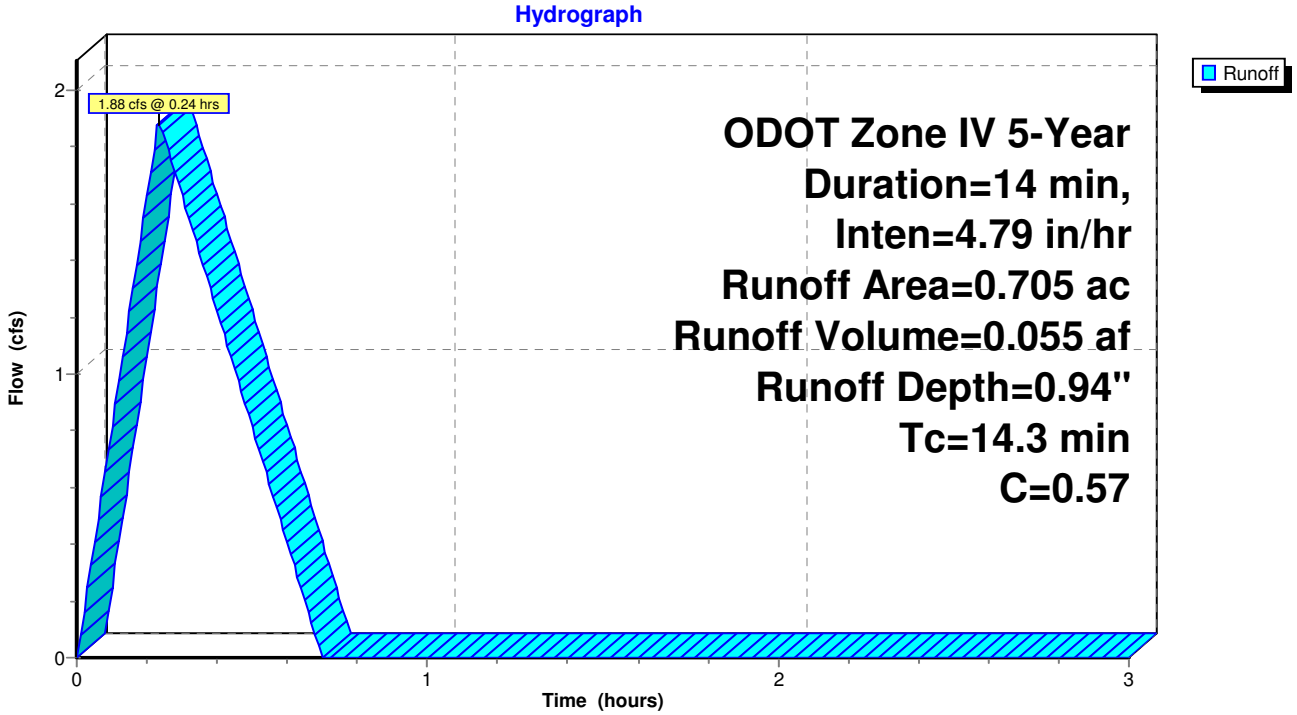
Runoff = 1.88 cfs @ 0.24 hrs, Volume= 0.055 af, Depth= 0.94"
Routed to Pond P1.2 : Detention Pond P1.2

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 5-Year Duration=14 min, Inten=4.79 in/hr

Area (ac)	C	Description
0.705	0.57	
0.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3					**Direct Entry,**

Subcatchment DEV1.2: DEV1.2 to Pond P1.2



Summary for Pond P1.2: Detention Pond P1.2

Inflow Area = 0.705 ac, 0.00% Impervious, Inflow Depth = 0.94" for 5-Year event
Inflow = 1.88 cfs @ 0.24 hrs, Volume= 0.055 af
Outflow = 0.98 cfs @ 0.46 hrs, Volume= 0.055 af, Atten= 48%, Lag= 13.5 min
Primary = 0.98 cfs @ 0.46 hrs, Volume= 0.055 af
Routed to Link DP1 : Design Point DP1

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Peak Elev= 1,057.60' @ 0.46 hrs Surf.Area= 1,485 sf Storage= 854 cf

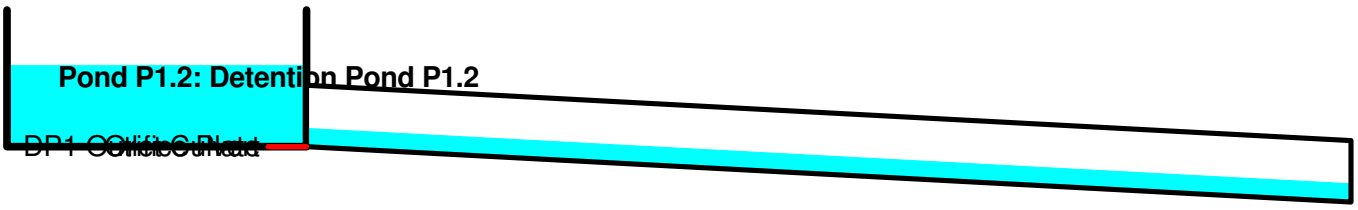
Plug-Flow detention time= 10.4 min calculated for 0.055 af (100% of inflow)
Center-of-Mass det. time= 10.5 min (29.2 - 18.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,056.28'	3,081 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

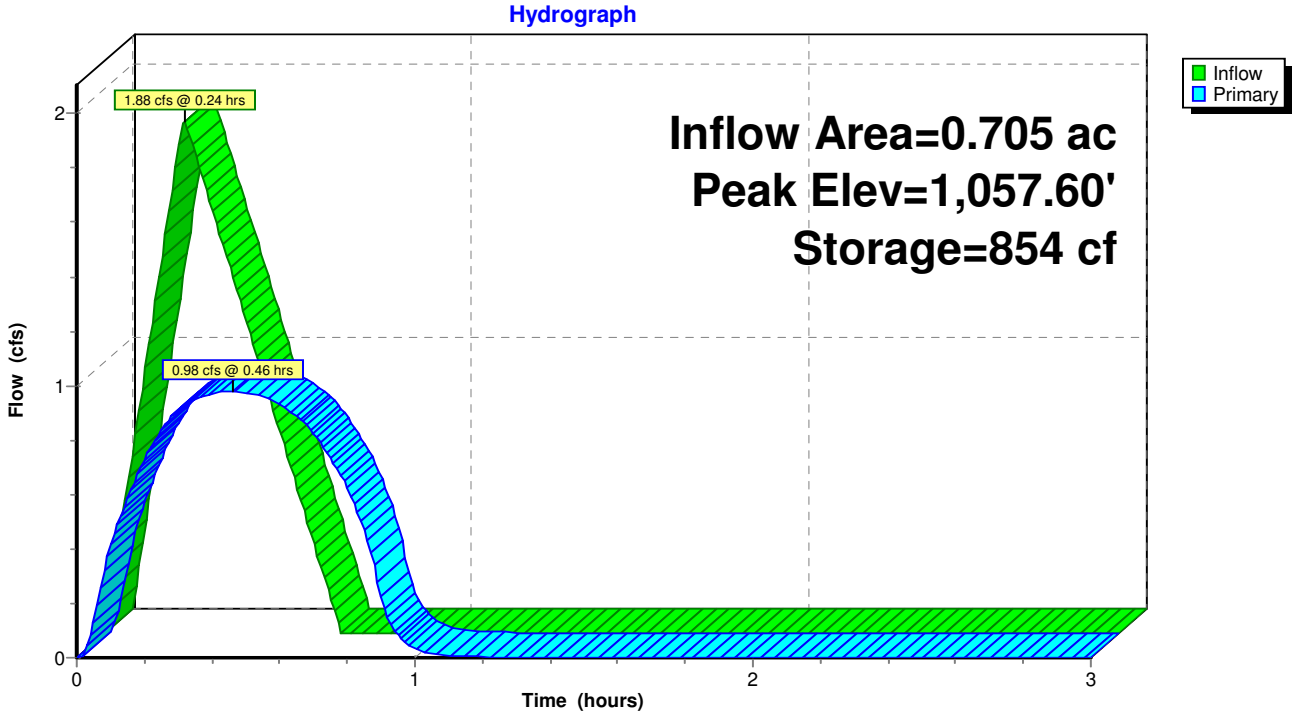
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,056.28	0	0	0
1,056.50	197	22	22
1,057.00	642	210	231
1,057.50	1,284	482	713
1,058.00	2,276	890	1,603
1,058.25	2,915	649	2,252
1,058.50	3,717	829	3,081

Device	Routing	Invert	Outlet Devices
#1	Primary	1,056.28'	**12.0" Round DP1 Outlet Culvert** L= 120.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,056.28' / 1,055.38' S= 0.0075 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,056.28'	**6.0" Vert. Orifice Plate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.98 cfs @ 0.46 hrs HW=1,057.60' TW=1,056.28' (Fixed TW Elev= 1,056.28')
↑—**1=DP1 Outlet Culvert** (Passes 0.98 cfs of 3.31 cfs potential flow)
↑—**2=Orifice Plate** (Orifice Controls 0.98 cfs @ 4.98 fps)



Pond P1.2: Detention Pond P1.2

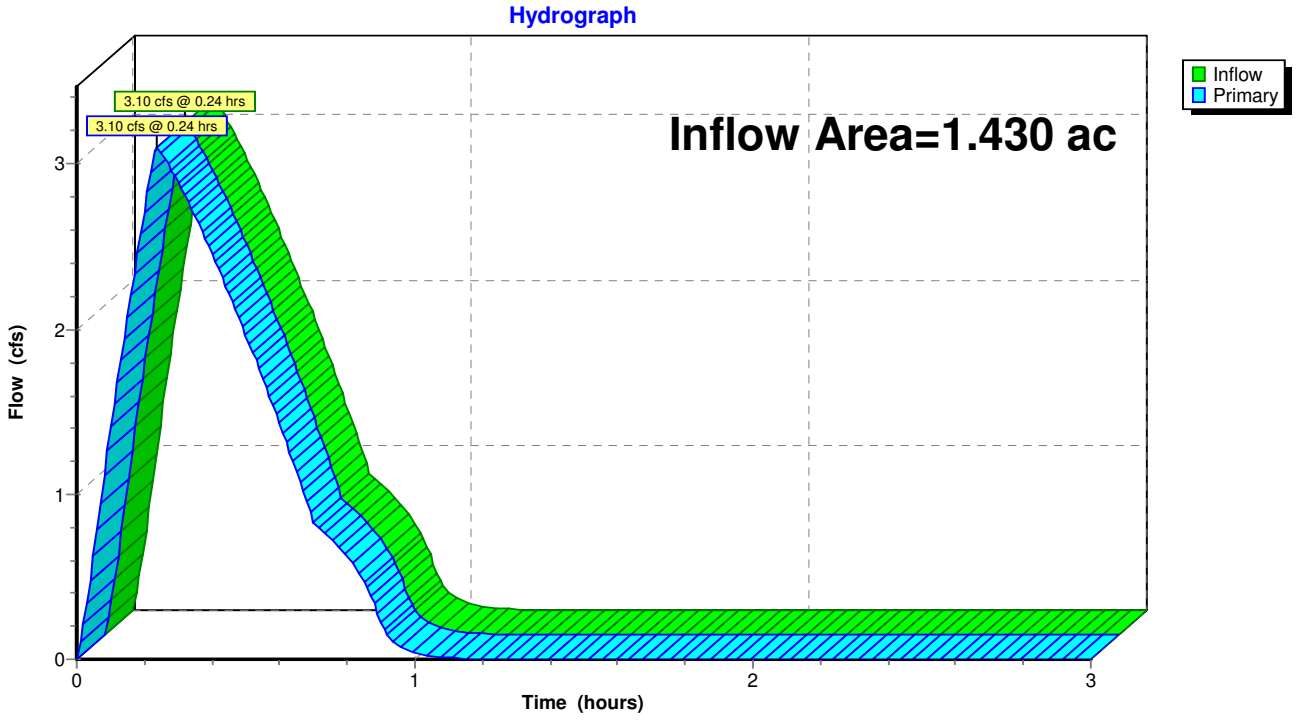


Summary for Link DP1: Design Point DP1

Inflow Area = 1.430 ac, 0.00% Impervious, Inflow Depth = 1.02" for 5-Year event
Inflow = 3.10 cfs @ 0.24 hrs, Volume= 0.122 af
Primary = 3.10 cfs @ 0.24 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link DP1: Design Point DP1



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DEV1.1: DEV1.1 to DP1 Runoff Area=0.725 ac 0.00% Impervious Runoff Depth=1.26"
Tc=14.0 min C=0.66 Runoff=2.60 cfs 0.076 af

Subcatchment DEV1.2: DEV1.2 to Pond P1.2 Runoff Area=0.705 ac 0.00% Impervious Runoff Depth=1.06"
Tc=14.3 min C=0.57 Runoff=2.13 cfs 0.062 af

Pond P1.2: Detention Pond P1.2 Peak Elev=1,057.73' Storage=1,055 cf Inflow=2.13 cfs 0.062 af
Outflow=1.03 cfs 0.062 af

Link DP1: Design Point DP1 Inflow=3.45 cfs 0.138 af
Primary=3.45 cfs 0.138 af

Total Runoff Area = 1.430 ac Runoff Volume = 0.138 af Average Runoff Depth = 1.16"
100.00% Pervious = 1.430 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DEV1.1: DEV1.1 to DP1 (Bypass)

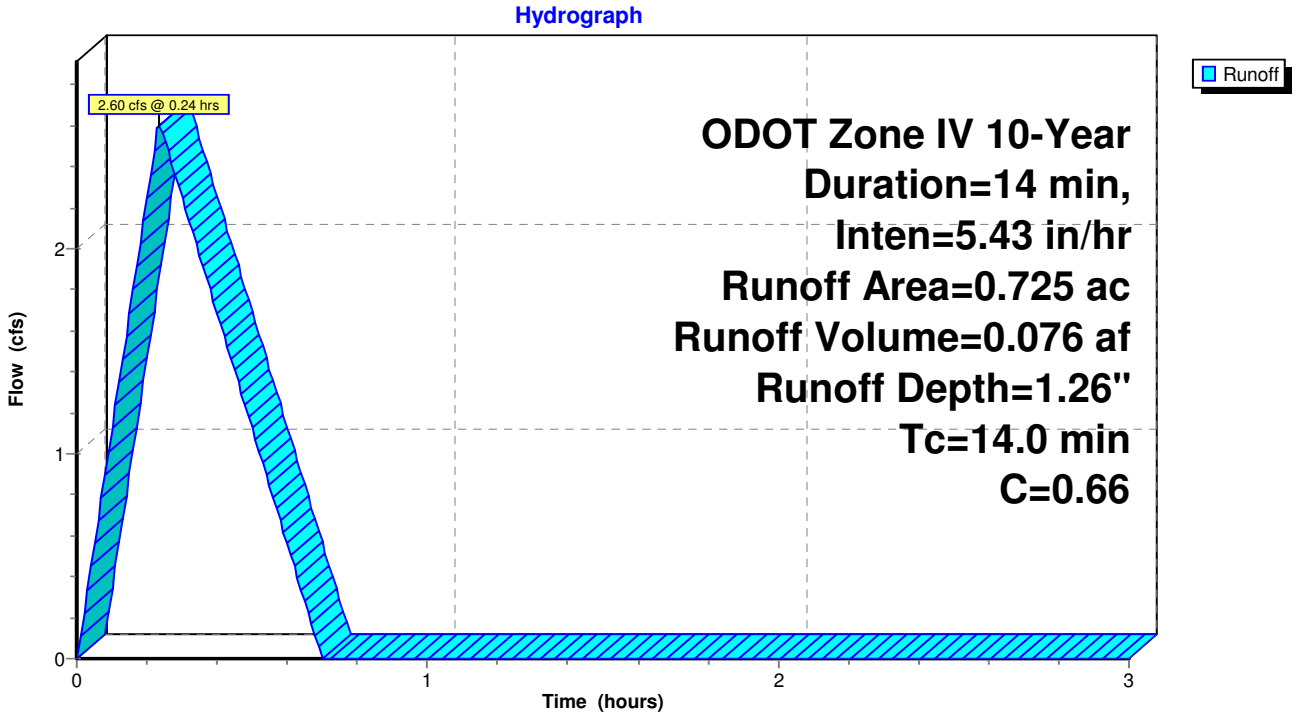
Runoff = 2.60 cfs @ 0.24 hrs, Volume= 0.076 af, Depth= 1.26"
Routed to Link DP1 : Design Point DP1

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 10-Year Duration=14 min, Inten=5.43 in/hr

Area (ac)	C	Description
0.725	0.66	
0.725		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0					**Direct Entry,**

Subcatchment DEV1.1: DEV1.1 to DP1 (Bypass)



Summary for Subcatchment DEV1.2: DEV1.2 to Pond P1.2

[48] Hint: Peak<CiA due to short duration

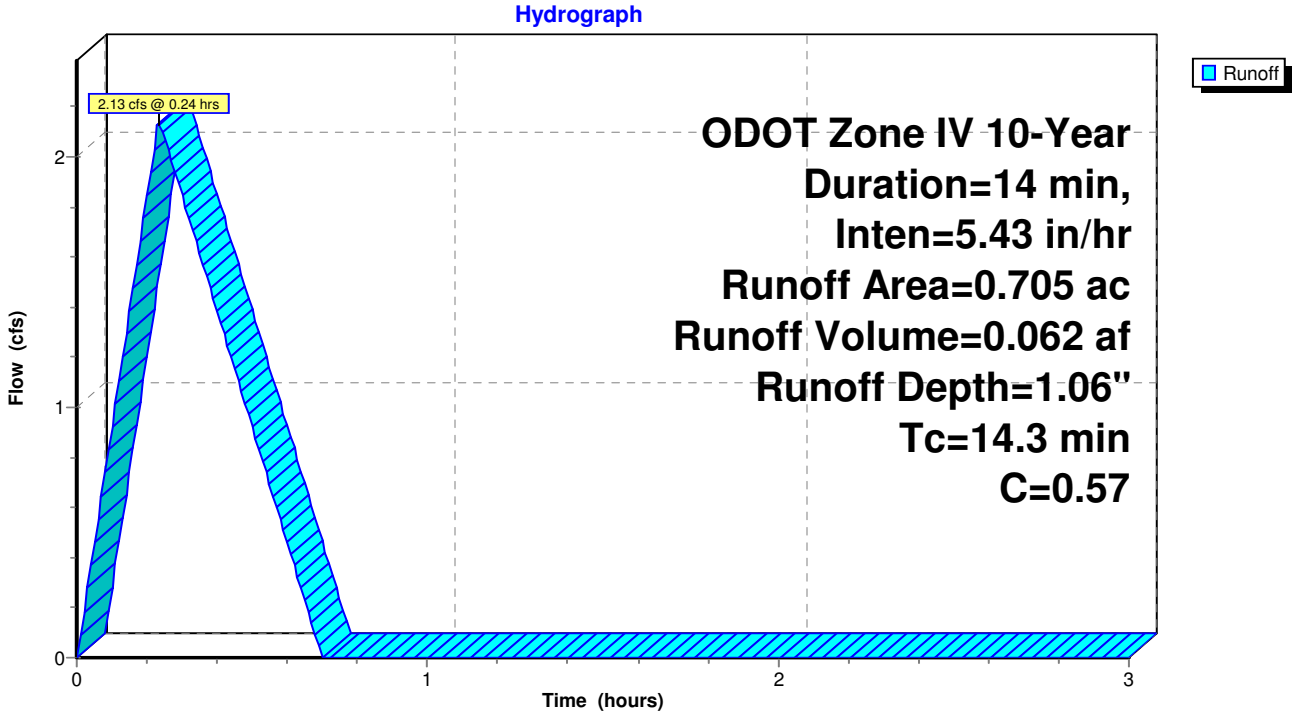
Runoff = 2.13 cfs @ 0.24 hrs, Volume= 0.062 af, Depth= 1.06"
Routed to Pond P1.2 : Detention Pond P1.2

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 10-Year Duration=14 min, Inten=5.43 in/hr

Area (ac)	C	Description
0.705	0.57	
0.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3					**Direct Entry,**

Subcatchment DEV1.2: DEV1.2 to Pond P1.2



Summary for Pond P1.2: Detention Pond P1.2

Inflow Area = 0.705 ac, 0.00% Impervious, Inflow Depth = 1.06" for 10-Year event
Inflow = 2.13 cfs @ 0.24 hrs, Volume= 0.062 af
Outflow = 1.03 cfs @ 0.48 hrs, Volume= 0.062 af, Atten= 51%, Lag= 14.5 min
Primary = 1.03 cfs @ 0.48 hrs, Volume= 0.062 af
Routed to Link DP1 : Design Point DP1

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Peak Elev= 1,057.73' @ 0.48 hrs Surf.Area= 1,734 sf Storage= 1,055 cf

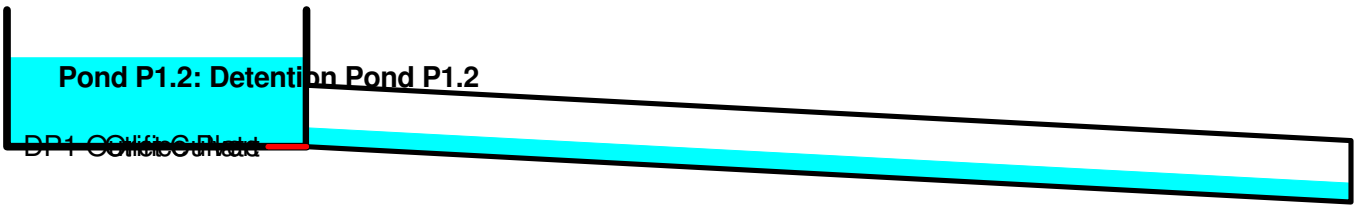
Plug-Flow detention time= 12.2 min calculated for 0.062 af (100% of inflow)
Center-of-Mass det. time= 12.0 min (30.7 - 18.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,056.28'	3,081 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

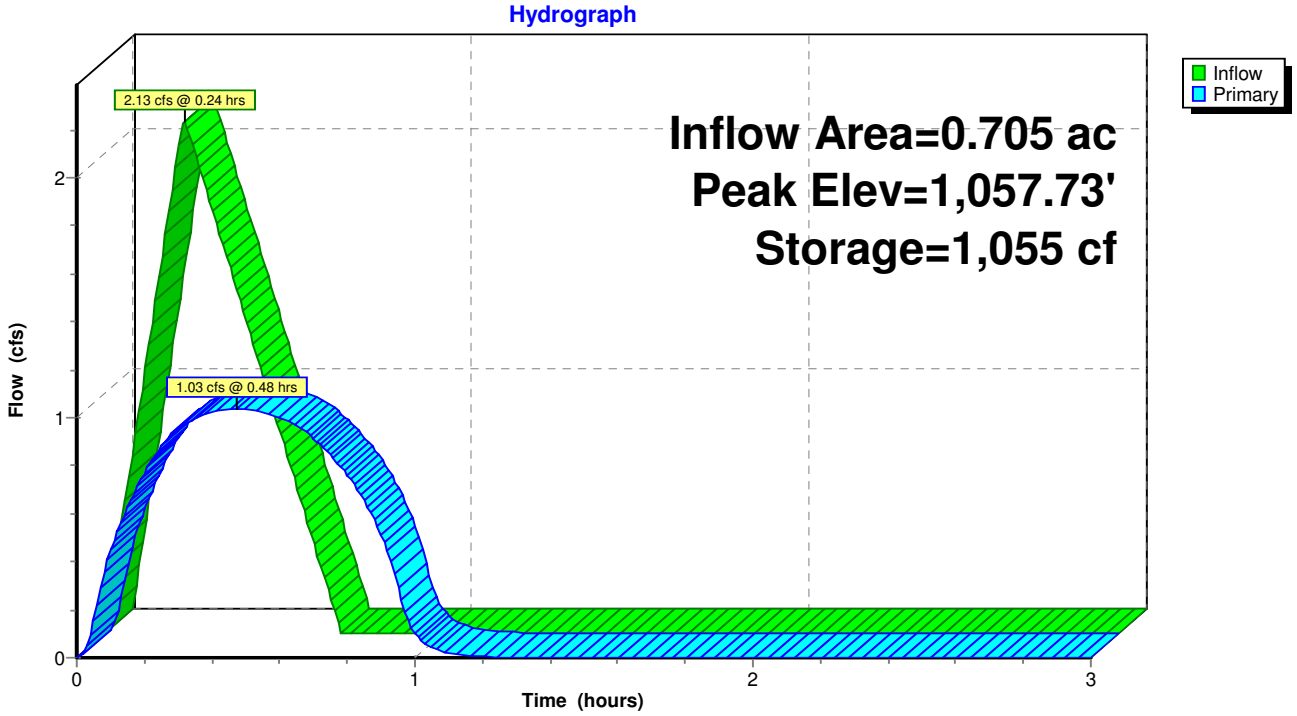
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,056.28	0	0	0
1,056.50	197	22	22
1,057.00	642	210	231
1,057.50	1,284	482	713
1,058.00	2,276	890	1,603
1,058.25	2,915	649	2,252
1,058.50	3,717	829	3,081

Device	Routing	Invert	Outlet Devices
#1	Primary	1,056.28'	**12.0" Round DP1 Outlet Culvert** L= 120.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,056.28' / 1,055.38' S= 0.0075 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,056.28'	**6.0" Vert. Orifice Plate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.03 cfs @ 0.48 hrs HW=1,057.73' TW=1,056.28' (Fixed TW Elev= 1,056.28')
↑—**1=DP1 Outlet Culvert** (Passes 1.03 cfs of 3.37 cfs potential flow)
↑—**2=Orifice Plate** (Orifice Controls 1.03 cfs @ 5.27 fps)



Pond P1.2: Detention Pond P1.2

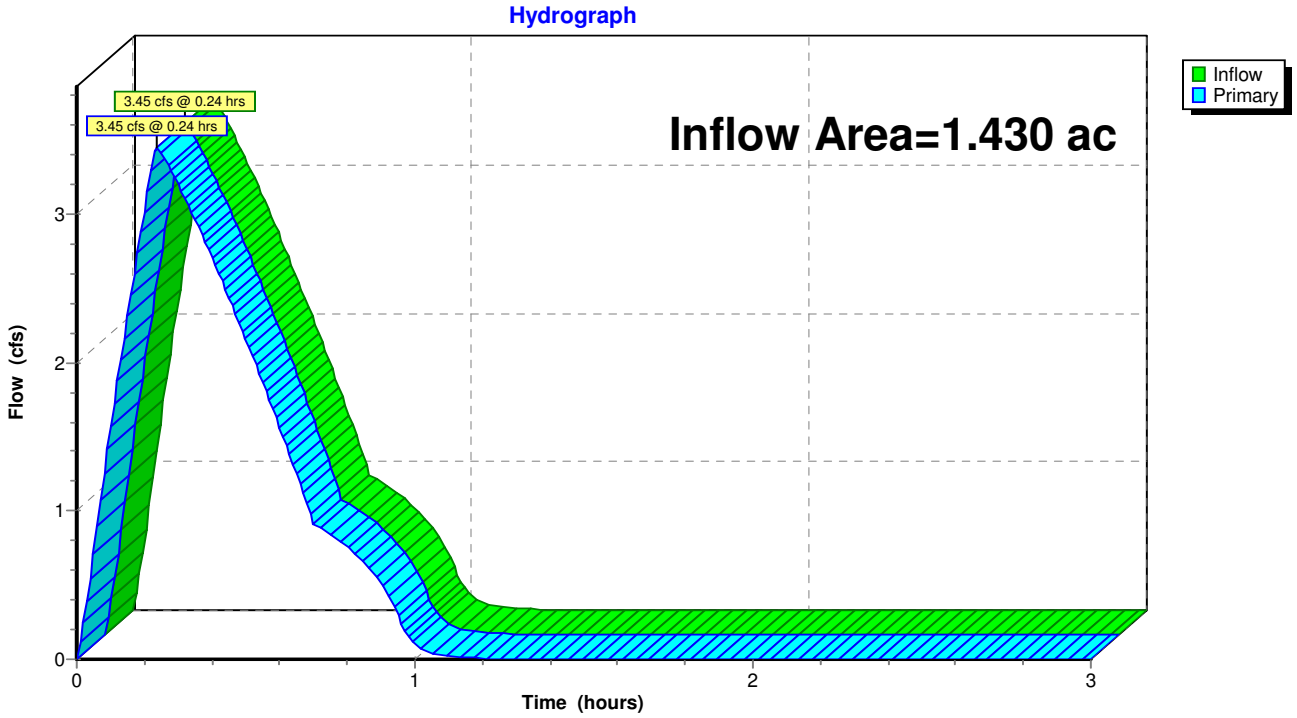


Summary for Link DP1: Design Point DP1

Inflow Area = 1.430 ac, 0.00% Impervious, Inflow Depth = 1.16" for 10-Year event
Inflow = 3.45 cfs @ 0.24 hrs, Volume= 0.138 af
Primary = 3.45 cfs @ 0.24 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link DP1: Design Point DP1



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DEV1.1: DEV1.1 to DP1 Runoff Area=0.725 ac 0.00% Impervious Runoff Depth=1.47"
Tc=14.0 min C=0.66 Runoff=3.05 cfs 0.089 af

Subcatchment DEV1.2: DEV1.2 to Pond P1.2 Runoff Area=0.705 ac 0.00% Impervious Runoff Depth=1.25"
Tc=14.3 min C=0.57 Runoff=2.50 cfs 0.073 af

Pond P1.2: Detention Pond P1.2 Peak Elev=1,057.89' Storage=1,372 cf Inflow=2.50 cfs 0.073 af
Outflow=1.10 cfs 0.073 af

Link DP1: Design Point DP1 Inflow=3.95 cfs 0.162 af
Primary=3.95 cfs 0.162 af

Total Runoff Area = 1.430 ac Runoff Volume = 0.162 af Average Runoff Depth = 1.36"
100.00% Pervious = 1.430 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DEV1.1: DEV1.1 to DP1 (Bypass)

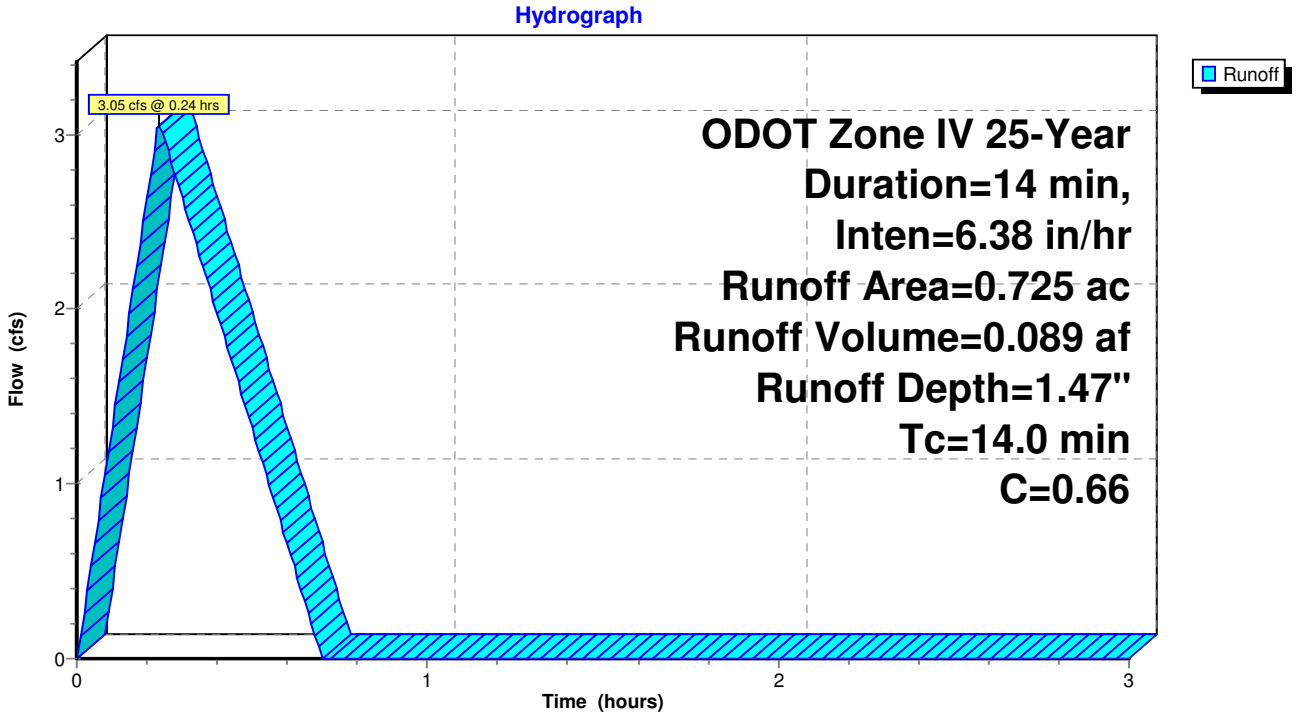
Runoff = 3.05 cfs @ 0.24 hrs, Volume= 0.089 af, Depth= 1.47"
Routed to Link DP1 : Design Point DP1

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 25-Year Duration=14 min, Inten=6.38 in/hr

Area (ac)	C	Description
0.725	0.66	
0.725		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0					**Direct Entry,**

Subcatchment DEV1.1: DEV1.1 to DP1 (Bypass)



Summary for Subcatchment DEV1.2: DEV1.2 to Pond P1.2

[48] Hint: Peak<CiA due to short duration

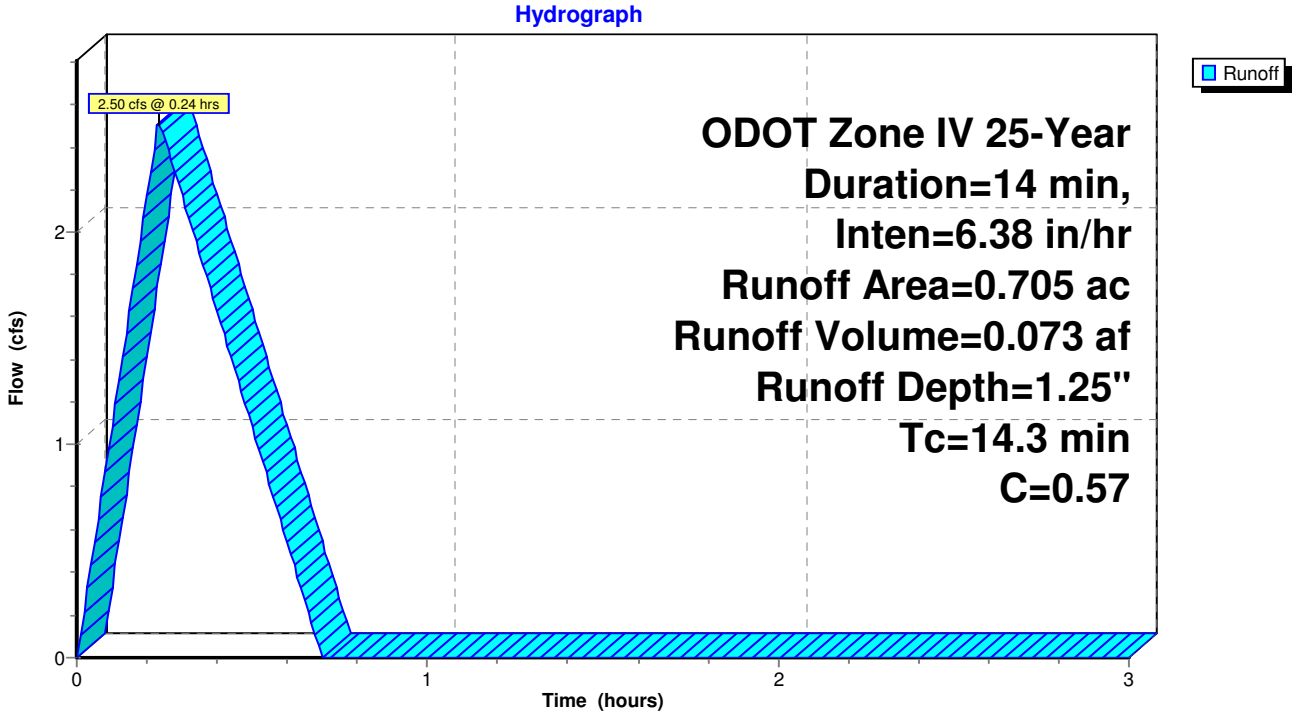
Runoff = 2.50 cfs @ 0.24 hrs, Volume= 0.073 af, Depth= 1.25"
Routed to Pond P1.2 : Detention Pond P1.2

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 25-Year Duration=14 min, Inten=6.38 in/hr

Area (ac)	C	Description
0.705	0.57	
0.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3					**Direct Entry,**

Subcatchment DEV1.2: DEV1.2 to Pond P1.2



Summary for Pond P1.2: Detention Pond P1.2

Inflow Area = 0.705 ac, 0.00% Impervious, Inflow Depth = 1.25" for 25-Year event
Inflow = 2.50 cfs @ 0.24 hrs, Volume= 0.073 af
Outflow = 1.10 cfs @ 0.50 hrs, Volume= 0.073 af, Atten= 56%, Lag= 15.7 min
Primary = 1.10 cfs @ 0.50 hrs, Volume= 0.073 af
Routed to Link DP1 : Design Point DP1

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Peak Elev= 1,057.89' @ 0.50 hrs Surf.Area= 2,065 sf Storage= 1,372 cf

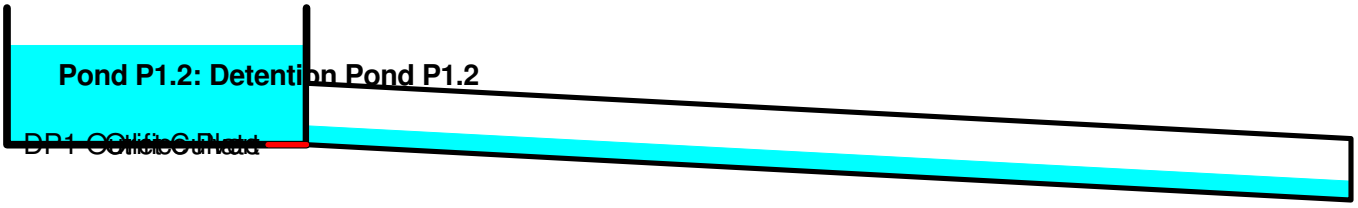
Plug-Flow detention time= 14.2 min calculated for 0.073 af (100% of inflow)
Center-of-Mass det. time= 14.3 min (33.0 - 18.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,056.28'	3,081 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

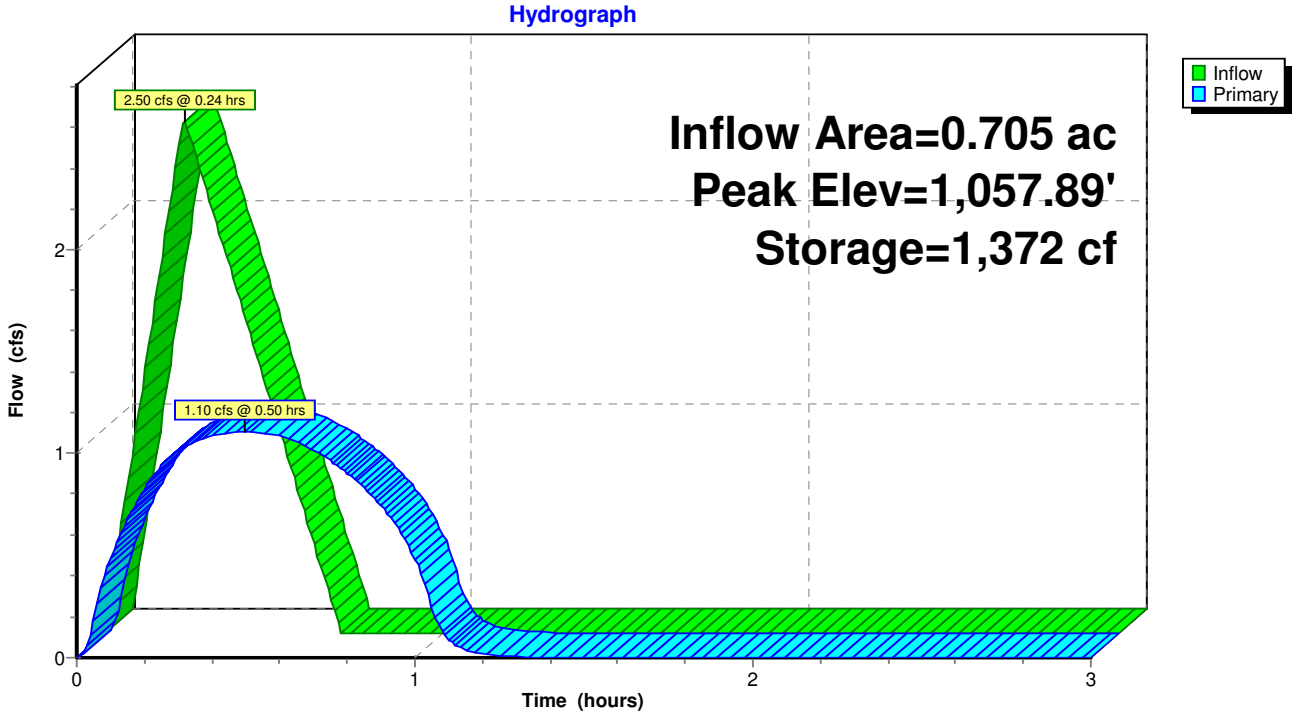
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,056.28	0	0	0
1,056.50	197	22	22
1,057.00	642	210	231
1,057.50	1,284	482	713
1,058.00	2,276	890	1,603
1,058.25	2,915	649	2,252
1,058.50	3,717	829	3,081

Device	Routing	Invert	Outlet Devices
#1	Primary	1,056.28'	**12.0" Round DP1 Outlet Culvert** L= 120.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,056.28' / 1,055.38' S= 0.0075 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,056.28'	**6.0" Vert. Orifice Plate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.10 cfs @ 0.50 hrs HW=1,057.89' TW=1,056.28' (Fixed TW Elev= 1,056.28')
↑—**1=DP1 Outlet Culvert** (Passes 1.10 cfs of 3.57 cfs potential flow)
↑—**2=Orifice Plate** (Orifice Controls 1.10 cfs @ 5.62 fps)



Pond P1.2: Detention Pond P1.2

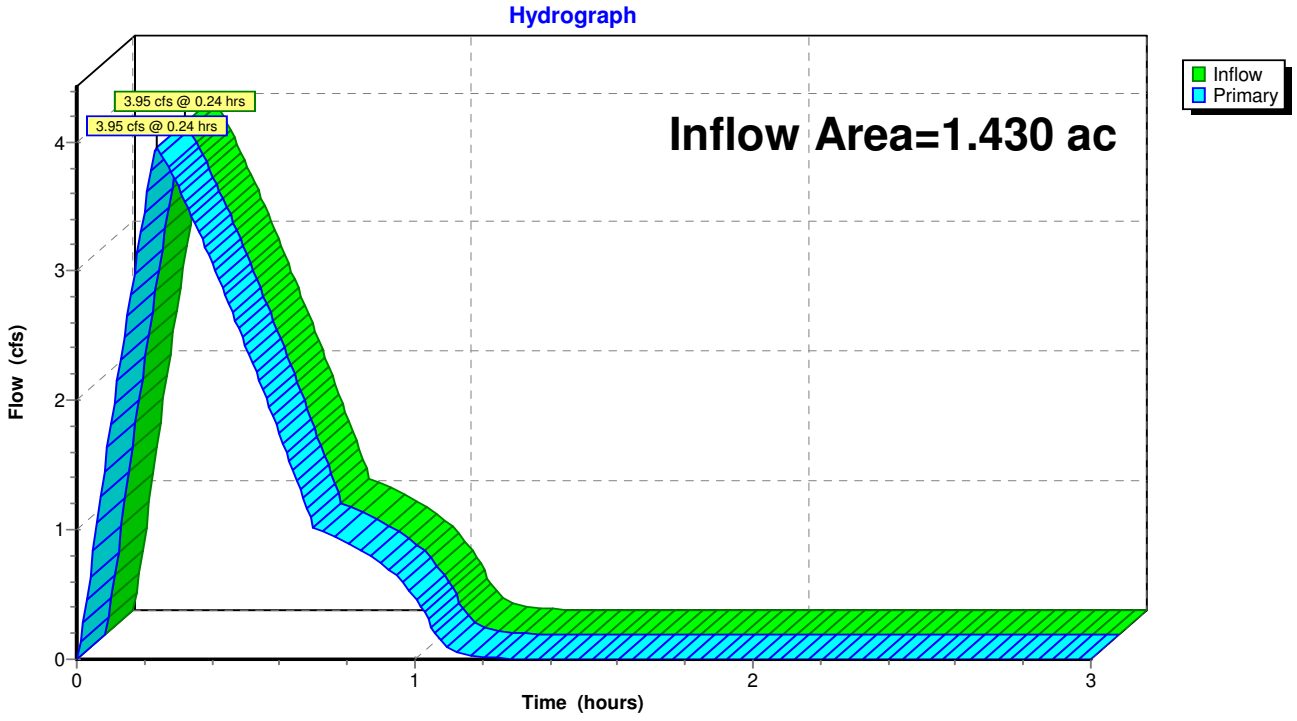


Summary for Link DP1: Design Point DP1

Inflow Area = 1.430 ac, 0.00% Impervious, Inflow Depth = 1.36" for 25-Year event
Inflow = 3.95 cfs @ 0.24 hrs, Volume= 0.162 af
Primary = 3.95 cfs @ 0.24 hrs, Volume= 0.162 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link DP1: Design Point DP1



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DEV1.1: DEV1.1 to DP1 Runoff Area=0.725 ac 0.00% Impervious Runoff Depth=1.66"
Tc=14.0 min C=0.66 Runoff=3.43 cfs 0.100 af

Subcatchment DEV1.2: DEV1.2 to Pond P1.2 Runoff Area=0.705 ac 0.00% Impervious Runoff Depth=1.40"
Tc=14.3 min C=0.57 Runoff=2.81 cfs 0.082 af

Pond P1.2: Detention Pond P1.2 Peak Elev=1,058.02' Storage=1,651 cf Inflow=2.81 cfs 0.082 af
Outflow=1.15 cfs 0.082 af

Link DP1: Design Point DP1 Inflow=4.37 cfs 0.182 af
Primary=4.37 cfs 0.182 af

Total Runoff Area = 1.430 ac Runoff Volume = 0.182 af Average Runoff Depth = 1.53"
100.00% Pervious = 1.430 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DEV1.1: DEV1.1 to DP1 (Bypass)

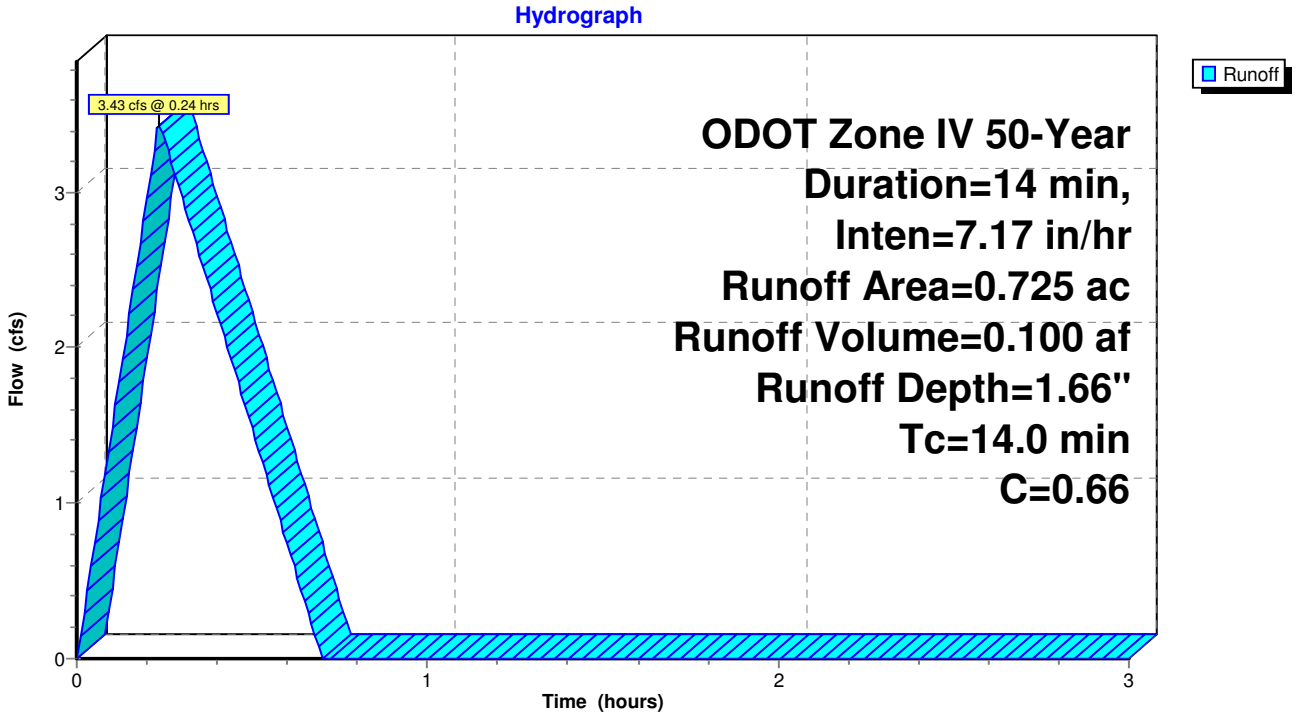
Runoff = 3.43 cfs @ 0.24 hrs, Volume= 0.100 af, Depth= 1.66"
Routed to Link DP1 : Design Point DP1

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 50-Year Duration=14 min, Inten=7.17 in/hr

Area (ac)	C	Description
0.725	0.66	
0.725		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0					**Direct Entry,**

Subcatchment DEV1.1: DEV1.1 to DP1 (Bypass)



Summary for Subcatchment DEV1.2: DEV1.2 to Pond P1.2

[48] Hint: Peak<CiA due to short duration

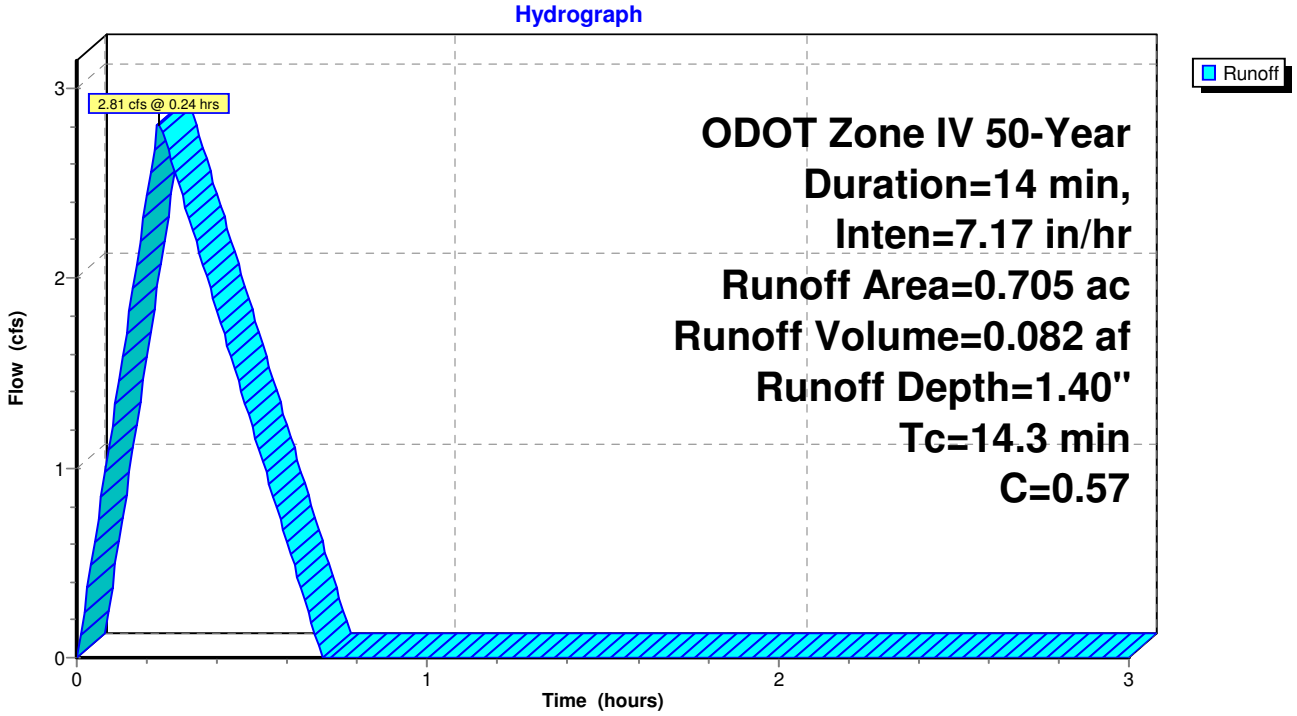
Runoff = 2.81 cfs @ 0.24 hrs, Volume= 0.082 af, Depth= 1.40"
Routed to Pond P1.2 : Detention Pond P1.2

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 50-Year Duration=14 min, Inten=7.17 in/hr

Area (ac)	C	Description
0.705	0.57	
0.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3					**Direct Entry,**

Subcatchment DEV1.2: DEV1.2 to Pond P1.2



Summary for Pond P1.2: Detention Pond P1.2

Inflow Area = 0.705 ac, 0.00% Impervious, Inflow Depth = 1.40" for 50-Year event
Inflow = 2.81 cfs @ 0.24 hrs, Volume= 0.082 af
Outflow = 1.15 cfs @ 0.51 hrs, Volume= 0.082 af, Atten= 59%, Lag= 16.5 min
Primary = 1.15 cfs @ 0.51 hrs, Volume= 0.082 af
Routed to Link DP1 : Design Point DP1

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Peak Elev= 1,058.02' @ 0.51 hrs Surf.Area= 2,329 sf Storage= 1,651 cf

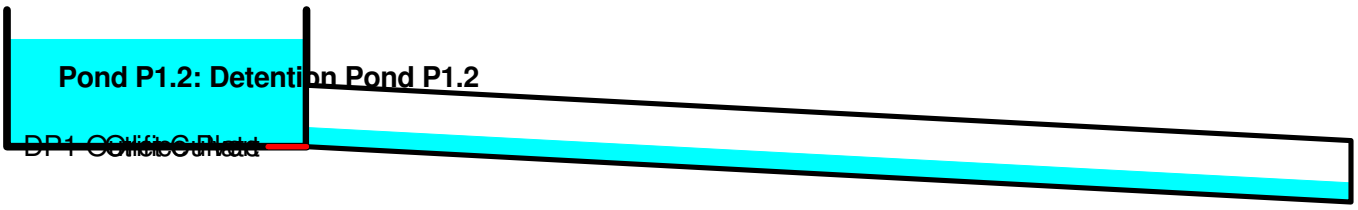
Plug-Flow detention time= 16.1 min calculated for 0.082 af (100% of inflow)
Center-of-Mass det. time= 16.2 min (34.9 - 18.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,056.28'	3,081 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

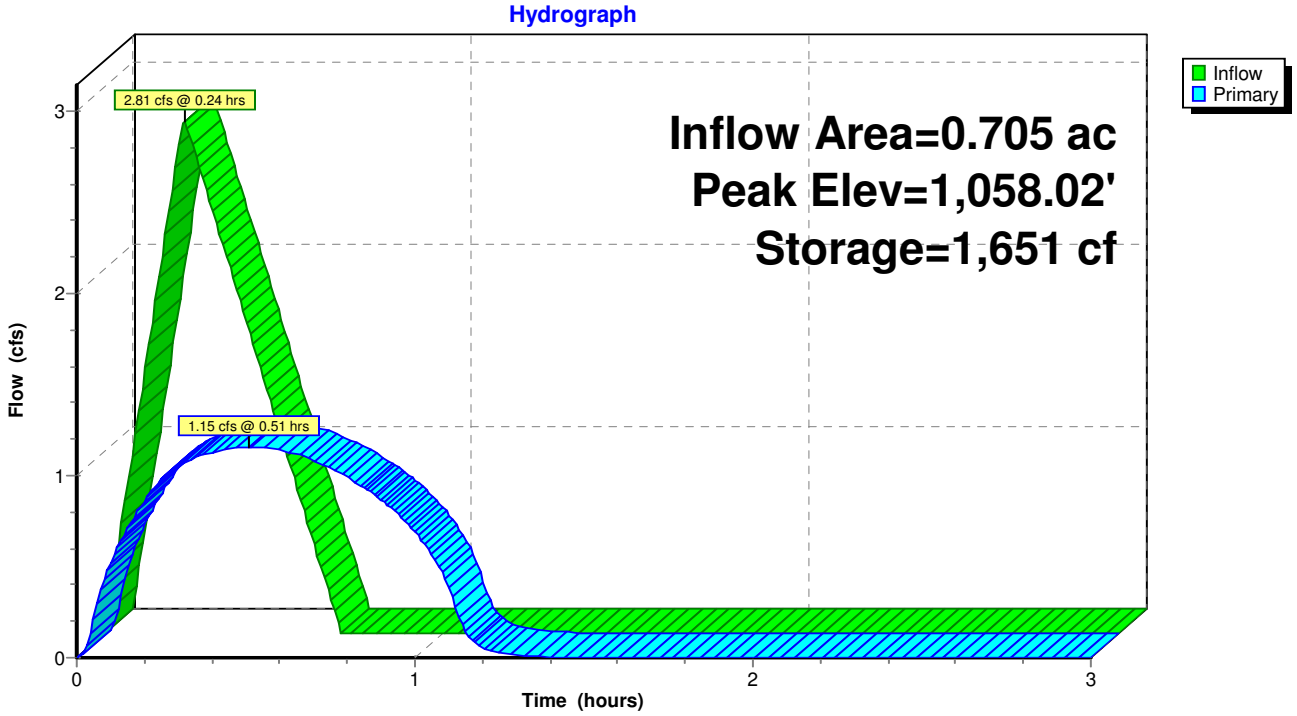
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,056.28	0	0	0
1,056.50	197	22	22
1,057.00	642	210	231
1,057.50	1,284	482	713
1,058.00	2,276	890	1,603
1,058.25	2,915	649	2,252
1,058.50	3,717	829	3,081

Device	Routing	Invert	Outlet Devices
#1	Primary	1,056.28'	**12.0" Round DP1 Outlet Culvert** L= 120.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,056.28' / 1,055.38' S= 0.0075 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,056.28'	**6.0" Vert. Orifice Plate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.15 cfs @ 0.51 hrs HW=1,058.02' TW=1,056.28' (Fixed TW Elev= 1,056.28')
↑—**1=DP1 Outlet Culvert** (Passes 1.15 cfs of 3.72 cfs potential flow)
↑—**2=Orifice Plate** (Orifice Controls 1.15 cfs @ 5.88 fps)



Pond P1.2: Detention Pond P1.2

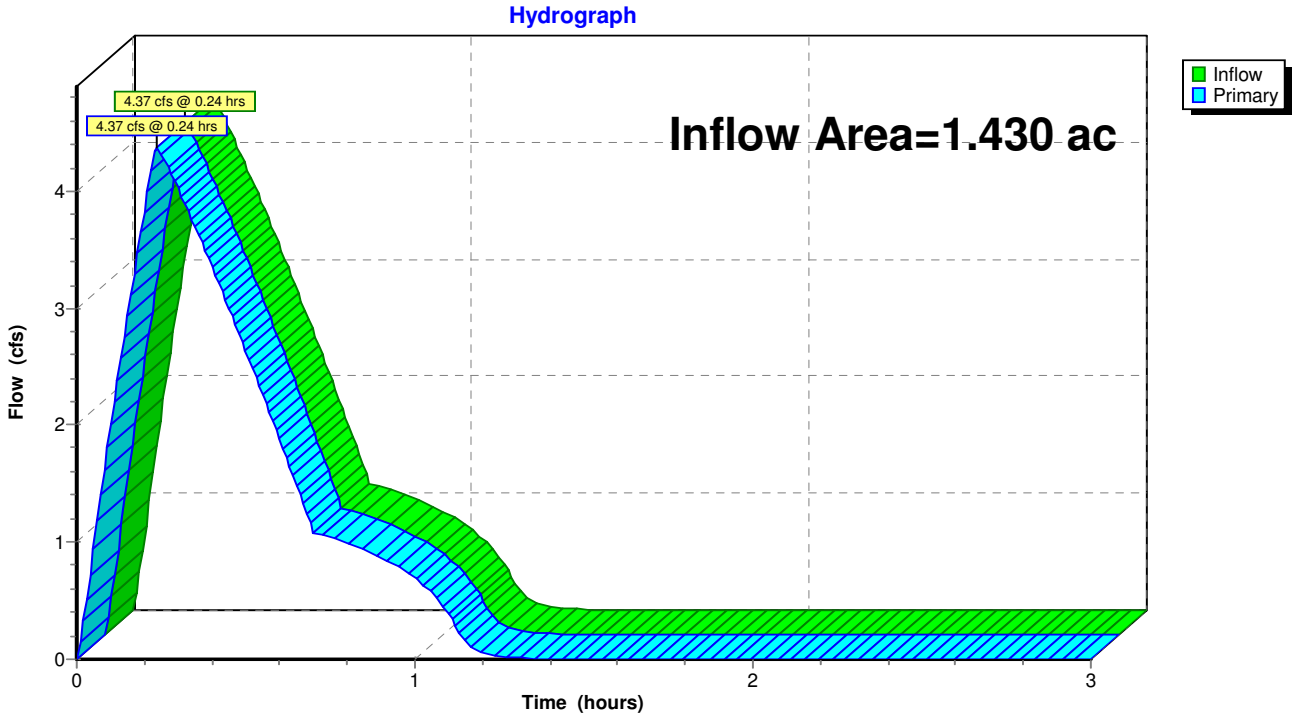


Summary for Link DP1: Design Point DP1

Inflow Area = 1.430 ac, 0.00% Impervious, Inflow Depth = 1.53" for 50-Year event
Inflow = 4.37 cfs @ 0.24 hrs, Volume= 0.182 af
Primary = 4.37 cfs @ 0.24 hrs, Volume= 0.182 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link DP1: Design Point DP1



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/2.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DEV1.1: DEV1.1 to DP1 Runoff Area=0.725 ac 0.00% Impervious Runoff Depth=1.81"
Tc=14.0 min C=0.66 Runoff=3.75 cfs 0.109 af

Subcatchment DEV1.2: DEV1.2 to Pond P1.2 Runoff Area=0.705 ac 0.00% Impervious Runoff Depth=1.53"
Tc=14.3 min C=0.57 Runoff=3.08 cfs 0.090 af

Pond P1.2: Detention Pond P1.2 Peak Elev=1,058.12' Storage=1,900 cf Inflow=3.08 cfs 0.090 af
Outflow=1.19 cfs 0.090 af

Link DP1: Design Point DP1 Inflow=4.72 cfs 0.199 af
Primary=4.72 cfs 0.199 af

Total Runoff Area = 1.430 ac Runoff Volume = 0.199 af Average Runoff Depth = 1.67"
100.00% Pervious = 1.430 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DEV1.1: DEV1.1 to DP1 (Bypass)

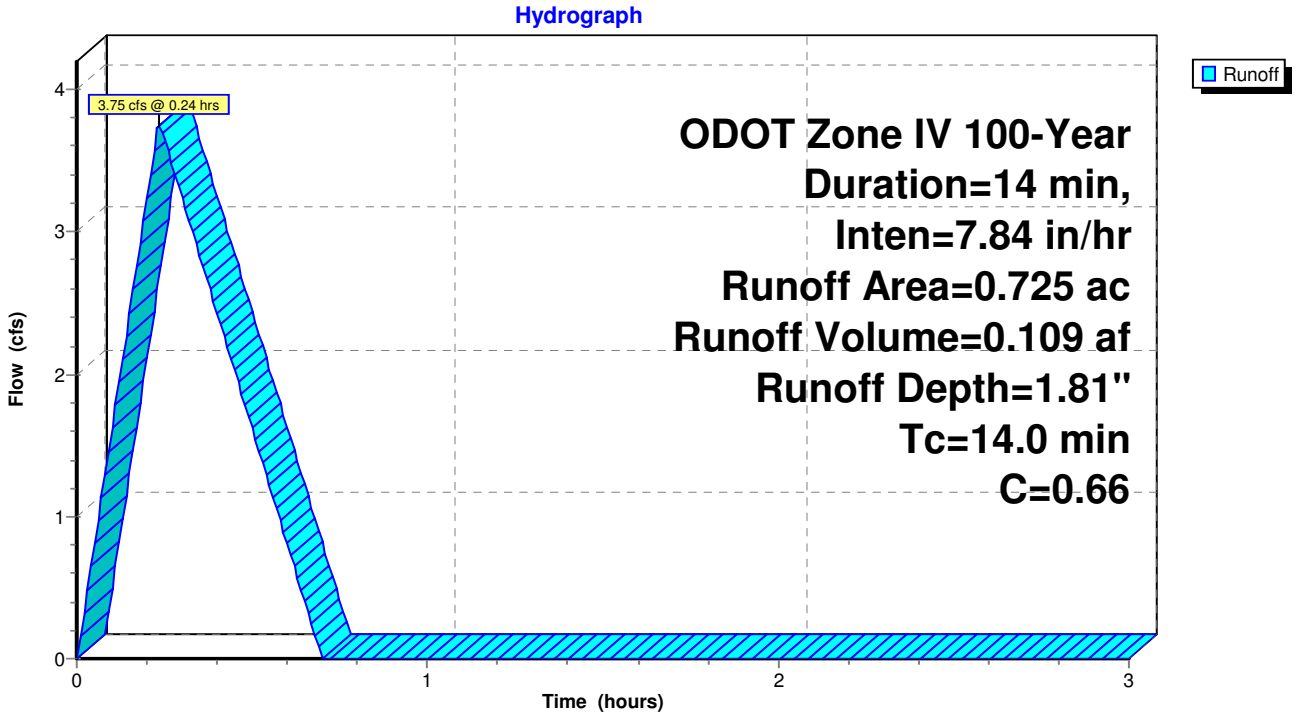
Runoff = 3.75 cfs @ 0.24 hrs, Volume= 0.109 af, Depth= 1.81"
Routed to Link DP1 : Design Point DP1

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 100-Year Duration=14 min, Inten=7.84 in/hr

Area (ac)	C	Description
0.725	0.66	
0.725		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0					**Direct Entry,**

Subcatchment DEV1.1: DEV1.1 to DP1 (Bypass)



Summary for Subcatchment DEV1.2: DEV1.2 to Pond P1.2

[48] Hint: Peak<CiA due to short duration

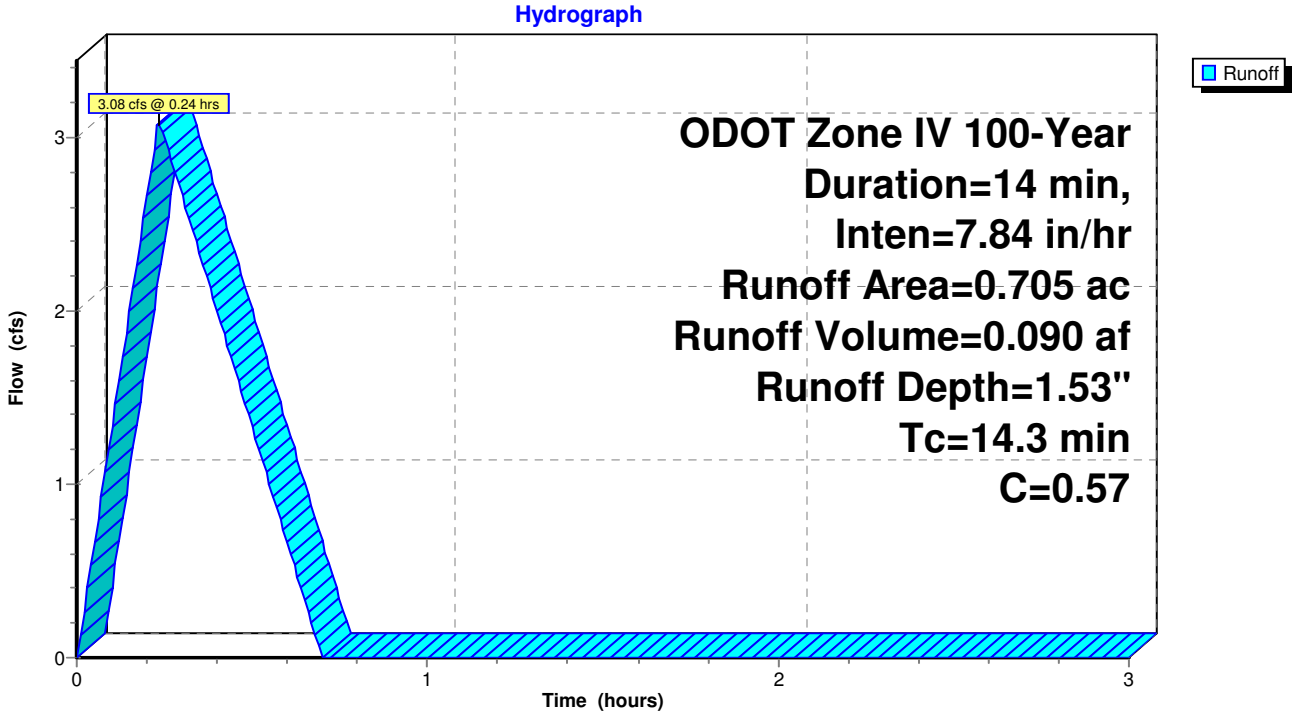
Runoff = 3.08 cfs @ 0.24 hrs, Volume= 0.090 af, Depth= 1.53"
Routed to Pond P1.2 : Detention Pond P1.2

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
ODOT Zone IV 100-Year Duration=14 min, Inten=7.84 in/hr

Area (ac)	C	Description
0.705	0.57	
0.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3					**Direct Entry,**

Subcatchment DEV1.2: DEV1.2 to Pond P1.2



Summary for Pond P1.2: Detention Pond P1.2

Inflow Area = 0.705 ac, 0.00% Impervious, Inflow Depth = 1.53" for 100-Year event
Inflow = 3.08 cfs @ 0.24 hrs, Volume= 0.090 af
Outflow = 1.19 cfs @ 0.52 hrs, Volume= 0.090 af, Atten= 61%, Lag= 17.2 min
Primary = 1.19 cfs @ 0.52 hrs, Volume= 0.090 af
Routed to Link DP1 : Design Point DP1

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Peak Elev= 1,058.12' @ 0.52 hrs Surf.Area= 2,588 sf Storage= 1,900 cf

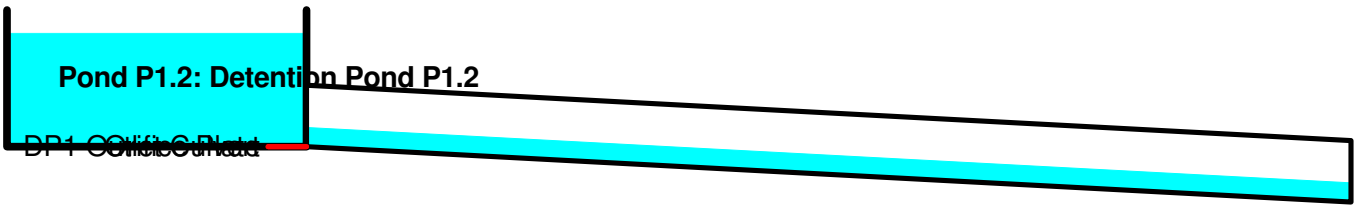
Plug-Flow detention time= 18.0 min calculated for 0.090 af (100% of inflow)
Center-of-Mass det. time= 17.8 min (36.5 - 18.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,056.28'	3,081 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

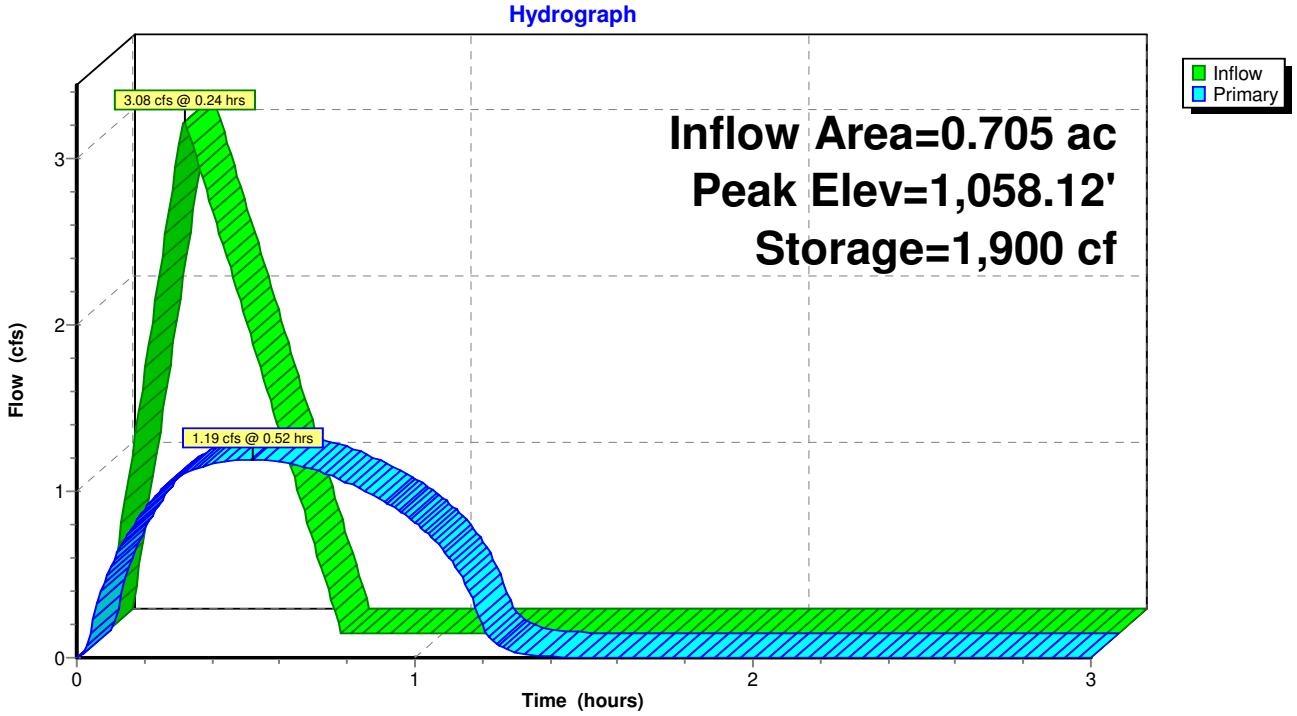
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,056.28	0	0	0
1,056.50	197	22	22
1,057.00	642	210	231
1,057.50	1,284	482	713
1,058.00	2,276	890	1,603
1,058.25	2,915	649	2,252
1,058.50	3,717	829	3,081

Device	Routing	Invert	Outlet Devices
#1	Primary	1,056.28'	**12.0" Round DP1 Outlet Culvert** L= 120.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,056.28' / 1,055.38' S= 0.0075 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,056.28'	**6.0" Vert. Orifice Plate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.19 cfs @ 0.52 hrs HW=1,058.12' TW=1,056.28' (Fixed TW Elev= 1,056.28')
└─**1=DP1 Outlet Culvert** (Passes 1.19 cfs of 3.83 cfs potential flow)
└─**2=Orifice Plate** (Orifice Controls 1.19 cfs @ 6.08 fps)



Pond P1.2: Detention Pond P1.2

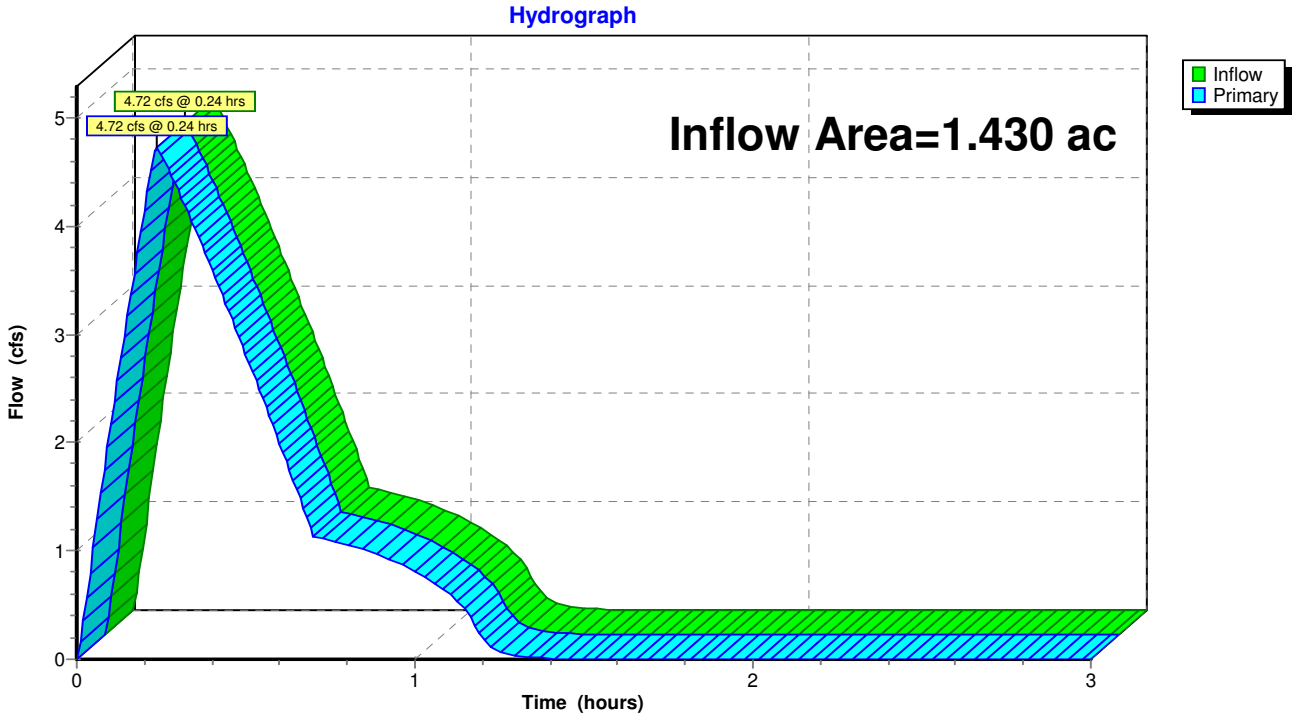


Summary for Link DP1: Design Point DP1

Inflow Area = 1.430 ac, 0.00% Impervious, Inflow Depth = 1.67" for 100-Year event
Inflow = 4.72 cfs @ 0.24 hrs, Volume= 0.199 af
Primary = 4.72 cfs @ 0.24 hrs, Volume= 0.199 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link DP1: Design Point DP1



Events for Subcatchment DEV1.1: DEV1.1 to DP1 (Bypass)

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-Year	0.87	1.79	0.052	0.86
5-Year	1.12	2.29	0.067	1.11
10-Year	1.27	2.60	0.076	1.26
25-Year	1.49	3.05	0.089	1.47
50-Year	1.67	3.43	0.100	1.66
100-Year	**1.83**	**3.75**	**0.109**	**1.81**

Events for Subcatchment DEV1.2: DEV1.2 to Pond P1.2

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-Year	0.87	1.47	0.043	0.73
5-Year	1.12	1.88	0.055	0.94
10-Year	1.27	2.13	0.062	1.06
25-Year	1.49	2.50	0.073	1.25
50-Year	1.67	2.81	0.082	1.40
100-Year	**1.83**	**3.08**	**0.090**	**1.53**

Events for Pond P1.2: Detention Pond P1.2

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
2-Year	1.47	0.87	1,057.37	555
5-Year	1.88	0.98	1,057.60	854
10-Year	2.13	1.03	1,057.73	1,055
25-Year	2.50	1.10	1,057.89	1,372
50-Year	2.81	1.15	1,058.02	1,651
100-Year	**3.08**	**1.19**	**1,058.12**	**1,900**

Events for Link DP1: Design Point DP1

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
2-Year	2.51	2.51	**0.00**
5-Year	3.10	3.10	0.00
10-Year	3.45	3.45	0.00
25-Year	3.95	3.95	0.00
50-Year	4.37	4.37	0.00
100-Year	**4.72**	**4.72**	0.00

SECTION 004100
BID FORM

THE PROJECT AND THE PARTIES

1.01 TO:

A. The Kingfisher County Commissioners

1.02 FOR:

A. Project: Kingfisher County Extension Office 2023

B. Architect: Corbin Merz Haney Architeture and Interior Design

1.03 DATE: _____ (BIDDER TO ENTER DATE)

1.04 SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)

A. Bidder's Full Name .....
   1. Address.....
   2. City, State, Zip.....

1.05 OFFER

A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Bid Documents prepared by Corbin Merz Haney Architects and Interior Design for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Sum of:

B. _____
_____ dollars
($_____), in lawful money of the United States of America.

C. We have included the required security deposit as required by the Instruction to Bidders.

D. We have excluded from the Bid Sum all applicable federal and State of Oklahoma taxes.

1.06 ACCEPTANCE

A. This offer shall be open to acceptance and is irrevocable for thirty days from the bid closing date.

B. If this bid is accepted by Owner within the time period stated above, we will:
   1. Execute the Agreement within seven days of receipt of Notice of Award.
   2. Furnish the required bonds within seven days of receipt of Notice of Award.
   3. Commence work within seven days after written Notice to Proceed of this bid.

C. If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bond(s), the security deposit shall be forfeited as damages to Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.

D. In the event our bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

1.07 CONTRACT TIME

A. If this Bid is accepted, we will:

B. Complete the Work in _____ calendar weeks from Notice to Proceed.
(Bidder to enter number of weeks.)

1.08 ADDENDA

A. The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.
   1. Addendum # _____ Dated _____.
   2. Addendum # _____ Dated _____.

3. Addendum # _____ Dated _____.
4. Addendum # _____ Dated _____.
5. Addendum # _____ Dated _____.

1.09 BID FORM SUPPLEMENTS

A. The following information is included with Bid submission:

B. The following Supplements are completed and attached to this Bid Form and are considered an integral part of this Bid Form:
   1. Advertisement for Bids
   2. Instructions to Bidders
   3. Certificate of Non-Discrimination
   4. Businesss Relationship Affidavit
   5. Non-Collusion Bidding Certification
   6. Bid Bond
   7. Certificates of intent to insure for insurance required in Section 07300 Supplementary General Conditions

1.10 BID FORM SIGNATURE(S)

A. The Corporate Seal of

B. _____

C. (Bidder - print the full name of your firm)

D. was hereunto affixed in the presence of:

E. _____

F. (Authorized signing officer, Title)

G. (Seal)

1.11 IF THE BID IS A JOINT VENTURE OR PARTNERSHIP, ADD ADDITIONAL FORMS OF EXECUTION FOR EACH MEMBER OF THE JOINT VENTURE IN THE APPROPRIATE FORM OR FORMS AS ABOVE.

END OF SECTION

SECTION 004301
BID FORM SUPPLEMENTS COVER SHEET

PARTICULARS

1.01 PROJECT: KINGFISHER COUNTY EXTENSION OFFICE 2023

1.02 SUPPLEMENTS TO BID FORM

A. Certificate of Non-Discrimination

B. Business Relationship Affidavit

C. Non-Collusion Bidding Certification

END OF SECTION

CERTIFICATE OF NON-DISCRIMINATION

In connection with the performance of work under this contract, the contractor agrees as follows:

A. The Contractor agrees not to discriminate against any employee or applicant for employment because of race, creed, color, sex, national origin or ancestry. The Contractor shall take affirmative action to insure that employees are treated without regard to their race, creed, color, national origin, sex, or ancestry. Such actions shall include, but not be limited to the following: employment, upgrading, demotion or transfer, recruiting or recruitment, advertising, lay-off or termination, rates of pay or other forms of compensation and selection for training, including apprenticeship. The Contractor and Sub-Contractor shall agree to post in a conspicuous place, available to employees and applicants for employment, notice to be provided by the County Clerk of Garfield County setting forth provisions of this section.

B. In the event of the Contractor's non-compliance with this non-discrimination clause, the contract may be cancelled or terminated by the County. The Contractor may be declared by the County ineligible for further contracts with the said agency until satisfactory proof of intent to comply shall be made by the Contractor.

C. The Contractor agrees to include this non-discrimination clause in any sub-contracts connected with the performance of this agreement.

I have read the above stated clause and agree to abide by its requirements.

_____
Contractor

ATTEST:

_____
Secretary

BUSINESS RELATIONSHIPS AFFIDAVIT

STATE OF _____)
)§
COUNTY OF_____)

_____, of lawful age, being first duly sworn, on oath says that (s)he is the agent authorized by the bidder to submit the attached bid. Affiant further states that the nature of any partnership, joint venture, or other business relationship presently in effect or which existed within one (1) year prior to the date of this statement with the architect, engineer, or other party to the project is as follows:

_____

_____

_____

Affiant further states that any such business relationship presently in effect or which existed within one (1) year prior to the date of this statement between any officer or director of the bidding company and any officer or director of the architectural or engineering firm or other party to the project is as follows:

_____

_____

_____

Affiant further states that the names of all persons having any such business relationships and the positions they hold with their respective companies or firms are as follows:

_____

_____

_____

(If none of the business relationship hereinabove mentioned exist, affiant should so state.)

subscribed and sworn to before me this _____ day of _____, 20 _____.

_____
Notary Public

My Commission Expires:

_____

(SEAL)

NON-COLLUSION AFFIDAVIT

STATE OF _____)
)§
COUNTY OF_____)

_____ of lawful age, being first duly sworn, on oath says that (s) he is the agent authorized by the bidder to submit the attached bid. Affiant further states that the bidder has not been a party to any collusion among bidders in restraint to freedom of competition by agreement to bid at a fixed price or to refrain from bidding; or with any state official or employee as to quantity, quality, or price in the prospective contract, or any other terms of said prospective contract; or in any discussions between bidders and any state official concerning exchange of money or other things of value for special consideration in the letting of a contract.

Subscribed and sworn to before me this _____ day of _____, 20_____.

_____
Notary Public

My Commission Expires:

_____

(SEAL)

SECTION 005000
CONTRACTING FORMS AND SUPPLEMENTS

PART 1 GENERAL

1.01 CONTRACTOR IS RESPONSIBLE FOR OBTAINING A VALID LICENSE TO USE ALL COPYRIGHTED DOCUMENTS SPECIFIED BUT NOT INCLUDED IN THE PROJECT MANUAL.

1.02 AGREEMENT AND CONDITIONS OF THE CONTRACT

A. See Section 005200 - Agreement Form for the Agreement and General Conditions.

B. See Section 007300 - Supplementary Conditions for the Supplementary Conditions.

1.03 FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in Contract Documents.

B. Bond Forms:
   1. Refer to Section 06000 PROJECT FORMS

C. Post-Award Certificates and Other Forms:
   1. Submittal Transmittal Letter Form: AIA G810.
   2. Application for Payment Forms: AIA G702 with AIA G703 (for Contractors).

D. Clarification and Modification Forms:
   1. Construction Change Directive Form: AIA G714.
   2. Change Order Form: AIA G701.

E. Closeout Forms:
   1. Certificate of Substantial Completion Form: AIA G704.
   2. Contractor's Affidavit of Release of Liens Form: AIA G706A

END OF SECTION

SECTION 005200
AGREEMENT FORM

PART 1 GENERAL

1.01 FORM OF AGREEMENT

1.02 THE AGREEMENT TO BE EXECUTED IS ATTACHED FOLLOWING THIS PAGE.

A. The Agreement form is based on the attached AIA A101-2017 (8 pages)

B. The General Conditions is based on the attached AIA A201-2017 (38 pages)

1. The Agreement Form and General Conditions are available for viewing the Architect's office or can be e-mailed to approved General Contractors upon written request.

1.03 RELATED REQUIREMENTS

A. Section 007300 - Supplementary Conditions.

END OF SECTION

SECTION 006000
PROJECT FORMS

PART 1 GENERAL

1.01 REQUIRED BONDS AND CERTIFICATES FORMS SUBMITTED WITH THE CONTRACT

A. Maintenance Bond (2 year)

B. Labor and Payment Bond

C. Performance Bond

D. Affidavit for Contracts and Payments

E. Certificate of Insurance as required by Supplementary General Conditions

END OF SECTION

DEFECT (MAINTENANCE) BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____, as Principal, and _____, a corporation organized under the laws of the State of _____ and authorized to transact business in the State of Oklahoma, as Surety, are held and firmly bound unto The Kingfisher County Commissioners, Kingfisher County, Oklahoma in the penal sum of _____ Dollars ($_____) in lawful money of the United States of America, said sum being equal to 100% of the contract price, for the payment of which, well and truly to be made, we bind ourselves and each of us, our heirs, executors, administrators, trustees, successors, and assigns, jointly and severally, firmly by these presents.

DATED this _____ day of _____, 20_____.

The condition of this obligation is such that:

WHEREAS, said Principal entered into a written Contract with the Kingfisher County Commissioners, Kingfisher County, Oklahoma dated _____, 20___, for

_____

_____

_____

all in compliance with the plans and specifications therefore, made a part of said Contract and on file in the office of the The Kingfisher County Commissioners, 101 South Main Street, Suite 9, Kingfisher, Oklahoma 73750

STATUTORY PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____, as Principal, and _____, a corporation organized under the laws of the State of _____ and authorized to transact business in the State of Oklahoma, as Surety, are held and firmly bound unto The Kingfisher County Commissioners, Kingfisher, County Oklahoma the penal sum of _____ Dollars ($_____) in lawful money of the United States of America, said sum being equal to the full contract price, for the payment of which, well and truly to be made, we bind ourselves and each of us, our heirs, executors, administrators, trustees, successors, and assigns, jointly and severally, firmly by these presents.

DATED this _____ day of _____, 20_____.

The condition of this obligation is such that:

WHEREAS, said Principal entered into a written Contract with The Kingfisher County Commissioners, Kingfisher County, Oklahoma dated _____, 20 ___, for

_____

_____

_____

all in compliance with the plans and specifications therefor, made a part of said Contract and on file in the office of The Kingfisher County Commissioners, 101 South Main Street, Suite 9, Kingfisher, Oklahoma, 73750

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____, as Principal, and _____, a corporation organized under the laws of the State of _____ and authorized to transact business in the State of Oklahoma, as Surety, are held and firmly bound unto The Kingfisher County Commissioners, Kingfisher County, Oklahoma, in the penal sum of _____ Dollars ($_____) in lawful money of the United States of America, said sum being equal to the full contract price, for the payment of which, well and truly to be made, we bind ourselves and each of us, our heirs, executors, administrators, trustees, successors, and assigns, jointly and severally, firmly by these presents.

DATED this _____ day of _____, 20_____.

The condition of this obligation is such that:

WHEREAS, said Principal entered into a written Contract with The Kingfisher County Commissioners, Kingfisher County, Oklahoma
dated _____, 20 ___, for

_____

_____

_____

all in compliance with the plans and specifications therefore, made a part of said Contract and on file in the office of The Kingfisher County Commissioners, 101 South Main Street, Suite 9, Kingfisher, Oklahoma 73750.

NOW, THEREFORE, if said Principal shall fail or neglect to pay all indebtedness incurred by said Principal or subcontractors of said Principal who perform work in the performance of such contract, for labor and materials and repairs to and parts for equipment used and consumed in the performance of said contract after the same becomes due and payable, the person, firm, or corporation entitled thereto may sue and recover on this bond, the amount so due and unpaid.

It is further expressly agreed and understood by the parties hereto that no changes or alterations in said Contract and no deviations from the plan or mode of procedure herein fixed shall have the effect of releasing the sureties, or any of them, from the obligations of this Bond.

IN WITNESS WHEREOF, the said Principal has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its duly authorized officers, and the said Surety has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its attorney-in-fact, duly authorized so to do, the day and year first above written.

Principal:

_____

ATTEST: By _____

_____

Surety:

_____

By _____

Attorney-in-Fact

NOW, THEREFORE, if said Principal shall pay or cause to be paid to ISD #57, Garfield County all damage, loss, and expense which may result by reason of defective materials and/or workmanship in connection with said work, occurring within a period of (2) years from and after acceptance of said project by The Kingfisher County Commissioners; then this obligation shall be null and void, otherwise to be and remain in full force and effect.

The surety further agrees that the terms of this Bond shall cover the payment of the prevailing hourly rate of wages as determined by the Commissioner of Labor of the State of Oklahoma and in force at the date of the Contract. The prevailing wage rates are included in the specifications which are a part of the Contract. Prevailing wage rates included in the specifications will not be altered as long as this Contract is in force.

It is further expressly agreed and understood by the parties hereto that no changes or alterations in said Contract and no deviations from the plan or mode of procedure herein fixed shall have the effect of releasing the sureties, or any of them, from the obligations of this Bond.

IN WITNESS WHEREOF, the said Principal has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its duly authorized officers, and the said Surety has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its attorney-in-fact, duly authorized so to do, the day and year first above written.

Principal:

_____

ATTEST: By _____

_____

Surety:

_____

By _____
Attorney-in-Fact

SECTION 007300
SUPPLEMENTARY CONDITIONS

PART 1 SUPPLEMENTARY CONDITIONS

PART 2 GENERAL

2.01 THESE SUPPLEMENTARY CONDITIONS AMEND AND SUPPLEMENT THE GENERAL CONDITIONS AND OTHER PROVISIONS OF CONTRACT DOCUMENTS AS INDICATED BELOW. PROVISIONS THAT ARE NOT SO AMENDED OR SUPPLEMENTED REMAIN IN FULL FORCE AND EFFECT.

2.02 THE TERMS USED IN THESE SUPPLEMENTARY CONDITIONS THAT ARE DEFINED IN THE GENERAL CONDITIONS HAVE THE MEANINGS ASSIGNED TO THEM IN THE GENERAL CONDITIONS.

PART 3 MODIFICATIONS TO THE GENERAL CONDITIONS

3.01 ARTICLE 3 - CONTRACTOR

A. Modify paragraph **3.6 Taxes** to state the following:
   1. Purchases by Kingfisher County, Oklahoma are not subject to State or Federal taxes

3.02 ARTICLE 7 - CHANGES IN THE WORK

A. Add the following subparagraph:
   1. **7.2.2** The following fees apply to Changes in the Work:
      a. Ten (10) percent overhead and profit on the net cost of Work done by the Contractor
      b. Ten (10) percent overhead and profit on the cost of Work done by any Subcontractor
      c. On Work deleted from the Contract, credit to the Owner shall be the Architect approved net cost plus 1/2 of the overhead and profit percentage noted above.

3.03 ARTICLE 9 - PAYMENTS AND COMPLETION

A. Add the following subparagraph:
   1. **9.3.1.3** The Application for Payment shall reflect a retainage of five (5) percent on itemized amounts. This retainage will be held until Final Completion of the Project.

3.04 ARTICLE 11 - INSURANCE AND BONDS

A. Add the following subparagraphs:
   1. **11.1.1.1** The following insurance shall be carried by the General Contractor:
      a. Workmen's compensation insurance at statutory limits.
      b. Commercial General Liability for the Project written on an occurrence form with policy limits of not less than:
         1) $1,000,000 each occurrence
         2) $2,000,000 general aggregate
         3) $2,000,000 products/completed operations hazard, providing coverage for claims including:
            (a) damages because of bodily injury, sickness, or disease, including occupational sickness or disease, and death of any person;
            (b) personal injury and advertising injury;
            (c) damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
            (d) bodily injury or property damage arising out of completed operations; and
            (e) the Contractor's indemnity obligations under Section 3.18 of the General Conditions.
         4) $1,000,000 personal injury
         5) $100,000 fire damage
         6) $10,000 medical
      c. The Commercial General Liability policy shall not contain exclusion or restriction of coverage for the following:
         1) Claims by one insured against another insured, if the exclusion of restriction is based solely on the fact that the claimant is an insured, and there would

otherwise be coverage for the claim.

2) Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damage Work or the Work out of which the damage arises was performed by a Subcontractor.
3) Claims for bodily injury other than to employees of the insured.
4) Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
5) Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
6) Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
7) Claims related to residential multi-family, or other habitational projects, if the Work is to be performed on such a project.
8) Claims related to roofing, if the Work involves roofing.
9) Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
10) Claims related to earth subsidence or movement, where the work involves such hazards.
11) Claims related to explosion, collapse and underground hazards where the Work involves such hazards.

d. Automobile Liability covering vehicles owned, and not-owned vehicles used by the Contractor, with policy limits of not less than $1,000,000 combined single limits per accident, for bodily injury, death, or any person and property damage arising out of the ownership, maintentance and use of those motor vehicles along with any other statutorily required automobile coverage.
e. Property Insurance
    1) The Contractor shall effect and maintain property insurance written on a builder's risk 'all-risk' completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The property insurance coverage shall be not less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. This insurance shall include the interests of mortgagees as loss payees. This insurance shall include coverage for the following:
        (a) Physical damage to property while it is in storage and in transit to the construction site.
        (b) Property owned by the Contractor and used on the Project including scaffolding and other equipment.
f. Owners and Contractors Protective Liability Coverage (OCP) with policy limits of $1,000,000 per occurrence/aggregate

2. **11.1.1.2** The following insurance shall be carried by each sub-contractor:
    a. The General Contractor shall require each of his subcontractors to procure and maintain during the life of his sub-contract, sub-contractors Public Liability and Property Damage Insurance in an amount not less than $1,000,000 for injuries, including accidental death to any one person and subject to the same limit for each person in an amount not less than $1,000,000 on account of one accident.
3. **11.1.2.1** Performance, Payment, and Maintenance Bonds
    a. The Contractor shall provide performance and payment bonds. The bond value requirements are as follows:
        1) Maintenance bond in the amount of 100 percent for a period of 2 years after acceptance by the Owner.
        2) Provide a 100 percent Performance Bond on AIA 312 or a standard surety bond.
        3) Provide a 100 percent Payment Bond on AIA 311 or a standard surety bond form.
4. **11.2.1.1** The following insurance shall be carried by the Owner:

a. General Liability Insurance

END OF SECTION

SECTION 012000
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Documentation of changes in Contract Sum and Contract Time.

C. Procedures for preparation and submittal of application for final payment.

1.02 SCHEDULE OF VALUES

A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.

C. Forms filled out by hand will not be accepted.

D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.

E. Revise schedule to list approved Change Orders, with each Application For Payment.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.

C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

D. Forms filled out by hand will not be accepted.

E. Execute certification by signature of authorized officer.

F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.

H. Submit Application for Payment in an electronic format

I. Include the following with the application:
   1. Transmittal letter as specified for submittals in Section 013000.
   2. Affidavits attesting to off-site stored products.

J. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.04 MODIFICATION PROCEDURES

A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.

B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
   1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
   2. Promptly execute the change.

C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications . Contractor shall prepare and submit a fixed price quotation within 21 days.

D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for

the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 6000.

E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.

F. Substantiation of Costs: Provide full information required for evaluation.
   1. On request, provide the following data:
      a. Quantities of products, labor, and equipment.
      b. Taxes, insurance, and bonds.
      c. Overhead and profit.
      d. Justification for any change in Contract Time.
      e. Credit for deletions from Contract, similarly documented.

G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

J. Promptly enter changes in Project Record Documents.

1.05 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:
   1. All closeout procedures specified in Section 017000.

END OF SECTION

SECTION 012500
SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

A. Section 002113 - Instructions to Bidders: Restrictions on timing of substitution requests.

1.02 DEFINITIONS

A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
   1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
      a. Unavailability.
      b. Regulatory changes.
   2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
      a. Substitution requests offering advantages solely to the Contractor will not be considered.

1.03 REFERENCE STANDARDS

A. CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage) Current Edition.

B. CSI/CSC Form 13.1A - Substitution Request (After the Bidding/Negotiating Phase) Current Edition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.

C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
   1. Forms indicated in the Project Manual are adequate for this purpose, and must be used.

D. Limit each request to a single proposed substitution item.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

A. Submittal Time Restrictions:
   1. Section 002113 - Instructions to Bidders specifies time restrictions and the documents required for submitting substitution requests during the bidding period.

B. Submittal Form (before award of contract):
   1. Submit substitution requests by completing CSI/CSC Form 1.5C - Substitution Request. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

A. Submittal Form (after award of contract):

1. Submit substitution requests by completing CSI/CSC Form 13.1A - Substitution Request (After Bidding/Negotiating). See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

B. Architect will consider requests for substitutions only within 15 days after date of Agreement.

3.04 RESOLUTION

A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.

B. Architect will notify Contractor in writing of decision to accept or reject request.
   1. Architect's decision following review of proposed substitution will be noted on the submitted form.

3.05 ACCEPTANCE

A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.06 CLOSEOUT ACTIVITIES

A. See Section 017800 - Closeout Submittals, for closeout submittals.

B. Include completed Substitution Request Forms as part of the Project record.

END OF SECTION

SECTION 013000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General administrative requirements.

B. Preconstruction meeting.

C. Progress meetings.

D. Submittals for review, information, and project closeout.

E. Number of copies of submittals.

F. Submittal procedures.

1.02 GENERAL ADMINISTRATIVE REQUIREMENTS

A. Comply with requirements of Section 017000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

B. Make the following types of submittals to Architect:
   1. Requests for Interpretation (RFI).
   2. Requests for substitution.
   3. Shop drawings, product data, and samples.
   4. Test and inspection reports.
   5. Design data.
   6. Manufacturer's instructions and field reports.
   7. Applications for payment and change order requests.
   8. Progress schedules.
   9. Coordination drawings.
   10. Correction Punch List and Final Correction Punch List for Substantial Completion.
   11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Schedule meeting after Notice of Award.

B. Attendance Required:
   1. Owner.
   2. Architect.
   3. Contractor.

C. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   3. Distribution of Contract Documents.
   4. Submission of list of subcontractors, schedule of values, and progress schedule.
   5. Designation of personnel representing the parties to Contract and Architect.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   7. Scheduling.

D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.

B. Attendance Required:

1. Contractor.
2. Owner.
3. Architect.
4. Contractor's superintendent.
5. Major subcontractors.

C. Agenda:
1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Maintenance of progress schedule.
7. Corrective measures to regain projected schedules.
8. Planned progress during succeeding work period.
9. Maintenance of quality and work standards.
10. Effect of proposed changes on progress schedule and coordination.
11. Other business relating to work.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
1. Product data.
2. Shop drawings.
3. Samples for selection.
4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.

C. Samples will be reviewed for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 017800 - Closeout Submittals.

3.04 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
1. Design data.
2. Certificates.
3. Test reports.
4. Inspection reports.
5. Manufacturer's instructions.
6. Manufacturer's field reports.
7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

3.05 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 017800 - Closeout Submittals:
1. Project record documents.
2. Operation and maintenance data.
3. Warranties.
4. Bonds.

5. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.06 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.07 SUBMITTAL PROCEDURES

A. General Requirements:
   1. Use a single transmittal for related items.
   2. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
   3. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
   4. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
   5. Schedule submittals to expedite the Project, and coordinate submission of related items.
      a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
      b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
   6. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
   7. Provide space for Contractor and Architect review stamps.
   8. When revised for resubmission, identify all changes made since previous submission.
   9. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.

B. Product Data Procedures:
   1. Submit only information required by individual specification sections.
   2. Collect required information into a single submittal.
   3. Submit concurrently with related shop drawing submittal.
   4. Do not submit (Material) Safety Data Sheets for materials or products.

C. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
   2. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:
   1. Transmit related items together as single package.
   2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

END OF SECTION

SECTION 014000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 REFERENCE STANDARDS

1.02 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.

B. Base design on performance and/or design criteria indicated in individual specification sections.

C. Scope of Contractor's Professional Design Services: Provide for the following items of work:

1.03 TESTING AND INSPECTION AGENCIES AND SERVICES

PART 3 EXECUTION

2.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

2.02 MOCK-UPS

A. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Architect will use accepted mock-ups as a comparison standard for the remaining Work.

D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

2.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

2.04 TESTING AND INSPECTION

A. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.

3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
5. Perform additional tests and inspections required by Architect.
6. Submit reports of all tests/inspections specified.

B. Limits on Testing/Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency may not approve or accept any portion of the Work.
3. Agency may not assume any duties of Contractor.
4. Agency has no authority to stop the Work.

C. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
3. Provide incidental labor and facilities:
a. To provide access to Work to be tested/inspected.
b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
c. To facilitate tests/inspections.
d. To provide storage and curing of test samples.
4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

D. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.

E. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

2.05 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 015000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

A. Section 015100 - Temporary Utilities.

1.02 TEMPORARY UTILITIES - SEE SECTION 015100

A. Owner will provide the following:
   1. Electrical power and metering, consisting of connection to existing facilities.
   2. Water supply, consisting of connection to existing facilities.

B. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

1.04 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

1.05 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.06 FENCING

A. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.07 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.08 INTERIOR ENCLOSURES

1.09 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.

B. Coordinate access and haul routes with governing authorities and Owner.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.10 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site periodically.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

1.11 FIELD OFFICES

A. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

1.12 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition.

E. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 015100
TEMPORARY UTILITIES

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. 29 CFR 1926 - Safety and Health Regulations for Construction Current Edition.

1.02 TEMPORARY ELECTRICITY

A. Cost: By Owner.

B. Provide power service required from utility source.

C. Provide temporary electric feeder from existing building electrical service at location as directed.

D. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.

E. Provide main service disconnect and over-current protection at convenient location and meter.

F. Permanent convenience receptacles may be utilized during construction.

G. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

1.03 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain LED, compact fluorescent, or high-intensity discharge lighting as suitable for the application for construction operations in accordance with requirements of 29 CFR 1926 and authorities having jurisdiction.

B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

C. Maintain lighting and provide routine repairs.

1.04 TEMPORARY HEATING

A. Provide heating devices and heat as needed to maintain specified conditions for construction operations.

B. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.05 TEMPORARY VENTILATION

A. Provide temporary ventilation as necessary for construciton operations and to comply with applicable safety regulations.

1.06 TEMPORARY WATER SERVICE

A. Cost of Water Used: By Owner.

B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.

C. Exercise measures to conserve water.

D. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 016000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.02 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

B. Provide interchangeable components by the same manufacture for components being replaced.

C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.

D. Cord and Plug: Provide minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

A. See Section 012500 - Substitution Procedures.

3.02 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 017419.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 017000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations 2022, with Errata (2021).

1.02 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
   3. Submit surveys and survey logs for the project record.

C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.

1.03 QUALIFICATIONS

A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.

1.04 PROJECT CONDITIONS

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
   1. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

G. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.05 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of work of separate sections.

G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Contractor shall locate and protect survey control and reference points.

D. Control datum for survey is that indicated on drawings.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

H. Utilize recognized engineering survey practices.

I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.

J. Periodically verify layouts by same means.

K. Maintain a complete and accurate log of control and survey work as it progresses.

3.04 GENERAL INSTALLATION REQUIREMENTS

A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.

B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 015000 in locations indicated on drawings.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
   1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
   2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.
   2. Relocate items indicated on drawings.

3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
   b. Provide temporary connections as required to maintain existing systems in service.
4. Verify that abandoned services serve only abandoned facilities.
5. Remove abandoned pipe, ducts, conduits, and equipment , including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

F. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.

G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.

H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

I. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

J. Clean existing systems and equipment.

K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

L. Do not begin new construction in alterations areas before demolition is complete.

M. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:
1. Complete the work.
2. Fit products together to integrate with other work.
3. Provide openings for penetration of mechanical, electrical, and other services.

4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove samples of installed work for testing when requested.
8. Remove and replace defective and non-complying work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 078400, to full thickness of the penetrated element.

J. Patching:
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
2. Match color, texture, and appearance.
3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.09 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.10 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.
   1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

B. Use cleaning materials that are nonhazardous.

C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

F. Clean filters of operating equipment.

G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.

H. Clean site; sweep paved areas, rake clean landscaped surfaces.

I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.11 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Owner.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.12 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 017800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project record documents.

B. Operation and maintenance data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 013000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Individual Product Sections: Specific requirements for operation and maintenance data.

C. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   3. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 3 EXECUTION

2.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   3. Field changes of dimension and detail.
   4. Details not on original Contract drawings.

2.02 OPERATION AND MAINTENANCE DATA

A. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

B. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

C. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

2.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

2.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

D. Include color coded wiring diagrams as installed.

E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

G. Provide servicing and lubrication schedule, and list of lubricants required.

H. Include manufacturer's printed operation and maintenance instructions.

I. Include sequence of operation by controls manufacturer.

J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

K. Provide control diagrams by controls manufacturer as installed.

L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

M. Include test and balancing reports.

N. Additional Requirements: As specified in individual product specification sections.

2.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.

I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

2.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

END OF SECTION

SECTION 031000
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.02 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary 2019 (Reapproved 2022).

B. ACI PRC-347 - Guide to Formwork for Concrete 2014 (Reapproved 2021).

C. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).

D. ACI SPEC-301 - Specifications for Concrete Construction 2020.

E. PS 1 - Structural Plywood 2019.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.

C. Chamfer outside corners of beams, joists, columns, and walls.

D. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

E. Comply with relevant portions of ACI CODE-318, ACI PRC-347, and ACI SPEC-301.

2.02 WOOD FORM MATERIALS

A. Softwood Plywood: PS 1, B-B High Density Concrete Form Overlay, Class I.

B. Lumber: Douglas Fir or Southern Pine species; 2 grade; with grade stamp clearly visible.

2.03 FORMWORK ACCESSORIES

A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, 1 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface.

B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.

C. Filler Strips for Chamfered Corners: Wood strip type; 3/4 x 3/4 inch size; maximum possible lengths.

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

E. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 051200.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI SPEC-301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval before framing openings in structural members that are not indicated on drawings.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

3.06 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI SPEC-117, unless otherwise indicated.

3.08 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

END OF SECTION

SECTION 032000
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Welded wire reinforcement

C. Supports and accessories for steel reinforcement.

1.02 REFERENCE STANDARDS

A. ACI 301 - Specifications for Concrete Construction 2020.

B. ACI SP-66 - ACI Detailing Manual 2004.

C. ASTM A184/A184M - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement 2019.

D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.

E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2022.

F. CRSI (DA4) - Manual of Standard Practice 2018, with Errata (2019).

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

1.04 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Refer to Structural Notes for additional requirements

B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Deformed billet-steel bars.
   2. Unfinished.

C. Steel Welded Wire Reinforcement (WWR): Plain type; ASTM A1064/A1064M.

D. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
      a. At flat slabs use prefabricated chairs sized and spaced to maintain specified clearances

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

B. Welding of reinforcement is not permitted.

C. Locate reinforcing splices not indicated on drawings at point of minimum stress.
   1. Review locations of splices with Architect.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.
C. Accommodate placement of formed openings.
D. Comply with applicable code for concrete cover over reinforcement.
E. Bond and ground all reinforcement to requirements of Section 260526.

END OF SECTION

SECTION 033000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Floors and slabs on grade.

B. Joint devices associated with concrete work.

C. Miscellaneous concrete elements, including equipment pads, light pole bases, and manholes.

D. Concrete curing.

1.02 REFERENCE STANDARDS

A. ACI 211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide 2022.

B. ACI 301 - Specifications for Concrete Construction 2020.

C. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.

D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).

E. ACI 305R - Guide to Hot Weather Concreting 2020.

F. ACI 306R - Guide to Cold Weather Concreting 2016.

G. ACI 308R - Guide to External Curing of Concrete 2016.

H. ACI 318 - Building Code Requirements for Structural Concrete 2019 (Reapproved 2022).

I. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2023.

J. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.

K. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2023.

L. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2020.

M. ASTM C150/C150M - Standard Specification for Portland Cement 2022.

N. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete 2020.

O. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2023.

P. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete 2010a (Reapproved 2016).

Q. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2019, with Editorial Revision (2022).

R. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2023, with Editorial Revision.

S. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2020.

T. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2018.

U. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.

V. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers 2020.

W. ASTM E1155M - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers (Metric) 2014.

X. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs 2017 (Reapproved 2023).

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
   2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

C. Samples: Submit samples of underslab vapor retarder to be used.

D. Test Reports: Submit report for each test or series of tests specified.

1.04 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

1.05 MOCK-UP

A. Construct and erect mock-up panel for architectural concrete surfaces indicated to receive special treatment or finish as result of formwork.
   1. Panel Size: 6 by 6 feet.
   2. Locate where directed.

B. Accepted mock-up panel is considered basis of quality for the finished work. Keep mock-up exposed to view for duration of concrete work.

C. Mock-up may remain as part of the Work.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 031000.

2.02 REINFORCEMENT MATERIALS

A. Comply with requirements of Section 032000.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.

B. Fine and Coarse Aggregates: ASTM C33/C33M.

C. Fly Ash: ASTM C618, Class C or F.

D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.

D. Accelerating Admixture: ASTM C494/C494M Type C.

E. Water Reducing Admixture: ASTM C494/C494M Type A.

2.05 ACCESSORY MATERIALS

A. Underslab Vapor Retarder:
   1. Sheet Material: ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single-ply polyethylene is prohibited.
   2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.

3. Products:
    a. Henry Company; Moistop Ultra 15: www.henry.com
    b. Stego Industries, LLC; Stego Wrap Vapor Barrier (15-mils): www.stegoindustries.com
    c. W. R. Meadows, Inc; PERMINATOR Class A - 15 mils (0.38 mm): www.wrmeadows.com
    d. Substitutions: See Section 012500- Substitution Procedures

B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
    1. Grout: Comply with ASTM C1107/C1107M.

2.06 BONDING AND JOINTING PRODUCTS

A. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
    1. Material: ASTM D1751, cellulose fiber.

B. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.

2.07 CURING MATERIALS

A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
    1. Application: Use at exterior slabs on grade.

B. Moisture-Retaining Sheet: ASTM C171.
    1. Curing paper, regular.
    2. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
    3. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.

C. Water: Potable, not detrimental to concrete.

2.08 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
    1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

D. Normal Weight Concrete at Interior Slabs on Grade:not to recieve polished finish
    1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 pounds per square inch.
    2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
    3. Water-Cement Ratio: Maximum 45 percent by weight.
    4. Total Air Content: 3 percent, determined in accordance with ASTM C173/C173M.
    5. Maximum Slump: 3"-5" inches.
    6. Aggregate: #67 stone

E. Normal Weight Concrete at Interior Slabs on Grade to receive polished finish
    1. Compressive strength, when tested in accordance with ASTM C173/C39M at 28 days: 4,000 pounds per square inch
    2. Portland cement Type 1, conforming to ASTM C 150
    3. Straight cement mix (no fly ash or slag)
    4. Admixtures kept to a minimum
    5. No air entrainment
    6. Aggregate: #67 stone

7. Refer to Section 033543 for Polished Concrete Specifications

F. Normal Weight Concrete at Exterior Slabs on Grade:
   1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,500 pounds per square inch.
   2. Total Air Content: 6 percent, determined in accordance with ASTM C173/C173M.
   3. Maximum Slump: 3 inches.

G. Normal Weight Concrete at Footings:
   1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,000 pounds per square inch.
   2. Total Air Content: 3 percent, determined in accordance with ASTM C173/C173M.
   3. Maximum Slump: 4 inches.
   4. Maximum Aggregate Size: 5/8 inch.

2.09 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Verify that forms are clean and free of rust before applying release agent.

B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

C. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Architect not less than 24 hours prior to commencement of placement operations.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. Ensure reinforcement, inserts, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

F. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.04 SLAB JOINTING

A. Locate joints as indicated on drawings.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

3.05 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
   1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15, on-grade only.
   2. Under Thick-Bed Tile: F(F) of 20; F(L) of 15, on-grade only.

3. Slabs receiving stained and polished finish: F(F) of 40; F(L) of 30
4. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.

B. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.

C. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.

D. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.06 CONCRETE FINISHING

A. Repair surface defects, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
2. Cement slurry coat finish over surface is not allowed.

D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
2. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

E. Broom Finish: Apply a light broom finish to exterior concrete walks, steps, ramps, and drives.
1. immediately after float finishing, slightly roughen trafficked surface by brooming with fiberbristle boroom perpendicular to the main traffic route.
2. Coordinate required final finish with Architect before application.

3.07 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
1. Normal concrete: Not less than seven days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

D. Surfaces Not in Contact with Forms:
1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
3. Final Curing: Begin after initial curing but before surface is dry.
a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.

3.08 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.

D. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

E. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.09 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.10 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

SECTION 033543
POLISHED CONCRETE - PROSOCO

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Polished concrete system.

B. Densifiers and hardeners.

C. Summary
   1. See Section 03300 for polished concrete mix design. Polished concrete contractor verify concrete mix design
   2. This specification includes specific requiremjents for protection of concrete work.It is the General Contractor's responsibilty to insure all trades are aware of proper care for and protection of concrete surface during contr
   3. Concrete surface must be fully and and uniformly protected for 28 days after pour.
   4. No satisfactory chemical or cleaning procedure is available to remove petrolem based or other deep stains from within the concrete surface including many oils, fuels paint products, glues or other penetrating sains. Prevention is essential.
   5. General contractor to provide for and insure mantenance of protection system to protect concrete surfaces during construction.

D. Coatings.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Finishing of concrete surface; curing.

B. Section 079200 - Joint Sealants.

1.03 REFERENCE STANDARDS

A. ANSI/NFSI B101.1 - Test Method for Measuring the Wet SCOF of Hard-Surface Walkways 2020.

B. ANSI/NFSI B101.3 - Test Method for Measuring the Wet DCOF of Hard Surface Walkways 2020.

C. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Coating Systems 2020.

D. ASTM D4039 - Standard Test Method for Reflection Haze of High-Gloss Surfaces 2009 (Reapproved 2020).

E. ASTM D5767 - Standard Test Method for Instrumental Measurement of Distinctness-of-Image (DOI) Gloss of Coated Surfaces 2018.

F. ASTM G154 - Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials 2023.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate work of this section with concrete floor placement and concrete floor curing.

B. Preinstallation Meeting: Conduct a preinstallation meeting 10 days prior to start of work of this section.
   1. Items for Review:
   2. Require attendance of parties directly affecting work of this section, including:
      a. Finish installer.
      b. Contractor's representative.
      c. Architect.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.

C. Product Data: Manufacturer's published data and installation instructions for concrete polishing system and finishing products, including manufacturer's installation instructions, information on compatibility of different products, and limitations.

D. Installer's qualification statement.

1.06 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Company specializing in installing products specified in this section, having completed minimum of 20 projects of similar size and complexity.
   2. Company is listed applicator of concrete finishes, having completed manufacturer's training program.

1.07 MOCK-UP

A. Mock-Up Size: 36 sq ft.

B. Locate on site where directed.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's sealed packaging, including application instructions.

B. Store materials per manufacturer's product data sheets:
   1. Store containers upright in cool, dry, well-ventilated place, out of the sun, at temperature between 40 degrees F and 100 degrees F.
   2. Store away from other chemicals and potential sources of contamination.
   3. Keep containers tightly closed when not in use.

1.09 FIELD CONDITIONS

A. Ambient Conditions:
   1. Apply treatments and coatings when surface and air temperature is between 40 degrees F and 95 degrees F.
   2. Apply treatments and coatings when surface and air temperature is expected to remain above 40 degrees F for a minimum of eight hours after application.
   3. Maintain ambient temperature of 50 degrees F minimum.
   4. Apply treatments and coatings during calm wind conditions; provide adequate ventilation of enclosed or confined area.
   5. Apply treatments and coatings minimum 24 hours after rain exposure; suspend application when rain is anticipated within 8 hours of application.
   6. Do not apply to frozen substrate.

PART 2 PRODUCTS

2.01 POLISHED CONCRETE SYSTEM

A. Polished Concrete System: Materials, equipment, and procedures designed and furnished by a single manufacturer to produce dense polished concrete of the specified sheen.
   1. PROSOCO, Inc; Consolideck Polished Concrete System: www.prosoco.com/consolideck/#sle is used as reference standard
   2. Titus Restoration
   3. Substitutions: See Section 012500- Substitution Procedures

2.02 DENSIFIERS AND HARDENERS

A. Liquid Densifier and Hardener: Penetrating chemical compound, reacts with concrete, filling pores, hardening, and dustproofing.
   1. Composition: Lithium silicate.
   2. UV Stability: No degradation or yellowing when tested in accordance with ASTM G154.
   3. Product: PROSOCO, Inc; Consolideck LS: www.prosoco.com/consolideck/#sle.
      a. Color to be selected from standard colors.
   4. Substitutions: See Section 012500- Substitution Procedures

2.03 COATINGS

A. Coatings, General:
   1. Treated Material Slip Resistance: High traction range when tested according to ANSI/NFSI B101.1 and ANSI/NFSI B101.3.
   2. Stain Resistance: No adverse effect when tested according to ASTM D1308.
   3. UV Stability: No degradation or yellowing when tested according to ASTM G154.

B. Clear Coating:
   1. Medium Gloss: Film forming protective treatment.
      a. Product: PROSOCO, Inc; Consolideck PolishGuard: www.prosoco.com/consolideck/#sle.

PART 3 EXECUTION

3.01 INSTALLERS

A. Execute using manufacturer-approved installer:

3.02 EXAMINATION

A. Verify that floor surfaces are clean and free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.

B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes and allow complete curing before application of concrete hardener and densifier.

3.03 GENERAL

A. Apply materials in accordance with manufacturer's instructions.

3.04 PREPARATION

A. Protect adjacent non-coated areas from drips, overflow, and overspray; avoid contact with metal, glass, and painted surfaces; immediately remove excess material.

3.05 CONCRETE POLISHING

A. Grind and polish in multiple passes with each full pass in direction perpendicular to previous pass.

B. Fill gaps, voids, and pop-outs during grinding operation.

C. Apply densifier and hardener at specified rates and intervals.

D. Final Polished Concrete Aggregate Exposure: Not to exceed CPC Class A - Cement Fines; cement fines, 85 to 95 percent; fine aggregates, 5 to 15 percent based on visual observation of overall area of polished floor versus Polished Concrete Aggregate Exposure Chart.

E. Final Polished Concrete Appearance: CPC Level 3 - Polished, image clarity value 40 to 69 percent with haze index less than 10.

3.06 PROTECTIVE TREATMENT

A. Apply coatings in accordance with manufacturer's instructions. Match approved mock-ups for color, texture, sealing, and workmanship.

B. Apply manufacturer's recommended protective treatment material to clean, dry slab after mechanically polishing.
   1. Medium gloss protective treatment:

C. Clean spills on slab surfaces immediately, with manufacturer's recommended chemicals and absorptive materials.

D. No haze, white residue, streaking, or burnish marks permitted.

3.07 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Final Polished Concrete Appearance: Test image clarity value and haze index prior to application of sealer at a rate of three tests per 1000 sq ft of polished concrete.

1. Image clarity: Test with Image Clarity Meter in accordance with ASTM D5767.
2. Haze index: Test with Glossmeter in accordance with ASTM D4039.
3. Match approved mock-ups for texture, appearance, and workmanship.

END OF SECTION

SECTION 042000
UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete block.

B. Clay facing brick.

C. Mortar and grout.

D. Reinforcement and anchorage.

E. Flashings.

F. Accessories.

1.02 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2023.

B. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement 2022.

C. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2022.

D. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units 2022.

E. ASTM C91/C91M - Standard Specification for Masonry Cement 2023.

F. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units 2022.

G. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar 2018.

H. ASTM C150/C150M - Standard Specification for Portland Cement 2022.

I. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2018.

J. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale) 2023.

K. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019a, with Editorial Revision.

L. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2018.

M. ASTM C476 - Standard Specification for Grout for Masonry 2023.

N. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry 2019a.

O. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing 2017.

P. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls 2017.

Q. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls 2005.

R. BIA Technical Notes No. 46 - Maintenance of Brick Masonry 2017.

S. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2022, with Errata.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

1.04 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least ten years of documented experience.

1.05 MOCK-UPS

A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.

B. Locate where directed.

C. Mock-up may remain as part of work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
   2. Load-Bearing Units: ASTM C90, lightweight.
      a. Hollow block, as indicated.
      b. Exposed Faces: Manufacturer's standard color and texture where indicated.
   3. Nonloadbearing Units: ASTM C129.
      a. Hollow block, as indicated.
      b. Lightweight.

2.02 BRICK UNITS

A. Manufacturers:
   1. Hebron Brick Company, Contact Keith Naigele; Offfice Cell: 1-785-820-1333
   2. Substitutions: See Section 012500- Substitution Procedures

B. Facing Brick: ASTM C216, Type FBX, Grade SW.
   1. Color and texture:
      a. Brick #1: Toasted Gray, velour finish
      b. Brick #2: Chocolate, velour finish
   2. Actual size: "Meridian Series 3 5/8" x 3 5/8" x 11 5/8".
   3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
      a. 135 degree corner shaped brick

2.03 MORTAR AND GROUT MATERIALS

A. Masonry Cement: ASTM C91/C91M, Type N.

B. Portland Cement: ASTM C150/C150M, Type I.

C. Hydrated Lime: ASTM C207, Type S.

D. Mortar Aggregate: ASTM C144.

E. Grout Aggregate: ASTM C404.

F. Water: Clean and potable.

G. Packaged Dry Material for Mortar for Unit Masonry: Premixed masonry cement and mason's sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
   1. Type: Types as scheduled in this section.
   2. Color: Standard gray.

H. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.

2.04 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:
   1. Hohmann & Barnard, Inc: www.h-b.com
   2. TruFast Walls, a division of Altenloh, Brinck & Co. US, Inc: www.trufastwalls.com
   3. WIRE-BONDwww.wirebond.com
   4. Substitutions: See Section 016000 - Product Requirements.

B. Reinforcing Steel: Type specified in Section 032000; size as indicated on drawings; uncoated finish.

C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.

D. Single Wythe Joint Reinforcement: ASTM A951/A951M.
   1. Type: Truss.
   2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M Class B.
   3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.

E. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
   1. Description: Single screw veneer tie for metal stud construction with a stainless steel barrel and EDPM washers and anchor. From face of metal studs wall shal receive 1/2" fiber glass faced gypsum sheathing, fluid applied weather barrier, 1.5" semi- rigid mineral wool continuous insulation and 1.5" air space to inside face of 3-5/8" thick face brick. Contractor size anchors and ties to fit this configuration.
   2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
   3. Vertical adjustment: Not less than 2 inches.
   4. Reference Product: Thermal 2-Seal Wing Nut Anchor by Hohmann & Barnard, Inc.

F. Metal-to-Metal Fasteners: Self-drilling, self-tapping screws; corrosion resistant finish or hot dip galvanized to ASTM A153/A153M.
   1. Manufacturers:
      a. Substitutions: See Section 01250 - Substititution Procedures

2.05 FLASHINGS

A. Membrane Non-Asphaltic Flashing Materials:
   1. Composite Polymer Flashings - Self-Adhering: Composite polyethylene; 40 mil thick with pressure-sensitive butyl adhesive and release paper.
      a. Manufacturers:
         1) Hohmann & Barnard, Inc; Textroflash: www.h-b.com
         2) York Manufacturing, Inc; Wicked Good Flashing: www.yorkmfg.com
         3) Substitutions: See Section 012500- Substitution Procedures

B. Termination Bars: aluminum; compatible with membrane and adhesives.

C. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

2.06 ACCESSORIES

A. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.

B. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
   1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
      a. Manufacturers:
         1) Advanced Building Products, Inc; Mortar Break DT: www.advancedbuildingproducts.com

2) Mortar Net Solutions; MortarNet: www.mortarnet.com
3) Substtutions: See Section 012500 - Substitution Procedures

C. Weeps:
1. Type: Polyester mesh.

D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.
1. Manufacturers:
a. Diedrich Technologies, Inc.; a Hohmann & Barnard Company
b. PROSOCO, Inc.
c. Substitutions: See Section 012500 - Substitution Procedures

2.07 MORTAR AND GROUT MIXING

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.

B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

C. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.04 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
1. Bond: Running.
2. Coursing: One unit and one mortar joint to equal 8 inches.
3. Mortar Joints: Concave.

D. Brick Units:
1. Bond: Running.
2. Coursing: Three units and three mortar joints to equal 12 inches.
3. Mortar Joints: Concave.

3.05 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Remove excess mortar and mortar smears as work progresses.

C. Interlock intersections and external corners, except for units laid in stack bond.

D. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

E. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.06 WEEPS/CAVITY VENTS

A. Install weeps in veneer and cavity walls at 32 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

3.07 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.08 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, AND CAVITY WALL MASONRY

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch mortar cover on each side.

E. Lap joint reinforcement ends minimum 6 inches.

3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.10 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at nonmasonry construction.
   2. Remove or cover protrusions or sharp edges that could puncture flashings.
   3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Terminate flashing up 8 inches minimum on vertical surface of backing:
   1. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer’s directions.
   2. Anchor vertical leg of flashing into backing with a termination bar and sealant.
   3. Apply cap bead of sealant on top edge of self-adhered flashing.

C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.

D. Support flexible flashings across gaps and openings.

E. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

3.11 LINTELS

A. Install loose steel lintels over openings.

3.12 GROUTED COMPONENTS

A. Lap splices minimum 24 bar diameters.

B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

C. Place and consolidate grout fill without displacing reinforcing.

3.13 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

3.14 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

3.15 TOLERANCES

A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

E. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

3.16 CUTTING AND FITTING

A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.

3.17 CLEANING

A. Remove excess mortar and mortar droppings.

B. Clean soiled surfaces with cleaning solution.

C. Use non-metallic tools in cleaning operations.

3.18 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 054000
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formed steel stud exterior wall framing.

1.02 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members 2016, with Supplement (2020).

B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing 2015, with Errata (2020).

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2023.

E. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings 2020.

F. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members 2015.

G. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories 2020.

H. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel 2018, with Errata (2022).

I. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with work of other sections that is to be installed in or adjacent to metal framing systems, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on cold-formed steel structural members; include material descriptions and base steel thickness.

C. Product Data: Provide manufacturer's data on factory-made connectors and mechanical fasteners, showing compliance with requirements.

D. Product Data: For lateral-force resisting systems, provide product data sheets on hold-down, showing compliance with requirements.

E. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.

F. Design Data:
   1. Shop drawings signed and sealed by a professional structural engineer.
   2. Details and calculations for factory-made connectors, signed and sealed by a professional structural engineer.

1.05 QUALITY ASSURANCE

A. See Section 014000 - Quality Requirements for additional requirements.

B. Designer Qualifications: Design framing system under direct supervision of a professional structural engineer experienced in designing this work and licensed in the State in which the Project is located.

C. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.

D. Manufacturer Qualifications: Member of Steel Stud Manufacturers Association (SSMA): www.ssma.com/#sle.

E. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M and dated no more than 12 months before start of scheduled welding work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Structural Framing:
   1. Clark Dietrich; is used as reference standarda: www.clarkdietrich.com/#sle.
   2. Substtutions: See Section 012500 - Substitiution Procedures

B. Connectors:
   1. Clark Dietrich; is used as reference standard: www.clarkdietrich.com/#sle.
   2. Substitutions: See Section 012500 - Substitution Procedures

2.02 PERFORMANCE REQUIREMENTS

A. Comply with requirements for Contractor's design-related professional design services indicated in Section 014000 - Quality Requirements.

B. Design Requirements: Design cold-formed framing systems, components and connectors to withstand specified design loads in compliance with ICC (IBC), ASCE 7, AISI S100, and AISI S240.

C. Regulatory Requirements: Comply with applicable building code criteria for loads, including seismic loads.

D. Design Criteria: In accordance with applicable codes.
   1. Wind Loads: refer to structural drawings psf positive and refer to structural drawings psf negative.
      a. Exterior walls: Maximum horizontal deflection under wind load of 1/600 of span
      b. Design nonaxial loadbearing framing to accommodate not less than 1/2" vertical deflection.
   2. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
   3. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

2.03 MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.

2.04 STRUCTURAL FRAMING COMPONENTS

A. Refer to Structural Notes for Structural Framing Components and additional requirements

B. Wall Studs and Track Sections: AISI S240; c-shaped studs and u-shaped track sections in stud-matching nominal width and compatible height.
   1. Structural Grade: As required to meet design criteria.
   2. Corrosion Protection Coating Designation: CP 90 in accordance with AISI S240.
   3. Thickness and Depth: As indicated on drawings.
   4. Provide components fabricated from ASTM A1011/A1011M Designation SS (structural steel).
   5. Products:
      a. Clark Dietrich is used as reference standard
      b. Substitutions: See Section 012500 -Substitution Procedures

2.05 CONNECTIONS

A. Performance Requirements: Provide connections in compliance with requirements of AISI S240.

B. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.
   1. Structural Grade: As required to meet design criteria.
   2. Corrosion Protection Coating Designation: CP 90 in accordance with AISI S240.

C. Structural Performance: Maintain load and movement capacity required by applicable building code and specified design criteria.

D. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.

E. Fixed Connections: Provide nonmovement devices for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.

F. Bridging Connections: Provide mechanical load-transferring devices that accommodate wind load torsion and weak axis buckling induced by axial compression loads. Provide bridging connectors where indicated on the drawings.

2.06 MISCELLANEOUS CONNECTIONS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot-dip galvanized per ASTM A153/A153M.

B. Anchorage Devices: Powder actuated.

C. Welding: Comply with AWS D1.1/D1.1M.

2.07 SHEATHING

A. Wall Sheathing: See Section 061000.

2.08 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Galvanizing Repair: Touch up bare steel with zinc-rich paint in compliance with ASTM A780/A780M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify field measurements and adjust installation as required.

3.02 PREPARATION

A. Structural Wall Foundations: For gaps between wall bottom track and top of foundation 1/4 inch or greater, level substrate with loadbearing shims or grout between track and foundation.

3.03 INSTALLATION - GENERAL

A. Install structural members and connections in compliance with AISI S240.

3.04 INSTALLATION OF STUDS

A. Install wall studs plumb and level.

B. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.

C. Install load-bearing studs full length in one piece. Splicing of studs is not permitted.

D. Install load-bearing studs; brace, and reinforce to develop full strength and achieve design requirements.

E. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

F. Install intermediate studs above and below openings to align with wall stud spacing.

G. Provide deflection allowance in stud track, directly below horizontal building framing at non-loadbearing framing.

H. Touch-up field welds and damaged corrosion-protected surfaces zinc-rich paint in compliance with ASTM A780/A780M.

3.05 INSTALLATION OF WALL SHEATHING

A. Install wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.

3.06 TOLERANCES

A. Studs - Vertical Alignment (Plumbness): 1/960 of span or 1/8 inch in 10 ft, in accordance with ASTM C1007.

B. Studs - Maximum Variation from True Position: 1/8 inch in accordance with ASTM C1007.

C. Stud Spacing: 1/8 inch from the designated spacing, provided that the cumulative error does not exceed the requirements of the finishing materials in accordance with ASTM C1007.

END OF SECTION

SECTION 055000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items.

B. Cast iron trench castings.

1.02 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2022.

C. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.

D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.

E. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2021.

F. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.

G. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.

H. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2023).

I. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 2004.

J. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.

F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

A. Lintels: As detailed; galvanized finish.

2.04 FINISHES - STEEL

A. Prime paint steel items.
   1. Exceptions: Galvanize items to be embedded in concrete, items to be embedded in masonry, and items specified for _____ finish.

B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

C. Prime Painting: One coat.

2.05 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Obtain approval prior to site cutting or making adjustments not scheduled.

E. After erection, prime welds, abrasions, and surfaces not shop primed , except surfaces to be in contact with concrete.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 061000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Rough opening framing for doors, windows, and roof openings.

B. Sheathing.

C. Roofing nailers.

D. Preservative treated wood materials.

E. Miscellaneous framing and sheathing.

F. Communications and electrical room mounting boards.

G. Concealed wood blocking, nailers, and supports.

1.02 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2023.

B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.

C. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2021.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.

E. AWPA U1 - Use Category System: User Specification for Treated Wood 2023.

F. PS 1 - Structural Plywood 2019.

G. PS 20 - American Softwood Lumber Standard 2021.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide technical data on manufactured products.

1.04 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir or Southern Pine, unless otherwise indicated.
   2. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
   3. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Sizes: Nominal sizes as indicated on drawings, S4S.

B. Moisture Content: S-dry or MC19.

C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

A. Wall Sheathing: Glass mat faced gypsum, ASTM C1177/C1177M, 1/2 inch; at fire rated assemblies use type x, 5/8 inch.
   1. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. Edges: Square.
   4. Products:
      a. CertainTeed Corporation; GlasRoc Brand: www.certainteed.com
      b. Georgia-Pacific Gypsum; DensGlass Sheathing: www.gpgypsum.com
      c. USG Corporation; Securock Brand Glass-Mat Sheathing Regular 1/2 in. (12.7 mm): www.usg.com
      d. USG Corporation; Securock Brand Glass-Mat Sheathing Firecode SHX 5/8 in. (15.9 mm): www.usg.com
      e. Substitutions: See Section 012500 - Substitution Procedures

B. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

C. Other Applications:
   1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
   2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
   3. Other Locations: PS 1, C-D Plugged or better.

2.04 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

2.05 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:
   1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
      a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
      b. Treat lumber in contact with masonry or concrete.
      c. Treat lumber in other locations as indicated.
   2. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
      a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
      b. Treat plywood in contact with masonry or concrete.
      c. Treat plywood in other locations as indicated.

PART 3 EXECUTION

3.01 PREPARATION

A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

D. Provide the following specific nonstructural framing and blocking:
   1. Cabinets and shelf supports.
   2. Wall brackets.
   3. Handrails.
   4. Grab bars.
   5. Towel and bath accessories.
   6. Wall-mounted door stops.
   7. Chalkboards and marker boards.
   8. Wall paneling and trim.
   9. Joints of rigid wall coverings that occur between studs.

3.04 INSTALLATION OF CONSTRUCTION PANELS

A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using screws.
   1. Install sheathing according to manufacturer's written instructions

B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.
   4. Size: 48 by 96 inches, installed horizontally at ceiling height.

END OF SECTION

SECTION 064100
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Countertops.

C. Hardware.

1.02 RELATED REQUIREMENTS

A. Section 123600 - Countertops.

1.03 REFERENCE STANDARDS

A. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications 2022.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.

D. BHMA A156.9 - Cabinet Hardware 2020.

E. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2020.

F. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
   1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

C. Product Data: Provide data for hardware accessories.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

1.07 FIELD CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 CABINETS

A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Wood Veneer Faced Cabinet:
   1. Exposed Surfaces: HPVA HP-1 Grade A, Red Oak, plain sliced, random-matched.
   2. Semi-Exposed Surfaces: Thermally fused, melamine-impregnated laminate, NEMA LD 3, Grade VGL
   3. Concealed Surfaces: Manufacturer's option.

2.02 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

B. Hardwood Edgebanding: Use solid hardwood edgebanding matching species, color, grain, and grade for exposed portions of cabinetry.
   1. Thickness: 3 mm

2.03 PANEL CORE MATERIALS

A. Medium Density Fiberboard (MDF): Composite panel composed of cellulosic fibers, additives, and bonding system; cured under heat and pressure; comply with ANSI A208.2.
   1. Grade: 130; moisture resistance: MR10.

2.04 HARDWOOD PLYWOOD PANELS

A. Hardwood Plywood: Plywood manufactured for nonstructural decorative applications; consisting of faces and backs applied to a variety of core types; comply with HPVA HP-1.
   1. Woodwork Quality Standard: Panels complying with specified woodwork quality standard.
   2. Face: Red oak; plain-sliced; grade AA.
   3. Back: melamine
   4. Core, Medium Density Fiberboard: Comply with ANSI A208.2.

2.05 THERMALLY FUSED LAMINATE PANELS

A. Thermally Fused Laminate (TFL): Melamine- or polyester-resin-saturated decorative papers; for fusion to composite wood substrates under heat and pressure.
   1. Test in accordance with NEMA LD 3 Section 3.
   2. Panel Core Substrate: Medium Density Fiberboard (MDF).
   3. Color: White.

2.06 COUNTERTOPS

A. Countertops: See Section 123600.

2.07 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Fasteners: Size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

D. Concealed Joint Fasteners: Threaded steel.

E. Grommets: Standard plastic, painted metal, or rubber grommets for cut-outs, in color to match adjacent surface.

2.08 HARDWARE

A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.

B. Exposed Hardware Finishes: provide finish that complies with ANSI/BHMA A156.18 for finish number indicated
   1. Satin Chromium Plated: ANSI/BHMA 626 for brass or bronze base; ANSI/BHMA 652 for steel base

C. Concealed Hardware Finishes: provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9

D. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated self rests, satin chrome finish, for nominal 1 inch spacing adjustments.

E. Drawer and Door Pulls: "U" shaped wire pull, steel with chrome finish, 4 inch centers.
   1. 5/16 inch diameter

F. Keyed Cabinet Locks: Keyed cylinder, two keys per lock, steel with satin finish.
   1. Door Locks: ANSI/BHMA A156.11, E07121
   2. Drawer Locks: ANSI/BHMA A156.11, E07041

G. Drawer Slides:
   1. Type: Full extension.
   2. Static Load Capacity: Heavy Duty grade.
   3. Stops: Integral type.

4. Features: Provide self closing/stay closed type.
5. Manufacturers:
    a. Blum, Inc: www.blum.com
    b. Grass America Inc: www.grassusa.com
    c. Knape & Vogt Manufacturing Company: www.knapeandvogt.com
    d. Substitutions: See Section 012500- Substitution Procedures

H. Hinges: European style concealed self-closing type, ANSI/BHMA A 156.9, B01602 , steel with nickel-plated finish.
1. Manufacturers:
    a. Blum, Inc: www.blum.com
    b. Grass America Inc: www.grassusa.com
    c. Substitutions; See Section 012500- Substitution Procedures

I. Grommets for Cable Passage: 1-1/4 inch OD, molded plastic grommets and matching plastic caps with slot for wire passage.

J. Door and Door Silencers: ANSI/BHMA A156.16, L03011; clear silicone, stick on type at all cabinet doors and drawers

2.09 SITE FINISHING MATERIALS

A. Stain, Shellac, Varnish, and Finishing Materials: In compliance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2.10 FABRICATION

A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

E. Matching Wood Grain: Comply with requirements of quality standard for specified Grade and as follows:

END OF SECTION

SECTION 072100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation at cavity wall construction and perimeter foundation wall.

B. Batt insulation and vapor retarder in exterior pre- engineered metal building wall and roof construction.

C. Thermal break inserts at pre-engineered metal building at secondary roof framing of pre-engineered metal building system.

D. Batt insulation in exterior cold formed metal stud curtain walls

E. Continuous insulation over exterior cold formed metal stud curtain wall.

F. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

G. Sound attenuation batts at interior partitions where indicated on plans

1.02 REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.

B. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications 2013 (Reapproved 2019).

C. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2023.

D. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation 2014 (Reapproved 2019).

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.
   1. Provide 2" x 24" extruded polystyrene board

B. Insulation over metal stud framed backer walls for masonry veneer cavity walls: Continuous: Mineral fiber board.
   1. Provide R-6.5 semi rigid mineral wool board continuous cavity insulation over sheathing and weather barrier at brick veneer exterior wall.
      a. 1.5 inch "CavityRock" as manufactured by "Rock Wool " is used as reference standard.
      b. Substitutions: See Section 012500, Substitution Procedures

C. Insulation in metal framed backer walls for masonry cavity veneer wall: Fiber glass insulation batts with adhered vapor retarder.
   1. Provide R-19, 6.25 inch, fiber glass, with foil faced vapor retarder.

D. Insulation at pre-engineered building roof secondary framing:
   1. Pro Liner Banded Liner double layer insulation system supplied manufactured By Therm-All is used as reference standard. (Christina Jenkins, telephone: 888-746-4147, 214-630-4800)
      a. Double layer insulation system

1) Thermal space blocks 1" thick
2) R-11 "EcoTouch" unfaced fiber glass batts over thermal blocks
3) R-19 "EcoTouch" unfaced batts between purlins
4) Liner fabric "Therm-All type 1070 class I vapor retarder liner , black
   (a) Weight 4.4 oz/ sq. yd.
   (b) Thickness ASTM D1777 Nominal 9 mils
   (c) Classifiation ASTM C1136 TypeV-V1
   (d) Tensile strength ASTM D5035 Warp 105 lb/in., Weft 85lb./in.
   (e) Grab tensile Strength ASTM D5034 Warp 130 lb., Weft 115 lb.
   (f) Tear strength ASTM D2261 Warp 50 lb. Weft 45 lb.
   (g) Burst strength ASTM D3786 235 psi
   (h) Puncture resistance ASTM D4833 65lb.
   (i) Light reflectance value ASTM E1477 N/A black finish
   (j) Flame resistance NFPA 701 Pass
   (k) Elevated temperature and humidity resistance, ASTM C1258 02 perms no delamination
   (l) Dimensional stability ASTM D1204 Warp 1.0% Weft 2.0%
   (m) Thermal stability ASTM C1263
   (n) Fungi Resistance ASTM C1336 No growth
   (o) Water vapor permeance ASTM E96 Method A 0.02 perms
   (p) Surface burning characteristics UL 723 (ASTM E84)
      (1) Flame spread 0
      (2) Smoke developed 28
5) Galvanized metal support straps, black finish to match vapor retarder liner in color

b. Substitutions: See Section 012500, Substitution Procedures

E. Insulation at pre-engineered building wall secondary framing:
1. Pro liner System Single layer system as manufactured by "Therm-All" is used as reference standard.
   a. Single layer insulation system with thermal break at girts
      1) 1/8" foam (thermal tape)
      2) Insulation hangers
      3) R-27, 8" thick, unfaced, "EcoTouch" batts
      4) Liner fabric, " Therm- All type 1070 class I vapor retarder liner white
         (a) Weight 4.4 oz/ sq. yd.
         (b) Thickness ASTM D1777 Nominal 9 mils
         (c) Classifiation ASTM C1136 TypeV-V1
         (d) Tensile strength ASTM D5035 Warp 105 lb/in., Weft 85lb./in.
         (e) Grab tensile Strength ASTM D5034 Warp 130 lb., Weft 115 lb.
         (f) Tear strength ASTM D2261 Warp 50 lb. Weft 45 lb.
         (g) Burst strength ASTM D3786 235 psi
         (h) Puncture resistance ASTM D4833 65lb.
         (i) Light reflectance value ASTM E1477 84
         (j) Flame resistance NFPA 701 Pass
         (k) Elevated temperature and humidity resistance, ASTM C1258 02 perms no delamination
         (l) Dimensional stability ASTM D1204 Warp 1.0% Weft 2.0%
         (m) Thermal stability ASTM C1263
         (n) Fungi Resistance ASTM C1336 No growth
         (o) Water vapor permeance ASTM E96 Method A 0.02 perms
         (p) Surface burning characteristics UL 723 (ASTM E84)
            (1) Flame spread 0
            (2) Smoke developed 28

5) Galvanized metal support straps, white finish to match vapor retarder liner in color

b. Substitutions : See Section 012500, Substitution Procedures

F. Sound attenuation insulation at interior walls: Unfaced R-13 mineral wool batts.
1. Thermafiber "Fire & Sound Guard Plus is used as reference standard

2.02 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
5. Board Edges: Square.
6. Provide 2" x 24" extruded polystyrene board
7. Products:
a. DuPont de Nemours, Inc: building.dupont.com/#sle.
b. Kingspan Insulation LLC: www.kingspan.com/#sle.
c. Foamular 250 as manufactured by Owens Corning is used as reference standard
d. Substitutions: See Section 012500 - Substitution Procedures

2.03 MINERAL FIBER BOARD INSULATION MATERIALS

A. Mineral Wool Semi Rigid Thermal Insulation: Complying with ASTM C612 or ASTM C553.
1. Where indicated, provide fiberglass reinforced polypropylene facing on one side; with flame spread index of 25 or less, when tested in accordance with ASTM E84.
2. Smoke Developed Index: 25, when tested in accordance with ASTM E84.
3. Flame spread index 10 when tested in accordance with ASTM E84
4. Board Size: 16 by 48 inches.
5. Board Thickness: 1-1/2 inches.
6. Thermal Resistance: R-value of 4.3 per inch at 75 degrees F, minimum, when tested in accordance with ASTM C518.
7. Products:
a. Johns Manville; CladStone 45 Water & Fire Block Insulation: www.jm.com
b. ROCKWOOL; CAVITYROCK: www.rockwool.com is used as reference standard
c. Thermafiber, Inc; RainBarrier 45: www.thermafiber.com
d. Substitutions: See Section 012500 - Product Requirements

2.04 ACCESSORIES

A. Insulation Fasteners: Appropriate for purpose intended sagging in interstitial spaces between metal studs is not acceptable .

B. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Install boards horizontally on foundation perimeter.
1. Butt edges and ends tightly to adjacent boards and to protrusions.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.02 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 072700
AIR BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air barriers.

1.02 DEFINITIONS

A. Air Barrier: Airtight barrier made of material that is virtually air impermeable but water vapor permeable, both to amount as specified, with sealed seams and sealed joints to adjacent surfaces.

1.03 REFERENCE STANDARDS

A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension 2016 (Reapproved 2021).

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.

C. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a, with Editorial Revision (2023).

D. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials 2021a.

E. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components 2023.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on material characteristics, performance criteria, and limitations.

1.05 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.01 AIR BARRIER MATERIALS (AIR IMPERMEABLE AND WATER VAPOR PERMEABLE)

A. Air Barrier, Fluid Applied: Vapor semi-permeable, elastomeric waterproofing.
   1. Air Barrier Coating:
      a. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
      b. Water Vapor Permeance: 11 perms, minimum, when tested in accordance with ASTM E96/E96M using Procedure B - Water Method, at 73.4 degrees F.
      c. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 90 days of weather exposure.
      d. Elongation: 300 percent, minimum, when tested in accordance with ASTM D412.
      e. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A when tested in accordance with ASTM E84.
      f. Comply with NFPA 285 requirements for wall assembly.
      g. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
      h. Products:
         1) Dow Chemical Company; DOWSIL DefendAir 200C: consumer.dow.com/en-us/industry/ind-building-construction.html
         2) Master Builders Solutions; MasterSeal AWB 660: www.master-builders-solutions/en-us/
         3) Parex USA, Inc; Parex USA WeatherSeal Spray & Roll-on: www.parexusa.com
         4) Pecora Corporation; Pecora ProPerm VP - Vapor Permeable Air Barrier System with XL-Flash Liquid Flashing and Joint Filler, AVB Silicone Surface Transitions,

and XL-Span Transition Membrane: www.pecora.com
5) Sto Corp; Sto Gold Coat: www.stocorp.com
6) W.R. Meadows, Inc; Air-Shield TMP: www.wrmeadows.com
7) Substitutions: See Section 012500- Substitution Procedures

2.02 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Air Barrier and Adjacent Substrates: As indicated or in compliance with air barrier manufacturer's installation instructions.

B. Thinners and Cleaners: As recommended by material manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions are ready for work of this section.

B. Where existing conditions are responsibility of another installer, notify Architect of unsatisfactory conditions.

C. Do not proceed with this work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's installation instructions.

B. Air Barriers: Install continuous airtight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.

D. Fluid-Applied Coatings or Membranes:
1. Prepare substrate in accordance with manufacturer's installation instructions; treat joints in substrate and between dissimilar materials as indicated.
2. Seal joints between panels and around penetrations
3. Where exterior masonry veneer is being installed, install masonry anchors before installing air barrier over masonry; provide airtight seal around anchors.
4. Apply bead or trowel coat of mastic sealant with minimum thickness of 1/4 inch along coating seams, rough cuts, and as recommended by manufacturer.
5. Use flashing to seal to adjacent construction and to bridge joints in coating substrate.

E. Openings and Penetrations in Exterior Air Barriers:
1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto air barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
2. At openings with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
3. At openings with nonflanged frames, seal air barrier to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
4. At head of openings, install flashing under air barrier extending at least 2 inches beyond face of jambs; seal air barrier to flashing.
5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
6. Service and Other Penetrations: Form flashing around penetrating item and seal to air barrier surface.

3.04 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 079200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

1.02 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer 2015 (Reapproved 2022).

B. ASTM C834 - Standard Specification for Latex Sealants 2017 (Reapproved 2023).

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016 (Reapproved 2023).

E. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants 2022.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.
   5. Substrates for which use of primer is required.

C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Nonsag Sealants:
   1. Dow: www.dow.com
   2. Master Builders Solutions: www.master-builders-solutions.com/en-us
   3. Pecora Corporation: www.pecora.com
   4. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com
   5. Substitutions: See Section 016000 - Product Requirements.

B. Self-Leveling Sealants:
   1. Dow: www.dow.com
   2. Master Builders Solutions: www.master-builders-solutions.com/en-us
   3. Pecora Corporation: www.pecora.com
   4. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com
   5. Substitutions: See Section 012500- Substitution Procedures

2.02 JOINT SEALANT APPLICATIONS

A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to:
      a. Wall expansion and control joints.
      b. Joints between door, window, and other frames and adjacent construction.
      c. Joints between different exposed materials.

d. Openings below ledge angles in masonry.
e. Other joints indicated below.

2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
   a. Joints between door, window, and other frames and adjacent construction.
   b. Other joints indicated below.

B. Type P1 - Exterior Joints: Use nonsag polyurethane sealant, unless otherwise indicated.
   1. Type B1 - Lap Joints in Sheet Metal Fabrications: Butyl rubber, noncuring.
   2. Type P2 - Control and Expansion Joints in Concrete Paving: Self-leveling polyurethane traffic-grade sealant.

C. Type A1 - Interior Joints: Use nonsag acrylic emulsion latex sealant, unless otherwise indicated.
   1. Type S1 - Joints between tile in wet areas and floors, walls, and ceilings: nonstaining silicone sealant
   2. Type S1 - Joints between fixtures and floor and wall surfaces: nonstaining silicone sealant

D. Interior Wet Areas: Bathrooms, restrooms, and kitchens; fixtures in wet areas include plumbing fixtures, countertops, cabinets, and other similar items.

2.03 NONSAG JOINT SEALANTS

A. Type S1 - Nonstaining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Nonstaining to Porous Stone: Nonstaining to light-colored natural stone when tested in accordance with ASTM C1248.
   3. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
   4. Color: To be selected by Architect from manufacturer's standard range.
   5. Products:
      a. Pecora Corporation; Pecora 864 NST (Non-Staining Technology):
      b. Tremco Commercial Sealants & Waterproofing; Tremsil 200
      c. Substitutions: See Section 016000 - Product Requirements.

B. Type P1 - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
   2. Hardness Range: 35 to 45, Shore A, when tested in accordance with ASTM C661.
   3. Color: To be selected by Architect from manufacturer's standard range.
   4. Products:
      a. Master Builders Solutions; MasterSeal NP1
      b. Pecora Corporation; DynaFlex
      c. Tremco Commercial Sealants & Waterproofing; Dymonic 100
      d. Substitutions: See Section 016000 - Product Requirements.

C. Type A1 - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, nonstaining, nonbleeding, nonsagging; not intended for exterior use.
   1. Color: To be selected by Architect from manufacturer's standard range.
   2. Products:
      a. Master Builders Solutions; MasterSeal NP 520
      b. Pecora Corporation; AC-20 +Silicone
      c. Tremco Commercial Sealants & Waterproofing; Tremflex 834
      d. Substitutions: See Section 016000 - Product Requirements.

D. Type B1 - Noncuring Butyl Sealant: Solvent-based, single component, nonsag, nonskinning, nonhardening, nonbleeding; nonvapor permeable; intended for fully concealed applications.
   1. Products:
      a. Pecora Corporation; Pecora BA-98 Non-Skinning Butyl Sealant
      b. Tremco Commercial Sealants & Waterproofing; Acoustical/Curtainwall Sealant

c. Substitutions: See Section 016000 - Product Requirements.

2.04 SELF-LEVELING JOINT SEALANTS

A. Type P2 - Self-Leveling Polyurethane Sealant for Horizontal Expansion Joints: ASTM C920, Grade P, Uses T, M, and O; multicomponent; explicitly approved by manufacturer for horizontal expansion joints.
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Hardness Range: 30 to 35, Shore A, when tested in accordance with ASTM C661.
   3. Color: Limestone.
   4. Products:
      a. Pecora Corporation; DynaTrol II-SG (Slope Grade)
      b. Tremco Commercial Sealants & Waterproofing; THC-901
      c. Substitutions: See Section 016000 - Product Requirements.

2.05 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
   1. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Provide joint sealant installations complying with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.

D. Install bond breaker backing tape where backer rod cannot be used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

END OF SECTION

SECTION 081113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Hollow metal frames for wood doors.

C. Thermally insulated hollow metal doors with frames.

1.02 ABBREVIATIONS AND ACRONYMS

A. ANSI: American National Standards Institute.

B. HMMA: Hollow Metal Manufacturers Association.

C. NAAMM: National Association of Architectural Metal Manufacturers.

D. NFPA: National Fire Protection Association.

E. SDI: Steel Door Institute.

F. UL: Underwriters Laboratories.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2022.

C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2023.

D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2020.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2023.

F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2023.

G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2023.

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.

I. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames 2016.

J. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

K. NAAMM HMMA 805 - Recommended Selection and Usage Guide for Hollow Metal Doors and Frames 2012.

L. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames 2002.

M. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames 2011.

N. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames 2017.

O. NAAMM HMMA 860 - Guide Specifications for Hollow Metal Doors and Frames 2018.

P. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames 2014.

Q. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames 2023.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.

B. Maintain at project site copies of reference standards relating to installation of products specified.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Doors and Frames:
1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com
2. Curries, an Assa Abloy Group company: www.assaabloydss.com
3. Fleming Door Products, an Assa Abloy Group company: www.assaabloydss.com
4. Substitutions: See Section 012500- Product Requirements

2.02 PERFORMANCE REQUIREMENTS

A. Requirements for Hollow Metal Doors and Frames:
1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
2. Accessibility: Comply with ICC A117.1 and ADA Standards.
3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
4. Typical Door Face Sheets: Flush.
5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturer's standard.
6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
7. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
    a. Based on SDI Standards: Provide at least A40/ZF120 (galvannealed) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvannealed) for corrosive locations.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

A. Door Finish: Factory primed and field finished.

B. Exterior Doors: Thermally insulated.
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 2 - Heavy-duty.
      b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Model 2 - Seamless.
      d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.
      e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
   2. Door Core Material: Polyurethane, 1.8 lbs/cu ft minimum density.
      a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
   3. Door Thermal Resistance: R-Value of 8.7, minimum, for installed thickness of polyurethane.
   4. Door Thickness: 1-3/4 inches, nominal.
   5. Weatherstripping: Refer to Section 087100.

C. Interior Doors, Non-Fire-Rated:
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 2 - Heavy-duty.
      b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Model 1 - Full Flush.
      d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.
   2. Based on NAAMM HMMA Custom Guidelines:
      a. Comply with guidelines of NAAMM HMMA 860 for Hollow Metal Doors and Frames.
      b. Performance Level 1 - Light Duty, in accordance with NAAMM HMMA 805.
      c. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
      d. Door Face Metal Thickness: 20 gauge, 0.032 inch, minimum.
   3. Door Thickness: 1-3/4 inches, nominal.
   4. Door Finish: Factory primed and field finished.

2.04 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Frame Finish: Factory primed and field finished.

C. Exterior Door Frames: Full profile/continuously welded type.
   1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
   2. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.
   3. Weatherstripping: Separate, see Section 087100.

D. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
   1. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.

E. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

F. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

G. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.05 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES

A. Door Window Frames: Door window frames with glazing securely fastened within door opening.

1. Size: As indicated on drawings.
2. Frame Material: 18 gauge, 0.0478 inch, galvanized steel.

B. Glazing: As specified in Section 088000, factory installed.

C. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.

D. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.

E. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Coordinate frame anchor placement with wall construction.

C. Install door hardware as specified in Section 087100.

D. Comply with glazing installation requirements of Section 088000.

E. Coordinate installation of electrical connections to electrical hardware items.

3.03 TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.04 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.05 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 081416
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush and flush glazed configuration; fire-rated and non-rated.

1.02 RELATED REQUIREMENTS

A. Section 081113 - Hollow Metal Doors and Frames.

B. Section 087100 - Door Hardware.

C. Section 088000 - Glazing.

D. Section 099300 - Staining and Transparent Finishing: Field finishing of doors.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.

B. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.

C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).

D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.

E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.

F. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.

D. Samples: Submit two samples of door veneer, 6 by 6 inches in size illustrating wood grain, stain color, and sheen.

1.05 QUALITY ASSURANCE

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging, and inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Masonite Architectural: www.architectural.masonite.com
   2. VT Industries, Inc: www.vtindustries.com
   3. Substitutions: See Section 012500- Substitution Procedures

2.02 DOORS

A. Doors: See drawings for locations and additional requirements.
   1. Quality Standard: Premium Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at each location.
   2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
   3. Wood veneer facing for field transparent finish.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

2.04 DOOR FACINGS

A. Veneer Facing for Transparent Finish: Red oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
   1. Vertical Edges: Same species as face veneer.
   2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.

B. Facing Adhesive: Type I - waterproof.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:

C. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.

D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
   1. Exception: Doors to be field finished.

F. Provide edge clearances in accordance with the quality standard specified.

2.06 FINISHES - WOOD VENEER DOORS - FACTORY APPLIED

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
   1. Transparent:
      a. System - 1, Lacquer, Nitrocellulose.
      b. Stain: As selected by Architect.
      c. Sheen: Flat.

2.07 ACCESSORIES

A. Hollow Metal Door Frames: See Section 081113.

B. Glazed Openings:
   1. Heat-Strengthened and Fully Tempered Glass: ASTM C1048.
   2. Fire-Protection-Rated Glass: Safety Certification, 16 CFR 1201, Category II.

C. Door Window Frames: Door window frames with glazing securely fastened within door opening.

D. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

E. Door Hardware: See Section 087100.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
   1. Install fire-rated doors in accordance with NFPA 80 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

E. Coordinate installation of glazing.

F. Install door louvers plumb and level.

3.03 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.

B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.05 SCHEDULE

A. See Door and Frame Schedule appended to Drawings.

END OF SECTION

SECTION 083613
SECTIONAL DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Overhead sectional doors, electrically operated.

1.02 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2023.

C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.

D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.

E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.

F. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.

G. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014 (Reapproved 2021).

H. DASMA 102 - American National Standard Specifications for Sectional Doors 2018.

I. ITS (DIR) - Directory of Listed Products Current Edition.

J. UL (DIR) - Online Certifications Directory Current Edition.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.

C. Product Data: Show component construction, anchorage method, and hardware.

D. Samples: Two panel finish samples, 12 by 12 inch in size, illustrating color and finish.

E. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Operation Data: Include normal operation, troubleshooting, and adjusting.

I. Wind performance requirements
   1. Design load : Uniform pressure (velocity pressure) of 20 lbf/sq. ft. acting inward and outward

J. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least 5 years documented experience.

C. Comply with applicable code for motor and motor control requirements.

D. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction, as suitable for purpose specified.

1.05 WARRANTY

A. See Section 017800 - Closeout Submittals for warranty requirements.

B. Extended Correction Period: Correct defective work within a 2-year period commencing on Date of Substantial Completion.

C. Manufacturer Warranty: Provide 10 year manufacturer warranty for electric operating equipment. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Sectional Doors:
   1. C.H.I. Overhead Doors: www.chiohd.com/#sle.
   2. Clopay Building Products; 524S: www.clopaydoor.com/#sle. is used as reference standard
   3. Raynor Garage Doors: www.raynor.com/#sle.
   4. Wayne-Dalton, a Division of Overhead Door Corporation: www.wayne-dalton.com/#sle.
   5. Substitutions: See Section 012500- Substitution Procedures

2.02 PERFORMANCE REQUIREMENTS

A. Performance: Withstand positive and negative wind loads 20 lbf/sq. ft. without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.

B. Air Leakage Rate: Less than 0.40 cfm/sq ft when tested in accordance with ASTM E283/E283M at test pressure difference of 1.57 psf.

C. Thermal Transmittance: U-factor of 0.31 Btu/hr sq ft degrees F, maximum, in accordance with DASMA 102.

2.03 STEEL DOORS

A. Type SSD-1 - Doors: Flush steel, insulated; standard lift operating style with track and hardware; complying with DASMA 102, Commercial application.

B. Door construction:
   1. Panel Sections: 2 inches thick roll formed commercial quality steel panel sections, hot dipped galvanized per ASTM A 924/A 924M and ASTMA 653/A 653M, phosphatized and prepainted with primer and baked on polyester top coat . Panel faces reinforced with two 1/2 inch deep ribs on 8 inch centers, complemented by six 1/8 inch beads on 2 inch centers. Sections formed to create weather tight tongue and groove meeting rail. Bottom panel section reinforced with continuous .050 aluminum astragal retainer with U-shaped flexible PVC astragal.
   2. Door Stiles: Galvanized, primed and polyester top coated turn down end stiles; wrap of panel sections a full 1 3/8"; .049 inch minimum thickness, engineered for ease of haredware attachment through pre-punched holes
   3. Style: Ribbed steel polystyrene insulated doors
   4. Steel backer cover: Interior prepainted 24 gauge steel back cover
   5. Exterior steel skin thickness: Minimum 24 gauge
   6. Stiles: Galvanized , primed and polyester top-coated turn down steel end stiles
   7. Astragal: U shaped flexible PVC in retainer of full length .055 inch rigid PVC
   8. Insulation: 1-3/8" thick polystyrene insulation
   9. Thermal resistance: R-6.6
   10. Weatherstripping: Provide complete perimeter seals
   11. Tracks: Vertical tracks minimum .061" galvanized steel tapered and mounted fot wedge closing. Horizontal tracks minimum .075" galvanized steel reinforced with minimum .0897 inch galvanized steel angles as required.

12. Spring counter balance: Torsion spring counterbalance mechanism sized to weight of door with high strength galvanized aircraft cable with a minimum 7 to one safety factor
13. Operation cycles: Door components and operators capable of operating for not less than 10,000 cycles
14. Shaft: 1 1/4" extended solid shaft
15. Finish: Exterior 1 mil coating; Interior .5 mil coating; Color to be selected from manufacturer standard colors
    a. Two part paint system utilizing Sherwin Williams Solar reflective Polane system or equal
16. Door operators: **GH** ks used as reference standard
    a. Operation: Gearhead hoist
    b. Mounting: Wall
    c. Drive type: Worm gear sealed in oil bath
    d. Dosconnect for manual operationb: Floor level emergency release sash chain hoist with electric interlock
    e. Rated duty cycle: Maximum 25 cycles per hour and 125 ctcles per day
    f. 1/2 hp 110/120 volt operator
    g. Meet UL 325
    h. Motor: Listed by Underwriters Laboratories, sized to door conditions
        1) Enclosure: NEMA 1
        2) Travel rate 8 to 9 inches per second
    i. radio receiver: Logic 5.0 on-board; accept secusrity =2.0 rolling code technology remote controls and binary DIP switch remote controls
    j. Interconnectivity: 50 channel FHSS myQ technology
    k. Control station: Three push button type in MEMA 1 enclosure
    l. Primary Entrapment Protection Devices:
        1) (2) sets photo eyes
            (a) First set to be installed with the top of the eye lens no higher tha 6 inches above the floor in compliance with UL 325
            (b) Second set of eyes to be installed at vehicle bumper height or a height as recommended by owner and architect.
    m. Track configuration: Standard lift track
    n. Weather seals: Fitted to bottom and top and around entire perimeter of door
    o. Locking Devices: Equip door with slide bolt for pad lock
        1) Locking device assembly: Cremone type, both jamb sides, locking bars, operable from inside with turn handle
        2) Motor exposure: (Interior, clean and dry), (Exterior, dusty wet, or humid)
        3) Emergency Manual Operation (Chain type)
        4) Obstruction -Detection Device:Electric sensor edge
        5) Control Station: Interior side mounted

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.

B. Verify that electric power is available and of the correct characteristics.

3.02 PREPARATION

A. Prepare opening to permit correct installation of door unit to perimeter air and vapor barrier seal.

3.03 INSTALLATION

A. Install door unit assembly in accordance with manufacturer's instructions.

B. Anchor assembly to wall construction and building framing without distortion or stress.

C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.

D. Fit and align door assembly including hardware.

E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

F. Install perimeter trim.

3.04 TOLERANCES

A. Maximum Variation from Plumb: 1/16 inch.

B. Maximum Variation from Level: 1/16 inch.

C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.

D. Maintain dimensional tolerances and alignment with adjacent work.

3.05 ADJUSTING

A. Adjust door assembly for smooth operation and full contact with weatherstripping.

3.06 CLEANING

A. Clean doors and frames and glazing.

B. Remove temporary labels and visible markings.

3.07 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

SECTION 084313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

D. Door hardware.

1.02 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site 2015.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.

C. AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum 2020, with Errata (2022).

D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.

E. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.

F. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.

G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

H. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.

I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.

J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.

K. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.

L. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014 (Reapproved 2021).

M. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2023).

N. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, and internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.

D. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.07 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Aluminum-Framed Storefronts:
   1. Kawneer North America: www.kawneer.com
   2. Manko Window Systems, Inc: www.mankowindows.com
   3. Oldcastle BuildingEnvelope: www.oldcastlebe.com
   4. YKK AP America, Inc: www.ykkap.com/commercial
   5. Substitutions: See Section 012500- Substitution Procedures

2.02 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

A. Front-Set Style, Thermally-Broken:
   1. Basis of Design: Kawneer; Model 451T.
   2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.

2.03 BASIS OF DESIGN -- SWINGING DOORS

A. Wide Stile, Monolithic Glazing:
   1. Basis of Design: Kawneer Company, Inc.; 500 Wide Style Standard Entrance with a 10 inch bottom rail.
   2. Thickness: 1-3/4 inches.

B. Wide Stile, Insulating Glazing, Not Thermally-Broken:
   1. Basis of Design: Kawneer Company, Inc.; 500 Wide Style Standard Entrance with a 10 inch bottom rail.
   2. Thickness: 1-3/4 inches.

2.04 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Glazing Rabbet: For 1 inch insulating glazing.
   2. Finish: See Part 2.07 Finishes
      a. Factory finish all surfaces that will be exposed in completed assemblies.
   3. Finish Color: Dark bronze.
   4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   5. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

7. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
8. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

B. Performance Requirements
1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
a. Design Wind Loads: Comply with requirements of ASCE 7.
b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf.
3. Air Leakage:0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 6.27 psf pressure difference.
4. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.
5. Overall U-value Including Glazing: 0.41 Btu/(hr sq ft deg F), maximum.

2.05 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
1. Framing members for interior applications need not be thermally broken.
2. Glazing Stops: Flush.
3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

B. Swing Doors: Glazed aluminum.
1. Thickness: 1-3/4 inches.
2. Top Rail: 5 inches wide.
3. Vertical Stiles: 5 inches wide.
4. Bottom Rail: 10 inches wide.
5. Glazing Stops: Square.
6. Finish: Same as storefront.

2.06 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Sheet Aluminum: ASTM B209/B209M.

C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.

D. Fasteners: Stainless steel.

E. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.

F. Sealant for Setting Thresholds: Non-curing butyl type.

G. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

H. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.07 FINISHES

A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick.

B. Color Anodized Finish with Organic Seal: AAMA 612 Electrolytically deposited colored anodic coating with non-aqueous electro-deposited organic seal; not less 0.7 mils.

C. Color: Dark bronze anodized.

2.08 HARDWARE

A. For each door, include weatherstripping, sill sweep strip, and threshold.

B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

C. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

D. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.

E. Pivots: Offset type; top, intermediate, and bottom.

F. Push/Pull Set: Standard configuration push/pull handles.

G. Exit Devices: Panic type.

H. Door Closers: Exposed overhead.
   1. Provide on all doors.

I. Locks: See Section 087100 .

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Set thresholds in bed of sealant and secure.

J. Install hardware using templates provided.

K. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.05 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

3.06 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 087100
DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood, aluminum, and hollow metal doors.

B. Electrically operated and controlled hardware.

C. Lock cylinders for doors that hardware is specified in other sections.

D. Thresholds.

E. Weatherstripping and gasketing.

1.02 RELATED REQUIREMENTS

A. Section 281000 - Access Control: Electronic access control devices.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.

B. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames 2016.

C. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames 2006.

D. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

E. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL (DIR) - Online Certifications Directory Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.

C. Keying Schedule:
   1. Submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years of documented experience.

B. See attached hardware schedule for product specifications

C. Substitutions: See Section 012500 -- Substitution procedures.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer's Warranty: Provide warranty against defects in material and workmanship for period indicated. Complete forms in Owner's name and register with manufacturer.
   1. Locksets and Cylinders: Three years, minimum.

2. Other Hardware: Two years, minimum.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Provide individual items of single type, of same model, and by same manufacturer.

C. Provide door hardware products that comply with the following requirements:
   1. Applicable provisions of federal, state, and local codes.
   2. Accessibility: ADA Standards and ICC A117.1.
   3. Applicable provisions of NFPA 101.
   4. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
   5. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.
   6. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.

D. Electrically Operated and/or Controlled Hardware: Provide necessary power supplies, power transfer hinges, relays, and interfaces as required for proper operation; provide wiring between hardware and control components and to building power connection in compliance with NFPA 70.
   1. See Section 281000 for additional access control system requirements.

E. Fasteners:
   1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
      a. Aluminum fasteners are not permitted.
      b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.

2.02 FIRE DEPARTMENT LOCK BOX

A. Manufacturers:
   1. Knox Company; Knox-Box Rapid Entry System: www.knoxbox.com/#sle.

B. Fire Department Lock Box:
   1. Heavy-duty, surface mounted, solid stainless-steel box with hinged door and interior gasket seal; single drill resistant lock with dust covers and tamper alarm.
   2. Capacity: Holds 10 keys.
   3. Finish: Manufacturer's standard dark bronze.

2.03 FINISHES

A. Finishes: Identified in Door Hardware Schedule.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

B. Verify that electric power is available to power operated devices and of correct characteristics.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on drawings.

D. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel

countersunk screws.

3.03 ADJUSTING

A. Adjust work under provisions of Section 017000 - Execution and Closeout Requirements.

B. Adjust hardware for smooth operation.

C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.04 CLEANING

A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.

B. Clean adjacent surfaces soiled by hardware installation.

3.05 PROTECTION

A. Protect finished Work under provisions of Section 017000 - Execution and Closeout Requirements.

B. Do not permit adjacent work to damage hardware or finish.

3.06 SCHEDULE

A. Refer to the attached Door Hardware Schedule

END OF SECTION

Set #1

Doors: 01

1	Continuous Hinge	CFM 83 SLI HD1		PE
1	Exit Device	7100 1109 6 PIN 121NL 36"	630	YA
1	Offset Door Pull	BF158 TYPE 1XHD FASTENING	US32D	RO
1	Operator	6061	689	NO
2	Door Switch	672		NO
1	Door Bottom	315 CN 36"		PE
1	Threshold	171 A 36"		PE

NOTE: Weatherstripping by Door Supplier. Automatic Door Operator only when Exit Device is dogged in unlatched position.

Set #2

Doors: 02

1	Continuous Hinge	CFM 83 SLI HD1		PE
1	Exit Device	7100 1109 6 PIN 121NL 36"	630	YA
1	Offset Door Pull	BF158 TYPE 1XHD FASTENING	US32D	RO
1	Closer	UNI7500	689	NO
1	Drop Plate	7788	689	NO

Set #3

Doors: 04, 06, 07, 11

3	Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1	Lockset	PB 5407LN	626	YA
1	Wall Stop	409	US32D	RO
3	Door Silencer	608-RKW	GREY	RO

Set #4

Doors: 05

3	Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1	Passage	PB 5401LN	626	YA
1	Wall Stop	409	US32D	RO
3	Door Silencer	608-RKW	GREY	RO

Set #5

Doors: 08, 09

3	Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1	Push Plate	70C-RKW 4 X 16	US32D	RO
1	Pull Plate	110 X 70C	US32D	RO
1	Closer	8501 SN-134	689	NO
1	Protection Plate	K1050 10" x 34"	US32D	RO
1	Wall Stop	409	US32D	RO
3	Door Silencer	608-RKW	GREY	RO

Set #6

Doors: 10A, 10B

NOTE: CASED OPENING, NO HARDWARE

Set #7

Doors: 12A, 12B, 13B

3	Hinges	TA2714 4 1/2 X 4 1/2 NRP	26D	MC
1	Exit Device	7100 x PB626F 1109 6 PIN 36"	630	YA
1	Electric Strike Body	9500 2004M	630	HS
1	Closer	UNI7500	689	NO
1	Protection Plate	K1050 10" x 34"	US32D	RO
1	Linear Power Supply	BPS-12/24-1		SN
1	Wiring Harness	QC-C400		MC
1	Wiring Harness	QC-C1500		MC
1	Gasketing Set	160 V 3' X 7'		NA
1	Door Bottom	95 WH 36"		NA
1	Threshold	896 V 36"	AL	NA

Set #8

Doors: 13A

3	Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1	Lockset	PB 5407LN	626	YA
1	Closer	8501 SN-134	689	NO
1	Protection Plate	K1050 10" x 34"	US32D	RO
1	Gasketing	5050 B-17 17'		NA
1	Door Sweep	601 36"		NA

SECTION 088000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Insulating glass units.

B. Glazing units.

C. Glazing compounds.

1.02 RELATED REQUIREMENTS

A. Section 072700 - Air Barriers.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015 (Reaffirmed 2020).

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers 2005 (Reapproved 2019).

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.

F. ASTM C1036 - Standard Specification for Flat Glass 2021.

G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.

H. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016 (Reapproved 2023).

I. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass 2021a.

J. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings 2016.

K. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation 2019.

L. GANA (GM) - GANA Glazing Manual 2022.

M. GANA (SM) - GANA Sealant Manual 2008.

N. GANA (LGRM) - Laminated Glazing Reference Manual 2019.

O. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use 1990 (2016).

P. NFRC 100 - Procedure for Determining Fenestration Product U-factors 2023.

Q. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence 2023.

R. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems 2023.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.06 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Glass Fabricators:
   1. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com
   2. Viracon, Inc: www.viracon.com
   3. Substitutions: See Section 012500- Produdct Requirements

B. Float Glass Manufacturers:
   1. Cardinal Glass Industries: www.cardinalcorp.com
   2. Guardian Glass, LLC: www.guardianglass.com
   3. Pilkington North America Inc; _____: www.pilkington.com/na
   4. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com
   5. Substitutions: See Section 016000 - Product Requirements.

C. Laminated Glass Manufacturers:
   1. Cardinal Glass Industries: www.cardinalcorp.com
   2. Viracon, Architectural Glass segment of Apogee Enterprises, Inc: www.viracon.com

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Design Pressure: Calculated in accordance with ASCE 7.
   2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
   3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
   4. Glass thicknesses listed are minimum.

B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
   1. In conjunction with weather barrier related materials described in other sections, as follows:
      a. Air Barriers: See Section 072700.

C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's

published data as determined with the following procedures and/or test methods:

1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
3. Solar Optical Properties: Comply with NFRC 300 test method.

2.03 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.
   1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
   2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
   3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
   4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
   5. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.

2.04 INSULATING GLASS UNITS

A. Manufacturers:
   1. Glass: Any of the manufacturers specified for float glass.

B. Insulating Glass Units: Types as indicated.
   1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
   2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
   3. Metal-Edge Spacers: Aluminum, bent and soldered corners.
   4. Spacer Color: Black.
   5. Edge Seal:
      a. Color: Black.
   6. Purge interpane space with dry air, hermetically sealed.

C. Insulating Glass Units: Vision glass, double glazed.
   1. Applications: Exterior glazing unless otherwise indicated.
   2. Space between lites filled with air.
   3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Tint: Gray.
      b. Coating: Low-E (passive type), on #2 surface.
   4. Metal edge spacer.
   5. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Tint: Clear.
   6. Total Thickness: 1 inch.
   7. Total Thickness at doors: 5/8 inch
   8. Thermal Transmittance (U-Value): 0.29, nominal.
   9. Visible Light Transmittance (VLT): 35 percent, nominal.
   10. Solar Heat Gain Coefficient (SHGC): 0.25, nominal.
   11. Glazing Method: Dry glazing method, gasket glazing.

D. Insulating Glass Units: Safety glazing.
   1. Applications:
      a. Glazed lites in exterior doors.
      b. Glazed sidelights and panels next to doors.
      c. Other locations required by applicable federal, state, and local codes and regulations.
      d. Other locations indicated on drawings.
   2. Space between lites filled with air.
   3. Glass Type: Same as other vision glazing except use fully tempered float glass for both outboard and inboard lites.

2.05 GLAZING UNITS

A. Monolithic Interior Vision Glazing:
   1. Applications: Interior glazing unless otherwise indicated.
   2. Glass Type: Annealed float glass.
   3. Tint: Clear.
   4. Thickness: 1/4 inch, nominal.

B. Type G-3 - Monolithic Safety Glazing: Non-fire-rated.
   1. Applications:
      a. Glazed lites in doors, except fire doors.
      b. Glazed sidelights to doors, except in fire-rated walls and partitions.
      c. Other locations required by applicable federal, state, and local codes and regulations.
      d. Other locations indicated on drawings.
   2. Glass Type: Fully tempered safety glass as specified.
   3. Tint: Clear.
   4. Thickness: 1/4 inch, nominal.

C. Transparent One-Way Mirror: Mirror quality float glass with pyrolytic (hard coat) type coating located on high light level surface of glass; ASTM C1376.
   1. Applications: Locations as indicated on drawings.
   2. Thickness: 1/4 inch.
   3. Glass Tint: Grey.
   4. Glass Type: Annealed.

2.06 GLAZING COMPOUNDS

A. Type GC-2 - Butyl Sealant: Single component; ASTM C920 Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.

B. Type GC-5 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

C. Manufacturers:
   1. Bostik Inc: www.bostik-us.com
   2. Dow Corning Corporation: www.dowcorning.com/construction
   3. Master Builders Solutions: www.master-builders-solutions.com/en-us
   4. Momentive Performance Materials, Inc: www.momentive.com
   5. Pecora Corporation: www.pecora.com
   6. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com
   7. Substitutions: See Section 016000 - Product Requirements.

2.07 ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Continuous by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.

D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

B. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

C. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - WET/DRY GLAZING METHOD (PREFORMED TAPE AND SEALANT)

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.

C. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.

D. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

E. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

F. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.

1. Place glazing tape on glazing pane of unit with tape flush with sight line.

G. Fill gap between glazing and stop with exterior type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.

H. Apply cap bead of exterior type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.06 INSTALLATION - WET/DRY GLAZING METHOD (TAPE AND SEALANT)

A. Application - Interior Glazed: Set glazing infills from the interior of the building.

B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

E. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.

F. Fill gaps between pane and applied stop with compatable type sealant to depth equal to bite on glazing, to uniform and level line.

G. Carefully trim protruding tape with knife.

3.07 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove nonpermanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.08 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 088300
MIRRORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass mirrors.
   1. Annealed float glass.

1.02 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.

C. ASTM C1036 - Standard Specification for Flat Glass 2021.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016 (Reapproved 2023).

E. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror 2018.

F. GANA (GM) - GANA Glazing Manual 2022.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data on Mirror Types: Submit structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM) for glazing installation methods.

B. Fabricate, store, transport, receive, install, and clean mirrors in accordance with manufacturer's recommendations.

1.05 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for reflective coating on mirrors and replacement of same.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Mirrors:
   1. Binswanger Mirror/ACI Distribution: www.binswangerglass.com
   2. Lenoir Mirror Co: www.lenoirmirror.com
   3. Trulite Glass and Aluminum Solutions: www.trulite.com
   4. Walker Glass Company Ltd: www.walkerglass.com
   5. Subtitutions: See Section 012500- Product Requirements

2.02 MATERIALS

A. Mirror Design Criteria: Select materials and/or provide supports as required to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.

B. Mirror Glass: ASTM C1036, Type 1 - Transparent Flat, Class 1 - Clear, Quality - Q2 (general use mirrors); silvering, protective coating, and quality requirements in compliance with ASTM C1503.
   1. Size: As indicated on drawings.

2.03 ACCESSORIES

A. Safety Glazing Products: For film backed mirrors, provide products that comply with 16CFR 1201, Category II.

B. J-Shape Frame: Aluminum extrusion, 1/2 inch by 1/2 inch by 3/8 inch deep.
   1. Material: Comply with ASTM B221 (ASTM B221M), 6005-T6 alloy and temper.
   2. Finish: Anodized, clear.
   3. Location: Continuous along top and bottom edges of mirror

2.04 FABRICATION

A. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint, as recommend in writing by film backing manufacturer.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Prepare installation in accordance with ASTM C1193 for solvent release sealants, and install sealant in accordance with manufacturer's instructions.

3.02 INSTALLATION

A. Install mirrors in accordance with manufacturer's recommendations.

B. Set mirrors plumb and level, and free of optical distortion.

C. Set mirrors with edge clearance free of surrounding construction including countertops or backsplashes.

D. Install mirrors with mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or insert as applicable. Install fasterners so heads do not impose point loads on backs of mirrors.

3.03 CLEANING

A. Remove labels after work is complete.

B. Clean mirrors and adjacent surfaces.

END OF SECTION

SECTION 092116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Gypsum board ceiling grid suspension system

D. Acoustic insulation.

E. Gypsum wallboard.

F. Joint treatment and accessories.

G. Textured finish system.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Building framing and sheathing.

B. Section 061000 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members 2016, with Supplement (2020).

B. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing 2020.

C. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing 2015, with Errata (2020).

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2023.

E. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members 2015.

F. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017 (Reapproved 2022).

G. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2023.

H. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2020.

I. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2020.

J. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness 2022.

K. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base 2019.

L. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel 2018.

M. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.

N. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2021.

O. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).

P. ASTM E413 - Classification for Rating Sound Insulation 2022.

Q. GA-216 - Application and Finishing of Gypsum Panel Products 2021.

R. GA-600 - Fire Resistance and Sound Control Design Manual 2021.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the installation of gypsum board assemblies with size, location, and installation of service utilities.

B. Sequencing: Install service utilities in an orderly and expeditious manner.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data:
   1. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store gypsum products and accessories indoors and keep above freezing. Elevate boards above floor, on nonwicking supports, in accordance with manufacturer's recommendations.

B. Store metal products to prevent corrosion.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. Interior Partitions, not indicated as acoustic:
   1. See plans for location, partition type and details

C. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
   1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
   2. See plans for location, partition type and details

D. Grid Suspension Systems: Provide grid suspension systems in accordance with ASTM C840 and GA-216 complying with the following:
   1. ICC-ES Evaluation Report No. _____.

E. Fire-Resistance-Rated Assemblies: Provide completed assemblies with the following characteristics:
   1. Fire-Resistance-Rated Partitions: GA-600 File Number WP1004; 1 hour rating.
   2. See plans for location and details
   3. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.

2.02 METAL FRAMING MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.

B. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. ClarkDietrich: www.clarkdietrich.com
   2. MarinoWARE: www.marinoware.com
   3. Phillips Manufacturing Co: www.phillipsmfg.com
   4. Substitutions: See Section 012500- Substitution Procedures

C. Nonstructural Framing System Components: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
   1. Studs: C-shaped with knurled or embossed faces.
   2. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch.
   3. Furring Members: Zee-shaped sections, minimum depth of 1 inch.

D. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection and prevent rotation of studs while maintaining structural performance

of partition.

1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.
2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.

E. Non-structural Framing Accessories:
   1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

F. Grid Suspension Systems: Steel grid system of main tees and support bars connected to structure using hanging wire.
   1. Products:
      a. Donn DGLW system or approved substitute.
      b. Provide ceiling hangers at spacing recommended by grid manufacturer to limit deflection to L/240
      c. Provide ceiling hangers of gauge recommended by manufacturer for 5/8" gypsum ceiling board

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. American Gypsum Company: www.americangypsum.com
   2. CertainTeed Corporation: www.certainteed.com
   3. Georgia-Pacific Gypsum: www.gpgypsum.com
   4. Gold Bond Building Products, LLC provided by National Gypsum Company: www.goldbondbuilding.com
   5. USG Corporation: www.usg.com
   6. Substitutions: See Section 012500- Substitution Procedures

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   3. Thickness:
      a. Vertical Surfaces: 5/8 inch.
      b. Ceilings: 5/8 inch.

C. Backing Board For Wet Areas: One of the following products:
   1. Application: Surfaces behind tile in wet areas including tiled walls at rest rooms.
   2. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
      a. Regular Type: Thickness 5/8 inch.
      b. Products:
         1) Georgia-Pacific Gypsum; DensShield Tile Backer: www.gpgypsum.com/#sle.
         2) USG Corporation; Durock Brand Glass-Mat Tile Backerboard SGX 5/8 in. (15.9 mm): www.usg.com/#sle.
         3) Substitutions: See Section 012500 Substitution Procedures

D. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
   1. Application: Vertical surfaces behind thinset tile, except in wet areas.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   4. Type: Regular and Type X, in locations indicated.
   5. Type X Thickness: 5/8 inch.
   6. Regular Board Thickness: 5/8 inch.
   7. Edges: Tapered.
   8. Products:

a. Georgia-Pacific Gypsum; DensArmor Plus: www.gpgypsum.com/#sle.
b. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond XP Fire-Shield Gypsum Board: www.goldbondbuilding.com/#sle.
c. Substitutions: See Section 012500- Substitution procedures

E. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Ceilings, unless otherwise indicated.
2. Thickness: 5/8 inch.
3. Edges: Tapered.

F. Exterior Sheathing Board: See Section 061000.

2.04 GYPSUM BOARD ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed mineral-fiber, friction fit type, unfaced; thickness 3.5 inch.

B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

C. Finishing Accessories: ASTM C1047, extruded aluminum alloy (6063 T5) or galvanized steel sheet ASTM A924/A924M G90, unless noted otherwise.
1. Types: As detailed or required for finished appearance.
2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
3. Products:
a. Same manufacturer as framing materials.

D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
1. Paper Tape: 2 inch wide, creased paper tape for joints and corners.
2. Joint Compound: Drying type, vinyl-based, ready-mixed.

E. Textured Finish Materials: Latex-based compound; plain.

F. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with AISI S220 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
1. Level ceiling system to a tolerance of 1/1200.
2. Laterally brace entire suspension system.

C. Studs: Space studs at 16 inches on center.
1. Extend partition framing to structure where indicated and to ceiling in other locations.
2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
3. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

E. Blocking: Install wood blocking for support of:
1. Wall-mounted cabinets.

2. Plumbing fixtures.
3. Toilet partitions.
4. Toilet accessories.
5. Wall-mounted door hardware.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

C. Place one bead continuously on substrate before installation of perimeter framing members.

D. Provide stick pin support for sound attenuation batts as required to prevent sagging within wall a cavities

3.04 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Nonrated: Install gypsum board parallel to framing, with ends and edges occurring over firm bearing.

C. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

D. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

E. Installation on Metal Framing: Use screws for attachment of gypsum board.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
2. Wings of 'L', 'U' and 'T' shaped ceiling areas
3. Door and window frame jambs
4. Abutting dissimilar materials
5. At changes in construction type within the plane of the partition or ceiling

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.06 JOINT TREATMENT

A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
2. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.

C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch.

3.07 TEXTURE FINISH

A. Apply finish texture coating by means of roller in accordance with manufacturer's instructions and to match approved sample.

3.08 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.09 PROTECTION

A. Protect installed gypsum board assemblies from subsequent construction operations.

END OF SECTION

SECTION 093000
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Ceramic trim.

D. Non-ceramic trim.

1.02 REFERENCE STANDARDS

A. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar 2017 (Reaffirmed 2022).

B. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 2017.

C. ANSI A108.1c - Contractor's Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 1999 (Reaffirmed 2021).

D. ANSI A108.2 - American National Standard General Requirements: Materials, Environmental and Workmanship 2019.

E. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesive or Water Cleanable Tile-Setting Epoxy Adhesive 2019.

F. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar 2021.

G. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grout Epoxy 1999 (Reaffirmed 2019).

H. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout 1999 (Reaffirmed 2019).

I. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout 1999 (Reaffirmed 2019).

J. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework 2017 (Reaffirmed 2022).

K. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar 1999 (Reaffirmed 2019).

L. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone 2005 (Reaffirmed 2021).

M. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar 2020.

N. ANSI A108.20 - American National Standard Specifications for Exterior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs 2020.

O. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar 2019.

P. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation 2019.

Q. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation 2014 (Reaffirmed 2019).

R. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2022.

S. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2023.

T. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.

U. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation 2023.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

1.04 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Company specializing in performing tile installation, with minimum of five years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.06 FIELD CONDITIONS

A. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

PART 2 PRODUCTS

2.01 TILE

A. Manufacturers: Refer to Finish Schedule .

2.02 TRIM AND ACCESSORIES

A. Ceramic Trim: Matching bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
   1. Applications:
      a. Open Edges: Bullnose.
      b. Inside Corners: Jointed.
   2. Manufacturers: Same as for tile.

B. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
   1. Applications:
      a. Open edges of wall tile.
      b. Open edges of floor tile.
      c. Transition between floor finishes of different heights.
      d. Thresholds at door openings.
      e. Expansion and control joints, floor and wall.
      f. Floor to wall joints.
      g. Borders and other trim as indicated on drawings.
   2. Manufacturers:
      a. Schluter-Systems: www.schluter.com
      b. Substitutions: See Section 012500- Substitution Procedures

2.03 SETTING MATERIALS

A. Manufacturers:
   1. ARDEX Engineered Cements: www.ardexamericas.com
   2. Bostik Inc: www.bostik-us.com
   3. Custom Building Products: www.custombuildingproducts.com

4. LATICRETE International, Inc: www.laticrete.com
5. Merkrete, by Parex USA, Inc: www.merkrete.com
6. Mapei Corporation: www.mapei.com..
7. Substitutions: See Section 012500- Substitution Procedures

B. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
1. Applications: Use this type of bond coat where indicated, and where no other type of bond coat is indicated.
2. Products:
a. Mapei Corporation; Ultraflex LFT.
b. Substitutions: See Section 012500- Substitution Procedures

2.04 GROUTS

A. Manufacturers:
1. ARDEX Engineered Cements: www.ardexamericas.com
2. Bostik Inc: www.bostik-us.com
3. Custom Building Products: www.custombuildingproducts.com
4. LATICRETE International, Inc: www.laticrete.com
5. Merkrete, by Parex USA, Inc: www.merkrete.com
6. Mapei Corporation: www.mapei.com.
7. Substitutions: See Section 012500- Substitution Procedures

B. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
3. Color(s): As selected by Architect from manufacturer's full line.
4. Products:
a. Mapei Corporation; Ultracolor Plus FA.
b. Substitutions: See Section 016000 - Product Requirements.
c. Substittutions: See Section 012500- Product Requirements

2.05 MAINTENANCE MATERIALS

A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.

B. Refer to Section 079200 - JOINT SEALANTS
1. Applications: Between tile and plumbing fixtures.
2. Color(s): As selected by Architect from manufacturer's full line.
3. Products:
a. Substitutions: See Section 012500- Product Requirements

2.06 ACCESSORY MATERIALS

A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
1. Crack Resistance: No failure at 1/8 inch gap, minimum.
2. Fluid or Trowel Applied Type:
a. Thickness: 20 mils, maximum.
b. Products:
1) LATICRETE International, Inc; LATICRETE Blue 92 Anti-Fracture Membrane
2) Merkrete, by Parex USA, Inc; Merkrete Fracture Guard:
3) Mapei Corporation: Mapeilastic CI.
4) Substitutions: See Section 012500- Substitution Procedures

B. Mesh Tape: 2 inch wide self-adhesive fiberglass mesh tape.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.

C. Cementitious Subfloor Surfaces: Verify that substrates are ready for tiling installation by testing for moisture and alkalinity (pH).
   1. Test as Follows:
      a. Alkalinity (pH): ASTM F710.
      b. Internal Relative Humidity: ASTM F2170.
      c. Moisture Vapor Emission: ASTM F1869.
   2. Obtain instructions if test results are not within limits recommended by tiling material manufacturer and setting material manufacturer.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

3.03 INSTALLATION - GENERAL

A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.20, manufacturer's instructions, and TCNA (HB) recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

E. Form internal angles square and external angles bullnosed.

F. Install non-ceramic trim in accordance with manufacturer's instructions.

G. Sound tile after setting. Replace hollow sounding units.

H. Keep control and expansion joints free of mortar, grout, and adhesive.

I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

J. Grout tile joints unless otherwise indicated.

K. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.
   1. Use uncoupling membrane under all tile unless other underlayment is indicated.

3.05 INSTALLATION - WALL TILE

A. Over gypsum wallboard on wood or metal studs install in accordance with TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat, unless otherwise indicated.

3.06 CLEANING

A. Clean tile and grout surfaces.

3.07 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 095100
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

1.02 REFERENCE STANDARDS

A. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings 2022.

B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels 2019.

C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions 2022.

D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products 2023.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on suspension system components and acoustical units.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Acoustical Units: 40 sq ft of each type and size.

1.05 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acoustic Tiles/Panels:
   1. Armstrong World Industries, Inc: www.armstrongceilings.com
   2. CertainTeed Corporation: www.certainteed.com/ceilings-and-walls
   3. Hunter Douglas Contract: www.hunterdouglascontract.com
   4. USG Corporation: www.usg.com/ceilings
   5. Substitutions: See Section 012500- Product Requirements

B. Suspension Systems:
   1. Same as for acoustical units.
   2. Substitutions: See Section 012500- Substitution Procedures

2.02 ACOUSTICAL UNITS

A. Acoustical Units - General: ASTM E1264, Class A.

B. Acoustical Panels: Painted mineral fiber, with the following characteristics:
   1. Classification: ASTM E1264 Type III.
      a. Form: 2, water felted.
   2. Size: 24 by 24 inches.
   3. Thickness: 5/8 inch.
   4. Light Reflectance: 82 percent, determined in accordance with ASTM E1264.

5. NRC Range: 0.50 to 0.60, determined in accordance with ASTM E1264.
6. Ceiling Attenuation Class (CAC): 33, determined in accordance with ASTM E1264.
7. Panel Edge: tegular.
8. Color: White.
9. Suspension System: Exposed grid.
10. Products:
    a. Substitutions: See Section 012500- Product Requirements

2.03 SUSPENSION SYSTEM(S)

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, stabilizer bars, clips, and splices as required.

B. Exposed Suspension System: Hot-dipped galvanized steel grid with steel cap.
   1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
   2. Profile: Tee; 15/16 inch face width.
   3. Finish: Baked enamel.
   4. Color: White.
   5. Products:
      a. Armstrong World Industries: Prelude
      b. USG Corporation; Donn DX
      c. Substitutions: See Section 012500- Substitution Procedures

2.04 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.

B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.

C. Perimeter Moldings: Same metal and finish as grid.

D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

A. Install after major above-ceiling work is complete.

B. Coordinate the location of hangers with other work.

3.03 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.

D. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

F. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

G. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

H. Do not eccentrically load system or induce rotation of runners.

3.04 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

E. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.
   2. Double cut and field paint exposed reveal edges.

3.05 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.06 CLEANING

A. Clean surfaces.

B. Replace damaged or abraded components.

END OF SECTION

SECTION 099113
EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Exposed surfaces of steel lintels and ledge angles.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Floors, unless specifically indicated.
   6. Glass.
   7. Concealed pipes, ducts, and conduits.

1.02 REFERENCE STANDARDS

A. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.

C. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).

D. SSPC-SP 2 - Hand Tool Cleaning 2018.

E. SSPC-SP 6 - Commercial Blast Cleaning 2007.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Samples: Submit two paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.

1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience and approved by manufacturer.

1.05 MOCK-UPS

A. See Section 014000 - Quality Requirements, for general requirements for mock-up.

B. Provide panel, 4 feet long by 4 feet wide, illustrating paint color, texture, and finish.

C. Locate where directed by Architect.

D. Mock-up may remain as part of the work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes from the same manufacturer to the greatest extent possible.

B. Paints:
   1. Behr Process Corporation: www.behr.com
   2. PPG Paints: www.ppgpaints.com
   3. Sherwin-Williams Company: www.sherwin-williams.com is used as reference standard
   4. Valspar Corporation: www.valsparpaint.com.

C. Primer Sealers: Same manufacturer as top coats.

D. Substitutions: See Section 012500- Product Requirements

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. Supply each paint material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.

2.03 PAINT SYSTEMS - EXTERIOR (SHERWIN WILLIAMS PRODUCTS ARE USED AS REFERENCE STANDARDS)

A. Factory-primed Wood, Opaque, Latex, 2 Coat
   1. Flat: Two coats of latex enamel: A-100 Exterior Latex
      a. Dry mil thickness: 1.3

B. Ferrous Metals, Unprimed, Waterbourne Acrylic, 3 Coats:
   1. One coat of Pro Industrial Pro-Cryl Primer
   2. Matte: Two coats acrylic enamel: Pro Industrial Multi-Surfce Acrylic
      a. Dry mil thickness: 1.4 - 2.3

C. Ferrous Metals, Primed, Waterbourne Acrylic, 2 Coats:
   1. Touch up with Pro Industrial Pro-Cryl Primer

2. Matte: Two coats of acrylic enamel: Pro Industrial Multi-Surfce Acrylic
    a. Dry mil thickness: 1.4 - 2.3

D. Galvanized Metals, Waterbourne Acrylic, 2 Coats:
1. Matte: Two coats of acrylic enamel: Pro Industrial Multi-Surfce Acrylic
    a. Dry mil thickness: 1.4 - 2.3

E. Pavement Marking Paint:
1. White: One coat.

2.04 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. Test shop-applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Exterior Plaster and Stucco: 12 percent.
2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
3. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
4. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete:

G. Masonry:
1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
2. Prepare surface as recommended by top coat manufacturer.
3. Clean surfaces with pressurized water. Use pressure range of 600 to 1,500 psi at 6 to 12 inches. Allow to dry.

H. Galvanized Surfaces:
1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

2. Prepare surface according to SSPC-SP 2.

I. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 Commercial Blast Cleaning. Protect from corrosion until coated.

J. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance.

E. Sand wood and metal surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 099123
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Floors, unless specifically indicated.
   6. Glass.
   7. Concealed pipes, ducts, and conduits.

1.02 REFERENCE STANDARDS

A. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).

B. SSPC-SP 2 - Hand Tool Cleaning 2018.

C. SSPC-SP 6 - Commercial Blast Cleaning 2007.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
   2. Cross-reference to specified paint system products to be used in project; include description of each system.

C. Samples: Submit two paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.

1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

1.05 MOCK-UP

A. See Section 014000 - Quality Requirements, for general requirements for mock-up.

B. Provide panel, 4 feet long by 4 feet wide, illustrating paint color, texture, and finish.

C. Locate where directed by Architect.

D. Mock-up may remain as part of the work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Provide lighting level of 80 fc measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
   1. If a single manufacturer cannot provide specified products; minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.

B. Paints:
   1. Behr Process Corporation: www.behr.com
   2. PPG Paints: www.ppgpaints.com
   3. Sherwin-Williams Company: www.sherwin-williams.com is used as reference standard
   4. Valspar Corporation - Architectural (Pro).

C. Primer Sealers: Same manufacturer as top coats.

D. Substitutions: See Section 012500 - Substitution Procedures

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
   4. Supply each paint material in quantity required to complete entire project's work from a single production run.
   5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

2.03 PAINT SYSTEMS - INTERIOR

A. Concrete/Masonry, Opaque, Latex, 3 Coat:
   1. One coat of block filler.
   2. Eggshell: Two coats of latex enamel; Promar 200
      a. Dry mil thickness: 1.7

B. Ferrous Metals, Unprimed, Water-Based Light Industrial Coating System, 3 Coat:
   1. One Coat Primer: Pro Industrial Pro-Cryl Primer
   2. Eggshell: Two coats of epoxy coating: Pro Industrial Pre-Catalyzed Epoxy
   3. Dry mil thickness: 1.4

C. Ferrous Metals, Primed, Water-Based Light Industrial Coating System, 2 Coat:
   1. Touch up with Pro Industrial Pro-Cryl Primer
   2. Eggshell: Two coats of epoxy coating: Pro Industrial Pre-Catalyzed Epoxy

3. Dry mil thickness: 1.4

D. Galvanized Metals, Water-Based Light Industrial Coating System, 3 Coat:
   1. One Coat Primer: Pro Industrial Pro-Cryl Primer
   2. Eggshell: Two coats of epoxy coating: Pro Industrial Pre-Catalyzed Epoxy
   3. Dry mil thickness: 1.4

E. Gypsum Board/Plaster, Latex, 3 Coat:
   1. One coat of latex primer sealer.
   2. Two coats of latex enamel; Promar 200.
      a. Sheen: eggshell at walls and flat at ceilings and bulkheads
      b. Dry mil thickness: 1.7

2.04 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been adequately prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. Test shop-applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.

F. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

G. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.

H. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
   3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 Commercial Blast Cleaning. Protect from corrosion until coated.

I. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions.

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

E. Sand wood and metal surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 099300
STAINING AND TRANSPARENT FINISHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Field application of stains.

B. Field application of transparent finishes.

1.02 REFERENCE STANDARDS

A. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and catalog number, and general product category.

C. Samples: Two samples on actual wood substrate to be finished, 12 by 12 inch in size, indicating selected colors and sheens for each system.

1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of stain or transparent finish, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Stain and Transparent Finish Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.06 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by manufacturer of stains and transparent finishes.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Provide lighting level of 80 fc measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide finishes from the same manufacturer to the greatest extent possible.
   1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.

B. Transparent Finishes:
   1. Behr Process Corporation: www.behr.com
   2. PPG Paints: www.ppgpaints.com
   3. Sherwin-Williams Company: www.sherwin-williams.com
   4. Substitutions: See Section 016000 - Product Requirements.

C. Stains:
   1. Behr Process Corporation: www.behr.com
   2. PPG Paints: www.ppgpaints.com

3. Sherwin-Williams Company: www.sherwin-williams.com/
4. Substitutions: See Section 016000 - Product Requirements.

2.02 STAINS AND TRANSPARENT FINISHES - GENERAL

A. Finishes:
1. Provide finishes capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Provide materials compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
3. Supply each finish material in quantity required to complete entire project's work from a single production run.
4. Do not reduce, thin, or dilute finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Colors: To be selected from manufacturer's full range of available colors.
1. Selection to be made by Architect after award of contract.

2.03 EXTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS

2.04 INTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS (SHERWIN WILLIAMS PRODUCTS ARE USED AS REFERENCE STANDARDS

A. Finish on Wood - Vertical Surfaces:
1. Filler Coat (for open grained wood only)
2. One-coat stain.
3. One-coat sealer.
4. One-coat lacquer.
5. Stain: Semi-transparent stain for wood, solvent based.
a. Products:
1) SW Oil Stain.
6. Sealer: Alkyd, sanding sealer, clear.
a. Products:
1) SW T6-F3.
7. Top Coat: Clear lacquer.
a. Products:
1) Sherwood Moisture Resistant Lacquer, T70 series.
8. Top Coat Sheen:
a. Satin: MPI gloss level 4; use this sheen at all locations.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of finished surfaces.

B. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of stains and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions.

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

D. Sand wood surfaces lightly between coats to achieve required finish.

E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

F. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

G. Reinstall items removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 101416
PLAQUES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Plaques.

1.02 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's product literature for each type of plaque sign, indicating style, font, foreground and background colors, locations, and overall dimensions of each sign.

C. Shop Drawings: Indicate dimensions, locations, elevations, materials, text and graphic layout, and attachment details.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Package plaque signs as required to prevent damage before installation.

B. Store under cover and elevated above grade.

PART 2 PRODUCTS

2.01 PLAQUES

A. Metal Plaques:
   1. Material: Aluminum casting.
   2. Material Thickness: 1/8 inch, minimum.
   3. Text and Typeface:
      a. Character Font: Helvetica, Arial, or other sans serif font.
      b. Character Case: Upper case only.
      c. Character Color: Contrast with background color.
   4. Background Texture: Stipple.
   5. Mounting: Rosettes and toggle bolts.
   6. Products:
      a. A.R.K. Ramos is used as reference standar.d.
      b. Substitutions: See Section 016000 - Product Requirements.

END OF SECTION

SECTION 101419
DIMENSIONAL LETTER SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Dimensional letter signage.

B. Dimensional logo signage

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's product literature for each type of dimensional letter sign, indicating style, font, colors, locations, and overall dimensions of each sign.

C. Shop Drawings:
   1. Include dimensions, locations, elevations, materials, text and graphic layout, and attachment details.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package dimensional letter signs as required to prevent damage before installation.

B. Store under cover and elevated above grade.

PART 2 PRODUCTS

2.01 DIMENSIONAL LETTERS AND LOGO

A. Metal Letters and Logo:
   1. Material: Aluminum sheet, flat.
   2. Thickness at letters: As indicated on drawings.
   3. Letter and Logo Height: As indicated on drawings.
   4. Image: A digital file of the logo and lettering will be provided by the Architect
   5. Finish: Baked Enamel or Powder Coat Finish: Manufacturer's standard (unless noted otherwise).
   6. Color: As selected.
   7. Mounting: As indicated on drawings. Channel mounted to web crippling at entry beam

2.02 ACCESSORIES

A. Concealed Screws: Noncorroding metal; stainless steel or other.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install with horizontal edges level.

END OF SECTION

SECTION 101423
PANEL SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Panel signage.

1.02 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.

B. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's product literature for each type of panel sign, indicating styles, font, foreground and background colors, locations, and overall dimensions of each sign.

C. Shop Drawings:
   1. Include dimensions, locations, elevations, materials, text and graphic layout, attachment details, and schedules.

D. Manufacturer's qualification statement.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Store tape adhesive at normal room temperature.

1.06 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain minimum ambient temperature during and after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Panel Signage:
   1. Best Sign Systems, Inc: www.bestsigns.com Best Sign Systems
   2. Inpro Corporation: www.inprocorp.com
   3. Mohawk Sign Systems, Inc: www.mohawksign.com
   4. Substitutions: See Section 016000 - Product Requirements.

2.02 REGULATORY REQUIREMENTS

A. Accessibility Requirements: Comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most restrictive requirements.

2.03 PANEL SIGNAGE

A. Interior Panel Signage: Base specification- Best Sign Systems , Style, Lucent
   1. Application: Room signs.
   2. Refer to Sign Schedule
   3. Description: Flat signs with engraved panel media, tactile characters.
   4. Sign Size: 6 inches by 6 inches.
   5. Letter Edges: Squared.
   6. Corners: Radiused.
   7. Color and Font, unless otherwise indicated:

a. Character Font: Helvetica, Arial, or other sans serif font.
b. Character Case: Upper case only.
c. Font Height: 5/8 inch
d. Background Color: As selected by the Architect from Manufacturer's standard selections.
e. Surface texture: Matte
f. Character Color: As selected by the Architect from Manufacturer's standard selections.

8. Material: clear acrylic with background color. matte finish.
9. Tactile Letters: Raised 1/32 inch minimum.
10. Braille: Grade II, ADA-compliant.
11. Graphics: Provide International Symbols of accessible toilets
12. Mounting: Tape adhesive

B. Handicapped Parking Sign
1. Material: Screen printed copy on engineer grade reflective vinyl sheeting on 0.8 inch aluminim backing
2. Size: 12 inch by 18 inch
3. Graphic: 'HANDICAPPED PARKING' with International symbol for accessibility
4. Color: Manufacturer's standard
5. Mounting: Attach to galvanized 'u' channel post with galvanized steel crariage bolts. Mount 60 inches above the paving to the bottom of th sign

2.04 ACCESSORIES

A. Exposed Screws: Stainless steel.

B. Tape Adhesive: Double-sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install with horizontal edges level.

C. Locate panel signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

3.03 SCHEDULE

A. Refer to Drawings

END OF SECTION

SECTION 102113.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Solid plastic toilet compartments.

B. Urinal and vestibule screens.

1.02 REFERENCE STANDARDS

A. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth 2024.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Solid Plastic Toilet Compartments:
   1. ASI Accurate Partitions; _____: www.asi-accuratepartitions.com/#sle.
   2. ASI Global Partitions; _____: www.asi-globalpartitions.com/#sle.
   3. Scranton Products; Hiny Hiders Partitions: www.scrantonproducts.com/#sle. is used as reference standard
   4. Substitutions: Section 012500 Substitution Procedures

2.02 PLASTIC TOILET COMPARTMENTS

A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286; floor-mounted headrail-braced.
   1. Color: black.Orange peel texture
   2. Doors:
      a. Thickness: 1 inch.
      b. Width: 24 inch.
      c. Width for Handicapped Use: 36 inch.in swinging
      d. Height: 55 inch.
   3. Panels:
      a. Thickness: 1 inch.
      b. Height: 55 inch.
      c. Depth: As indicated on drawings.
   4. Pilasters:
      a. Thickness: 1 inch.
      b. Width: As required to fit space; minimum 3 inch.
   5. Screens: Without doors; to match compartments; mounted to wall with two panel brackets.

2.03 ACCESSORIES

A. Pilaster Shoes: Stainless steel, satin finish, 3 inches high; concealing floor fastenings.
   1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.

B. Head Rails: Extruded aluminum, anti-grip profile.
   1. Size: Manufacturer's standard size.

C. Wall and Pilaster Brackets: Stainless steel; manufacturer's standard type for conditions indicated on drawings.

D. Attachments, Screws, and Bolts: Stainless steel , tamper proof type.
   1. For attaching panels and pilasters to brackets: Through-bolts and nuts ; tamper proof.

E. Hinges: Stainless steel, manufacturer's standard finish.
   1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
   2. Continuous-type hinge, self closing.

F. Door Hardware: Stainless steel, manufacturer's standard finish.
   1. Door Latch: Slide type with exterior emergency access feature.
   2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
   3. Provide door pull for outswinging doors.

G. Coat Hook: One per compartment, mounted on door.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify correct spacing of and between plumbing fixtures.

3.02 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.

B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 102800
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Commercial toilet accessories.

B. Diaper changing stations.

C. Utility room/Janitor closet accessories.

1.02 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.

B. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use 2022.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:
   1. AJW Architectural Products: www.ajw.com
   2. American Specialties, Inc: www.americanspecialties.com
   3. Bradley Corporation: www.bradleycorp.com
   4. Substitutions: Section 016000 - Product Requirements.

B. Diaper Changing Stations:
   1. American Specialties, Inc: www.americanspecialties.com
   2. Base Specs: Bradley Corporation: www.bradleycorp.com
   3. Koala Kare Products: www.koalabear.com
   4. Substitutions: 016000 - Product Requirements.

2.02 COMMERCIAL TOILET ACCESSORIES

A. Reference Standard: Bradley Corporation

B. Diaper Changing Station: Surface mounted, high density plastic, ADA compliant, integrated liner dispenser
   1. Color: Light Gray
   2. Products: Bradley 9631

C. Toilet Paper Dispenser: By owner

D. Paper Towel Dispenser: By Owner

E. Soap Dispenser: By Owner

F. Grab Bars: Stainless steel, textured surface.
   1. Standard Duty Grab Bars:
      a. Push/Pull Point Load: 250 pound-force, minimum.
      b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, concealed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
      c. Finish: Satin.
      d. Length and Configuration: As indicated on drawings.
      e. Products: Bradley 832-2

G. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.

1. Products: Bradley - 4722-150000, stainless steel

H. Sanitary Napkin Disposal Unit:
   1. Products: Bradley 4A10-11

I. Coat Hook: Single-prong, surface mounted, concealed fasteners, polished chrome finish, heavy-duty
   1. Products:
      a. Bradley: 9119

2.03 UTILITY ROOM ACCESSORIES

A. Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, hat-shaped channel.
   1. Holders: Three spring-loaded rubber cam holders.
   2. Length: 36 inches.
   3. Products: Bradley 9984-00, stainless steel

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

3.02 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
   1. Grab Bars: As indicated on drawings.
   2. Other Accessories: As indicated on drawings.

3.03 PROTECTION

A. Protect installed accessories from damage due to subsequent construction operations.

3.04 SCHEDULE - REFER TO PLANS

END OF SECTION

SECTION 104400
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

1.02 REFERENCE STANDARDS

A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2023a.

B. FM (AG) - FM Approval Guide Current Edition.

C. NFPA 10 - Standard for Portable Fire Extinguishers 2022.

D. UL (DIR) - Online Certifications Directory Current Edition.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide extinguisher operational features.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Extinguishers:
   1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com
   2. Guardian Fire Equpment, Inc.: www.guardianfire.com
   3. Larsens Manufacturing Co: www.larsenmfg.com
   4. Potter-Roemer: www.potterroemer.com
   5. Substitutions: See Section 016000 - Product Requirements.

B. Fire Extinguisher Cabinets and Accessories:
   1. Same as Fire Extinguishers

2.02 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
   1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.

B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
   1. Class: A:B:C type.
   2. Size: 5 pound.
   3. Classification: 3A:40B:C
   4. Finish: Baked polyester powder coat, red color.

2.03 FIRE EXTINGUISHER CABINETS

A. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.

B. Cabinet Construction: Non-fire rated.
   1. Formed primed steel sheet; 0.036 inch thick base metal.

C. Fire Rated Cabinet Construction: Maintain wall's specified fire rating.

D. Cabinet Configuration: Semi-recessed type.
   1. Size to accommodate accessories.
   2. Trim: Flat rolled edge, with 2 1/2 inch wide face.

E. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinges.

F. Door Glazing: Acrylic plastic, clear, 1/8 inch thick, flat shape and set in resilient channel glazing gasket.

G. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.

H. Finish of Cabinet Interior: White colored enamel.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings, 36 inches from finished floor to inside bottom of cabinet.

C. Secure rigidly in place.

D. Place extinguishers in cabinets.

END OF SECTION

SECTION 107500
FLAGPOLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum Flagpoles.

1.02 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

B. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube 2022.

C. NAAMM FP 1001 - Guide Specifications for Design Loads of Metal Flagpoles 2007.

1.03 SUBMITTALS

A. Product Data: Provide data on pole, accessories, and configurations.

B. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.

B. Protect flagpole and accessories from damage or moisture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Source Limitations: Obtain flagpoles as complete units, including fittings, accessories, bases, and anchorage devices from a single source and single manufacturer

B. Flagpoles:
   1. Concord American Flagpole: www.concordamericanflagpole.com
   2. Morgan-Francis Flagpoles & Accessories: www.morgan-francis.com
   3. Pole-Tech Co, Inc: www.poletech.com
   4. Substitutions: See Section 016000 - Product Requirements.

2.02 FLAGPOLES

A. Flagpoles: Designed in accordance with NAAMM FP 1001
   1. Material: Aluminum.
   2. Design: Cone tapered.
   3. Mounting: Ground mounted type.
   4. Nominal Height: 30 ft; measured from nominal ground elevation.
   5. Halyard: Internal type, manual winch operation.

B. Performance Requirements:
   1. Structural Performance: Flagpole assemblies, including anchorages and supports shall withstand design loads indicated with ilimits and under conditions indicated
      a. Design Flag Size: 5 feet x 8 feet
   2. Wind Pressure Loading on Flagpole with Flag: Resistant without permanent deformation to 90 miles/hr wind speed, in accordance with NAAMM FP 1001; the factor of safety used is 2.5.

2.03 POLE MATERIALS

A. Aluminum: ASTM B241/B241M , 6063 alloy , T6 temper.

2.04 ACCESSORIES

A. Finial Ball: Aluminum, 6 inch diameter.

B. Internal Halyard, Cam Cleat System: 5/16 inch diameter, braided polypropylene halyard; cam cleat; and cast aluminum, concealed revolving truck assembly with sealed, stainless stelel bearings; and plastic coated counterweight and sling. Furnish flush access door secured with cylindrical lock. Finish truck assembly to matchc flagpole.
   1. Halyard Flag Snaps: Stainless steel swivel snap hooks with neoprene or vinyl covers. Funish two per halyard.

C. Spun Aluminum flash collar, sloped to drain

2.05 MOUNTING COMPONENTS

A. Foundation Tube Sleeve: Manufacturer's standard corrugated steel foundation tube, 0.060 inch wall thickness with 3/16 inch steel bottom plate and support plate; 3/4 inch diameter, steel ground spike; and steel centering wedges welded together. Galvanize foundation tube assembly. Furnish loose hardwood wedges at top of foundation tube for plumbing pole.

2.06 MISCELLANEOUS MATERIALS

A. Drainage Material: Crushed stone, or uncrushed gravel; coarse aggregate

B. Sand: ASTM C33, fine aggregate

C. Elastomeric Joint Sealant: Single component, nonsag urethane joint sealant

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187

2.07 FINISHING

A. Metal Surfaces in Contact With Concrete: Asphaltic paint.

B. Concealed Steel Surfaces: Galvanized to ASTM A123/A123M requirements.

C. Aluminum: Natural Satin Finish: AA-M32, fine, directional, medium satin polish; buff complyinig with AA-M20; seal aluminum surfaces with clear, hard-coat wax..

D. Finial: Gold anodized finish.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.

3.02 PREPARATION

A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

3.03 INSTALLATION

A. Install flagpole , base assembly, and fittings in accordance with manufacturer's instructions.

B. Prepare uncoated metal flagpoles that are set in foundation tubes by painting belowgrade portions with a heavy coat of bituminous paint

C. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and fioreign matter from excavation and moisten earth before placing concrete Place and compact drainage material at excavation bottom

D. Foundation Tube: Place foundation tube, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level foundation tube and allow concrete to cure.

E. Place concrete. Compact in place by using viprators. Moist cureexposed concrete for no fewer than seven days

F. Trowel exposed concrete surfaces to a smooth dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

G. Flagpole installation: Install flagpole according to Shop Drawings and manufacturer's written instructions.

H. Foundation Tube: Place flagpole in tube, seated on bottom plate between steel centering wedges, and install hardwood wedges to secure flagpole in space. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundatin tube with a 2 inch layer of elastomeric joint sealant and cover with flashing collar.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1 inch.

3.05 ADJUSTING

A. Adjust operating devices so that halyard functions smoothly.

END OF SECTION

SECTION 123600
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Countertops for architectural cabinet work.

1.02 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.

C. ISFA 3-01 - Classification and Standards for Quartz Surfacing Material 2013.

D. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

E. NSI (DSDM) - Dimensional Stone Design Manual, Version VIII 2016.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.

D. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.

E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

PART 2 PRODUCTS

2.01 COUNTERTOPS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
   1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
      a. Manufacturers:
         1) Refer to Finish Schedule
      b. Finish: refer to Finish Schedule.
   2. Exposed Edge Treatment: Molded PVC edge, 3.0 mm thick, matching laminate in color, pattern, and finish.
   3. Back and End Splashes: Same material, same construction.

C. Natural Quartz and Resin Composite Countertops: Sheet or slab of natural quartz and plastic resin over continuous substrate.
   1. Flat Sheet Thickness: 1-1/4 inch, minimum.

2. Natural Quartz and Resin Composite Sheets, Slabs and Castings: Complying with ISFA 3-01 and NEMA LD 3; orthophthalic polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard stone fabrication tools; no surface coating; color and pattern consistent throughout thickness.
    a. Manufacturers:
        1) Refer to Finish Schedule
    b. Factory fabricate components to the greatest extent practical in sizes and shapes indicated; comply with NSI (DSDM).
    c. Finish on Exposed Surfaces: Polished.
3. Other Components Thickness: 3/4 inch, minimum.
4. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

D. Natural Quartz and Resin Composite Wall Panels: Sheet or slab of natural quartz and plastic resin over continuous substrate.
1. Flat Sheet Thickness: 3/4 inch thick.
2. Natural Quartz and Resin Composite Sheets, Slabs and Castings: Complying with ISFA 3-01 and NEMA LD 3; orthopthalic polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard stone fabrication tools; no surface coating; color and pattern consistent throughout thickness.
    a. Factory fabricate components to the greatest extent practical in sizes and shapes indicated; comply with NSI (DSDM).
    b. Finish on Exposed Surfaces: Polished.

2.02 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
1. Join lengths of tops using best method recommended by manufacturer.
2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
2. Height: 4 inches, unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.

C. Seal joint between back/end splashes and vertical surfaces.

3.04 TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.

B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.

C. Field Joints: 1/8 inch wide, maximum.

3.05 CLEANING

A. Clean countertops surfaces thoroughly.

3.06 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 133419
METAL BUILDING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufacturer-engineered, shop-fabricated structural steel building frame.

B. Metal wall and roof panels including soffits, gutters and downspouts, roof mounted equipment curbs, and accessories required for complete wall and roof assemblies including jamb covers for walk doors and upward acting doors .

1.02 RELATED REQUIREMENTS

A. Section 055000 - Metal Fabrications.

B. Section 079200 - Joint Sealants: Sealing joints between accessory components and wall system.

C. Section 081113 - Hollow Metal Doors and Frames.

D. Section 081213 - Hollow Metal Frames.

E. Section 083613 - Sectional Doors.

F. Section 085113 - Aluminum Windows.

G. Section 088000 - Glazing.

1.03 REFERENCE STANDARDS

A. AISC 360 - Specification for Structural Steel Buildings 2022.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2023.

E. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.

F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2023.

G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2021.

H. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality 2019.

I. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel 2021, with Editorial Revision.

J. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2023.

K. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process 2023.

L. ASTM A992/A992M - Standard Specification for Structural Steel Shapes 2022.

M. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2023.

N. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2020.

O. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2023a.

P. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.

Q. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a, with Editorial Revision (2023).

R. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength 2020.

S. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2023.

T. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.

U. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.

V. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2023).

W. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems 2018.

X. MBMA (MBSM) - Metal Building Systems Manual 2019.

Y. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components 2023.

Z. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.

AA. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on profiles, component dimensions, fasteners.

C. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections; wall and roof system dimensions, panel layout, general construction details, anchors and methods of anchorage, accessories, and installation; framing anchor bolt settings, sizes, locations from datum, and foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature.

D. Samples: Submit two samples of precoated metal panels for each color selected, 24" by 24" inch in size illustrating color and texture of finish.

E. Manufacturer's Instructions: Indicate preparation requirements, anchor bolt placement, and _____.

F. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.

G. Erector qualifications: An erector with a minimum of 8 years experience in erecting and installing work similar in material , design and extent to plans and specifications of this project

H. Manufacturer's Qualification Statement: Provide documentation showing metal building manufacturer is accredited under IAS AC472.
   1. Include statement that manufacturer designs and fabricates metal building system as integrated components and assemblies, including but not limited to primary structural members, secondary members, joints, roof, and wall cladding components specifically designed to support and transfer loads and properly assembled components form a complete or partial building shell.

I. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

1. AWS D1.1/D1.1M, Structural Welding Code - Steel
2. AWS D1.3, Structural Welding Code- Sheet Steel

J. Project Record Documents: Record actual locations of concealed components and utilities.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this type of work.
   1. Design Engineer Qualifications: Licensed in the State in which the Project is located.
   2. Comply with applicable code for submission of design calculations as required for acquiring permits.
   3. Cooperate with regulatory agency or authorities having jurisdiction (AHJ), and provide data as requested.

B. Perform work in accordance with AISC 360 and MBMA (MBSM).
   1. Maintain one copy on site.

C. Manufacturer Qualifications: Company specializing in the manufacture of products similar to those required for this project.
   1. Not less than 10 years of documented experience.
   2. Accredited by IAS in accordance with IAS AC472.

D. Erector Qualifications: Company specializing in performing the work of this section with minimum 10 years experience.

E. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.

1.07 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide 25 year manufacturer warranty for repairing finish or replacing metal panels that show evidence of deterioration of factory applied finishes within specified warranty period.

D. Provide special weathertightness warranty for standing seam metal roof panels. Manufacturer agreees to repairr or replace standing seam roof panel assemblies that leak or otherwise fail to remain weathertight within 25 year warranty period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Buildings Systems:
   1. Alliance Steel Inc. is used as reference standard
   2. Butler Manufacturing Company; ____: www.butlermfg.com/#sle.
   3. Ceco Building Systems; ____: www.cecobuildings.com/#sle.
   4. Chief Buildings; ____: www.chiefbuildings.com/#sle.
   5. Kirby Building Systems, a Nucor Company; _____: www.kirbybuildingsystems.com/#sle.
   6. Metallic Building Systems; _____: www.metallic.com/#sle.
   7. Nucor Building Systems; _____: www.nucorbuildingsystems.com/#sle.
   8. Red Dot Buildings; ____: www.reddotbuildings.com/#sle.
   9. VP Buildings; ____: www.vp.com/#sle.
   10. Substitutions: See Section 016000 - Product Requirements.

2.02 ASSEMBLIES

A. Single span rigid frame.

B. Bay Spacing: see plans.

C. Primary Framing: Rigid frame of rafter beams and columns, canopy beams and end wall columns, and wind bracing.

D. Secondary Framing: Purlins, and other items detailed.

E. Wall System: Preformed metal panels of vertical profile, with sub-girt framing/anchorage assembly, and accessory components.

F. Roof System: Preformed metal panels oriented parallel to slope, with sub-girt framing/anchorage assembly and insulation, and accessory components.

G. Roof Slope: 2 inches in 12 inches.

2.03 PERFORMANCE REQUIREMENTS

A. See Thermal Insulation section of specifications for insulation system and thermal performance level specification for walls and roof.

B. See Structural drawings and specifications for design roof and wall loads

C. See Structural drawings and specifications for allowable deflections and drift limits.

D. See Structural drawings and specifications for additional requirements.

E. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 120 degrees F ambient, 180 degrees F material.

F. Structural Performance for Metal roof and wall panels: Provide metal panel systems capable of withstand itne design loading as shown on structural drawings and specifications.

G. Air infiltrations for metal roof panels: Air leakage of not more than .06 cfm/sq. ft. when tested according to ASTM e 1680 or ASTM E 283 at the following test pressure difference: 1.57lbf/sq. ft.

H. Air infiltration for metal wall panels: Air leakage of not more than .06 cfm/ sq. ft. when tested in accordance with ASTM E 283 at the following test pressure difference: 1.57 lbf/sq.ft.

I. Water penetration for metal roof panels: No water penetration when tested accdording to ASTM E 1646 or ASTM E 331 atthe following test pressure difference: 2.86 lbf/sq. ft..

J. Waster penetration for metal wall panels: No water penetration when tested according to ASTM E 331 at the following test pressure difference: 2.86lbf/sq. ft.

K. Wind uplift resistance: Provide metal roof panel assemblies tha comply with UL 580 for wind uplift resistance rating of UL 90.

L. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

2.04 MATERIALS - FRAMING

A. Structural Steel Members: Comply with AISC 360, "Specification for Structural Steel Buildings".

B. Bolted connections: Comply with RCSC's "Specification for Structural Joines Using High-Strength Bolts"

C. Cold formed steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Steel Members" for design requirements and allowable stresses.

D. Primary Framing: Manufacturer's standard primary framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse , lean-to , porch frames; rafters and rake beams; side wall, intermediate, end-wall and corner columns and wind bracing.
   1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field bolted assembly. Provide frame span and spacing as indicated.
      a. Slight variations in span and spacing may be acceptable if necessary to comply with manufactureres standard as approved by Architect.
   2. Frame configuration: see plans

E. End wall framing: Manufacturer'r standard primary end wall framing fabricated for field bolted assembly

F. All primary framing is to receive standard gray primer

G. Secondary framing: Manufacturer's standard secondary framing, including purlins, girts, flange bracing, base members, gable angles clips, headers, jambs and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from cold formed, structural steel sheet or roll formed , metallic coated steel sheet . Provide galvanized or standard gray primer finish.

H. Anchor rods: Headed anchor rods as indicated in anchor rod plan for attachment of metal building to foundation.

I. Secondary

J. Structural Tubing: ASTM A500/A500M Grade B cold-formed.

K. Plate or Bar Stock: ASTM A529/A529M, Grade 50.

L. Anchor Bolts: ASTM A307, Grade A, with no preference for protective coatings.

M. Anchor Bolts: ASTM F1554, Grade 36, Class 1A, with no preference for protective coating.

N. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1; galvanized to ASTM A153/A153M.

O. Welding Materials: Perform in accordance with AWS D1.1/D1.1M.

P. Primer: SSPC-Paint 20 zinc rich.

Q. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
   2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
   3. Height Change, Plastic State: When tested in accordance with ASTM C827/C827M:
      a. Maximum: Plus 4 percent.
      b. Minimum: Plus 1 percent.

2.05 MATERIALS - WALLS AND ROOF

A. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, Designation SS (structural steel), Grade 33 (230), with G90/Z275 coating.

B. See DIVISION 07- SECTION 07 2100 THERMAL INSULATION for insulation systems at walls and roof.

C. Joint Seal Gaskets: Manufacturer's standard type.

D. Fasteners: Manufacturer's standard type, galvanized to comply with requirements of ASTM A153/A153M, finish to match adjacent surfaces when exterior exposed.

E. Bituminous Paint: Asphaltic type.

F. Sealant: Manufacturer's standard type.

G. Metal Mesh: Galvanized steel wire, woven.

H. Roof Curbs: Insulated metal same as roofing, ____ inch thick, designed for imposed equipment loads, anchor fasteners to equipment, counterflashed to metal roof system.

I. Trim, Closure Pieces, Caps, Flashings, Gutters, Downspouts, Rain Water Diverter, Fascias, Infills, and jamb covers: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

J. Provide snow guards
   1. Sno-Gem 11-ME or Sno-Gem 11-MEC-R are used as reference standard

2.06 COMPONENTS

A. Doors and Frames: See Section 081113.

B. Overhead Doors: See Section 083613.

C. Overhead Door Frame: Formed steel sections braced to building frame; see Section 055000.

D. Overhead Doors and Frames: Manufacturer's standard.
   1. Glass and Glazing: See Section 088000.

E. Windows: See Section 085200.

F. Wall Louvers: see mechanical plans and specifications type Z blade design, same finish as adjacent material, with steel mesh bird screen and frame, blank sheet metal at unused portions.

2.07 FABRICATION - FRAMING

A. Provide wall opening framing for doors, windows, and other accessory components.

2.08 FABRICATION - WALL AND ROOF PANELS

A. Metal Roof Panels ("Alliance Steel" is used as reference standard)
   1. Standing seam, trapezoidal-rib, metal roof panels: formed with interlocking ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequentials installation by mechanically attaching panels to supports using concealed clips located under one side of panels an engaging opposite edge of adjacent panels.
      a. Reference product: As-24 Panel by Alliance Steel Inc.
      b. Material: Zinc coated (galvanized or aluminum-zinc alloy coated steel sheet, 24 gauge uncoated steel thickness prepainted by the coil-coating to comply with ASTM A 755/A 755M
         1) Exterior finish: Galvalume plus
      c. Clips: Two piece floating to accommodate thermal movement.
      d. Joint type: mechannically seamed
      e. Panel coverage: 24 inches
      f. Panel height: 3 inches

B. Metal Wall Panels
   1. Exterior Panels: Exposed fastener wall panels 24 gauge, providing 36 inch wide net coverage having 1-1/2" high major ribs at 7.2" centers. Side laps shall be one full major rib.Panels shal be continuous from eave to sill until panel length exceeds 35 feet.. End laps shall be 6 inch and occur over a supporting member.
      a. Reference product: LT3.3 by Alliance Steel Inc.
         1) Exterior finish: Weather-X standard color
   2. Interior Wall Panels: Exposed fastener wall panels, 24 gauge, providing 36 inch wide net coverage having symmetrical corrugated sine wave ribs at 2.67 inches on center. Side laps shall be one and one-half ribs. Panels shall be continuous from eave to sill until panel length exceeds 35 feet. End laps shall be 6 inch and occur over a supporting member.
      a. Reference product: ABT-32 by Alliance Steel Inc.
         1) Interior panel finish: Galvalume plus

C. Metal Soffit Panels:
   1. General: Provide factory-formed metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation
   2. Metal soffit panels: Concealed fastener soffit panels with 1 inch high interlocking sidelap design and provideing 12 inch of net coverage. The panel is beaded with two pencil ribs.
      a. Reference product: A12 by Alliance Steel Inc. 24 gauge
         1) Exterior finish : Weather-X standard color

2.09 THERMAL INSULATION

A. See **DIVISION 07 SECTION 07 7200 THERMAL INSULATION** for insulation systems at walls and roof

2.10 ACCESSORIES

A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements..
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling and tool marks. and that are true to line and levels indicated, with exposed edges folded

back to form hems.

B. Roof panel accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips and similar items. Match material and finish of roof panels unless otherwise indicated.

C. Wall panel accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, jamb covers and similar items. Match material and finish of metal wall panels unless indicated otherwise.

D. Flashing and trim: Zinc coated (galvanized) or aluminum-zinc alloy coated steel sheet, 0.018 inch nominal uncoated steel thickness, prepainted with coil coating; finished to match adjacent metal panels.

E. Gutters: Zinc coated (galvanized) or aluminum zinc alloy coated steel sheet.0.018 inch nominal uncoated steel thickeness, prepainted with coil coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes and other special pieces as required. Fabricate in minimum 96 inch long sectio0n, complete with formed elbows and offsets.
   1. Gutter supports: Fabricated from same material and finish as gutters.

F. Downspouts: Zinc coated (galvanized) or aluminum zinc alloy coated sheet. 0.018 inch nominal coated steel thickness, prepainted with coil coating; finished to match metal wall panels unless otherwise noted. Fabricate in minimum 10 foot long sections, complete with formed elbows and offsets.
   1. Mounting straps: Fabricated from same material and finish as gutters.

G. Roof curbs if applicable,: Zinc coated (galvanized or aluminum zinc alloy coated steel sheet , 0.048 inch nominal uncoated steel thickness prepainted with coil coating: finished to match metal roof panels; with welded top box and bottom skirt, and integral full length cricket ; capable of withstanding loads of size and height required..

H. Pipe flashing: Premolded, EPDM pipe collar with flexible aluminium ring bonded to base.

I. Girts/Purlins: Rolled formed structural shape to receive siding, roofing and liner sheet.

J. Internal and External Corners: Same material thickness and finish as adjacent material, profile brake formed to required angles. Back brace mitered internal corners with 24 gauge thick sheet.

K. Expansion Joints: Same material and finish as adjacent material where exposed, 24 gauge thick, manufacturer's standard brake formed type, of profile to suit system.

L. Ice and Snow guards:
   1. Provide snow guards at all new roofing panels:
      a. Sno-Gem 11 MEC or Sno-Gem 11-MEC-R are used as reference standard

2.11 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.
   1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams and construction manuals
   2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size , shape and location. Members shall be free of cracks, tears, and ruptures.

B. Tolerances: Comply with MBMA's "Metal Buildings Systems Manual" for fabrication and erection tolerances.

C. Primary framing: Shop fabricate framing components to indicated size and section, with base plates, bearing plates stiffeners, and other items required for erection welded into place, cut , form, punch, drill and weld framing for bolted field assembly.

D. Secondary framing: Shop fabricate framing components to indicated size and section by roll forming with base plates, bearing plates, stiffeners and other plates required for erection

welded into place. Cut, form punch, drill and weld framing for bolted field connections to primary framing.

E. Metal panels: Fabricate and finish metal panels at the factory to greatest extent possible by manufacturer's standard procedures and processes as necessary to fulfill indicated performance requrements. Comply with indicateds profiles and with dimensional and structural requirements.
   1. Provide panel profile including major ribs and intermediate stiffening ribs for full length of profile.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position

3.02 ERECTION STRUCTURAL FRAMING

A. Erect framing in accordance with AISC 360.

B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.

C. Erect metal building system according to manufacturer's written instructions and drawings.

D. Do not field cut, drill or alter structural members without written approval from metal building system manufacturer's structural engineer.

E. Set structural framing accurately in locations and to elevations indicated.

F. Base and bearing plates: Clean concrete and masonry bearing surfaces of bond reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.
   1. Set plates for structural members on wedges, shims or setting nuts as required.
   2. Tighten anchor rods after supported members have been positioned and plumbed.
   3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage resistant grouts.

G. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and orther surfaces that will be in permanent contact with framing. Perform neccesary adjustments to compensate for discrepancies in elevations and alignment.
   1. Level and plumb individual members of structure.
   2. Make allowances for difference between temperature at time of erection

H. Primary framing and end walls: erect framing level, plumb, rigid, secure, and true to line. Level base plates to a true even plane with full bearing to supporting structures, set with double nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist cure grout for not less than seven days after placement.
   1. Make field connections using using high strength bolts installed according to RCSC's "Specification for structural joints using high strength bolts" for bolt type and joint type specified.
      a. Joint type: Snug tightened or pretensioned as required by manufacturer.

I. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to to clips attached to primary framing..
   1. Provide rake and gable purlins with tight fitting closure channels and fasccia
   2. Locate and space wall girts to suit openings such as doors and windows
   3. Provide additional girt at 3'-6" above finish floor for attachment of electrical and mechanical items.
   4. Provide supplemental framing at entire perimeter of openings, including doors, windows ventilators and other penetrations of roof and walls.

J. Steel joists: Install joists and accessories plumb, square, and true to line;securely fasten to supporting construction according to SJI's "Standard Specifications and load tables for Steel

Joists and Joist Girders" joist manufacturer's written instructions", and requirements in this Section.

1. Before installation, splice joists delivered to project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening
3. Install temporary bracing and erection bridging, connectionsand anchors to ensure that joists are stabilized during construction.
4. Joist installation: Bolt joists to supporting steel framewosrk using carbon steel bolts unless otherwise indicated.
5. Install and connect bridging concurrently with joist erection.before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at at walls or beams.

K. Bracing: Install bracing in roof and side walls wher indicated on erection drawings.

1. Tighten rod and cable bracing to avoid sag.
2. Located interior end-bay bracing only where indicated.

L. Framing for openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed under mechanical and electrical work. Securely attach to structural framing.

M. Erection tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.03 METAL PANEL INSTALLATION, GENERAL

A. General: Anchor metal panels and other components of the work securely in place with provisions for thermal and structural movement

1. Field cut metal panels as required for doors, windows and other openings. Cut openings as small as possible, neatly to size as required and without damage to adjacent metal panel finishes.
    a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
2. Install metal panels perpendicular to structural supports unless otherwise indicated.
3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self tapping screws.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Locate metal panel splices over structural supports with end laps in alignment.
6. Lap metal flashing over metal panels to allow moisture to run over and off the material.

B. Lap-seam metal panels: Install screw fasteners using power tools with controlled torque adjusted to compress EPDM washers tightly without damage to washers, screw threads or metal panels. InAstall screws in pre drilled holes.

1. Arrange and nest side lap joints so prevaiing winds blow over not into lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply metal panels and associated items for and weathertight enclosure. Avoid "panel creep" or application not true to line.

C. Metal protection: Where dissimilar metals contact each other or corrosive substrates , protect against galvanic action by painting contact surfaces with corrosion resistant coating, by applying rubberized asphalt underlayment to each contact surface ar by other as recommended by metal roof manufacturer.

D. Joint sealers: Install gaskets, joint fillers and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or if not indicated, provide types recommended by metal roof panel manufacturer.

1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommemnded by metal panel manufacturer.
2. Prepare joints and apply sealeants sto comply with requirements in Section 07 9200 joint sealants.

3.04 METAL ROOF PANEL INSTALLATION

A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.

1. Install ridge caps as metal roof panel work proceeds.
2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self apping screws

B. Standing seam metal roof panels: Fasten metal roof panels to supports with concealed clips at each standing seam joint, at location and spacing and with fasteners recommended by manufacturer.
1. Install clips to supports with self drillinjg or self lapping fasteners
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
3. Seamed joint: Crimp standing seams with manufacturer approved motorized seamer tool so that clip, metal roof panel and factory and factory applied sealant are fully engaged.
4. Rigidly fasten eave and end of metal roof panels and allow ridge end free.
5. Provide metal closures at rake edges each side of ridge caps

3.05 METAL WALL PANEL INSTALLATION

A. General : Install metal wall panels in orientation, sizes and locations indicated on drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the work securely in place, with provisions for thermal and structural movement.
1. Unless otherwise indicated, begin metal panel installation at corners with center rib lined up with line of framing
2. Shim or otherwise plumb substrates receiving metal wall panels .
3. When two rows of metal panels are required, lap panels 4 inches minimum.
4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
5. Rigidly fasten base end of panels and allow eave end free movement for thermal expansion and contraction. Predrill panels.
6. Flash and seal metal wall panels with weather closures at eaves and rakes and at perimeter of all openings. Fasten with self tapping screws.
7. Install screw fasteners in predrilled holes.
8. Install flashing and trim as metal panel work proceeds.
9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete and elsewhere as indicated on drawings; If not indicated, as necessasry for waterproofing.
10. Align bottom of metal wall panels and fasten with blind rivets, bolts or self drilling or self tapping screws.
11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

3.06 METAL SOFFIT PANEL INSTALLATION

A. Provide metal soffit panels the full width of soffits. Install panels perpendicular to support framing.

B. Flash and seal metal soffit panels with weather closures where panels meet walls and at perimeter of all openings.

3.07 THERMAL INSULATION INSTALLATION

A. See **DIVISION 07, SECTION 07 200 THERMAL INSULATION** for insulation specifications.

B. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface according to manufacturer's written instructions.
1. Set vapor retarder faced units with vapor barrier toward warm side of construction unless otherwise indicated. Do not obstruct ventilation spaces except for firestopping.
2. Tape joints and ruptures in vapor barrier and seal each continuous area of insulation to the surrounding construction to ensure air tight installation
3. Install factory laminated, vapor retarder faced blankets straight and true in one piece lengths, with both sets of facing tabs sealed to provide a complete vapor retarder.

C. Blanket Roof Insulation: Comply with the following installation method:

1. Over-Purlin-with Spacer-Block installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Install layer of filler insulation over first layer to fill space formed by metal roof panel standoffs. Hold in place by panels fastend to standoffs
    a. Thermal spacer blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
2. Blanket wall insulation: Extend insulation and vapor retarder over and perpendicuar to top flange of of secondary framing. Hold in place by metal panels fastened to secondary framing.
    a. Retainer strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

3.08 ACCESSORY INSTALLATION

A. Install accessories with positive anchorage to building and weathertight mounting and providefor thermal expansion. Coordinate installation with flashings and other components.
    1. Install components uired for a complete meal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, snow guards and similar items .
    2. Install components for a complete metal wall assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, jamb covers and similar items.
    3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coatingm by applying rubberized asphalt underlayment to each contact surface or by other permanent separation as recommended by manufacturer.

B. Flashing and trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's " Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level. Install work with laps, joints, and seams that will be permanently weathertight and weather resistant.
    1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather resistant performance.
    2. Expansion provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with 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 weather resistant and waterproof, form expansion joints fo intermeshing hooked flanges not less than 1 inch deep filled filled with mastic sealant (concealed within joints).

C. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size but not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

D. Downspouts: Join sections with 1-1/2 inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c between.
    1. Provide splash blocks at each downspout unless indicated otherwise.
    2. Provide elbows at base of downspouts to direct water away from building.
    3. Tie downspouts to under ground drainage system if indicated on drawings.

END OF SECTION

SECTION 311000
SITE CLEARING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clearing and protection of vegetation.

B. Removal of existing debris.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: As specified in Section 312200 - Grading

PART 3 EXECUTION

3.01 SITE CLEARING

A. Comply with other requirements specified in Section 017000.

B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.02 EXISTING UTILITIES AND BUILT ELEMENTS

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Protect existing structures and other elements that are not to be removed.

3.03 VEGETATION

A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by building structure, paving, playing fields, lawns, and planting beds.

B. Do not begin clearing until vegetation to be relocated has been removed.

C. Do not remove or damage vegetation beyond the limits indicated on drawings.

D. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:
   1. At vegetation removal limits.

E. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.

F. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
   1. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
   2. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.

G. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.

H. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.04 DEBRIS

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 312200
GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of topsoil.

B. Rough grading the site for site structures.

C. Finish grading.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Verify the absence of standing or ponding water.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

D. Notify utility company to remove and relocate utilities.

E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.

F. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

G. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.

H. Protect plants, lawns, and other features to remain as a portion of final landscaping.

3.03 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not remove topsoil when wet.

C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

D. Do not remove wet subsoil , unless it is subsequently processed to obtain optimum moisture content.

E. When excavating through roots, perform work by hand and cut roots with sharp axe.

F. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

G. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.04 SOIL REMOVAL

A. Stockpile topsoil to be re-used on site; remove remainder from site.

B. Stockpile subsoil to be re-used on site; remove remainder from site.

C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.05 FINISH GRADING

A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.

C. Where topsoil is to be placed, scarify surface to depth of 3 inches.

D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.

E. Place topsoil to the following compacted thicknesses:
   1. Areas to be Sodded: 4 inches.
   2. Shrub Beds: 18 inches.

F. Place topsoil during dry weather.

G. Remove roots, weeds, rocks, and foreign material while spreading.

H. Near plants spread topsoil manually to prevent damage.

I. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

J. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.06 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.

B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

3.07 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

B. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.08 FIELD QUALITY CONTROL

A. See Section 312323 for compaction density testing.

3.09 CLEANING

A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 312316
EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating for building volume below grade, footings, slabs-on-grade, paving, site structures, and utilities within the building.

B. Trenching for utilities outside the building to utility main connections.

C. Temporary excavation support and protection systems.

1.02 REFERENCE STANDARDS

A. 29 CFR 1926 - Safety and Health Regulations for Construction Current Edition.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Locate, identify, and protect utilities that remain and protect from damage.

C. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

3.03 TEMPORARY EXCAVATION SUPPORT AND PROTECTION

A. Excavation Safety: Comply with OSHA's Excavation Standard, 29 CFR 1926, Subpart P.

3.04 EXCAVATING

A. Excavate to accommodate new structures and construction operations.
   1. Excavate to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work.
   2. Hand trim excavations. Remove loose matter.

B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.05 FILLING AND BACKFILLING

A. Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation.

B. See Section 312323 for fill, backfill, and compaction requirements at general excavations.

3.06 CLEANING

A. Remove excavated material that is unsuitable for re-use from site.

B. Remove excess excavated material from site.

3.07 PROTECTION

A. Divert surface flow from rains or water discharges from the excavation.

B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.

D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

E. Keep excavations free of standing water and completely free of water during concrete placement.

END OF SECTION

SECTION 312316.13
TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Backfilling and compacting for utilities outside the building to utility main connections.

1.02 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

1.03 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop 2022, with Errata .

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)) 2012 (Reapproved 2021).

C. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)) 2012 (Reapproved 2021).

1.04 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where indicated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 3 EXECUTION

2.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

2.02 TRENCHING

A. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Cut trenches wide enough to allow inspection of installed utilities.

E. Hand trim excavations. Remove loose matter.

F. Remove excavated material that is unsuitable for re-use from site.

G. Remove excess excavated material from site.

H. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

I. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

2.03 PREPARATION FOR UTILITY PLACEMENT

A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

2.04 BACKFILLING

A. Backfill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

F. Correct areas that are over-excavated.
   1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

G. Compaction Density Unless Otherwise Specified or Indicated:

H. Reshape and re-compact fills subjected to vehicular traffic.

2.05 BEDDING AND FILL AT SPECIFIC LOCATIONS

2.06 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for field inspection and testing.

B. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").

C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

D. Frequency of Tests: _____.

END OF SECTION

SECTION 312323
FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for building volume below grade, footings, slabs-on-grade, paving, and utilities within the building.

B. Backfilling and compacting for utilities outside the building to utility main connections.

C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop 2022, with Errata .

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)) 2012 (Reapproved 2021).

C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method 2015, with Editorial Revision (2016).

D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)) 2012 (Reapproved 2021).

E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method 2015.

F. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth) 2023.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data for Manufactured Fill.

C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.

D. Compaction Density Test Reports.

1.04 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill
   1. Amount finer than 2 inch sieve = 100 percent
   2. Amunt finier than No. 200 sieve = 12 percent minimum and if PI is greater than or equal to 7, 60 percent maximum
   3. Liquid Limit: 40 percent, maximum
   4. Plasticity Index (PI) range: 5-15

B. Granular Fill - Gravel - Fill Type 33 grade, number 67 aggregate, see structural plans and specifications: Pit run washed stone; free of shale, clay, friable material and debris.

C. Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter.

D. Topsoil: Topsoil excavated on-site.
   1. Select.
   2. Graded.
   3. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
   4. Acidity range (pH) of 5.5 to 7.5.
   5. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.

2.02 ACCESSORIES

A. Geotextile: Non-biodegradable, woven.

B. Vapor Retarder: 15 mil thick, polyethylene.

2.03 SOURCE QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

A. Identify required lines, levels, contours, and datum locations.

B. See Section 312200 for additional requirements.

C. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

D. Verify structural ability of unsupported walls to support imposed loads by the fill.

E. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.

B. Proofroll with a tandem axle truck weighing at least 16,000 pounds per axle to locate any zones that are soft or unstable. Proofrolling should involve overlapping passes in perpendicular directions. Where pumping or rutting is encountered, the unstalbe soils should be overexcavated and replaced with cohesive low volumne change fill. Compact to required density.

C. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

D. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

E. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

G. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

H. Correct areas that are over-excavated.
   1. Load-bearing foundation surfaces: Use structural fill, flush to required elevation, compacted to 95 percent of maximum dry density.
   2. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.

I. Compaction Density Unless Otherwise Specified or Indicated:

J. Reshape and re-compact fills subjected to vehicular traffic.

K. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.

B. Structural Fill at locations where natural bearing is disturbed or footings are above stripped natural grade:
   1. Use general fill.
   2. Fill up to subgrade elevations.
   3. Maximum depth per lift: 8 inches, compacted.
   4. Compact to minimum 95 percent of maximum dry density.

C. Under Interior Slabs-On-Grade:
   1. Use general fill.
   2. Compact to 95 percent of maximum dry density.
   3. Cover with granular fill.
      a. Depth: 6 inches.
      b. Compact to 95 percent of maximum dry density.

D. At Foundation Walls and Footings:
   1. Use general fill.
   2. Fill up to subgrade elevation.
   3. Compact each lift to 95 percent of maximum dry density.
   4. Do not backfill against unsupported foundation walls.

E. Over Buried Utility Piping, Conduits, and Duct Bank in Trenches:
   1. Bedding: Use general fill.
   2. Cover with general fill.
   3. Fill up to subgrade elevation.
   4. Compact in maximum 8 inch lifts to 95 percent of maximum dry density.

F. At Lawn Areas:
   1. Use general fill.
   2. Fill up to subgrade elevations.
   3. Compact to 95 percent of maximum dry density.

G. At Planting Areas Other Than Lawns :
   1. Use general fill.
   2. Fill up to 12 inches below finish grade elevations.
   3. Compact to 95 percent of maximum dry density.

H. Under Monolithic Paving and Monolithic Paver Setting Beds:
   1. Compact subsoil to 95 percent of its maximum dry density before placing fill.
   2. Use general fill.
   3. Fill up to subgrade elevation.
   4. Compact to 95 percent of maximum dry density.
   5. Provide coarse aggregate base course over subgrade
      a. Comply with ODOT standards
      b. Depth: 4 inches

I. Under exterior sidewalks and patios:
   1. Use general fill.
   2. Fill up to subgrade elevation.
   3. Maximum compacted depth of each lift: 8 inches.
   4. Compact to 95 percent of maximum dry density.

3.05 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.06 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for field inspection and testing.

B. Soil Fill Materials:
   1. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
   2. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor"), ASTM D1557 ("modified Proctor"), or AASHTO T 180.
   3. If tests indicate work does not meet specified requirements, remove work, replace and retest.
   4. Frequency of Tests: Test the field density for each lift of fill at frequencies of every 4,000 square feet in areas under structures (minimum of two tests) and every 10,000 square feet in areas under pavement (minimum of two tests)..

3.07 CLEANING

A. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 313116
TERMITE CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Chemical soil treatment.

B. Site-applied termiticide for wood, steel, and concrete.

1.02 REFERENCE STANDARDS

A. Title 7, United States Code, 136 through 136y - Federal Insecticide, Fungicide and Rodenticide Act 2019.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.

C. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements.

D. Manufacturer's Instructions: Indicate caution requirement.

E. Warranty: Submit warranty and ensure that forms have been completed in Owner's name.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing this type of work and:
   1. Having minimum of three (3) years documented experience.
   2. Approved by manufacturer of treatment materials.
   3. Licensed in the State in which the Project is located.

1.05 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year installer's warranty against damage to building caused by termites.

PART 2 PRODUCTS

2.01 CHEMICAL SOIL TREATMENT

A. Toxicant Chemical: EPA Title 7, United States Code, 136 through 136y approved; synthetically color dyed to permit visual identification of treated soil.

B. Diluent: Recommended by toxicant manufacturer.

C. Manufacturers:
   1. Bayer Environmental Science Corp: www.backedbybayer.com/pest-management
   2. FMC Professional Solutions: www.fmcprosolutions.com
   3. Syngenta Professional Products: www.syngentaprofessionalproducts.com
   4. Substitutions: See Section 016000 - Product Requirements.

D. Mixes: Mix toxicant to manufacturer's instructions.

2.02 SITE-APPLIED TERMITICIDE

A. Site Applied Termiticide for Wood, Steel and Concrete: Borate mineral salt based, spray applied termiticide formulated for use on wood, steel, concrete and other building materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.

B. Verify final grading is complete.

3.02 APPLICATION - CHEMICAL TREATMENT

A. Comply with requirements of U.S. EPA and applicable state and local codes.

B. Spray apply toxicant in accordance with manufacturer's instructions.

C. Apply toxicant at following locations:
   1. Under Slabs-on-Grade.
   2. At Both Sides of Foundation Surface.

D. Under slabs, apply toxicant immediately prior to installation of vapor barrier.

E. At foundation walls, apply toxicant immediately prior to finish grading work outside foundations.

F. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.

G. Re-treat disturbed treated soil with same toxicant as original treatment.

H. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

3.03 INSTALLATION - SITE-APPLIED TERMITICIDE

A. Comply with manufacturer's written instructions.

3.04 PROTECTION

A. Do not permit soil grading over treated work.

B. Protect sheet materials from damage after completed installation. Repair damage with manufacturer's recommended products and according to the manufacturer's written instructions.

END OF SECTION

SECTION 323113
CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Posts, rails, and frames.

B. Wire fabric.

C. Concrete.

D. Manual gates with related hardware.

E. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Concrete anchorage for posts.

1.03 REFERENCE STANDARDS

A. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric 2011a (Reapproved 2022).

B. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2023.

C. ASTM F567 - Standard Practice for Installation of Chain-Link Fence 2023.

D. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework 2018 (Reapproved 2022).

E. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures 2018 (Reapproved 2022).

F. CLFMI CLF-FIG0111 - Field Inspection Guide 2014.

G. CLFMI CLF-PM0610 - Product Manual 2017.

H. CLFMI CLF-SFR0111 - Security Fencing Recommendations 2014.

I. CLFMI WLG 2445 - Wind Load Guide for the Selection of Line Post and Line Post Spacing 2023.

J. FS RR-F-191/1D - Fencing, Wire and Post Metal (Chain-Link Fence Fabric) 1990.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

C. Design Calculations: For high wind load areas, provide calculations for fence fabric and accessory selection as well as line post spacing and foundation details. See CLFMI WLG 2445 for line post and spacing guidance.

D. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components. See CLFMI CLF-SFR0111 for planning and design recommendations.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Fence Installer: Company with demonstrated successful experience installing similar projects and products, with not less than five years of documented experience.

1.06 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Chain Link Fences and Gates:
   1. Master-Halco, Inc; spectra Bond (extruded bonded PVC): www.masterhalco.com.
   2. Merchants Metals: www.merchantsmetals.com.
   3. Substitutions: See Section 016000 - Product Requirements.

2.02 COMPONENTS

A. Line Posts: 2.38 inch diameter.

B. Corner and Terminal Posts: 2.88 inch diameter.

C. Gate Posts: 3-1/2 inch diameter.

D. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.

E. Bottom Rail: 1.66 inch diameter, plain end, sleeve coupled.

F. Gate Frame: 1.66 inch diameter for welded fabrication.

G. Fabric: 2 inch diamond mesh interwoven wire, 9 gauge, 0.1483 inch thick, top selvage knuckle end closed, bottom selvage knuckle end closed.

H. Tie Wire: Aluminum alloy steel wire.

2.03 MATERIALS

A. Posts, Rails, and Frames:
   1. ASTM A1011/A1011M, Designation SS; hot-rolled steel strip, cold formed to pipe configuration, longitudinally welded construction, minimum yield strength of 50 ksi; zinc coating complying with ASTM F1043 and ASTM F1083.
   2. Line Posts: Type I round in accordance with FS RR-F-191/1D.
   3. Terminal, Corner, Rail, Brace, and Gate Posts: Type I round in accordance with FS RR-F-191/1D.

B. Wire Fabric:
   1. ASTM A392 zinc coated steel chain link fabric.
   2. Comply with CLFMI CLF-PM0610.

C. Concrete:
   1. Type specified in Section 033000.

2.04 MANUAL GATES AND RELATED HARDWARE

2.05 LIGHT-DUTY ARCHITECTURAL HARDWARE

A. Roller Assembly: Steel chassis assembly with permanently-lubricated and sealed roller bearings.
   1. Weight Rating: 1,000 pound (454 kg).
   2. Shaft: 1 inch diameter hardened steel shaft.
   3. Roller: Polymer casting, secured to shaft with nylon locknut.
   4. Protective Cover: Manufacturer's standard UV-inhibited molded polyethylene casting.
      a. Color: Black.
   5. Mounting to Round Fence Post: U-bolts.
   6. Finish: Galvanized.
   7. Products:
      a. DAC Industries, Inc; Stealth Cantilever Roller: www.dacindustries.com.
      b. Substitutions: See Section 016000 - Product Requirements.

2.06 ACCESSORIES

A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.

B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.

2.07 FINISHES

A. Components and Fabric: Vinyl coated over coating of 1.8 ounces per square foot galvanizing.

B. Accessories: Same finish as framing.

C. Color(s): Black.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Verify that areas are clear of obstructions or debris.

3.02 PREPARATION

A. Removal: Obstructions or debris.

3.03 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with ASTM F567.

B. Place fabric on outside of posts and rails.

C. Set intermediate posts plumb , in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.

D. Line Post Footing Depth Below Finish Grade: ASTM F567.

E. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567.

F. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.

G. Provide top rail through line post tops and splice with 6 inch long rail sleeves.

H. Do not stretch fabric until concrete foundation has cured 28 days.

I. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.

J. Position bottom of fabric 2 inches above finished grade.

K. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.

L. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.

M. Install hardware and gate with fabric to match fence.

N. Peen all bolts upon installation.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Position: 1 inch.

3.05 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Layout: Verify that fence installation markings are accurate to design, paying attention to gate locations, underground utilities, and property lines.

C. Gates: Inspect for level, plumb, and alignment.

D. Workmanship: Verify neat installation free of defects. See CLFMI CLF-FIG0111 for field inspection guidance.

3.06 CLEANING

A. Leave immediate work area neat at end of each work day.

B. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.

C. Clean fence with mild household detergent and clean water rinse well.

D. Remove mortar from exposed posts and other fencing material using a 10 percent solution of muriatic acid followed immediately by several rinses with clean water.

E. Touch up scratched surfaces using materials recommended by manufacturer. Match touched-up paint color to factory-applied finish.

END OF SECTION

SECTION 329223
SODDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Placing topsoil.

B. Sod installation.

1.02 RELATED REQUIREMENTS

A. Section 312200 - Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this section.

1.03 DEFINITIONS

A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.04 REFERENCE STANDARDS

A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding 2006.

1.05 QUALITY ASSURANCE

A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience, and certified by the State of Oklahoma.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver sod on pallets. Protect exposed roots from dehydration.

B. Do not deliver more sod than can be laid within 24 hours.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sod: TPI (SPEC), Certified Turfgrass Sod quality; cultivated grass sod; type indicated in plant schedule on Drawings; with strong fibrous root system, free of stones, burned or bare spots; containing no more than 5 weeds per 1000 sq ft. Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.
   1. Type: Bermuda Grass Type: 100 percent.
   2. Thickness: "Thin" sod, minimum 3/4 inch and maximum 1 inch topsoil base.
   3. Cut sod in area not exceeding 1 sq yd.
   4. Machine cut sod and load on pallets in accordance with TPI (SPEC) Guidelines.

B. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this section.

3.02 PREPARATION

A. Place topsoil in accordance with Section 312200.

3.03 LAYING SOD

A. Moisten prepared surface immediately prior to laying sod.

B. Lay sod immediately after delivery to site to prevent deterioration.

C. Lay sod smooth and tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.

D. Where new sod adjoins existing grass areas, align top surfaces.

E. Where sod is placed adjacent to hard surfaces, such as curbs, pavements, etc., place top elevation of sod 1/2 inch below top of hard surface.

F. On slopes 6 inches per foot and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet on center. Drive pegs flush with soil portion of sod.

G. Water sodded areas immediately after installation. Saturate sod to 4 inches of soil.

H. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities.

3.04 MAINTENANCE

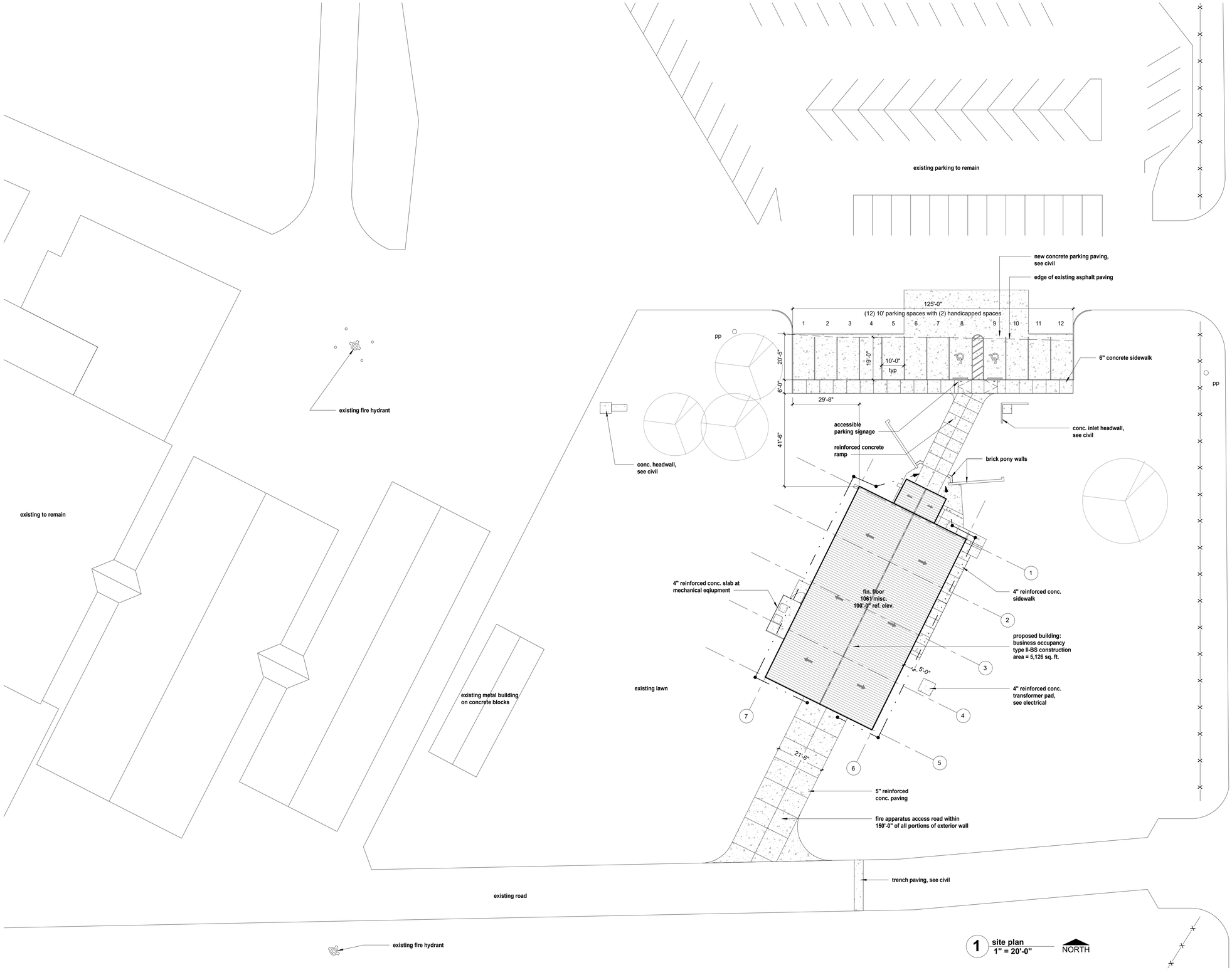
A. Maintain lawn areas and planters until Substantial Completion

B. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.

C. Immediately remove clippings after mowing and trimming.

D. Water to prevent grass and soil from drying out.

END OF SECTION



Site Plan Legend

- power pole
- fire hydrant
- —X——X— fence line
- O/H E O/H E overhead electrical line
- concrete slab
- cj construction joint
- ej expansion joint

sheet index	
Site	
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Life Safety	
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Architectural	
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Electrical	
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E1.3	electrical specifications
E1.4	electrical specifications
E1.5	electrical specifications
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E3.1	floor plan - lighting

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STATE OF OKLAHOMA KENNETH CLARK CORBIN 1249 REGISTERED ARCHITECT

sp01

LIFE SAFETY AND FIRE PROTECTION CODE NARRATIVE

GENERAL PROJECT INFORMATION

Project Name	**Kingfisher County Extension Office**
Project Location	**300 South 13th St. Kingfisher, Oklahoma 73750**
Building Owner	**Kingfisher County Extension Office**
Estimated Project Cost	**$1,200,000**
Authority Having Jurisdiction	**Oklahoma State Fire Marshal**

Project Description: New office building with associated parking and drives to be located in the southeast portion of the Kingfisher County Fairgrounds
1.Dimensions are projected to be 50' deep (wide) x 100' long providing an area of 5,000 square feet
3.The spaces to be provided in the building are as follows:
a.Entrance/ Reception area
i. (1) reception
b.(3) Offices
c.(1) Work Room
d.(1) Men Rest Room ADA accessible
e.(1) Women Rest Room ADA accessible
f.(1) Conference room
g.(1) Break Room
h.(1) Mechanical/ Electrical

APPLICABLE DESIGN CRITERIA (APPLICABLE CODES ARE CHECKED)

	Name	Edition
State Code Adoption		
X	International Building Code (IBC)	2018
X	International Fire Code (IFC)	2018
X	International Fuel Gas Code (IFGC)	2018
X	International Mechanical Code (IMC)	2018
X	International Plumbing Code (IPC)	2018
X	National Electric Code (NEC)	2014
Additional Codes		
X	NFPA 101 Life Safety Code Handbook	2006
X	2010 ADA Standards for Accessible Design	2010

Fire Marshal Directives

BUILDING OCCUPANCY, CONSTRUCTION AND SEPARATION

USE AND OCCUPANCY CLASSIFICATION (IBC CHAPTER 3)

Building Name	IBC Classification	NFPA 101 Classification
OSU Extension Office	**B**	**Business**

SPECIAL REQUIREMENTS BASED ON USE AND OCCUPANCY (IBC CHAPTER 4)

	Remarks:
	Remarks:
	Remarks:

OKLAHOMA UNIFORM BUILDING CODE COMMISSION MODIFICATIONS

CODE	SECTION	MODIFICATION APPLIED TO PROJECT

GENERAL BUILDING HEIGHTS AND AREA (IBC CHAPTER 5)

ALLOWABLE BUILDING HEIGHTS			AS DESIGNED BUILDING HEIGHTS
Height	55 ft	Height:	**16 feet 10 inches**
Stories	4	Stories:	**1 story**
ALLOWABLE BUILDING AREA TYPE 2BSI = 92,000			**AS DESIGNED BUILDING AREA**
Aa= At + (NS x If) = 92,000 + 17,250 = 109,250 SF			Area: **5,126 SF**
Frontage Increase:		yes	
If = [(F/P) - .25) x W/30 = 17,250 sq. ft.			

REQUIRED SEPARATION OF OCCUPANCIES (IBC SECTION 508)

TYPES OF CONSTRUCTION (IBC CHAPTER 6)

FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (IBC, TABLE 601)

Building Element	Hourly Rating Required
Primary Structural Frame	0
Exterior Bearing Walls	0
Interior Bearing Walls	0
Exterior Non-Bearing Walls	see table below
Interior Non-Bearing Walls	0
Floor Construction and Secondary Members	0
Roof Construction and Secondary Members	0

FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE (IBC TABLE 602)

Construction Type:	**2BS**	Sprinkler System:	**sprinklered**	Occupancy Group:	**B**

Fire Separation Distance = X (Feet)	Fire Resistance Rating
X < 5	1
5 <= X < 10	1
10 <= X < 30	0
X >= 30	0

FIRE AND SMOKE PROTECTION FEATURES (IBC CHAPTER 7)

MAXIMUM AREA OF EXTERIOR WALL OPENING BASED ON FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION (IBC TABLE 705.8)

Fire Separation Distance (Feet)	Degree of Opening Protection	Allowable Area
0 to less than 3	Unprotected, Non-sprinklered	**not permitted**
3 to less than 5	Unprotected, Non-sprinklered	**15%**
5 to less than 10	Unprotected, Non-sprinklered	**25%**
10 to less than 15	Unprotected, Non-sprinklered	**45%**
15 to less than 20	Unprotected, Non-sprinklered	**75%**
20 to less than 25	Unprotected, Non-sprinklered	**no limit**
25 to less than 30	Unprotected, Non-sprinklered	**no limit**
30 or greater	Unprotected, Non-sprinklered	**no limit**

FIRE WALL FIRE-RESISTANCE RATING (IBC TABLE 706.4)

Occupancy Group	Fire-Resistance Rating (Hours)	Construction Notes
B	**3**	**none required**

FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLES OR HORIZONTAL ASSEMBLIES BETWEEN FIRE AREAS (IBC TABLE 707.3.10)

Occupancy Group	Fire-Resistance Rating (Hours)	Construction Notes
B	**2**	**none required**

SHAFT ENCLOSURES (IBC SECTION 713; NFPA 101 8.6.5)

Occupancy Group	Fire-Resistance Rating (Hours)	Construction Notes
B	**1**	**none required**

less than 4 stories

OCCUPANCY LOAD, MEANS OF EGRESS, AND PASSIVE FIRE PROTECTION FEATURES

INTERIOR FINISHES (IBC CHAPTER 8)

INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY (IBC 803.13)

Occupancy Group:	**B**	Sprinkler System:	**Sprinklered**		
Exit stairs, ramps and passageways		Corridors and exit access enclosures		Rooms	
Class:	**B**	Class:	**C**	Class:	**C**

INTERIOR FLOOR FINISH REQUIREMENTS (IBC SECTION 804)

Interior Floor Finish and Floor Covering Requirements	Classification	Testing Standard
Minimum Critical Radiant Flux:	**Class 2**	**NFPA 253**

DECORATIVE MATERIALS AND TRIM (IBC SECTION 806)

Combustible Decorative Materials:	Max. percentage of wall/ceiling area: 10%	Percentage used: less than 5%

FIRE PROTECTION SYSTEMS (IBC CHAPTER 9)

AUTOMATIC SPRINKLER SYSTEMS (IBC SECTION 903)

Occupancy Group:	**B**	Fire Area (square feet):	**5,126**	Occupant Load:	**68**
Status:	Sprinkler system is required				
Basis:	Per IBC 903.2.8				

PORTABLE FIRE EXTINGUISHERS (IBC SECTION 906)

FIRE EXTINGUISHERS FOR CLASS A FIRE HAZARDS (IBC SECTION 906, TABLE 906.3(1)

Fire Hazard Class:	**A**	Occupancy Hazard Class:	**Low**	Building Area:	**5,126**
		Table 906.3 (1)		Extinguishers Provided:	**4**
Min. Rated Single Extinguisher		**2-A**			
Maximum Floor Area Per Unit of A		**3,000 sf**			
Maximum Floor Area for Extinguisher		**11,250 sf**			
Maximum Travel Distance to Extinguisher		**75 Feet**		65 feet @ exhibit room	

FIRE ALARM AND DETECTION SYSTEMS (IBC SECTION 907)

Occupancy Group	**B**	Occupancy Load:	**68**		
Fire Alarm System		Manual		**Not Required**	
Voice/Alarm Communications				**N/A**	
Smoke Detection System		Automatic		**Not Required**	
Occupancy Notification System		Automatic		**N/A**	

MEANS OF EGRESS (IBC CHAPTER 10)

OCCUPANT LOAD CALCULATIONS (IBC TABLE 1004.1.1)

OCCUPANCY SCHEDULE

Name	Function of Space	Occupancy Area	Table 1004.1.2 - Maximum Floor Allowances		
		Room Area (square feet)	S.F. Per Occupant	Area Type	Occupancy Load Calculated
storage room	**storage**	**1,136**	**300**	**gross**	**4**
exhibit room	**assembly uncon.**	**585**	**15**	**net**	**39**
mech./electrical	**storage**	**97**	**300**	**gross**	**1**
break room	**business**	**196**	**150**	**gross**	**2**
men's bathroom	**business**	**108**	**150**	**gross**	**3**
women's bathroom	**business**	**128**	**150**	**gross**	**3**
work room	**business**	**290**	**150**	**gross**	**2**
office 07	**business**	**199**	**150**	**gross**	**2**
office 06	**business**	**227**	**150**	**gross**	**2**
office 04	**business**	**222**	**150**	**gross**	**2**
reception	**business**	**211**	**150**	**gross**	**2**
lobby	**business**	**130**	**150**	**gross**	**6**
TOTAL		**3,529**			**68**

MEANS OF EGRESS (IBC CHAPTER 10) - CONTINUED

EGRESS WIDTH (IBC, SECTION 1005)

Occupancy Group:	**B**	maximum occupant load served by component	egress capacity factor	minimum egress width based on occupant load (inches)
Component				
Stairs		N/A	.3 inches/ occupant	**N/A**
Other components		45	.2 inches /occupant	**9**

MINIMUM NUMBER OF EXITS (IBC, SECTION 1006) | **1**

MINIMUM EGRESS COMPONENT WIDTHS (IBC, SECTION 1010, 1011, 1020, & 1024)

Component	minimum width (inches)
Doors	32 inches (clear width)
Stairs	44 inches
Corridor	36 inches
Exit Passageway	44 inches

EXIT ACCESS TRAVEL DISTANCE

Component	Occupancy	Maximum Distance OL<=30	Maximum Distance OL>30	Source	Provided	
Common Path of Travel	B	75 feet	75 feet	IBC 1006.2.1	**22 feet**	**work room**
Dead End Corridors		50 feet		IBC 1020.4	**n/a**	
Travel to Exit Access		250 feet		IBC 1017.2	**100 feet**	**corr.**

CORRIDORS (IBC, SECTION 1020)

Fire Resistance Rating:	**1 hour rating**
Remarks	no corridors required

ACCESSIBILITY FEATURES

ACCESSIBILITY (IBC CHAPTER 11)

ACCESSIBLE PARKING SPACES (IBC TABLE 1106.1)

Total Spaces Provided:	12	Minimum Accessible Spaces:	1	Total Accessible Provided:	**2**

notes: 6" poured in place concrete parking lot and drive with 2 accessible parking spaces.

ROOF ASSEMBLY

Description of Roof : insulated metal roof with 8" z-purlins spaced 24" o.c.

PLUMBING SYSTEM FEATURES

PLUMBING SYSTEMS (IBC CHAPTER 29)

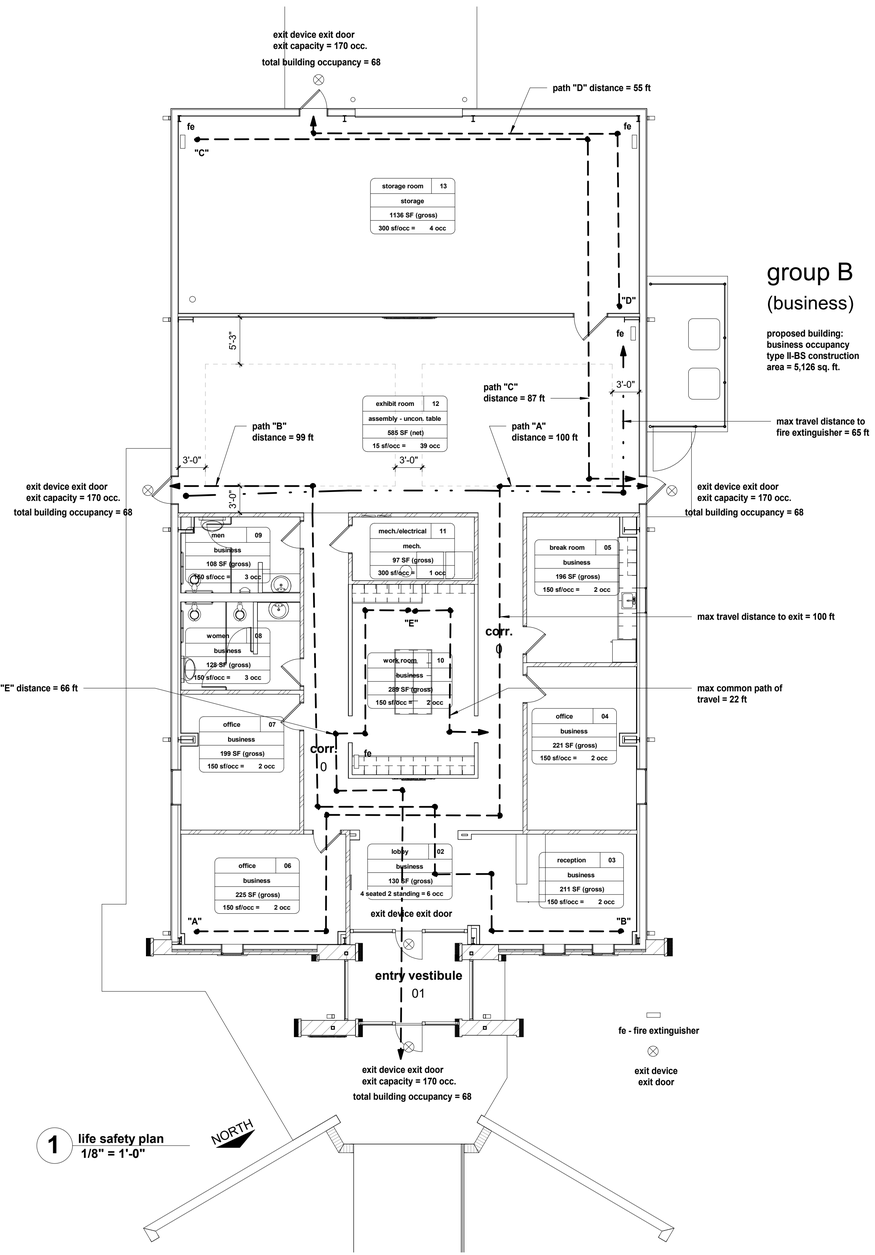
MINIMUM NUMBER OF PLUMBING FIXTURES

Occupancy Group:	**B**	Occupancy Load				**68**		
Occupancy Group	Water Closets		Lavatories		Bathtubs or Showers	Drinking Fountains	Other	
	Male	Female	Male	Female				
B	1/sleeping unit		1/sleeping unit		1/sleeping unit	-	1 service sink	
Total Minimum	2	2	2	2	4	0	1 service sink	

PROVIDED NUMBER OF PLUMBING FIXTURES

Occupancy Group	Water Closets/Urinals		Lavatories		Bathtubs or Showers	Drinking Fountains	Other
Business	Male	Female	Male	Female			
Total provided	1	1	1	1	0	0	0

Note: Owner to provide drinking fountain



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ls01

Door Schedule						
Door Number	Type	Size: Width x Height x Thickness	Fire Rating	Material	Frame	Notes
01		3'-0" x 7'-0" x	nr	al	al	3,4,5,6,8,9
02		3'-0" x 7'-0" x	nr	al	al	3,4,5,6,8,9
04	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	6
05	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	
06	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	6
07	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	6
08	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	6,8
09	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	6,8
10a	3	3'-0" x 7'-0" x 0'-4"	nr	co	hm	
10b	3	3'-0" x 7'-0" x 0'-4"	nr	co	hm	
11	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	6
12a	2	3'-0" x 7'-0" x 0'-1 3/4"	nr	hm	hm	1,2,5,6,7,8
12b	5	3'-0" x 7'-0" x 0'-1 3/4"	nr	hm	hm	1,2,5,6,7,8
13a	2	3'-8" x 7'-0" x 0'-1 3/4"	nr	hm	hm	
13b	2	3'-0" x 7'-0" x 0'-1 3/4"	nr	hm	hm	1,2,5,6,7,8
13c	4	12'-0" x 10'-0" x 0'-1 1/2"	nr			3

Legend
co - cased opening
nr - not rated
hm - hollow metal
wd - wood, factory finish
al - aluminum

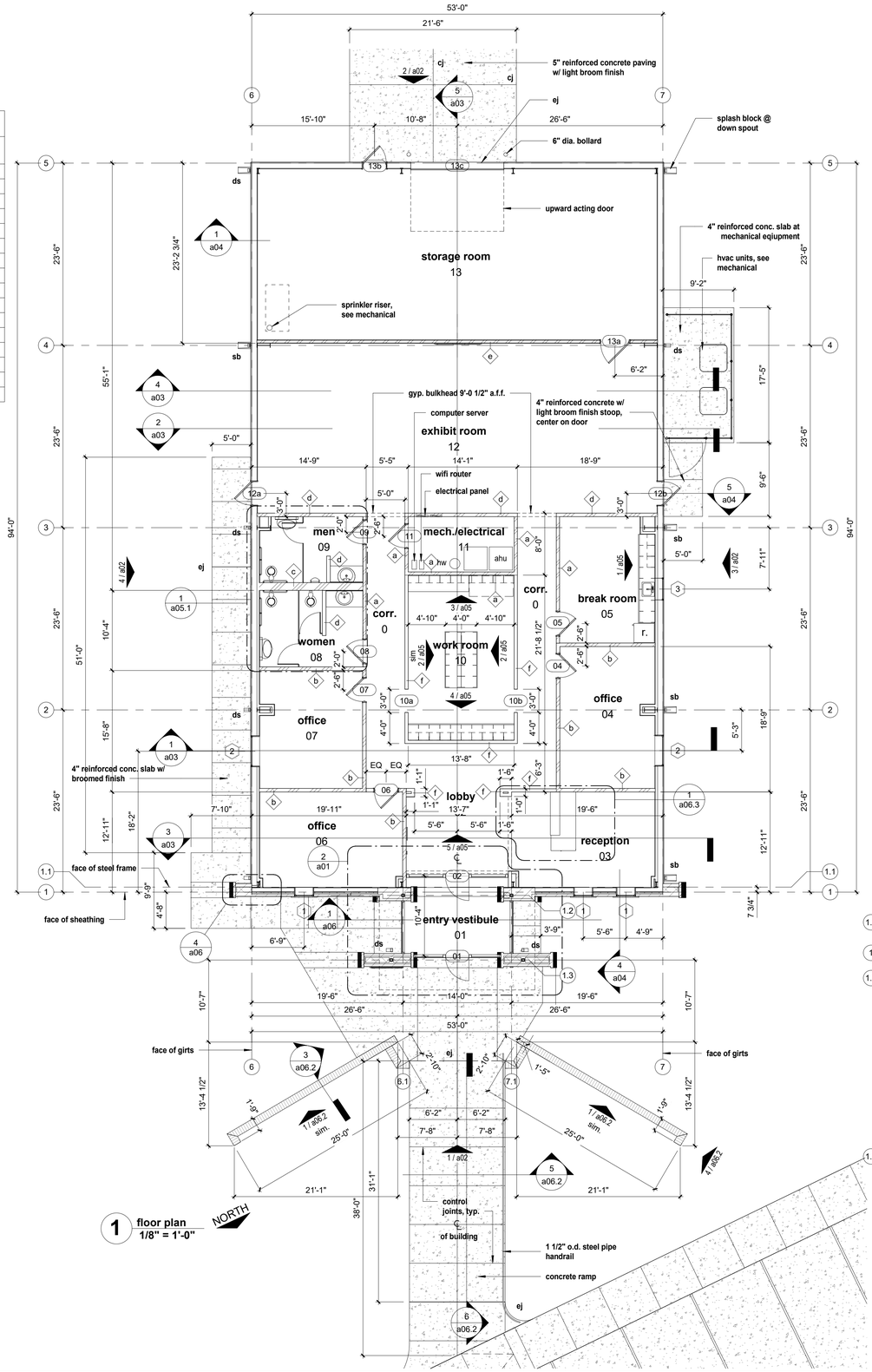
door schedule remarks:
1. provide galvanized primer at door & frame
2. weatherize all exterior doors
3. hardware by door manufacturer
4. push button ADA access on building
5. panic hardware
6. lockable door
7. card reader entry (key fob)
8. automatic closer
9. see window types for storefront dimensions

Window Schedule						
Type Mark	R.O. Sill Height	Height	R.O. Width	R.O Head Height	Room Number	Fire Rating
1	3'-0"	4'-0"	2'-6"	7'-0"	03	nr
1	3'-0"	4'-0"	2'-6"	7'-0"	03	nr
2	3'-0"	4'-0"	4'-0"	7'-0"	04	nr
3	4'-0"	3'-0"	3'-0"	7'-0"	05	nr
1	3'-0"	4'-0"	2'-6"	7'-0"	06	nr
2	3'-0"	4'-0"	4'-0"	7'-0"	07	nr

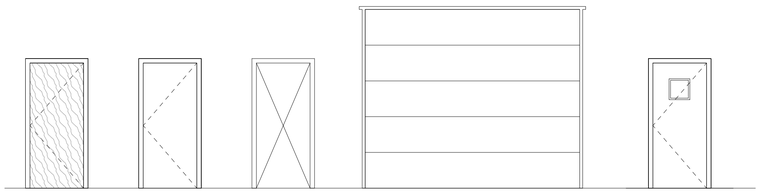
(see window types 4 and 5 for aluminum storefront)

Plan Legend

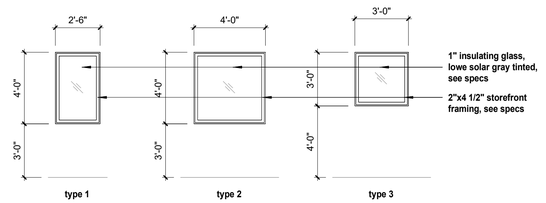
- drywall partition
- drywall sound partition a
- drywall sound partition b/d
- cmu wall
- brick veneer
- ds - downspout
- x - wall type, see typical wall details
- 101 - door type, see door schedule
- x - window type, see door schedule
- cj - sawn in control joint
- ej - expansion joint
- sb - splash block

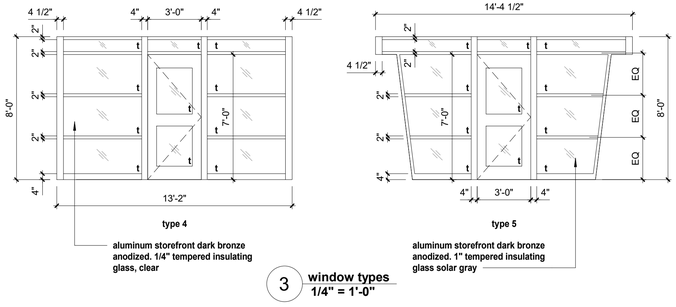


1 floor plan
1/8" = 1'-0"

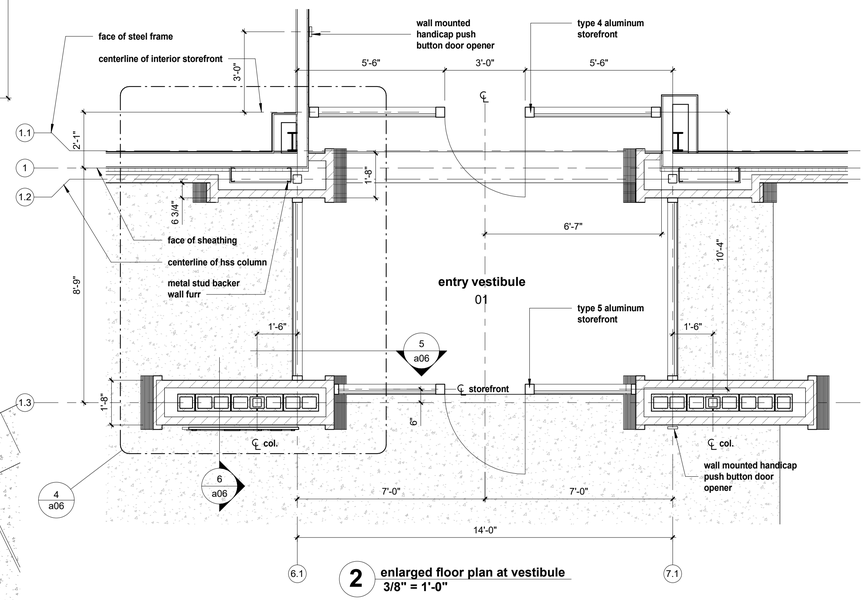


4 door types
1/4" = 1'-0"





3 window types
1/4" = 1'-0"



2 enlarged floor plan at vestibule
3/8" = 1'-0"

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a01

94'-0"

snow and ice guard typical. location by snow guard manufacturer

AS-24 panel system 24 ga., galvalume finish w/ 1" thermal spacers

24 ga. LT3.3 corrugated siding with kynar finish

prefinished gutter and downspout

eave height 112'-0"

fin. flr. 100'-0"

insulating hm door & frame, galv. primer, paint

prefinished alum. fixed window

snow and ice guard typical. location by snow guard manufacturer

prefinished gutter and downspout

prefinished metal barge trim

steel plate girder by mbs

bottom plate beam 108'-0"

prefinished metal cover plate

stacked bond and battered wall

aluminum storefront dark bronze anodized. 1" tempered insulating glass solar gray

4 east elevation
1/4" = 1'-0"

3'-6"

24 ga. standing seam roofing panels, mechanically seamed galvalume plus finish w/ 1" thermal spacers

112'-0" eave height

bottom plate beam 108'-0"

stacked bond and battered wall

aluminum storefront dark bronze anodized. 1" tempered insulating glass solar gray

2'-0"

prefinished alum. storefront window with insulating glass

24 ga. LT3.3 corrugated siding with kynar finish

prefinished gutter and downspout

AS-24 panel system 24 ga., galvalume finish w/ 1" thermal spacers

116'-10" building height

snow and ice guard typical. location by snow guard manufacturer

eave height 112'-0"

fin. flr. 100'-0"

insulating hm door & frame, galv. primer, paint

5'h chainlink fence

3 west elevation
1/4" = 1'-0"

no point (dead) loads such as roof hvac units are located on roofs or more specifically within 10'-0" of edges. typical for entire building. uniform collateral design for roof is 15 psf

AS-24 panel system 24 ga., galvalume finish w/ 1" thermal spacers

24 ga. LT3.3 corrugated siding with kynar finish

prefinished gutter and downspout

eave height 112'-0"

face brick surround

5'h chain link fence

concrete bollard, see civil

10' x 12' upward acting door

insulating hm door & frame, galv. primer, paint

2 south elevation
1/4" = 1'-0"

rowlock course in mainfield of face brick

4" brick surround

4x12 face brick #1

4x12 face brick #2

building elev. 116'-9 1/4"

8"x3/4" thick stand-off letter signage

plate beam by mbs

decorative web crippling 2" deep

brick lintel

sloped brick sill, typ.

face brick surround

KINGFISHER COUNTY EXTENSION

eave height 112'-0"

bottom plate beam 108'-0"

fin. flr. 100'-0"

sloped brick sill

dimensions same as west pylon opposite hand

power to sign by contractor, sign by owner

aluminum storefront dark bronze anodized. 1" tempered insulating glass solar gray

plylon

wall mounted handicap push button door opener

5'h chain link fence

1 north elevation
1/4" = 1'-0"

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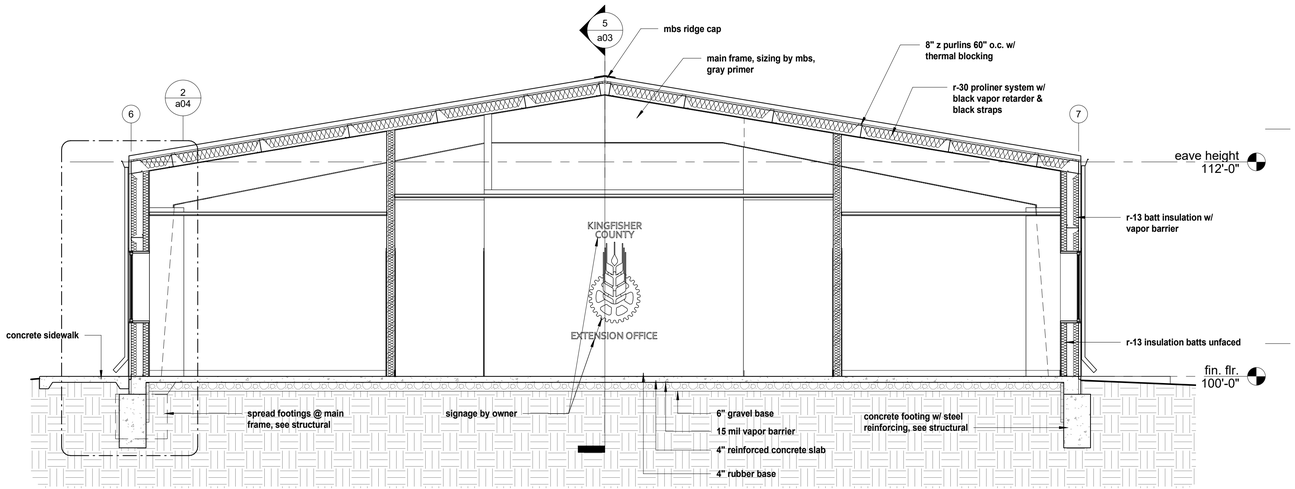
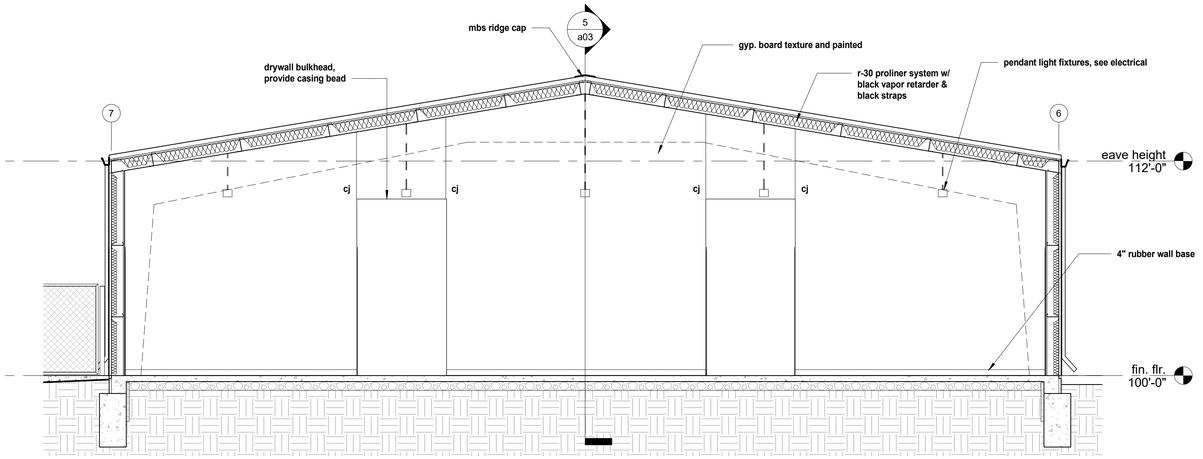
302 NORTH INDEPENDENCE ENID, OK 73701 WWW.CORBINMERZHANEY.COM PH:(580)233-2362

STATE OF OKLAHOMA KENNETH CLARK CORBIN 1248 REGISTERED ARCHITECT

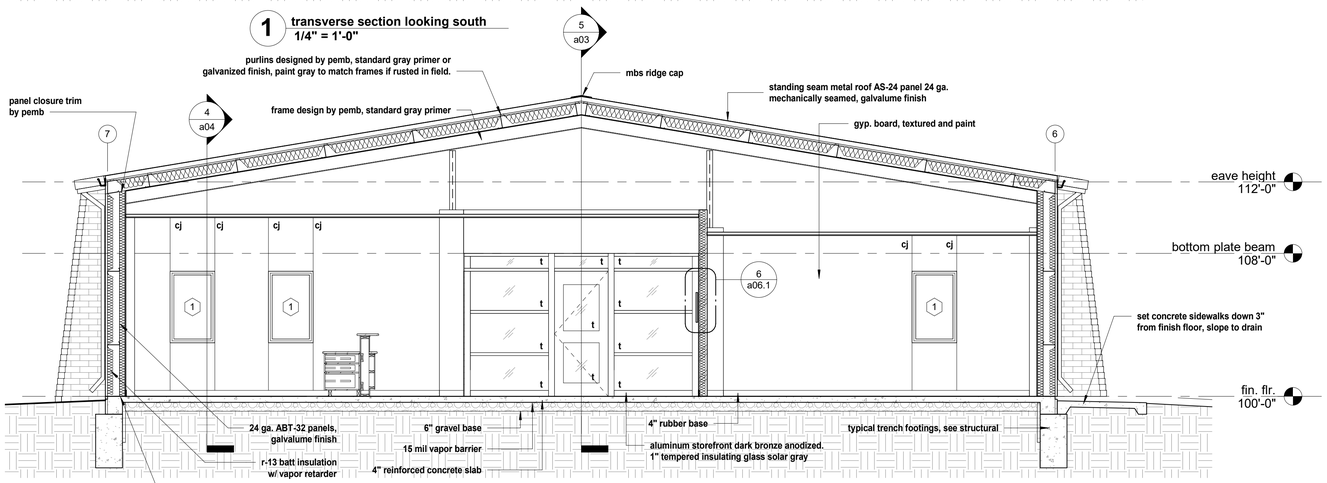
a02



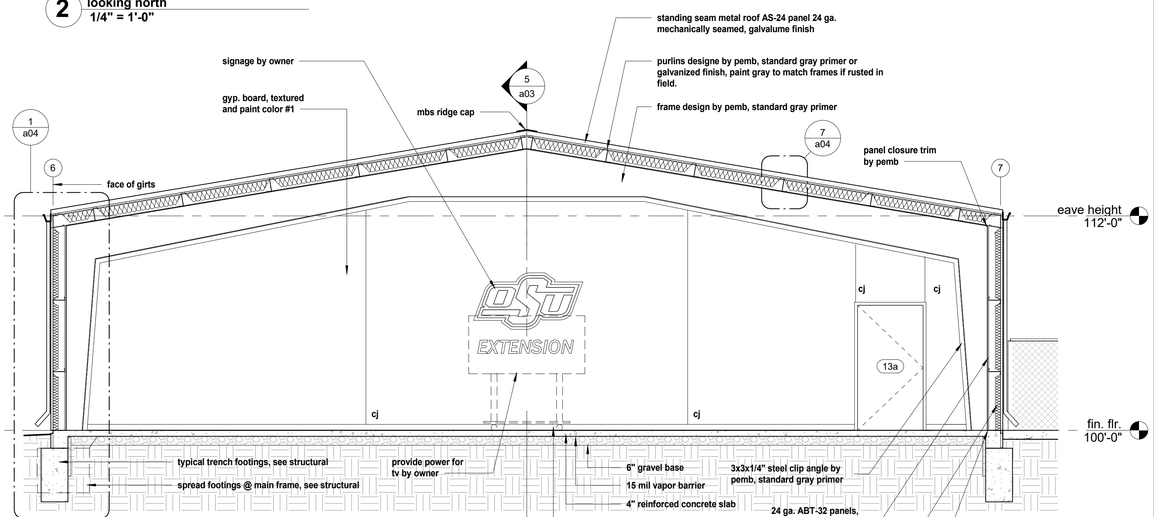
1 **transverse section looking south**
1/4" = 1'-0"



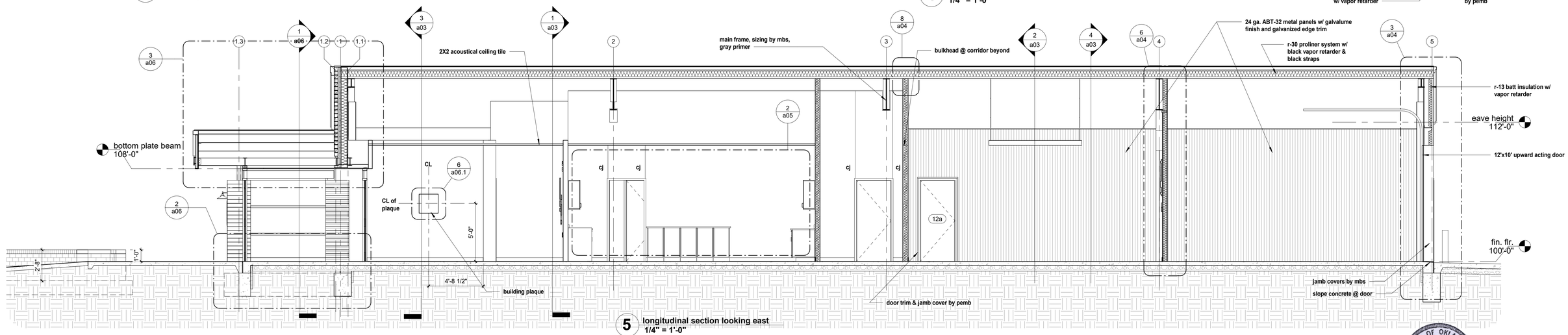
2 **transverse section at exhibit room looking north**
1/4" = 1'-0"



3 **transverse section looking north**
1/4" = 1'-0"



4 **transverse section looking south @ exhibition room**
1/4" = 1'-0"



5 **longitudinal section looking east**
1/4" = 1'-0"

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STATE OF OKLAHOMA
KENNETH CLARK CORBIN
1249
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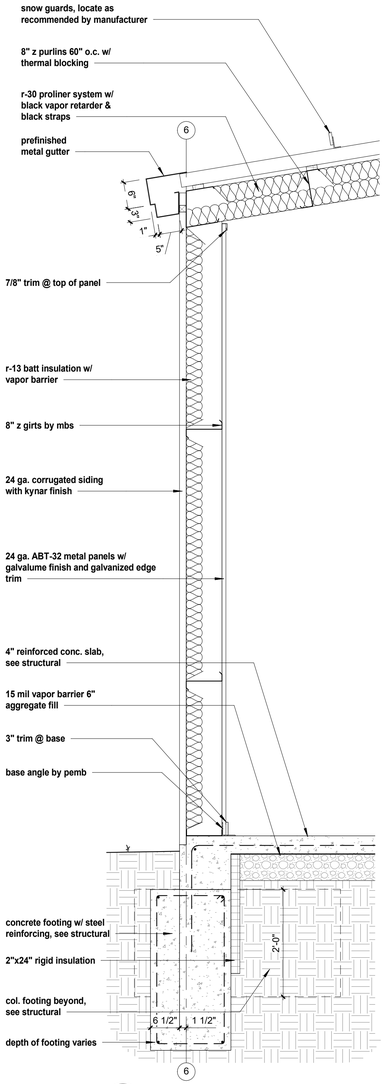
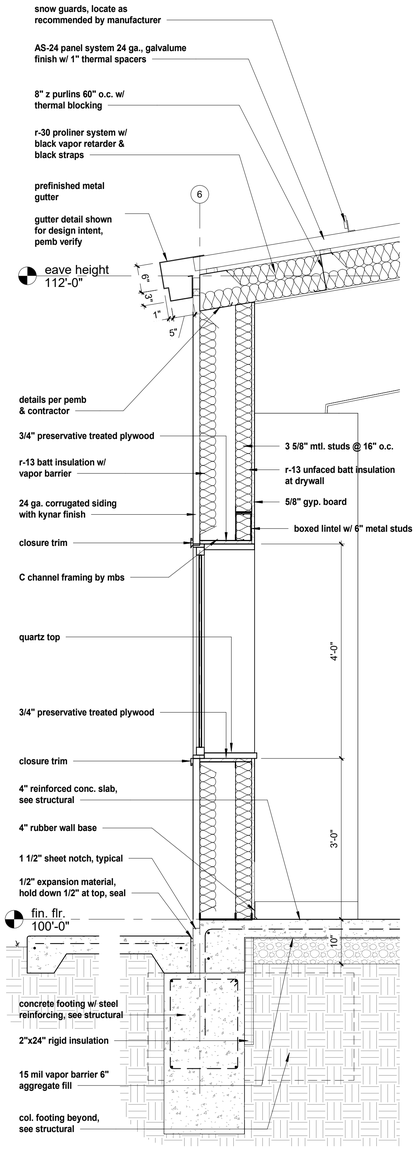
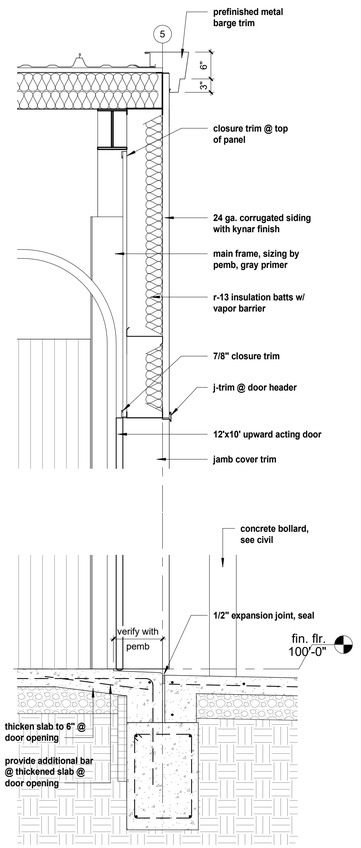
a03



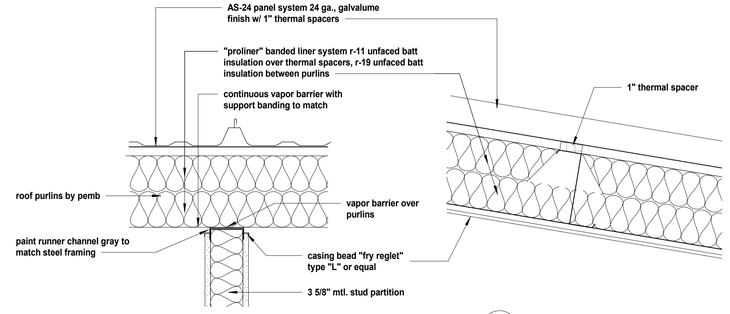
1 typical wall section at metal building
3/4" = 1'-0"



2 typical wall section at exterior wall w/ furring wall
3/4" = 1'-0"

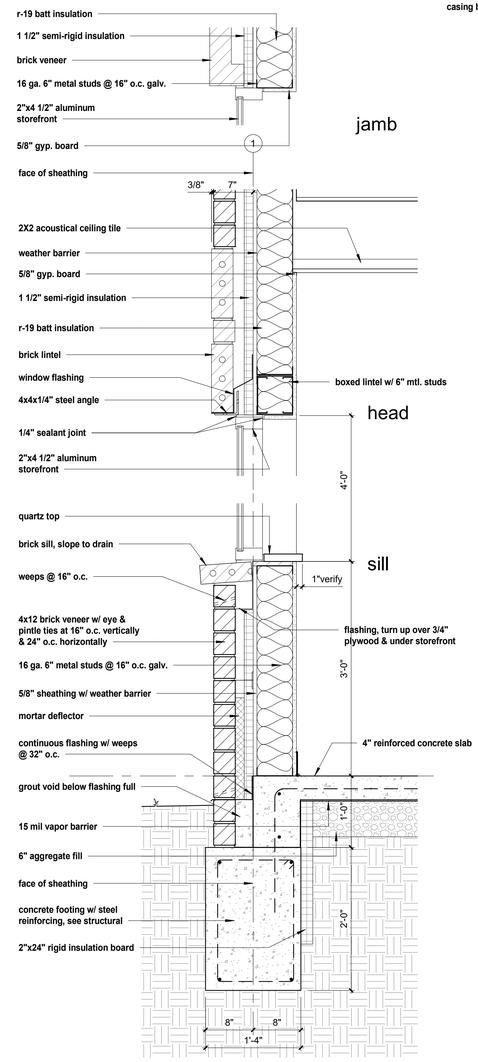


3 section at overhead door
3/4" = 1'-0"

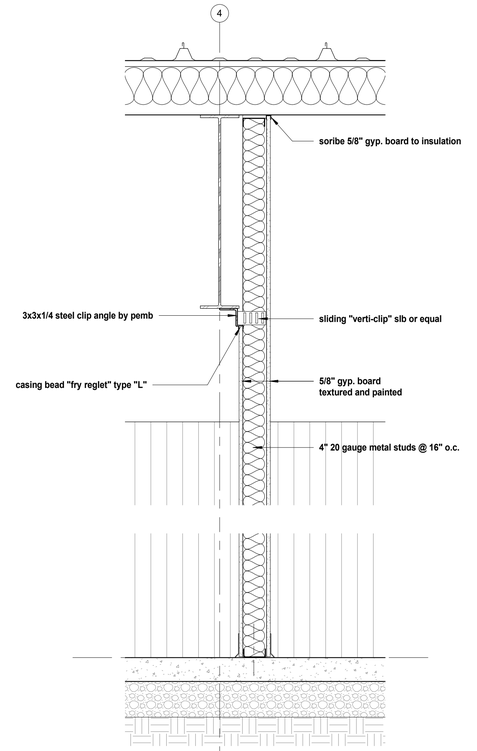


7 detail at roof purlin
1 1/2" = 1'-0"

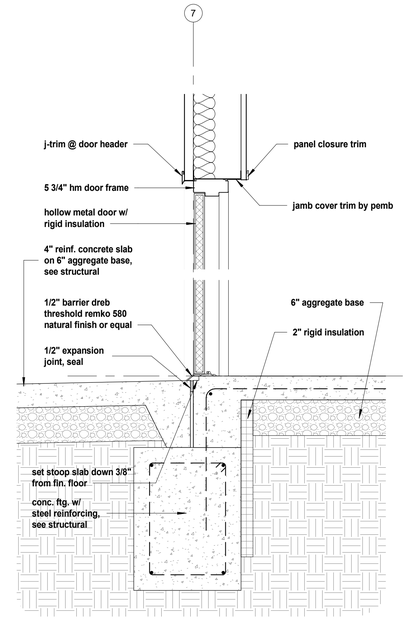
8 detail at slip connection
1 1/2" = 1'-0"



4 window at brick veneer detail
1" = 1'-0"



6 section at feature wall
1" = 1'-0"



5 typ. section through walk door
1" = 1'-0"

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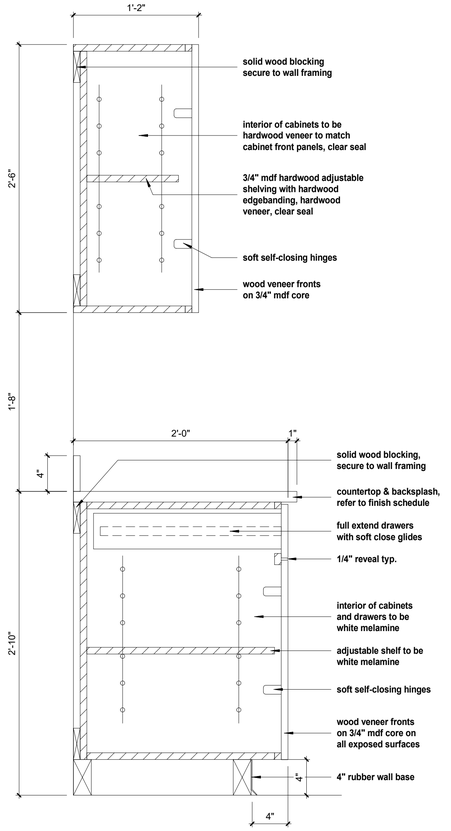
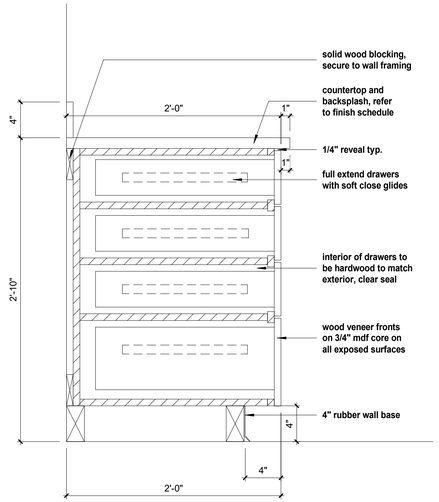
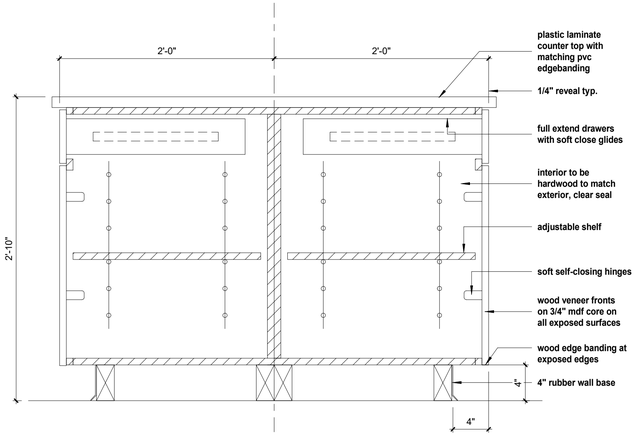
a04



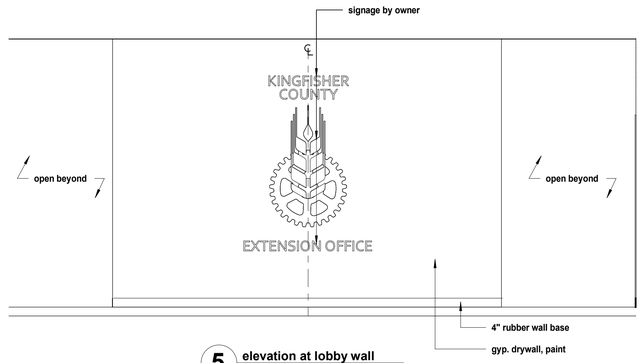
7 millwork section at cabinets
1 1/2" = 1'-0"



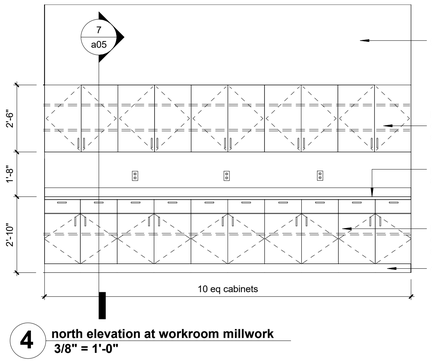
6 millwork sections at drawers
1 1/2" = 1'-0"



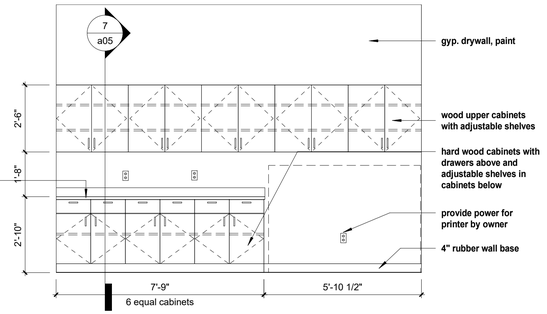
9 millwork - back to back
1 1/2" = 1'-0"



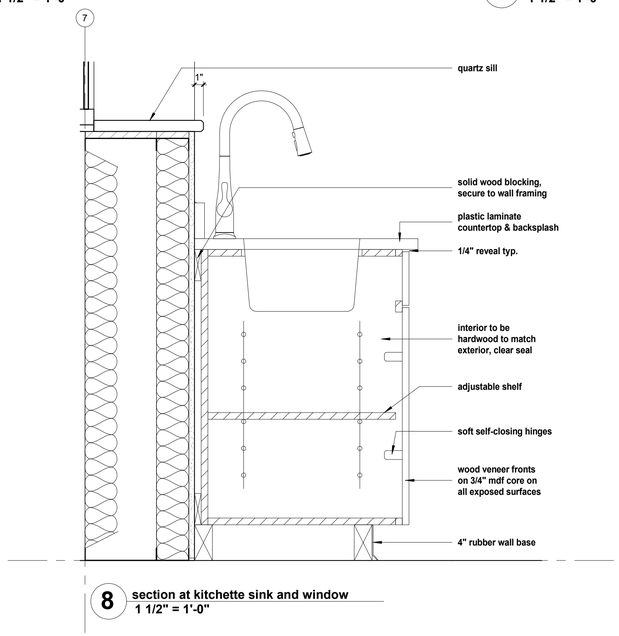
5 elevation at lobby wall
3/8" = 1'-0"



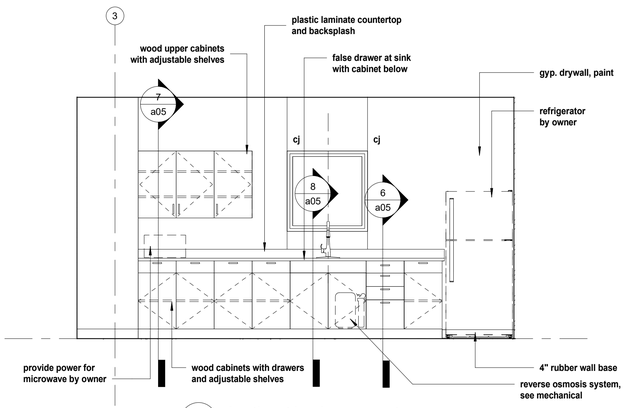
4 north elevation at workroom millwork
3/8" = 1'-0"



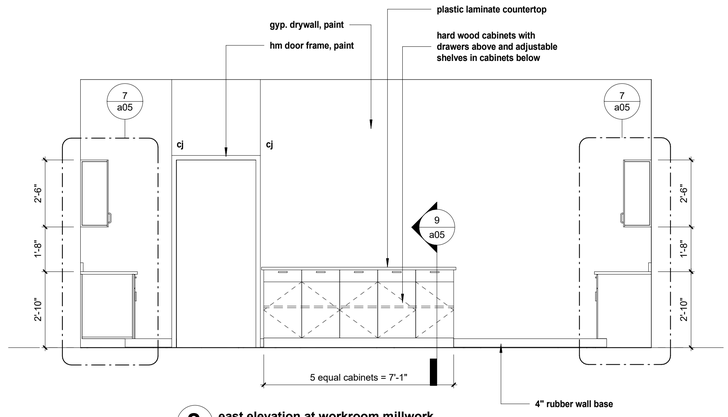
3 south elevation at workroom millwork
3/8" = 1'-0"



8 section at kitchette sink and window
1 1/2" = 1'-0"



1 elevation at break room counter
3/8" = 1'-0"



2 east elevation at workroom millwork
3/8" = 1'-0"

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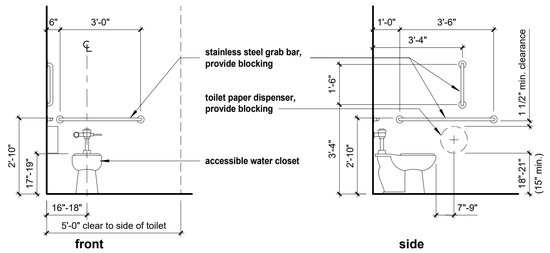
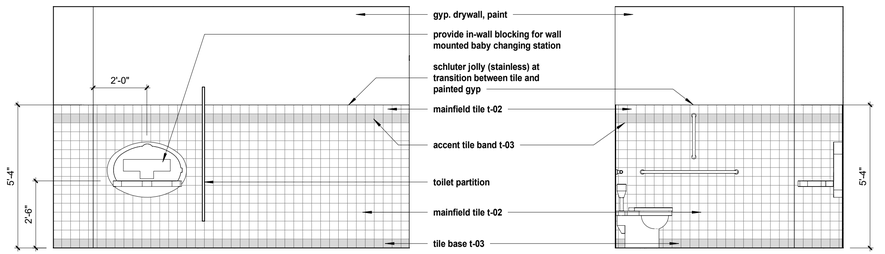
a05

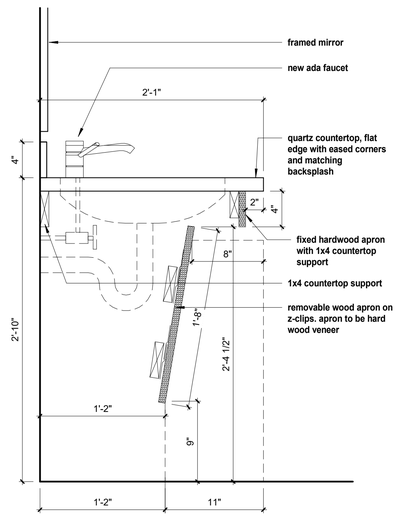


9 typical ADA water closet
3/8" = 1'-0"

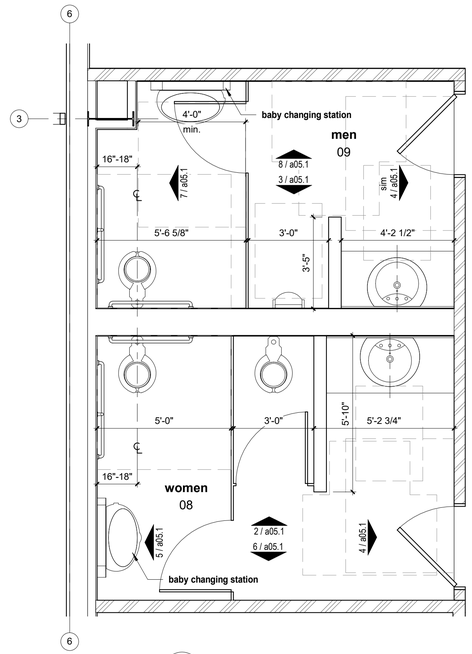


8 men's wc elevation - east wall
3/8" = 1'-0"

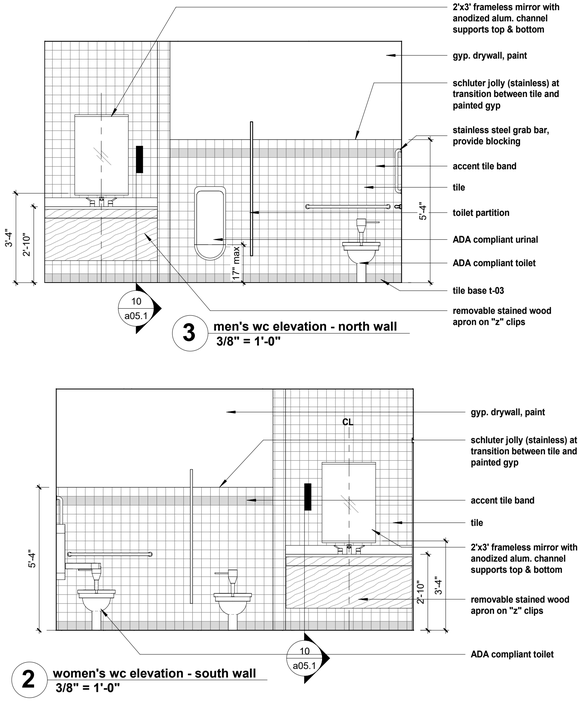
7 men's wc elevation - south wall
3/8" = 1'-0"



10 sink millwork detail typ.
1 1/2" = 1'-0"

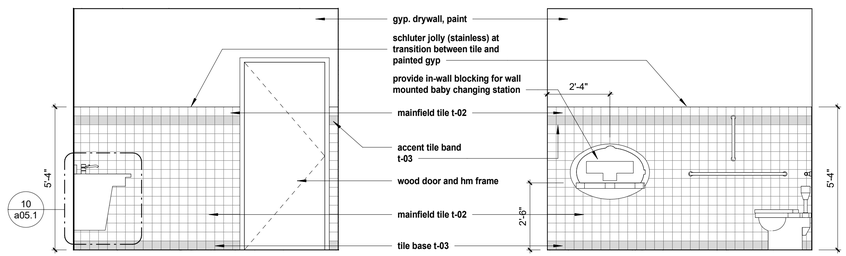


1 enlarged plan - bathrooms
3/8" = 1'-0"



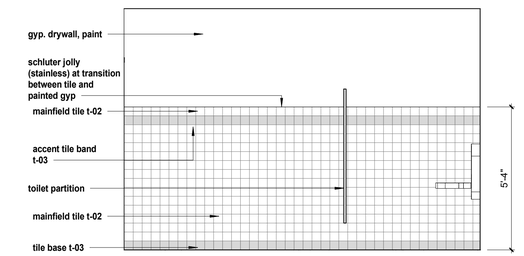
3 men's wc elevation - north wall
3/8" = 1'-0"

2 women's wc elevation - south wall
3/8" = 1'-0"



4 women's wc elevation - west wall
3/8" = 1'-0"

5 woman's wc elevation - east wall
3/8" = 1'-0"



6 woman's wc elevation - north wall
3/8" = 1'-0"

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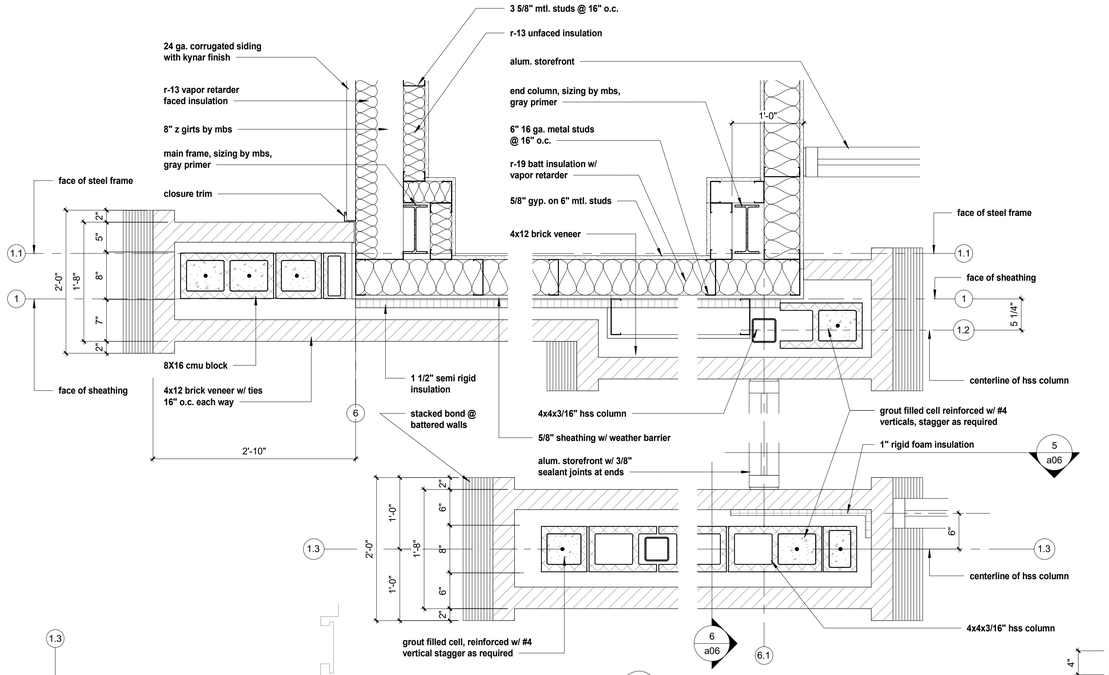
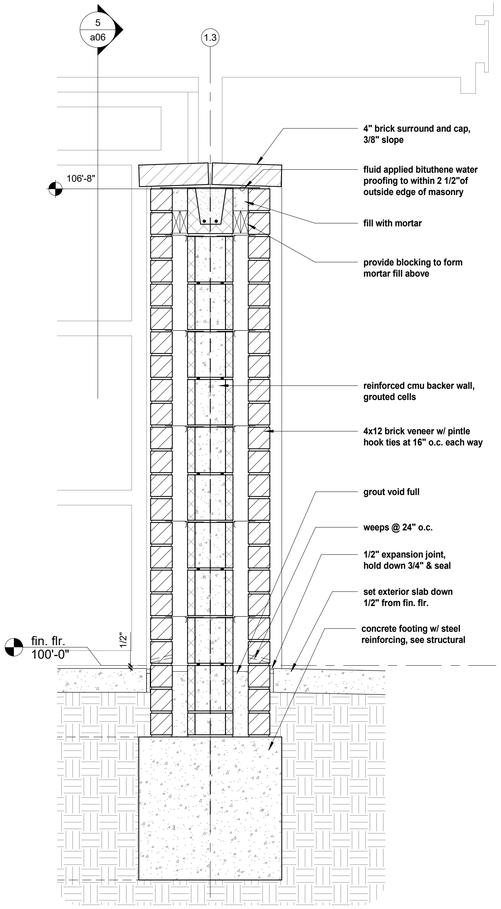
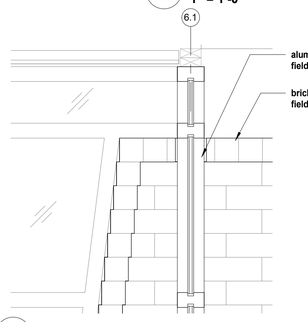
a05.1



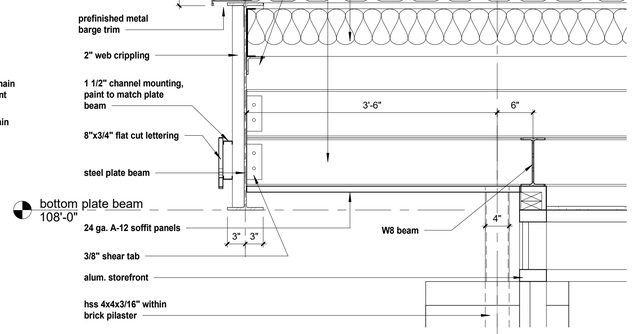
4 plan detail at pilasters & mtl. stud wall
1" = 1'-0"



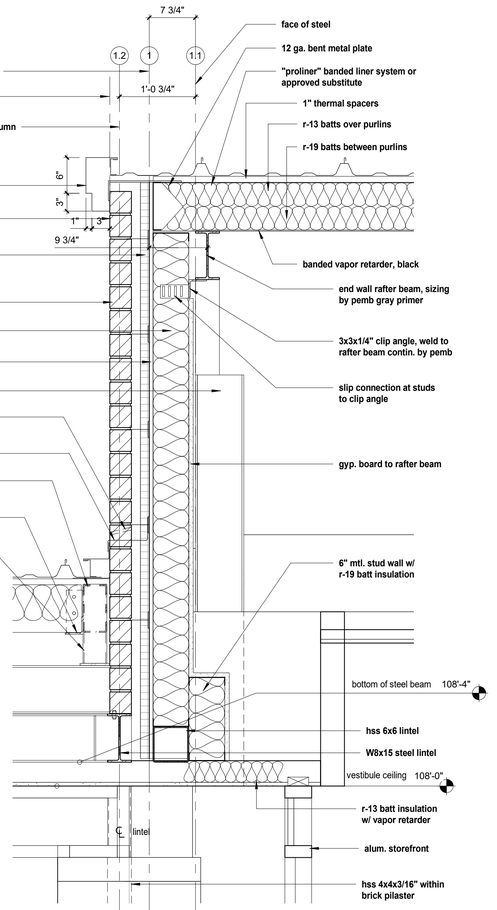
6 section detail at masonry pylon
1" = 1'-0"

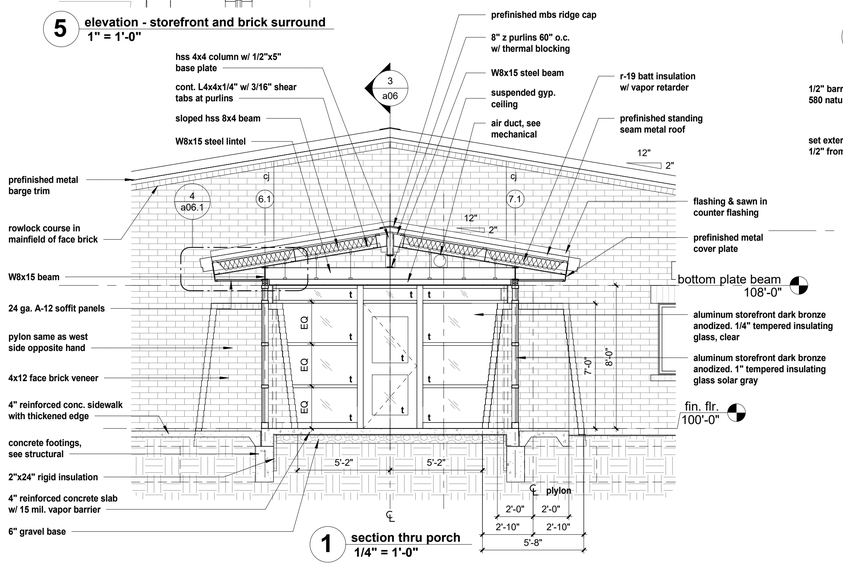


5 elevation - storefront and brick surround
1" = 1'-0"

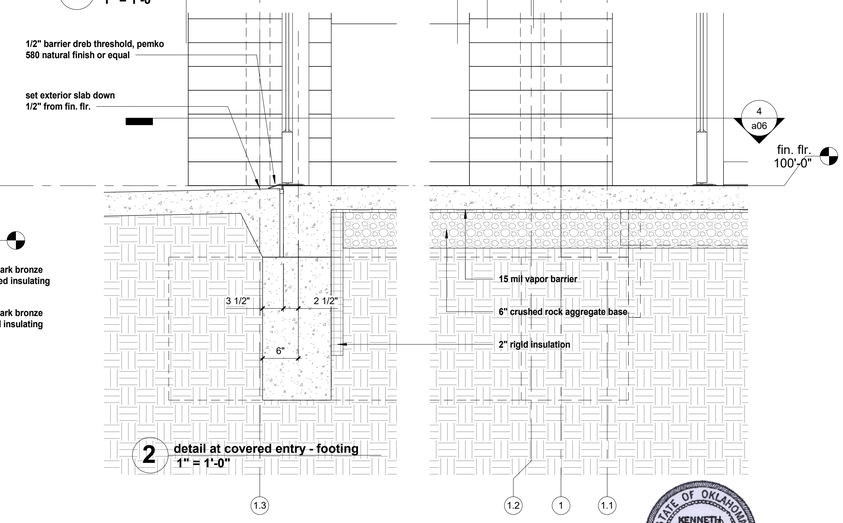


3 detail at covered entry
1" = 1'-0"





1 section thru porch
1/4" = 1'-0"



2 detail at covered entry - footing
1" = 1'-0"

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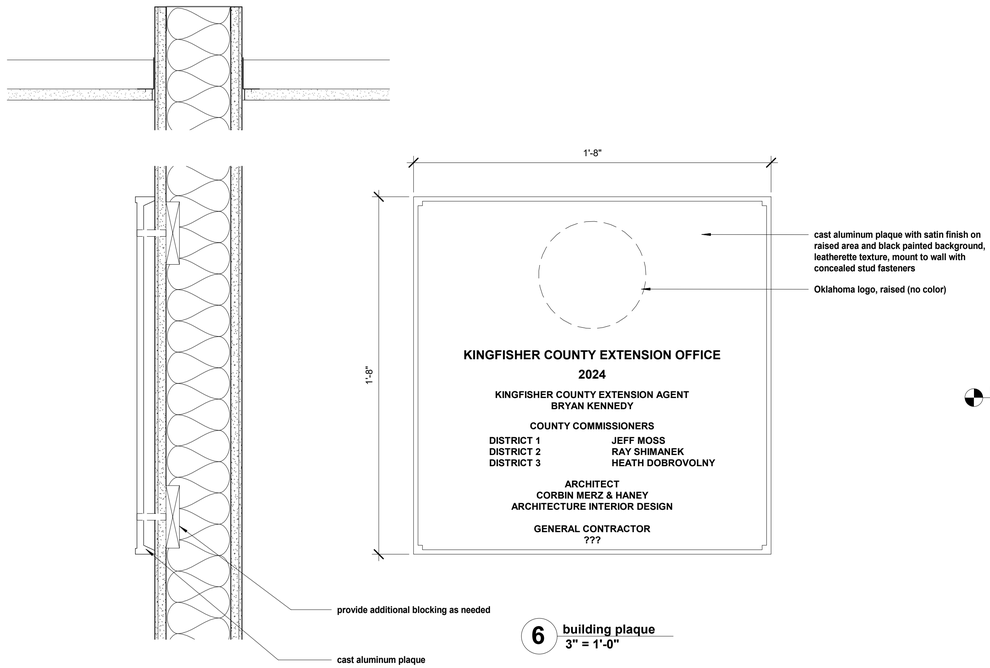
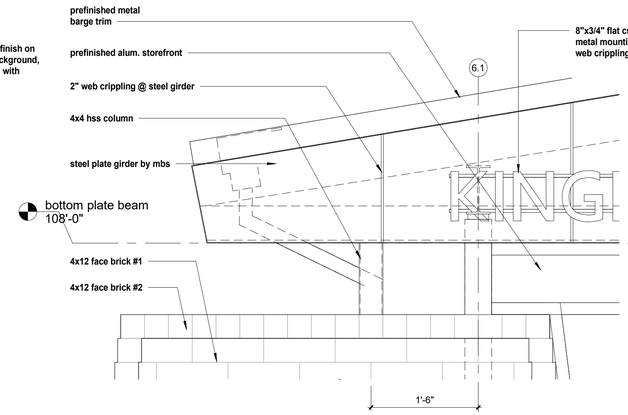
STATE OF OKLAHOMA KENNETH CLARK CORBIN 1249 REGISTERED ARCHITECT

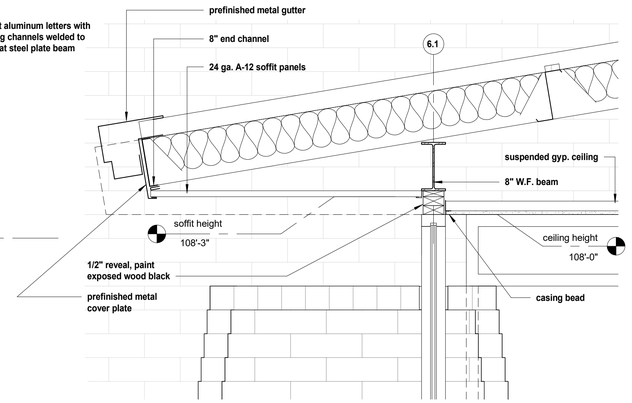
a06



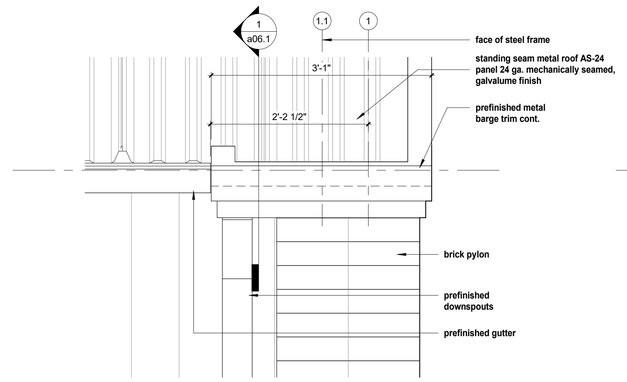
6 **building plaque**
3" = 1'-0"



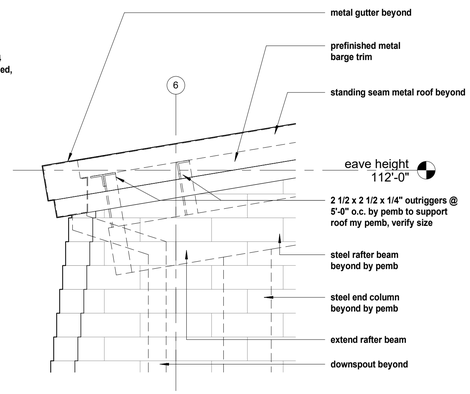
5 **north elevation - girder plate and col.**
1" = 1'-0"



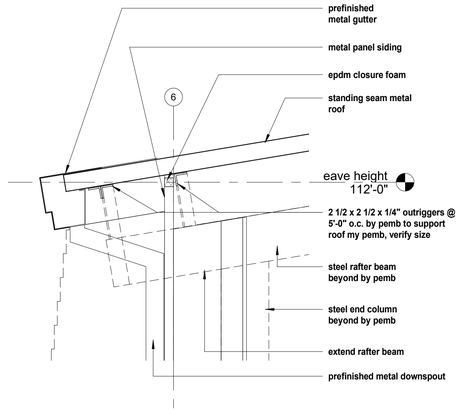
4 **detail at porch roof**
1" = 1'-0"



3 **partial east elevation @ endwall**
1" = 1'-0"



2 **north elevation at end wall NE corner**
1" = 1'-0"



1 **section thru wingwall**
1" = 1'-0"

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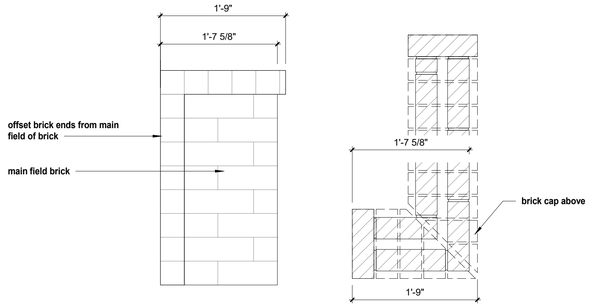
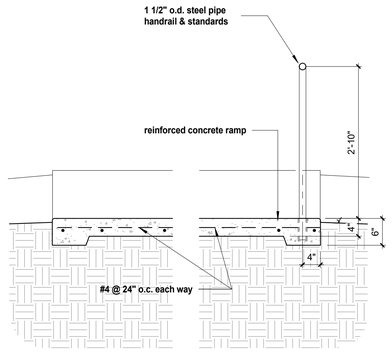
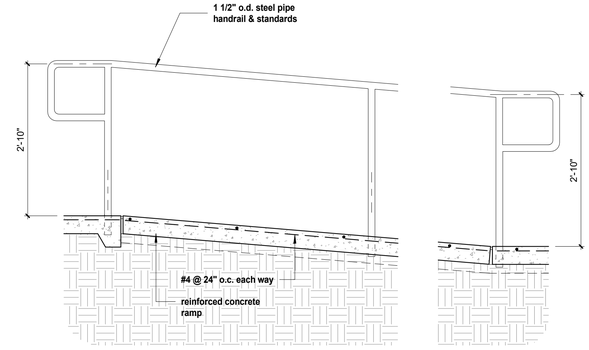
a06.1



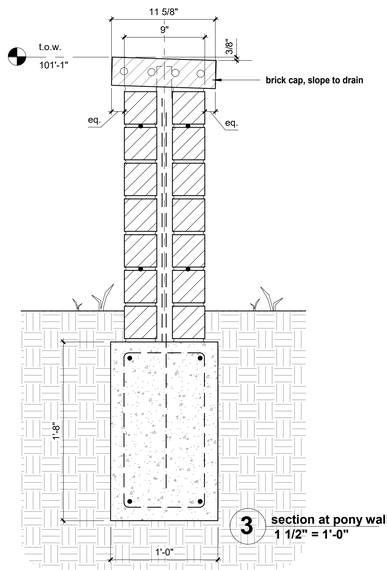
4 plan detail at brick pony wall
1" = 1'-0"



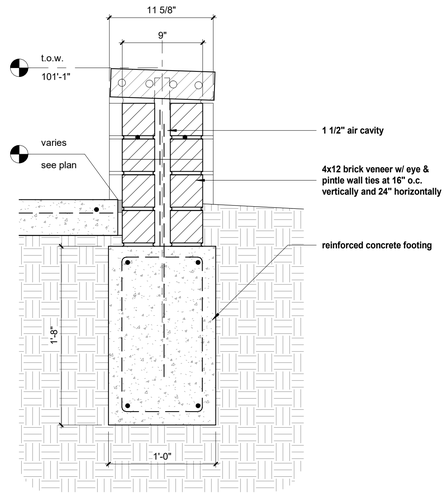
5 transverse section at ramp
3/4" = 1'-0"



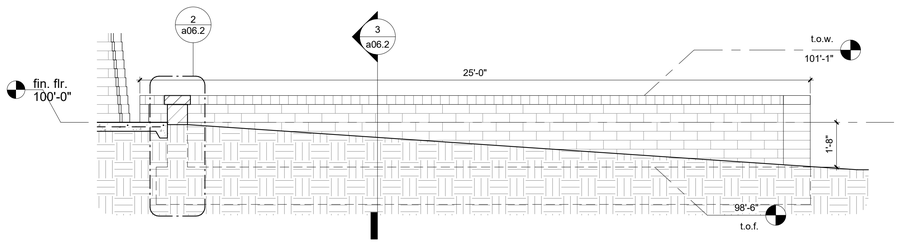
6 longitudinal section at ADA ramp
3/4" = 1'-0"



3 section at pony wall
1 1/2" = 1'-0"



2 section at pony wall at sidewalk
1 1/2" = 1'-0"



1 elevation at west pony walls
3/8" = 1'-0"

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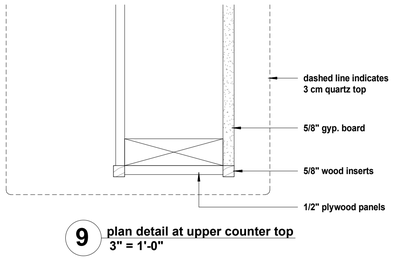
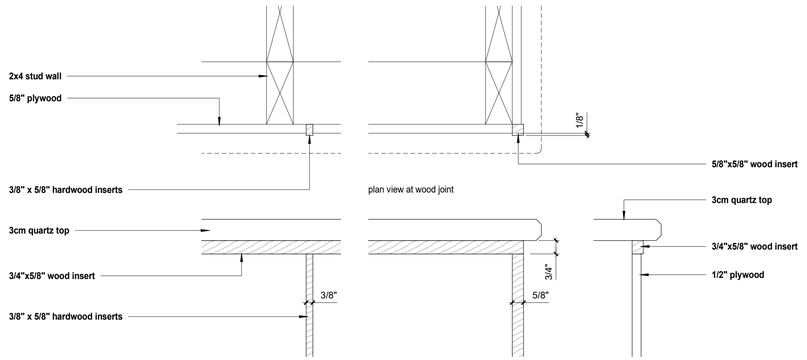
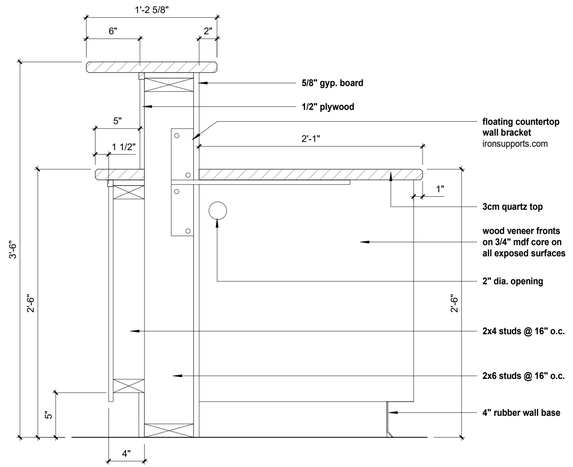
1249
REGISTERED ARCHITECT

a06.2

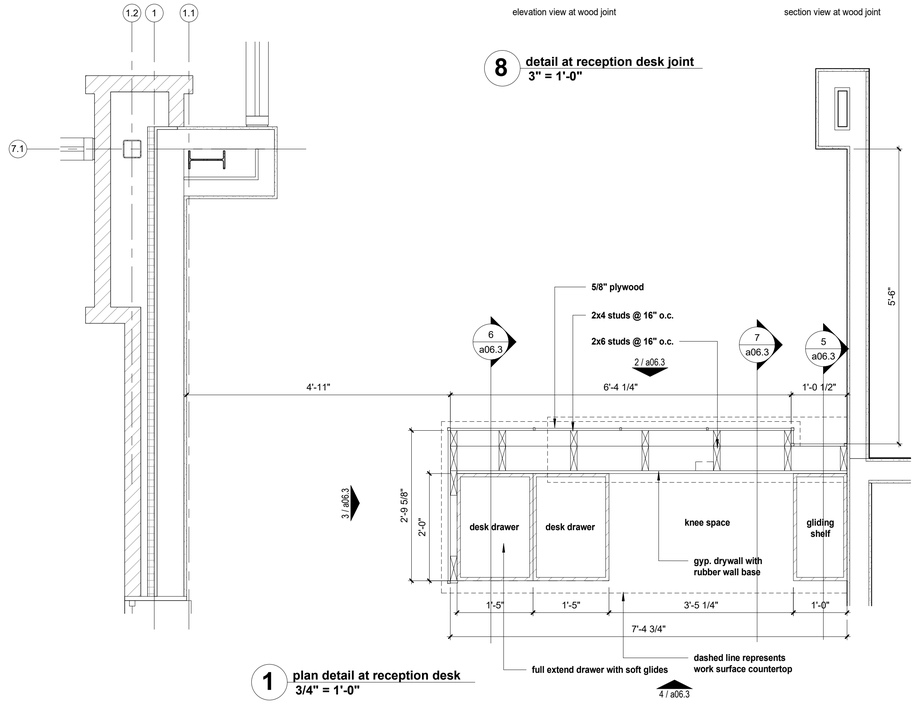


9 plan detail at upper counter top
3" = 1'-0"



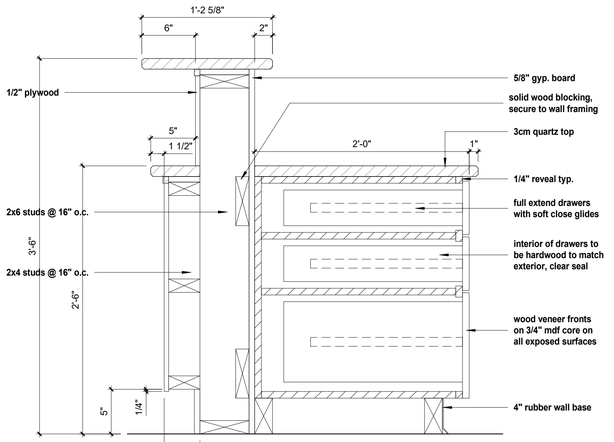


7 section at reception desk angle bracket
1 1/2" = 1'-0"

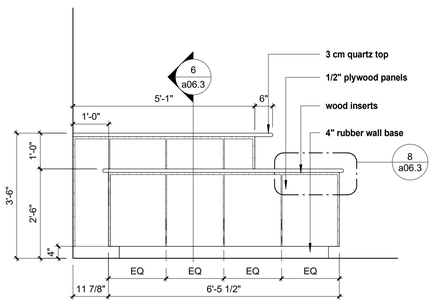


1 plan detail at reception desk
3/4" = 1'-0"

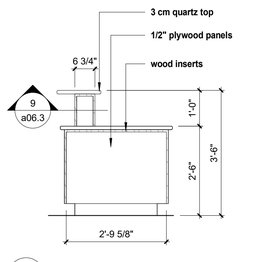
8 detail at reception desk joint
3" = 1'-0"



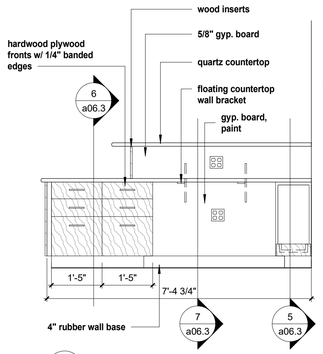
6 section at reception desk
1 1/2" = 1'-0"



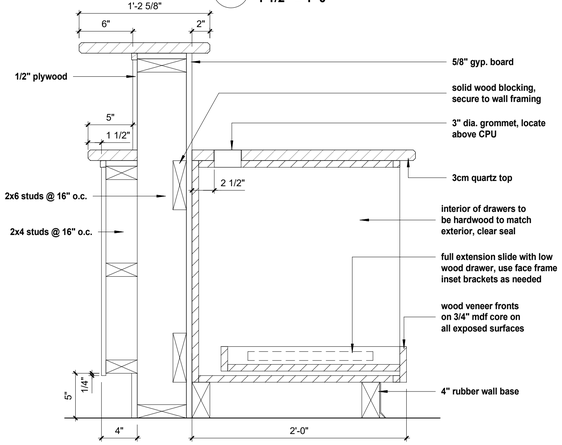
2 front elevation at reception desk
1/2" = 1'-0"



3 side elevation at reception desk
1/2" = 1'-0"



4 back elevation at reception desk
1/2" = 1'-0"



5 section at gliding shelf - reception desk
1 1/2" = 1'-0"

date issued:	1-8-2024				

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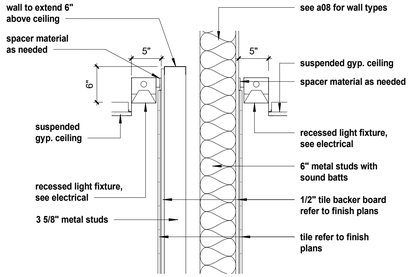
300 South 13th Street, Kingfisher, OK 73750

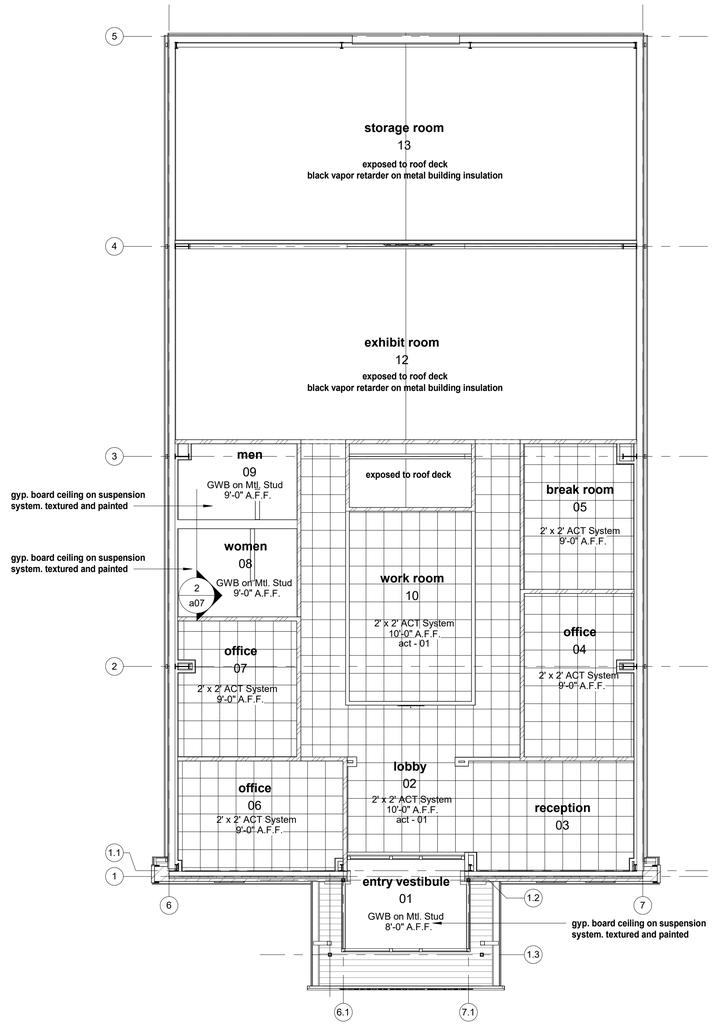
CORBIN ◆ MERZ ◆ HANEY
ARCHITECTURE INTERIOR DESIGN
302 NORTH INDEPENDENCE ENID, OK 73701 WWW.CORBINMERZHANEY.COM PH:(580)233-2362

STATE OF OKLAHOMA
KENNETH CLARK CORBIN
1249
REGISTERED ARCHITECT

a06.3



2 section detail at restroom light fixture
1" = 1'-0"



1 reflected ceiling plan
1/8" = 1'-0"

date issued: 1-8-2024

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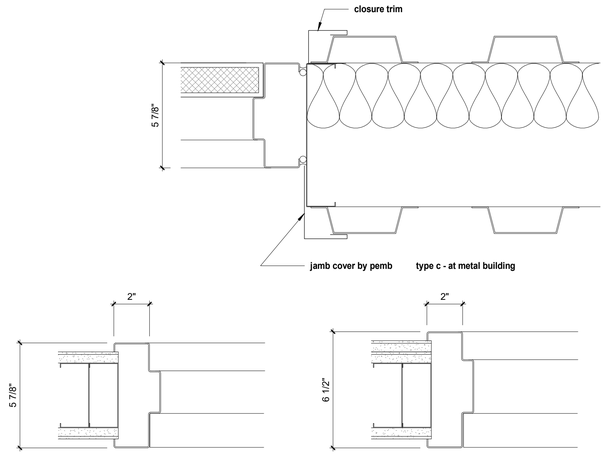
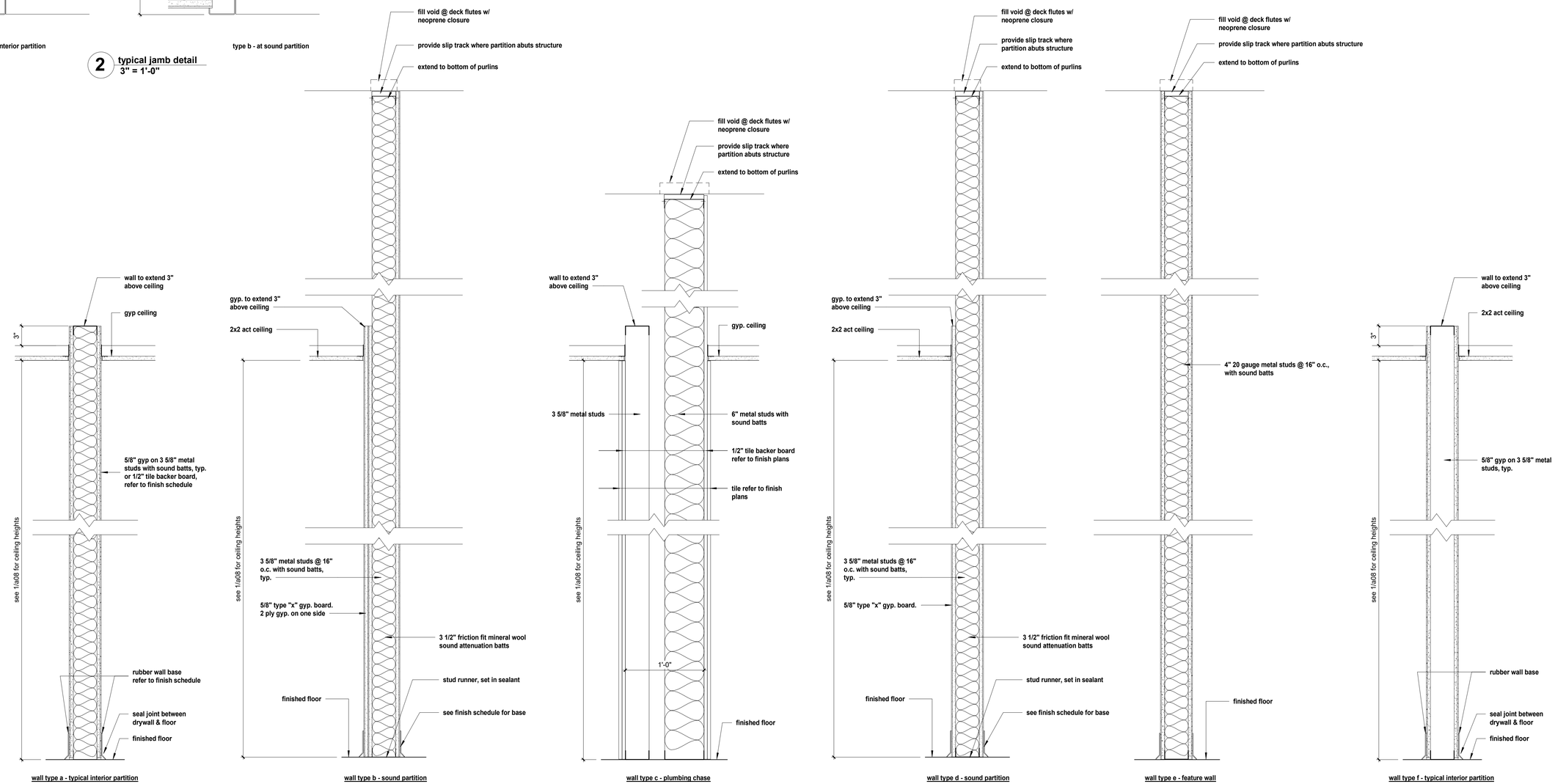
STATE OF OKLAHOMA
KENNETH CLARK CORBIN
1248
REGISTERED ARCHITECT

a07



2 typical jamb detail
3" = 1'-0"



1 typical interior partition types
1 1/2" = 1'-0"

date issued: 1-8-2024

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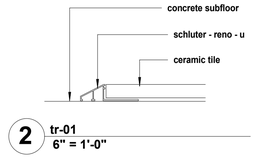
a08

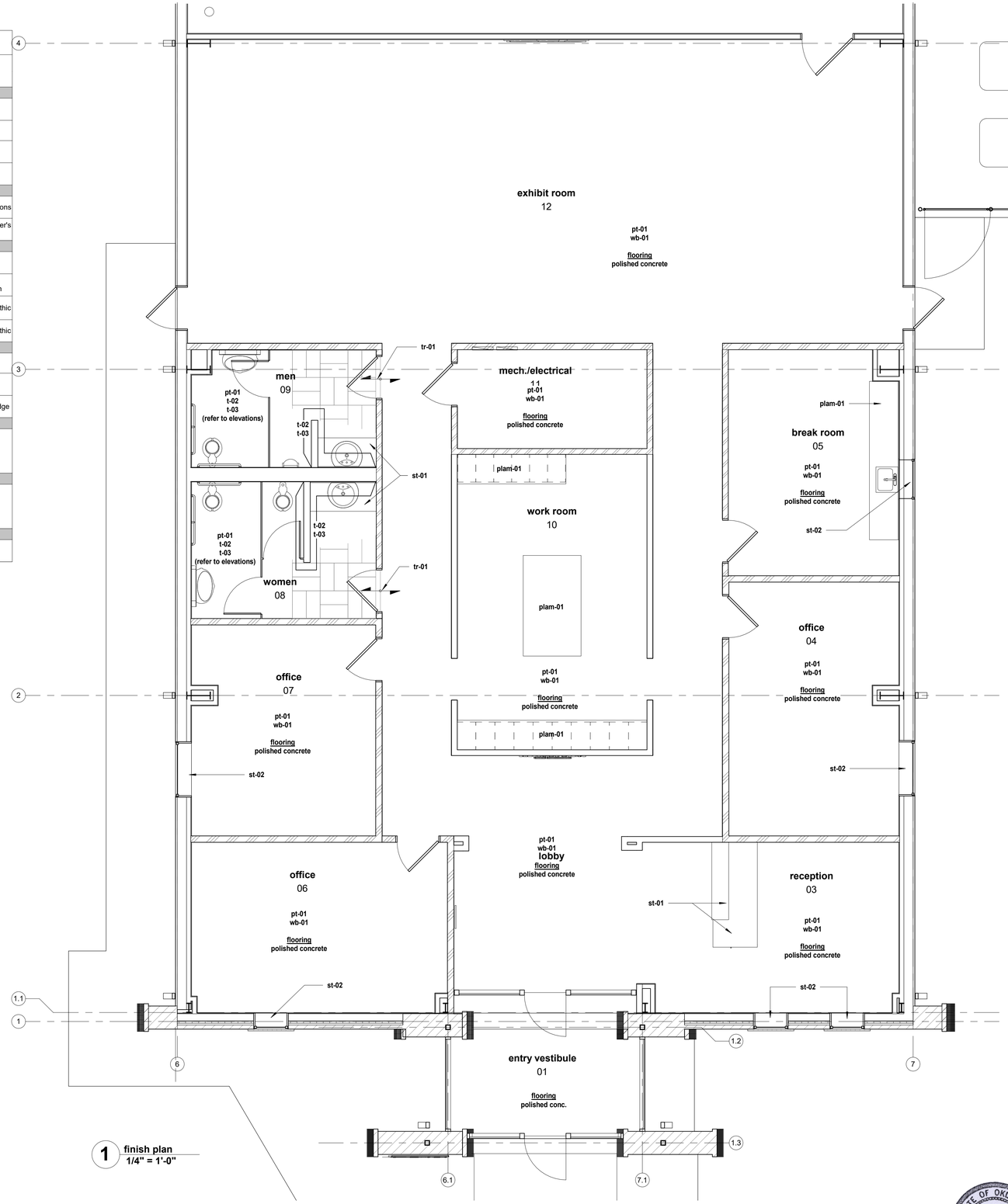
Finish Schedule

Kingfisher County Extension Office 2023
300 South 13th Street, Kingfisher, OK 73750

PAINT								
reference no.	description	manufacturer	color name	color no	sheen @ walls	Sheen @ ceilings & bulkheads	Installation Instructions	general notes
pt-01	general paint color at walls and bulkheads	Benjamin Moore	Nature's Essentials	1521	eggshell	eggshell		
pt-02	metal door frame	Sherwin Williams	Iron Ore	7068	satin			
pt-03	ceiling paint color at restrooms	Sherwin Williams	Pure White	7005	flat			
CEILING TILE								
reference no.	description	manufacturer	type	style	size	color	suspension system	installation instructions
act-01	general acoustical ceiling tile	armstrong	ultima high NRC	15/16" tegular	24x24	white	prelude	refer to manufacturer's install instructions
TILE								
reference no.	description	manufacturer	series	color	size	joint size	grout color	general notes
t-01	tile at restroom floor	Crossville	Civilization	Legality	12x24	1/8" max	Mapei Flex Seal #47 Charcoal	tile installed herringbone pattern
t-02	wall tile - main field	Metro Surfaces	Melange	Beige	4x4	1/16" max	Mapei Flex Seal #14 Biscuit	tile installed monolithic
t-03	wall tile - accent band and wall base	Metro Surfaces	Melange	Nero	4x4	1/16" max	Mapei Flex Seal #47 Charcoal	tile installed monolithic
STONE								
reference no.	description	distributer/manufacturer	type	color	size	thickness	finish	edge
st-01	Countertop at reception desk and Bathrooms	Caesarstone	quartz	Vanilla Noir	vif	3 cm	polished	straight edge with mitered corners
st-02	Interior Window Sills	Cambria Quarts	quartz	Colton	vif	3cm	polished	straight polished edge
PLASTIC LAMINATE								
reference no	description	manufacturer	color name/no	finish	edge trim/style			
plam-01	typical countertops unless otherwise noted	Wilsonart	Blackbird 5024k-19	Leno Weave Finish	PVC edgebanding to match surface pattern			
WALL BASE								
reference no.	description	manufacturer	color name	type	material	size		
wb-01	typical project wall base unless otherwise noted	johnsonite	burnt umber	traditional standard tow	rubber	4 1/2"		
WOOD TYPES								
wood type and stain to match designer's samples								



2 tr-01
6" = 1'-0"



1 finish plan
1/4" = 1'-0"

date issued:	1-8-2024				

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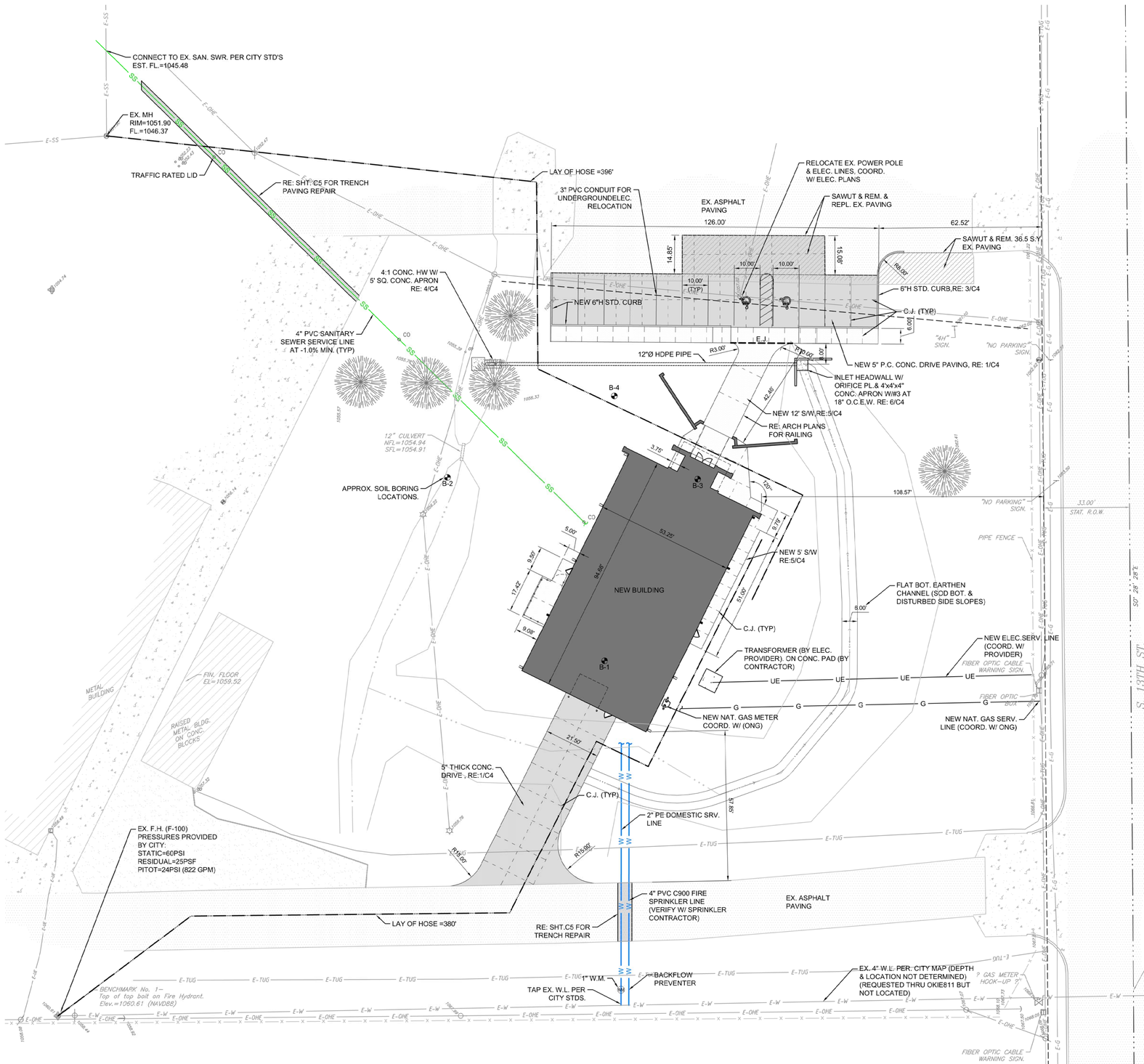
a09



N

0 1" = 20 FT. 40 Feet

811 Know what's below. Call before you dig.

UTILITY WARNING

THE ENGINEER AND SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. AND FURTHER DO NOT WARRANT THAT THE UINDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. THE SURVEY OR ENGINEER HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILTIES.

CAUTION!
CONTRACTOR IS TO HAVE ALL UNDERGROUND UTILITIES FIELD MARKED PRIOR TO ANY EXCAVATION.
CALL OKIEONE 1-800-522-6543

LEGEND

EXISTING STORM SEWER E-ST	PROPOSED STORM SEWER ST
EXISTING SAN. SEWER E-SS	PROPOSED SAN. SEWER SS
EXISTING WATER E-W	PROPOSED WATER W
EXISTING OVER-HEAD ELEC. E-OHE	PROPOSED O.H. ELEC OHE
EXISTING U.G. ELEC. E-UE	PROPOSED U.G. ELEC UE
EXISTING NAT. GAS E-G	PROPOSED NAT. GAS G
EXISTING O.H. TELE. CABLE E-T	PROPOSED O.H. TELEPHONE T
EXISTING U.G. TELE. CABLE E-TUG	PROPOSED U.G. TELEPHONE TUG
EXISTING T.V. E-TV	PROPOSED CABLE TV TV
EXISTING FIBER OPTIC CABLE E-FO	PROPOSED FIBER OPTIC FO
EXISTING FENCE LINE	PROPOSED FENCE LINE
EXISTING FLOW LINE	PROPOSED FLOW LINE
	PROPOSED LAY OF HOSE

GAS METER		GAS VALVE	
POWER POLE		LIGHT POLE	
S.S. MANHOLE	SS	GUY WIRE	
STM. S. MANHOLE	ST	FIRE HYDRANT	
ELEC. BOX	E	WATER METER	WM
TELEPHONE POLE	T	WATER VALVE	WV
SBC BOX	T	S.S. CLEAN OUT	CO
U-G TRAFFIC CTRL. SIGNAL BOX		2 WAY CLEAN OUT	DCO
ST. GRATE / BASIN		DOWN SPOUT	DS
PARKING BUMPER		FREEZE PROOF - YARD HYDRANT	FPYH
TRUNCATED DOMES		SIGN	
BOLLARD		HANDICAPPED SIGN	HC

EX. BUILDING	EX. CONCRETE	EX. S/W	EX. GRAVEL	EX. ASPHALT
PROP. BUILDING	PROP. CONCRETE	PROP. S/W	PROP. GRAVEL	
PROP. PAVING 1	PROP. DETENTION			

SHEET NOTES:

1. THIS DOCUMENT USES COLOR HATCH AND LINE WORK TO IDENTIFY ITEMS. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN COLOR DOCUMENTS. CONTRACTOR SHALL INCLUDE REPRODUCTION OF PLANS IN COLOR.

SURVEY
TOPOGRAPHIC SURVEY WAS PERFORMED BY PORTERFIELD SURVEYING INC., DATED 08/28/2023.

BENCHMARKS
BENCHMARK No. 1
TOP OF TOP BOLT ON FIRE HYDRANT, SW FIRE HYDRANT ON SURVEY: ELEV.= 1060.61

BENCHMARK NO. 2
CROSS IN TOP OF CURB, S37°48'W-49.7' FROM NE CORNER OF NE/4: ELEV.= 1053.11

BENCHMARK NO. 3
CROSS IN TOP OF CURB, N30°56'W-40.1' FROM SE CORNER OF NE/4: ELEV.= 1079.89

BENCHMARK NO. 4
NGS MONUMENTFJ0572, BRASS CAP STAMPED 'A 185' IN HEADWALL, AT THE SE CORNER OF TEH 1ST INTERSECTION NORTH OF STATE HWY 33 AND 29' EAST OF TEH CENTERLINE OF 13TH ST.: ELEV.= 1043.06

date issued						
12/18/2023	REV0					

Kingfisher County Extension Office 2023

300 South 13th Street, Kingfisher, Ok 73750

HOLTZEN ENGINEERING GROUP
C.A. #7050 EXP. 6/30/25
302 N. INDEPENDENCE ST. STE. 1100
ENID, OK 73701
P. 580.233.8533 F: 580.540.8906
www.HoltzenEngineering.com
HEG PROJECT NO.: 23.030

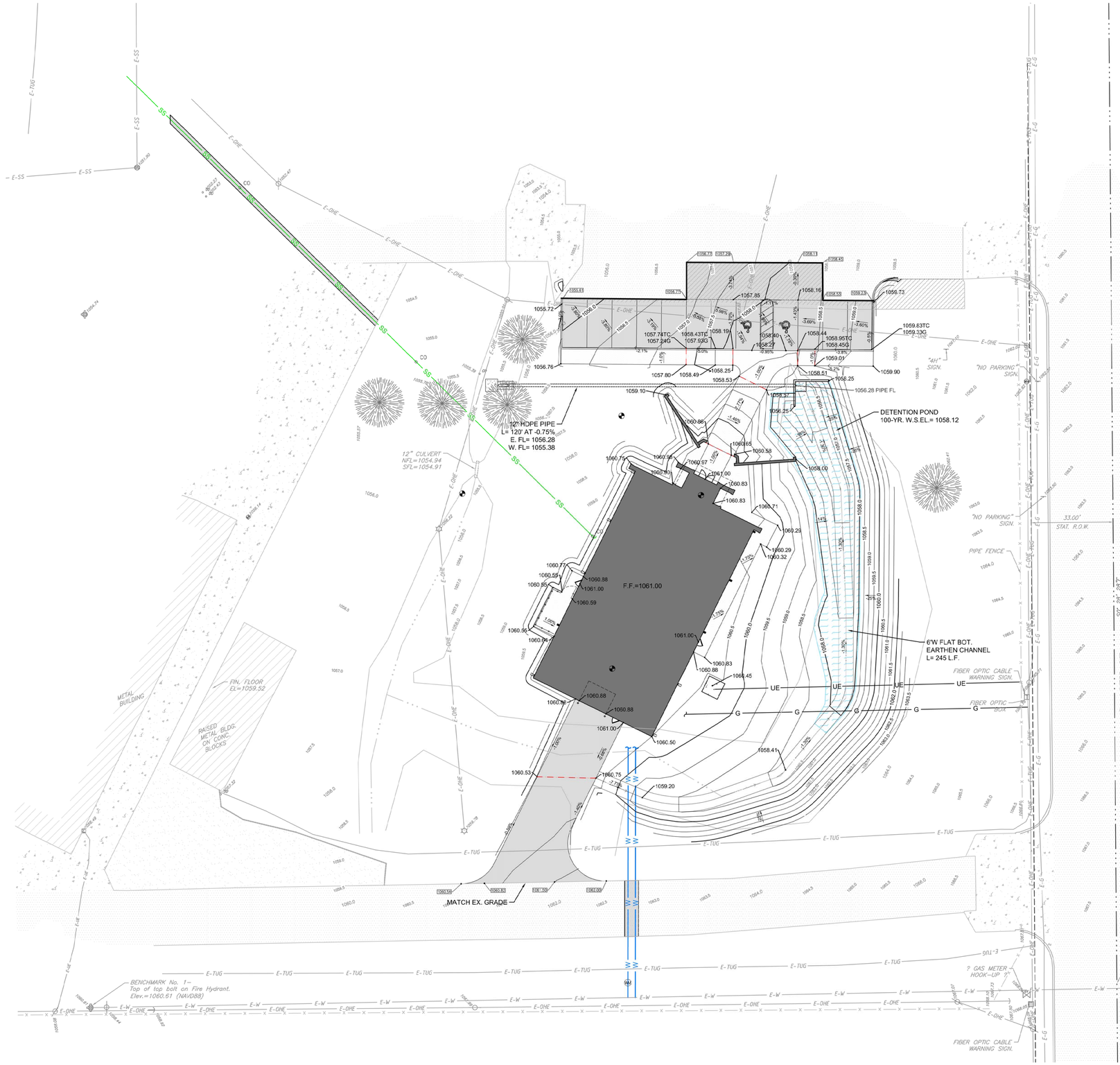
CORBIN • MERZ • HANEY
ARCHITECTURE INTERIOR DESIGN
302 NORTH INDEPENDENCE ENID, OK 73701 WWW.CORBINMERZHANEY.COM PH: (580)233-2362

LICENSED PROFESSIONAL ENGINEER
SCOTT E. HOLTZEN
23396
12/18/23
OKLAHOMA

SITE PLAN

C1

of 5 sheet(s)



N

0 1" = 20 FT. 40 Feet

L E G E N D

- EXIST. CONTOURS
- PROPOSED CONTOURS
- EXIST. ELEV. PT
- 920.10 PROPOSED ELEV. PT.
- 920.10 G PROP. GUTTER ELEV.
- 920.10 TC PROP. TOP CURB ELEV.
- 920.10 FL PROP. FLOW LINE ELEV.
- 920.10 TOG PROP. TOP OF GRATE ELEV.
- 920.10 TOW PROP. TOP OF WALL ELEV.
- 920.10 TW PROP. TOP OF S/W ELEV.
- 920.10 G.B. PROP. GRADE BREAK ELEV.
- -0.50% PROP. CROSS SLOPE & FL SLOPE ARROW
- -5.0% PROP. SLOPE ARROW
- EXIST. FLOW LINE
- PROPOSED FLOW LINE
- PROPOSED RIDGE LINE
- PROPOSED DRAINAGE PIPE

SHEET NOTES:

1. THIS DOCUMENT USES COLOR HATCH AND LINE WORK TO IDENTIFY ITEMS. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN COLOR DOCUMENTS.
2. REFER TO SITE PLAN FOR HATCH LEGEND,

date issued
12/18/2023 REV0

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HOLTZEN ENGINEERING GROUP
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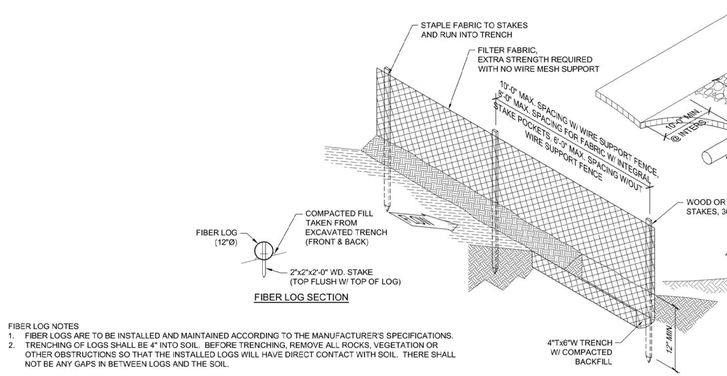
LICENSED PROFESSIONAL ENGINEER
SCOTT E. HOLTZEN
23396
12/18/23
OKLAHOMA

GRADING PLAN

C2

of 5 sheet(s)



FIBER LOG SECTION

FIBER LOG NOTES

1. FIBER LOGS ARE TO BE INSTALLED AND MAINTAINED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
2. TRENCHING OF LOGS SHALL BE 4" INTO SOIL. BEFORE TRENCHING, REMOVE ALL ROCKS, VEGETATION OR OTHER OBSTRUCTIONS SO THAT THE INSTALLED LOGS WILL HAVE DIRECT CONTACT WITH SOIL. THERE SHALL NOT BE ANY GAPS IN BETWEEN LOGS AND THE SOIL.

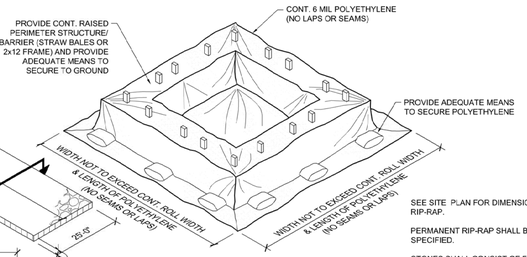
FIBER LOG DETAIL

SECTION A

SILT FENCE DETAIL

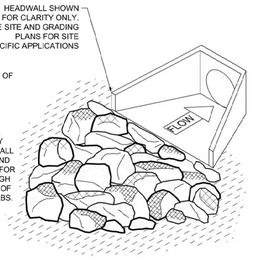
CONSTRUCTION ENTRANCE DETAIL

CONTRACTOR TO COORDINATE WITH OWNER FOR LOCATION OF CONSTRUCTION ENTRANCE.



CONCRETE WASHOUT PIT

CONTRACTOR TO COORDINATE WITH OWNER FOR LOCATION OF CONCRETE WASHOUT PIT.



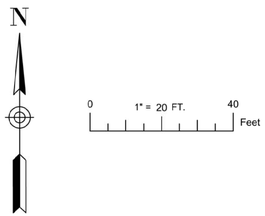
SEE SITE PLAN FOR DIMENSIONS AND LIMITS OF RIP-RAP.

PERMANENT RIP-RAP SHALL BE GROUTED AS SPECIFIED.

STONES SHALL CONSIST OF FIELD STONE OR ROUGH, UNHEWN QUARRY STONE AS NEARLY UNIFORM IN SIZE AS PRACTICAL. STONES SHALL BE DENSE, RESISTANT TO THE ACTION OF WIND AND WATER, AND SUITABLE IN ALL ASPECTS FOR THE INTENDED USE. ALL STONES SHALL WEIGH BETWEEN 50-150 LBS. EA. AND AT LEAST 60% OF THE STONES SHALL WEIGH MORE THAN 100 LBS. EACH.

AGGREGATE CHECK DAM

- BENCHMARK No. 1-
Top of top bolt on Fire Hydrant.
Elev.=1060.61 (NAVD88)



SHEET NOTES:

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2. REFER TO SITE PLAN FOR HATCH LEGEND.

L E G E N D

- [S] — SILT FENCE
- AGGREGATE CONSTUCTION ENTRANCE
- FIBER LOG
- CWP — CONCRETE WASHOUT PIT
- INLET SEDIMENT BARRIER
- INLET PROTECTION
- AGGREGATE CHECK DAM

EROSION CONTROL PLAN

date issued
12/18/2023 REV0

Kingfisher County Extension Office 2023

300 South 13th Street, Kingfisher, Ok 73750

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HEG PROJECT NO.: 23.030

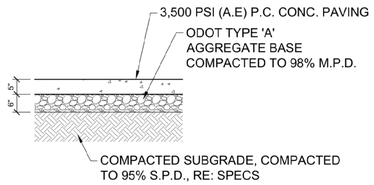
OKLAHOMA LICENSED PROFESSIONAL ENGINEER SCOTT E. HOLTZEN 23396 12/18/23 OKLAHOMA

EROSION CONTROL PLAN

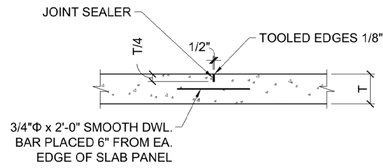
C3

of 5 sheet(s)

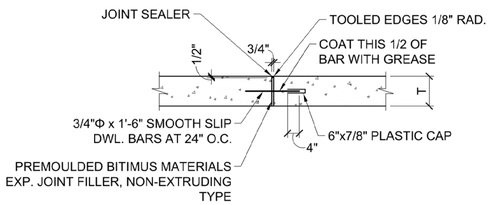
PAVING SECTION NOTES:
1. REFER TO SPECS FOR CONCRETE REQUIREMENTS.
2. EXTEND BASE, STABILIZATION, AND SUBGRADE PREPARATION 1 FT. BEYOND EDGE OF PAVING.



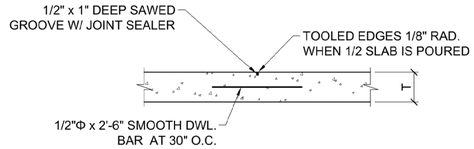
P.C. CONC. PAVING



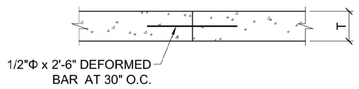
TRANSVERSE CONTRACTION JOINT



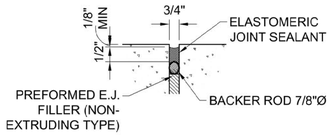
EXPANSION JOINT



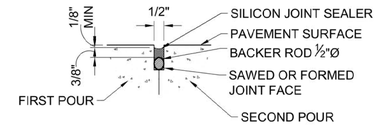
CENTERLINE LONGITUDINAL HINGE JOINT
(FOR FULL MONOLITHIC CONSTRUCTION OR DOWEL)



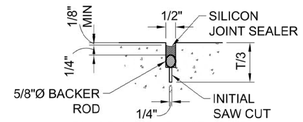
CONSTRUCTION JOINT AND
CENTERLINE LONGITUDINAL HINGE JOINT



EXPANSION JOINT & SEALANT DETAIL



CONSTRUCTION JOINT & SEALANT DETAIL

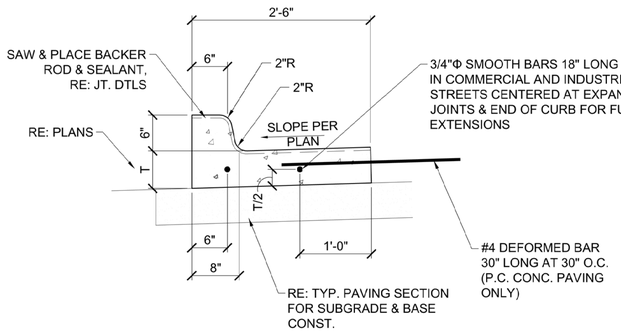


CONTRACTION JOINT & SEALANT DETAIL

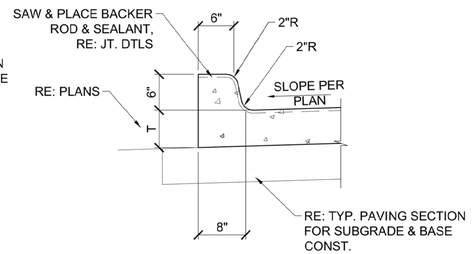
1 TYPICAL PAVING SECTION
N.T.S.

2 TYPICAL PAVING JOINT DETAILS
N.T.S.

TOOLED OR SAWED CONTRACTION JOINTS SHALL BE CONSTRUCTED AT 20 FOOT INTERVALS WITH ASPHALT PAVING AND SHALL MATCH PAVING JOINTS WITH P.C. CONCRETE PAVING. EXPANSION JOINTS SHALL BE CONSTRUCTED AT PC'S AND PT'S OR AT 600 FOOT INTERVALS.

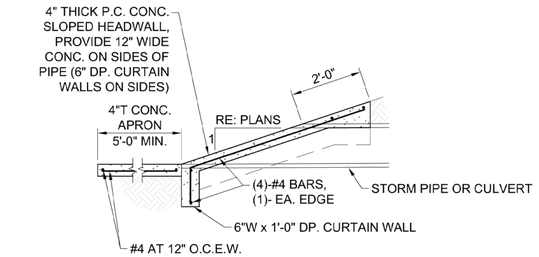


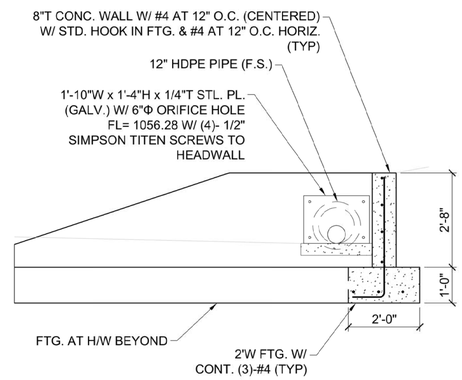
COMBINED CURB & GUTTER DETAIL



INTERGRAL CURB DETAIL

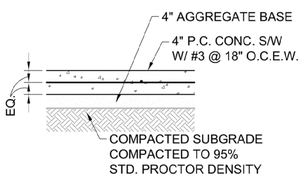
3 TYPICAL CURB DETAILS
N.T.S.



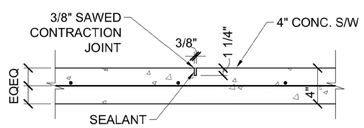


OUTLET SECTION 'A'

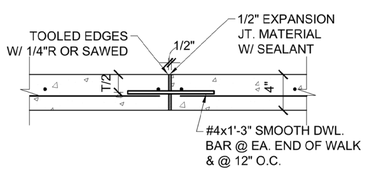
4 TYPICAL SLOPED HEADWALL DETAILS
N.T.S.



TYPICAL SIDEWALK SECTION - REINFORCED



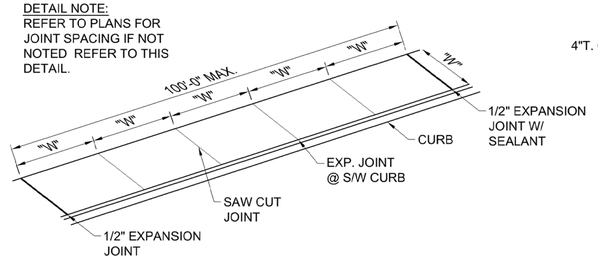
CONTROL JOINT



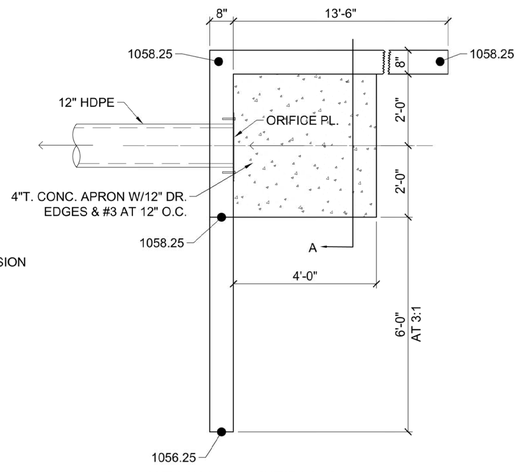
EXPANSION JOINT

5 TYPICAL SIDEWALK DETAILS
N.T.S.

DETAIL NOTE:
REFER TO PLANS FOR JOINT SPACING IF NOT NOTED REFER TO THIS DETAIL.



TYPICAL SIDEWALK JOINT LAYOUT DETAIL



6 TYPICAL HEADWALL DETAILS
N.T.S.

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HEG PROJECT NO.: 23.030

date issued						
12/18/2023	REV0					

Kingfisher County Extension Office 2023
300 South 13th Street, Kingfisher, Ok 73750

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302 NORTH INDEPENDENCE ENID, OK 73701 WWW.CORBINMERZHANEY.COM PH:(580)233-2382

SITE DETAILS

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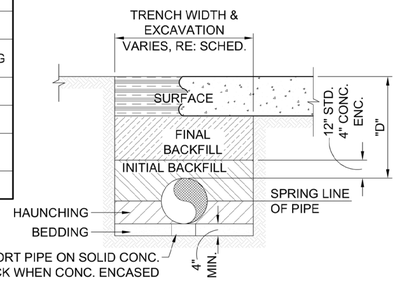
of 5 sheet(s)

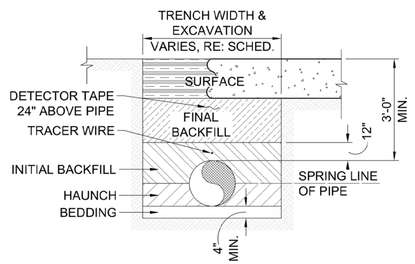
GRAVITY PIPE EMBEDMENT						
BACKFILL DESCRIPTION	NON-PAVED AREAS		GRAVEL SURFACE AREAS		PAVED AREAS	
DEPTH "D"	≥12"	<12"	≥18"	<18"	≥12"	<12"
SURFACE	EXCAV. MAT'L	EXCAV. MAT'L	GRAVEL	GRAVEL	CONC. PAVING	CONC. PAVING
FINAL BACKFILL	EXCAV. MAT'L	EXCAV. MAT'L	SBM	SBM	SBM	SBM
INITIAL BACKFILL	SS	CONC. ENC.	SBM	CONC. ENC.	SBM	CONC. ENC.
HAUNCH	EMBED. MAT'L	CONC. ENC.	EMBED. MAT'L	CONC. ENC.	EMBED. MAT'L	CONC. ENC.
BEDDING	RE: NOTE 2	CONC. ENC.	RE: NOTE 2	CONC. ENC.	RE: NOTE 2	CONC. ENC.



STANDARD GRAVITY PIPE TRENCH SECTION

STANDARD TRENCH WIDTH	
I.D. PIPE	STD. TRENCH WIDTH
4"	21"
6"	24"
8"	24"
10"	30"
12"	30"
15"	36"
18"	36"
24"	42"
30"	54"
36"	60"
42"	66"
48"	72"
60"	84"

WATER LINE PIPE EMBEDMENT			
BACKFILL DESCRIPTION	NON-PAVED AREAS	GRAVEL SURFACE AREAS	PAVED AREAS
SURFACE	EXCAV. MAT'L	GRAVEL	P.C. OR A.C. CONC. PAVING
FINAL BACKFILL	SS	SBM	SBM
INITIAL BACKFILL	SBM	SBM	SBM
HAUNCH	EMBED. MAT'L	EMBED. MAT'L	EMBED. MAT'L
BEDDING	RE: NOTE 2	RE: NOTE 2	RE: NOTE 2



STANDARD WATER LINE PIPE TRENCH SECTION

PIPE EMBEDMENT NOTES:

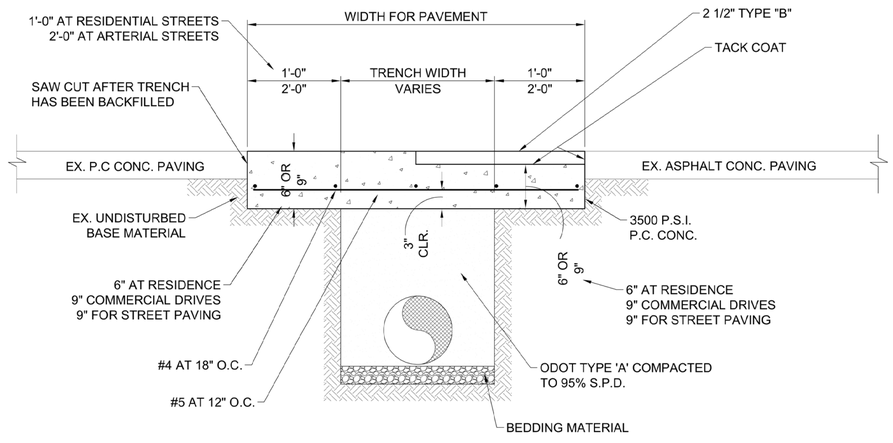
1. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
2. BEDDING MATERIAL MAY SAND OR ODOT TYPE "A" AGGREGATE, IF TRENCH IS WET, BEDDING SHALL BE ASTM C33: NO. 67 AGGREGATE. MATERIAL SHALL BEAR ON UNDISTURBED NATIVE SOIL OR PROPERLY COMPACTED BACKFILL.
3. EMBEDMENT MATERIAL SHALL BE EITHER:
   A. ASTM C33: NO. 8 (3/8") OR NO. 67 (3/4") AGGREGATE COMPACTED WITH HAND OPERATED VIBRATORY COMPACTOR
   B. ODOT TYPE "A" AGGREGATE
   C. FLOWABLE FILL (NOT APPLICABLE TO WATER LINES)
      a. PIPE SHALL BE ADEQUATELY ANCHORED TO PREVENT FLOATATION.
4. STANDARD BACKFILL MATERIAL (SBM) SHALL BE EITHER:
   A. ODOT TYPE "A" AGGREGATE.
      a. COMPACT TO 95% STANDARD PROCTOR DENSITY (ASTM D698) IN 6" LIFTS.
   B. FLOWABLE FILL (NOT APPLICABLE TO WATER LINES)
      a. PIPE SHALL BE ADEQUATELY ANCHORED TO PREVENT FLOATATION
5. SATISFACTORY SOILS (SS) SHALL BE EXCAVATED MATERIAL FREE OF ROCKS GREATER THAN 2 1/2", ORGANIC MATERIAL AND DEBRIS. COMPACT TO 90% STANDARD PROCTOR DENSITY AND MOISTURE WITHIN -2% TO +3% OPTIMUM IN 6" LIFTS.
6. EXCAVATED MATERIAL SHALL BE COMPACTED TO 90% STANDARD PROCTOR DENSITY IN 6" LIFTS.
7. CONCRETE ENCASE (CONC. ENC.) GRAVITY PIPE WHERE DEPTH IS LESS THAN MINIMUM.
8. EXCAVATE AROUND BELL SO THAT PIPE IS NOT SUPPORTED BY BELL.
9. ODOT TYPE "A" AGGREGATE SHALL CONFORM TO OKLAHOMA DEPARTMENT OF TRANSPORTATION 2009 SPECIFICATIONS SECTION 703.01.
10. FOR PUBLIC LINES INSTALL PER MUNICIPAL/STATE STANDARDS.

STANDARD TRENCHING AND BEDDING DETAILS - PRIVATE LINES

1 TYPICAL TRENCH AND BEDDING DETAILS

N.T.S.

NOTES:
1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE GOVERNING JURISDICTIONS STANDARD SPECIFICATION FOR PAVEMENTS AND APPURTENANCES ON PUBLIC RIGHT-OF-WAY.



PAVEMENT REPAIR DETAIL

2 TYPICAL TRENCH PAVING REPAIR DETAIL

N.T.S.

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12/18/2023 REV0

Kingfisher County Extension Office 2023

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LICENSED PROFESSIONAL ENGINEER
SCOTT E. HOLTZEN
23396
12/18/23
OKLAHOMA

SITE DETAILS

C5

of 5 sheet(s)

GENERAL STRUCTURAL NOTES

ALL MATERIALS, WORKMANSHIP AND CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL DRAWINGS, SPECIFICATIONS AND NOTES LISTED BELOW. MINIMUM PROVISIONS OF THE INTERNATIONAL BUILDING CODE, 2018 EDITION, AND LOCAL AMENDMENTS SHALL APPLY WHERE DETAILS ARE NOT SHOWN OR DESCRIBED. OTHER APPLICABLE CODES AND STANDARDS ARE GIVEN BELOW.

DESIGN LOADS

UNIFORM DEAD LOADS AND LIVE LOADS

1. DEAD LOADS	BUILDING MATERIALS
2. COLLATERAL LOADS (TOTAL)	11 PSF
- SUSPENDED CEILING	3 PSF
- MECHANICAL & ELECTRICAL ALLOWANCE	5 PSF
- SPRINKLER ALLOWANCE	3 PSF
3. ROOF LIVE LOADS	20 PSF (NON-REDUCIBLE)
4. LATERAL ACTIVE SOIL PRESSURE (E.F.P.)	60 PSF/FT
5. LATERAL PASSIVE SOIL PRESSURE (E.F.P.)	200 PSF/FT

ROOF SNOW LOADS

1. GROUND SNOW LOAD, Pg	10 PSF
2. FLAT-ROOF SNOW LOAD, Pf	7.7 PSF
3. SNOW EXPOSURE FACTOR, Ce	1.0
4. SNOW LOAD IMPORTANCE FACTOR, Is	1.0
5. THERMAL FACTOR, Ct	1.1

WIND DESIGN DATA

1. ULTIMATE WIND SPEED	115 MPH
2. NOMINAL WIND SPEED	89 MPH
3. RISK CATEGORY	II
4. WIND EXPOSURE CATEGORY	C
5. INTERNAL PRESSURE COEFFICIENT	+/-0.18
6. COMPONENT & CLADDING PRESSURE	RE: SCHEDULE

EARTHQUAKE DESIGN DATA

1. RISK CATEGORY	II
2. SEISMIC IMPORTANCE FACTOR	1.0
3. MAPPED SPECTRAL RESPONSE ACCELERATIONS	Ss= 0.271 S1= 0.074
4. SITE CLASS	C
5. DESIGN SPRECTRAL RESPONSE ACCELERATIONS	SDS= 0.235, SD1= 0.074
6. SEISMIC DESIGN CATEGORY	B
7. BASIC SEISMIC-FORCE RESISTING SYSTEM	STEEL SYSTEMS NOT SPECIFICALLY DETAILED FOR SEISMIC RESISTANCE
8. RESPONSE MODIFICATION FACTOR, R	3
9. SEISMIC RESPONSE COEFFICIENT, Cs	0.0783
10. DESIGN BASE SHEAR	0.0783W
11. ANALYSIS PROCEDURE USED	EQUIVALENT LATERAL FORCE

GENERAL NOTES

1. THE STRUCTURAL DRAWINGS DEPICT THE STRUCTURE IN ITS FINAL CONSTRUCTED CONFIGURATION.
2. NEITHER CONSTRUCTION MEANS AND METHODS, TECHNIQUES, CONSTRUCTION SEQUENCE NOR CONSTRUCTION SAFETY ARE PART OF THE STRUCTURAL ENGINEER'S RESPONSIBILITY OR SCOPE OF WORK.
3. THE GENERAL CONTRACTOR AND HIS SUBCONTRACTORS ARE FULLY RESPONSIBLE FOR THE MEANS AND METHODS WHICH INCLUDE CONSTRUCTION BRACING AND TEMPORARY SUPPORTS USED TO CONSTRUCT THE STRUCTURE AND FOR FULL COMPLIANCE WITH ALL JOB SAFETY RELATED REGULATIONS AND CONDITIONS AT THE SITE.
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING TEMPORARY LATERAL BRACING FOR STRUCTURAL STABILITY. TEMPORARY BRACING SHALL REMAIN IN PLACE UNTIL PERMANENT BRACING, ROOF AND FLOOR DIAPHRAGMS, AND WALL ARE COMPLETELY INSTALLED AND ALL CONNECTIONS COMPLETED.
5. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE DURING ERECTION OF THE BUILDING ADDITIONAL TEMPORARY SHORING, BRACING, FORMING, GUYING, VERTICAL SUPPORTS, ETC... TO STABILIZE THE STRUCTURE, HOLD THE STRUCTURE IN PROPER ALIGNMENT, AND TO WITHSTAND CONSTRUCTION LOADING.
6. OBSERVATION SITE VISITS, IF ANY BY STRUCTURAL ENGINEER OR A REPRESENTATIVE OF THE STRUCTURAL ENGINEER SHALL NOT INCLUDE INSPECTIONS, SPECIAL INSPECTIONS, SAFETY INSPECTIONS, NOR REVIEW OR INSPECTIONS OF CONSTRUCTION MEANS AND METHODS. OBSERVATION SITE VISITS ARE SOLELY FOR THE PURPOSE OF ASSISTING WITH ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS, BUT DO NOT GUARANTY CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL DETAILS ARE TYPICAL UNLESS NOTED OTHERWISE. DETAILS SHALL APPLY TO ALL SIMILAR AND LIKE CONDITIONS.
8. CRANES, CONCRETE TRUCKS, AND ALL OTHER HEAVILY LOADED VEHICLES ARE NOT TO BE DRIVEN ACROSS FOUNDATION MEMBERS NOR BUILDING SLABS. VEHICLES DRIVEN ON BUILDINGS SLABS ARE AT THE RISK OF THE GENERAL CONTRACTOR.
9. THE GENERAL CONTRACTOR SHALL COORDINATE ALL FLOOR AND ROOF PENETRATIONS WITH ARCHITECTURAL DRAWINGS, AND MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS.
10. IF GENERAL STRUCTURAL NOTES OR PLANS CONFLICT WITH THE SPECIFICATIONS THE MORE STRINGENT SHALL CONTROL.

ANCHOR BOLTS

1. CAST-IN-PLACE ANCHOR BOLTS SHALL CONFORM TO THE FOLOWING UNLESS NOTED OTHERWISE.
   - A. STEEL COLUMN AND STEEL BEAM-TO-CONCRETE/CMU ANCHOR BOLTS SHALL BE PLACED PRIOR TO CONCRETE INSTALLATION. WET-SET STEEL COLUMN AND STEEL BEAM-TO-CONCRETE/CMU ANCHOR BOLTS ARE PROHIBITED, CAST-IN-PLACE ANCHOR BOLTS SHALL NOT BE INSTALLED AFTER CONCRETE IS POURED. ANCHOR BOLT TEMPLATE SHALL BE USED TO HOLD ANCHOR BOLTS IN PLACE.
   - B. HEADED ANCHOR BOLTS: ASTM F1554 GRADE 36, Fy= 36 KSI, Fu= 58 KSI
   - C. STEEL PLATE WASHERS: ASTM A36
   - D. BENT L-BOLTS OR J-BOLTS SHALL NOT BE USED WITH STEEL COLUMNS, OR STEEL BEAM-TO-CONCRETE/CMU CONNECTIONS.
   - E. BENT L-BOLTS OR J-BOLTS USED WITH WOOD BOTTOM PLATE OR LIGHT GAUGE METAL BOTTOM TRACK CONNECTIONS SHALL MEET BENDING AND DIMENSION REQUIREMENTS OF ACI-318.
2. POST-INSTALLED ANCHORS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATION. POST INSTALLED ANCHORS SHALL NOT BE USED IN-PLACE OF CAST-IN-PLACE ANCHORS UNLESS NOTED IN DRAWINGS.
   - A. ADHESIVE ANCHORS FOR CONCRETE/GROUTED CMU SHALL CONFORM TO THE FOLLOWING UNLESS NOTED OTHERWISE.
     - a. HAS THREADED ROD BY HILTI OR EQUAL.
     - b. HILTI HIT-HY 200 A V3 ADHESIVE OR EQUAL.
   - B. ADHESIVE ANCHORS FOR HOLLOW CMU SHALL CONFORM TO THE FOLLOWING UNLESS NOTE OTHERWISE:
     - a. HIT-A THREADED ROD BY HILTI OR EQUAL.
     - b. HILTI MESH SLEEVE
     - c. HILTI HIT-HY 270 ADHESIVE OR EQUAL
3. POWDER ACTUATED FASTENERS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS.
   - A. CONCRETE BASE: HILTI 0.177: DIA. DS, EMBEDMENT 1 1/2", UNLESS NOTED OTHERWISE.
   - B. STEEL BASE:
     - a. UP TO 1/2" THICK: HILTI 0.177 DIA. EDS, UNLESS NOTED OTHERWISE.
     - b. GREATER THAN 1/2" THICK HILTI 0.177 DIA. EDS MINIMUM EMBEDMENT 1/2", UNLESS NOTED OTHERWISE.

SHOP DRAWINGS AND SUBMITTALS

1. SHOP DRAWINGS SHALL BE PREPARED FOR ALL STRUCTURAL ITEMS IN ACCORDANCE WITH THE SPECIFICATIONS AND SUBMITTED FOR REVIEW BY THE ENGINEER. CONTRACT DRAWINGS SHALL NOT BE REPRODUCED AND USED AS SHOP DRAWINGS.
2. THE CONTRACTOR SHALL REVIEW SHOP DRAWINGS FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS AND SHALL CERTIFY THAT HE HAS DONE SO BY A STAMP NOTING THAT THE DRAWINGS HAVE BEEN "APPROVED" AND WHICH BEARS THE SIGNATURE (OR INTIALS) OF AN AUTHORIZED REPRESENTATIVE OF THE CONTRACTOR AND THE DATE. SUBMITTAL WHICH DO NOT REFLECT THE CONTRACTOR'S APPROVAL, SIGNATURE AND DATE MAY BE RETURNED WITHOUT REVIEW.
3. CORRECTIONS OR COMMENTS ON THE SHOP DRAWINGS OR MANUFACTURER'S DATA SHEETS DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE PLANS AND SPECIFICATIONS. THE ENGINEER'S SHOP DRAWING REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. CONTRACTOR IS RESPONSIBLE FOR THE DIMENSIONS AND QUANTITIES TO BE CONFIRMED AND CORRELATED AT THE JOB SITE, FOR INFORMATION THAT PERTAINS SOLELY TO THE FABRICATION PROCESSES OR TO THE MEANS AND METHODS OF CONSTRUCTION, AND FOR THE COORDINATION OF THE WORK OF ALL TRADES.

FOUNDATIONS

FOUNDATION DESIGNS ARE BASED ON RECOMMENDATIONS CONTAINED IN A SUBSURFACE EXPLORATION REPORT PREPARED BY BURGESS ENGINEERING AND TESTING, DATED NOVEMBER 13, 2023. B.E.T. PROJECT NO.: 731-23119.

FOOTING FOUNDATIONS

1. MAXIMUM NET ALLOWABLE SOIL BEARING PRESSURE:
   - A. SPREAD FOOTINGS = 2,200 PSF
   - B. CONTINUOUS FOOTINGS = 1,540 PSF
2. FOOTINGS SHALL BEAR A MINIMUM OF 2'-0" BELOW FINISHED EXTERIOR GRADE AND ON APPROVED MATERIAL IN ACCORDANCE WITH THE SOILS REPORT.
3. PROTECT BOTTOMS OF EXCAVATION AGAINST FROST AND KEEP FREE OF WATER, DEBRIS AND LOOSE MATERIAL. SOIL BECOMING UNSUITABLE FOR BEARING MUST BE REMOVED.
4. PROTECTIVE MEASURES SHALL BE TAKEN BY THE CONTRACTOR TO PREVENT MOISTURE CHANGE IN FOOTING EXCAVATIONS.
5. EXCESS EXAVATION BELOW FOOTINGS SHALL BE FILLED WITH LEAN CONCRETE.

EARTHWORK

1. EARTHWORK AND SUBGRADE CONSTRUCTION AND INSPECTIONS SHALL BE IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED IN THE SOILS REPORT.
2. PRIOR TO THE PLACEMENT OF FILL, THE EXISTING SUBGRADE SHALL BE:
   - A. STRIPPED OF ALL VEGETATION, TOPSOIL, AND ANY OTHER DELETERIOUS MATERIALS.
   - B. PROOF-ROLL INCLUDING REMOVING AND REPLACING ANY SOFT MATERIAL WHICH EXHIBITS RUTTING OR DEFFLECTS EXCESSIVELY WHEN TRAVERSED BY A LOADED TRUCK WITH A REAR AXLE LOADED OF APPROXIMATELY 16,000 lbs.
   - C. SCARIFIED TO A DEPTH OF (8) INCHES, AND MOISTURE CONDITION TO WITHIN 0% TO +3% OF OPTIMUM AND COMPACTED TO 95 PERCENT OR MORE OF STANDARD PROCTOR MAXIMUM DRY DENSITY.
3. COMPACTION SHALL BE EXTENDED 5 FT. BEYOND THE BUILDING FOOTPRINT.
4. ALL FILL AND NATURAL GRADES (FOR THE CASE WHERE NO FILL IS USED) IN THE BUILDING AREA SHALL BE:
   - A. COMPACTED TO AT LEAST 98 PERCENT OF STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D698) AT A MOISTURE CONTENT AT OR SLIGHTLY IN EXCESS OF THE OPTIMUM (0% TO +3% OF OPTIMUM).
   - B. PLACED IN LIFTS NOT TO EXCEED (9) INCHES IN LOOSE THICKNESS.
   - C. TESTED FOR FIELD DENSITY EVERY 5,000 S.F. PER LIFT UNDER STRUCTURE WITH A MINIMUM OF (3)-TESTS PER LIFT.
5. STRUCTURAL FILL REQUIREMENTS:
   - A. AMOUNT FINER THAN 2-INCH SIEVE = 100%
   - B. AMOUNT FINER THAN NO. 200 SIEVE = 12% MINIMUM, AND IF P.I ≤ 7, 60% MAXIMUM.
   - C. LIQUID LIMIT = 35 MAXIMUM
   - D. PLASTICITY INDEX (P.I.) = 5 TO 15
   - E. SANDY CLAY OR CLAYEY SAND
6. SIX (6) INCHES OR MORE OF GRANULAR BASE, MEETING THE FOLLOWING REQUIREMENTS, SHALL BE PLACED OVER THE SUBGRADE:
   - A. ASTM C33 NO. 67 AGGREGATE
7. SUBGRADE MOISTURE SHALL BE MAINTAINED UNTIL CONCRETE SLAB IS POURED.
8. THE CONTRACTOR SHALL CONTRACT WITH A QUALIFIED SOILS ENGINEER TO PERFORM TESTING, INSPECT THE FOOTING EXCAVATIONS, PROOF-ROLLING, AND COMPACTION TO VERIFY THE BEARING MATERIAL AND IDENTIFY SOFT AND YEILDING AREAS ON THE SITE.

UTILITY TRENCH BACKFILL

1. CONSTRUCT AN EFFECTIVE CLAY TRENCH PLUG AT ALL UTILITY TRENCHES THAT PENETRATE BENEATH THE BUILDING OR THROUGH A PERIMETER FOOTING.
2. CLAY PLUG SHALL COMPLETELY SURROUND UTILITY LINE, EXTEND 5-FEET FROM FACE OF EXTERIOR PERIMETER FOOTING.
3. COMPACTED CLAY PLUG AT A WATER CONTENT ABOVE OPTIMUM.
4. BACKFILL, COMPACT, AND TEST UTILITY TRENCHES AS OUTLINED IN SOILS REPORT.

CONCRETE MASONRY

1. MAONRY CONSTRUCTION SHALL CONFORM TO IBC CHAPTER 21, TMS 402-16 "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES, TMS 602-16 "SPECIFICATION FOR MASONRY STRUCTURES".
2. CONCRETE MASONRY UNITS SHALL CONFORM TO ASTM C90, LIGHT WEIGHT, WITH A NET AREA COMPRESSIVE STRENGTH OF CONCRETE MASONRY UNITS OF 2,000 PSI.
3. MORTAR SHALL CONFORM TO ASTM C270, TYPE S.
4. MINIMUM NET AREA COMPRESSIVE STRENGTH OF MASONRY ASSEMBLY, F'm IS 2,000 PSI AS VERIFIED BY THE UNIT STRENGTH METHOD CONFORMING TO IBC SECTION 2103 AND TMS602-16.
5. ALL GROUT SHALL CONFORM TO ASTM C476 WITH A MINIMUM 2,000 PSI COMPRESSIVE STRENGTH IN 28 DAYS.
6. ALL TORNADO SHELTER MASONRY WALLS SHALL HAVE TRUSS TYPE HORIZONTAL JOINT REINFORCING WITH (2)-9 GAUGE WIRES AND WITH PREFABRICATED CORNER AND TEE UNITS AT CORNERS AND INTERSECTIONS.
7. NON-TORNADO SHELTER WALLS AND PARTITION WALLS SHALL HAVE LADDER TYPE HORIZONTAL JOINT REINFORCING WITH (2)-9 GAUGE WIRES AND WITH PREFABRICATED CORNER AND TEE UNITS AT CORNERS AND INTERSECTIONS.
8. TYPICAL JOINT REINFORCING SHALL CONFROM TO ASTM A951 AND SHALL BE LOCATED AT 16" ON CENTER VERTICALLY.
9. 4" CMU AND 6" CMU PARTITION CHASE WALLS SHALL HAVE 1/8"Tx2"W ASTM A36 STEEL BARS WITH 2" HOOKS AT EACH END SPACED HORIZONTALLY AT 4'-0" O.C. AND VERTICALLY 4'-0" O.C. TO WITHIN (2)-COURSES FROM THE TOP COURSE, STARTING 4'-0" ABOVE FINISH FLOOR.
10. REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60.
11. ANCHORS, TIES, AND ACCESSORIES SHALL CONFROM TO TMS 602 SECTION 2.4D.
12. SOLID GROUT ALL CELLS WITH REINFORCING.
13. DO NOT USE SOLID BOTTOM BLOCKS FOR BOND BEAMS AT SOLID GROUTED WALLS OR AT CELLS WITH VERTICAL REINFORCING.
14. VERTICAL CELLS TO BE FILLED SHALL HAVE VERTICAL ALIGNMENT SUFFICIENT TO MAINTAIN A CONTINOUS CLEAR CELL. OVERHANGING MORTAR OR OTHER OBSTRUCTIONS SHALL BE REMOVED FROM THE INSIDES OF CELL WALLS.
15. REINFORCING SHALL BE CONTINUOUS OR LAPPED 48 BAR DIAMETERS OR AS SHOWN IN DRAWINGS WHICH EVER IS GREATER.
16. VERTICAL REINFORCEMENT SHALL BE HELD IN POSITION AT TOP AND BOTTOM AND AT INTERVALS NOT EXCEEDING 6'-0".
17. GROUT SHALL BE POURED IN LIFTS OF 5-FEET MAXIMUM HEIGHT. STOP GROUT POUR 2-INCHES BELOW TOP OF BLOCK TO CREATE KEY FOR NEXT GROUT POUR. EXTEND REINFORCING BAR BEYOND GROUT POUR FOR A LENGTH EQUAL TO OR GREATER THAN THE BAR LAP LENGTH.
18. ALL STEEL LINTELS ON MASONRY SHALL HAVE MINIMUM OF 8-INCHES BEARING.
19. LOCATE VERTICAL WALL CONTROL JOINTS IN EXTERIOR MASONRY WALLS AT 24'-0" O.C. MAXIMUM. LOCATE BARS THROUGH JOINTS. DO NOT LOCATE JOINTS WITHIN 2-FEET OF AN OPENING.
20. FURNISH AND HAVE IN PLACE ADEQUATE LATERAL BRACING AND VERTICAL SUPPORT FOR THE SAFE ERECTION AND TRUE ALIGNMENT OF THE MASONRY WALL UNTIL SUCH TIME AS THE FINAL CONNECTIONS ARE MADE AND THE ROOF, AND DECKING IS IN PLACE.
21. SUBMIT THE FOLLOWING: (REFER SPECIFICATIONS FOR ADDITIONAL SUBMITTALS)
   - A. REINFORCING SHOP DRAWINGS
   - B. MORTAR MIX: MIX DESIGN INDICATING TYPE AND PROPORTIONS OF INGREDIENTS IN COMPLIANCW ITH THE PROPORITON SPECFICATION OF ASTM C270.
   - C. GROUT MIX: MIX DESIGNS AND GROUT STRENGTH TEST PERFORMED IN ACCORDANCE WITH ASTM C476.
   - D. MATERIAL CERTIFICATES FOR THE FOLLOWING:
     - a. REINFORCEMENT
     - b. ANCHORS, TIES, FASTENERS, AND METAL ACCESSORIES
     - c. MASONRY UNITS
     - d. MORTAR AND GROUT
   - E. CONSTRUCTION PROCEDURES
     - a. COLD AND HOT WEATHER CONSTRUCITNO PROCEDURES

DEFERED SUBMITTALS

PRIOR TO FABRICATION AND INSTALLTION THE FOLLOWING ITEMS SHALL BE SUBMITTED TO THE ARCHITECT AND THE CITY OF KINGFISHER BUILDING CODE REVIEW DEPARTMENT.

1. METAL BUILDING SHOP DRAWINGS

SPECIAL INSPECTIONS

THE OWNER SHALL EMPLOY SPECIAL INSPECTORS WHO SHALL PROVIDE INSPECTION FOR THE TYPES OF WORK LISTED IN IBC SECTION 1704 FOR THE IS PROJECT. SPECIAL INSPECTIONS DO NOT REPLACE INSPECTIONS AND MATERIAL TESTING REQUIRED BY THE CONTRACTOR. REFER TO SHEET S1.2 FOR ADDITIONAL INFORMATION.

CAST-IN-PLACE CONCRETE

MATERIALS

1. ALL CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH ACI 301, 304, ACI 318, AND ACI 347.
2. ALL CONCRETE SHALL BE MADE WITH STONE AGGREGATE
3. DO NOT ADD WATER TO CONCRETE DURING PLACEMENT.
4. CONCRETE MIX SHALL MEET THE FOLLOWING UNLESS STATED OTHERWISE IN THE SPECIFICATIONS.
   - A. PORTLAND CEMENT: ASTM C150, TYPE I/II
   - B. FLY ASH: ASTM C618 CLASS C
   - C. NORMAL-WEIGHT AGGREGATE: ASTM C33, GRADED
   - D. WATER: ASTM 94 AND POTABLE
   - E. AIR-ENTRAINMENT: ASTM C260

CONCRETE MIX SCHEDULE

TYPE OF CONSTRUCTION	28 DAY COMPRESSIVE STRENGTH (PSI)	*MAX. SLUMP (INCH)	MAX. AGGREGATE SIZE (INCH)	AIR ENTRAINMENT (±1 1/2%)	MAX. W/C RATIO	MIN. CEMENTIOUS MATERIAL (lbs./C.Y.)	MAX. FLY-ASH (%)
FOOTINGS	3,000	5	1 1/2	4.5	0.53	470	20
EXTERIOR PORCH SLAB-ON-GRADE	3,500	4	1	4.5	0.45	470	20
SLAB-ON-GRADE	3,500	4	1	0	0.475	470	20

* SLUMP MAY BE INCREASED WHEN CHEMICAL ADMIXTURES ARE USED, PROVIDED THAT THE ADMIXTURE TREATED CONCRETE HAS THE SAME OR LOWER WATER-CEMENT RATIO AND DOES NOT EXHIBIT SEGREGATION POTENTIAL OR EXCESSIVE BLEEDING. MAXIMUM 8" SLUMP AFTER ADDING ADMIXTURES. MIX DESIGN SUBMITTAL SHALL IDENTIFY VALUE OF PRE-ADMIXTURE SLUMP VALUE.

GENERAL

1. PROVIDE ADMIXTURES CERTIFIED BY MANUFACTURER TO BE COMPATIBLE WITH OTHER ADMIXTURES AND THAT WILL NOT CONTRIBUTE WATER-SOLUBLE CHLORIDE IONS EXCEEDING THOSE PERMITTED IN HARDENED CONCRETE. DO NOT USE CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CALCIUM CHLORIDE.
   - A. WATER-REDUCING ADMIXTURE: ASTM C 494, TYPE A.
   - B. RETARDING ADMIXTURE: ASTM C494, TYPE B.
   - C. WATER-REDUCING AND RETARDING ADMIXTURE: ASTM C 494, TYPE D
   - D. HIGH-RANGE, WATER-REDUCING ADMIXTURE: ASTM C494, TYPE F.
   - E. HIGH-RANGE, WATER-REDUCING AND RETARDING ADMIXTURE: ASTM C494, TYPE G.
   - F. PLASTICIZING AND RETARDING ADMIXTURE: ASTM C 1017, TYPE II.
   - G. WATER REPELLANT: BASF RHEOMIX 235 ADDED PER MANUFACTURERS RECOMMENDATION (SLAB-ON-GRADE ONLY)
2. AGGREGATES SHALL BE PROPORTIONED SUCH THAT MIX DESIGN CONTAINS A MINIMUM OF 50% COARSE AGGREATE PER THE GRADATION REQUIREMENT OF ASTM C33.
3. ADDITION OF ANY ADMIXTURES SHALL BE APPROVED BY THE PROJECT STRUCTURAL ENGINEER.
4. CURING COMPOUND: ASTMC309 MASTER BUILDER "MASTER SEAL"(OR APPROVED EQUAL)
5. COLD WEATHER PLACEMENT: COMPLY WITH ACI 306.
6. HOT WEATHER CONCRETE: COMPLY WITH ACI 305.
7. VAPOR RETARDER SHALL MEET ASTM E 1745, CLASS A, AND REQUIREMENT BELOW (UNLESS STATED OTHERWISE IN THE SPECIFICATION OR ARCHITECTURAL DRAWINGS)
   - A. INSTALL PER MANUFACTURER'S RECROMMENDATION (USE MANUFACTURERS RECOMMENDED TAPE)
   - B. STEGO INDUSTRIES, LLC,: STEGO WRAP (10 MIL CLASS A) OR EQUAL.
8. PROVIDE A RUBBED FINISH TO EXPOSED CONCRETE (EXCLUDING FLOOR SLABS), UNLESS STATED OTHERWISE IN SPECIFICATIONS OR ARCHITECTURAL DRAWINGS).
9. PROVIDE A BROOM FINISH TO EXTERIOR CONCRETE PLATFORMS, STEPS, RAMPS, AND WALKS, UNLESS STATED OTHERWISE IN SPECIFICATIONS OR ARCHITECTURAL DRAWINGS.
10. CLEAN AND SEAL ALL JOINTS WITH CAULKING, AFTER CAULKING IS HARDENED TRIM FLAT WITH TOP OF JOINT.

REINFORCING:

1. CONCRETE POURED AGAINST EARTH = 3"
2. CONCRETE POURED IN FORMS BUT EXPOSED TO WEATHER OR EARTH:
   - A. IF BARS ARE LARGER THAN #5 = 2"
   - B. IF BARS ARE #5 OR SMALLER = 1 1/2"
3. CONCRETE NOT EXPOSED TO WEATHER OR EARTH:
   - A. STRUCTURAL SLABS AND WALLS = 3/4"
4. ALL BAR LENGTHS TO SCALE UNLESS NOTED OTHERWISE. REFER TO CONCRETE LAP SPLICES SCHEDULE FOR SPLICE LENGTHS OR AS SHOWN ON DRAWINGS WHICHEVER IS GREATER. PROVIDE CORNER BARS AT WALL FOOTING AND GRADE BEAM CORNERS, AND INTERSECTIONS. SIZE AND SPACING SHALL MATCH HORIZONTAL BARS.
5. PROVIDE ALL ACCESORIES NECESSARY TO SUPPORT REINFORCING AT POSITIONS SHOWN ON THE PLANS IN ACCORDANCE WITH THE LATEST ACI DETAILING MANUAL.
6. REINFORCING BARS, HAIRPINS, AND TIE RODS/TIE BEAM REINFORCING SHALL CONFORM TO THE ASTM A615 GRADE 60. DO NOT WELD OR REBEND REINFORCING, UNLESS NOTED OTHERWISE.
7. STIRRUPS SHALL CONFORM TO ASTM A615 GRADE 40. DO NOT WELD OR REBEND.
8. ONLY ASTM A706 GRADE 60 REINFORCING BARS MAY BE WELDED AND WELDING SHALL CONFORM TO THE LATEST EDITION OF AWS D1.4.
9. WIRE MESH REINFORCEMENT SHALL CONFORM TO ASTM A185. LAP ONE FULL MESH AT SIDE AND END LAPS AND WIRE TOGETHER. PLACE MESH AT MID-DEPTH OF SLAB.
10. PROVIDE SLEEVES FOR ALL PIPES PLACED THROUGH CONCRETE WALLS OR SLABS. NO OPENINGS OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS WILL BE PERMITTED, UNLESS ARCHITECT/ENGINEER'S APPROVAL IS SECURED PRIOR TO PLACEMENT OF REINFORCING STEEL.
11. REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR OPENINGS, PROVIDE REINFARCING BARS AT CORNERS AND EDGES OF OPENINGS AND PENETRATIONS IN ACCORDANCE WITH TYPICAL DETAILS.
12. VERTICAL CONSTRUCTION JOINTS IN FOOTINGS AND GRADE BEAMS SHALL BE LOCATED WHERE APPROVED BY ARCHITECT/ENGINEER.

STRUCTURAL STEEL

STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING:

1. WIDE FLANGE BEAMS	ASTM A992 GR. 50, Fy = 50 KSI
2. BUILT-UP BEAMS	ASTM A572 GR. 50, Fy = 50 KSI
3. HSS SQUARE COLUMNS AND BRACES	ASTM A500GR B, Fy = 46 KSI
4. PIPE COLUMNS	ASTM A53GR B, Fy = 35 KSI
5. OTHER SHAPES, PLATES AND BARS	ASTM A36, Fy = 36 KSI
6. STRUCTURAL BOLTS	ASTM A325 (3/4" DIAMETER MIN.)
7. HEADED STUDS	ASTM A108 TYPE B, Fu= 65 KSI

GENERAL

1. COORDINATE FABRICATION WITH SUPPLIER. SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION.
2. ALL CONNECTIONS NOT EXPLICITLY DETAILED ON THE DRAWING SHALL BE DESIGNED AND DETAILED BY THE FABRICATOR'S ENGINEER.
3. CONNECTIONS SHALL BE WITH ASTM A325 HIGH STRENGTH BOLTS WITH MINIMUM 3/4" DIAMETER AND SHALL BE DESIGNED FOR 125% OF THE SERVICE LOAD REACTIONS NOTED ON THE DRAWINGS. CONNECTIONS NOT SPECIFIED ON THE DRAWING SHALL BE DETAILED TO HAVE A CAPACITY NOT LESS THAN 1/2 TOTAL UNIFORM LOAD CAPACITY TABULATED IN AISC MANUAL FOR GIVEN SHAPE, SPAN, AND STEEL SPEC. OF BEAM.
4. SHORT SLOTTED HOLES SHALL HAVE HARDENED WASHERS ON OUTER PLY.
5. ALL BOLTS IN MOMENT CONNECTIONS SHALL BE FULLY PRE-TENSIONED WITH AISC TURN-OF-THE-NUT METHOD, LOAD INDICATING WASHERS, OR TWIST-OFF BOLTS.
6. ALL STRUCTURAL WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1 AND PERFORMED BY QUALIFIED WELDERS. ELECTRODE SHALL BE E70XX OR OTHER DEVELOPING FT = 72KSI. ALL FIELD WELDED CONNECTIONS ARE TO BE SHOWN ON THE SHOP DRAWINGS.
7. FURNISH AND HAVE IN PLACE ADEQUATE LATERAL BRACING AND VERTICAL SUPPORT FOR THE SAFE ERECTION AND TRUE ALIGNMENT OF THE STRUCTURAL STEEL UNTIL SUCH TIME AS THE FINAL CONNECTIONS ARE MADE AND THE ROOF OR FLOOR DECKING IS IN PLACE.
8. CLEAN AND APPLY ONE COAT OF PRIMER PAINT TO ALL OTHER STEEL IN CONFORMANCE WITH THE SPECIFICATIONS AND THE STEEL STRUCTURES PAINTING COUNCIL.
9. ALL DIMENSIONS SHOWN ON STRUCTURAL DRAWINGS SHALL BE CHECKED AGAINST ARCHITECTURAL DRAWINGS.

STRUCTURAL SHEET INDEX

LIGHT GAUGE COLD-FORMED STEEL FRAMING

CONTRACTOR SHALL SUBMIT STRUCTURAL CALCULATIONS AND SHOP DRAWINGS FOR COLD-FORMED STEEL FRAMING SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE THE PROJECT IS LOCATED IN.

MATERIALS

1. ALL GALVANIZED STUDS AND JOISTS SHALL MEET THE FOLLOWING REQUIREMENTS:
   - A. 12, 14, AND 16 GUAGE STUDS & TRACKS: ASTM A653, Fy, min = 50,000 PSI
   - B. 18 & 20 GAUGE STUDS, TRACK, BRIDGING AND ACCESSORIES: ASTM A653, Fy, min = 33,000 PSI
2. METAL STUDS MEET THE FOLLOWING PROPERTIES:

	SIZE	DEPTH	FLANGE	LIP	GAUGE	Ix(IN^4)	Sx(IN^3)
A.	362S162-43	3 5/8"	1 5/8"	1/2"	18	0.482	0.392
B.	362S162-54	3 5/8"	1 5/8"	1/2"	16	0.710	0.873
C.	600S162-43	6"	1 5/8"	1/2"	18	2.316	0.772
D.	600S162-54	6"	1 5/8"	1/2"	16	2.861	0.954
E.	600S200-97	6"	2"	1/2"	12	4.80	1.60
F.	800S162-43	8"	1 5/8"	1/2"	18	4.640	1.160
G.	800S162-54	8"	1 5/8"	1/2"	16	5.740	1.430
H.	800S200-97	8"	2"	1/2"	12	5.61	1.87

GENERAL

1. FASTENING OF COMPONENTS SHALL BE WITH SELF-DRIVING-SCREWS, WELDING, OR AS SHOWN ON DRAWINGS AND SHALL BE SIZED AS RECOMMENDED BY MANUFACTURER. FASTENING COMPONENTS SHALL BE INSTALLED PER MANUFACTUERS RECOMMENDATIONS.
2. SCREWS SHALL BE ITW BUILDEX TEKS SELECT SELF-DRILLING STRUCTURAL FASTENERS (OR EQUAL), CONTRACTOR SHALL PROVIDE ADEQUATE SCREW LENGTH TO FULLY DEVELOP SCREW STRENGTHS, AND INSTALL PER MANUFACTURER RECOMMENDATIONS.
   - A. HEADED SCREWS: #10-16 HWH OR #12-14 HWH.
   - B. FLAT HEAD SCREWS SHALL BE #12-14 UPFH.
     - a. USE FLAT HEADED SCREWS WHERE HEAD OBSTRUCTS FINISHES
3. ALL WELDING SHALL BE PERFORMED IN CONFORMANCE WITH A.W.S. D1.3 USING E60 ELECTRODES, UNLESS NOTED OTHERWISE. MINIMUM MEMBER THICKNESS FOR WELDING IS 16 GAUGE.
4. FIXED CLIPS SHALL BE 14 GAUGE UNI-CLIP BY CLARK DIETRICH OR EQUAL. ATTACH TO MAIN MEMBER WITH MINIMUM (3)-FASTENERS.
5. SLIDE CLIPS SHALL BE 14 GAUGE FASTCLIP SLIDE CLIP BY CLARK DIETRCH OR EQUAL. USE 3 1/2" FASTCLIP FOR CONNECTION TO 3 5/8" AND 4" DEEP STUDS, USE 5 1/2" FASTCLIPS FOR CONNECTION TO STUDS 6" DEEP AND GREATER. ATTACH TO MAIN MEMBER WITH MINIMUM (3)-FASTENERS.
6. WALL STUD BRIDGING AND JOIST BRIDGING SHALL BE PROVIDED AND SPACED AT 4'-0" ON CENTER OR PER MANUFACTURER'S RECOMMENDATIONS IF LESS THAN 4'-0" ON CENTER. USE FLAT V STRAP, COLD ROLLED CHANNEL OR SOLID BRIDGING AS RECOMMENDED BY MANUFACTURER. ANCHOR BRIDGING PER AISI S100 AT A MAXIMUM OF 14'-0" O.C.
7. AXIAL LOADED STUDS AND CURTAIN WALL STUDS SHALL NOT BE SPLICED.
8. STUD WALLS SHALL HAVE CONTINUOUS SHEATHING OR GYPSUM BOARD ON EACH SIDE OF THE STUD AND CONNECTED TO EACH FLANGE WITH MINIMUM NO. 6 SELF-DRILLING SCREWS AT MAXIMUM 8" O.C. AT EDGES AND 12-INCHES ON CENTER AT INTERIOR, UNLESS OTHERWISE RECOMMENDED BY THE MANUFACTURER. SHEATHED AND GYPSUM BOARD SHEAR WALLS, AND OTHER WALL AREAS MAY REQUIRE CLOSER SPACING AND DIFFERENT SCREW TYPE OR SIZE. REFER TO PLANS FOR MORE STRINGENT REQUIREMENTS.
9. JOISTS AND BEAMS SHALL BE LOCATED DIRECTLY OVER BEARING STUDS UNLESS A STRUCTURAL STEEL LOAD DISTRUBUTION MEMBER IS PROVIDED AT THE TOP TRACK.
10. PROVIDE DOUBLE STUDS AT EACH SIDE OF OPENINGS AT EXTERIOR WALLS. PROVIDE DOUBLE 14 GAUGE STUDS AT EACH SIDE OF OPENINGS 5'-0" WIDER OR GREATER UNLESS NOTED OTHERWISE.
11. COORDINATE AND VERIFY ALL OPENINGS THROUGH FLOOR, ROOF AND WALLS WITH MECHANICAL AND ELECTRICAL CONTRACTOR.
12. ALL DIMENSIONS SHOWN ON STRUCTURAL DRAWINGS SHALL BE CHECKED AGAINST ARCHITECTURAL DRAWINGS.

METAL BUILDING COMPONENTS

1. METAL BUILDING SUPPLIER SHALL FURNISH ALL TRIM, FLASHING, CLOSURES, TAPE SEALANTS, TUBE SEALANTS, FASTNERS, ECT. TO PROVIDE A COMPLETE AND WEATHER TIGHT STRUCTURE.
2. METAL BUILDING SYSTEM SHALL SATISFY ALL U.L. 90 REQUIREMENTS FOR UPLIFT.
3. METAL BUILDING MAIN FRAME INCLUDING METAL BUILDING COMPONENTS SHALL BE DESIGNED FOR THE LOADS SHOWN ON THE DESIGN CRITERIA. SNOW DRIFT LOADS AS SHOWN ON DRAWINGS AND UNBALANCED SNOW LOADS SHALL BE CONSIDERED.
4. METAL BULDING MAIN FRAME AND COMPONENTS SHALL BE DESIGNED FOR PARTIAL SNOW LOADING PER ASCE 7-16 SECTION 7.5.
5. METAL BUILDING MAIN FRAME SHALL BE TAPERED OR STRAIGHT COLUMNS (UNLESS NOTED OTHERWISE IN THE CONSTRUCTION PLANS OR SPECIFICATIONS) WITH TAPERED BEAMS WITH INTERIOR SUPPORTING COLUMNS WHERE SHOWN ON PLANS. INTERIOR SUPPORT COLUMNS SHALL BE DESIGN AS PINNED-PINNED COLUMNS AND ARE NOT INCLUDED IN THE LATERAL FORCE RESISTING SYSTEM (UNLESS SPECIFICALLY NOTED NOT THE PLANS). MAIN FRAME COLUMN TO BEAM CONNECTION SHALL BE DESIGNED TO RESIST MOMENTS DUE TO GRAVITY LOADS, WIND AND EARTHQUAKE LOADS PARALLEL TO THE FRAMES. ROD X-BRACING OR PORTAL FRAMES SHALL BE USED TO RESIST LATERAL LOADS PERPENDICULAR TO MAIN FRAMES. LOCATIONS SHALL BE COORDINATED AND APPROVED BY THE ARCHITECT/ENGINEER PRIOR TO CONSTRUCTION AND SHALL NOT OBSTRUCT ARCHITECTURAL FEATURES.
6. METAL BUILDING DETAILS HAVE BEEN SHOWN SCHEMATICALLY, FINAL DETAILING IS THE RESPONSIBILITY OF THE METAL BUILDING MANUFACTURER..
7. MAIN FRAMES AND PURLINS SHALL BE DESIGNED AND SIZED TO SUPPORT THE WEIGHT OF MECHANICAL EQUIPMENT SHOWN ON THE ARCHITECTURAL AND/OR M.E.&P. PLANS.
8. ALL COLUMN CONNECTIONS TO THE FOUNDATION SHALL BE DESIGNED AS A PINNED CONNECTION, FIXED CONNECTIONS TO FOUNDATION ARE NOT PERMITTED, UNLESS SPECIFICALLY IDENTIFIED ON THE PLANS.
9. ALL OVERHEAD DOORS, DOORS, AND WINDOWS SHALL BE DESIGNED FOR WIND LOADS SHOWN IN WIND DESIGN DATA.
10. COLUMNS NOTED AS 'END WALL COLUMNS' ARE INTENDED TO BE PART OF THE VERTICAL AND OUT-OF-PLANE LATERAL SUPPORT OF THE END WALL FRAMING.
11. COLUMNS NOTED AS 'WIND COLUMNS, ARE INTENDED TO RESIST OUT-OF-PLANE LATERAL WALL LOADS AND ARE NOT INTENDED TO BE PART OF THE VERTICAL LOAD RESISTING SYSTEM OF THE END MAIN FRAME. WIND COLUMNS ARE ONLY TO TRANSFER LATERAL LOADS TO THE ROOF DIAPHRAGM/BRACING AND FOUNDATION. THE END MAIN FRAME WHERE THESE COLUMNS EXIST SHALL NOT BE STRUCTURALLY DEPENDENT ON THESE COLUMNS.
12. ALL HANGERS CONNECTED TO AND/OR SUPPORTED BY METAL BUILDING COMPONENTS SHALL BE REVIEWED AND APPROVED BY THE METAL BUILDING MANUFACTURER.
13. METAL BUILDING MANUFACTURER SHALL LIMIT DEFLECTION OF COMPONENTS AS FOLLOWS:

• PURLINS (VERTICAL)	L/240 TOTAL LOAD	L/360 LIVE LOAD
• RAFTERS (VERTICAL)	L/180 TOTAL LOAD	L/240 LIVE LOAD
• GIRTS (HORIZONTAL)	L/240 *(METAL WALL PANEL)*	L/600 *(BRICK VENEER WALL)*
• BUILDING LATERAL DRIFT	H/180 *(METAL WALL PANEL BLD'G) -OR-*	H/300 *(BRICK VENEER WALL BLD'G)*

FOUNDATION DESIGN:

THE METAL BUILDING REACTIONS USED FOR FOUNDATION DESIGN ARE PRELIMINARY. ENGINEER SHALL REVIEW METAL BILDING SHOP DRAWINGS AND PROVDED METAL BUILDING COLUMN REACTIONS PRIOR TO FOUNDATION CONSTRUCTION. CONTRACTOR SHALL PROVIDE A COST PER CUBIC YARD AND COST PER POUND OF REINFORCING STEEL WHICH SHALL BE USED FOR DETERMINING INCREASED FOOTINGS COSTS.

COMPONENT AND CLADDING WIND PRESSURES

ZONE	DESCRIPTION	EFFECTIVE WIND AREA		
		10 S.F.	50 S.F.	100 S.F.
1	ROOF INTERIOR	+17/-26	+13/-25	+12/-24
2	ROOF EDGE	+17/-46	+13/-38	+12/-34
3	ROOF CORNER	+17/-68	+13/-58	+12/-53
4	WALL INTERIOR	+27/-29	+24/-26	+23/-25
5	WALL EDGE	+27/-35	+24/-30	+23/-28

NOTES:

1. EDGE/CORNER PRESSURES ZONES LENGTH "a"=4'-10" FROM EDGES.
2. LINEAR INTERPOLATION IS PERMITTED FOR EFFECTIVE WIND AREA BETWEEN 10 S.F. AND 100 S.F.
3. PRESSURES ARE NORMAL TO THE SURFACE.
4. PLUS AND MINUS SIGNS SIGNIFY PRESSURES ACTING TOWARD AND AWAY FROM THE SURFACES, RESPECTIVELY.

COMPONENT & CLADDING SCHEMATIC

HEG PROJECT NO.: 23.030

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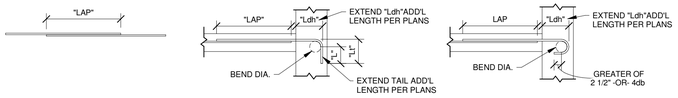
GENERAL STRUCTURAL NOTES

S1.0
of 7 sheet(s)



REBAR LAP SPLICE IN CONCRETE

BAR SIZE	f'c = 3,000 PSI		f'c = 3,500 PSI		f'c = 4,000 PSI	
	TOP	OTHER	TOP	OTHER	TOP	OTHER
#3	28"	22"	26"	20"	24"	19"
#4	37"	29"	34"	27"	32"	25"
#5	47"	36"	43"	33"	40"	31"
#6	56"	43"	52"	40"	48"	37"
#7	81"	63"	75"	58"	70"	54"
#8	93"	72"	86"	66"	80"	62"
#9	105"	81"	97"	74"	90"	70"
#10	116"	89"	107"	83"	100"	77"

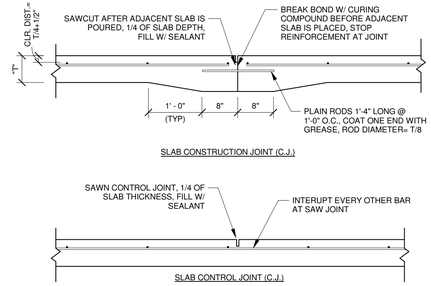
NOTES:
1. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF FRESH CONCRETE PLACED BELOW THE HORIZONTAL REINFORCEMENT.
2. LAP SPLICE LENGTHS SHOWN ARE CLASS "B".
3. SPLICE LENGTHS ARE FOR REINFORCING WITH Fy=60,000 PSI.
4. SPLICE LENGTHS ARE FOR NORMAL WEIGHT CONCRETE, INCREASE BY 33% FOR LIGHTWEIGHT CONCRETE

REBAR STANDARD HOOKS IN CONCRETE

BAR SIZE	STD. HOOK LENGTH 'L'		BEND DIA.	90° HOOK TAIL LENGTH (W/ BEND) "Lt"	DEVELOPMENT LENGTH (Ldh) PER CONCRETE STRENGH (f'c)		
	90°	180°			3,000 PSI	3,500 PSI	4,000 PSI
#3	4 1/2"	2 1/2"	2 1/4"	6"	8 1/4"	8"	7"
#4	6"	2 1/2"	3"	8"	11"	10"	9 1/2"
#5	7 1/2"	2 1/2"	3 3/4"	10"	14"	13"	12"
#6	9"	3"	4 1/2"	12"	16 1/2"	15 1/2"	14 1/2"
#7	10 12"	3 1/2"	5 1/4"	14"	19"	18"	17"
#8	12"	4"	6"	16"	22"	20 1/2"	19"
#9	13 1/2"	4 1/2"	9"	19 1/8"	25"	23"	21 1/2"
#10	15"	5"	10"	21 1/4"	27 1/2"	25 1/2"	24"

NOTES:
1. DEVELOPMENT LENGTHS ARE FOR NORMAL WEIGHT CONCRETE, INCREASE BY 33% FOR LIGHTWEIGHT CONCRETE
2. DEVELOPMENT LENGTHS ARE FOR REINFORCING WITH Fy=60,000 PSI.

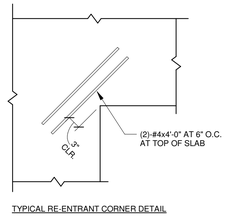
1 CONCRETE REINFORCING LAP SPLICE AND STANDARD HOOK DETAILS & SCHEDULE
N.T.S.



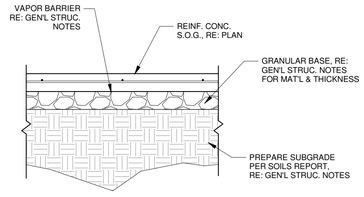
SLAB CONSTRUCTION JOINT (C.J.)

SLAB CONTROL JOINT (C.J.)

2 TYPICAL SLAB-ON-GRADE DETAILS
N.T.S.



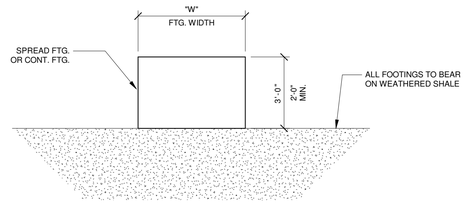
TYPICAL RE-ENTRANT CORNER DETAIL

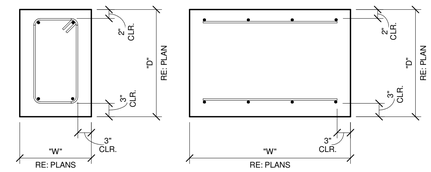


FLOOR SLAB-ON-GRADE

3 TYPICAL BUILDING PAD SECTION
N.T.S.

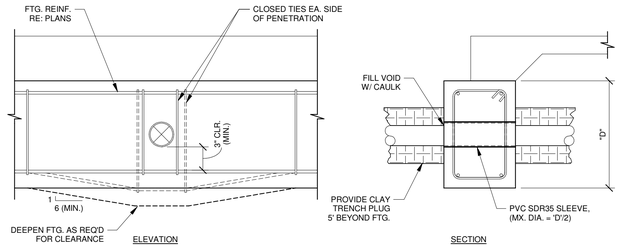
FOOTING BEARING NOTES:
WEATHERED SHALE IS APPROXIMATELY 3' TO 4' BELOW FINISH FLOOR PER SOILS REPORT. ALL FOOTINGS SHALL BEAR ON WEATHERED SHALE. FOOTING DEPTH WILL LIKELY VARY DUE VARIED SHALE DEPTH. PROVIDE TRENCH FOOTING REINFORCING FOR 24-INCH DEEP FOOTINGS.





TRENCH FOOTING - TYPICAL

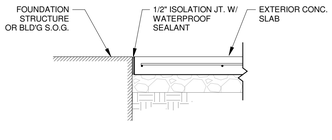
CONTINUOUS FOOTING OR SPREAD FOOTING - TYPICAL



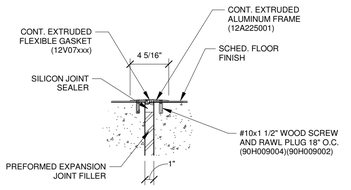
ELEVATION

SECTION

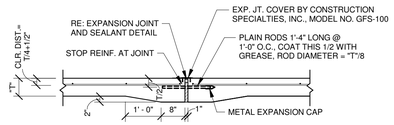
DETAIL NOTE:
REFER TO FOUNDATION DETAILS FOR SMOOTH DOWEL LOCATIONS IF REQUIRED.



4 TYPICAL FOOTING BEARING DETAIL
N.T.S.



EXPANSION JOINT AND SEALANT DETAIL



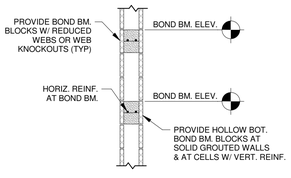
EXPANSION JOINT (E.J.)

5 TYPICAL FOOTING REBAR CLEAR DISTANCE
N.T.S.

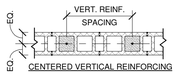
REBAR LAP SPLICES IN CMU

BAR SIZE	LAP LENGTH
#3	24"
#4	32"
#5	40"
#6	48"
#7	56"
#8	64"

NOTES:
1. LAP LENGTHS ARE FOR REINFORCING WITH Fy= 60,000 PSI



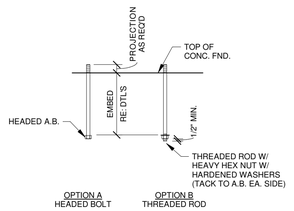
BOND BEAM LOCATION



CENTERED VERTICAL REINFORCING

6 TYPICAL FOOTING PENETRATION DETAIL
N.T.S.

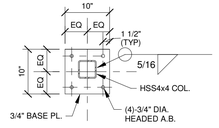
BASE PLATE NOTES:
1. PROVIDE LEVELING NUTS AND 1 1/2" N.S. GROUT FOR EACH BASE PLATE.
2. WHERE ANCHOR BOLTS ARE LOCATED AT AN EXISTING CONCRETE FOUNDATION, USE ADHESIVE ANCHORS OF THE SAME DIAMETER & EMBEDMENT.
3. J-BOLTS AND L-BOLTS NOT PERMITTED.
4. ALL ANCHOR BOLTS SHALL BE ASATM F1554 GRADE 36, UNLESS NOTED OTHERWISE.



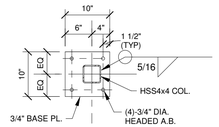
OPTION A HEADED BOLT

OPTION B THREADED ROD

ANCHOR BOLT DIAGRAM



BP1



BP2

7 TYPICAL S.O.G. ABUTTING VERT. CONC.
N.T.S.

8 TYPICAL SLAB EXPANSION JOINT AT CORRIDOR
N.T.S.

9 TYPICAL CMU DETAILS
N.T.S.

10 BASE PLATE DETAILS
3/4" = 1'-0"

date issued
12/18/2023 REV0

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OKLAHOMA

TYPICAL DETAILS

S1.1
of 7 sheet(s)

TABLE 1705.6 REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY	-	X
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL	-	X
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS	-	X
4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL	X	-
5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY	-	X

TABLE 1705.3 REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD (a)	IBC REFERENCE
1. INSPECT REINFOREMENT AND VERIFY PLACEMENT.	-	X	ACI 318 CH. 20, 25.2, 25.3, 26.6.1-26.6.3	1908.4
2. INSPECT ANCHORS CAST IN CONCRETE	-	X	ACI 318: 17.8.2	-
3. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS(b)				
A. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINE ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS	X		ACI 318: 17.8.2.4	-
B. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 4.A.		X	ACI 318, 17.8.2	
4. VERIFY USE OF REQUIRED DESIGN MIX	-	X	ACI 318: CH. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
5. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	X	-	ASTM C172 ASTM C31 ACI 318: 26.4,...	1908.10
6. INSPECT CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES	X	-	ACI 318: 26.5	1908.6, 1908.7, 1908.8
7. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES	-	X	ACI 318: 26.5.3-26.5.5	1908.9
8. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	-	X	ACI 318: 26.11.1.2(b)	-

(a) WHERE APPLICABLE, SEE ALSO SECTION 1705.12, SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE.
(b) SPECIFIC REQUIREMENTS FOR SPECIAL INSPECTION SHALL BE INCLUDED IN THE RESEARCH REPORT FOR THE ANCHOR ISSUED BY AN APPROVED SOURCE IN ACCORDANCE WITH 17.8.2 IN ACI 318, OR OTHER QUALIFICAITON PROCEDURES. WHERE REQUIREMENTS ARE NOT PROVIDED, SPECIAL INSPECTION REQUIREMENTS SHALL BE SPECIFIED BY THE REGISTERED DESIGN PROFESSIONAL AND SHALL BE APPROVED BY THE BUILDING OFFICIAL PRIOR TO THE COMMENCEMENT OF THE WORK.

STRUCTURAL STEEL - TABLE N5.4-1 INSPECTION TASKS PRIOR TO WELDING.

INSPECTION TASKS PROR TO WELDING	QC	QA
1. WELDING PROCEDURE SPECIFICATIONS (WPSs) AVAILABLE	P	P
2. MANUFACTURER CERTIFICATIONS OF WELDING CONSUMABLES AVAILABLE	P	P
3. MATERIAL IDENTIFICATION (TYPE/GRADE)	O	O
4. WELDER IDENTIFICATION SYSTEM (1)	O	O
5. FIT-UP GROOVE WELDS (INCLUDING JOINT GEOMETRY) - JOINT PREPARATION - DIMENSIONS (ALIGNMENT, ROOT OPENING, ROOT FACE, BEVEL) - CLEANLINESS (CONDITION OF STEEL SURFACES) - TACKING (TACK WELD QUALITY AND LOCATION) - BACKING TYPE AND FIT (IF APPLICABLE)	O	O
6. CONFIGURATION AND FINISH OF ACCESS HOLES	O	O
7. FIT-UP OF FILLET WELDS - DIMENSIONS (ALIGNMENT, GAPS AT ROOT) - CLEANLINESS (CONDITION OF STEEL SURFACES) - TACKING (TACK WELD QUALITY AND LOCATION)	O	O
8. CHECK WELDING EQUIPMENT	O	-

(1) THE FABRICATOR OR ERECTOR, AS APPLICABLE, SHALL MAINTAIN A SYSTEM BY WHICH A WELDER WHO HAS WELDED A JOINT OR MEMBER CAN BE IDENTIFIED. STAMPS, IF USED, SHALL BE THE LOW-STRESS TYPE.
O - OBSERVE THESE ITEMS ON A RANDOM BASIS. OPERATIONS NEED NOT BE DELAYED PENDING THESE INSPECTIONS.
P - PERFORM THESE TASKS FOR EACH WELDED JOINT OR MEMBER

STRUCTURAL STEEL - TABLE N5.4-2 INSPECTION TASKS DURING WELDING.

INSPECTION TASKS DURING WELDING	QC	QA
1. USE OF QUALIFIED WELDERS	O	O
2. CONTROL AND HANDLING OF WELDING CONSUMABLES - PACKING - EXPOSURE CONTROL	O	O
3. NO WELDING OVER CRACKED TACK WELDS	O	O
4. ENVIROMENTAL CONDITIONS - WIND SPEED WITHIN LIMITS - PRECIPITAION AND TEMPERATURE	O	O
5. WPS FOLLOWED - SETTINGS ON WELDING EQUIPMEN - TRAVEL SP - SELECTED WELDING MATERIAL - SHIELDED GAS TYPE/FLOW RATE - PREHEAT APPLIED - INTERPASS TEMPERATURE MAINTAINED (MIN./MAX.) - PROPER POSITION (F, V, H, OH)	O	O
6. WELDING TECHNIQUES - INTERPASS AND FINAL CLEANING - EACH PASS WITHIN PROFILE LIMITAIONS - EACH PASS MEETS QUALITY REQUIREMENTS	O	O

O - OBSERVE THESE ITEMS ON A RANDOM BASIS. OPERATIONS NEED NOT BE DELAYED PENDING THESE INSPECTIONS
P - PERFORM THESE TAKS FOR EACH WELDED JOINT OR MEMBER

STRUCTURAL STEEL - TABLE N5.4-3 INSPECTION TASKS AFTER WELDING.

INSPECTION TASKS AFTER WELDING	QC	QA
1. WELDS CLEANED	O	O
2. SIZE, LENGTH AND LOCATION OF WELDS	P	P
3. WELDS MEET VISUAL ACCEPTANCE CRITERIA - CRACK PROHIBITION - WELD/BASE-METAL FUSION - CRATOR CROSS SECTION - WELD PROFILES - WELD SIZE - UNDERCUT - POROSITY	P	P
4. ARC STRIKES	P	P
5. K-AREA (1)	P	P
6. BACKING REMOVED AND WELD TABS REMOVED (IF REQUIRED)	P	P
7. REPAIR ACTIVITIES	P	P
8. DOCUMENT ACCEPTANCE OR REJECTION OF WELDED JOINT OR MEMBER	P	P

(1) WHEN WELDING OF DOUBLER PLATES, CONTINUITY PLATES OR STIFFENERS HAS BEEN PERFORMED IN THE K-AREA, VISUALLY INSPECTED THE WEB K-AREA WITHIN 3 IN. (75 MM) OF THE WELD
O - OBSERVE THESE ITEMS ON A RANDOM BASIS. OPERATIONS NEED NOT BE DELAYED PENDING THESE INSPECTIONS.
P - PERFORM THESE TASKS FOR EACH WELDED JOINT OR MEMBER

STRUCTURAL STEEL - TABLE N5.6-1 INSPECTION TASKS PRIOR TO BOLTING

INSPECTION TASKS PROR TO BOLTING	QC	QA
1. MANUFACTURER'S CERTIFICATIONS AVAILABLE FOR THE FASTERNER MATERIALS	O	P
2. FASTENERS MARKED IN ACCORDANCE WITH ASTM REQUIREMENTS	O	O
3. PROPER FASTENERS SELECTED FOR THE JOINT DETAIL (GRADE, TYPE, BOLT LENGTH IF THREADS ARE TO BE EXCLUDED FROM SHEAR PLANE.	O	O
4. PROPER BOLTING PROCEDURE SELECTED FOR JOINT DETAIL	O	O
5. CONNECTING ELEMENTS, INCLUDING THE APPROPRIATE FAYING SURFACE CONDITION AND HOLE PREPARATION, IF SPECIFIED, MEET APPLICABLE REQUIREMENTS	O	O
6. PRE-INSTALLATION VERIFICATION TESTING BY INSTALLATION PERSONNEL OBSERVED AND DOCUMENTED FOR FASTENER ASSEMBLIES AND METHODS USED	P	O
7. PROPER STORAGE PROVIDED FOR BOLTS, NUTS, WASHERS AND OTHER FASTENER COMPONENTS	O	O

O - OBSERVE THESE ITEMS ON A RANDOM BASIS. OPERATIONS NEED NOT BE DELAYED PENDING THESE INSPECTIONS
P - PERFORM THESE TASKS FOR EACH BOLTED CONNECTION

STRUCTURAL STEEL - TABLE N5.6-2 INSPECTION TASKS DURING BOLTING

INPECTION TASKS DURING BOLTING	QC	QA
1. FASTNER ASSEMBLIES, OF SUITABLE CONDITION, PLACED IN ALL HOLES AND WASHERS (IF REQUIRED) ARE POSITIONED AS REQUIRED	O	O
2. JOINT BROUGHT TO THE SNUG-TIGHT CONDITION PRIOR TO THE PRETENSIONING OPERATION	O	O
3. FASTENER COMPONENT NOT TURNED BY THE WRENCH PREVENTED FROM ROTATING	O	O
4. FASTENERS ARE PRETENSIONED IN ACCORDANCE WITH THE RCSC SPECIFICATION, PROGRESSING SYSTEMATICALLY FROM THE MOST RIGID POINT TOWARD THE FREE EDGES	O	O

O - OBSERVE THESE ITEMS ON A RANDOM BASIS. OPERATIONS NEED NOT BE DELAYED PENDING THESE INSPECTIONS
P - PERFORM THESE TASKS FOR EACH BOLTED CONNECTION

STRUCTURAL STEEL - TABLE N5.6-3 INSPECTION TASKS AFTER BOLTING

INSPECTION TASKS AFTER BOLTING	QC	QA
1. DOCUMENT ACCEPTANCE OR REJECTION OF BOLTED CONNECTIONS	P	P

O - OBSERVE THESE ITEMS ON A RANDOM BASIS. OPERATIONS NEED NOT BE DELAYED PENDING THESE INSPECTIONS.
P - PERFORM THESE TASKS FOR EACH BOLTED CONNECTION

ABBREVIATIONS

- A.F.F. ABOVE FINISHED FLOOR
- A.E. AIR ENTRAINED
- A.B. ANCHOR BOLT
- ACI AMERICAN CONCRETE INSTITUTE
- AISC AMERICAN INSTITUE OF STEEL CONSTRUCTION
- ALT. ALTERNATE
- APA AMERICAN PLYWOOD ASSOCIATION
- ARCH ARCHITECTURAL DRAWINGS
- AWS AMERICAN WELDING SOCIETY
- BM. BEAM
- B.O.B. BOTTOM OF BEAM
- B.O.D. BOTTOM OF DECK
- B.O.F. BOTTOM OF FOOTING
- B.O.S. BOTTOM OF STEEL
- BOT. BOTTOM
- B.N. BOUNDARY NAILING
- BRG. BEARING
- BLDG. BUILDING
- CANT. CANTILEVER
- C.L. CENTERLINE
- CLR. CLEAR
- C.J. CONTROL OR CONSTRUCTION JOINT
- CMU CONRETE MASONRY UNIT
- COL. COLUMN
- C.F.S. COLD-FORMED STEEL
- CONC. CONCRETE
- CONN. CONNECTION
- CONST. CONSTRUCTION
- CONT. CONTINUOUS
- D.B.A. DEFORMED BAR ANCHOR
- DBL. DOUBLE
- D OR D.L. DEAD LOAD
- DIA DIAMETER
- D.F.(S) DOUGLAS FIR (SOUTH)
- DWGS DRAWINGS
- DWL. DOWEL
- EA. EACH
- E.W. EACH WAY
- E.N. EDGE NAILING
- ELEV. ELEVATION
- EX. EXISTING
- EXIST. EXISTING
- EXP. EXPANSION
- EXT EXTERIOR
- f'c CONCRETE COMPRESSIVE STRENGTH
- f'm CONRETE MASONRY COMPRESSIVE STRENGTH
- F.F. FINISH FLOOR
- FND. FOUNDATION
- F.S. FAR SIDE
- FT. FEET
- FTG. FOOTING
- GA. GAGE OR GAUGE
- GALV. GALVANIZED
- H.E.G. HOLTZEN ENGINEERING GROUP, P.C.
- H.S.A. HEADED STUD ANCHOR
- HORIZ. HORIZONTAL
- HSS HOLLOW STEEL SECTION
- IN. INCH
- INFO. INFORMATION
- INSUL. INSULATION
- INT. INTERIOR
- J.B. JOIST BEARING
- K KIPS
- L LENGTH
- LAP LAP SPLICE LENGTH
- Ldh DEVELOPMENT LENGTH FOR HOOKED REINF.
- Lt LENGTH OF REINFORCING HOOK
- LT. WT. LIGHT WEIGHT
- L-OR-L.L LIVE LOAD
- LLH LONG LEG HORIZONTAL
- LLV LONG LEG VERTICAL
- LONG LONGITUDINAL
- MAT'S MATERIAL
- MAX. MAXIMUM
- MECH. MECHANICAL
- MEZZ. MEZZANINE
- MFR. MANFACTURER
- MIN. MINIMUM
- MPH MILES PER HOUR
- MISC MISCELLANEOUS
- MTL. METAL
- N.S. NEAR SIDE
- N.T.S. NOT TO SCALE
- O.C. ON CENTER
- OPP OPPOSITE
- O.S.B. ORIENTED STRAND BOARD
- O.W.S.J. OPEN WEB STEEL JOIST
- P.A.F. POWDER ACTUATED FASTENER
- PL. PLATE
- P.T. PRESSURE TREATED -OR- POST TENSIONED
- QTY. QUANTITY
- REINF. REINFORCEMENT
- REQD. REQUIRED
- R.S. RING SHANK (DEFORMED SHANK)
- RLL-OR Lr ROOF LIVE LOAD
- RTU ROOF TOP UNIT
- SCHED. SCHEDULE
- SDS SELF DRILLING SCREW
- SIM. SIMILAR
- S-OR-S.L. SNOW LOAD
- S.P SOUTHERN PINE
- SPECS. SPECIFICATIONS
- S.O.G. SLAB-ON-GRADE
- SQ. SQUARE
- STD. STANDARD
- STIFF. STIFFENER
- T&B. TOP AND BOTTOM
- T.O.F. TOP OF FOOTING
- T.O.M. TOP OF MASONRY
- T.O.S. TOP OF STEEL, TOP OF STUD
- T.O.W. TOP OF WALL
- T.P. TIE PLATE
- TRANS. TRANSVERSE
- TYP. TYPICAL
- VERT. VERTICAL
- V.I.F. CERIFY IN FIELD
- W WIDE FLANGE DESIGNATION
- W.W.F. WELDED WIRE FABRIC
- W/ WITH
- W/OUT WITHOUT

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LICENSED STRUCTURAL ENGINEER
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STRUCTURAL SPECIAL INSPECTION

S1.2
of 7 sheet(s)

date issued						
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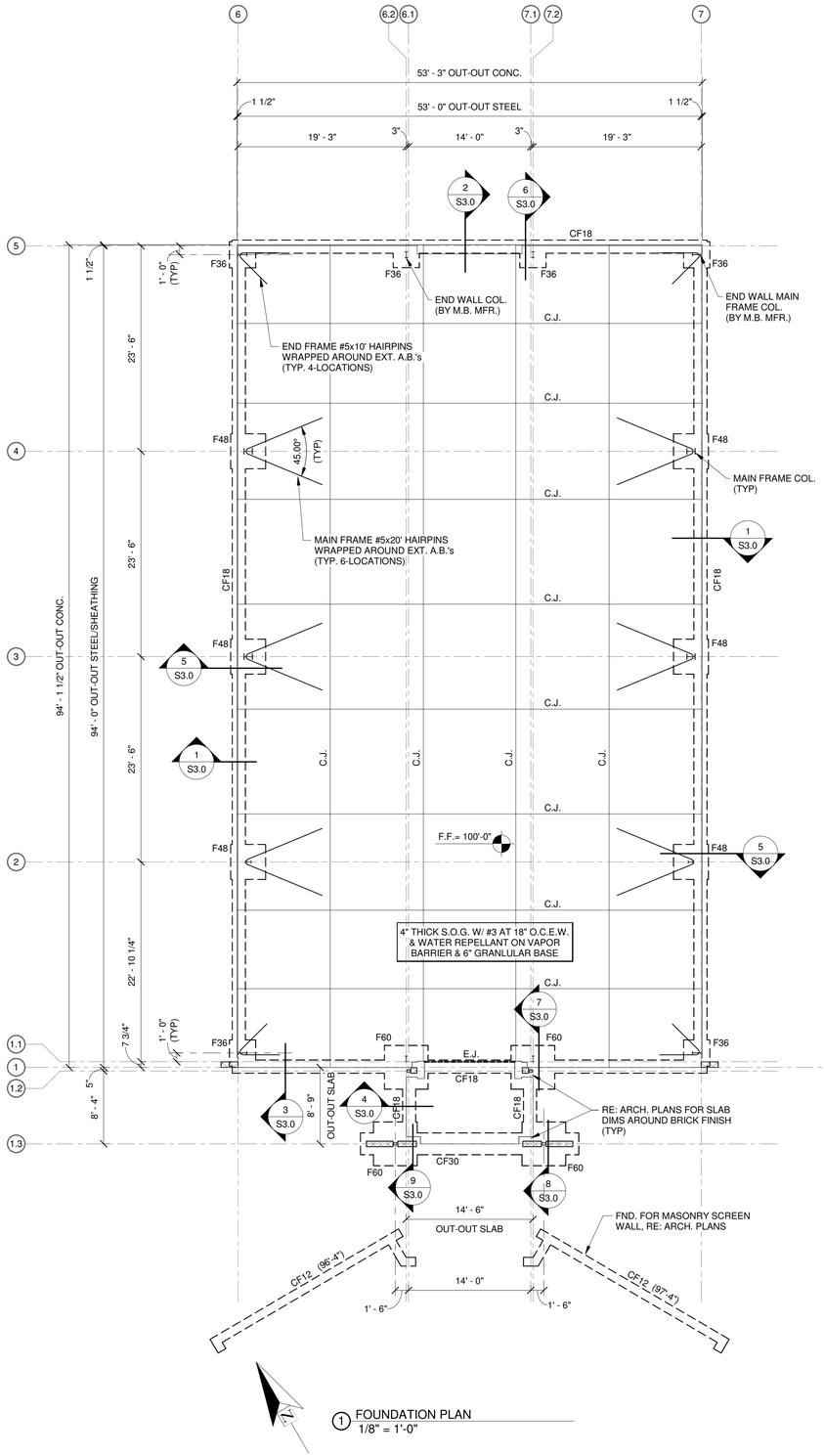

1 FOUNDATION PLAN
1/8" = 1'-0"

SPREAD FOOTING SCHEDULE

TYPE	THICKNESS	WIDTH	LENGTH	TOP MAT. REINF.	BOT. MAT. REINF.	T.O.F.
F36	3' - 0"	3' - 0"	3' - 0"	(4)-#5 EA. WAY	(4)-#5 EA. WAY	99' - 0"
F48	3' - 0"	4' - 0"	4' - 0"	(5)-#5 EA. WAY	(5)-#5 EA. WAY	99' - 0"
F60	3' - 0"	5' - 0"	5' - 0"	(6)-#5 EA. WAY	(6)-#5 EA. WAY	99' - 0"

CONTINUOUS FOOTING SCHEDULE

TYPE	THICKNESS	WIDTH	LONG. REINF.	TRANSV. REINF.	CLOSED TIES
CF12	3' - 0"	1' - 0"	(2) - #5 CONT. T&B	-	#3 AT 32" O.C.
CF18	3' - 0"	1' - 6"	(2) - #5 CONT. T&B	-	#3 AT 32" O.C.
CF30	3' - 0"	2' - 6"	(3) - #5 CONT. T&B	-	#3 AT 32" O.C.

SHEET NOTES:

1. GRIDS ARE TO FACE OF STEEL GIRTS, CENTERLINE OF STEEL COLUMNS AND STEEL BEAMS, AND FACE OF WALL STUD SHEATHING.
2. DATUM FOR STRUCTURAL WORK IS TOP OF SLAB-ON-GRADE= 100'-0", REFER TO CIVIL DRAWINGS FOR TRUE ELEVATION.
3. WHERE BASE PLATES FOR MAIN FRAME COLUMNS, PORTAL FRAME COLUMNS, AND COLUMNS WITH X-BRACING HAVE OVERSIZED HOLES FOR ANCHOR BOLTS, PROVIDE 5/16"x3" PLATE WASHER WITH STANDARD HOLES. ATTACH PLATE WASHER TO BASE PLATE WITH 1/4" FILLET WELDS.
4. TIE RODS AND/OR HAIRPINS PROVIDE STABILITY FOR BUILDING IN IT'S FINAL STATE, DO NOT CUT, USE CAUTION DURING SAW CUTTING OF SLAB JOINT.
5. REFER TO SHEET S1.1 FOR TYPICAL CONCRETE AND FOUNDATION DETAILS.
6. REFER TO THIS SHEET FOR FOOTING SCHEDULE.
7. PORTAL FRAMES AND/OR X-BRACING LOCATIONS BY METAL BUILDING MANUFACTURER. VERIFY OPENINGS AND ARCHITECTURAL INTENT IS NOT OBSTRUCTED. ANY PORTAL FRAME/X-BRACE LOCATIONS SHOWN ON THIS PLAN ARE SUGGESTIONS AND MAY BE RELOCATED BY THE METAL BUILDING ENGINEER.
8. COORDINATE METAL BUILDING COMPONENT SIZE LIMITATIONS WITH ARCHITECTURAL PLANS.

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12/18/2023	REV0					

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300 South 13th Street, Kingfisher, OK 73750

HEG PROJECT NO.: 23.030

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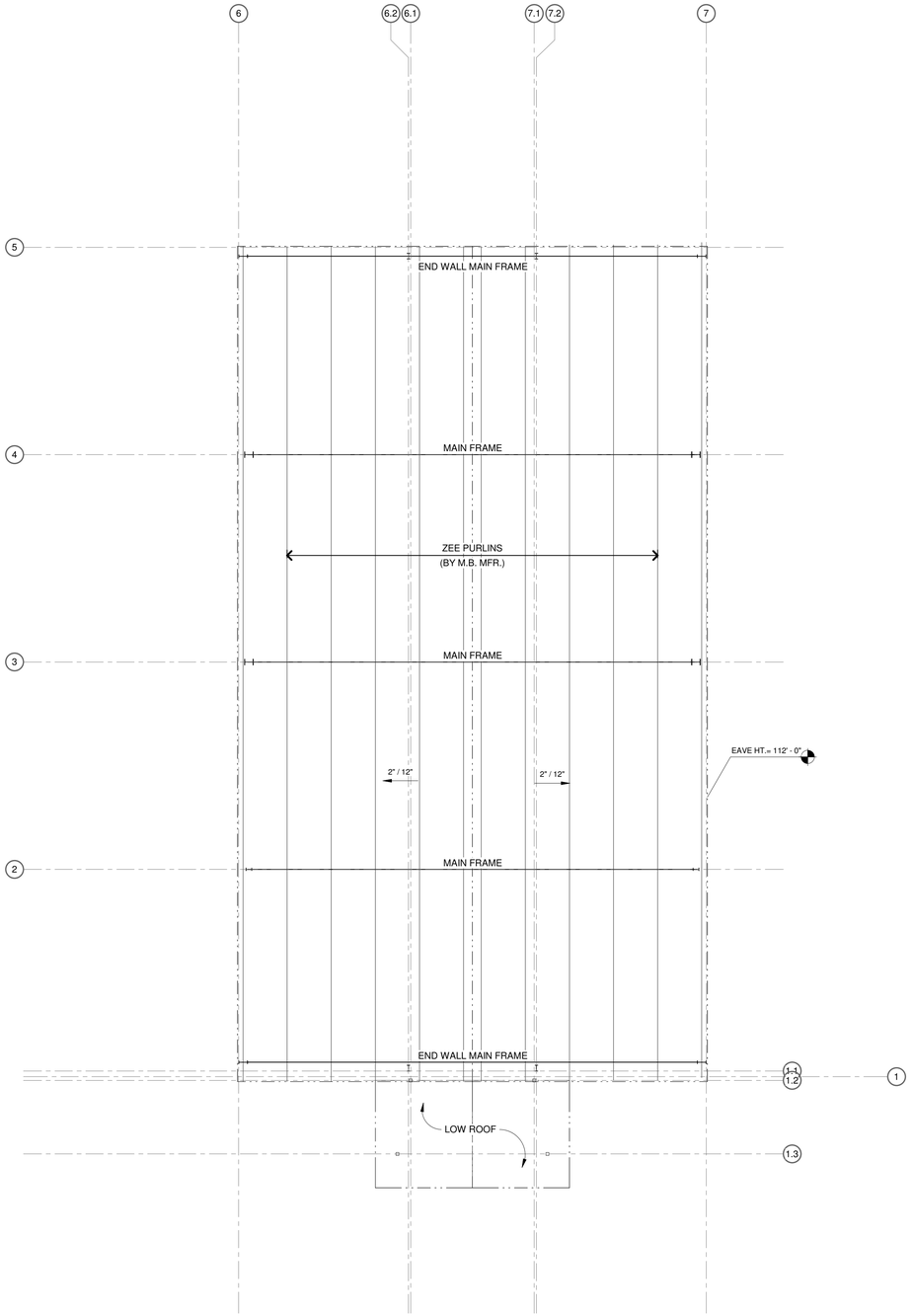
LICENSED STRUCTURAL ENGINEER
SCOTT E. HOLTZEN
23396
OKLAHOMA
12/18/23

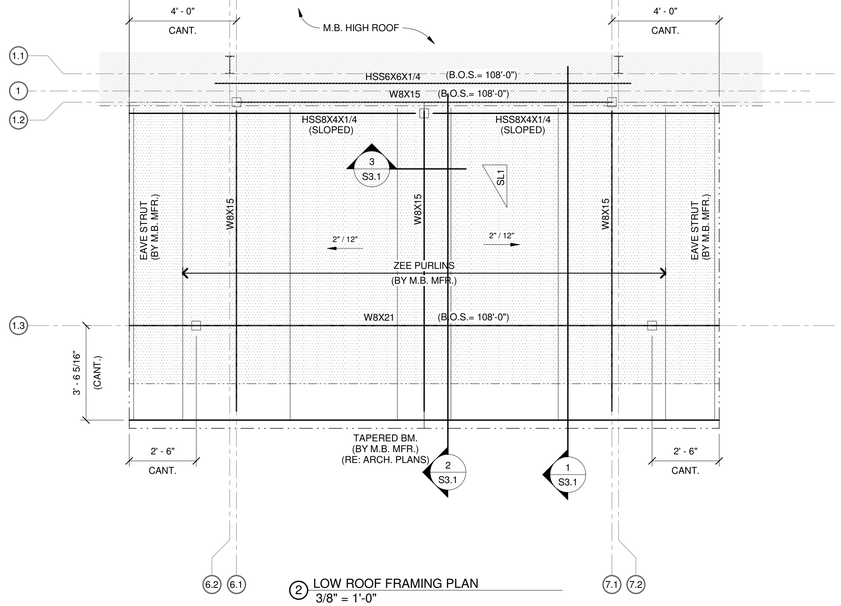
FOUNDATION PLAN

S2.0

of 7 sheet(s)



1 ROOF FRAMING PLAN
1/8" = 1'-0"



2 LOW ROOF FRAMING PLAN
3/8" = 1'-0"

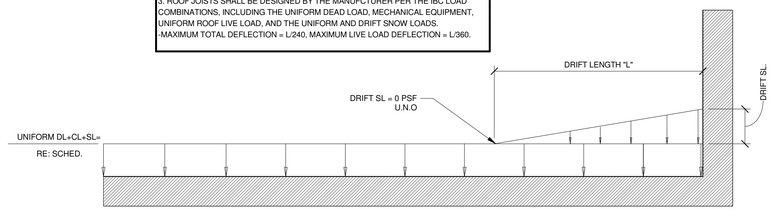
SNOW DRIFT LOAD SCHEDULE				
MARK	UNIFORM DEAD LOAD + COLLATERAL LOAD (PSF)	UNIFORM SNOW LOAD (PSF)	DRIFT SNOW LOAD (PSF)	DRIFT LENGTH "L"
SL#1	15	7.7	41	10'-6"
SL#2	-	-	-	-
SL#3	-	-	-	-

NOTES:

1. THE MAGNITUDE OF THE DRIFT LOAD EXCLUDES THE UNIFORM SNOW LOAD.

2. SNOW DRIFT LOADS ARE TO BE USED IN CONJUNCTION WITH THE UNIFORM DEAD LOAD AND UNIFORM SNOW LOAD.

3. ROOF JOISTS SHALL BE DESIGNED BY THE MANUFCTURER PER THE IBC LOAD COMBINATIONS, INCLUDING THE UNIFORM DEAD LOAD, MECHANICAL EQUIPMENT, UNIFORM ROOF LIVE LOAD, AND THE UNIFORM AND DRIFT SNOW LOADS.
-MAXIMUM TOTAL DEFLECTION = L/240, MAXIMUM LIVE LOAD DEFLECTION = L/360.



3 SNOW DRIFT LOAD DIAGRAM & SCHEDULE METAL BLDGS.
N.T.S.

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12/18/23
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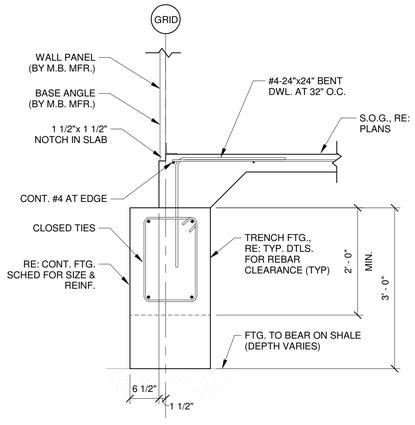
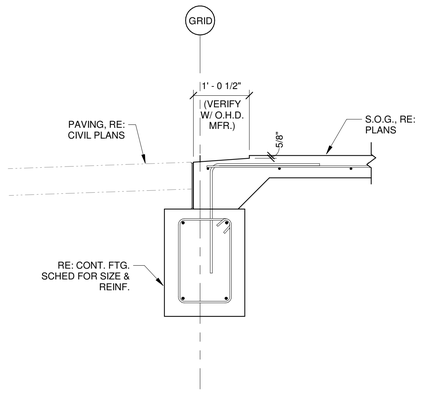
ROOF FRAMING PLANS

S2.1

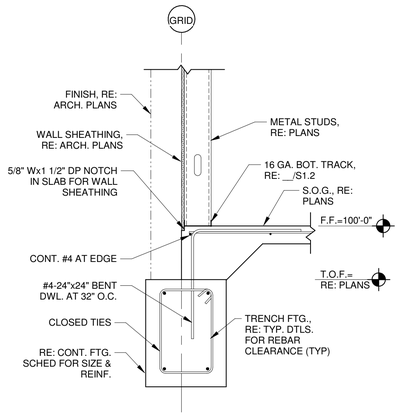
of 7 sheet(s)



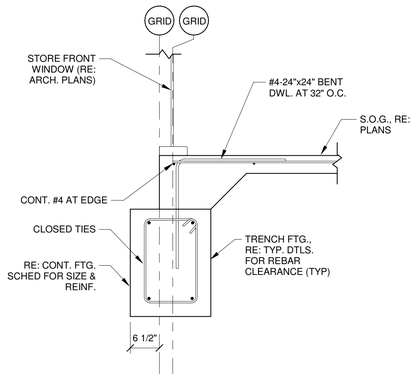
1 PERIMETER TRENCH FOOTING SECTION - TYPICAL
3/4" = 1'-0"



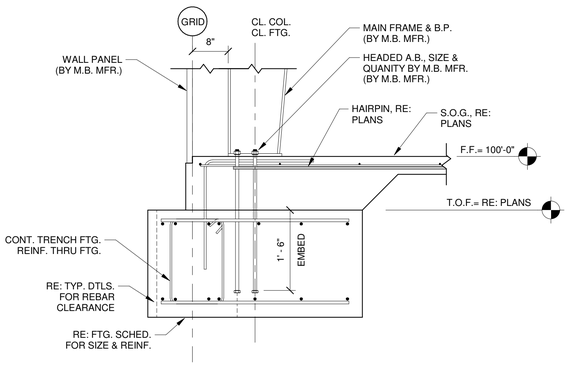
2 FOUNDATION SECTION AT O.H.D.
3/4" = 1'-0"



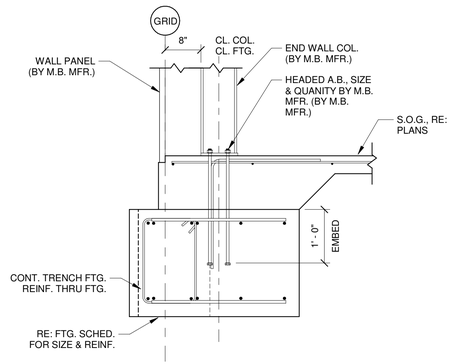
3 NORTH PERIMETER TRENCH FOOTING SECTION
3/4" = 1'-0"



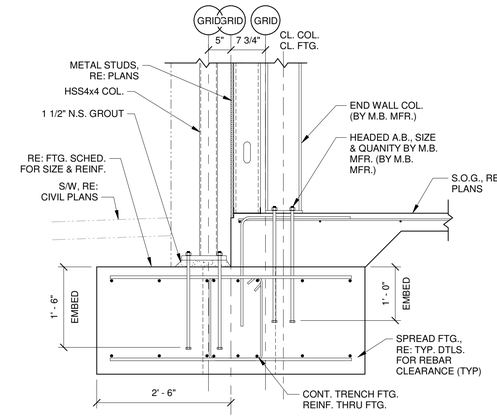
4 PERIMETER TRENCH FOOTING SECTION AT ENTRY
3/4" = 1'-0"



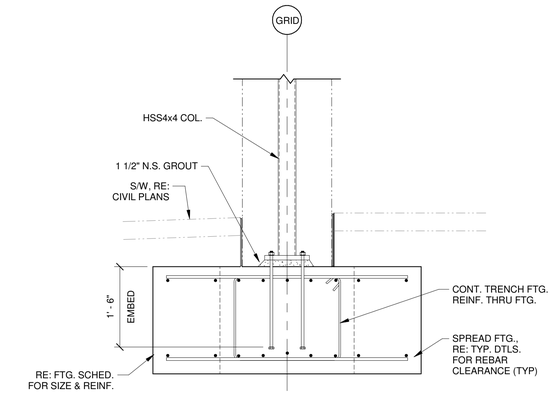
5 MAIN FRAME FOOTING SECTION - TYPICAL
3/4" = 1'-0"



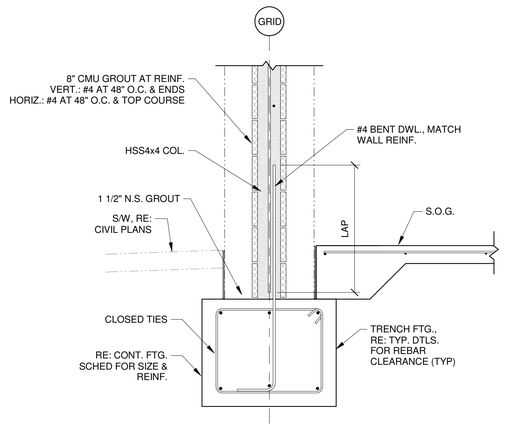
6 SOUTH END WALL FOOTING SECTION
3/4" = 1'-0"



7 NORTH END WALL FOOTING SECTION
3/4" = 1'-0"



8 COVERED ENTRY - NORTH FOOTING SECTION
3/4" = 1'-0"



9 COVERED ENTRY - NORTH CMU WALL FOOTING SECTION
3/4" = 1'-0"

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LICENSED STRUCTURAL ENGINEER
SCOTT E. HOLTZEN
23396
12/18/23
OKLAHOMA

DETAILS

S3.0

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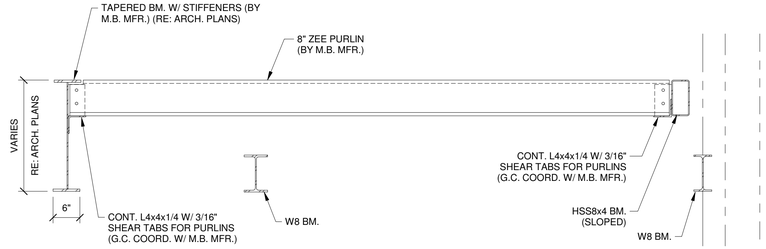
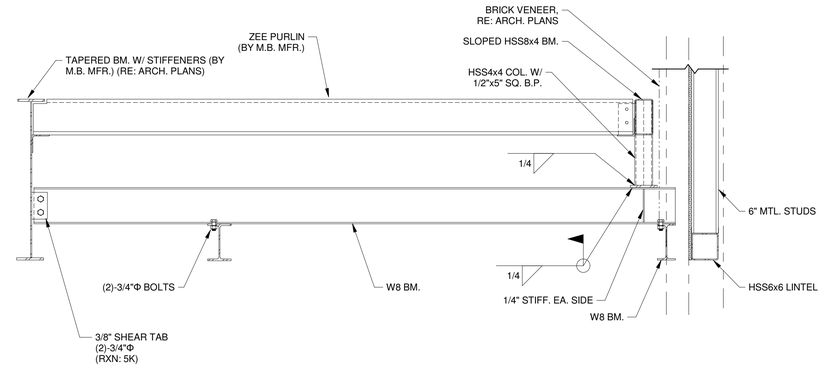
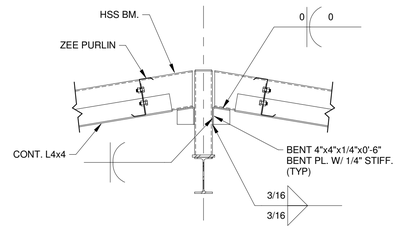


1 ENTRY ROOF SECTION
3/4" = 1'-0"

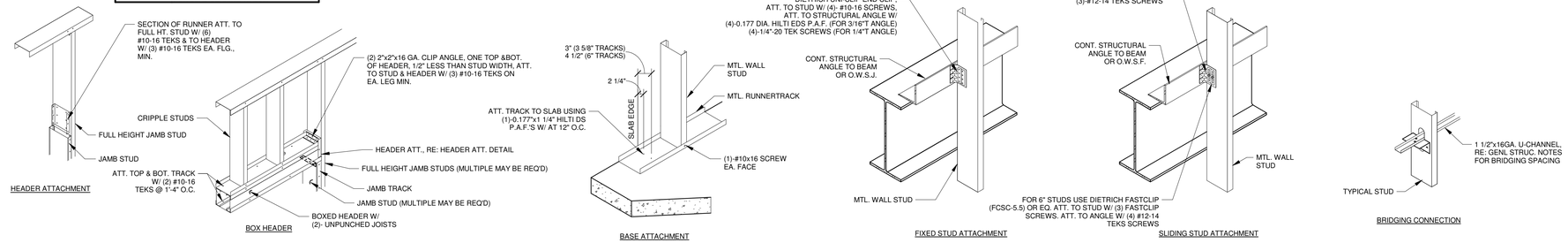


2 ROOF SECTION AT ENTRY
3/4" = 1'-0"

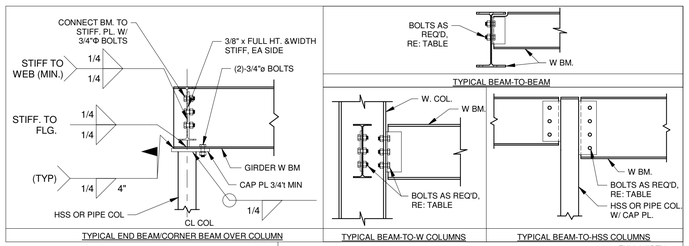


3 ENTRY ROOF SECTION AT RIDGE
3/4" = 1'-0"

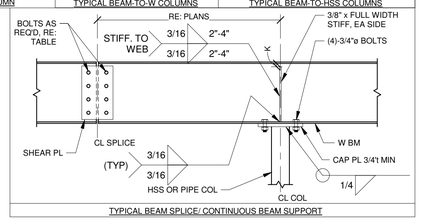
HEADER SCHEDULE - CURTAIN WALLS		
CURTA	SIZE	NO. O JAMB STUDS
L ≤ 4'-0"	(2)-800S162-54	1
4'-0" < L ≤ 11'-0"	(2)-800S162-54	1
NOTES: DO NOT USE THIS HEADER SCHEDULE FOR LOAD BEARING WALLS.		



4 TYPICAL LIGHT GAUGE METAL STUD DETAILS
N.T.S.



MINIMUM BOLT SCHEDULE	
BEAM	MIMUM NO. OF BOLTS
W8	2
W10	2
W12	3
W14	3
W16	4
W18	4
W21	5
W24	6
W27	7
W30	7



NOTES:
1. FABRICATOR'S ENGINEER SHALL DESIGN AND DETAIL ALL CONNECTIONS NOT EXPLICITLY DETAILED ON THE DRAWINGS PER AISC. CONNECTIONS SHALL BE DESIGNED FOR 125% OF THE REACTIONS SHOWN ON THE DRAWINGS.
2. MINIMUM BOLT SCHEDULE IS REQUIRED FOR ALL BEAM CONNECTIONS UNLESS NOTED OTHERWISE ON THE DRAWINGS. SCHEDULE IS ALSO APPLICABLE TO CHANNEL SECTIONS.
3. CONTRACTOR MAY USE SHORT SLOTTED HOLES IN SINGLE THRU PLATE WITH STANDARD WASHERS ON THE PLY WITH THE SLOT.
4. JOINTS SHALL BE SNUG-TIGHTENED JOINTS PER AISC UNLESS NOTED OTHERWISE.
5. BOLTS SHALL BE A MINIMUM 3/4" DIAMETER, AND SINGLE PLATES SHALL BE A MINIMUM 3/8" THICK.

5 TYPICAL STEEL CONNECTIONS
N.T.S.

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LICENSED STRUCTURAL ENGINEER
SCOTT E. HOLTZEN
23396
12/18/23
OKLAHOMA

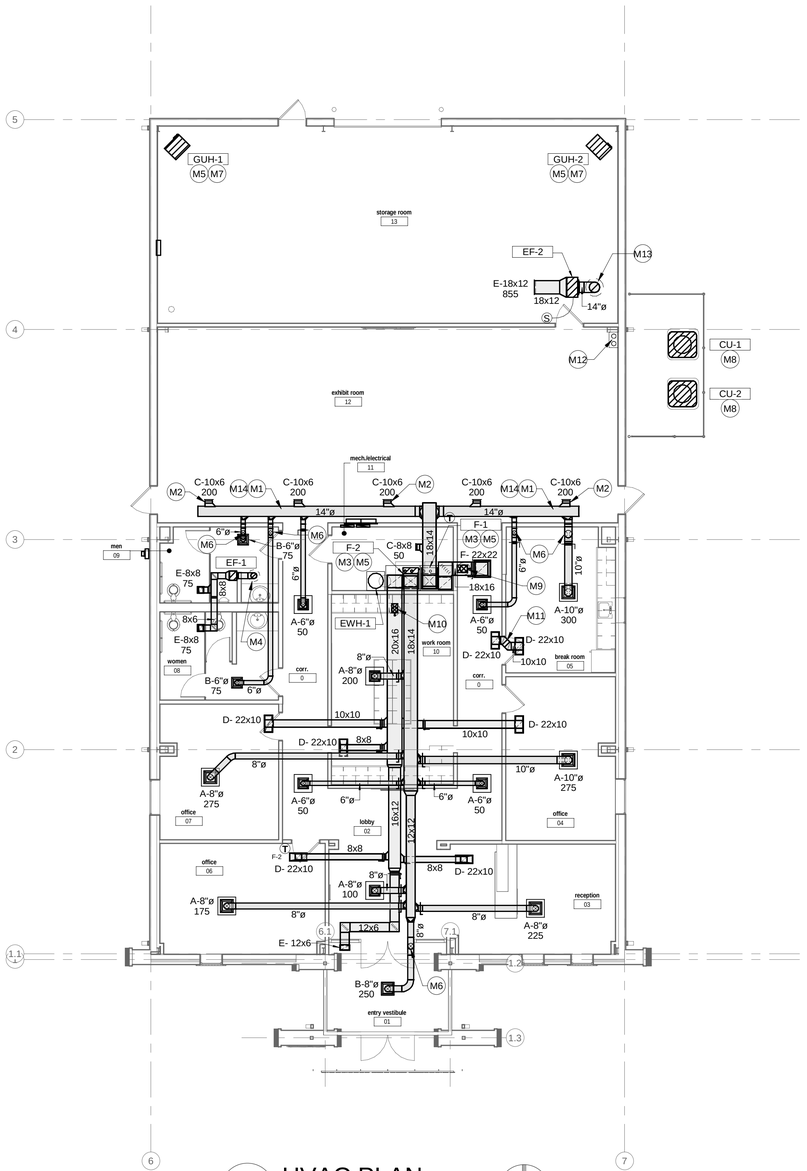
DETAILS

S3.1

of 7 sheet(s)

MECHANICAL PLAN NOTES

M1	ROUTE DUCTWORK AS HIGH AS POSSIBLE.
M2	MOUNT GRILLE AT 30 DEG. FROM HORIZONTAL (TYPICAL). REFER TO DETAIL FOR ADDITIONAL INFORMATION.
M3	SET FURNACE ON 16" TALL FIELD FABRICATED INSULATED RETURN AIR PLENUM. CONTRACTOR TO PROVIDE FIELD FABRICATED SLIDE OUT FILTER RACK BELOW INDOOR UNIT. REFER TO DETAIL FOR ADDITIONAL INFORMATION.
M4	EXTEND 8" DIA. E.A. DUCT UP THROUGH ROOF AND TERMINATE WITH COOK ROOF HOOD MODEL PR8.
M5	EXTEND VENT AND INTAKE PIPING UP THROUGH ROOF AND TERMINATE WITH CONCENTRIC TERMINATION KIT PER MANUFACTURER RECOMMENDATIONS.
M6	OFFSET DUCTWORK TO ROUTE AROUND STRUCTURE AS NEEDED.
M7	MOUNT UNIT HEATER AS HIGH AS POSSIBLE. COORDINATE EXACT MOUNTING HEIGHT WITH G.C. PRIOR TO INSTALLATION.
M8	G.C. TO PROVIDE 4" EQUIPMENT PAD BELOW EQUIPMENT.
M9	PROVIDE MANUAL BALANCING DAMPER IN O.A. DUCT BALANCED TO 240 CFM. PROVIDE MOTORIZED ON/OFF DAMPER INTERLOCKED TO OPEN WITH BLOWER START. EXTEND 10" DIA. O.A. DUCT UP THROUGH ROOF AND TERMINATE WITH COOK ROOF HOOD MODEL PR12.
M10	PROVIDE MANUAL BALANCING DAMPER IN O.A. DUCT BALANCED TO 170 CFM. PROVIDE MOTORIZED ON/OFF DAMPER INTERLOCKED TO OPEN WITH BLOWER START. EXTEND 8" DIA. O.A. DUCT UP THROUGH ROOF AND TERMINATE WITH COOK ROOF HOOD MODEL PR8.
M11	PROVIDE TRANSFER DUCTWORK.
M12	ROUTE REFRIGERANT PIPING UP IN CHASE TO ROUTE AS HIGH AS POSSIBLE. ROUTE TO CORRESPONDING COOLING COIL. COORDINATE CHASE REQUIREMENTS WITH ARCHITECT PRIOR TO CONSTRUCTION.
M13	EXTEND 14" DIA. E.A. DUCT UP THROUGH ROOF AND TERMINATE WITH COOK ROOF HOOD MODEL PR16.
M14	ALL EXPOSED ROUND DUCTWORK TO BE MILL PHOSPHATIZED DUAL WALL SPIRAL DUCTWORK WITH PERFORATED INNER LINER.



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OKLAHOMA REGISTRATION NUMBER: 5682
Integrated Consulting Engineers, Inc.
349 South Hydraulic • Wichita, KS 67211
316.264.3588 • 316.264.3948 • www.iconengineers.net

PROFESSIONAL ENGINEER
DWAYNE A. JOHN
12-18-2023
24635
OKLAHOMA

date issued: 01-08-2024

Kingfisher County Extension Office 2023

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M1.1

PROJECT MECHANICAL DESIGN CRITERIA

ICE

PROJECT CITY: KINGFISHER, OKLAHOMA
PROJECT ELEVATION: 1,548 FT. ABOVE SEA LEVEL

GOVERNING CODES

BUILDING CODE: 2018 INTERNATIONAL BUILDING CODE
MECHANICAL CODE: 2018 INTERNATIONAL MECHANICAL CODE
PLUMBING CODE: 2018 INTERNATIONAL PLUMBING CODE
ELECTRICAL CODE: 2017 NATIONAL ELECTRIC CODE
FIRE CODE: 2018 INTERNATIONAL FIRE CODE

COOLING WEATHER DESIGN DATA

DESIGN WEATHER STATION: WATONGA MUNICIPAL
DESIGN WEATHER BASIS: ASHRAE 0.4%

DESIGN DRY BULB: 99.2° F
MEAN COINC. WET BULB: 75.6° F

DESIGN WET BULB: 77.5° F
MEAN COINC. DRY BULB: 82.9° F

HEATING WEATHER DESIGN DATA

DESIGN WEATHER BASIS: ASHRAE 99.6%
DESIGN DRY BULB: 12.2° F

ENERGY DATA

ASHRAE CLIMATE ZONE: 3A
COOLING DEGREE DAYS(65): 1,991
HEATING DEGREE DAYS(65): 3,697

MECHANICAL GENERAL NOTES

1. PLANS ARE SCHEMATIC IN NATURE. LAYOUT IS BASED ON BEST AVAILABLE INFORMATION. PRIOR TO SUBMITTING BID CONTRACTOR SHALL VISIT JOB SITE AND BECOME FULLY ACQUAINTED WITH EXISTING CONDITIONS OF PROJECT. NOTIFY ARCHITECT, CONSTRUCTION MANAGER, AND/OR ENGINEER OF CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
2. COORDINATE INSTALLATION OF MECHANICAL SYSTEMS WITH OTHER TRADES TO ENSURE NEAT AND ORDERLY INSTALLATION.
3. FIELD MEASURE FINAL DUCTWORK LOCATIONS PRIOR TO FABRICATION AND MAKE ADJUSTMENTS AS REQUIRED. MAINTAIN MANUFACTURER'S RECOMMENDATIONS REGARDING SERVICE CLEARANCE AND PROPER AIRFLOW CLEARANCE AROUND EQUIPMENT.
4. ADJUST LOCATION OF CEILING DIFFUSERS, REGISTERS AND GRILLES AS REQUIRED TO ACCOMMODATE FINAL CEILING GRID AND LIGHTING LOCATIONS.
5. ALL DIFFUSERS ARE 4-WAY BLOW UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
6. COORDINATE ACCESS TO EQUIPMENT, VALVES, AND DAMPERS INSTALLED ABOVE 'INACCESSIBLE' CEILINGS AND IN CHASES, ETC. WITH GENERAL CONTRACTOR. PROVIDE LOCKING ACCESS DOORS FOR INSTALLATION BY GENERAL CONTRACTOR AS REQUIRED TO SERVICE CONCEALED EQUIPMENT, VALVES, AND DAMPERS. CEILING ACCESS DOORS FOR FIRE DAMPERS, AND FIRE SMOKE DAMPERS FURNISHED BY THIS CONTRACTOR AND INSTALLED BY GENERAL CONTRACTOR.
7. MAINTAIN MINIMUM 10'-0" CLEARANCE BETWEEN OUTSIDE AIR INTAKES AND EXHAUST/VENT TERMINATIONS.
8. A MAXIMUM LENGTH OF 5'-0" FLEX DUCT MAY BE USED AT EACH RUNOUT TO SUPPLY DIFFUSERS. FLEX DUCT SHALL NOT BE USED IN RETURN OR EXHAUST APPLICATIONS AND ONLY IN CONCEALED LOCATIONS.
9. RECTANGULAR & ROUND DUCT SIZES INDICATED ARE INSIDE CLEAR DIMENSIONS. SEE SPECIFICATIONS FOR DUCT LINER / INSULATION REQUIREMENTS.
10. DO NOT ROUTE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS OR ELECTRICAL GEAR. COORDINATE ROUTING WITH OTHER TRADES.
11. NEW HVAC EQUIPMENT SHALL NOT BE USED DURING CONSTRUCTION. CONTRACTOR SHALL FURNISH ALL NECESSARY TEMPORARY HEATING / COOLING EQUIPMENT AND CONTROLS AS REQUIRED.
12. INSTALL BALANCING DAMPERS (UNLESS PROVIDED WITH GRILLES / DIFFUSERS) IN EACH GRILLE / DIFFUSER DUCT RUNOUT. LOCATE DAMPERS ABOVE ACCESSIBLE CEILINGS OR IN ACCESSIBLE AREAS.
13. INSTALL TURNING VANES IN ALL RECTANGULAR DUCT ELBOWS.
14. PROVIDE FIRE DAMPERS AT ALL RATED WALLS OR CEILINGS WHETHER IT IS NOTED ON PLANS OR NOT.
15. ALL NEW THERMOSTATS SHALL BE PLACED AT 4'-0" MAXIMUM ABOVE FINISHED FLOOR PER ADA REQUIREMENTS. VERIFY HEIGHTS WITH OWNER PRIOR TO FINAL INSTALLATION.

PLUMBING GENERAL NOTES

1. PLANS ARE SCHEMATIC IN NATURE. LAYOUT IS BASED ON BEST AVAILABLE INFORMATION. PRIOR TO SUBMITTING BID CONTRACTOR SHALL VISIT JOB SITE AND BECOME FULLY ACQUAINTED WITH EXISTING CONDITIONS OF PROJECT. NOTIFY ARCHITECT, CONSTRUCTION MANAGER, AND/OR ENGINEER OF CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
2. COORDINATE INSTALLATION OF PLUMBING SYSTEMS WITH OTHER TRADES TO ENSURE NEAT AND ORDERLY INSTALLATION.
3. FIELD MEASURE FINAL PIPING LOCATIONS PRIOR TO FABRICATION AND MAKE ADJUSTMENTS AS REQUIRED. MAINTAIN MANUFACTURER'S RECOMMENDATIONS REGARDING SERVICE CLEARANCE AND PROPER AIRFLOW CLEARANCE AROUND EQUIPMENT.
4. COORDINATE ROUTING OF PLUMBING AND FIRE PROTECTION PIPING WITH DUCTWORK, LIGHTS, ARCHITECTURAL CEILING AND STRUCTURAL ELEMENTS. PIPING SHALL RISE AND DROP, JOG OR OFFSET AS REQUIRED TO AVOID CONFLICTS. DUCTWORK SHALL TAKE PRECEDENCE OVER ALL PIPING, INCLUDING FIRE SPRINKLER PIPING EXCEPT WHERE GRADE MUST BE MAINTAINED FOR DRAINAGE. PROVIDE ADDITIONAL MANUAL AIR VENTS FOR PIPING WHERE REQUIRED FOR PIPING TO OFFSET. FIRE PROTECTION CONTRACTOR SHALL PROVIDE ADDITIONAL DRAINS AS REQUIRED TO DRAIN SYSTEM.
5. NO PIPING SHALL PENETRATE STRUCTURAL MEMBERS.
6. WALL CLEANOUT AND ACCESS DOORS SHALL MATCH ADJACENT SURFACES.
7. MAINTAIN MINIMUM 10'-0" CLEARANCE BETWEEN OUTSIDE AIR INTAKES AND EXHAUST/VENT TERMINATIONS.
8. DO NOT ROUTE PIPING OR DUCTWORK ABOVE ELECTRICAL PANELS OR ELECTRICAL GEAR. COORDINATE ROUTING WITH OTHER TRADES.
9. ALL WALL CAPS SHALL BE PAINTED TO MATCH WALL. ROOF CAPS AND VENTS SHALL BE PAINTED, COLOR SELECTED BY ARCHITECT.
10. PROVIDE WCO AT BASE OF ALL WASTE STACKS INCLUDING LAVATORIES AND SINKS.
11. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS FOR ROUTING AND CONNECTION OF SANITARY SEWER / WATER / GAS SERVICES. COORDINATE WITH LOCAL UTILITIES AND AUTHORITIES WHERE REQUIRED.
12. REFER TO PLUMBING FIXTURE SCHEDULE FOR PIPING RUNOUT SIZES TO INDIVIDUAL PLUMBING FIXTURES.
13. CONTRACTOR SHALL VERIFY ALL CONNECTION REQUIREMENTS TO EQUIPMENT PROVIDED BY OTHERS WITH ACTUAL EQUIPMENT PROVIDED ON SITE.
14. CONTRACTOR TO COORDINATE WITH LOCAL UTILITY TO PROVIDE THE REQUIREMENTS FOR THE NEW GAS SERVICE. NEW BUILDING LOAD = 260.0 MBH.

MECHANICAL LEGEND

(NOT ALL SYMBOLS LISTED BELOW ARE BEING USED IN THIS SET OF MECHANICAL DRAWINGS)

ICE

SYMBOL	ABBR	DESCRIPTION
HVAC:		
		DIFFUSER
	RAG	RETURN AIR GRILLE
		ARROWS INDICATE FLOW DIRECTION
		NEW DUCTWORK
		EXISTING DUCTWORK
		EXISTING DUCTWORK TO BE REMOVED
		SUPPLY DUCT UP
		ROUND DUCT UP
		SUPPLY DUCT DOWN
		RETURN OR EXHAUST DUCT DOWN
		ROUND DUCT DOWN
		RECTANGULAR VANED ELBOW
		ROUND ELBOW
		MITERED ROUND ELBOW
		CONCENTRIC TRANSITION
		ECCENTRIC TRANSITION
		SQUARE TO ROUND TRANSITION
DN/UP		DUCT DROP/RISE IN DIRECTION OF ARROW
		45° TAKEOFF FITTING
		45° TAKEOFF FITTING WITH MANUAL VOLUME DAMPER
MVD		MANUAL VOLUME DAMPER WITH LOCKING QUADRANT
M MD	MD	MOTORIZED DAMPER
FD	FD	FIRE DAMPER
FS	FS	COMBINATION FIRE/SMOKE DAMPER

SYMBOL	ABBR	DESCRIPTION
PIPING:		
	CW	DOMESTIC COLD WATER
	HW	DOMESTIC HOT WATER
140°	140°	DOMESTIC 140° HOT WATER
	HWC	DOMESTIC HOT WATER CIRCULATING
	SAN	SANITARY WASTE ABOVE FLOOR
	SAN	SANITARY WASTE BELOW FLOOR
	V	SANITARY VENT
	RD	ROOF DRAIN
	RD	ROOF DRAIN BELOW FLOOR
	ORD	ROOF OVERFLOW
	FP	FIRE PROTECTION
	G	NATURAL GAS
	CWS	CHILLED WATER SUPPLY
	CWR	CHILLED WATER RETURN
	HWS	HEATING WATER SUPPLY
	HWR	HEATING WATER RETURN
	D	CONDENSATE DRAIN
	GW	GREASE WASTE
	RL	REFRIGERANT LIQUID
	RS	REFRIGERANT SUCTION
RHG	RHG	REFRIGERANT HOT GAS
	S	STEAM SUPPLY (10 PSI)
	CR	CONDENSATE RETURN
	A	COMPRESSED AIR
		ELBOW UP
		ELBOW DOWN
		TEE UP
		TEE DOWN
		PIPE CAP OR PLUG

SYMBOL	ABBR	DESCRIPTION
PLUMBING EQUIP.		
		SHUT-OFF VALVE (GATE VALVE NOT ALLOWED)
		BALL VALVE
		BUTTERFLY VALVE
		BALANCING VALVE
		CHECK VALVE
		STRAINER
		GAS COCK
		PIPING UNION
		PIPE REDUCER
		VALVE IN RISER
	HB	HOSE BIBB
	WH	WALL HYDRANT
	FPWH	FREEZE PROOF WALL HYDRANT
	RD	ROOF DRAIN
	ORD	OVERFLOW ROOF DRAIN
	AD	AREA DRAIN
	BD	BOILER DRAIN
	FD	FLOOR DRAIN
	WCO	WALL CLEANOUT
	FCO	FLOOR CLEANOUT
	FS	FLOOR SINK
	VTR	VENT THRU ROOF
D M3.1		ENLARGED PLAN CALLOUT

SYMBOL	ABBR	DESCRIPTION
SYMBOLS:	P1.1	PLUMBING FIXTURE NUMBER EQUIPMENT DESIGNATION
F-1	F-1	
1		SHEET NOTE
	POC	POINT OF CONN. (CONN. NEW TO EXISTING)
	DN	DOWN
	TOD	TOP OF DUCT (ABOVE FIN. FLOOR)
	BOP	BOTTOM OF PIPE
	NTS	NOT TO SCALE
	A.F.F.	ABOVE FINISHED FLOOR
	C.A.	COMBUSTION AIR
	O.A.	OUTSIDE AIR
	E.A.	EXHAUST AIR
	S.A.	SUPPLY AIR
	R.A.	RETURN AIR
	R.A.G.	RETURN AIR GRILLE
	T.A.G.	TRANSFER AIR GRILLE
	O.B.D.	OPPOSED BLADE DAMPER
	W.P.L.	WEATHER PROOF LOUVER
	G.C.	GENERAL CONTRACTOR
	M.C.	MECHANICAL CONTRACTOR
	P.C.	PLUMBING CONTRACTOR
	E.C.	ELECTRICAL CONTRACTOR
T		THERMOSTAT/SENSOR
H		HUMIDISTAT/SENSOR
	F.P.C.	FIRE PROTECTION CONTRACTOR
	T.C.C.	TEMPERATURE CONTROLS CONTRACTOR

GAS LOAD SCHEDULE

ICE

EQUIPMENT	GAS INPUT (MBH)	RUNOUT SIZE
F-1	100.0	1"
F-2	100.0	1"
GUH-1	30.0	1/2"
GUH-2	30.0	1/2"
TOTAL CFH		260.0

NOTES

1. ALL REGULATORS, GAS-COCKS, UNIONS, ETC. SHALL BE LINE SIZE OF GAS PIPING (MINIMUM).
2. ALL LOW PRESSURE GAS PIPE SIZES ARE BASED ON NATURAL GAS: 7" W.C., 0.5 PSI (MAX.), 0.6 SPECIFIC GRAVITY AND 0.5" W.C. PRESSURE DROP.
3. IF DEVELOPED LENGTH (125 FT) OF GAS PIPING VARIES FROM DESIGN, PLUMBING CONTRACTOR SHALL NOTIFY ENGINEER FOR VERIFICATION OF ALL PIPE SIZING. P.C. SHALL VERIFY THAT GAS SYSTEM PRESSURE DOES NOT EXCEED ALLOWABLE LIMITS OF GAS UTILIZATION EQUIPMENT.

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MP1.0

FURNACE SCHEDULE

ICE

MARK	TYPE	HEAT (MBH)		EVAPORATOR				BLOWER					VENT PIPE DIA. (IN.)	INTAKE PIPE DIA. (IN.)	MODEL NUMBERS	
		INPUT	OUTPUT	MBH	PD (IN.)	ROWS	AREA	CFM	ESP (IN.)	HP	FAN SPEED	ELECT			FURNACE	DX COIL
F-1	UPFLOW	100.0	97.4	48.0	0.4	3.0	6.0	1,600	0.7	1	1,075	120/60/1ø	2"	2"	S9X1C100U5	4PXCCU48B
F-2	UPFLOW	100.0	97.4	48.0	0.4	3.0	6.0	1,600	0.7	1	1,075	120/60/1ø	2"	2"	S9X1C100U5	4PXCCU48B

NOTES:
1. UPFLOW FURNACE SELECTIONS ARE BASED ON TRANE SERIES XR 90 (90% MIN. EFFICIENCY) GAS-FIRED SEALED COMBUSTION FURNACES WITH MATCHING CASED EVAPORATOR COILS.
2. COOLING CAPACITIES ARE BASED ON AHRI CONDITIONS.
3. FAN SPEED INDICATED IS FOR BOTH COOLING AND HEATING.
4. SCHEDULED BLOWER EXTERNAL STATIC PRESSURE INCLUDES EVAPORATOR COIL AND CLEAN FILTER PRESSURE DROPS.

CONDENSING UNIT SCHEDULE

ICE

MARK	MATCH W/ UNIT #	MANUF.	MODEL	CAPACITY		COMP. (EA)		CONDENSER FANS (EA)				COIL		ELECTRICAL			ACCESSORIES											SEER
				TMBH	SMBH	NO.	RLA	NO.	HP	FLA	AMBIENT	SQ. FT.	ROWS	VOLT.	MCA	MOCP	ANTI-SHORT CYCLE TIMER	OVERLOAD PROTECTION	LOW AMBIENT KIT [0 DEGREES]	HIGH PRESSURE SWITCH	HIGH/LOW PRES/TEMP CONTROL	CRANKCASE HEATER	LIQUID LINE FILTER DRYER	SIGHT GLASS W/ MOIST IND.	START KIT	INTERNAL ISOLATION	
CU-1	F-1	TRANE	4TTA3048DS3	46.4	33.6	1	13.7	1	1/5	0.93	105°	19.07	1	208/3ø	18.0	30.0	●	●	●	●	●	●	●	●	●	--	13.0
CU-2	F-2	TRANE	4TTA3048DS3	46.4	33.6	1	13.7	1	1/5	0.93	105°	19.07	1	208/3ø	18.0	30.0	●	●	●	●	●	●	●	●	●	--	13.0

NOTES:
1. REFRIGERANT PIPING SHALL BE SIZED FOR ACTUAL INSTALLED LENGTH AND CONFIGURATION BY UNIT MANUFACTURER.
2. COOLING CAPACITIES ARE BASED ON 80 DEG. F DB / 67 DEG. F WB INDOOR AIR, 105 DEG. F DB OUTDOOR AIR.

FAN SCHEDULE

ICE

MARK	TYPE	MANUF.	MODEL NUMBER	CFM	E.S.P. (IN.)	AIR TEMP DEG.	SONES	FAN				MOTOR		FAN CONTROL							NOTES
								RPM	TIP SPEED	O.V.	DRIVE	HP (MAX. WATTS)	ELECTRICAL	SWITCH W/LIGHTS	PILOTED WALL SWITCH	THERMOSTAT CONTROLLED	DDC CONTROLS	KITCHEN HOOD	CONTINUOUS OPERATION	DISHWASHER CONTROL CIRCUIT	
EF-1	INLINE	COOK	GN-186	150	0.5	75°	3.5	947	1,891	765	DIRECT	69.1w	120/60/1ø	●	--	--		--	--	--	1,2,3,4
EF-2	INLINE	COOK	GN-842	855	0.5	75°	4.0	969	2,029	1,026	DIRECT	0.33	120/60/1ø	--	●	--		--	--	--	1,2,3,4

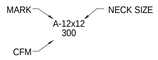
NOTES:
1. MODEL NUMBERS ARE BASED ON COOK FANS.
2. SEE SPECIFICATIONS FOR FAN TYPES AND ACCESSORIES.
3. ALL SWITCHES, INTERLOCKS, RELAYS, TRANSFORMERS, TIMECLOCKS, ETC., SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. SEE ELECTRICAL PLANS.
4. ALL BELT DRIVE FAN SELECTIONS SHALL INCLUDE DRIVE LOSSES.

GRILLES, REGISTERS, & DIFFUSERS SCHEDULE

ICE

MARK	USE	LOCATION	FINISH	MATERIAL	MOUNTING	NECK SIZE	FACE SIZE	MODEL NO.	ACCESSORIES	NOTES
A	SUPPLY	CEILING	WHITE	STEEL	LAY-IN	SEE DWG.	24x24	TDC	---	24x24 LAY-IN PANEL
B	SUPPLY	CEILING	WHITE	STEEL	SURFACE	SEE DWG.	12x12	TDC	O.B.D.	---
C	SUPPLY	DUCT	WHITE	STEEL	SURFACE	SEE DWG.	SEE DWG	300RL	O.B.D.	---
D	RETURN	CEILING	WHITE	ALUMINUM	LAY-IN	SEE DWG.	22x10	50F	---	24x12 LAY-IN PANEL
E	RET./EXH.	CLG. / DUCT	WHITE	STEEL	SURFACE	SEE DWG.	SEE DWG	350RL	O.B.D.	---
F	RETURN	CEILING	WHITE	ALUMINUM	LAY-IN	SEE DWG.	22x22	50F	---	24x24 LAY-IN PANEL

NOTES:
1. MODEL NUMBERS ARE BASED ON TITUS.
2. CALLOUTS ON DRAWINGS INDICATE NECK SIZE, CFM, AND SCHEDULE MARK.
3. M.C. SHALL FABRICATE NECESSARY RECTANGULAR TO ROUND ADAPTERS AT ALL GRILLE CONNECTIONS.
4. ALL SURFACES VISIBLE THROUGH FACE OF GRILLE/DIFFUSER SHALL BE PAINTED FLAT BLACK.



PLUMBING FIXTURE SCHEDULE

ICE

P-NO.	FIXTURE	MAN.	MODEL	SIZE	MATERIAL	MOUNTING	MOUNTING HEIGHTS	FLUSH VALVE/TANK	NO. OF FAUCET HOLE	ADA COMPLIANT	CARRIER	TRIM				ROUGH-IN SIZES					NOTES
												FAUCET/ VALVE MAN.	FAUCET/ VALVE MODEL	STRAINER	HOSE & SPRAY	SOAP DISP.	WASTE		VENT	WATER	
																	ABOVE GND.	BELOW GND.		HOT	COLD	
P1.1	WATER CLOSET	KOHLER	K-96057	N/A	VC	F	1	V	--	●	--	SLOAN ROYAL	111-1.6	--	--	--	---	4"	2"	---	1 1/4"	1,2
P1.2	WATER CLOSET	KOHLER	K-96053	N/A	VC	F	--	V	--	--	--	SLOAN ROYAL	111-1.6	--	--	--	---	4"	2"	---	1 1/4"	2
P2.1	URINAL	KOHLER	K-4991-ET	N/A	VC	W	2	V	--	●	●	SLOAN ROYAL	186-1.0	--	--	--	2"	2"	1 1/2"	---	3/4"	1
P3.1	LAVATORY	KOHLER	K-2196-4	20"x17"	VC	C	--	--	3	●	--	DELTA	22C531	1	--	--	1 1/2"	2"	1 1/2"	1/2"	1/2"	3,4
P4.1	SINGLE COMP. SINK	ELKAY	LRAD221965	22"x19"	SS	C	--	--	3	●	--	DELTA	27C2934-R7	2	--	--	1-1/2"	2"	1-1/2"	1/2"	1/2"	5
P5.1	ICE BOX	GUY GRAY	MIB1	7"x7"	--	W	--	--	--	--	--	----	----	--	--	--	---	---	---	---	1/2"	---

SCHEDULE LEGEND

MATERIAL

VC VITREOUS CHINA
SS STAINLESS STEEL

MOUNTING

F FLOOR MOUNTED
W WALL HUNG
C COUNTER MOUNTED

MOUNTING HEIGHTS

1. TOP OF SEAT AT 19" MAX. - VALVE OPERATOR AT 48" A.F.F. MAX. (ADA)
2. LIP AT 17" A.F.F. - VALVE OPERATOR AT 48" A.F.F. MAX. (ADA)

STRAINER TYPE

1. GRID
2. BASKET

NOTES:
1. PROVIDE WITH TRIP LEVER ON WIDE SIDE OF FIXTURE.
2. PROVIDE WITH WHITE OPEN-FRONT SEAT, LESS COVER.
3. PROVIDE AND INSTALL TRUEBRO MODEL 103 INSULATION, WITH ONE P-TRAP COVER, TWO ANGLE VALVE AND SUPPLY COVERS, AND ONE OFFSET TAILPIECE WHEEL CHAIR COVER. FIXTURES EQUIPPED WITH ARCHITECTURAL KNEE / UNDER-COUNTER SHROUDS DO NOT REQUIRE INSULATION.
4. PROVIDE LEAD-FREE POWERS LFE480 MIXING VALVE (OR EQUAL) TO MAINTAIN LAVATORY TEMPERATURE AT 110°F.
5. SUPPLY FAUCET WITH RIGID SPOUT.

WATER HEATER SCHEDULE

ICE

MARK	TYPE	STOR. CAP. GALLONS	RECOVERY G.P.H. (G.P.M.)	DEG. RISE	GAS					ELECTRIC			EXP. TANK	MODEL
					INPUT MBH	VENT DIA.	INTAKE DIA.	BURNER		NO. OF ELEMENTS	ELEMENT KW	VOLTAGE		
								HP	AMPS					
EWH-1	TANK	40.0	20.0	90°	--	--	--	--	--	2	4.5	208/60/3ø	--	DEN-30

NOTES:
1. ELECTRIC WATER HEATER SELECTION BASED ON A.O. SMITH COMMERCIAL ELECTRIC WATER HEATERS.
2. WATER HEATER TO OPERATE WITH NON-SIMULTANEOUS OPERATION.

PUMP SCHEDULE

ICE

MARK	MANUF.	MODEL	SERVICE	TYPE	GPM	HEAD (FT)	EFFICIENCY	MOTOR			NOTES
								ELECT.	HP (W)	RPM	
RCP-1	B&G	NFB-33	DOM. HW	RECIRC.	15	7	--	120/60/1ø	1/6	2,950	1

NOTES:
1. BASED ON BELL & GOSSETT RECIRCULATING PUMP.

GAS UNIT HEATER SCHEDULE

ICE

MARK	MANUF.	MODEL	TYPE	FAN			HEATING		INTAKE DIA.	FLUE DIA.	NOTES
				CFM	HP	ELECT.	INPUT (MBH)	OUTPUT (MBH)			
GUH-1	REZNOR	UDZ-30	SUSP.	456	0.06	120/60/1ø	30.0	24.6	4"	4"	1,2
GUH-2	REZNOR	UDZ-30	SUSP.	456	0.06	120/60/1ø	30.0	24.6	4"	4"	1,2

NOTES:
1. GAS UNIT HEATER SELECTION BASED ON REZNOR MODEL UDZ SEPARATED-COMBUSTION, LOW-STATIC AXIAL FAN UNIT HEATERS.
2. MAINTAIN MANUFACTURER CLEARANCES TO COMBUSTIBLES.

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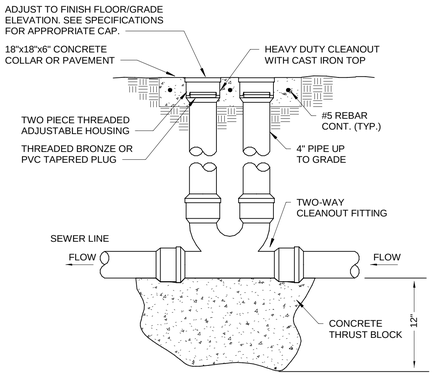
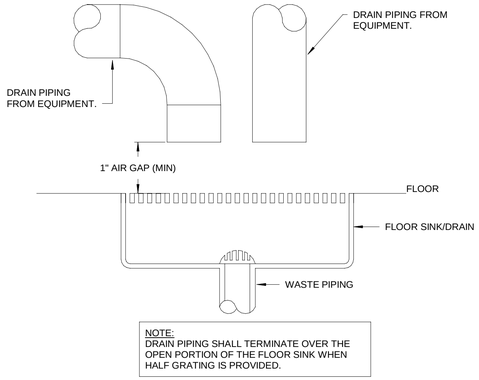


1 2-WAY GRADE CLEANOUT

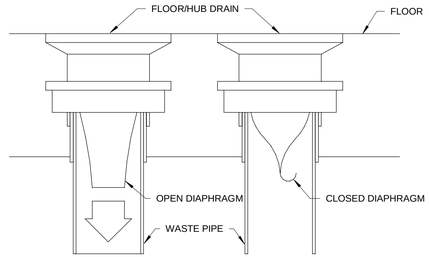
SCALE: N.T.S.



NOTE:
DRAIN PIPING SHALL TERMINATE OVER THE OPEN PORTION OF THE FLOOR SINK WHEN HALF GRATING IS PROVIDED.

2 INDIRECT WASTE CONNECTION

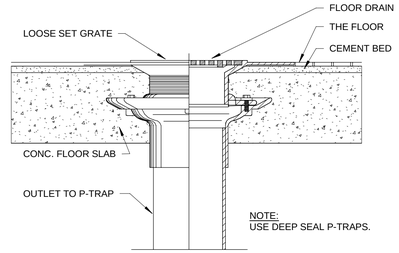
SCALE: N.T.S.



NOTES :
1. TRAP GUARD DIAPHRAGM AS MANUFACTURED BY PROSET SYSTEMS, INC, SURESEAL OR APPROVED EQUAL. SEE SPECIFICATION.
2. WHERE ALLOWED BY LOCAL CODE, TRAP GUARD MAY BE USED IN LIEU OF TRAP PRIMER.

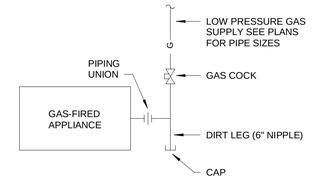
3 TRAP GUARD DIAPHRAGM

SCALE: N.T.S.



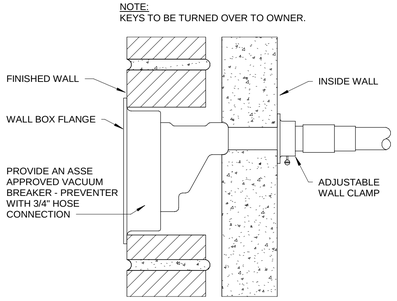
4 FLOOR DRAIN

SCALE: N.T.S.



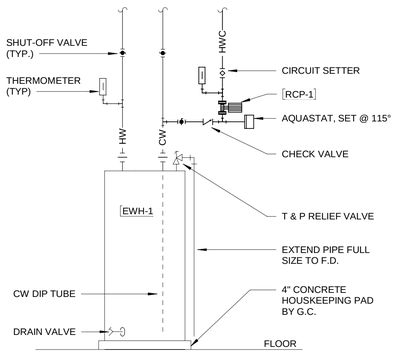
5 GAS-FIRED APPLIANCE PIPING

SCALE: N.T.S.



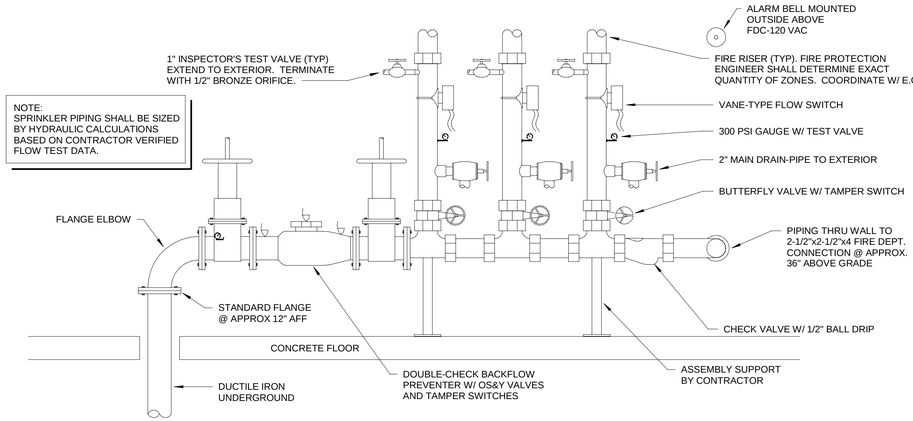
6 FREEZE-PROOF WALL HYDRANT

SCALE: N.T.S.



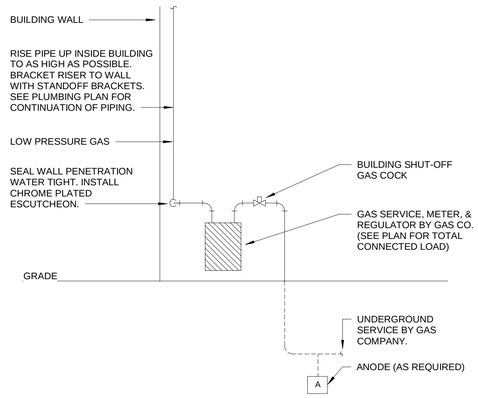
7 ELECTRIC WATER HEATER

SCALE: N.T.S.



8 FIRE PROTECTION SYSTEM RISER

SCALE: N.T.S.



9 GAS RISER PIPING SCHEMATIC

SCALE: N.T.S.

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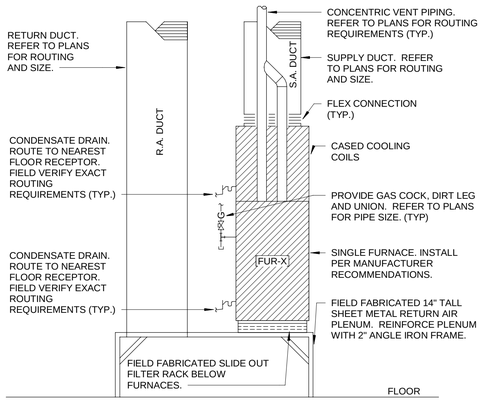
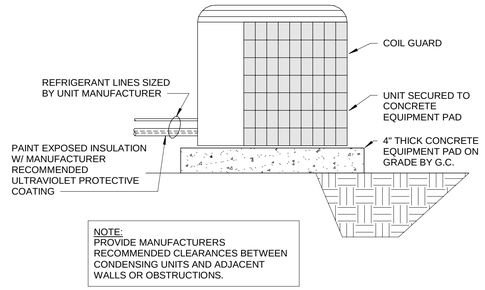


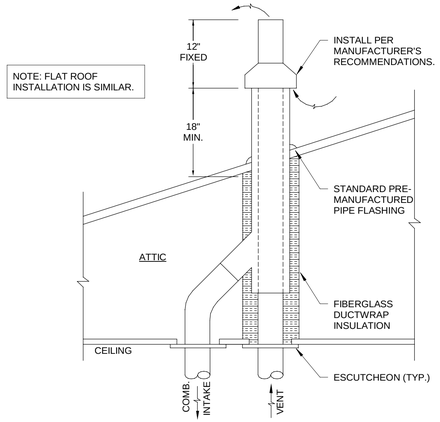
1 GAS-FIRED FURNACE - HIGH EFFICIENCY

SCALE: N.T.S.



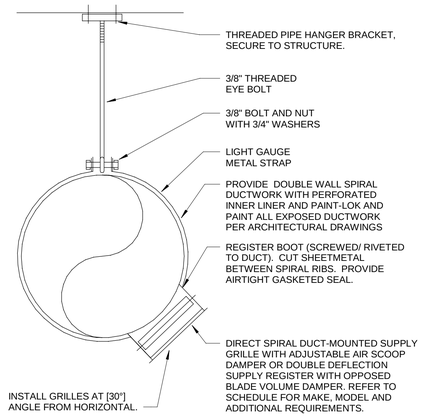
2 CONDENSING UNIT (GROUND MOUNTED)

SCALE: N.T.S.



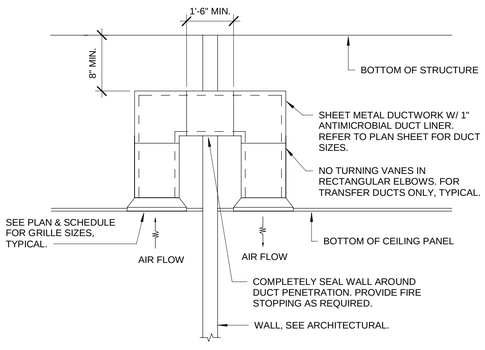
3 CONCENTRIC TERMINATION KIT

SCALE: N.T.S.



4 EXPOSED SPIRAL DUCTWORK

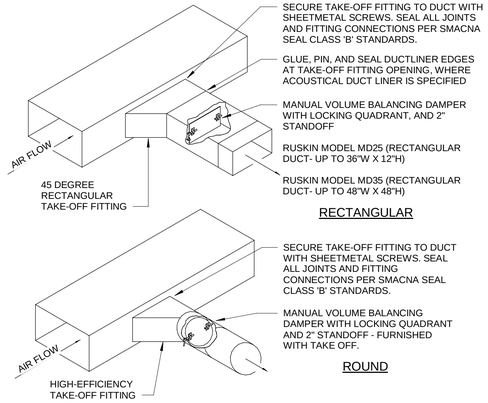
SCALE: N.T.S.



NOTES:
1. INSTALL RETURN AIR TRANSFER DUCT ABOVE CEILING.
2. INSTALL FIRE DAMPERS OR FIRE/SMOKE DAMPERS AS SHOWN ON PLANS.

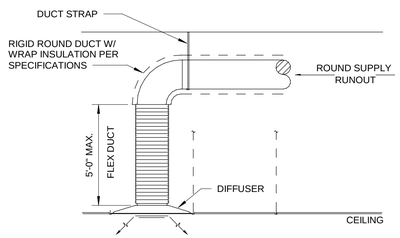
5 TRANSFER DUCT (TERM. AT CEILING)

SCALE: N.T.S.



6 DUCT TAKE-OFFS (RECTANGULAR & ROUND)

SCALE: N.T.S.



NOTES:
1. USE IN VERTICAL ARRANGEMENT WHERE POSSIBLE. IF BENDING IS NECESSARY, SUPPORT FLEX DUCT TO MAXIMIZE BEND RADIUS. 90 DEGREE TURNS ARE NOT ALLOWED.
2. PROVIDE AIRTIGHT CONNECTIONS TO RIGID ROUND DUCT AND AIR DEVICE.
3. SEE SPECIFICATIONS FOR FLEX DUCT RESTRICTIONS.

7 FLEXIBLE DUCT TO DIFFUSER

SCALE: N.T.S.

231972.00 - 622
OKLAHOMA REGISTRATION NUMBER: 5682
Integrated Consulting Engineers, Inc.
349 South Hydraulic • Wichita, KS 67211
316.264.3588 • 316.264.3948 • www.iconengineers.net

PROFESSIONAL ENGINEER
DWAYNE GRIN
12-18-2023
24635
OKLAHOMA

date issued: 01-08-2024

Kingfisher County Extension Office 2023

300 South 13th Street, Kingfisher, OK 73750

CORBIN • MERZ • HANEY
ARCHITECTURE INTERIOR DESIGN
302 NORTH INDEPENDENCE ENID, OK 73701 WWW.CORBINMERZHANEY.COM PH:(580)233-2362

MP1.3

GENERAL PROVISIONS 15010

1.01 Furnish all labor, materials, equipment, fixtures, apparatus, special or occasional services, and other appurtenances required for installation of complete and operational heating, ventilating, air conditioning (HVAC) and plumbing systems as indicated on the drawings and as described in these specifications. This work shall include all materials, apparatus, and appliances not specifically mentioned herein or noted on the Drawings as being furnished and installed under another section.

1.02 Work Included: This work includes but is not limited to the following systems: Sanitary sewer and vent, domestic water, natural gas, plumbing fixtures and trim, unit condensate drainage, refrigerant, supply and return HVAC.

1.03 Related Requirements: Prime and protective painting is included in this section; finish painting is specified elsewhere. Temperature controls including low voltage wiring and components are included in this section. Power for temperature controls, interlocks and line voltage electrical power is specified elsewhere. Duct mounted access doors are included in this section; access doors in gyp board walls, ceilings, etc., is specified elsewhere.

Concrete mounting slabs and structural steel reinforcing is specified elsewhere.

Miscellaneous fittings, brackets, supports, etc. are included in this section; other metal work is specified elsewhere. Flashings, counter flashings, caulking, sealants, etc. as required for weatherproofing mechanical penetrations through walls, floors, and roofs are included in this section; other waterproofing is specified elsewhere.

1.04 Coordination with Other Trades: These drawings are diagrammatical in nature and show certain physical relationships which shall be established by the contractor. Install the system within the constraints of the building in an approved manner and coordinate with other trades to ensure harmonious working conditions and proper installation.

1.05 Permits and Inspections: Obtain all permits and inspections and pay all fees for completion of this work.

1.06 Codes and Standards: Comply with the latest adopted version of the International Mechanical and International Plumbing Codes including all local amendments, applicable sections of the NFPA, and other applicable current laws, codes, ordinances, etc. of all Federal, State, and Local authorities whether included or not in the contract documents. All mechanical equipment shall be labeled by UL, ETL, AGA, or other approved independent testing authority. Air conditioning equipment shall be AHRI certified.

1.07 Submittals and Review of Materials, Samples, and Drawings: Provide submittals for all major mechanical equipment and other items where indicated. Identify each piece of equipment with designation indicated on the contract documents. Submit minimum of 3 copies for approval. Submit shop drawings showing any proposed deviation from the contract documents required for interface with the building. Electronic .pdf submittals of equipment and shop drawings may be provided in lieu of hard-copies at contractors' option.

Electronic .pdf copies shall be submitted and reviewed without requiring the utilization of contractor or job specific (not necessarily proprietary) job management or submittal software.

1.08 Guarantees and Warranties: Provide a one-year warranty starting at the date of acceptance by the owner for all systems and equipment installed under this contract.

1.09 Operations and Maintenance Data: Provide operation and maintenance data for all equipment. Identify each piece of equipment as indicated in the contract documents. Information shall include but is not limited to startup, shut down, service and lubrication procedures. Bind information in 3-ring, loose leaf, hard back binder. At Contractors option, and with approval of owner, operations and maintenance data may be provided in electronic .pdf format.

1.10 Product Delivery, Storage and Handling: Protect all fixtures, material, equipment, and appurtenances from physical and weather damage. All damaged items will be restored to original condition or replaced at owner's option before final acceptance.

1.11 Temporary Services: Provide temporary services and utilities as required.

1.12 All materials exposed in return air plenum to comply with NFPA 90A flame spread under 25, smoke developed, and fuel contributed under 50 for return air plenums.

1.13 Provide access doors where indicated on drawings and/or as required to properly operate, adjust and maintain all equipment. Coordinate exact location with architect prior to installation.

1.14 Caulking and Flashing: Seal all floor, wall and roof penetrations water tight with suitable sealant. Seal penetrations through fire rated assemblies with minimum 1" thickness 3M brand fire barrier caulk CP-25 (or other approved manner) to maintain rating of assembly.

1.15 Openings, Cutting and Patching: Place all equipment in time to avoid cutting new construction. Coordinate required openings with other trades. Undertake no cutting without architect's approval. All patching shall be structurally and aesthetically equal to the surface surrounding the area patched.

1.16 Field verify exact location, size, routing, and availability of existing HVAC and plumbing systems. Verify sufficient space is available to install new equipment and systems as indicated on drawings. If changes are necessary, notify engineer as soon as possible and modify systems as instructed. Coordinate exact location of ceiling diffusers and recessed equipment with light fixtures, ceiling grid, etc.

1.17 Cleaning and Sterilization: Remove all construction debris from site and clean all mechanical equipment. Clean and disinfect all plumbing fixtures and trim. Disinfect domestic hot and cold-water systems with 60 ppm chlorine, allow to stand 24 hours, thoroughly flush system, refill system and ensure residual chlorine content of less than .20 ppm.

1.18 Testing of Piping: All piping shall be tested with hydrostatic or pneumatic pressure, or other means as directed, and shall be proved tight as hereinafter specified in the presence of the local building inspector before it is concealed or covered in any way.

This Contractor shall furnish and install all plugs and make all temporary connections necessary to perform these tests. He shall furnish all labor, tools, and equipment necessary to perform such tests.

Duration of tests shall be of sufficient time to permit inspection of all joints by the local building inspector, and generally holding test pressure for a period of not less than 12 hours continuously without loss of any pressure.

Individual System Tests:

1. Domestic water piping tested under 100 PSI hydrostatic pressure.
2. Soil, waste, vent tested under 12' head of water pressure.
3. Natural gas piping tested under 30 PSI air pressure.
4. Refrigerant piping tested under 300 PSI nitrogen gas pressure.

1.19 Mounting Heights: Install all exposed equipment and piping as high as possible while maintaining access for service of piping and surrounding systems and equipment. Conceal piping and equipment unless indicated otherwise.

1.20 Freeze Protection: Piping and equipment located in areas subject to freezing shall be installed in a manner to prevent freezing. Install all piping on warm side of building insulation to prevent freezing.

1.21 Start-up Instructions: Start-up equipment in accordance with manufacturer's instructions. Review equipment and instruct owner in proper operation of the equipment.

1.22 Equipment and Systems Installation: Install equipment and systems in accordance with manufacturer's printed installation instructions and in accordance with accepted industry standards and all applicable codes. Meet all required clearances and provide all necessary equipment accessories, bases, supports, shields, etc. for a complete and operational installation.

1.23 All mechanical equipment shall be labeled with the equipment identification number. Identification shall be with laminated three-layer plastic nameplates, with engraved black letters on white background. Lettering size shall be 0.75-inches high.

1.24 Pipe Identification: Install pipe identification markers and direction arrows on all piping that is exposed and above ceilings. Markers to be color coded and identified per ANSI specifications. Install at valves and no further than thirty (30) feet apart along any run of pipe, except equipment rooms where spacing will be twenty (20) feet.

1.25 Balancing and Adjusting: The mechanical contractor shall adjust and balance the mechanical systems and check every operational piece of equipment. System shall be balanced to airflow quantities as indicated on drawings. Check, adjust and balance to provide a complete and operational system. A typewritten final balance report shall be provided to the engineer for record purposes.

PIPING SYSTEMS 15060

1.01 Work Included: Installation of all piping systems.

1.02 Water Service: The water department will provide the water main tap and furnish the water meter(s), costs of such will be charged to the mechanical contractor. The mechanical contractor will install the water main extension, the water meter vault(s), the water meter(s), and all necessary valving per The City of Kingfisher requirements and details. Extend water service to building as shown on plans. Install a building shut-off valve at riser in new building. Where local water pressure is in excess of eighty (80) pounds per square inch (PSI), an approved type pressure regulator preceded by an adequate strainer shall be installed. Regulator with integral by-pass is acceptable. Regulator and strainer shall be accessibly located and shall have the strainer readily accessible for cleaning without removing the regulator or strainer body or disconnecting the supply piping.

The water service shall be Type 'L' copper or schedule 40 PVC installed a minimum of 48" below finish grade or 6" below local ground freeze level. Such service shall not be less than five (5) feet from any tree on public property. The water service pipe shall be laid in a trench separate from other underground pipes or conduits. There shall be not less than eighteen (18) inches of solid undisturbed earth between water service pipes and other underground pipes and conduits. Changes in direction in copper tubing may be made with bends having a radius of not less than six (6) diameters of the tubing, providing that such bends are made through the use of forming equipment which does not deform or create a loss in cross sectional area of the tubing.

Refer to Division 2 for excavation, trenching, and backfilling requirements. All buried PVC plastic piping shall be installed with metallic tracer wire accessible at both ends.

1.03 Domestic Water: Type "L" hard copper ASTM B88 pipe. Wrought copper ASTM B16.22 fittings. Sweat 95-5 tin antimony solder joints. Use Type "K" copper below grade. Plumbing installer shall minimize piping joints below floor. Where joints are necessary, all joints shall be brazed with silver bearing solder.

1.04 Condensate Drain Piping: Schedule 40 PVC ASTM D1784 pipe. Drainage pattern ASTM D2729 fittings. Solvent weld ASTM D2564 joints. Install pipe without sags or bow-ups. Provide intermediate hangers as required. Install deep seal traps and cleanout plugs at all equipment connections. Piping on roof shall be supported on pre-manufactured piping supports as noted and detailed on drawings or treated/redwood blocking if not noted otherwise. Do not use PVC in return air plenums except where allowed by code. Piping in return air plenums shall be copper piping (the same as domestic water piping), except use drainage pattern fittings.

1.05 Sanitary Drain, Waste, and Vent Piping (Buried within 5 Feet of Building): ASTM D2665, Schedule 40 PVC DWV pipe with ASTM D3311 PVC drainage pattern fittings and ASTM D2855 solvent welded joints with ASTM D2564 solvent cement. Install pipe in a straight line and grade uniformly to slopes indicated by flow line elevations at the building and connection to sanitary sewer main on site. Plug open ends of piping when installation is not in progress.

Install pipe with barrel on firm undisturbed material for the entire length. Refer to Architectural and other division specifications for excavation, trenching, and backfilling requirements.

1.06 Sanitary Drain, Waste, and Vent Piping (Above Grade): ASTM D2665, Schedule 40 PVC DWV pipe with ASTM D3311 PVC drainage pattern fittings and ASTM D2855 solvent welded joints with ASTM D2564 solvent cement.

NOTE: Do not use plastic piping in return air plenums nor penetrate fire rated construction materials except where allowed by code. Piping in return air plenums and through fire rated construction materials shall be cast iron.

In lieu of cast iron piping and at contractors option: where allowed by code and local authority having jurisdiction, PVC piping may be insulated with fire wrap equal to Fyre Wrap 0.5" plenum insulation as manufactured by UniFrax.

1.07 Natural Gas Piping: ASTM A53, Schedule 40 black steel Type E Grade B or Type S Grade B.

For piping up to and including 2 inches: ASME B16.11, 2000 psi forged steel, welded or threaded type; Class 150 black malleable iron, threaded, ASME B16.3 fittings. NFPA 54, threaded or welded to ANSI B31.2, ANSI B31.8 joints. ASME B16.11, forged steel, 3000 psi, threaded or welded; Class 150 black malleable iron, threaded, ASME B16.3 couplings.

For piping over 2 inches: ASME B16.9, steel, butt-welding type (wall thickness to match pipe) fittings. ANSI B31.2, ANSI B31.8, welded joints. Class 150 forged black steel, slip-on or weldneck, raised face, ASME B16.5 flanges. Use flat-faced flanges for connection to Class 125 flat-faced cast iron flanges, fittings, or valves. Non-metallic, self-centering or full face, ASME B16.21 gaskets. Flange bolts to be carbon steel, coarse thread, ASTM A307 Grade B, ASME B18.2.1; Heavy hex nuts, ASTM A563 Grade C, D, DH, DH3, ASME B18.2.2. Flange insulation to include insulating gasket, bolt tubes, insulating washers, steel washers; Electrically isolate underground piping from aboveground piping.

Provide a quarter turn lubricated cut-off cock at each piece of equipment. Teflon tape is not allowed in natural gas system piping. Underground piping shall be coated and wrapped with .04" thick polyethylene equal to AWWA C203 or C025. Provide cathodic protection as required. Coordinate with local gas utility company. Gas piping exposed on exterior of building shall be primed and painted with (2) coats of Rustoleum paint or equal. Piping on roof shall be supported on pre-manufactured piping supports as noted and detailed on drawings or treated/redwood blocking if not noted otherwise.

NOTE: Contractor may substitute polyethylene piping in lieu of coated black steel for the underground piping, if allowed by local code officials. Piping installation shall conform to all code requirements and include necessary tracer wire (18 ga. copper), and steel pipe risers.

1.08 Refrigerant Piping: Type "ACR" hard copper ASTM B-88 pipe. Wrought copper ASTM B16.22 fittings. Brazed joints with Sil-Fos or equivalent silver bearing solder. Purge with dry nitrogen while brazing. Evacuate system for 12 hours minimum prior to charging with refrigerant. Refrigerant pipe sizing and pipe accessories shall be sized and selected by the equipment manufacturer providing the equipment. Install piping with adequate slope to prevent oil trapping. Furnish all suction accumulators, solenoid valves, traps, double suction risers, etc., as required by equipment manufacturer's installation instructions. Selection and sizing shall provide the necessary scheduled capacities per actual job conditions.

1.09 Fire Protection Service Piping: Underground pipe and fittings shall be in accordance with NFPA Standard No. 24 and local water department requirements (verify prior to bidding). Underground piping shall be class 50 centrifugally cast ductile iron pressure pipe field wrapped with two layers of .040 polyethylene film with cement lining and mechanical joints meeting AWWA Specification C-151. Pipe more than 10 feet from the building may be C900 DR 18 PVC pipe "Ring Tite" joints (where allowed by the local water department). Fittings shall be cast iron mechanical joint type meeting AWWA Specification C111-72 and C100-71. Provide flanged and anchored connections under the building floor. All pipe shall have a minimum cover of 3.5' measured from top of pipe to finish grade, or as required by local code. Provide concrete and install as required for proper thrust blocking.

Building fire protection piping from the connection to the City main to the building shall be sized by the Fire Protection Contractor and installed by the Plumbing Contractor.

1.10 Pipe Hangers and Supports: Provide pipe hangers and supports designed to carry the load with a safety factor of 5 or larger. Hangers oversized to fit pipe and insulation on insulated lines. Copper hangers shall be used for support of copper piping.

Hangers of malleable iron split ring, clevis, or roller type.

Rods and adjustable turnbuckles suspended from inserts or supporting members in construction for overhead suspension. Heavy welded steel brackets for wall suspension. Furnish and install hangers, rollers, insulation saddles, stands, anchor chairs and all required attachments. Wall supports bolt through wall with suitable back plate on back side of wall.

Pipe Hanger Spacing:

5'-0" for cast iron soil pipe, ABS & PVC plastic pipe.
8'-0" for copper, iron and steel piping up to 1" size.
10'-0" for copper, iron and steel piping above 1" size.

1.11 Exterior Piping and Equipment Supports: Field fabricated steel framing for support of mechanical equipment, piping, and duct systems shall be reviewed by a licensed Structural Engineer. A detailed shop drawing indicating the proposed design of the support framing system shall be submitted for structural engineer's review prior to installation.

1.12 Valves & Cocks:

A. General: All valves of a given type shall be of one manufacturer. Provide all valves where required for operation, service and maintenance of systems and equipment. 150 PSIG working pressure or for pressure and service specified herein. All valves shall be of a suitable type for intended service.

Sweat joints valves in copper piping. Protect valves from heat during installation. All valves in insulated piping system will be installed with operating handles above insulation through use of extension stems, extended necks, or rising stems.

B. Valve Connection:
1. Thread pipe sizes 2" and smaller
2. Flange pipe sizes 2½" and larger
3. Solder for copper tubing

C. Ball Valves: Bronze, swing-away design, full port, chrome plated bronze ball with teflon seats, 125 SWP, 400 WOG screwed or soldered ends.

D. Drain Valves: Bronze, compression stop with nipple and cap or hose thread.

1.13 Piping Specialties:

A. Circuit Setter: Bell & Gossett Series CB venturi type calibrated balance valve to measure flow of chilled water with minimal water pressure drop. Bronze body construction with gauge ports. Adjusting valve with calibrated scale and indicator and memory stops. Pre-formed molded insulated covers to permit access for balance and measurement.

B. Shock Absorbers: Provide PDI WH-201 approved shock absorbers at all equipment subject to water hammer.

1.14 Floor Drains:

Zurn ZN-415-BZ or equal: Dura-coated cast iron body with bottom outlet, combination invertible membrane clamp and adjustable collar with seepage slots. "Type BZ" polished nickel bronze, light-duty, leveling round strainer for general floor drains including those installed in linoleum or asphalt/VCT tile floors. 2" & 3" drains to have 5" strainer, 4" drains to have 6" strainer.

Zurn ZN-415-A or equal: Dura-coated cast iron body with bottom outlet, combination invertible membrane clamp and adjustable collar with seepage slots. "Type S" polished nickel bronze, square heel-proof, light duty strainer for installation in ceramic tile, quarry tile or terrazzo floors.

Deep seal P-trap. Furnish with trap primer connection as required by local codes or where shown on the plumbing drawings. Drains equipped with trap guard seals do not require trap primer connection.

General Contractor to locate and set elevations for drains, no deviation made from this with-out permission of the Architect.

1.15 Floor Sinks: Deep cast iron body and slotted light duty grate with 1/2" slotted openings, white acid resisting porcelain enamel interior and top, complete with aluminum anti-splash interior bottom dome strainer. Floor sinks with indirect waste connections shall be set with the open part of the grate under the equipment so that the indirect piping is out of the way. Verify kitchen (and other) equipment sizes and orientation so that floor sinks are located to catch all drainage associated with each piece of equipment.

4"FS - Zurn Model Z-1910 or equal (8"x8"x6") with full grate

1.16 Trap Primer:

A. J.R. Smith 2698, Sioux Chief 200/213 series, or equal. Chrome plated cast 'P'-trap with ground joint connection and escutcheons, ½" primer tube with compression fitting connection at wall. Install per manufacturer's installation instructions. Tailpiece shall be certified by ASSE to the ASSE 1044 Standard and meet applicable drainage requirements set forth by ASSE 1044. Refer to plans for additional information.

B. Inline Floor Drain Trap Sealer: (Where allowed by local Authority Having Jurisdiction): Sure Seal, Pro-set or equal. IAPMO listed, ASSE 1072 approved. 10-year limited warranty.

1.17 Cleanouts: Full size of pipe up to 4". Locate at base of vertical stacks, ends of mains, changes in directions greater than 135 degrees. Install cleanouts at a maximum of every 100 linear feet in all waste piping inside and outside of building.

Finished walls: Zurn Z-1468 stainless steel wall access cover complete with securing screw and bronze raised hex head plug.

Finished floors - Zurn Z-1400 - adjustable floor level cleanout - polished bronze top.

Carpeted floors - Zurn Z-1400 - adjustable floor level cleanout - polished bronze top - carpet marker.

Outside building - heavy-duty cleanout with cast iron top - threaded bronze or PVC tapered plug - set in reinforced concrete collar.

1.18 Traps: Furnish and install all traps required for fixtures or equipment, including traps not supplied with fixture or equipment.

Separately trap fixtures having waste connection as close to the fixture as possible. Deep seal traps where required.

Chromium plated cast brass exposed traps in finished areas.

1.19 Exterior Wall Hydrant: Non-freeze "anti-siphon" automatic draining - integral backflow preventor - chrome finish on brass casing - removable tee key - bronze interior parts with stainless steel stem - wall clamp - length to suit wall thickness. Equal to Woodford Model B67.

1.20 Piping Installation: Evenly spaced - run harmoniously with the building walls and ceilings. Installed in the desired location as indicated on drawings. Certain branch piping may be rerouted, providing rerouting does not alter intended design. Installed in strict accordance with best piping practice. Piping not sized on drawings shall be sized by the Engineer.

Provide unions and isolation valves at all equipment to facilitate removal. Install gas piping in open or ventilated areas. Use non-conducting fittings where joining dissimilar metals. Slope all drainage piping 1/4" per foot (1/8" per foot for DWV piping 4" and larger). Arrange piping in a manner to allow for expansion and contraction. Thoroughly clean before installing - no sand, dirt, filings, etc.

PUMPS 15140

1.01 Work included: Installation of pumps and accessories

1.02 Submittals:

A. Product Data: Submit product data for the following, as specified under Section 15010.

1. Pumps and Accessories

1.03 Acceptable Manufacturers:

A. Domestic Hot Water Circulating Pumps
1. Bell & Gossett
2. Armstrong
3. Grundfos
4. Taco

1.04 Domestic Hot Water Recirculating Pump:

See schedule on the drawings.

Bell & Gossett NBF Series as scheduled. In-line, horizontal, system lubricated circulating pump - bronze construction approved for potable water circulation - ceramic shaft supported by carbon bearings – suitable for 225 deg. F operation at 150 psig working pressure - Noryl impeller - quiet operation, non-overloading motor with built-in thermal overload protection - flanged piping connections. Furnish 7-day adjustable automatic timer kit to turn pump "on" or "off" at selected times. Furnish and install adjustable aquastat with immersion well to cycle pump operation based on temperature when enabled by timer kit.

All line voltage wiring and disconnect switch by the Electrical Contractor.

1.05 Installation:

A. Install units as shown on drawings. Coordinate installation with Electrical and General Contractors.

B. Equipment shall be installed per manufacturer's installation instructions and shall accommodate minimum clearance and service requirements.

C. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25% of midpoint of published maximum efficiency curve.

INSULATION 15250

1.01 Work Included: All piping and duct system insulation and acoustical liner.

1.02 Acceptable Manufacturers:

A. Fiberglass Insulation
1. Owens Corning
2. Johns-Manville
3. Knauf
4. Certainteed

B. Foamed Plastic Insulation
1. Armstrong Armaflex
2. Rubatex

1.03 Refrigerant Suction: Pipe sizes up to 1 1/4" - 1/2" thick, 1 1/2" and larger 1" thick foamed plastic closed-cell type insulation. Where exposed to weather paint with two (2) coats of manufacturer recommended ultraviolet protective coating.

1.04 Domestic Cold Water and Hot Water Piping: Insulate all domestic cold water and hot water piping with fiberglass SSK-11 ASJ pipe insulation with self-sealing lap.

All insulation shall be continuous through wall and ceiling openings and sleeves. Insulation on all cold surfaces where vapor barrier jackets are used, will be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors, etc., which are secured directly to cold surfaces must be adequately insulated and vapor-sealed to prevent condensation. Crushing of insulation at hangers is not permitted and will require pipe saddles or high-density foam glass inserts. Pipe saddles shall be insulated as required to provide a continuous unbroken insulation of pipe as specified for the piping being supported. Specified adhesives mastics and coatings shall be applied at the manufacturer's recommended minimum coverage per gallon.

Fittings: All fittings, valves, and flanges, shall be covered with PVC pre-molded one-piece fitting covers utilizing factory supplied hi-lo temperature insulation insert. Insulation insert shall be applied to the fitting with ends of insert tucked snugly into throat of fitting and edges adjacent to pipe. No gaps shall occur between fitting insulation and pipe insulation. Secure PVC pre-molded cover to insulated fitting by stapling and taping edges of cover with Zeston color matching Z-tape. Rainleaders and cold water systems, fittings, valves, flanges, PVC pre-molded fitting cover shall be secured with Zeston Vapor Barrier Adhesive or Equal (Fosters 85-20). Circumferential edges of cover shall be wrapped with Zeston color matching Z-tape. The tape shall extend over adjacent pipe insulation and overlap itself at least 2" on the downward side.

Preparation: All testing of piping shall be completed, and all leaks repaired prior to application of insulation.

Installation: All insulation shall have composite (insulation, jacket or facing, and adhesive used to adhere the facing or jacket to the insulation) fire and smoke hazard ratings as tested by procedure ASTM E-84, NFPA 255 and Underwriters' Laboratories, Inc. Standard #723, not to exceed:

Flame Spread	25
Smoke Developed	50
Fuel Contributed	50

Accessories, such as adhesives, mastics, cements, tapes, and glass cloth for fitting shall have the same component ratings as listed above. All products or their shipping cartons shall bear a label indicating flame and smoke ratings in compliance with the listed ratings maximum. Any treatment of jackets or facings to impart flame and smoke-safety shall be permanent. The use of water-soluble treatments is prohibited. The Insulation Contractor shall certify, in writing, prior to installation, that all products to be used will meet the above criteria.

Edges of insulation and butt joints shall be taped with joint sealing tape. The vapor barrier for cold or dual temperature equipment and piping shall be secure at all times; no staples shall be used to close or secure jacket in these systems.

Adhesives, Sealers, Facings, and Vapor Barrier Coatings shall be compatible with materials to which applied, and shall not corrode, soften, or otherwise attack the pipe or insulation materials in either the wet or dry state. Use only adhesives, sealers, facings, and vapor barrier coatings recommended by the approval manufacturers of insulation materials.

Thickness	System
1"	Domestic Hot Water (up to 1-1/4")
1-1/2"	Domestic Hot Water (1-1/2" and up)
1/2"	Domestic Cold Water(up to 1-1/4")
1"	Domestic Cold Water(1-1/2" and up)

1.05 Duct Insulation: Insulate all concealed round supply air ducts and outside air ducts with 1½" thick R-6 minimum faced duct wrap fiberglass insulation (seal and tape all joints and seams). Round ductwork exposed in conditioned space does not require insulation.

1.06 Duct Liner: Line all rectangular supply and return air ducts and plenums with 1" thick, 1.5 pcf acoustical liner with a minimum R-value = 4.2. Liner to comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."

Apply antimicrobial erosion-resistant coating to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.

Solvent or water-based liner adhesive to comply with NFPA 90A or NFPA 90B and with ASTM C 916.

Cupped-head, capacitor-discharge-weld pins shall consist of copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch (38-mm) galvanized carbon-steel washer.

Insulation-retaining washers shall be self-locking formed from 0.016-inch-thick galvanized steel, aluminum or stainless steel with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

Shop application of duct liner shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-19, "Flexible Duct Liner Installation."

PLUMBING SYSTEM COMPONENTS/PLUMBING FIXTURES 15400

1.01 Work Included: Installation of all plumbing system components including plumbing fixtures and trim.

1.02 Acceptable Manufacturers:

A. Plumbing Fixtures (Vitreous China)
1. Kohler
2. American Standard
3. Zurn
4. Sloan
5. Gerber

B. Plumbing Fixtures (Stainless Steel)
1. Elkay
2. Just

C. Faucets/Trim
1. Delta
2. Sloan
3. American Standard
4. Zurn

D. Closet Seats
1. Church
2. Bemis

E. Ice Maker Box
1. Guy Gray

F. Electric Hot Water Heater
1. Lochinvar
2. State
3. A.O. Smith

1.03 Submittals: Submit shop drawings on plumbing fixtures, faucets, trim, and water heaters.

1.04 Plumbing Installation: Provide traps at all fixture waste connections. Provide stops at all individual plumbing fixtures and equipment. All exposed stops, wall escutcheons, and supplies shall be chrome plated. Install chrome plated escutcheons at all piping penetrations to finished materials. Install additional wall support framing for all wall hung fixtures (where carriers are not provided). Install offset P-traps from handicapped lavatories and sinks back at wall to allow maximum clearance for wheelchair access. Countertop handicapped sinks shall be supplied with rear center drain connection. Securely anchor all flush valves behind or within walls to be absolutely rigid and not subject to movement due to push or pull action of valve. All vitreous china fixtures shall be standard white color. Certain fixtures installed for handicapped access may have different rough-in requirements. See the drawings for locations and mounting heights. All fixtures and accessories designated as handicapped shall conform to the Americans With Disabilities Act.

1.05 Plumbing Fixture Schedule:

Refer to schedule on drawings for fixture and trim descriptions.

1.06 Electric Hot Water Heater:

Capacities as scheduled on the plans.

Light Duty Commercial Electric

Light Duty commercial electric water heater with glass lined steel tank, 150 PSI working pressure, tank saver anode rod, steel jacket with non-CFC foam insulation, immersion Incoloy sheathed heating elements, non-simultaneous operation, adjustable thermostats with automatic overheat protection, ASME T & P relief valve, brass drain, and 3 year limited warranty.

Meets ASHRAE 90.1 energy efficiency standards and UL & CSA certified.

Electrical Contractor to provide all wiring and disconnect switch.

FIRE PROTECTION SYSTEMS 15500

1.01 Description: Provide all labor, materials, equipment, tools, skilled supervision and appurtenances to provide a complete and operational fire protection system throughout the entire building including all overhangs exceeding 3'-0". Refer to architectural code plan for additional information.

All work shall comply with federal, state, and local codes, ordinances, and regulations. Materials, equipment, and complete installation shall be in accordance with NFPA-13 and 13R standards as applicable. Prepare drawings and hydraulic calculations for approval by all governing agencies including, but not necessarily limited to the following:

1. Oklahoma State Fire Marshall as required
2. City of Kingfisher or local fire department
3. Owners approving agency (if required)

Submit four (4) copies sealed by a state of Oklahoma Fire Protection Engineer to each of the above for review and obtain approval stamp on each copy.

Submit product material equipment brochures to the engineer for review.

Electronic .pdf submittals of equipment and shop drawings may be provided in lieu of hard copies at contractor's option and where approved by local authorities having jurisdiction.

1.02 Quality Assurance: All work performed shall be designed by a Licensed Fire Protection Engineer and installed by a fire protection installer whose principal business is the installation and service of Fire Protection Systems.

1.03 Hydrostatic Test: All interior piping, new and existing, shall be pressure-tested at 200 PSI for a period of two (2) hours without any leaks or drop in pressure. Tests shall be witnessed by the fire department with test certificates sent to the engineer/architect.

1.04 Coordination and Work By Others: Fire protection installer shall coordinate with different trades to avoid conflicts. Electrical installer will provide wiring, alarm panels, interlocks, etc. Sprinkler contractor shall provide and install flow and tamper switches. Sprinkler contractor is to furnish any local alarm bells associated with the sprinkler system. Bells shall be mounted and wired by the electrician.

1.05 Products: All materials and equipment furnished under this contract shall be new and have Factory Mutual approved listing and UL listing for fire protection service.

Use of manufacturer's names and trade names in specifying equipment is for establishing standards of quality.

1.06 Acceptable Manufacturers:

A. Sprinkler Heads:
1. Viking
2. Reliable
3. Central
4. Grinnell

B. Fire Department Connections & Accessories:
1. Potter-Roemer
2. Elkart
3. Sierra
4. Grinnell

C. Sprinkler Valves, Flow Switches, and Accessories:
1. Viking
2. Reliable
3. Central
4. Grinnell

D. Air Compressor:
1. Reliable
2. Engineer pre-approved equal.

1.07 Underground Pipe and Fittings: Refer to section 15060.

1.08 Piping Within the Building: New pipe and fittings may be of any approved type except threadable lightwall tube used with threaded fittings. All new pipe is to be domestically manufactured.

1.09 Hangers and Supports: All hangers, supports, etc., used with sprinkler pipe shall be UL-FM listed and approved for use with sprinkler systems. Only lag screws shall be used with eye rods. Drive screws are not acceptable.

1.10 Sprinkler Heads: Temperature ratings of fusible elements shall be in accordance with NFPA-13 and 13R standards as applicable. Automatic sprinklers of standard temperature rating shall be used except in areas of above-normal temperatures; sprinklers suitable for the temperature condition shall be provided. Furnish two-piece chrome plated escutcheons for use with exposed sprinklers.

All sprinkler heads in lay-in acoustical ceilings are to be centered in the ceiling tile.

For suspended ceilings, provide semi-recessed pendant type with chrome plated finish and chrome plated escutcheon.

For exposed areas, provide standard upright type with chrome plated finish. For sidewall application, provide sidewall type with chrome plated finish and chrome plated escutcheon.

1.11 Valves: Provide approved automatic sprinkler alarm check valve with trim, including flow detectors (one-or two-pole as required--coordinate with fire alarm system), pressure switches, valves, strainers, pressure gauges, etc. as required. Refer to Fire Alarm System for annunciation. Provide and install a double check backflow preventor in the new service line as shown on the drawings. Concrete vault (if required) and installation shall conform to City of kingfisher standards.

1.12 Flow Switches: Provide approved automatic flow switch with pressure retard element, 250 psi pressure rated, 2 SPDT circuit switches of voltage as required for fire alarm interface (coordinate with fire alarm contractor).

1.13 Air Compressor (Dry Pipe Systems): Provide electric drive, riser mounted, single-stage compressor, capable of restoring normal system air pressure within 30 minutes, two-pole air pressure operated electric pressure switch with 2-way release or breather valve, safety valve, check valve, tank drain, belt guard, and controls.

1.14 Inspectors Tests: Provide 1" inspectors test where required.

1.15 Fire Department Connection: Furnish and install chrome or brass flush type fire department siamese 18" above finish grade where shown on plans. Threads to fit kingfisher Fire Department hose threads.

1.16 Execution: Install in strict accordance with federal, state, and local codes, ordinance, and regulations. It is the intention of this specification to have the fire protection installer provide a complete and operational system that meets all prevailing requirements and is of top-quality workmanship. This contractor is to plan for all problems that may occur. No requests for extra money will be granted.

The Latest Edition of NFPA 13 and NFPA 13R is to be used as the guiding standard.

Locate outside alarms on wall of building adjacent to fire department inlet connection. Coordinate with architect and Kingfisher Fire Department.

Provide on wall near sprinkler valve or in other approved location, cabinet containing extra sprinkler heads as required by NFPA 13 and 13R for each head type used and wrench suitable for each head type.

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MP1.4

REFRIGERATION/HEAT TRANSFER UNITS 15740

1.01 Work Included: Installation of furnace and condensing unit systems including flues and combustion air openings and accessories.

1.02 Reference Standard: AHRI rated capacities. All equipment shall be UL or ETL approved. Gas fired equipment shall be AGA approved. All equipment shall meet code minimum energy efficiency requirements (or greater where scheduled/listed on plans).

1.03 Performance: All units shall meet or exceed performance indicated in the equipment schedules and shall be selected at conditions indicated in the schedule.

1.04 Acceptable Manufactures:

A. Furnace/Evaporator Coil
1. Trane
2. Carrier
3. Lennox
4. York

B. Condensing Unit
1. Trane
2. Carrier
3. Lennox
4. York

1.05 Submittals: Submit shop drawings of furnaces, evaporator coils, condensing units, and accessories.

1.06 Gas Furnace (90%): See schedule on the drawings.

Natural gas fired high efficiency condensing furnace complete with casing, heat exchanger, burners, fan,

and controls - A.G.A. design certified - 90 % minimum efficiency. Units shall be convertible and capable of vertical or horizontal arrangement. See drawings for required airflow arrangement.

Heavy gauge steel cabinet with baked enamel finish - front service access with blower door safety switch - interior metal liners and foil faced fiberglass insulation - heavy gage aluminized steel heat exchangers - stainless steel secondary heat exchanger - 20 year limited warranty on heat exchangers - multi-port in-shot steel burners - direct vent sealed combustion system - direct drive multi-speed blower motor - corrosion resistant drain with built-in trap - field fabricated slide-out filter rack with 1" thick filter media.

Automatic gas controls with 100 % safety shut-off - electric gas control valve with electronic spark ignition - gas pressure regulator - main shut-off valve - fan and limit controls - blower heating relay - transformer - wiring junction box for power supply and control wiring.

Controls - all controls shall be the sole responsibility of the equipment manufacturer and shall include all necessary transformers, relays, etc.

Equipment supplier shall provide complete wiring diagrams for field wiring and controls connections.

All line voltage electrical wiring and disconnect switch by the Electrical Contractor.

Furnish Honeywell TH8320R1003 or equal programmable thermostat and matching subbase.

Thermostats shall be field installed and wired by the Mechanical Contractor. Thermostat rough-in and conduit by the Electrical Contractor.

Install PVC/CPVC schedule 40 piping with solvent welded joints for furnace vent and intake piping.

Installation of vent and intake piping shall conform to the furnace manufacturer's installation instructions. Provide concentric vent termination kits and accessories to provide a complete and operational system.

Where freezing conditions may occur, vent pipe shall be insulated with 1" fiberglass (ASJ) pipe insulation. Heat exchanger drain piping shall be schedule 40 PVC/CPVC piping with solvent welded joints.

1.07 Evaporator Coil: See schedule on drawings.

Heavy gauge steel double wall constructed cabinet with baked enamel finish to match furnace. High grade, heat resistant, corrosion free polymer material drain pan with 3/4" primary and secondary drain connections.

Cased coil shall be convertible type capable of vertical or horizontal arrangement.

A-shaped coil with copper tubing and aluminum fins. Belled sweat connections. Silver solder for leak proof joints and pressure tested under water for leak proof construction. Thermal expansion valve properly sized and matched with condensing unit to produce required capacity scheduled on the drawings.

Evaporator defrost control.

1.08 Air Cooled Condensing Unit: See schedule on the drawings.

Factory packaged one-piece construction - heavy gauge steel cabinet - non-corrosive fan and condenser grilles with louvered coil guard - baked-on acrylic enamel finish.

Large removable access panel to compressor and controls compartment. Vertical air discharge, minimum 13 SEER.

Hermetically sealed compressor - overload protection - anti-short cycle timer to prevent compressor short cycling - high and low pressure controls - built in start kit - standard ambient controls to 35 degrees F - crankcase
heater - mufflers - internal spring isolation. Quiet operating condenser fan and motor - copper tube aluminum fin condenser coil 450 PSI pressure tested. Suction and discharge service valves - liquid line sight glass/moisture indicator - high capacity liquid line filter drier.

Complete operating charge of refrigerant.

Control panel will be factory wired with contactors. 5 Year limited warranty on compressor and coil, 1 year on parts.

Disconnect switches and all electrical wiring by the Electrical Contractor. Concrete pad by general contractor.

1.09 Filters: Furnish filters with equipment. Replace all filters upon completion of project and leave one extra set of filters for Owner. Provide replacement chart to Owner showing each piece of equipment requiring filters, type of filter, and quantity. Throwaway filters shall be of one manufacturer.

GAS FIRED HEATERS 15811

1.01 Installation of gas-fired unit heaters including flues and combustion air ductwork as required.

1.02 Reference Standard: All equipment shall be CSA certified to ANSI Standard Z83.8/CSA 2.6 and ASHRAE 90.1 compliant. All equipment shall meet code minimum energy efficiency requirements (or greater where scheduled/listed on plans).

1.03 Performance: All units shall meet or exceed performance indicated in the equipment schedules and shall be selected at conditions indicated in the schedule.

1.04 Acceptable Manufacturers:

A. Gas-Fired Unit Heater
1. Sterling
2. Reznor
3. Modine
4. Engineer pre-approved equal.

1.05 Submittals: Submit shop drawings of gas-fired unit heaters and accessories.

1.06 Gas Fired Unit Heater: See schedule on drawings.

Unit shall of power vented design, factory assembled, piped, and wired. Cabinetry of heavy gauge material and painted manufacturers standard color with enamel finish. Insulated with foil faced insulation with fire hazard classification of 25/50 Flame Spread/Smoke Developed Rating. Unit to include hanger bracket for unit suspension.

Heat exchanger shall consist of aluminized steel tubes - 321 stainless steel burner box with single-orifice burners - aluminized steel flue collector.

Aluminum propeller fan(s) - open drip proof motor(s) with internal automatic reset thermal overload protection - factory installed fan-blade guard.

24-volt, single-stage, redundant gas control valve of fast opening type. Direct spark ignition system with integrated control - flame rectification shall be independent of the spark ignitor. Integrated electronic control board with onboard LED indicator for troubleshooting. Factory mounted control transformer and pressure switch accessible for service. Provide automatic reset high limit switch - air pressure switch - manual rollout safety switch - flame sensor.

Provide a single-stage mercury free, low voltage heating only thermostat with protective wire guard, for each heater. Thermostat to have 45 - 95 degree scale range and positive off control. Supply necessary transformers, relays, etc. for individual and multi-heater control.

Discharge louvers shall be individually adjustable and removable with horizontal blades for directing airflow.

Provide optional concentric vent termination kit.

10-year non-prorated heat exchanger warranty.

Equipment shall be installed per manufacturer's installation instructions and shall accommodate minimum clearance and service requirements.

Suspend overhead heaters as high as possible or as noted on the drawings. Provide appropriate all thread rods and rubber in-shear isolators.

AIR DISTRIBUTION 15840

1.01 Work Included: All duct distribution, grilles, registers, dampers, etc. required for a complete and operational system.

1.02 Reference Standards: Installation and fabrication of all ductwork shall conform with the latest edition SMACNA duct manuals, ASHRAE handbooks and local codes.
Construct ductwork to NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems, and NFPA 90B Standard for the Installation of Warm Air Heating and Air Conditioning Systems. Fans shall bear the AMCA Certified Ratings Seal and UL Label.

1.03 Acceptable Manufacturers:

A. Ductwork (Rectangular)
1. Installing contractor
2. Wichita Sheetmetal
3. Engineer pre-approved equal

B. Ductwork (Round-Spiral)
1. Installing Contractor
2. Wichita Sheetmetal
3. Kruse Corporation
4. Engineer pre-approved equal

C. Ductwork (Round Snap-Lock)
1. Wichita Sheetmetal
2. Engineer pre-approved equal

D. Flexible Ductwork
1. Thermaflex Type M-KE
2. Atco

E. Grilles, Registers, & Diffusers
1. Titus
2. Krueger
3. Carnes
4. Nailor
5. Greenheck

F. Dampers & Duct Accessories
1. Ruskin
2. Pottorff
3. Price
4. Nailor
5. Greenheck

G. Fans & Roof Hoods
1. Cook
2. Penn Ventilator Company
3. Greenheck
4. Carnes
5. Twin City
6. Greenheck

1.04 Submittals: Submit shop drawings of fans, roof hoods, grilles, registers and diffusers, flexible ductwork, dampers, fire/smoke dampers, and duct accessories.

1.05 Duct Sizes: All duct sizes indicated on plans are inside clear dimensions. Overall duct sizes shall be increased to accommodate duct liner (where specified). Where structural conditions deem it necessary to change the size or shape of any duct, the equivalent free area shall be maintained.

1.06 Duct Pressure Class: Low pressure class - static pressure in duct less than 2" wg and velocities less than 2400 fpm.

1.07 Duct Material: Galvanized steel lock-forming quality, having a zinc coating of 1.25 ounces per square foot for each side (coating Class G90). Concealed round ductwork shall be snap-lock (low-pressure only) or spiral construction. Exposed round ductwork shall be spiral construction. Low pressure elbows shall be 4-piece adjustable seam type with a radius of not less than (1) times width of duct on centerline.

1.08 Exposed Ductwork: All exposed ductwork shall be mill phosphatized metal. Finish of all exposed ductwork shall be suitable for painting by the General Contractor.

1.09 Joints: Seal all longitudinal and transverse joints on concealed ductwork, with foil back tape (Hardcast Foil-Grip 1402 as manufactured by Carlisle Coating and Waterproofing, Inc., Design Polymetrics DP 1010 duct sealant or equal. Screw or rivet all round duct joint connections.

1.10 Flexible Ducts: Flexible round ducts, not to exceed five (5) foot length, may be used at connection to supply air ceiling diffusers and where shown on the drawings. NOTE: Flex duct shall not be used when connection is to a fire damper and shall only be used in concealed, accessible areas. Install with only one elbow and support with strap hanger (do not lay on ceiling). Fiberglass insulating blanket with vapor barrier.

1.11 Grilles, Registers, and Diffusers: Provide in accordance with schedule or notations on drawings.

1.12 Dampers: Provide balance dampers at all duct branches to individual diffusers, grilles, and registers (unless scheduled with diffuser). Dampers shall be locking quadrant type.

Provide damper rod extension and ceiling flange where dampers are concealed and inaccessible.

1.13 Dampers and Duct Accessories:

A. Balancing Dampers: Balancing dampers shall be provided for each supply, return, and exhaust grille and diffuser as indicated on the schedule or as shown on the plans.

Manual volume balancing dampers shall be locking quadrant type and built in accordance to SMACNA standards for low pressure duct systems. Blades and frames shall be galvanized steel construction with molded synthetic bearings. Dampers shall be single or opposed blade type.

Ruskin Model MD25 or approved equal (rectangular duct - up to 36"W x 12"H).

Ruskin Model MD35 or approved equal (rectangular duct - up to 48"W x 48" H).

Ruskin Model MDRS25 or equal (round duct - up to 20" dia.).

B. Backdraft Dampers: Provide backdraft dampers of size indicated on drawings. 4" Deep extruded aluminum (.081" thickness) frame with aluminum vinyl edged blades and dustproof shaft bearings. Blades shall incorporate an adjustable counterbalance and shall be suitable for horizontal or vertical mounting. Ruskin Model CBD4 or approved equal.

C. Control Dampers: Provide automatic control dampers of size indicated on drawings. Automatic dampers, where not furnished under Temperature Control Section (15900) shall be equal to Ruskin Model CD36 or approved equal. Outside air, low leakage type dampers, shall be equal to Ruskin Model CD50 or approved equal. Dampers shall be parallel blade type action with factory installed 120-volt electric actuator. Actuator shall be a normally closed two-position (open/closed) type with a maximum duration from full close to full open of 20 seconds. A maximum travel adjustment shall be provided for field balancing. See electrical plans for wiring and interlocks.

All wiring by the Electrical Contractor.

D. Access Doors: Access doors shall be double skin, insulated, hinged type with locking latches. 22 Ga. galvanized steel double skin door, 1" fiberglass insulation, continuous piano hinge, foam gasketing between door and frame, and between duct connection and frame. Maximum leakage of .25 CFM/sq. ft. at 1" W.G. static pressure. Built to SMACNA standards.

Ruskin Model ADH22 or approved equal.

1.14 Fans: See schedule on the drawings. Model numbers below are based on Cook to establish minimum criteria - equals by listed acceptable manufacturers.

Provide fans of the type, capacity and size as scheduled/indicated on the drawings. Provide complete wiring diagrams for field wiring and controls connections.

Heavy duty 1750 RPM motors - vibration eliminators.

Type I - Cook Gemini - centrifugal cabinet fan - ceiling or in-line installation - high quality permanently lubricated motor - removable motor and blower assembly - acoustically insulated heavy gage galvanized steel housing - adjustable mounting brackets - outlet flange (see drawings for discharge arrangement) - integral backdraft damper.

NOTES:
1. All direct drive motors shall be provided with factory or field mounted speed controllers (for balancing purposes).
2. All fans shall be supplied with internal anti-vibration mounts.
3. All fans shall be supplied with factory mounted disconnect switches.
4. All prefabricated factory curbs shall be minimum 12" high. Curbs shall match roof slope and be compatible with roof construction (see architectural plans).
5. See electrical drawings for fan interlocks and control of fans. All electrical wiring by Electrical Contractor.

All electrical wiring by Electrical Contractor.

1.15 Roof Hoods: See notes on the drawings.

Type I - Cook Type PR or approved equal - low profile type gravity intake/relief ventilator - all aluminum construction - weatherproof - bird screen - factory curb (curb shall match roof slope and be compatible with roof construction).

1.16 Wall Louvers: 4" Deep extruded aluminum (.125" thickness) frame with stationary fixed 45-degree weatherproof drainable blades at approximately 5" centers. Factory assembled components/sections. Minimum 54% free area design. Architecturally styled with hidden mullions. Wall flange. Bird screen. Factory prime coat for field painting. Ruskin Model ELF375DXH or approved equal.

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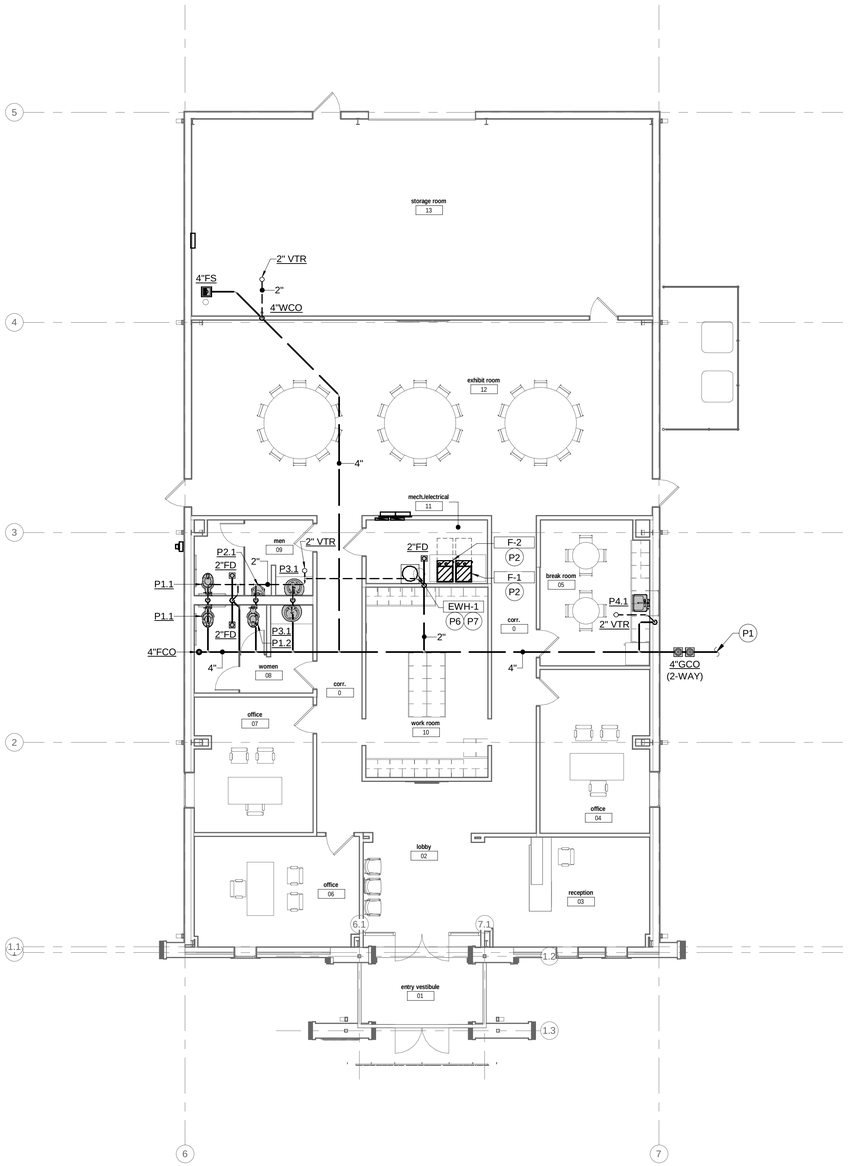
MP1.5

PLUMBING PLAN NOTES

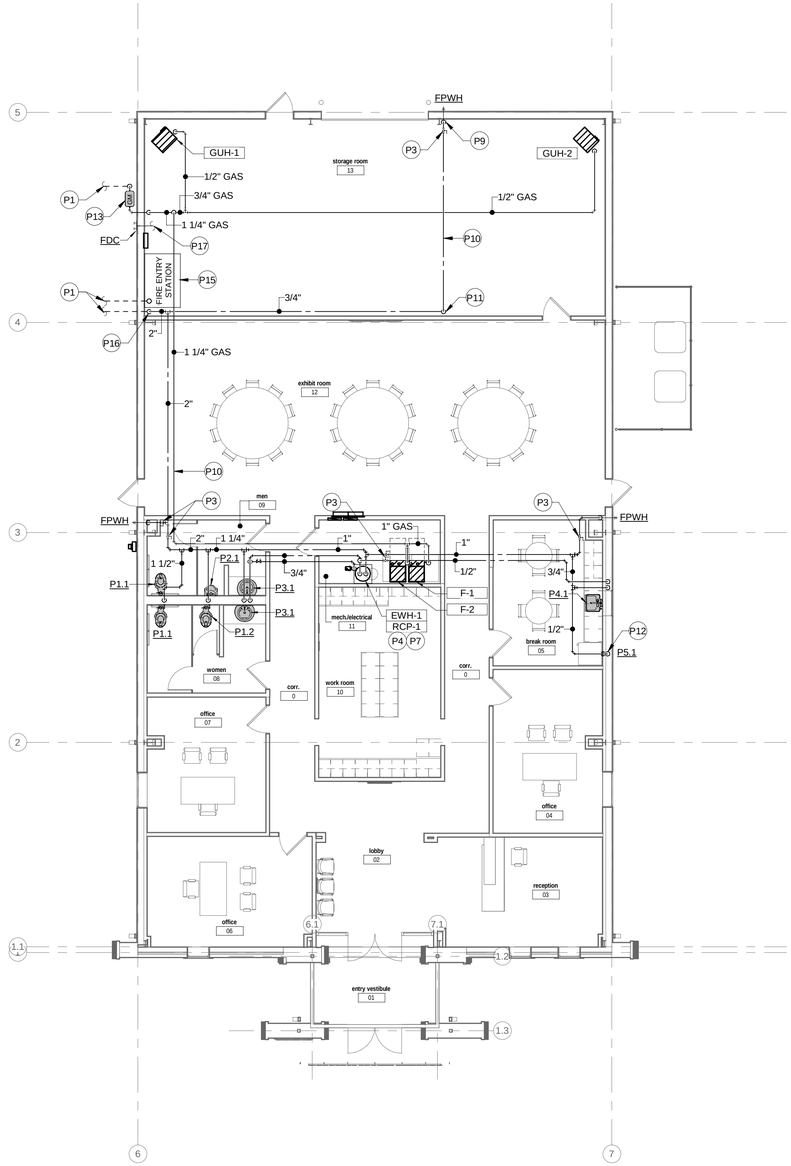
P1	SEE SITE PLAN FOR CONTINUATION.
P2	EXTEND CONDENSATE PIPING FROM FURNACE TO FLOOR DRAIN AND TERMINATE WTIH 2" AIR GAP PER MANUFACTURER RECOMMENDATIONS.
P3	PROVIDE BALL VALVE. (TYPICAL)
P4	PROVIDE BALL VALVES IN 3/4" CW / HW PIPING PRIOR TO CONNECTION TO WATER HEATER.
P6	EXTEND T&P RELIEF DOWN TO FLOOR DRAIN AND TERMINATE WITH 2" AIR GAP.
P7	G.C. TO PROVIDE 4" CONCRETE HOUSEKEEPING PAD BELOW WATER HEATER.
P9	ROUTE 3/4" CW PIPING DOWN TIGHT TO WALL AND EXTEND TO FPWH. COORDINATE EXACT LOCATION WITH G.C. / ARCHITECT PRIOR TO INSTALLATION. PROVIDE PLASTIC INSULATION BARRIER ON EXPOSED CW PIPING.
P10	ROUTE PIPING AS HIGH AS POSSIBLE.
P11	OFFSET PIPING TO ROUTE TIGHT TO STRUCTURE.
P12	EXTEND 1/2" CW PIPING IN WALL TO ICE BOX AS INDICATED.
P13	INSTALL GAS METER PER UTILITY PROVIDER STANDARDS. SEE GAS LOAD SCHEDULE FOR TOTAL CONNECTED LOAD.
P15	PROPOSED LOCATION OF FIRE ENTRY STATION. COORDINATE WITH FIRE SPRINKLER ENGINEER.
P16	PROVIDE SHUT-OFF VALVE IN BUILDING RISER.
P17	REFER TO FIRE RISER DIAGRAM FOR ADDITIONAL INFORMATION.



A WASTE AND VENT PLAN

0' 4' 8' 12' 1/8" = 1'-0"

NORTH



B PLUMBING PLAN

0' 4' 8' 12' 1/8" = 1'-0"

NORTH

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P1.1

EQUIPMENT CONNECTION SCHEDULE

ICE

SCH. CODE: SW=DISC. SW CB=CIR.BKR. T=TOGGLE SW.

UNIT DESIG	LOAD 120/60/1	LOAD 208/60/1	LOAD 208/60/3	H.P.	FLA	MCA	PANEL DEVICE RATING (AMPS/POLE) 20/1	30/1	20/3	30/3	40/1	40/2	40/3	50/1	50/2	50/3	DISCONNECTING DEVICE AT UNIT (AMPS/POLE) FUSTAT	30/1	30/2	30/3	60/1	60/2	60/3	SIZE FUSE	NEMA3R	STARTER (SIZE/POLE) 0/3	1/3	2/3	IN MCC	AT UNIT	NEMA3R	CIRCUIT NUMBER	FEEDER IDENT.
CU-1			●			18			●										SW						30A	●							A-2	30.3
CU-2			●			18			●										SW						30A	●							A-8	30.3
F-1	●			1			●										T															A-14	20.2
F-2	●			1			●										T															A-16	20.2
① EF-1	●			FRAC			●										T															A-37	20.2
GUH-1	●			FRAC			●										T															A-18	20.2
GUH-2	●			FRAC			●										T															A-18	20.2
EWH-1			●		12.5			●											SW													A-20	30.3
RCP-1	●			1/6			●										T															A-26	20.2

EQUIPMENT CONNECTION SCHEDULE NOTES

ICE

GENERAL NOTES:

a. ALL CONNECTIONS AND ELECTRICAL EQUIPMENT LISTED IN THIS SCHEDULE SHALL BE PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR

b. REFER TO THE MECHANICAL DRAWINGS AND SPECIFICATIONS FOR THE REQUIREMENTS ASSOCIATED WITH WIRING AND CONNECTIONS OF INTERLOCKING, THERMOSTAT LOCATIONS, EXHAUST FAN CONTROL SWITCHES AND OTHER CONTROLS OF MECHANICAL EQUIPMENT.

SCHEDULE NOTES:

① EXHAUST FAN SHALL BE SWITCHED WITH LIGHT FIXTURES. PROVIDE WITH MOTOR RATED TOGGLE SWITCH.

CU FEEDER SCHEDULE

ICE

FEEDER IDENT.	CONDUCTORS SETS	CONDUCTORS QUANT. PER SET	CONDUCTORS SIZE	GROUND SIZE PER SET	ISOLATED GRD. SIZE PER SET	CONDUIT SIZE PER SET
20.X	1	SEE NOTE 'b'	#12	#12	-----	1/2"
30.X	1	SEE NOTE 'b'	#10	#10	-----	1/2"
40.X	1	SEE NOTE 'b'	#8	#10	-----	3/4"
50.X	1	SEE NOTE 'b'	#6	#10	-----	1"
60.X	1	SEE NOTE 'b'	#4	#10	-----	1 1/4"
70.X	1	SEE NOTE 'b'	#4	#8	-----	1 1/4"
80.X	1	SEE NOTE 'b'	#3	#8	-----	1 1/4"
90.X	1	SEE NOTE 'b'	#2	#8	-----	1 1/4"
100.X	1	SEE NOTE 'b'	#1	#8	-----	1 1/2"
150.X	1	SEE NOTE 'b'	#1/0	#6	-----	2"
200.X	1	SEE NOTE 'b'	#3/0	#6	-----	2"
225.X	1	SEE NOTE 'b'	#4/0	#4	-----	2-1/2"
250.X	1	SEE NOTE 'b'	#250 KCMIL	#4	-----	2-1/2"
300.X	1	SEE NOTE 'b'	#350 KCMIL	#4	-----	3"
400.X	1	SEE NOTE 'b'	#500 KCMIL	#3	-----	3-1/2"
450.X	2	SEE NOTE 'b'	#4/0	#2	-----	2-1/2"
500.X	2	SEE NOTE 'b'	#250 KCMIL	#2	-----	2-1/2"
600.X	2	SEE NOTE 'b'	#350 KCMIL	#1	-----	3"
800.X	2	SEE NOTE 'b'	#500 KCMIL	#1/0	-----	3-1/2"
1200.X	4	SEE NOTE 'b'	#350 KCMIL	#3/0	-----	3"
1600.X	5	SEE NOTE 'b'	#400 KCMIL	#4/0	-----	3-1/2"
2000.X	6	SEE NOTE 'b'	#400 KCMIL	#250	-----	3"
2500.X	7	SEE NOTE 'b'	#500 KCMIL	#350	-----	4"

FEEDER SCHEDULE NOTES:

a. THIS PROJECT MAY NOT REQUIRE ALL FEEDER TYPES LISTED IN THIS SCHEDULE.

b. THE NUMBER OF CONDUCTORS WILL BE BASED ON THE FOLLOWING NOTATION AT THE END OF EACH FEEDER TAG:

EXAMPLE: XXXX.X

AMPACITY

XXXX.XS: INDICATES THE SERVICE FEEDER SIZE, AND NUMBER OF CONDUCTORS. NO GROUND SHALL BE REQUIRED FOR SERVICE FEEDERS.

XXXX.2: INDICATES (2) HOT CONDUCTORS (OR 1 HOT + 1 NEUTRAL) FOR SINGLE PHASE CONNECTIONS

XXXX.3: INDICATES (3) HOT CONDUCTORS FOR THREE PHASE CONNECTIONS.(OR 2 HOT +1 NEUTRAL) FOR SINGLE PHASE CONNECTIONS

XXXX.4: INDICATES (3) HOT CONDUCTORS & (1) NEUTRAL CONDUCTOR. FOR THREE PHASE CONNECTIONS

GENERAL NOTES

ICE

1. VERIFY ALL OUTLET LOCATIONS ON THE JOB PRIOR TO ROUGH-IN.
2. REFER TO RELATED ARCHITECTURAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR RELATED INFORMATION.
3. REFER TO THE SPECIFICATIONS FOR DATA NOT ON THE DRAWINGS.
4. COORDINATE OUTLET BOX LOCATIONS WITH MASONRY TO MINIMIZE CUTTING OF BRICK OR BLOCK.
5. WALL MOUNTING HEIGHTS TO CENTERLINE OF DEVICE UNLESS OTHERWISE NOTED.
6. E.C. SHALL REFER TO MECHANICAL DRAWINGS AND SPECIFICATIONS FOR THE REQUIREMENTS ASSOCIATED WITH WIRING AND CONNECTION OF INTERLOCKING AND CONTROLS OF MECHANICAL UNITS AND THERMOSTAT LOCATIONS.
7. CONDUIT RUN W/CONDUCTORS AS INDICATED. CONDUIT SIZE AS REQUIRED. CONDUIT RUN TO PANEL DEVICE SIZE AS INDICATED (AMP/POLE). CIRCUIT WITHOUT INDICATION IS ROUTED TO 20A.,1P. BREAKER. CONDUCTOR COUNT IS NOT SHOWN ON THE DRAWINGS FOR #12 SIZE CONDUCTORS. ELECTRICAL CONTRACTOR SHALL PROVIDE NUMBER OF CONDUCTORS AS REQUIRED FOR CIRCUITING, SWITCHING AND/OR CONTROL AS REQUIRED. ALL REQUIREMENTS OF THE CURRENT NATIONAL ELECTRICAL CODE SHALL BE FOLLOWED FOR CONDUIT FILL AND CONDUCTOR DE-RATING IF APPLICABLE.
8. EXIT LIGHTS AND EMERGENCY LIGHT FIXTURES WITH BATTERY BACKUP SHALL BE CIRCUITED WITH UNSWITCHED HOT CONDUCTOR FROM AREA LIGHTING CIRCUIT FOR POWER SENSING AND CHARGING. IN ADDITION, PROVIDE SWITCHED CIRCUITS TO ANY REQUIRED EMERGENCY LIGHT FIXTURES REQUIRING SAME FOR LOCAL AREA CONTROL.
9. "CT" INDICATED ADJACENT TO DEVICE INDICATES DEVICE IS MOUNTED ABOVE BACKSPLASH OF COUNTER TOP. VERIFY EXACT HEIGHT WITH ARCHITECTURAL PLANS AND ELEVATIONS.
10. A GROUND CONDUCTOR SIZED PER N. E. C. ARTICLE 250 IS REQUIRED IN ALL POWER, RECEPTACLE, AND LIGHTING CIRCUITS. GROUND CONDUCTORS ARE NOT SHOWN ON DRAWINGS.
11. WHERE AREA SMOKE DETECTORS ARE SHOWN ON THE DRAWINGS ELECTRICAL CONTRACTOR SHALL NOT LOCATE SMOKE DETECTORS CLOSER THAN 4 FEET FROM ANY MECHANICAL AIR SUPPLY OR RETURN DIFFUSER, GRILLE, OR REGISTER PER NFPA. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH OTHER TRADES FOR LOCATION OF DETECTOR.
12. AT EVERY SMOKE OR FIRE/SMOKE DAMPER ELECTRICAL CONTRACTOR SHALL INSTALL A DUCT SMOKE DETECTOR AND RELAY TO CLOSE DAMPER AND SHUT DOWN ASSOCIATED MECH UNIT ON ACTIVATION OF DETECTOR. REFER TO MECHANICAL PLANS AND SPECIFICATIONS AND/OR MECHANICAL CONTRACTOR FOR LOCATIONS AND CONTROL REQUIREMENTS. PROVIDE 120V. CONTROL POWER AT DAMPER IF REQUIRED. IF REQUIRED BY THE FIRE ALARM SYSTEM SUPPLIER, MECHANICAL CONTRACTOR SHALL MODIFY DUCTWORK WHERE FIRE/SMOKE DAMPERS ARE LOCATED AS REQUIRED TO INSTALL DUCT SMOKE DETECTORS IN THE DUCTWORK AT THE FIRE/SMOKE DAMPER LOCATIONS. NOT ALL SMOKE OR FIRE/SMOKE DAMPERS MAY BE SHOWN ON THE DRAWINGS, HOWEVER, ALL SMOKE OR FIRE/SMOKE DAMPERS SHALL BE PROVIDED WITH ABOVE REQUIREMENTS.
13. THE ELECTRICAL CONTRACTOR SHALL PROVIDE A LABEL WITH THE AVAILABLE FAULT CURRENT AT THE SERVICE ENTRANCE EQUIPMENT. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION

LIGHT FIXTURE SCHEDULE

ICE

FIXT LTR	MANUFACTURER	CATALOG NUMBER	LAMPS WATTAGE	LAMPS TEMP	LAMPS LUMENS	FIXT. VOLT.	FINISH	MOUNTING	REMARKS
A	COLUMBIA	LCAT24-S-35L048G-EDU	33W	3,500K	4,837	120V	STD	LAY-IN	2X4 SHALLOW LED TROFFER
	METALUX	24CZ2-50-S-UNV-L835-CD1	39.6W	3,500K	5,049	120V	STD	LAY-IN	
B	PRESCOLITE	LFR-6RD-M-15L35K8-MD-DM1/LFR-6RD-T-VNR-SS	11.4W	3,500K	1,500	120V	STD	RECESSED	6" ROUND DOWNLIGHT
	HALO COMMERCIAL	HC615D010-HM60525835-61MDH	14.5W	3,500K	1,500	120V	STD	RECESSED	
BE	PRESCOLITE	LFR-6RD-M-15L35K8-MD-DM1-EM/LFR-6RD-T-VNR-SS	19.5W	3,500K	1,500	120V	STD	RECESSED	6" ROUND EMERGENCY DOWNLIGHT ②
	HALO COMMERCIAL	HC615D010IEM14-HM60525835-61MDH	14.5W	3,500K	1,500	120V	STD	RECESSED	
C	ILP	VS8-12L-U-35-FRL-HB-36-18Y-PAD	90W	3,500K	11,981	120V	STD	SUSPENDED	8' STRIP LIGHT ①
	METALUX	8SLSTP11035DD-UNV	94W	3,500K	11,436	120V	STD	SUSPENDED	
D	COLUMBIA	LCAT22-S-35L036G-ED1U	28W	3,500K	3,826	120V	STD	RECESSED	2X2 SHALLOW LED TROFFER
	METALUX	22CZ2-39-S-UNV-L835-CD1	31W	3,500K	3,900	120V	STD	RECESSED	
E	MULE LIGHTING	SQ-LED-W	-	-	-	-	WHITE	SURFACE	EMERGENCY LIGHT ②
	EXITRONIX	QMS-WH	-	-	-	-	WHITE	SURFACE	
F	BEACON LIGHTING	TRP2-36L-39-4K7-3-UNV-DBT-12F	45.1W	4,000K	5,749	120V	③	SURFACE	WALL PACK
	MCGRAW EDISON	IST-SA1D-740-U-T3-BZ	49.5W	4,000K	5,684	120V	③	SURFACE	
G	BEACON LIGHTING	TRP1-24L-20-4K7-3-UNV-DBT-8F-EH	20.6W	4,000K	2,594	120V	③	SURFACE	WALL PACK W/ EMERGENCY LGT ②
	MCGRAW EDISON	IST-SA1A-740-1-T3-BZ-CBP	23.3W	4,000K	2,731	120V	③	SURFACE	
H	LIGMAN	UDU-30123-20W-1-W40-XX-120/277V	20W	4,000K	1,376	120V	③	SURFACE	DECORATIVE WALL PACK ④
	ALUMILITE	VK-1320/LED-UV/40K/BZ	20W	4,000K	2,000	120V	③	SURFACE	
J	LITECONTROL	4L-P-D-12-06-SOF-XX-35K9-D0100-D01-1C-UNV-FA1	96W	3,500K	12,000	120V	③	SUSPENDED	12' LED DIRECT PENDANT
	LUMENWERX	VIA4P-D-WDO-FH-SW-80CRI-1000LMF-35K-12'-120V-D1-ACS-XX	136W	3,500K	12,000	120V	③	SUSPENDED	
K	LITECONTROL	4L-WS3-DW-D-8-08-NRW-C1-35K-D675-D01-1C-UNV-2EC	46.8W	3,500K	5,400	120V	WHITE	RECESSED	⑤
	ALW LIGHTING	SP4R/PR3-MUD-S8-MED/80/3500K-V05-CR/WG-SW-UNV	33.6W	3,500K	5,400	120V	WHITE	RECESSED	
XA	MULE LIGHTING	RMX-U-R-W-EM	-	-	-	120V	WHITE	SURFACE	EXIT SIGN ②
	EXITRONIX	VEX-U-WB-WH	-	-	-	120V	WHITE	SURFACE	
XB	MULE LIGHTING	SQC-LED-U-R-WW	-	-	-	120V	WHITE	SURFACE	EXIT SIGN AND EMERGENCY COMBO ②
	EXITRONIX	VLED-U-WH-EL90L	-	-	-	120V	WHITE	SURFACE	

LIGHT FIXTURE SCHEDULE NOTES

ICE

GENERAL NOTES:

a. GENERAL CONTRACTOR SHALL PROVIDE FIREPROOFING AROUND RECESSED FIXTURES INSTALLED IN FIRE RATED CEILING PER U.L. REQUIREMENTS. ELECTRICAL CONTRACTOR SHALL COORDINATE.

b. SEE SPECIFICATIONS FOR LAMP AND BALLAST TYPE. VERIFY LAMP COLOR WITH ARCHITECT PRIOR TO ORDERING.

c. PROVIDE ARROWS AND FACES AS INDICATED BY THE DRAWINGS.

d. MANUFACTURERS LISTED IN THIS SCHEDULE OR BY WRITTEN ADDENDUM WILL BE THE ONLY APPROVED MANUFACTURERS TO BID THE LIGHTING FIXTURES FOR THIS PROJECT. CONTRACTORS AND SUPPLIERS USING PRICING FROM MANUFACTURERS NOT LISTED ON SCHEDULE OR BY ADDENDUM DO SO AT THEIR OWN RISK.

e. ALTERNATE LIGHT FIXTURE PACKAGES SHALL BE CONSIDERED FOR APPROVAL PENDING THE FOLLOWING INFORMATION IS PROVIDED TO THE ENGINEER OF RECORD SIX BUSINESS DAYS PRIOR TO THE PROJECT BIDDING:
- FIXTURE CUT SHEETS FOR ALL PROPOSED EQUAL FIXTURES. THE CUT SHEETS SHALL HAVE THE SPECIFIC MODEL NUMBER INDICATED ON EACH INDIVIDUAL CUT SHEET
- PROVIDE A COVER PAGE WITH ALL FIXTURE MODEL NUMBERS LISTED
- THE COVER PAGE AND ALL INDIVIDUAL FIXTURE CUT SHEETS SHALL BE COMBINED INTO A SINGLE PDF.

PACKAGES THAT ARE SUBMITTED THAT DO NOT MEET THE CRITERIA ABOVE WILL NOT BE REVIEWED FOR APPROVAL.

f. PROVIDE 0-10V CONTROL WIRING AS REQUIRED FOR DIMMING.

LIGHT FIXTURE SCHEDULE NOTES:

① FIXTURE TO BE SUSPENDED AT 13' AFF.

② PROVIDE 90 MINUTE BATTERY PACK AS REQUIRED FOR EMERGENCY OPERATION.

③ COORDINATE FINISH WITH ARCHITECT PRIOR TO ORDERING.

④ COORDINATE MOUNTING HEIGHT WITH ARCHITECT/OWNER PRIOR TO ROUGH IN.

⑤ LINEAR FIXTURE TO BE RECESSED IN DRY-WALL CEILING AS REQUIRED. CONTRACTOR SHALL COORDINATE EXACT LENGTHS AND CEILING CONFIGURATION OF FIXTURE WITH ARCHITECT PRIOR TO ORDER OF FIXTURES.

LIGHTING MANAGEMENT DEVICE SCHEDULE

ICE

SYMBOL	DESCRIPTION
A	PROVIDE A CEILING MOUNTED LINE VOLTAGE DUAL TECHNOLOGY OCCUPANCY SENSOR EQUAL TO STEINEL IR QUATTRO HD COM1-WR. COORDINATE FINISH WITH OWNER/ARCHITECT PRIOR TO ORDER.
B	PROVIDE A WALL MOUNTED LINE VOLTAGE DUAL TECHNOLOGY OCCUPANCY SENSOR. DEVICE SHALL BE EQUAL TO STEINEL DT VS 1. COORDINATE FINISH WITH OWNER/ARCHITECT PRIOR TO ORDER.

SPECIAL OUTLET SCHEDULE

ICE

SYMBOL	DESCRIPTION
A	E.C SHALL PROVIDE AND INSTALL A GFCI DEAD FRONT DEVICE. THE DEAD FRONT DEVICE SHALL BE EQUAL TO HUBBELL GFBFST20. VERIFY THE FINISH PRIOR TO ORDERING.

SYMBOL LIST

ICE

SYMBOL	DESCRIPTION	MOUNTING
A	LED FIXTURE & FIXTURE LETTER	CEILING
A	LED FIXTURE & FIXTURE LETTER	CEILING
A A	LED FIXTURE & FIXT. LETTER	SURF./RECESSED
A	LED FIXTURE & FIXT. LETTER	WALLBRACKET
	EXIT FIXT. - SHADING DENOTES FACE(S)	CEIL./WALL
E	EMERGENCY LIGHT	CEIL./WALL
	GFCI DUPLEX GROUNDED RECEPTACLE	1'-6" AFF
	DUPLEX GROUNDED RECEPTACLE	1'-6" AFF
	EXTERIOR GFCI RECEPT. WEATHERPROOF	1'-6" AFF
	DOUBLE DUPLEX RECEPTACLE	1'-6" AFF
	SPECIAL OUTLET, SEE SCHEDULE OR AS NOTED	
	OCCUPANCY SENSOR, SEE SCHEDULE OR AS NOTED	
	PHONE/DATA OUTLET	1'-6" AFF
	DATA OUTLET	1'-6" AFF
	CATV OUTLET	1'-6" AFF
	SWITCHED RECEPTACLE	1'-6" AFF
W	TELEPHONE OUTLET (W= 44")	1'-6" AFF
$ $3 $4 $D $K $P	SWITCHES (1-POLE,3-WAY,DIMMER,KEY,PILOT)	4'-0" TO TOP
	PUSH BUTTON	
J	JUNCTION BOX	
A	BRANCH CIRCUIT PANEL & PANEL DESIG.	6'-6"TO TOP
30/3/240	H.D. SAFETY SWITCH (AMPS,POLE,VOLTAGE)	6'-6"TO TOP
0/3/240	STARTER (SIZE,POLE,VOLTAGE)	6'-6"TO TOP
X	PLAN NOTE	
	MOTOR	
	CONDUIT RUN W/ CONDUCTORS SEE NOTE #7	CEIL./WALL
	CONDUIT RUN 2 CIRCUIT, SEE NOTE #7	EARTH/FLOOR
	PARTIAL HOMERUN (MULTIPLE LOAD LOCATIONS)	
30.3 30/3	FEEDER 30.3 30A CIRCUIT SEE NOTE #7	
	CIRCUIT SUPPLIED FROM EMERGENCY SYSTEM	
XXX.X	FEEDER IDENTIFICATION, SEE SCHEDULE	
CM	CEILING MOUNT	
CT	SEE NOTE #9	
WP	WEATHERPROOF	
EM	ITEM SUPPLIED FROM EMERGENCY SYSTEM	
a,b,c	INDICATES SWITCHING SCHEME	
TP	TAMPER PROOF	
FACP	FIRE ALARM CONTROL PANEL	
FAAP	FIRE ALARM ANNUNCIATOR PANEL	
NL	NIGHT LIGHT, WIRED FOR ALWAYS ON OPERATION	
	FIRE ALARM MANUAL STATION	4'-0" TO TOP
	COMB. F.A. HORN & VISUAL SIGNAL	WALL 80"AFF
	FIRE ALARM VISUAL SIGNAL	WALL 80"AFF
	AREA SMOKE DETECTOR, SEE GEN. NOTE #11	CEIL./WALL
	HEAT DETECTOR	CEIL./WALL
	DUCT DETECTOR	
	MAGNETIC DOOR HOLD OPEN	
C	CARBON MONOXIDE DETECTOR	CEILING

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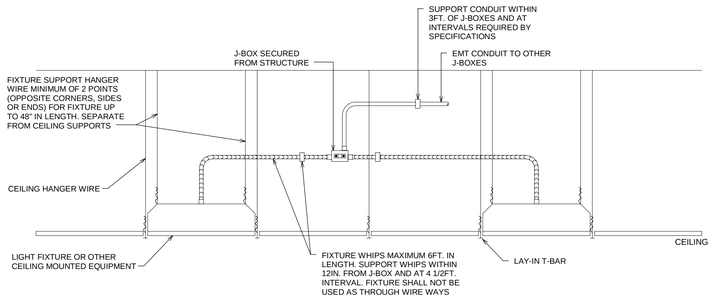
OKLAHOMA PROFESSIONAL ENGINEER Drew Rose 29010 12/18/2023 OKLAHOMA

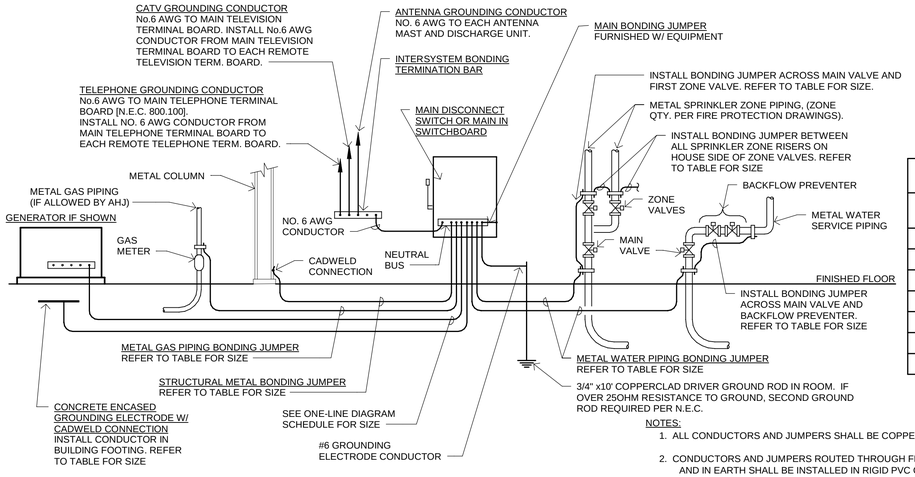
EXPIRES: 12-31-2024

E1.1



B LIGHT FIXTURE MOUNTING DETAIL

SCALE: N.T.S.



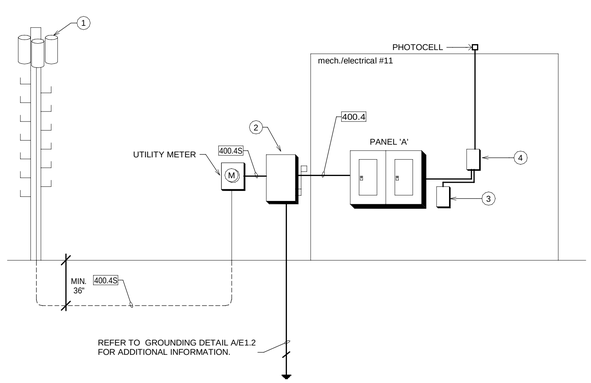
COPPER BONDING JUMPER SIZING CHART	
SERVICE SIZE	SIZE OF CONDUCTOR
≤90A	8
100-150A	6
200A	4
225A-300A	2
400A	1/0
425-500A	2/0
≥525A	3/0

NOTES:

1. ALL CONDUCTORS AND JUMPERS SHALL BE COPPER.
2. CONDUCTORS AND JUMPERS ROUTED THROUGH FLOOR SLABS AND IN EARTH SHALL BE INSTALLED IN RIGID PVC CONDUIT.
3. ALL GROUNDING AND BONDING CONNECTIONS SHALL BE ACCESSIBLE AND LOCATED ADJACENT TO VALVES, BACKFLOW PREVENTER AND GAS METER AS SHOWN.
4. CONDUCTOR OR JUMPER INSTALLED IN METALLIC RACEWAY SHALL BE BONDED TO RACEWAY AT EACH END.

A SYSTEM GROUNDING DETAIL

SCALE: N.T.S.



RISER NOTES:

1. NEW POLE MOUNTED ELECTRIC UTILITY TRANSFORMER FOR 120/208V, 3 PHASE, 4 WIRE SERVICE TO NEW BUILDING. COORDINATE EXACT REQUIREMENTS WITH LOCAL UTILITY PRIOR TO BID.
2. NEW 400A 208V, 3 PHASE SERVICE ENTRANCE RATED NEMA 3R FUSIBLE DISCONNECT SWITCH. SWITCH SHALL BE FUSED WITH CURRENT LIMITING FUSE EQUAL TO BUSSMAN #LPN-RK-400SP.
3. PROVIDE A 30A 4-POLE CONTACTOR FOR CONTROL OF EXTERIOR LIGHTING. CONTACTOR PANEL SHALL INTERFACE WITH PHOTOCELL AND TIMECLOCK.
4. PROVIDE TIMECLOCK WITH PHOTOCELL INTERFACE FOR CONTROL OF EXTERIOR LIGHTS. TIMECLOCK SHALL INTERFACE WITH 4-POLE CONTACTOR VIA LOW VOLTAGE WIRING.

C RISER DIAGRAM

SCALE: N.T.S.
120/208V, 3Ø, 4W

Panel: A

Load Type: L= Lighting, R=Receptacle, M=Motors,HO= Hotel Ki=Kitchen, H=HVAC, MI= Misc

Voltage: 208/120
Phase: Three
Wires: 4W + G
Enclosusure: Type 1
Sections: Two

A.I.C. Rating: 10000A
Mains Rating: 400A
Main Breaker Size: N/A
Panel Lugs: Main Lug Only
Mounting: Recessed

Circ No.	Load Description	Trip	Poles	Load	A	B	C	Load	Poles	Trip	Load Description	Circ No.
1	OVERHEAD DOOR- STOR. 13	20	1	MI	1000 2162			H	3	30	CU-1	2
3	RCPTS-STORAGE 13	20	1	R		1080 2162		H				4
5	SPRINKLER MONITORING P.	20	1	MI			500 2162	H				6
7	RCPTS-EXHIBIT 12	20	1	R	1080 2162			H	3	30	CU-2	8
9	RCPTS-EXHIBIT 12	20	1	R		900 2162		H				10
11	RCPT-MECH .11	20	1	R			1500 2162	H				12
13	RCPT-MECH .11	20	1	R	1500 1700			H	1	20	F-1	14
15	RCPTS-RESTROOM/CORRIDOR	20	1	R		1080 1700		H	1	20	F-2	16
17	RCPTS-OFFICE 07	20	1	R			720 500	H	1	20	GUH-1/GUH-2	18
19	RCPTS-OFFICE 06	20	1	R	720 1502			H	3	20	EWH-1	20
21	RCPTS-RECEPTION/CORRIDOR	20	1	R		1080 1502		H				22
23	RCPTS-COPIER-WORK ROOM	20	1	R			720 1502	H				24
25	RCPTS-WORK ROOM 10	20	1	R	720 530			H	1	20	RCP-1	26
27	RCPTS-OFFICE 04/BREAK 05	20	1	R		1080		MI	1	20	SPACE	28
29	RCPTS-BREAK ROOM 05	20	1	R			500	MI	1	20	SPACE	30
31	RCPTS-BREAK ROOM 05	20	1	R	500			MI	1	20	SPACE	32
33	RCPT-FRIDGE-BREAK ROOM 05	20	1	R		900		MI	1	20	SPACE	34
35	LGTS-STOR/EXHIBIT/BREAK	20	1	MI			1050	MI	1	20	SPACE	36
37	LGTS-OFFICES/RECEP./RESTR.	20	1	MI	1250			MI	1	20	SPACE	38
39*	EXTERIOR LIGHTS - NORTH	20	1	MI		100		MI	1	20	SPACE	40
41*	EXTERIOR LIGHTS - SOUTH	20	1	MI			120	MI	1	20	SPACE	42
43	RCPTS-WORK ROOM 10	20	1	MI	540			MI	1	20	SPACE	44
45	SPARE	20	1	MI				MI	1	20	SPACE	46
47	SPARE	20	1	MI				MI	1	20	SPACE	48
49	SPARE	20	1	MI				MI	1	20	SPACE	50
51	SPARE	20	1	MI				MI	1	20	SPACE	52
53	SPARE	20	1	MI				MI	1	20	SPACE	54
55	SPARE	20	1	MI				MI	1	20	SPACE	56
57	SPARE	20	1	MI				MI	1	20	SPACE	58
59	SPARE	20	1	MI				MI	1	20	SPACE	60
61	SPARE	20	1	MI				MI	1	20	SPACE	62
63	SPARE	20	1	MI				MI	1	20	SPACE	64
65	SPARE	20	1	MI				MI	1	20	SPACE	66
67	SPARE	20	1	MI				MI	1	20	SPACE	68
69	SPARE	20	1	MI				MI	1	20	SPACE	70
71	SPARE	20	1	MI				MI	1	20	SPACE	72
73	SPARE	20	1	MI				MI	1	20	SPACE	74
75	SPARE	20	1	MI				MI	1	20	SPACE	76
77	SPARE	20	1	MI				MI	1	20	SPACE	78
79	SPARE	20	1	MI				MI	1	20	SPACE	80
81	SPARE	20	1	MI				MI	1	20	SPACE	82
83	SPARE	20	1	MI				MI	1	20	SPACE	84
a - Arc Fault Breaker		Total (KVA)			15.366	13.746	11.436					
b- Shunt Trip Breaker		Total Connected (KVA):				40.55						
c - GFCI Breaker		Total Connected (Amps):				112.55						

Notes: * VIA LIGHTING CONTACTOR

Per NEC, Article 220 for Lighting and General Receptacle Loads

Load Summary

Load Classification	Connected Load (KVA)	Demand Factor	Demand (KVA)	Panel Totals	
Lights	0.0	1.25 Continuous	0.0		
Receptacles	14.1	Per NEC 220	12.0	Total Demand (KVA):	38.5
Motors	0.0	Per NEC 220	0.0	Demand Amps:	106.9
Hotel	0.0	Per NEC 220	0.0		
Kitchen	0.0	Per NEC 220	0.0		
HVAC	21.9	Per NEC 220	21.9		
Misc	4.6	1.00	4.6		

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EXPIRES: 12-31-2024

E1.2

DIVISION 16 ELECTRICAL

SECTION 16010
GENERAL REQUIREMENTS

PART 1 - GENERAL EXTENT OF WORK

1.01 The General Conditions, General Requirements, and Special Conditions shall be and are hereby made a part of this section. The Electrical Contractor shall furnish all labor, materials, tools, transportation, equipment, services and facilities required for the complete, proper and substantial installation of all electrical work shown on the drawings and/or outlined in these specifications. The installation shall include all materials, appliances and apparatus not specifically mentioned herein or noted on the drawings, but which are necessary to make a complete working installation of all electrical systems.

1.02 The Contractor shall consult and be guided by the General Conditions and all other divisions referred to herein and relative thereto in performing the work covered under this division of the specification.

1.03 All of the electrical related work required for this project (unless specified otherwise) is a part of the electrical contract price and is not necessarily specified under this division of the specifications or shown on the drawings. Therefore, all divisions of the specifications and all drawings shall be consulted.

1.04 The drawings showing the layout of the work indicate the approximate locations of outlets, apparatus and equipment. The drawings are schematic only and are not intended to show the exact routing of conduits, etc. The final determination as to the routing shall be governed by structural conditions and other obstructions. This shall not be construed to mean the design of the system may be changed, it merely refers to the exact run of a raceway between given points. The Contractor shall consult all contract drawings which may affect the location of any outlet, apparatus or equipment to avoid possible interference and permit full coordination of all work. The right to make any reasonable change in the location of apparatus, outlets and equipment up to the time of roughing-in is reserved by the Architect without involving any additional expense to the Owner.

1.05 The approval by the Architect or his representative of any materials, drawings, etc., submitted by the Contractor will be considered as general only and to aid the Contractor in carrying out his work. Such approval as may be given does not relieve the Contractor from the necessity of furnishing the materials and performing all the work as required by the drawings and the specifications.

1.06 The work specified under this division of the specifications shall include the furnishing of all labor, materials, apparatus and tools necessary for the complete installation of all conduit and wiring; devices for lighting, power and control systems, and such other work and equipment as are indicated on the drawings or as noted herein.

1.07 The entire installation shall be made in a workman like manner, left completely connected, and ready to give proper and continuous service.

1.08 All materials and work in connection with the foregoing items shall be as specified herein, or called for on the drawings.

1.09 The complete installation shall be in accordance with the latest rules and regulations of the National Fire Protection Association and all other Boards and Departments having jurisdiction. Any items or requirements noted herein or shown on the drawings in excess of code requirements, but permitted under the code, shall take preference unless special permission is obtained from the Architect to the contrary.

1.10 The light and power installation shall operate with the electrical energy obtained from outside sources. Such part of the system as may be regulated by rules of the local utility company shall, insofar as method of construction, workmanship and materials are concerned, be in full accordance with the standard practice and rules and regulations of the local utility company.

1.11 This Contractor shall coordinate his work under this division of the specifications with the work of other trades wherein it may be interrelated. His work shall be done in such an order that there will be no interference in installing, nor delay in completion, of any part or parts of each respective trade, thereby permitting all construction work to proceed in its natural sequence without unnecessary delay.

1.12 Before submitting his bid, the Contractor shall familiarize himself with the rules of all governing bodies having jurisdiction and shall notify the Architect in submitting his bid, if in his opinion, any work or material specified is contrary to such rules. Otherwise, the Contractor shall be responsible for the approval of all work and materials and, in case the use of any material specified is not permitted, a substitute shall be approved by the Architect and shall be provided at no increase in cost.

1.13 Unless noted otherwise on the Drawings, or elsewhere in these Specifications, the singular words 'Provide', 'Furnish', or 'Install' noted on the drawings or in these Specifications shall mean to completely furnish, install, and connect each item, and if such is a part or component of a system the entire system shall be functional with all items and components provided.

PART 2 - RULES AND REGULATIONS

2.01 All work under this heading shall comply with the latest rules and regulations of the National Electrical Code Standard of the National Fire Protection Association and with all laws, regulations and ordinances of the utility company, City, County and State.

2.02 Drawings and specifications indicate the minimum standards of construction. Should any work indicated be substandard to any ordinance, law, code, rule or regulation bearing on work, the Contractor shall execute work accordingly, without increased cost to the Owner, but not until he has referred such variances to the Architect for his approval.

2.03 This Contractor shall provide and install only the brands of materials and equipment specified herein, or equipment approved by the Architect-Engineer as equal. All material and equipment shall be listed and labeled by Underwriters Laboratories, Inc., indicating compliance with nationally recognized standards and/or tests.

PART 3 - PERMITS, FEES AND INSPECTIONS

3.01 Secure and pay for all necessary and usual permits, fees, inspections and certificates required for this work and deliver permits and certificates to the Architect for transmittal to the Owner before final acceptance of the project.

PART 4 - SERVICES

4.01 This Contractor shall pay for all expenses, deposits, reimbursements, etc., required by the local rules and codes for the service to the building, complete and ready for use.

4.02 This Contractor shall bear all expenses involved for the complete installation of the electrical service (both temporary and permanent) to the building ready for operation, except as specifically excluded on the drawings. All temporary wiring shall be installed per the National Electrical Code. This shall include guard posts around transformers and pedestals per utility company standards. Verify complete installation and locations of pad mount or pole mount transformers with the local electric utility company and bid installation to comply with their requirements.

4.03 This Contractor shall consult all local departments to verify requirements and bid installation of service in accordance with local codes and utility company standards.

4.04 This Contractor shall bear all expenses involved for the complete telephone service conduit installation and steel or nylon pull wire ready for cable installation. Verify complete installation with the local telephone company and bid installation to comply with their requirements.

ART 5 - TEMPORARY ELECTRICAL

5.01 Electrical Contractor/Subcontractor shall:

A. Make arrangements with electric utility for temporary service.

B. Provide materials, equipment, labor to install, modify, maintain (and upon completion of project, remove) safe temporary electrical power and lighting systems per OSHA standards.

C. Provide sufficient capacity for construction tools, equipment, temporary ventilation and lighting.

D. Distribute systems throughout building and construction area of site such that an extension cord no longer than 100' will reach any work area. Open branch systems permitted where permitted by the National Electrical Code and OSHA. Provide temporary services to all construction offices as required.

E. Employ permanent systems as they are completed and available.

F. Provide metering of temporary service. All temporary utility costs will be paid by the General Contractor.

PART 6 - MATERIALS OF APPROVED EQUAL

6.01 Where items of equipment and/or materials are specifically identified herein by a manufacturer's name, model or catalog number, only such specific items may be used in the base bid, except as hereinafter provided.

6.02 Unless requests for changes in base bid specifications are received and approved and noted by written addendum prior to the opening of bids, the successful contractor will be held to furnish specified items.

6.03 After contract is awarded, changes in specifications shall be made only as defined under "Substitution of Equipment."

PART 7 - SUBSTITUTION OF EQUIPMENT

7.01 After execution of the contract, substitution of equipment of makes other than those specifically named in the contract documents may be approved by the Engineer only if the equipment named in the specifications cannot be delivered to the job in time to completethe work in proper sequence to work of other contractors, due to conditions beyond control of the contractor.

7.02 Requests for substitutions must be accompanied by documentary proof of equality of difference in price and delivery, if any, in form of certified quotations from suppliers of both specified and proposed equipment.

7.03 The Owner shall receive all benefits of the difference in cost involved in any substitution, and the contract altered by change order to credit Owner with any savings so obtained.

PART 8 - SUBMITTALS

8.01 Contractor shall, within 15 days after award of contracts begin sending to the General Contractor for review submittals containing the following:

8.02 Shop Drawings:

A. Submit three master sets of "Shop Drawings" in the form of bond paper 8 1/2" x 11" or 11" x 17" size. Data shall be reduced on drawings as required to leave 5" x 3" clear on each drawing for Engineer's stamp.

B. Architect and consultants will retain copies of the master set for their records and return one reviewed master set to the contractor.

C. Contractor(s) shall, upon receipt of reviewed shop drawings, obtain and distribute copies of reviewed master set as necessary to coordinate work. (Contractor's file, job site file, record document file, other prime contractors, subcontractors and suppliers.)

D. Shop Drawings are custom prepared data and shall show and identify item(s) to be furnished and give location, arrangement, scale, details, sizes, dimensions, performance characteristics, capacities, wiring diagrams, finish and other pertinent information. Each individual item shall have its own separate sheet provided for approval. (Example: Separate sheets for each panelboard.)

E. All shop drawings shall be checked and signed by this contractor and General Contractor prior to submittal to the Architect/Engineer. SHOP DRAWINGS SUBMITTED WITHOUT THE CONTRACTOR'S STAMP OF APPROVAL AND VERIFICATION WILL BE RETURNED BEFORE THE ENGINEER WILL REVIEW SAME. Equipment, materials, etc., not meeting specifications and/or drawing requirements shall be returned to the supplier for corrections before they are submitted to the Architect-Engineer. This Contractor is reminded that only those materials specified, approved or otherwise indicated by the project specifications, drawings, or addenda will be permitted to be used in constructing the electrical work for this project. The first review of submittals (shop drawings) will be provided as indicated at no charge to the Contractor. However, subsequent review(s) of resubmittals required by "Rejected" status from the original review will necessitate the Electrical Contractor being charged by the electrical consultant a fee of $65 per man-hour, with a minimum charge of $100 for each item resubmitted. It is intended that all electrical submittals be made in a complete and timely fashion such as to permit a comprehensive and thorough review of same.

F. Each shop drawing sheet shall indicate job name.

G. Shop drawings submitted without contractor's signatures or approval and verification will not be reviewed.

H. Shop drawings shall be submitted on wire, devices, fixtures (including distribution curves), gear, systems, conduit, etc.

8.03 Product Data: Product Data includes manufacturer's printed specifications, instructions, recommendations, pertinent catalog pages and similar information. Such data shall be marked to identify the data applicable to the Project. Submit three copies. Architect and consultants will review, note and record action and make copies for their files. One submitted copy then will be returned to the Contractor who shall reproduce and distribute copies needed for Project Work.

8.04 Quantities of materials will not be verified by the Architect or Engineer. Submittal Review stamp on shop drawings does not constitute review of quantities listed on shop drawings.

8.05 Engineer's review of Compliance Submittals will not relieve Contractor from his responsibility for any deviations from the requirements of the Contract Documents unless Contractor, has in writing, called Engineer's attention to such deviation at the time of submission and Engineer has given written approval to the specific deviation, nor shall any review by Engineer relieve Contractor from responsibility for errors and/or omissions in Compliance Submittals. No work shall be fabricated until the Architect's review has been obtained. Any time delay caused by correcting and resubmitting shop drawings will be the responsibility of the Contractor.

PART 9 - OPERATING INSTRUCTIONS:

9.01 The Contractor shall submit along with the shop drawings of the equipment, three (3) copies of operating instructions for all items. Instructions shall be prepared by the manufacturer of the equipment.

9.02 After the operating instructions have been approved by the Engineer, the Contractor shall frame one (1) set under plastic and mount near the equipment described.

9.03 The Contractor shall also obtain all manufacturer's instruction manuals and provide one complete set of "as built" drawings and turn these over to the Architect upon completion of the project.

9.04 The Contractor shall keep in a safe place all keys and special wrenches furnished with equipment under this contract and shall give same to the Architect at the completion of the project.

9.05 The Contractor shall prepare (5) complete brochures covering all systems and equipment furnished and installed under his contract. Brochures shall be submitted to the Architect-Engineer for review prior to delivery to the Owner. The Engineer will retain (1) copy. The cost of these brochures shall be included in the contract cost. Brochures shall contain the following:

A. Certified equipment drawings and/or catalog data clearly marked for equipment furnished as required for approval submission under previously detailed section of these specifications.

B. Complete operating and maintenance instructions for each item of equipment.

C. Complete parts list for each equipment item.

D. Any special emergency operating instructions and a list of service organizations (including addresses and telephone numbers) capable of rendering emergency service to the various parts of the system.

E. Riser diagrams on special systems.

9.06 Brochures shall be bound in hard fiberboard covers or loose-leaf binders. If loose-leaf binding is used, each sheet shall be reinforced to prevent tearing from continued usage. Each brochure shall have the following information clearly printed on its front cover:

A. Project name and address.

B. Section of work covered: "Electrical Work".

C. Name and address of Architect.

D. Name and address of Engineer.

E. Name and address of Contractor.

F. Telephone number of Contractor, including night or emergency number.

9.07 In addition to these written instructions, each respective Contractor shall fully and carefully instruct the Owner, or his representatives, as to the proper operation, care and maintenance of each system and its equipment.

PART 10 - COORDINATION AND BUILDING CONDITIONS

10.01 The Contractor shall visit the site and determine all existing local conditions affecting work in his contract. He shall examine architectural drawings and specifications to familiarize himself with the type of construction to be used for all work and how it will affect the installation of work in his contract.

10.02 Failure to determine existing conditions or the nature of existing or new construction will not be considered as a basis for the granting of additional compensation.

10.03 The drawings have been prepared to cover all electrical work under this contract. The Contractor is referred to all other contract drawings to guide him in the proper installation of his work.

10.04 The Contractor shall fully familiarize himself with the floor drawings, elevations, details of construction, feeders, fixtures, conduit, wiring, service, etc., insofar as it may affect the installation of the work under this specification in order that all necessary materials and labor may be provided even though not specifically referred to on the drawings or called for in the specifications.

10.05 As the drawings are generally diagrammatic, the final layout of the work shall be subject to the approval of the Architect but the Contractor shall be responsible without increase in contract price for the coordination of all work under various divisions of the specifications.

10.06 This Contractor shall confer with other Contractors installing work which may affect his work and must arrange his conduit, etc., in proper relation to such work. Any damage resulting from his neglect to do so must be paid for by the Contractor.

10.07 Where necessary to fit and center with paneling of ceilings and wall spaces, the Contractor must, at his own expense, shift the lighting outlets or other outlets as required by the Architect.

10.08 All outlets shall be set in such a manner as to finish flush with wall and ceiling lines unless marked to be exposed or surface mounted on the drawings. The height of brackets, switches, outlets, etc., are to be as directed.

10.09 The Contractor shall obtain from the Architectural and Structural drawings the exact location and size of spaces available for his apparatus and material and shall install them accordingly. In case the space allowed is not sufficient, or an obstruction interferes with placing them as shown or specified, the Contractor shall obtain instructions from the Architect and shall install them as directed without extra charge.

10.10 The above provisions refer only to the exactness of positions that cannot be determined from the drawings and do not permit placing apparatus distinctly different from that shown on the drawings.

10.11 This Contractor shall do all cutting and patching of building materials required for the installation of work herein specified. No structural member shall be cut without the approval of the Architect and all such cutting shall be done in a manner directed by him.

10.12 All patching shall be done in a neat and workman-like manner, meeting with the approval of the Architect, by mechanics of the particular trade involved. Any penetrations through roof shall be made with "Stoneman" flashing connections as manufactured by Stoneman Engineering and Manufacturing Co., Inglewood, Calif., and any penetrations made in exterior or basement foundation walls shall be sealed with Thunderline "Link-Seal" connections, as manufactured by Thunderline Corporation, Wayne, Michigan.

10.13 Any holes or voids created in floors, ceilings and walls, including any spaces or gaps around conduit or equipment passing through such areas, which compromise the applicable rating of the floors, ceilings or walls, shall be sealed with an intumescent material equal to "3M Fire Barrier Caulk, Putty or Strip Sheet", "Carborundum Fiberfrax Fyre Putty", "Tremco X-feno Fire Products", or "Rectorseal Metacalk". Material equal to the above and meeting U.L. 1479 may be used. All installations shall be per manufacturer's exact instructions.

10.14 All drilling of holes through concrete shall be accurately and carefully done by using a "Concrete Termite" drill. The use of a star drill or air hammer for this work shall not be permitted.

10.15 This Contractor shall do all painting and finishing of all electrical equipment installed in finished areas. All work shall be performed in accordance with the Architectural specification section on "Painting and Finishing". All colors and finish applications shall be as directed by the Architect. (Painting is not required of receptacles, switches, circuit breakers, etc., unless specifically so noted on the drawings.)

10.16 The Electrical Contractor shall confirm the exact electrical requirements for all equipment supplied by others and installed or connected by the Electrical Contractor. The specific work performed for the installation of any equipment shall be in conformance with the requirements established by the shop drawings of the equipment supplied. In the event the shop drawings establish requirements distinctly different than the requirements shown in the contract documents, the Contractor shall be entitled only to an adjustment of the difference between the work shown and the work required with full credit for labor and materials shown on the original drawings.

10.17 The Electrical Contractor shall provide all trenching and backfilling for underground conduits. Unless noted otherwise in other divisions of these specifications, all trenches shall be backfilled and compacted with material defined by the United Soil Classification as ML or CL (silt and clay of low to medium plasticity). Compaction shall be to 90% of ASTM D698.

PART 11 - PERFORMANCE

11.01 Provide as part of the work of this contract, in addition to the first year guarantee on equipment and materials, the following described routine maintenance and inspection. (The one year time period will not start until each and every item is complete in accordance with drawings and specifications and accepted by the Owner). Check all emergency systems, control, fire alarm, transformers, etc., correct and adjust same. This service to be provided during the guarantee period.

PART 12 - SYSTEM

12.01 System: Distribution characteristics shall be as indicated on drawings.

PART 13 - GROUNDING

13.01 All conductors, motor frames, etc., that require grounding shall be grounded in accordance with the requirements of the National Electrical Code, local power company and local electrical codes. All ground connections to ground rods shall be with U.L. approved ground clamps. Provide additional ground rods as required to achieve a resistance of 25 ohms or less per N.E.C. 250-84; at the request of the Engineer provide a copy of the ground test results. Multiple ground rods (when required) shall not be less than 6 feet apart.

PART 14 - ADJUSTING, ALIGNING AND TESTING

14.01 All equipment shall be checked for proper adjustment and balance. All panelboards, distribution panels, switchboards, and transformers shall be balanced to provide a balanced load on each phase. A complete record of all such adjustments shall be made. Final readings shall be submitted to the Architect-Engineer for records. The Contractor shall provide all equipment, instruments, gauges, meters, etc., as required for the complete checking of these systems.

14.02 Mechanisms of all electrical equipment shall be checked, adjusted, and tested for proper operation. Adjustable parts of all lighting fixtures and other electrical equipment shall be checked, adjusted, and tested as required to produce the intended performance.

14.03 Completed wiring system shall be free from open or shorted circuits. After completion, this Contractor shall perform tests for insulation resistance in accordance with the requirements of the National Electrical Code.

14.04 The Contractor shall maintain service and equipment for the testing of electrical equipment and apparatus until all work is approved and accepted by the Owner. A first class voltmeter and ammeter shall be kept available at all times and this Contractor shall provide service for test readings when and as required. All test readings shall be recorded on an approved form and submitted to the Architect.

14.05 Before final acceptance is made, this Contractor shall, at his own expense, frame under plastic the sequence of operations of the sound system, controls, fire alarm, etc., for each and every item requiring instructions. These instructions shall be mounted as directed. He shall cover same with Architect and/or his selected parties, and shall adjust all apparatus and place same in satisfactory operating service as approved by the Architect.

14.06 Final observation will be made upon written request from the Contractor after the project is complete. At the time of final observation, the Contractor shall be present or shall be represented by a person of authority. The Contractor shall demonstrate, as directed by the Architect-Engineer, that his work fully complies with the purpose and intent of the drawings and specifications. All labor, services, and all instruments or tools necessary for such demonstration and tests shall be provided by the Contractor.

PART 15 - MOTOR CONTROL AND SPECIAL CONNECTIONS

15.01 The Electrical Contractor shall furnish, install and connect all wiring, conduit, boxes, toggle switches, thermal switches, disconnect switches, remote push-button stations not included in magnetic starters, etc., for all equipment requiring electrical power that is furnished by other contractors and/or the Owner, as required for a complete and operatable system. The Electrical Contractor shall receive, install and connect all magnetic starters and controllers, capacitors, power factor correction devices, transformers, alarms, bells, horns, relays, remote switches, etc., for equipment supplied by others, (i.e. starters, capacitors or power factor correction devices for mechanical equipment, etc.). In general all major equipment will be specified to be factory prewired with only service and interlocking required at the site by the Electrical Contractor; however he shall check all divisions of the specifications to verify if the equipment is specified factory prewired and if not, then it shall be the responsibility of the Electrical Contractor to provide the complete wiring of the equipment in accordance with wiring diagrams, and temperature control drawings provided by the other contractors and/or the Owner, to the Electrical Contractor. All interlocking of equipment shall be by the Electrical Contractor.

15.02 All control equipment requiring piping connections to air, water, steam, etc., lines such as pneumatic electrical relays, remote bulb temperature controls, solenoid valves, aquastats, pressure control, etc., will be furnished and installed under "Mechanical Work".

15.03 All line and low voltage wiring, conduit and connections required to control equipment and/or dampers are a part of this section. Provide and install line or low voltage wiring to all dampers as required for system operation. All low voltage wiring, conduit, connections and/or terminations are by the Electrical Contractor unless specifically noted otherwise within the bidding documents.

15.04 It shall be assumed the Contractor has familiarized himself with the equipment to be furnished by the other contractors and/or the Owner in connection with this work and that provisions for such connections and work have been included in the Contractor's price. In no case will extra remuneration be allowed for such work.

15.05 Connections to all equipment have been designed for units as specified on the drawings or in the specifications. In the event equipment or controls differ on approved mechanical shop drawings, it shall be the responsibility of the supplying contractor to coordinate electrical connections to the units and reimburse Electrical Contractor for any changes in system design. These changes shall not involve additional cost to the Owner.

PART 16 - GUARANTEE

16.01 This Contractor, by the acceptance of this specification and the signing of his contract, acknowledges his acquaintance with the requirements and guarantees that every part used in constructing the system as herein described will be of the best of its respective kind that can be obtained and will be erected in a most thorough and substantial manner by none but experienced workmen.

16.02 He guarantees that all conduit as provided within and by this specification will be free from all obstructions of every description and will be free from holes or broken places and be well bonded together. He guarantees that all wiring and conduit to be used in construction of this project will be new and unused.

16.03 He further guarantees to hold himself responsible for any defects which may develop in any part of the entire system, including apparatus and appliances provided under this section of the specification, and to replace and make good without cost to the Owner any such faulty parts of construction which develop defects at any time within one year from date of final certification of completion and acceptance. Provide manufacturer's engineering and technical staff at site to analyze and rectify problems that develop during guarantee period immediately. If problems cannot be rectified immediately to the Page 16010-
Owner's satisfaction, advise Architect in writing, describe efforts to rectify situation, and provide analysis of cause of problem. Architect will then suggest course of action. The Electrical Contractor shall replace material and equipment that requires excessive service during guarantee period as defined and as directed by the Architect. This guarantee does not include ordinary lamp failure.

16.04 Use of systems provided under the Specification for temporary services and facilities shall not constitute Final Acceptance of the work nor beneficial use by the Owner, and shall not institute guarantee period.

PART 17 - SUPPLEMENTARY CONDITIONS

17.01 Supplementary to all other terms of the contract, this work shall be performed subject to the following conditions.

17.02 Materials and equipment installed on this project shall be first class in quality and shall be new and unused.

17.03 Workmanship on this project shall be first class work performed by the experienced licensed mechanics of the proper trade.

17.04 Work under this contract shall be adequately protected at all times. Temporary raceways shall be kept closed and all raceways shall be installed clean and free from dirt and grease.

17.05 Storage, parking, signs, advertisement, fires and smoking shall conform to all applicable regulations and/or directions of the Architect.

17.06 Measurements on job and shop layouts required for installation of work shall be the responsibility of the contractor and acceptance of work is subject to approval of shop drawings by the Architect.

17.07 Contractor shall furnish all hoists, scaffolds, staging, runways and equipment necessary for the completion of this work.

17.08 Obtain and pay for all required electrical permits and licenses.

17.09 Maintain lights and guards required for safety.

17.10 Remove temporary service after use.

PART 18 - CONTRACT CHANGES

18.01 All changes or deviations from the contract, including those for extra or additional work, must be submitted in writing for the approval of the Architect/Engineer. No verbal orders will be recognized.

PART 19 - RUBBISH/CLEANUP

19.01 All rubbish resulting from the work herein specified shall be periodically removed by this Contractor.

19.02 Clean all electrical equipment and materials of all foreign matter (both inside and out). Clean all light fixtures using only methods and materials as recommended by the manufacturer.

PART 20 - PROPOSALS

20.01 The Contractor shall consult the General Conditions and the Proposal Form for proposals and subdivisions of the work required.

PART 21 - EXTENT OF WORK

21.01 The extent of the work under this heading of the contract shall be the furnishing of all plant, labor, materials, and equipment as required to complete work as shown on the drawings and as specified under this heading, and all plant, labor, materials and equipment not shown on the drawings or specified, but necessary to make installation complete in accordance with the intent of the contract, to provide first class, complete, and operative installation throughout.

PART 22 - TAXES

22.01 Contractor shall include all applicable local, state and federal taxes in his bid. Consult the Supplementary Conditions of these specifications relative to any and all tax exemptions permitted for this project.

PART 23 - "AS-BUILT DRAWINGS"

23.01 E.C. shall prepare and submit to the Engineer, upon completion of the project, one complete set of reproducible "As Built" drawings for the electrical portion of the project.

23.02 Drawings shall clearly indicate any and all approved deviations (i.e. addendum items, change order data, etc.) from the Project Bid Documents.

23.03 These drawings will become the property of the Owner and will be for his future reference file, record document.

PART 24 - PROTECTIVE DEVICE COORDINATION STUDY

24.01 Any Project that has breakers that are provided with an adjustable trip setting, those settings must be provided with a coordination study that is provided by the gear manufacturer. The coordination study shall include a time-current curve drawing with recommended settings. The coordination study shall be provided with the gear submittal congruently. The contractor shall be responsible for adjusting the breaker settings to match the coordination study suggestions. If the gear manufacturer does not provide a coordination study, then the electrical contractor shall hire Integrated Consulting Engineers, Inc. to provide the coordination study and respective circuit breaker settings.

DIVISION 16 ELECTRICAL

SECTION 16020

BASIC MATERIALS AND METHODS

PART 1 - CONDUIT

1.01 Materials:

A. All conduits and raceways shall be as listed below. No other wiring or raceway systems will be allowed.

B. Rigid conduit (G.R.S.) and intermediate metal conduits (IMC) shall be standard size, hot dip galvanized steel conduit, minimum 1/2" trade size, as manufactured by Triangle PWC, Inc., Allied, or equal. Rigid conduit and IMC shall be provided with threaded fittings and couplings. In trade sizes 2-1/2" to 4", contractor may use Allied 'KwikCouple' fittings in lieu of individual steel couplings. Where 'Kwik-Couple' fittings are used exterior for vertical risers, install fitting with taper end up. A "green" ground wire, sized per NEC 250-95, shall be installed in all conduits containing phase conductors.

C. E.M.T. (thinwall conduit) shall be minimum 1/2" trade size, as manufactured by Triangle PWC, Inc., Allied, or equal. Provide EMT with Thomas and Betts, or equal, U.L. listed steel or die-cast type fittings. Indenter type fittings shall not be used. Contractor may use Allied 'Kwik-Fit' fittings in lieu of individual fittings. A "green" ground wire, sized per NEC 250-95, shall be installed in all conduits containing phase conductors. E.M.T. conduit shall not be installed in earth or below grade.

D. All conduit installed in wet locations, exposed exterior to the building, or subjected to physical abuse (i.e. industrial locations), shall be rigid steel conduit (G.R.S.) or intermediate metal conduit (I.M.C.). All conduit installed in earth or below grade shall be rigid steel conduit (G.R.S.), intermediate metal conduit (I.M.C.), or U.L. approved schedule 40 P.V.C. conduit.

E. Thin wall conduit (E.M.T.) may be used where code permits except as outlined above.

F. U.L. approved schedule 40 P.V.C. conduit may only be used where conduits are to be run in earth or below slabs. P.V.C. conduits shall not be used above grade inside or outside of the building, unless specifically noted otherwise on the drawings. Use G.R.S. ells and risers, both horizontal and vertical. Use conduit adapters when converting from P.V.C. to steel conduit. Branch circuit and feeder P.V.C. conduit to be 3/4" min. Concrete encase all conduit installed below grade where so noted on the drawings, (U.L. approved schedule 40 P.V.C. with plastic spacers). All P.V.C. conduit shall be provided with a separate "green" ground conductor, sized per N.E.C.

G. Multi-Conductor Cables:
  1. Comply with NEMA WC 70; Exterior sheath shall be color coded to distinguish between cable voltages and quantity of phase conductors.
  2. Type AC Cable, Armored cable, shall comply with UL 1479 and UL 4 with green grounding conductors in addition to Armor/Bond wire ground combination. Cables shall be listed for use in environmental air space in accordance with NFPA 70 Article 300.
  3. Type MC Cable, Metal-clad cable; shall comply with UL 1479 and UL 1569 with green grounding conductors. Cables shall be listed for use in environmental air space in accordance with NFPA 70 article 300.

1.02 Bushings and Locknuts:

A. Where conduits enter boxes, they shall be rigidly clamped to the box by double locknuts and bushings. Conduit shall enter the box squarely. Bushings and locknuts shall be made of malleable iron and shall have sharp clean-cut threads.

1.03 Conduit Installation:

A. Where conduit sizes are not specifically indicated, provide sizes in accordance with the requirements of the N.E.C.

B. Conduit work in general shall be installed concealed in walls, floor and roof construction or concealed within furred spaces. Exposed work shall include only feeders and short connections to equipment in equipment room unless noted otherwise. All exposed conduits (where approved by the Engineer) shall be routed parallel and/or perpendicular to building elements.

C. Conduit to be installed to the requirements of structure and to the requirements of all other work on the project. Conduit shall be installed to clear all openings, depressions, pipes, ducts, reinforcing steel, etc. Conduit set in forms for concrete structure shall be installed in such a manner that installation will not affect the strength of the structure. Coordinate installation with Structural Engineer for conduits rising up from floor slabs into bottom of panelboards. Minimum distance between conduits shall be 6". Maximum size of conduit permitted in concrete slabs, if so approved by the Architect, is 1" trade size.

D. Conduit shall be installed continuous between connections to outlets, boxes and cabinets with a minimum possible number of bends and not more than the equivalent of 4-90 degree bends between J-box connections. Bends shall be smooth and even and shall be made without flattening conduit or flaking enamel. Radius of bends shall be as long as possible and never shorter than the corresponding trade elbow. Long radius elbows shall be used where necessary.

E. Conduits shall be securely fastened in place with approved straps, hangers, and steel supports as required by the National Electrical Code. All surface mounted conduits on walls below eight foot above grade shall be secured with conduit straps, no clamps. The use of wire, plumbers straps, etc, will not be permitted.

F. Junction and pull boxes shall be installed where shown on drawings and additional boxes shall be installed if required for pulling of wire, provided location and installation is approved by the Architect. All boxes shall be code gauge construction with screw type covers and shall be installed in accessible locations.

G. Conduit shall be reamed and thoroughly cleaned before installation and kept clean after installation. Openings shall be plugged and boxes shall be covered as required to keep conduit clean during construction. All conduit shall be fished clear of obstructions before the pulling of wires. All conduit shall be as sized above and shall not be smaller than N.E.C. listed minimum requirements.

H. All work shall be protected against damage during construction and any work damaged or moved out of line after roughing-in shall be repaired and reset to the approval of the Architect without additional cost to the Owner.

I. Conduit terminations at panelboards, switchboards, motor control equipment, junction boxes, etc., shall be aligned and installed true and plumb. Wood or steel bucks or templates shall be used where required. This work shall also include all steel supports as required for mounting of electrical equipment excepting only where steel supports are specified to be furnished under another specification heading.

J. Where conduits cross construction expansion joints, Contractor shall provide Appleton XJ or equal expansion couplings with copper bonding jumpers.

K. Where conduits are installed in concrete, all connectors and couplings shall be water tight or rated for direct burial in concrete.

L. Mechanical equipment service clearances and electrical apparatus service clearances as specified in their respective manufacturer's product data shall be maintained free from conduit obstructions.

M. All conduits routed below grade shall be minimum 30" below grade unless noted otherwise on the drawings. All conduits routed below floor slabs shall be installed a minimum of 4" below the slab.

N. MC Installation
  a. Install in accordance with the NEC, and as specified.

  b. Unless noted otherwise on the electrical drawings or herein, all feeders for all systems shall be routed within conduit, shall be of the same insulation type and shall be continuous between outlets and boxes (with no splices or taps into conduit). This shall include but not be limited to:

    - Service entrance feeders
    - Exposed feeders
    - Feeders concealed in ceilings, walls, partitions and crawl spaces
    - Feeders below slabs-on-grade and underground.

  c. Branch circuits concealed in ceilings, walls and partitions: single conductors in raceways. Type ac and type mc in locations limited to the following:

1. Type ac and type mc are acceptable for the following applications:

a. Install cables for lighting fixtures whips and for branch circuits concealed in walls and partitions only. locate junction box and convert to single conductors in rigid raceway within 24-inches from the point the cable exits the wall. do not install cable in the web of metal studs.

b. Use only single-circuit cable (i.e. two wire plus ground). for devices in the same wall connected to different circuits, install separate single circuit cable for each circuit.

2. Type AC and type MC are not acceptable for the following applications; instead provide single conductors in rigid raceway:

a. Homeruns to panelboards.

b. Branch circuits and feeders serving hvac equipment, elevator equipment, and kitchen loads.

c. Within mechanical, electrical or communication rooms.

d. Exposed branch circuits within areas that do not have ceilings (i.e. exposed to structure).

PART 2 - WIRES AND WIRING

2.01 American, Southwire, Essex, or equal code gauge wire, rated 600V, finished with fadeless color coding and bearing Underwriter's label. Wires shall be soft annealed copper with properties conforming to the National Electrical Code requirements. No. 8 gauge and larger shall be stranded and No. 10 gauge and smaller may be solid or stranded, unlessnoted otherwise on the drawings. Stranded conductors shall only be used on devices and lugs that are U.L. listed for use with stranded conductors.

2.02 Wire smaller than No. 12 gauge shall not be used unless specifically called for on the drawings.

2.03 Unless noted otherwise on the Electrical drawings or herein, all wiring for all systems shall be routed within conduit, shall be of the same insulation type and shall be continuous between outlets and boxes (with no splices or taps into conduit). Splices and taps in outlet boxes shall be twisted joints. U.L. approved pre-insulated spring pressure connectors shall be used for branch circuit connections. Connectors shall be installed so that all conductors are properly insulated.

2.07 A "green" insulated ground conductor, sized per N.E.C. 250-95 and/or as shown on the drawings, shall be installed in each conduit containing phase conductors.

2.08 Where quantities of conductors in a raceway system are not specifically indicated, provide the number as required to maintain function, control and number of circuits as indicated.

2.09 All conductors shall be identified at all termination points and in all pull and junction boxes by the following method of color coding:

208Y/120 Volt System	480Y/277 Volt System	240/120 Volt System
Phase A Black	Phase A Black	Phase A Brown
Phase B Red	Phase B Red	Phase B Orange
Phase C Blue	*Phase C Blue	Phase C Yellow
Neutral White	Neutral White	Neutral Gray
Ground Green	Ground Green	Ground Green

*(Note: identify "high leg" per N.E.C.)

2.10 All conductors size #6 AWG and smaller shall have colored insulation. Where conductors with black insulation are used for the larger wire sizes (#4 AWG and larger), color coding shall be provided with two (2) layers, one-half lapped, of No.35 colored Scotch Vinyl electrical tape. Where any conductor is or can be supplied from an emergency system the Contractor shall mark each conductor with an additional two layers, one-half lapped, of Purple colored Scotch Vinyl Electrical tape.

2.11 Isolated Ground conductors shall be green with one yellow stripe. All isolated ground circuits shall be provided with separate phase, neutral, and ground conductors (no shared neutrals or grounds).

2.12 Provide a listing of the above described conductor color code identification scheme at all branch circuit panelboards per Article 210-4(d), National Electrical Code.

2.13 Splices and taps for #6 and larger conductors shall be made with block type terminations (with insulating jacket) or with split bolt connectors, covered and completely insulated with a minimum of three half-lapped layers of Scotch No. 33+ (105 degree C) plastic electrical tape or by approved insulated fastener. All splices and taps having irregular surfaces shall be properly padded with Scotchfil putty before application of insulating plastic tape. Scotchlok electrical pre-insulated spring pressure connectors or equal may be used for up to #8 conductors.

2.14 If an elevator is provided with a battery lowering device, the contractor shall be responsible for providing the low voltage wiring between the battery lowering device and the auxiliary contact located in the elevator power module or local disconnecting device. Provide an auxiliary contact located in the elevator power module or local disconnecting device if not already specified. Coordinate all requirements with the equipment manufacturer prior to bid.

PART 3 - OUTLET BOXES

3.01 All electrical service outlets, including plug receptacles, lamp receptacles, lighting fixtures and switches shall be provided with 4" square, code gauge steel knockout boxes, galvanized or sherardized and of required depth for service and appliances. Single gang 'handy boxes' will not be allowed. All outlet boxes shall be flush mounted unless noted otherwise on the drawings or herein. Boxes installed in gyp board or plaster finish shall have code gauge galvanized raised covers set to not more than 1/4" behind final finish. Covers shall be selected with proper openings for devices installed in box. Manufacturers shall be Steel City, Appleton, RACO or equals approved by the Engineer.

3.02 Boxes mounted to metal wall studs shall be mounted with Caddy #MSF metal stud clip, or equal as approved by the Engineer. Boxes mounted to either metal or wood studs shall be mounted with Caddy #766 farside box support, or equal as approved by the Engineer. Single metal stud box clips without box supports are not acceptable for mounting boxes.

3.03 Sectional boxes shall not be used except where directed and approved by the Architect for installation in unplastered tile walls and provided conduit connections are installed concealed in walls.

3.04 Where lighting fixtures and appliance outlets are to be mounted on concrete or on plaster finish on concrete, outlet boxes shall be installed in forms of exact dimensions from bench marks, columns, walls or floors. Where lighting fixtures and appliance outlet are to be mounted on masonry walls and/or plastered furring or other finish, outlet boxes shall be roughed in to general location before installation of walls and furring and shall be reset to exact dimensions before walls and furring are constructed. All outlet boxes shall be set true to horizontal and vertical lines parallel to walls, floors, and ceilings and be true to finish lines.

3.05 Install all outlets in a secure and substantial manner and locate so as to be compatible with space, construction and equipment requirements and with the work of the other trades.

3.06 Furnish and install plaster rings for all boxes installed in plastered (or gyp board) ceilings and walls. Verify construction with general construction drawings.

3.07 Boxes for exterior or wet location work (where permitted or approved) shall be Appleton or Crouse-Hinds Type FS or FSC for shallow devices and Type FD or FDC for deep devices. Boxes for ceiling mounted light fixtures shall have approved no-bolt fixture studs. Boxes used as junction boxes shall have beveled edge flat steel blank covers.

3.08 Location of outlets on small drawings is approximate and exact dimensions for location of outlets shall be as taken from large scale drawings and details on drawings or as directed by the Architect. Outlets shall be located generally from column centers and finished wall lines or to center of joints of wall panels. Ceiling outlets shall be installed at elevation of suspended ceilings and connected to outlets in ceiling or slab above.

3.09 Clock outlets shall be mounted 8'-0" above floor unless otherwise noted on the drawings. All other outlets shall be mounted at heights above floor as called for on the drawings or as directed. Bracket lights over mirrors shall be centered on mirror with 2" clearance above mirror.

3.10 Boxes for switches and receptacles installed in columns shall be located off center to allow for future partitions.

3.11 Boxes for switches at or near doors shall be installed on the side opposite the hinge and within 6" of the door. Verify door swing direction prior to rough-in.

3.12 Rough-in outlets for electric water coolers so as to be concealed behind coolers, but remain accessible, in accordance with recommendation of equipment supplier.

3.13 To prevent sound from traveling through walls, electrical devices serving different rooms shall not be mounted in the same stud space. Through-wall boxes shall not be used. In fire rated walls or partitions, outlet boxes on opposite sides of walls or partitions shall be separated by a horizontal distance of not less than 24 inches. Installation shall be per UBC with fire stopping pads manufactured by International Protective Coating Corp. Outlet boxes larger than 4" square shall not be installed in fire rated walls or partitions. Verify location of fire rated walls or partitions with Architectural drawings prior to rough-in.

3.14 Provide blank cover plates for all outlet boxes not used. Plates in finished areas shall match those specified for switch and receptacle devices. Blank cover plates for junction boxes supplied from the emergency system or fire alarm system shall be painted red.

PART 4 - INSTALLATION OF SWITCH PLATES, ESCUTCHEONS, ETC.

4.01 It shall be the duty of this Contractor to examine the plaster, painting, and other finishes before making his installation to make sure that these accessories, when installed, will fit and cover properly and leave no open or unfinished surface showing. He shall refuse to complete his installation where faulty work on the part of others is found, and he shall promptly report the trouble to the Architect.

PART 5 - SUPPORTS AND HANGERS

5.01 Provide supports and hangers as necessary and as required to insure a good and substantial installation. Support raceways, fixtures, cabinets, boxes, etc., on approved type of trapeze hangers or wall brackets, as manufactured by Unistrut, American Electric, B-Line, Globe, or approved equal. Provide steel hanger rods securely fastened to or through the building structure for all trapezes, etc. Do not suspend from mechanical piping or ductwork. Perforated plumber's straps or wire will not be permitted.

PART 6 - JUNCTION, PULL AND SUPPORT BOXES

6.01 Pull and junction boxes shall be code gauge galvanized steel boxes with bolted, hinged or screwed covers. Boxes shall be flush or surface mounted as shown or required by N.E.C. and job conditions. Install in accessible locations.

6.02 Conductors shall not be spliced within pull boxes.

6.03 Boxes shall be rated as shown on the drawings or as required by applicable codes, ie: raintight, weatherproof, explosionproof, etc.

PART 7 - PAINTING AND FINISHES

7.01 Preparation of the material and the materials used for priming and finish painting shall be in accordance with the "Painting" section. Finish painting shall be performed under "Painting " section. Priming shall be performed under this section. Equipment specified to be factory-primed or finish-coated shall be the work of this section and materials and workmanship shall be as specified in "Painting" section.

PART 8 - NAMEPLATES AND IDENTIFICATION

8.01 General: The following shall be equipped with nameplates:

A. All distribution equipment (disconnect switches (fused or nonfused), switchboards, panelboards, transformers, motor control centers, separately mounted circuit breakers, contactors, motor starters and relays etc.).

8.02 Inscription: Nameplates shall adequately describe the function or use of the particular equipment involved. Nameplates for panelboards and switchboards shall include the panel designation, voltage, phase and A.I.C. rating required (See Schedules). For example, "Panel - A, 120/208 V, 3-Phase, 4-wire, 10,000 A.I.C" The name used for a machine nameplate shall be the same as the one used on the machine's motor starter, disconnect and P.B. station nameplates. Nameplates for fused switches and panels shall also indicate fuse type and size.

8.03 Construction: Nameplates shall be laminated phenolic plastic, black front and black with white core. Nameplates for emergency system panelboards and transfer switches shall be red front and back with white core letters. Lettering shall be engraved through front layer to form 1/4" white characters (1/2" white letters for distribution panels and switchboards). Branch switch label shall be 1/4" letters. Nameplates shall be securely fastened to the equipment to be identified, with double sided adhesive backed tape. Motor nameplates may be non-ferrous metal not less than 0.03" thick, die stamped. All nameplates and their installation are part of this work. Free hand lettering or adhesive tape type label markers will not be accepted.

8.04 Special Electrical Systems (fire alarm, sound system, emergency systems, etc.) shall be so identified at junction and pull boxes, terminal cabinets and equipment racks with a permanent, waterproof means of identification. (Example - FIRE ALARM). Free hand lettering or adhesive tape type label markers will not be accepted.

8.05 Wall switches or other control devices controlling equipment or special lighting control configurations shall have either engraved wall plates or shall be provided with engraved nameplates.

PART 9 - WALL SWITCHES

9.01 Wall switches in general, used to control lighting, shall be quiet operating, listed by U.L. and conform to NEMA standards as well as the latest Federal Specification W-S-896e. Certification that switch meets this specification shall be submitted to the Engineer for approval.

9.02 Switches shall be single pole, two-pole, three-way, or four-way, as called for on the drawings. Groups of switches shall be under one cover plate. Where switches are in fire rated walls groups of switches shall be maximum of 2 gangs under one cover plate.

9.03 All Switches shall be rated 20 A. at 125 V. - 277 V. unless specified otherwise.

9.04 Switches: (Verify colors)

Manuf:	(Series #)	Toggle	Key Pilot
P & S	20AC1	20AC1-L	20AC1-CPL
Hubbell	1221	HBL1220L	HBL1220PL
Leviton	1221-2	1221-2L	1221-PLR
Arrow-Hart	1221	1991L	1991PL

Once device manufacturer has been selected, all switches, receptacles and plates in the project shall be by the same manufacturer, unless noted otherwise on the Drawings or in the Specifications.

9.05 Pilot light switches shall be illuminated toggle switch lighted red in the "on" position. Key switches shall be master keyed.

9.06 All switches shall have High-Impact Thermoplastic or Nylon (not Thermoset), smooth surface, wall plates. Where plates are noted to be engraved or labeled, provide stainless steel wall plates in color to match other plates and provide engraved filled letters. If approved by the Engineer, high-impact thermoplastic plates with filled letters may be used for engraving provided that a sample plate is submitted for approval. Plates shall be set plumb and parallel with the wall. Stainless steel plates where used or specified shall be .032" nominal thickness, non-magnetic.

9.07 Color of switches and plates shall be as selected by the Architect. Verify colors prior to ordering.

9.08 Provide barriers between 277V. switches and between 277V. and 120V. switches installed in a common outlet box.

9.09 Incandescent wall box dimmers shall be linear slide type with smooth face plates, no exposed cooling fins, equal to Lutron NT-600, NT-1000, or NT-1500 for loads to 1500W. For Loads 1500W to 2000W, Lutron N-2000. Verify color of face plate and dimmer with Architect prior to ordering. Dimmer switches for fluorescent and compact fluorescent light fixtures shall be slide type, equal to Lutron. Fluorescent and compact fluorescent dimmer switches shall be compatible with the ballast used with the light fixture. Coordinate with ballast manufacturer.

PART 10 - RECEPTACLES

10.01 Convenience duplex receptacles shall be grounded twin outlet receptacles rated 20 amperes at 125 volts.

10.02 Provide WP receptacles with a single lift hinged weatherproof coverplate for interior or exterior receptacles protected from the weather (not subjected to rain, water runoff, or hose down) or in other damp locations.Where interior or exterior WP receptacles are installed in wet locations (subjected to rain, water runoff, or hose down), provide heavy duty metallic weatherproof cover, “Suitable for wet locations while in use”, and UL Listed. The weatherproof cover shall be equal to Hubbell MX4280S.

10.03 See drawings for special outlet schedule.

10.04 Receptacle body shall be formed of high-impact thermoplastic or urea and receptacle contacts shall be Bronze. Receptacles shall be listed by U.L. and conform to NEMA standards as well as the latest Federal Specification W-C-596. Certification that receptacle meets or exceeds N.E.M.A. Standards shall be submitted to the Engineer for approval.

10.05 Surge suppression (TVSS) duplex receptacles shall be 20A., 125V., NEMA 5-20R devices. Receptacles shall have a red, device verification light which is illuminated when the suppression circuit is functional. The receptacle shall meet or exceed UL Standards 1449 and 498 and be capable of suppressing 70 joules of transient energy. Receptacles shall be P & S #IG6362-ISP, Hubbell IG8362 or Wiremold #83TB2-V.

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10.06 Receptacles: (Verify colors)

Manuf:	DUPLEX (20A.125V)	DUPLEX GFCI (20A.125V)	DUPLEX ISOLATED (20A.125V)	CLOCK GRD. (15A.125V)
P & S	5362A	2091S	IG6300	S3733-SS
Hubbell	HBL5362	GF5352	IG5362	HBL5235
Leviton	5362A	6899	5362-IG	5621-CH
Arrow-Hart	5362	GF5342	IG5362	5708

Once device manufacturer has been selected, all receptacles, switches, and plates in the project shall be by the same manufacturer, unless noted otherwise on the Drawings or in the Specifications.

10.07 Where tamperproof receptacles are indicated on the drawings to be provided, receptacles shall be equal to Hubbell #CSR20, 20 amp, 125 volt. Provide tamper proof receptacles in all areas indicated per 2017 NEC section 406.12.

10.08 Install receptacles to clear all cabinets, equipment, etc.

10.09 All receptacles shall have High-Impact Thermoplastic or Nylon (not Thermoset), smooth surface, wall plates. Where plates are noted to be engraved or labeled, provide stainless steel wall plates in color to match other plates and provide engraved filled letters. If approved by the Engineer, high-impact thermoplastic plates with filled letters may be used for engraving provided that a sample plate is submitted for approval. Plates shall be set plumb and parallel with the wall. Stainless steel plates where used or specified shall be .032" nominal thickness, non-magnetic.

10.10 Color of receptacles and plates as selected by the Architect. Verify color prior to ordering.

10.11 Provide duplex receptacle on separate circuit beside each telephone terminal board location and other communications equipment requiring 120 volt power.

10.12 Provide GFCI protection as required in 2017 NEC 210.8.

10.13 Combination USB/Duplex receptacle shown on floor plans shall be equal to Hubbell USBB20.

10.14 Electrical contractor shall provide testing in patient care areas per NFPA 99.

PART 11 - FLOOR BOXES

11.01 Unless noted otherwise on the drawings, flush floor boxes shall be equal to Steel City #68 Series floor box with P-60-DS cover plate for specified and P-60-120-P cover plate for telephone and data outlets. Provide with carpet flange for floors with carpet. Verify exact location with Architect prior to rough-in.

11.02 All floor boxes shall be cleaned of all construction debris and dirt.

11.03 Where fire rated 'poke-through' devices are specified, Contractor shall install devices after concrete pour and after final verification of location with Owner. Fire rated 'poke-through' devices shall be spaced apart from each other as required by the manufacturer and U.L.

11.04 PVC floor boxes may be used in lieu of floor boxes indicated above. PVC floor boxes shall be equal to Walker, Wiremold, Hubbell, Carlon, with metal covers. Receptacle covers shall be double flap, telephone and data covers shall be combination 2"x2" inserts. Unless noted otherwise on the drawings, all floor boxes for similar devices shall be either metal or PVC, no intermixing of same types of floor boxes will be allowed.

PART 12 - CONTACTORS AND RELAYS

12.01 Shall be as manufactured by Cutler-Hammer, General Electric, Siemens, Allen Bradley, or Square "D". They shall be as sized on the drawings.

12.02 All contactors and relays shall be "T" (Tungsten) rated.

PART 13 - TIME SWITCHES

13.01 Time switches by Tork, Intermatic, or Paragon equal to those shown on the drawings or specified below, and approved by the Engineer, will be acceptable.

13.02 Exterior lighting or interior time switches shall be Intermatic ET701LC Series, 7 day with carry-over, unless specified otherwise. Set time switch per Owners Requirements.

13.03 All time switches shall be provided with momentary contacts if required.

13.04 All time switches shall be provided with manual bypass switches and standby battery systems.

PART 14 - PHOTO ELECTRIC CONTROLS

14.01 Photo Electric Controls by Tork, Intermatic, or Paragon equal to those indicated below and approved by the Engineer will be acceptable.

14.02 Photo Electric Controls (Photo Switches-Photo Cells) shall be Intermatic #K4133 rated at 3000W, 277 Volts, or #K4121 rated at 1800W, 120 volts, weatherproof. Mount on roof and orient photo electric controls to the north. Photo-electric controls supplied as a part of a fixture assembly shall be as provided by Fixture Manufacturer.

14.03 All photocell housings supplied as part of the light fixture assembly or mounted on the light fixture shall be painted to match the light fixture finish.

PART 15 - STARTERS (SEPARATELY MOUNTED)

15.01 Starters for all devices shown on all drawings shall be supplied by the Electrical Contractor unless specifically noted otherwise on the drawings.

15.02 Starters shall have melting alloy relays or bimetallic overload relays (as required for load served). Starter housing shall have NEMA rating for the location (general purpose, weatherproof, etc.). Each starter shall have an H-O-A switch in cover and control transformer (if required) for controls. See drawings for multispeed starter requirements.

15.03 Coil voltage shall be as required for controls as shown on all drawings and control power transformer size shall be adequate to provide control functions as shown.

15.04 Provide each starter with a spare set of auxiliary contacts. One closed when the starter is deactivated and one closed when the starter is activated.

15.05 Overload thermal units shall be sized on the basis of actual motor nameplate current. Overloads shall be non-adjustable NEMA standard trip and shall be available in sizes covering the complete NEMA horsepower. Starters shall be Class 20 (Class 10 not acceptable).

15.06 Starters shall be fully NEMA rated; I.E.C. design starters will not be acceptable.

15.07 Separately mounted starters shall be by the same manufacturer as the distribution equipment, or Allen Bradley or Furnas.

PART 16 - DISCONNECT SWITCHES

16.01 The Contractor shall furnish and install externally operated, non fused and/or fused (with Class R rejection features), heavy duty, horsepower rated, disconnect switches at all points indicated on the drawings or required by code. These switches shall be by the same manufacturer as the distribution equipment.

16.02 All disconnect switches shall be fused except for disconnect switches that have individual fuse protection at point circuit receives its supply.

16.03 Provide dead front type for all exterior disconnects on grade level when so required by local code.

16.04 All fused disconnect switches shall have a minimum rating of 100,000 A.I.C. with fuses installed unless noted otherwise on the drawings.

16.05 All disconnect switches shall be provided with grounding kits.

PART 17 - FUSES

17.01 Cartridge type fuses of proper size as required shall be furnished and installed for all switches and panelboards throughout, and an additional supply of three (3) spare fuses of each size shall be furnished in original packages to the Owner. Furnish a NEMA enclosure with hinged cover equal to Bussmann type SFC for storing all spare fuses and locate adjacent to main service equipment. Fuses for motor and mechanical equipment shall be sized from the nameplate data per N.E.C. requirements.

17.02 Fuses shall be manufactured by Bussmann Mfg. Co., Gould-Shawmut Co., Littelfuse or approved equal by Engineer. Fuse types shall be installed as follows:

Main Service and Distribution Feeder Protection:

	Bussman	Littelfuse	Gould Shawmut
601 amps and larger	KRP-C/KTN	KLPC	A4BQ
	Bussman	Littelfuse	Gould Shawmut
600 volts and less (Class L)			
600 amps and less	LPN-RK	LLN-RK	A2D-R
250 volts and less (Class RK1)			
600 amps and less	LPS-RK	LLS-RK	A6D-R
600 volts and less (Class RK1)			

Motors and Primary Feeders for Transformers:

250 volts and less (Class RK5)	FRN-R	FLN-R	TR-R
600 volts and less (Class RK5)	FRS-R	FLS-R	TRS-R

17.03 Class T fuses will not be accepted, unless they are a part of a manufacturers assembly or approved by the Engineer. Class J fuses may be used as an alternate to the Class R fuses listed above.

17.04 Fuses installed on project shall be by one manufacturer only. (Do not intermix Manufacturers.)

PART 18 - EQUIPMENT CONNECTIONS

18.01 For 120 volt motors 1/2 HP- and less, 15 amperes and less, Contractor shall provide Bussmann "SSY" box cover unit for indoor application and "SSN" box cover unit for outdoor applications, or equal by Perfect-Line, with fustat plug fuse and integral toggle switch for motors 1/2 HP-120V. and less. Fustats for cord and plug equipment with fuses. Fustat fuses shall be Bussmann "SRY" box cover unit, or equal by Perfect-Line, with fustat plug fuse. Mount fustats in housings of equipment served wherever possible. Plug fuses for motors shall be sized based upon 125% of manufacturer's nameplate full load amperage unless otherwise indicated on drawings.

18-02 For 3/4 HP-120V. motors, Contractor shall provide (1) 20 amp 1 pole 120 volt toggle disconnect switch with a Bussmann 'HPD' fuse holder and 'FNQ' fuse at each unit. Switch and fuse holder to be mounted in cover of a 4" square junction box at each unit. For 3/4 HP-120V: motors that are provided with cord and plug, Contractor shall provide 20 amp 120 volt duplex receptacle with (1) 20 amp 1 pole 120 volt toggle disconnect switch on line side of receptacle, and Bussmann 'HPD' fuse holder and 'FNQ' fuse on line side of receptacle. Switch, receptacle, and fuse holder to be mounted in cover of a 4" square junction box at each unit. Fuses for motors shall be sized based upon 125% of manufacturer's nameplate full load amperage unless otherwise indicated on drawings.

18.03 For connections to 277 volt equipment, Contractor shall provide (1) 20 amp 1 pole 277 volt toggle disconnect switch with a Bussmann 'HPD' fuse holder and 'FNQ' fuse at each unit. Switch and fuse holder to be mounted in cover of a 4" square junction box at each unit. Fuses for motors shall be sized based upon 125% of manufacturer's nameplate full load amperage unless otherwise indicated on drawings.

DIVISION 16 ELECTRICAL

SECTION 16030

SERVICE AND DISTRIBUTION

PART 1 - MAIN SERVICE

1.01 Primary: See the plans.

1.02 Secondary: See the plans. Voltage will be, 277/480-volt, 3-phase, 4-wire, WYE, 120/208-volt, 3-phase, 4-wire, WYE, 240-volt, 3-phase, 3 wire Delta, or 120/240-volt, 1-phase, 3 wire.

1.03 Consult power company for their requirements and for coordinating with their installation. Contractor shall provide any work thus required beyond that indicated by drawings and/or specifications and pay for costs incurred for Utility Company to install both temporary and permanent service to the project. Verify costs with Utility Company prior to bidding. Contractor shall provide guard posts around electrical transformers and electrical pedestals per Utility Company standards.

PART 2 - DISTRIBUTION EQUIPMENT

2.01 Part 2 applies to all distribution equipment supplied on the Project.

2.02 All electrical distribution equipment (switchboards, panelboards, disconnect switches, transformers, starters, etc.) shall be of one manufacturer, unless specifically noted on the drawings, in the specifications, or approved by the Engineer. Intermixing of distribution equipment by different manufacturers will not be permitted.

2.03 If shown on the plans, provide surge arrester for lightning protection on main service entrance. Refer to drawings for voltage and phasing of service. Arrester shall be located within, or adjacent to, the main switch enclosure as indicated on the plans.

2.04 Equipment layouts on the drawings are based upon one manufacturer. Verify all actual equipment sizes with equipment manufacturer prior to bidding.

2.05 If layout changes are required due to other electrical manufacturers equipment size, they must be submitted to and approved by the Engineer prior to bidding. National Electric Code working clearances must be maintained at all times. In no case will extra remuneration be allowed for layout changes that differ from those shown.

2.06 Shop drawings shall be furnished for all distribution equipment indicating the following information:

A. Switchboard voltage/current rating.

B. Overall outline dimensions including weight, available conduit space.

C. Switching and protective device ampere ratings.

D. Bus ratings and material.

E. One line diagram.

F. Integrated short circuit rating.

G. Coordination of any ground fault system settings shall be as per the manufacturers requirements.

Adequate conduit space shall be provided to meet the requirements established on the drawings.

2.07 All items of distribution equipment required to be floor mounted shall be mounted on a minimum 3 1/2" concrete base above floor. Concrete base to be by Electrical Contractor.

2.08 All phase and neutral busing and all ground bars in panelboards and switchboards shall be copper only. All lugs shall be AL/CU rated. All panelboards supplied by 'K' factor transformers shall have 200% rated neutrals.

2.09 Overcurrent devices that are 1,200 amp and larger, or can be adjusted to 1200A, shall be provided with an Arc flash Reduction Maintenance System Technology capability. The Arc flash Reduction Maintenance System shall allow the operator to enable a maintenance mode using a 5 position switch which enables a preset accelerated instantaneous override trip to reduce arc flash energy. A blue LED on the trip unit shall indicate the trip unit is in the maintenance mode. If required by code (1,200 amps on overcurrent devices on projects that are permitted under the 2017 NEC), the contractor shall provide Arc flash reduction maintenance system technology capability on those overcurrent devices regardless if it is shown on the drawings or not. Documentation shall be provided by the equipment manufacture to demonstrate that the energy-reducing maintenance switch is set to operate at a value below the available arcing current. This documentation shall be provided with the gear submittal congruently. The electrical contractor shall be responsible for the arc energy reduction performance testing per NEC 240.87(C). A written record of this testing shall be made available to the AHJ.

2.10 If required by the AHJ, the electrical contractor shall be responsible for providing an allowance for ground-fault and arc energy reduction performance testing when required by the 2020 National Electric Code Section. The testing shall be performed after the equipment is installed on site. The Ground fault and arc energy reduction protection system shall be performance tested by primary current injection testing. This testing shall be conducted by a qualified person(s) in accordance with the manufacturer's instructions. A written record of this testing shall be made and shall be available to the authority having jurisdiction. All written documents shall be submitted to engineer of record as required.

2.11 Each section of the Nema 3R switchgear shall be provided with a space heater thermostatically controlled. Power for the space heater shall be obtained from a control power transformer within the switchgear. Supply voltage shall be 120V AC.

PART 3 - BRANCH CIRCUIT AND DISTRIBUTION PANELBOARDS

3.01 General:

A. All panels shall be provided with key locking door.

B. Panels shall have hinged covers with concealed trim clamps, doors shall have laser cut trims with concealed hinges, and flush lock, master keyed. Hinged cover shall have continuous piano hinge down one side with door opening by a single latch. Where multi-section panelboards are indicated on the drawings, panel enclosures and covers shall be of the same size for each section.

C. Key all doors alike and furnish two (2) keys for each lock. Doors over 48" high and double doors shall have 3-point latching per U.L. 50. Consult drawings for flush or surface mounting.

D. After wiring, label each circuit and provide under plastic in door of panel a typewritten schedule indicating load description of all circuits in panel. Mark spare breakers and provisions for future breakers in pencil on schedule for future circuit marking.

E. Breakers shall have individual plastic cases sized as scheduled on the plans. Two and three pole breakers shall have common trip (single pole units with tie bars are not acceptable). Main circuit breakers shall be vertically mounted. Back-fed main circuit breakers above 100 amps will not be acceptable. Where spaces are noted in the panel summary, provide all necessary bussing, device support, and connections for future circuit breakers. Provide blank cover for all spaces.

F. All panelboards shall have copper ground buses installed and grounded per the requirements of the N.E.C. All panelboards serving devices having isolated ground circuits shall be provided with an additional insulated copper ground bus for connection of isolated ground conductors. All neutral and ground bars shall have a minimum number of lugs equal to 66% of number of pole spaces in panel. In computer rated or isolated ground panelboards, all neutral, ground and isolated ground bars shall have a minimum number of lugs equal to 100% of number of pole spaces in panel

G. Where flush mounted panels occur on drawings Contractor shall stub into ceiling void for future use, (1) 1" empty conduit for every four spare 20A. breakers or unused panel spaces. On multi-story buildings, Contractor shall stub into ceiling void above panel and into ceiling void of floor below for future use, (1) 1" empty conduit for every four spare 20A. breakers or unused panel spaces Conduits stubbed into ceiling void below panel shall be provided with conduit cap and labeled 'To Panel Above".

H. All panelboards supplied from an emergency source shall have breakers provided with handle lock-offs for each breaker. Breaker handles to be set in the "ON" position.

I. All phase and neutral busing and all ground bars in branch circuit panelboards and circuit breaker distribution panelboards shall be copper only. All lugs shall be AL/CU rated. All panelboards supplied by 'K' factor transformers shall have 200% rated neutrals.

3.02 Branch Circuit Panelboards:

A. Panelboards rated up to 240V (400A. max) shall have a short circuit current rating tested to U.L. Standards for a minimum rating of 10,000 A.I.C. unless noted otherwise. Breaker rating with-in panel shall be equal to or greater than minimum integrated equipment rating. Series ratings will not be accepted, unless specifically noted otherwise on the drawings. All breakers shall be of either the plug-in type or bolt-on type.

B. Panelboards rated over 240V and up to 480V (400A max) shall have a short circuit current rating tested to U.L. Standards for a minimum rating of 14,000 A.I.C. unless noted otherwise. Breaker rating with-in panel shall be equal to or greater than minimum integrated equipment rating. Series ratings will not be accepted, unless specifically noted otherwise on the drawings. All breakers shall be of the bolt-on type only.

C. Branch Circuit Breaker Panelboards:

Panel Rating	Square D	Siemens	G.E.	Cutler-Hammer
240V (400A max)	NQOD	P1	AL	PRL1X
480V (400A max)	NF	P1	AE	PRL2X

3.03 Circuit Breaker Distribution Panelboards:

A. Panelboards rated up to 240V (600A. and above) shall have a short circuit current rating tested to U.L. Standards for a minimum rating of 10,000 A.I.C. unless noted otherwise on the drawings. Breaker rating with-in panel shall be equal to or greater than minimum integrated equipment rating. Series ratings will not be accepted, unless specifically noted otherwise on the drawings

B. Panelboards rated over 240V and up to 480V (600A and above) shall have a short circuit current rating tested to U.L. Standards for a minimum rating of 14,000 A.I.C. unless noted otherwise on the drawings. Breaker rating with-in panel shall be equal to or greater than minimum integrated equipment rating. Series ratings will not be accepted, unless specifically noted otherwise on the drawings

C. Circuit Breaker Distribution Panelboards:

Panel Rating	Square D	Siemens	G.E.	Cutler-Hammer
All Ratings	I-Line	P5	Spectra	PRL3X

D. Distribution panels located in finished rooms (other than mechanical, electrical rooms or janitor rooms) shall be provided with key locking doors.

DIVISION 16030

PART 4 - DRY TYPE TRANSFORMERS (AS INDICATED BY DRAWINGS)

4.01 Dry type transformers up to 10 KVA (115 deg. C. rise), 15 KVA thru 112 1/2 KVA, (150 deg. C. rise), above 112-1/2 KVA, (80 deg. C. rise or higher rating), all in ambient of 40 deg. C, unless noted otherwise on plans.

4.02 Transformers (15 KVA and larger) shall have core isolated from the housing by vibration isolators. The entire housing shall also be isolated from the building by vibration isolators. Connecting conduits shall have flexible steel sections (12" long) to isolate sound transmission. Transformers shall meet NEMA ratings for sound levels and have not less than 4 full-capacity 2 1/2% taps (2 above and 2 below normal). These units may be as manufactured by the manufacturers providing distribution equipment or Hevi-Duty or Jefferson.

4.03 Provide 'K' factor transformers where indicated on the drawings. 'K' factor transformers shall be provided with electrostatic shielding, Class 220 insulation, reduced core flux, and 200% neutral terminal.

DIVISION 16 ELECTRICAL

SECTION 16040

LIGHTING

PART 1 - LIGHTING FIXTURES

1.01 This work shall include all lighting fixtures and lamps as specified on the drawings and herein. Fixtures shall be completely free of defects, dents, rust or chipped surfaces. No cracked, broken, or chipped lenses will be acceptable. Fixtures that are cracked, broken, chipped, rusted, dented or otherwise damaged, shall be replaced without additional cost to the Owner. Fixtures shall be furnished complete including hickeys, suspension nipples, and all other materials and equipment as required for hanging and supporting fixtures in accordance with U.L. UBC, and NEC requirements. This Contractor shall furnish and install lamps for all fixtures and shall wipe fixtures and lamps before and after installation. All recessed mounted fixtures shall be mounted with the trim flush to the finish ceiling or wall surfaces, free of gaps or cracks.

1.02 Electrical Contractor shall verify exact ceiling types in all areas with architectural room finish schedule for exact fixture mounting (i.e., grid or flange type mounting) prior to ordering of fixtures. Electrical Contractor shall verify ceiling construction details in all areas and provide appropriate mounting hardware for installation of lighting fixtures. All surface mounted fixtures shall be supported independent from ceiling system and shall be securely mounted. Lay-in fixtures shall be supported directly from structure, unless ceiling system has been designed for support of such fixtures.

1.03 General Contractor shall provide fireproofing around recessed fixtures installed in fire-rated ceilings per U.L. requirements, Electrical Contractor shall coordinate.

1.04 Provide clear tempered glass shields on all metal halide, and quartz fixtures. Exterior fixtures shall be constructed with gasketed shield and be "bugtight".

1.05 Provide thermal switches on all recessed fixtures as required by N.E.C

1.06 Light fixtures supported by framing members of suspended ceiling systems shall be attached to the framing member by mechanical means. Clips identified for use with the type of ceiling framing member and fixture shall be provided.

1.07 All fluorescent fixture lenses shall be 100% virgin acrylic and be a nominal thickness of 0.125", (Nominal thickness shall be no less than 0.115" thick). Styrene lenses shall not be provided for any light fixtures, unless specifically so noted on the drawings.

1.08 All fluorescent fixtures (housing, door, etc) shall be provided with factory applied powder coat baked enamel finish, applied after final fabrication, unless specifically noted otherwise on the lighting fixture schedule or drawings. Fixtures using pre-painted metal components will not be acceptable.

1.09 All fluorescent fixtures shall be provided with captive spring loaded latches, unless specifically noted otherwise on the lighting fixture schedule or drawings. Fixtures using non captive springs will not be accepted.

1.10 All fluorescent fixtures using F40T12 or FO32T8 type lamps shall be provided with twist-in (not push-in), bi-pin type, lamp holders.

1.11 Connections to all fixtures mounted in lay-in ceilings shall be as follows:

A. Provide J-Box on structure above fixtures for power circuit supply connections. Install U.L. listed 3/8" flexible (min.) steel conduit (whip) down to each fixture. Each whip shall be field cut to length to allow fixture to be relocated up to 4'-0" in any horizontal direction. Whips shall include (2) or (3) #12 AWG Copper, 90 degree rated, conductors (numbers as indicated) and a #12 AWG Copper ground conductor. Fixtures factory supplied with U.L. listed whip assemblies shall also be provided with the conductors as listed above. Tandem fluorescent fixtures shall have a factory supplied U.L. listed whip assembly with conductors as required to interconnect fixtures, and be of sufficient length to allow mounting fixtures 12'-0" on center in any horizontal direction.

B. Contractor may use a pre-manufactured flexible wiring system for light fixture connections. System shall be similar to "AFC" systems and shall not be used for switch drops or systems other than lighting.

C. If tandem wired fixtures are used, the maximum whip length between fixtures for electronic ballasts shall be 9 feet.

1.12 Where fluorescent fixtures are mounted in continuous rows, each row shall be supplied with 2 #12 AWG & 1 #12 AWG "green" ground, 90 degree C. rated, Copper conductors, all within 1/2" flexible steel conduit. Feed through wiring shall also be #12 AWG. 90 degree C. copper. Where flexible steel conduit is to be used, all fittings shall be U.L. labeled for the purpose.

1.13 When different lamps in the same fixture are controlled by separate switches (2 or 3 level lighting), the switches shall control the same lamp positions in all fixtures controlled by those switches. Arrangement of switching will generally be that one switch controls middle lamp or lamps, and other switch controls outside lamps unless noted otherwise on the drawings.

1.14 All T8 fluorescent lamp ballasts shall comply with the following requirements unless noted otherwise on the drawings.

A. Electronic integrated circuit, solid-state, full light output, energy efficient type compatible with lamps and lamp combinations to which connected. Ballasts shall be certified by E.T.L., and labeled by C.B.M. Ballasts shall be Class P, high power factor (minimum 90%), sound rating of 'A' or greater, and have a minimum efficiency of 85% Lamp current crest factor (LCCF) shall be less than 1.7.

B. Ballasts shall be provided in voltages to match connected circuits. Verify circuit voltage prior to ordering light fixtures.

C. Ballasts shall have lamp flicker less than 5% and have total harmonic distortion (THD) of less than 20%.

D. Ballasts shall be provided in one or two lamp configurations. Three and four lamp electronic ballasts will not be allowed unless noted otherwise on the drawings, or as provided in 'Master-Satellite' wiring arrangements.

E. Ballasts shall conform to FCC Regulations Part 15, Subpart J and CFR 47, Part 18 for EMI and RFI limits. Ballasts shall conform to IEEE C62.41, Category A for resistance to voltage surges for normal and common modes.

F. All ballasts shall be secured by a minimum of two bolts.

G. Electronic dimming ballasts shall provide smooth dimming over a minimum range from 100 to 10 percent light output. Ballasts shall be listed for use with the specific fluorescent dimming system provided.

H. Ballasts shall be as manufactured by Sylvania, Motorola, Magnatek, Universal, Jefferson, Howard, or Advance.

1.15 All compact fluorescent and biax lamp ballasts shall be electronic with the same characteristics as listed for T8 lamps except that compact fluorescent or biax ballasts shall be provided with end-of-life sensing and cutoff for disconnecting the lamp on end of life.

1.16 Lamps shall be as follows. Once a manufacturer has been selected, all lamps on the project shall be by the same manufacturer.

1. Fluorescent lamps, unless noted otherwise on the drawings, shall be Sylvania F40/DB35/SS for T-12 lamps and Sylvania FO32/835 for T-8 lamps ,or equal by Phillips, G.E. or as approved by the Engineer. Verify all lamp colors with Architect prior to ordering.

1.17 LED Lighting

a. Shall be Reduction of Hazardous Substance (RoHS) compliant, and comply with FCC 47 CFR Part 15, IES LM-79 & 80.
b. Minimum CRI of 80 with a color temperature of 3000-4000°K for interior fixtures and 4000-4500°K for exterior fixtures, unless otherwise noted in the Contract Documents.
c. Minimum rated life of 60,000 hours at 25°C ambient temperature.
d. LED driver shall have a THO of <20% and a power factor of 0.95 or higher with integral short circuit, open circuit and overload protection.
e. LED driver and LED module shall be accessible and replaceable from below.
f. LED lighting fixtures shall be assembled in the USA with minimum 80% materials content from the USA.
g. LED fixtures shall be provided with a minimum 5 year warranty on entire fixture (all components).
h. E.C. to provide all low voltage wiring for 0-10V dimmable fixtures. Provide pink and purple pair of wires to connect luminaires, drivers and devices.

1.18 Emergency operation of fixtures

1. Fixtures shown in the fixture schedule to contain a battery charger and battery shall be supplied with a factory installed sealed replaceable nickel cadmium battery and a solid state inverter charger and switch systems.

2. The emergency Battery Section shall be connected on the same circuit as the light ahead of any switches or contactors controlling area lights so that emergency lighting is maintained at all times. Other lamps not on emergency system in same fixture will be switched with area lights. Lamp sockets in Emergency Fixtures shall be in the exact same position as lamp sockets in non-emergency fixtures of the same type and number of lamps. All components shall be contained within the fixture. The emergency battery system shall operate two lamp (1000 lumen minimum) for a minimum of 90 minutes. Battery charger shall be capable of recharging batteries to full charge within 24 hours after complete discharge. Fixture shall contain pilot light to indicate charger condition and a test switch to simulate power failure. Systems shall be unconditionally guaranteed for three (3) years by emergency unit. Units shall be manufactured by Bodine, Iota, or approved by Engineer.

1.19 Exit Signs and Other Emergency Fixtures

1. Provide emergency battery power packs on all exit signs and emergency fixtures that are not connected to an emergency generator.

2. Batteries shall be lead calcium, pure lead, or nickel cadmium as indicated on the drawings. Lead acid will not be accepted. Batteries shall be unconditionally guaranteed for 5 years with a 10 year prorated warranty from the factory. Units shall be Underwriter's Laboratory listed an labeled as an emergency unit. Batteries shall be provided as standard or as optional equipment of the same series of the specified fixtures.

3. The emergency Battery Section shall be connected on the same circuit as the area lighting, ahead of any switches or contactors controlling area lights so that emergency lighting is maintained at all times.

SECTION 16741
COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1. SUMMARY:

A. Scope: Extent of communications systems work is indicated by drawings, specifications, and details, and as hereby defined to include, but not be limited to telephone, data, and CATV conduits, boxes, terminals, and other associated equipment and hardware.

B. Provide submittals on all products specified with this section.

C. All cabling materials, cabling, ends, jacks, patch panels, racks, etc. will be provided and installed by the Owners installers, unless otherwise noted on the drawings or in the specifications.

1.2. QUALITY ASSURANCE:

A. Codes and Standards: Conform to the following:

1. National Electrical Code (NEC): comply with applicable local code requirements of the authority having jurisdiction and NEC.

2. This installation must be done according to the requirements of the local system supplier and the general specifications contained herein. Consult the serving installers to verify all requirements.

PART 2 - PRODUCTS

2.1. TELEPHONE SYSTEM:

A. Outlets: All telephone outlet boxes shall be installed with 4" square, minimum 2 1/8" deep box and trim. Telephone coverplates to be as furnished by telephone system supplier unless noted otherwise on the drawings. All floor outlets shall be adjustable water-tight floor box, per Section 16110. All telephone outlet boxes to be located as directed. Telephone outlet boxes not used shall be provided with blank cover plates to match switch and receptacle plates.

B. Each telephone outlet box location requires (1) 1" empty conduit with pull wire unless noted otherwise. Where combination telephone/data outlets are noted on the drawings, provide only one 1" empty conduit with pull wire, unless noted otherwise on the drawings. Data conduits shall be stubbed into ceiling void, if entire ceiling void is accessible and not an air return plenum. Install insulated bushing on end of conduit in ceiling voids. Data conduits shall be routed to the data terminal board if ceiling void is not accessible, is an air return plenum, or ceiling void is not accessible for full distance to the data terminal board. Install insulated bushing on end of conduit at terminal board. Verify conditions of job prior to rough-in.

D. Provide data terminal board as shown on the drawings or as required by data system supplier. Board shall be 3/4" fire resistant plywood sized as required by data system supplier, minimum 4' x 4'. Unless shown otherwise on the drawings, data terminal board to be mounted on wall adjacent to telephone terminal board and painted with two coats of fire resistant non-conductive paint, color as selected by Architect.

E. Provide duplex receptacle on separate circuit beside each data terminal board location and other communications equipment requiring 120 volt power.

2.3. CATV (TELEVISION) OUTLET SYSTEM

A Section 2.3 will only apply if there are CATV outlets shown on the Drawings.

B. Outlets: All CATV outlet boxes shall be installed with 4" square, minimum 2 1/8" deep box and trim, with separately mounted 20 amp 125 volt duplex grounded receptacle adjacent to CATV outlet. CATV coverplates to be as furnished by CATV system supplier unless noted otherwise on the drawings. All floor outlets shall be adjustable water-tight floor box, per Section 16110. All CATV outlet boxes to be located as directed. CATV outlet boxes not used shall be provided with blank cover plates to match switch and receptacle plates.

C. Each CATV outlet box location requires (1) 1" empty conduit with pull wire unless noted otherwise. CATV conduits shall be stubbed into ceiling void, if entire ceiling void is accessible and not an air return plenum. Install insulated bushing on end of conduit in ceiling voids. CATV conduits shall be routed to the CATV terminal board if ceiling void is not accessible, is an air return plenum, or ceiling void is not accessible for full distance to the CATV terminal board. Install insulated bushing on end of conduit at terminal board. Verify conditions of job prior to rough-in.

D. The CATV system shall be provided with a 2" minimum main service conduit from the CATV terminal board to the property line unless a larger size is noted otherwise on the drawings or required by the CATV company. Conduit to be routed per the requirements of the serving CATV company. Verify conduit size with CATV company prior to installation.

E. Provide CATV terminal board as shown on the drawings or as required by CATV system supplier. Board shall be 3/4" fire resistant plywood sized as required by CATV system supplier, minimum 2' x 2'. Unless shown otherwise on the drawings, CATV terminal board to be mounted on wall adjacent to telephone terminal board and painted with two coats of fire resistant non-conductive paint, color as selected by Architect.

F. Provide duplex receptacle on separate circuit beside each CATV terminal board location and other communications equipment requiring 120 volt power.

PART 3 - EXECUTION

A. Provide and install nylon pull wires in all Communication Systems conduits. Provide tags on all pull wires to indicate termination of wire or conduit.

B. Provide and install pull boxes at all locations as required by the Communication Systems system supplier.

C. Provide and install conduit sleeves thru floors and walls as required by the Communication Systems system supplier. Vertical conduits/sleeves through closets floors shall terminate not less than 3-inches above the floor and not less than 3-inches below the ceiling of the floor below.

D. All conduit ends shall be equipped with non-metallic insulated bushings.

E. Terminate conduit runs to/from the associated telephone, data, or CATV backboard in a closet or designated space at the top or bottom of the backboard. Conduits shall enter closets next to the wall and be flush with the backboard.

F. Where drilling is necessary for vertical conduits, locate holes so as not to affect structural sections such as ribs or beams.

G. All empty conduits located in equipment closets or on backboards shall be sealed with a standard non_hardening duct seal compound to prevent the entrance of moisture and gases and to meet fire resistance requirements.

H. Conduit runs shall contain no more than four quarter turns (90 degree bends) between pull boxes/backboards.

SECTION 16742
EMERGENCY RADIO COMMUNICATION ENHANCEMENT SYSTEM

A. A survey should be performed after the building is substantially completed, and prior to start of installation of electrical wiring in order to determine the public safety radio signal strength per NFPA and IFC. The required Public Safety Radio Signal Level inside the Owner's facility must be determined per code, ordinance or AHJ. Survey shall be performed by an FCC licensed technician holding a current GROL license.

B. Testing Procedures
1. Minimum Signal Strength: For testing system signal strength and quality, the testing shall be based on the: -95dBm nominal signal at 100%.

2. Spectrum Analyzer or Calibrated Handheld Radio shall be used as basis for signal measurements or other method as approved by AHJ.

3. Testing should be based on a minimum of 20 grid locations per floor OR maximum of 1600 SQ ft. areas if the floor exceeds 32,000 Sq. Ft. Also, testing should include all critical areas per NFPA. See 1.02 of this specification and NFPA 72 2013 or NFPA 1221 2016. OR per any method determined by the AHJ, local code or ordinance.

4. A minimum signal strength of -95 dBm shall be provided throughout the coverage area for both uplink and downlink by the Local Fire Department.
a. RSSI measurement only

C. Provide an in-building radio signal amplification system to provide complete coverage in the building for the public safety agencies as required by the local AHJ (Authority Having Jurisdiction). System users shall receive and transmit radio signals from their portable radio units within the building. This shall be accomplished utilizing the following components:
a. Bi Directional Amplifiers (Signal Boosters)
b. Coaxial Cable
c. Antennas
d. Cable taps
e. Connectors
f. Power dividers
g. Other components and interconnecting circuitry as required

D. The system shall comply with the requirements of UL2524 In-building 2-Way Emergency Radio Communication Enhancement Systems, NFPA 72 2013 Edition, NFPA 1221 2016 Edition and IFC 2015, as referenced.

E. Design requirements
1. General building areas shall be provided with 95% radio coverage, or as specified by AHJ.
2. The In-building emergency radio communication enhancement systems must provide the following signal strengths:
3. Downlink - Minimum signal strength of -95 dBm throughout the coverage area.
4. Uplink - Minimum signal strength of -95 dBm received at the AHJ Radio System.
5. OR As otherwise required by the AHJ

F. Acceptance testing for an in-building radio system is required upon completion of installation. The coverage testing shall be done in accordance with NFPA 72, NFPA 1221, IFC and as required by the local AHJ. All test records along with system diagrams, iBWave design, equipment specifications, user manuals, RF link budget calculations, battery backup calculation and other design data shall be submitted upon completion of the project, and as required by the AHJ.

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EXPIRES: 12-31-2024

E1.4

SECTION 16724
MONITORING SYSTEM

PART 1 GENERAL

1.1 SCOPE & RELATED DOCUMENTS:

A. The Monitoring System shall monitor the following systems if shown on the drawings, or required by Code:

1. Fire/smoke dampers, or air handling equipment shutdown
2. Smoke detectors

B. The work covered by this section of the specifications includes the furnishing of all labor, equipment, materials, and performance of all operations in connection with the installation of the Monitoring System Network shown on the drawings and as herein specified and as directed by the Architect/Engineer.

C. The requirements of the conditions of the Contract, Supplementary Conditions and General Requirements, apply to the work specified in this section.

D. The complete installation is to conform to the applicable sections of NFPA_71, NFPA_72, NFPA 90A, Life safety code 101, ADA, FM, UL, Local Code Requirements of the City and National Electrical Code with particular attention to Article "Fire Alarm Systems", unless noted otherwise in these specifications or on the drawings.

E. It shall be the responsibility of the Contractor to provide all equipment and material compatible to the system supplied. All equipment shall be located as shown on the drawings. Any equipment not specifically mentioned in this specification or not shown on the drawings, but required for the operation of a complete system shall be furnished and installed.

F. Monitoring drawings from manufacturer and programming displays on final read out shall indicate owner approved room numbers.

1.2 QUALITY ASSURANCE:

A. Each and all items of the Monitoring System shall be listed as a product of a SINGLE Monitoring system manufacturer under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label. All control equipment is to be listed under UL category UOJZ as a single control unit. Partial listing shall NOT be acceptable. The system components shall meet the requirements of the Americans with Disabilities Act (ADA).

B. All equipment shall be U.L. approved for both fire and security and installed in accordance with the requirements of the National Electric Code, Americans with Disabilities Act (ADA), local codes and these specifications, with the stricter requirement governing in case of possible variance. Systems equipment shall be jointly guaranteed by the Electrical Contractor and the systems' manufacturer for a period of one (1) year from the date of acceptance.

C. Manufacturers equipment shall conform to the standards herein and the manufacturer must supply proof of having produced similar equipment for at least two years, provide the Engineer with a written history of similar local systems now rendering satisfactory service. Supplier of this equipment must also have had service and sales facilities to warrant for the past 4 years. The supplier shall be licensed and certified in accordance with any local laws and ordinances and shall provide proof on same upon demand of the building owner, Governing agencies, Architect or Engineer. The manufacturer shall coordinate and provide a test of the system in the presence of local Fire Department in accordance with the Fire Departments Testing requirements.

1.3 GENERAL:

A. Equipment shall be a FireWarden-50X (NFW-50X) system as manufactured and supplied by Notifier, as required for the number of identified sensors. Maximum number of devices on a circuit shall not exceed 80% of the rated capacity of the circuit. Unless otherwise indicated; the system shall be the standard product of one manufacturer and shall be factory coordinated.

B. Systems as manufactured by Simplex Grinell, equal to those specified and approved by the Engineer, will be acceptable. Manufacturers listed above shall submit to engineer prior to bidding proposed equipment list.

C. "Sensor" as described in this Specification for smoke, heat, and duct sensors is a descriptive term used by SimplexGrinnell and shall be a term interchangeable with "detector" as indicated on the Drawings and NFPA 72.

1.4 OPERATION:

A. The Monitoring control panel shall monitor addressable devices within the buildings and shall report to the annunciator panel.

B. The control panel shall be 24 VDC operation with 120 VAC operating power. Internally mounted, properly sized, sealed gelyte lead acid batteries shall be provided for operating the system in standby mode for 24 hours followed by alarm mode for 5 minutes.

C. Provide alarm initiation from any automatic smoke/heat detectors, duct smoke detectors in the air handling units, or smoke and fire/smoke dampers. All devices shall be located as shown on the drawings.

D. Provide an alarm indication at a constantly attended location when any Monitoring initiating device described is activated.

E. If shown on the drawings, provide the shutdown of all air handling equipmentrute controlled during an alarm. This function shall remain in effect until the system has been completely returned to its normal state (silencing of signals alone shall not reset this control status).

F. The entire system may be reset only following the resetting of individual alarm initiation devices and a resetting procedure within the control panel system trouble indication devices shall continue to operate until this operation is complete.

1.5 CONTROL OPERATION:

A. The Monitoring control panel shall allow for loading or editing special instructions and operating sequences as required. The system shall be capable of on site programming to accommodate and facilitate expansion, building parameter changes or changes as required by local codes. All software operations shall be stored in a non-volatile programmable memory within the Monitoring control panel. Loss of primary and secondary power shall not erase the instructions stored in memory.

B. The ability for selective input/output control functions based on AND/ing, OR/ing, timing and special coded operations shall also be incorporated in the resident software programming of the system.

C. To accommodate and facilitate job site changes, initiation circuits shall be individually configurable on site to provide either alarm/trouble operation, alarm only, trouble only, current limited alarm, no alarm, normally closed device monitoring, a non-latching circuit or an alarm verification circuit.

D. To accommodate and facilitate job site changes, indicating appliance circuits shall be individually configurable on site to provide upon activation a fast marchtime, slow march time, temporal code, PNIS code or a master code until silenced or reset upon any output circuit. The PNIS coded pulse on and off time may be selectable on site to provide 16 different duty cycles between 1/4 second and 5 seconds.

E. The system shall have the capability to store a minimum of 300 alarms and 300 troubles in a historical data file.

F. An alarm shall be displayed on an 80 character LCD display. The top line of 40 characters shall be the point label and the second line shall be the device type identifier. The system alarm red LED shall flash on the control panel and the remote annunciator until the alarm has been acknowledged at the control panel or the remote annunciator. Once acknowledged, this same LED shall latch on. A subsequent alarm received from another zone after acknowledged shall flash the system alarm LED on the control panel and remote annunciator. The LCD display shall show the new alarm information by device as applicable as follows:

1. Duct smoke detectors and fire/smoke damper detectors (if shown or required)

2. Smoke detectors associated with hold open doors.

G. A pulsing alarm tone shall occur within the control panel and the remote annunciator until acknowledged.

H. The activation of any system smoke detector shall initiate an Alarm Verification operation whereby the panel will reset the activated detector and wait for a second alarm activation. If, within one (1) minute after resetting, a second alarm is reported from the same or any other smoke detector, the system shall process the alarm as described previously. If no second alarm occurs within one minute the system shall resume normal operation. The Alarm Verification shall operate only on smoke detector alarms. Other activated initiating devices shall be processed immediately. The alarm verification operation shall be selectable by zone.

I.The control panel shall have the capability to display the number of times a zone has gone into a verification mode.

J. Alarm verification zones shall have the capability of being divided into seven different groups where by only two verification zones from a group will confirm the first activation and cause the panel to follow programmed alarm sequence.

L. A manual evacuation switch shall be provided to operate the systems alarm indicating appliances. Other control circuits shall not be activated. However, a true alarm shall be processed as described previously.

M. Activation of an auxiliary bypass switch shall override the automatic functions either selectively or throughout the system.

N. Alarm and trouble conditions shall be immediately displayed on the control panel from Alphanumeric LCD display. If more alarms or troubles are in the system the operator may scroll to display new alarms.

O. The system shall have an alarm list key that will allow the operator to display all alarms, troubles, and supervisory service conditions with the time of occurrence.

P. The actuation of the enable walk test program at the control panel shall activate the "Walk Test" mode of the system which shall cause the following to occur:

1. The city connection circuit shall be disconnected.

2. Control relay functions shall be bypassed.

3. The control panel shall show a trouble condition.

4. The alarm activation of any initiation device shall cause the audible signals to code a number of pulses to match the zone number.

5. The panel shall automatically reset itself after signaling is complete.

6. Any momentary opening of an initiating or indicating appliance circuit wiring shall cause the audible signals to sound for 4 seconds to indicate the trouble condition.

7. The control panel shall have the capacity of 8 distinctive walk test groups.

Q. All auxiliary manual controls shall be supervised so that all switches must be returned to the normal automatic position to clear system trouble.

R. Each independently supervised circuit shall include a discrete LED read-out to indicate disarrangement conditions per circuit.

S. The incoming power to the system shall be supervised so that any power failure must be audibly and visually indicated at the control panel and the remote annunciator. A green"power on" LED shall be displayed continuously while incoming power is present.

T. The system batteries shall be supervised so that a low battery condition or disconnection of the battery shall be audibly and visually indicated at the control panel and remote annunciator.

U. The System Expansion Modules shall be electrically supervised for module placement. Should a module become disconnected from the C.P.U. the system trouble indicator must illuminate and audible trouble signal must sound.

V. The system shall have provisions for disabling and enabling all circuits individually for maintenance and testing purposes.

W. Wiring to a hardwired (non-serial) remote annunciator shall be supervised for open and ground conditions. A separate annunciator trouble LCD Read-out Indication must be provided. It shall illuminate and an audible trouble signal shall sound at the control panel upon the detection of an open or ground condition.

1.6 MULTIPLE ADDRESSABLE PERIPHERAL NETWORK (IDNET):

A. Communication with addressable devices: The system must provide communication with all initiating and control devices individually. All of these devices are to be individually annunciated at the control panel. Annunciation shall include the following conditions for each point:

Alarm
Trouble
Open
Short
Ground
Device Fail/or Incorrect Device

B. All addressable devices are to have the capability of being disabled or enabled individually.

C. Up to 127 addressable devices may be multi-dropped from a single pair of wires. Systems that require factory reprogramming to add or delete devices are unacceptable.

D. Format - The communication format must be a poll/response protocol to allow t-tapping of the wire to addressable devices and be completely digital. A high degree of communication reliability must be obtained by using parity data bit error checking routines for address codes and check sum routines for the data transmission protocol. Systems that do not utilize full digital transmission protocol (i.e. -that may use time pulse width methods to transmit data, etc.) will not be acceptable since they are considered unreliable and prone to errors.

E. Identification of Addressable Devices - Each addressable device must be uniquely identified by an address code entered on each device at time of installation. The use of jumpers to set address will not be acceptable due to the potential of vibration and poor contact.

F. Wiring Type, Distance, Survivability and Configuration Wiring types will be approved by the equipment manufacturer. The system must allow up to 2,500 feet wire length to the furthest addressable device.

G. Sensor Operation: (if shown or required)

1. Smoke sensors shall be smoke density measuring devices having no self contained alarm set point (fixed threshold). The alarm decision for each sensor shall be determined by the control panel. The control panel shall determine the condition of each sensor by comparing the sensor valve to the stored values.

2. The control panel shall maintain a moving average of the sensors' smoke chamber value to automatically compensate (move the threshold) for dust and dirty conditions that could affect detection operation. The system shall automatically maintain a constant smoke obscuration sensitivity for each sensor (via the floating threshold) by compensating for environmental factors. Photoelectric sensor smoke obscuration sensitivity shall be adjustable to within 0.3% of either limit of the UL window (0.5% to 4.0%) to compensate for any environment.

3. The system shall automatically indicate when an individual sensor needs cleaning. When a sensor's average value reaches a predetermined level, a "DIRTY SENSOR" trouble condition shall be audibly and visibly indicated at the control panel for the individual sensor. Additionally, the LED on the sensor base shall glow steady giving a visible indication at the sensor location. If a "DIRTY SENSOR" is left unattended, and its average value increases to a second predetermined value, an "EXCESSIVELY DIRTY SENSOR" trouble condition shall be indicated at the control panel for the individual sensor. To prevent false alarms, these "DIRTY" conditions shall in no way decrease the amount of smoke obscuration necessary for system activation. For scheduling of maintenance, the control panel shall be able to generate an "ALMOST DIRTY" indication for any sensor approaching a "DIRTY" trouble condition.

4. The control panel shall continuously perform an automatic self-test routine on each sensor, which will functionally check sensor electronics and ensure the accuracy of the values being transmitted to the control panel. Any sensor that fails this test shall indicate a "SELF TEST ABNORMAL" trouble condition with the sensor location at the control panel.

5. An operator at the control panel, having a proper access level, shall have the capability to manually access the following information for each sensor:

Primary status
Device type
Present average value
Present sensitivity selected *
Peak detection values *
Sensor range (normal, dirty, etc.)

*Values shall be in "percent of smoke obscuration" format so that no interpretation is required by the operator.

6. An operator at the control panel, having a proper access level, shall have the capability to manually control the following for each sensor:

Clear peak detection values
Enable or disable the point
Clear verification tally
Establish alarm sensitivity
Control a sensor's relay driver output

7. It shall be possible to program the control panel to automatically change the sensitivity settings of each sensor based on time-of-day and day-of-week (for example, to be more sensitive during unoccupied times and less sensitive during occupied periods). There shall be seven (7) sensitivity settings available for each sensor.

8. The control panel shall have the capability of being programmed for a pre-alarm or two-stage function. This function allows an indication to occur when, for example, a 3% sensor reaches a threshold of 1.5% smoke obscuration.

9. At least 1016 individually identified sensors as well as conventional initiating device and notification appliance circuits shall be supported within a single control panel. (127 per circuit card).

10. For increased smoke detection assurance, all individually addressed smoke sensors shall be provided with alarm verification. Only a verified alarm shall initiate the alarm sequence operation.

1.7 POWER REQUIREMENTS:

A. Each control panel shall receive 120 VAC power from a dedicated circuit with locking clip over circuit breaker. 120 VAC power shall be at 20 Amps, unless otherwise noted. Label circuit breaker "Fire Alarm Control Circuit" in red.

B. All circuits requiring system operating power shall be 24VDC and shall be individually fused at the control panel.

PART 2 PRODUCTS

2.1 MONITORING CONTROL PANEL:

A. Provide and install a Notifier FireWarden (NFW-50X) Addressable Monitoring Control Panel, as required by the number of identified sensors. Construction shall be modular with solid state, microprocessor based electronics. An 80 character LCD display shall indicate alarms, supervisory service conditions and any troubles. Label control panel 'Monitoring System', not 'Fire Alarm System'.

B. The control panel shall contain the following. Verify quantities of each item with system supplier:

1. 80 character LCD display.

2. IDNET Addressable Circuit Cards Alarm Indicating Appliance Circuit (Class A or Class B).

3. (selectable) Local Energy, Shunt Master Box, or Reverse Polarity Remote Station Connection.

4. Form C Trouble Contact (2.0 Amps each) with feedback.

5. Earth Ground Supervision Circuit.

6. Basic 5 Amp Power Supply.

7. Expansion 8 Amp Power Supplies.

8. Automatic Battery Charger.

9. Set Standby Batteries to give 24 hours of operation upon loss of commercial power.

10. Lot Resident non-volatile programmable operating system memory for all operating requirements.

11. Programmable action keys.

12. Supervised Annunciator Circuits.

13. March time code, temporal code, selective code, zone code, general alarm, time limit cutout, and alarm silence inhibit, for NAC's. Set alarm for temporal code in all new buildings.

C.New Buildings - Contactor shall provide and install (1) cellular dialer located adjacent to the FACP if the owner does not wish to provide two dedicated phone lines to the system. The cellular dialer shall be connected to the FACP. Contactor shall provide 120V receptacle for cellular dialer as required. Contactor shall coordinate all requirements with the cellular dialer and the FACP prior to rough-in.

2.2 REMOTE ANNUNCIATOR(S):

A. Provide remote annunciator panel as required, Remote annunciator shall have a two line by 40 character (80 character total) LCD display. Annunciator shall Display all Alpha/Numeric messages as displayed at the control panel Annunciator shall also contain an alarm, trouble and supervisory service LED and acknowledgment switches, system reset and alarm silence switch, display time key, (4) programmable control keys with indicating LED's, alarmed silence LED and a key switch to activate or deactivate all other switches. The annunciators shall mount in a common flush mounted steel cabinet. Connect to the control panel with one Clifford 1P18B1OS, twisted shielded pair of 18's and two #14 power wires. Capabilities shall exist for a maximum of (32) annunciators per control panel. Verify location of annunciator with local fire department and owner.

2.3 PERIPHERAL DEVICES (IF SHOWN ON THE DRAWINGS):

A. All remote devices requiring outlet boxes shall be mounted on flush outlet boxes as recommended by the manufacturer, or as specified elsewhere in this division of the specifications. Any required surface devices (where approved by the Engineer) shall be installed on surface outlet boxes that are at a minimum the same size as the device. No part of a surface device shall overlap the outlet box. Verify all installation requirements and box types with manufacturer prior to rough-in.

B. All devices shall be supervised for trouble conditions. The system control panel shall be capable of indicating the type of trouble condition (open, short, device missing/failed). Should a device fail, it shall not hinder the operation of other system devices. Should a problem occur on a particular wire run, it shall not affect other wire runs.

C. Addressable Manual stations, double action, plainly marked "Push and Pull Down" to sound alarm, located as shown on the drawings at a height of 48" from finished floor to top, semi flush mounted. Circuit shall be 2-wire addressable loop supervision. Provide matching backbox for surface mounting only where job conditions require and where prior approval of the Architect is obtained. Where tamperproof devices are indicated on the drawings, provide station with tamperproof clear Lexan shield with alarm and battery. Alarm to sound when shield is lifted. A manual station shall be installed at the fire sprinkler entrance riser location in the building, or as determined by the Local Fire Marshall.

D. True Alarm Sensors and Addressable Sensor Bases shall be photoelectric sensor with matching base, mounted on a flush mounted outlet box. The addressable smoke sensors shall be of the photoelectric type and shall communicate actual smoke chamber values to the system control panel. The sensors shall be listed to UL Standard 268 and shall be documented as compatible with the control equipment to which they are connected. The sensors shall be listed for both ceiling and wall mount applications. Each sensor base shall contain a LED that will flash each time it is scanned by the control panel (once every 4 seconds). When the control panel determines that a sensor is in the alarm or a trouble condition, the control panel shall command the LED on that sensor's base to turn on steady indicating the abnormal condition. Sensors which do not provide a visible indication of an abnormal condition at the sensor location shall not be acceptable. Each sensor shall contain a magnetically actuated test switch to provide for easy alarm testing at the sensor location. Each sensor shall be scanned by the control panel for its type identification to prevent inadvertent substitution of another sensor type. The control panel shall operate with the installed device but shall initiate a "Wrong Device" trouble condition until the proper type is installed or the programmed sensor type is changed. The sensor's electronics shall be immune from false alarms caused by EMI and RFI.

Smoke detectors shall be installed on the ceiling at each control panel, extender panel, and annunciator location.

E. True Alarm Duct Sensors shall be air duct sensor housing with sampling tubes, relay, and photoelectric True Alarm Sensor, designed to detect the presence of smoke within the duct work, installed where indicated on the electrical drawings or where required by codes. A duct smoke detector shall be installed on each duct from the unit as required by governing Codes, whether or not indicated on the drawings. Sensors shall operate as described under True Alarm Sensors above. Sensors shall be equipped with a functional test device circuit capable of simulating a maximum acceptable amount of smoke for alarm. The test device circuit shall provide individual local tests of all components of the smoke detector and shall not require generation of actual smoke within the ductwork. Two (2) sampling tubes of the proper length to accommodate accurate sampling of air within the ductwork shall be supplied for each detector location. Intake sampling tube shall penetrate the duct a minimum 75% of its diameter. Provide each duct sensor with a Remote Test Switch, mounted on outlet box in nearest mechanical room or janitor closet. Verify location with Authority Having Jurisdiction prior to rough-in. Label each test switch to identify function and unit served or damper served. If required by the Monitoring system supplier, Mechanical Contractor shall modify ductwork where fire/smoke dampers are located as required to install duct smoke detectors in the ductwork at the fire/smoke damper locations.

At every smoke or fire/smoke damper Electrical Contractor shall install a duct smoke detector and relay to close damper and shut down associated mechanical unit on activation of detector. Refer to Mechanical drawings, specifications, and addendum items, and/or Mechanical Contractor for locations and control requirements. Provide 120 volt control power at damper if required. Not all smoke or fire/smoke dampers may be shown on the drawings, however, ALL smoke or fire/smoke dampers shall be provided with the above requirements.

F. Thermal (heat) sensor heads shall be combination rate-of-rise/fixed temperature heat detector (135 degrees) with matching base. The thermal type sensor shall be a plug-in unit which mounts to a twist-lock base. The sensor shall be a combination rate-of-rise/fixed temperature sensor U.L. listed as a rate compensated heat detector. Where indicated otherwise on the drawings, provide combination rate-of-rise/fixed temperature heat detector (200 degrees) with matching base, or fixed temperature heat detector (200 degrees) with matching base. See the drawings for temperature ratings. The sensors shall fit into a base that is common with both photoelectric and ionization sensors and shall be compatible with other addressable detectors, addressable manual station, and addressable Zone Adapter Modules on the same circuit. There shall be no limit to the amount of sensors, stations or Zone Adapter Modules which may be activated or "in alarm" simultaneously. Each rate-of-rise sensor shall be capable of operating at a selectable rate-of-rise operation of 15 or 20 degrees Fahrenheit per minute and shall be self-restorable. Fixed temperature sensing is independent of rate-of-rise sensing and operates at 135 degrees Fahrenheit. Each sensor shall be capable of being configured for utility monitoring and capable of sensing temperature between 32 and 158 degrees Fahrenheit.

G. Individually addressable modules (IAM) shall be used for monitoring of water flow, valve tamper, nonaddressable sensors, and for control of evacuation indicating appliances and mechanical systems.

1. An addressable interface module shall be provided for interfacing normally open direct contact devices to an addressable signaling line circuit. The device shall be a SimplexGrinnell Type IAM

2. IAM's shall be capable of mounting in a standard 4" square, 2 1/8" deep electric box. Verify box size with manufacturer. IAM's shall include cover plates to allow surface or flush mounting. Iam's shall receive their 24VDC power from a separate two wire pair running from an appropriate power supply.

3. There shall be three types of devices:

Type 1: Monitor Zone Adapter Module (ZAM)
Type 2: Relay IAM
Type 3: IAM (Individually Addressable Module

4. For Type 1 and/or Type 3 above:

For conventional 2-wire smoke sensor and/or contact device monitoring with Style B or Style D (NFPA-72 initiating device circuit) wiring supervision.

Type 1 only:

This type of addressable device module shall provide power to, and monitor the status of a zone consisting of conventional 2wire smoke sensors and/or N/O contact devices as specified elsewhere and identified on the drawings. The supervision of the initiating device circuit wiring shall be Style B. These IAM's shall communicate the zone's status (normal, alarm, trouble) to the control panel.

Type 3 only:

This type of addressable device module shall monitor the status of a zone consisting of conventional N/O contact devices as specified elsewhere and identified on the drawings. The supervision of the initiating device circuit wiring shall be Style B. These IAM's shall communicate the zone's status (normal, alarm, trouble) to the control panel. This device cannot power 2-wire smoke sensors.

5. For Type 2 above:

For non-supervised control. This type of addressable device shall provide double pole, single throw relay switching for loads up to 120VAC.

6. The IAM shall be supervised and uniquely identified by the control panel. Device identification shall be transmitted to the control panel for processing according to the program instructions. Should the IAM become non-operational, tampered with, or removed, a discrete trouble signal, unique to the device, shall be transmitted to, and annunciated at, the control panel.

7. The IAM shall be capable of being programmed for its "address" location on the addressable device signaling line circuit. The IAM shall be compatible with addressable manual stations and addressable sensors on the same addressable circuit.

H. Interior audio/visual Monitoring signal device unless noted otherwise on the drawings shall be wall mount or ceiling mount A/V unit, as indicated on the drawings, in color as selected by the Architect. Device shall be U.L. listed to Standard 1971 and meeting the requirements of ADA. A/V shall be 24VDC and shall be electro-mechanical in design with electronic control (no moving parts) providing 87db reverberant at 10 feet, with 24VDC xenon flasher, 110 CD (U.L.) intensity unless noted otherwise on the drawings, mounted on a flush mounted box. A/V units shall be provided with horn, strobe, and adaptor. Strobes shall be capable of being mounted in a vertical or horizontal position and still meet the requirements of U.L. for polar light distribution. Locate an audio/visual signal at a constantly attended location in the building. Provide nameplate directly below device lettered "Monitoring System Alarm".

I.Air handling unit shutdown relays and duct smoke detector relays shall be addressable, programmable fan shutdown relay, 24 VDC operation, mounted in surface cabinet with LED indicator indicating when relay is energized. These relays shall be controlled and powered from the 4100 control panel. Contacts shall be 2P D.T. rated at 10 amps resistive 28 VDC/120VAC.

J. Magnetic door holders shall be wall mounted electromagnetic holders unless indicated otherwise on the drawings, installed and wired by the Electrical Contractor. Each door shall require a magnetic door holder near the top of the door. Verify location of holder with the door supplier. The fire alarm control shall be equipped with auxiliary relays to release holders as required by the initiating alarm circuit. Voltage of the door holders shall be 24 VDC.

K. Monitoring signal circuit power extender if required shall provide an internal 8 amp power supply, battery charger and 4 supervised notification appliance circuits, style Y or style Z. The extender panel shall connect as the end- of- line device to a dedicated NAC circuit on the host panel which will signal four notification appliance circuits to extend the alarm. The extender panel shall monitor each output NAC for trouble conditions and Earth faults and report back to the host panel if trouble occurs. Provide with up to four additional signal circuits as required. The extender panel shall be capable of being remotely mounted from the host control panel and shall be housed in a beige steel cabinet to match host control panel. Provide dedicated 120 volt circuit to each extender panel. Extender panels shall be located in Storage Rooms, Mechanical Rooms, or Janitor Rooms only. Extender panels shall not be located in public access areas. Verify locations of extender panel with Engineer and Architect prior to installation.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Provide and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. All wiring shall be installed in strict compliance with all the provisions of NEC _ Article "Fire Alarm Systems", unless noted otherwise in these specifications or on the drawings, or if required may be reclassified as non_power limited and wired in accordance with NEC_Article "Fire Alarm Systems".

1. Upon completion, the contractor shall so certify in writing to the owner and general contractor.

2. All junction boxes shall be sprayed red and labeled "Monitoring". All system conduits will be labeled in boxes. Wiring color code shall be maintained throughout the installation.

3. All devices including zams shall be provided with labels indicating the device identification numbers.

4. End of line register when located infield shall be installed with a box and labeled (E.O.L.).

B. Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractors.

C. The contractor shall clean all dirt and debris from the inside and the outside of the Monitoring equipment after completion of the installation.

D. Contractor and equipment supplier shall jointly provide a proposed riser diagram for the Monitoring system indicating all devices, equipment, and cabling with the shop drawing submittals prior to construction. If changes are made during construction a corrected riser diagram shall be submitted with the operating and maintenance manuals upon project completion. Riser diagram shall use symbols as shown on the drawings and shall have room numbers adjacent to all devices. All wiring shall be in conduit. On Final drawing riser diagram shall reflect owners approved room numbers.

E. This Contractor shall furnish and install all wiring, conduit, junction boxes and outlet boxes required for the installation of a complete system. All wiring shall be installed in metallic conduit, shall be color coded throughout and shall be free and clear of opens, grounds, and shorts between conductors. All Monitoring wiring shall be #14 gauge solid copper, with the exception of the MAPNET II addressable cable which shall be West Penn #D975 (.210" OD) and ADA Audio/Visual signals and horns shall be wired with West Penn #995 (.211" OD). (Shielded wiring required only if required by the Manufacturer.). Maximum number of devices on a circuit shall not exceed 80% of the rated circuit capacity. Contractor shall provide separate circuits for audible and visual circuits. Access control wiring shall be as required by system manufacturer. All equipment shall be grounded with an approved earth ground wire being supplied at the control panel. All wiring shall be in conformance with Article 760 of the National Electric Code. Verify all wiring with system manufacturer prior to installation.

F. Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractors.

G. Contractor shall not remove protective covers from smoke sensors until all construction work and cleanup has been performed. If this is not adhered to all cleaning costs to clean dirty smoke detectors shall be paid for by the contractor.

H. A 1" empty conduit with pull wire shall be provided from the Monitoring control panel to the main telephone terminal board for Telephone Co. use.

I.Smoke detectors shall be installed on the ceiling at each control panel, extender panel, and annunciator location per NFPA 72.

J. All remote devices requiring outlet boxes shall be mounted on flush outlet boxes as recommended by the manufacturer, or as specified elsewhere in this division of the specifications. Any required surface devices (where approved by the Engineer) shall be installed on surface outlet boxes that are at a minimum the same size as the outside of the device. No part of a surface device shall overlap the outlet box. Verify all installation requirements and box types with manufacturer prior to rough in.

3.2 SERVICE AND TESTING:

A. The manufacturer shall co-ordinate and provide a test of the system in the presence of the Fire Marshal, Owner, and local Fire Department.

B. The manufacturer shall provide supervision of the project during installation, supervision of final connections, and testing of all devices, demonstrate system operation following checkout in the presence of the Architect, Engineer and Owner, and shall after completion of the project and acceptance by same, provide any service incidental to the proper performance of the system during the guarantee period. After the guarantee period, the manufacturer shall provide upon request and at standard rates, the service necessary for the future proper performance of this system. To provide this service, the manufacturer shall have an intrastate service organization consisting of at least three direct fulltime factory trained employees under the supervision of a qualified service manager. Service availability shall be within 120 miles with a maximum 24 hour response time. The prime function of this organization shall be prompt, efficient service. Upon project completion, the equipment supplier shall present a full coverage preventive maintenance agreement to the Owner for his purchase approval covering all service and instructions to the customer, within a minimum of two (2) inspections per year with no additional charge for emergency calls between inspections during normal working hours. Upon completion of Monitoring System Testing, submit to Engineer (3) copies of Testing and Inspection Report signed off as 100% functioning by the System Supplier and the Electrical Contractor. Submit forms in NFPA 72 format including db level readings per room marked on floor plans. floor plans to be submitted in operation booklet. Db reading shall be submitted to Engineer prior to walk thru by Engineer, inspecting personnel or final acceptance test. Bind (1) additional copy in the operation instructions booklet.

3.3 GUARANTEE:

A. After all work herein specified has been completed; the Contractor shall guarantee his work to be free from defects for a period of one year. Such defects shall apply to faulty materials or workmanship. In the event of the development of said defects, the Contractor shall remedy the failures at his own expense during normal business hours within a reasonable time after notice. Systems equipment shall be guaranteed by the manufacturer for one year.

END OF SECTION 16724

23172.00 - 622
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PROFESSIONAL ENGINEER
Drew Rose
29010
12/18/2023
OKLAHOMA

date issued: 01-08-2024

Kingfisher County Extension Office 2023

Kingfisher County Fairgrounds, Kingfisher, OK

EXPIRES: 12-31-2024

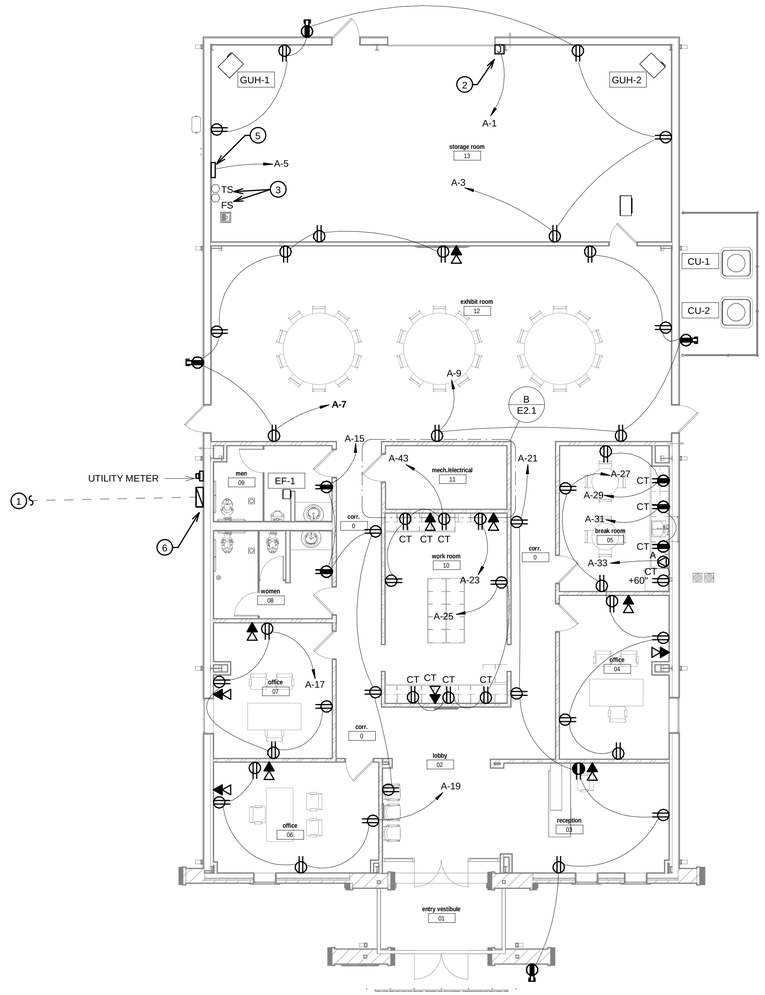
E1.5

GENERAL NOTES:

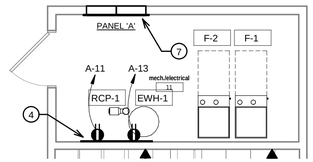
1. ALL CIRCUITS INDICATED ON DRAWINGS SHALL BE 20A, 120V CIRCUITS WITH (2)-#12'S AND (1)-#12 G. IN 0.5" CONDUIT U.O.N.
2. LABEL ALL SNAP SWITCH COVERPLATES WITH THE PANEL AND CIRCUIT NUMBER.
3. REFER TO RELATED ARCHITECTURAL DRAWINGS FOR RELATED INFORMATION.
4. REFER TO THE SPECIFICATIONS FOR DATA NOT ON THE DRAWINGS.
5. WALL MOUNTING HEIGHTS TO CENTERLINE OF DEVICE UNLESS OTHERWISE NOTED.
6. A GROUND CONDUCTOR SIZED PER N.E.C. ARTICLE 250 IS REQUIRED IN ALL POWER, RECEPTACLE, AND LIGHTING CIRCUITS. GROUND CONDUCTORS ARE NOT SHOWN ON DRAWINGS.

(#) E2.1 PLAN NOTES

1 TO NEW POLE MOUNTED TRANSFORMER. REFER TO A/E1.2 FOR ADDITIONAL INFORMATION.
2 PROVIDE JUNCTION BOX FOR 120V POWER CONNECTION TO OVERHEAD DOOR.
3 PROVIDE TAMPER AND FLOW SWITCH AS REQUIRED. CONNECTO TO SPRINKER MONITORING PANEL.
4 PROVIDE A PLYWOOD BACKING FOR OWNER PROVIDED TELEPHONE AND DATA INFRAESTRUCTURE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
5 SPRINKLER MONITORING PANEL.
6 NEW 400A 208V, 3 PHASE SERVICE ENTRANCE RATED NEMA 3R FUSIBLE DISCONNECT. REFER TO C/E1.2 FOR ADDITIONAL INFORMATION.
7 PANEL 'A' SHALL BE FLUSH MOUNTED IN A 6" WALL. COORDINATE WITH GENERAL CONTRACTOR.



A FLOOR PLAN - POWER
0' 4' 8' 12'
1/8" = 1'-0"
NORTH



B ENLARGED MECH./ELECTRICAL ROOM
0' 2' 4' 6'
1/4" = 1'-0"
NORTH

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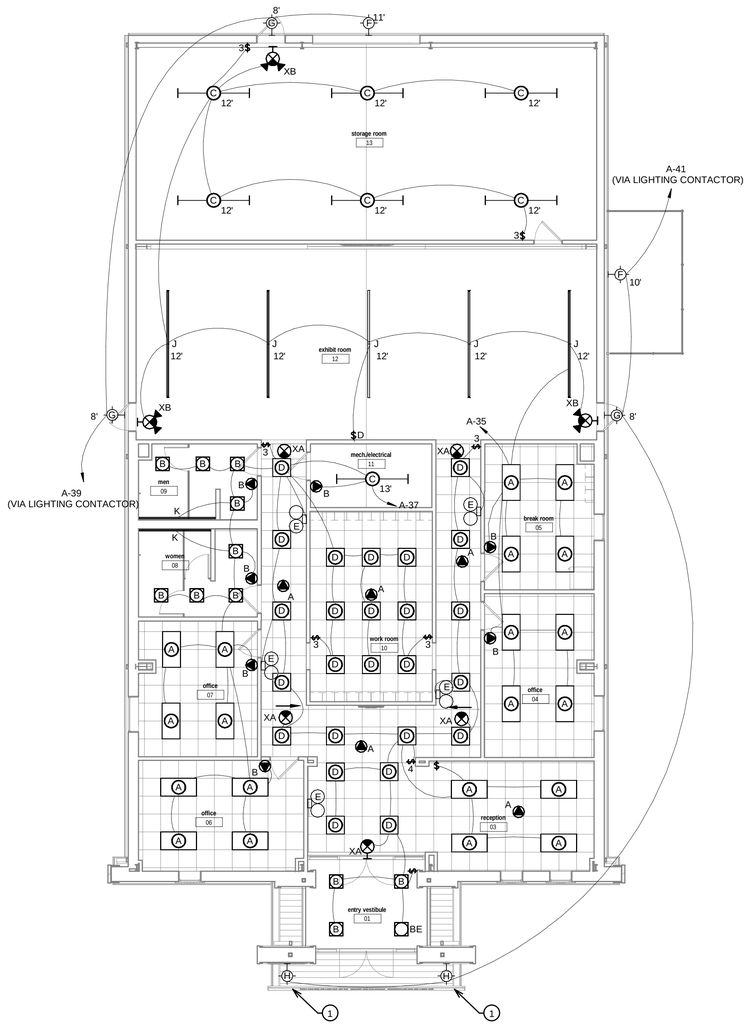
E2.1

GENERAL NOTES:

1. ALL CIRCUITS INDICATED ON DRAWINGS SHALL BE 20A, 120V CIRCUITS WITH (2)-#12'S AND (1)-#12 G. IN 0.5" CONDUIT U.O.N.
2. LABEL ALL SNAP SWITCH COVERPLATES WITH THE PANEL AND CIRCUIT NUMBER.
3. REFER TO RELATED ARCHITECTURAL DRAWINGS FOR RELATED INFORMATION
4. REFER TO THE SPECIFICATIONS FOR DATA NOT ON THE DRAWINGS.
5. WALL MOUNTING HEIGHTS TO CENTERLINE OF DEVICE UNLESS OTHERWISE NOTED.
6. A GROUND CONDUCTOR SIZED PER N.E.C. ARTICLE 250 IS REQUIRED IN ALL POWER, RECEPTACLE, AND LIGHTING CIRCUITS. GROUND CONDUCTORS ARE NOT SHOWN ON DRAWINGS.
7. LOWER CASE LETTERS NEXT TO LIGHT FIXTURES INDICATE WHICH SWITCH THEY ARE CONTROLLED BY.

(2) E3.1 PLAN NOTES

1 COORDINATE MOUNTING HEIGHT WITH ARCHITECT/OWNER PRIOR TO ROUGH-IN.



A FLOOR PLAN - LIGHTING

0' 4' 8' 12' 1/8" = 1'-0"

23172.00 - 622

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E3.1

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ADDENDUM #1

Kingfisher County Extension Office 2023

January 17, 2024

Attachments:

1. a01, a06.2 (2 pages)
2. Civil addendum no.1 (2 pages)

Clarifications:

1. Refer to Section 042000 - UNIT MASONRY, paragraph 2.02 BRICK UNITS, items A and B. Revise to the following:
   Manufacturers: Cloud Ceramics
   Facing Brick #1: Coronado Grey, velour finish
   Facing Brick #2: Cocoa Brown, velour finish
   Actual size: Utility 3 5/8” x 3 5/8” x 11 5/8”.
2. Revise 2’-0” dimension shown on 1/a04. Refer to 1/S3.0 note: footing to bear on shale (depth varies).
3. Refer to Section 072700 – Air Barriers
   a. AIR-SHIELD ™ TMP Liquid Membrane Thin Film Permeable Air Barrier is acceptable.

Changes to Drawings

1. Refer to clouded changes on a01 drawing 1.
2. Refer to clouded changes on a06.2 drawing 7.
3. Refer to civil sheet C2 sealed and dated 12/18/2023. Replace original sheet with the attached.

Door Schedule						
Door Number	Type	Size: Width x Height x Thickness	Fire Rating	Material	Frame	Notes
01		3'-0" x 7'-0" x	nr	al	al	3,4,5,6,8,9
02		3'-0" x 7'-0" x	nr	al	al	3,4,5,6,8,9
04	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	6
05	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	
06	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	6
07	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	6
08	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	6,8
09	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	6,8
10a	3	3'-0" x 7'-0" x 0'-4"	nr	co	hm	
10b	3	3'-0" x 7'-0" x 0'-4"	nr	co	hm	
11	1	3'-0" x 7'-0" x 0'-1 3/4"	nr	wd	hm	6
12a	2	3'-0" x 7'-0" x 0'-1 3/4"	nr	hm	hm	1,2,5,6,7,8
12b	5	3'-0" x 7'-0" x 0'-1 3/4"	nr	hm	hm	1,2,5,6,7,8
13a	2	3'-8" x 7'-0" x 0'-1 3/4"	nr	hm	hm	
13b	2	3'-0" x 7'-0" x 0'-1 3/4"	nr	hm	hm	1,2,5,6,7,8
13c	4	12'-0" x 10'-0" x 0'-1 1/2"	nr			3

Legend
co - cased opening
nr - not rated
hm - hollow metal
wd - wood, factory finish
al - aluminum

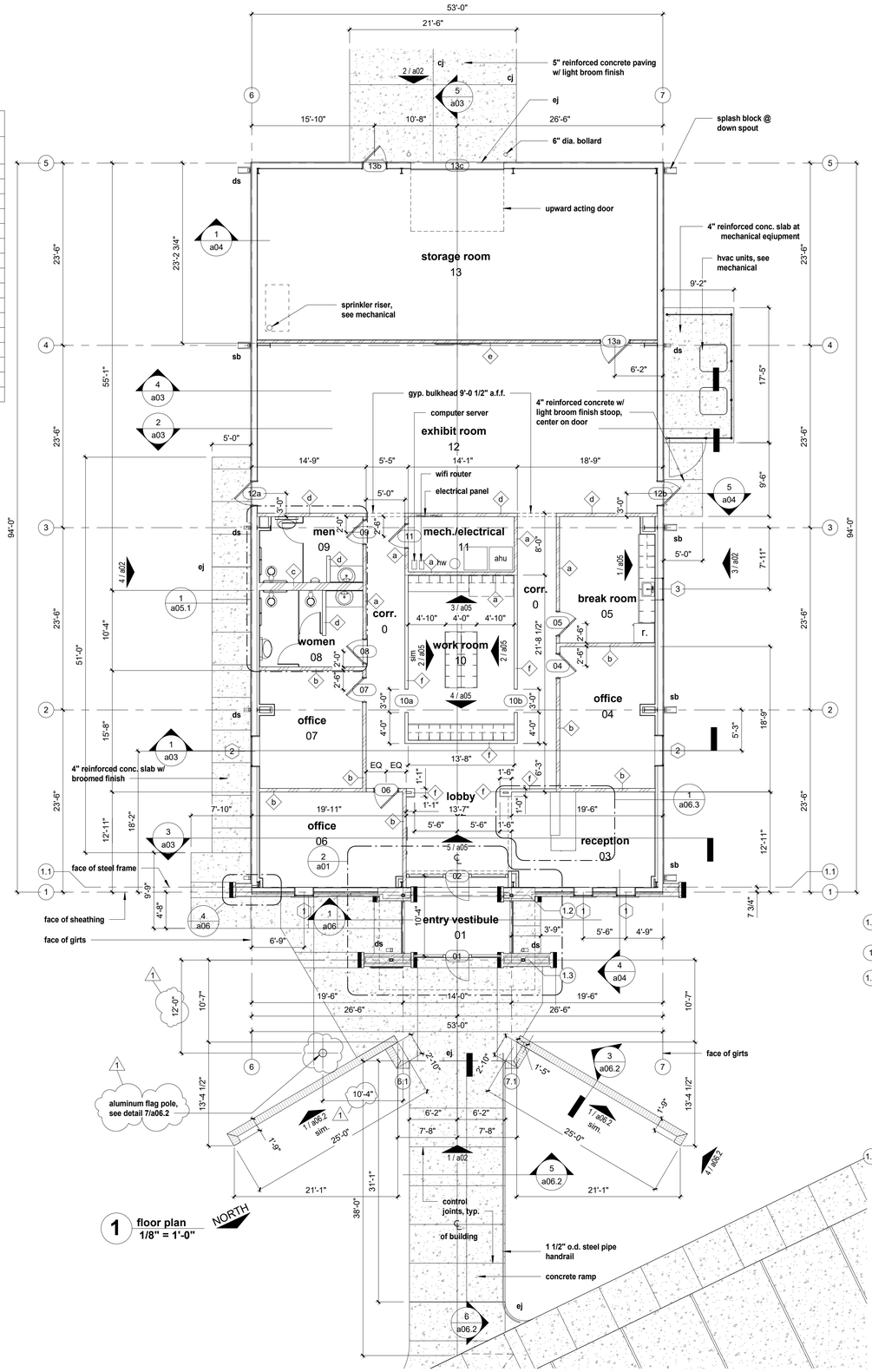
door schedule remarks:
1. provide galvanized primer at door & frame
2. weatherize all exterior doors
3. hardware by door manufacturer
4. push button ADA access on building
5. panic hardware
6. lockable door
7. card reader entry (key fob)
8. automatic closer
9. see window types for storefront dimensions

Window Schedule						
Type Mark	R.O. Sill Height	Height	R.O. Width	R.O Head Height	Room Number	Fire Rating
1	3'-0"	4'-0"	2'-6"	7'-0"	03	nr
1	3'-0"	4'-0"	2'-6"	7'-0"	03	nr
2	3'-0"	4'-0"	4'-0"	7'-0"	04	nr
3	4'-0"	3'-0"	3'-0"	7'-0"	05	nr
1	3'-0"	4'-0"	2'-6"	7'-0"	06	nr
2	3'-0"	4'-0"	4'-0"	7'-0"	07	nr

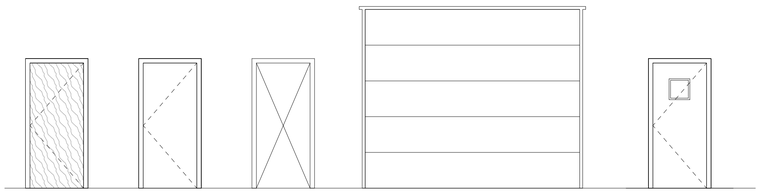
(see window types 4 and 5 for aluminum storefront)

Plan Legend

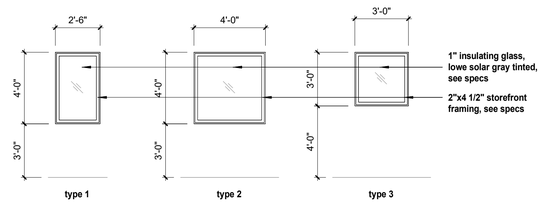
- drywall partition
- drywall sound partition a
- drywall sound partition b/d
- cmu wall
- brick veneer
- ds - downspout
- x - wall type, see typical wall details
- 101 - door type, see door schedule
- x - window type, see door schedule
- cj - sawn in control joint
- ej - expansion joint
- sb - splash block

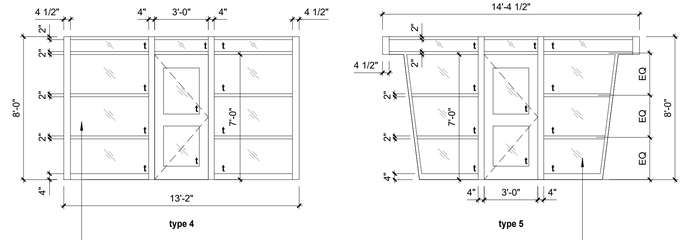


1 **floor plan**
1/8" = 1'-0"

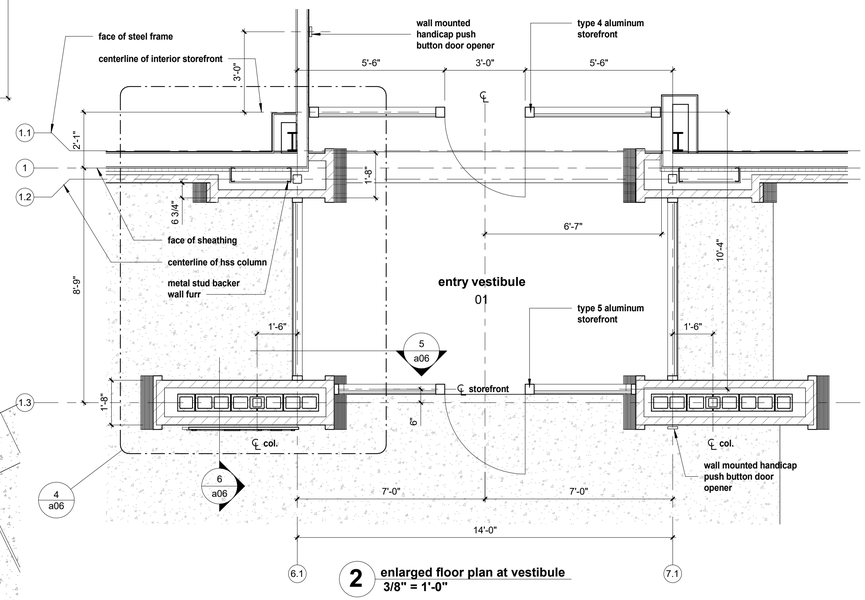


4 **door types**
1/4" = 1'-0"





3 **window types**
1/4" = 1'-0"



2 **enlarged floor plan at vestibule**
3/8" = 1'-0"

date issued: 1-17-2024

Kingfisher County Extension Office 2023

300 South 13th Street, Kingfisher, OK 73750

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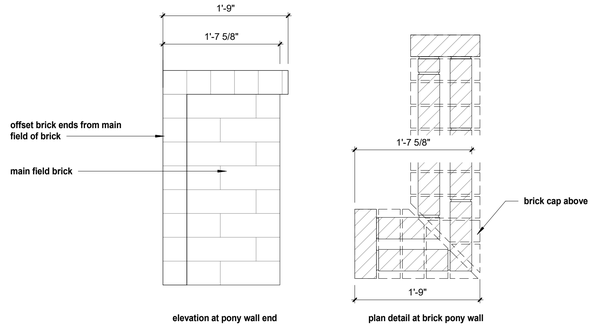
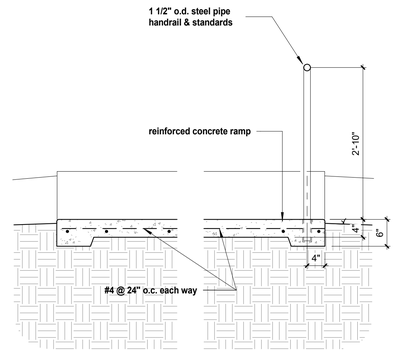
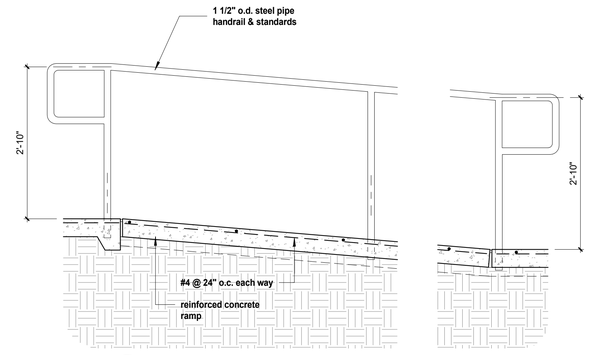
ARCHITECTURE INTERIOR DESIGN
302 NORTH INDEPENDENCE ENID, OK 73701 WWW.CORBINMERZHANEY.COM PH:(580)233-2362



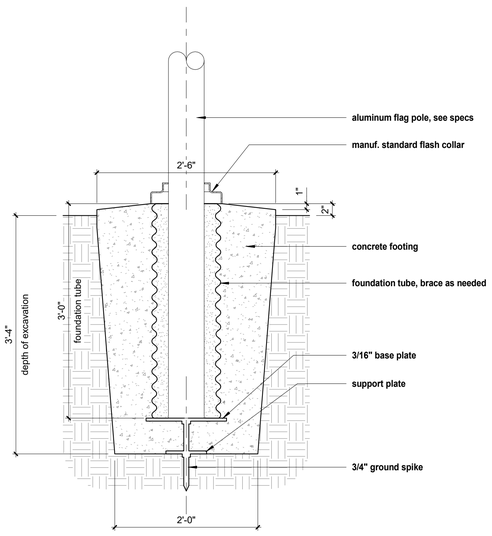
4 plan detail at brick pony wall
1" = 1'-0"



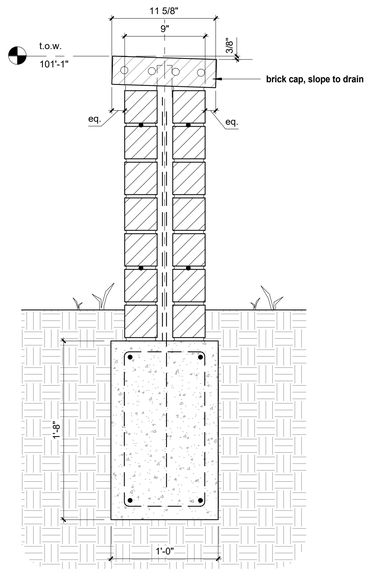
5 transverse section at ramp
3/4" = 1'-0"



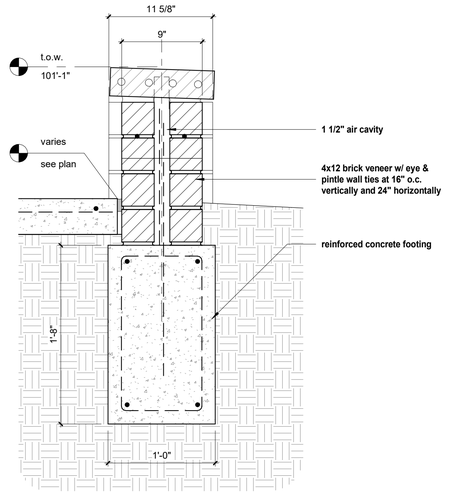
6 longitudinal section at ADA ramp
3/4" = 1'-0"



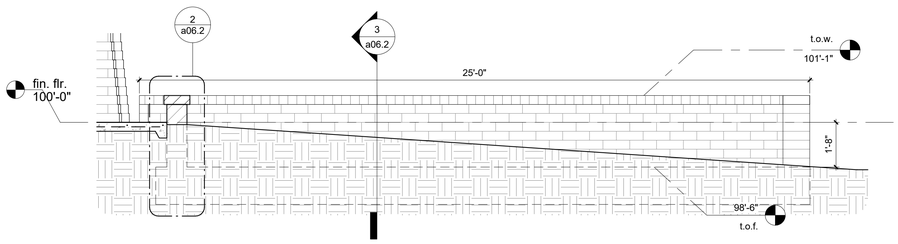
7 section @ flagpole footing
1" = 1'-0"



3 section at pony wall
1 1/2" = 1'-0"



2 section at pony wall at sidewalk
1 1/2" = 1'-0"



1 elevation at west pony walls
3/8" = 1'-0"

date issued:	1-17-2024				

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STATE OF OKLAHOMA
KENNETH CLARK CORBIN
1249
REGISTERED ARCHITECT

a06.2

ADDENDUM NO. 1 (Civil) HEG Project No.: 23.030

HOLTZEN ENGINEERING GROUP

PLANS AND SPECIFICATIONS
for
Kingfisher County Extension Office 2023
300 South 13th Street, Kingfisher, Ok 73750

January 15, 2024

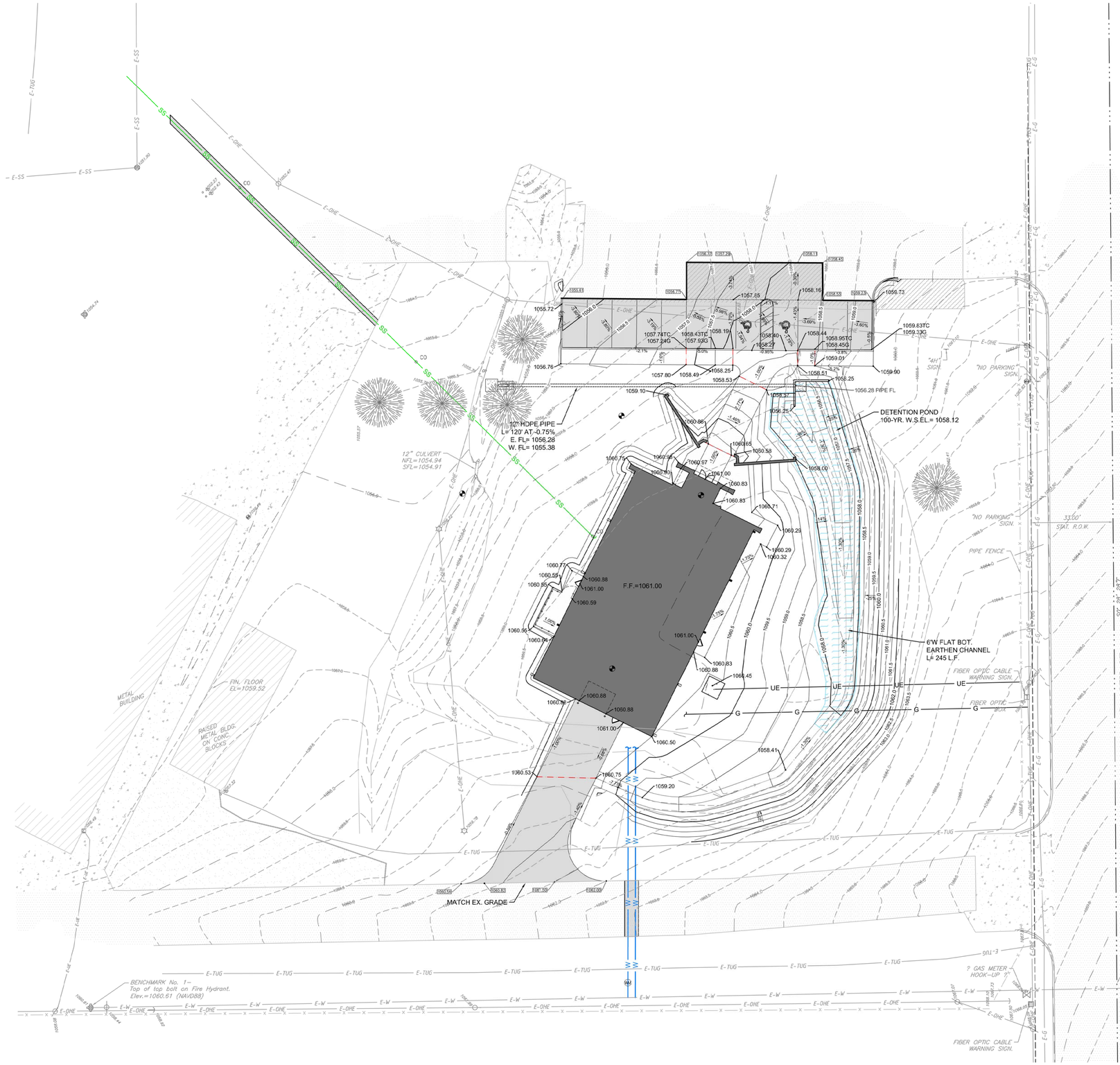
This Addendum forms a part of the contract documents as described above. The original contract documents remain in full force and effect except as modified herein.

Civil Item No. 1:
Refer to sheet C2: turned on existing contours

Sincerely,

Scott E. Holtzen, P.E.

LICENSED PROFESSIONAL ENGINEER
SCOTT E. HOLTZEN
23396
1/15/24
OKLAHOMA



L E G E N D

99.0	EXIST. CONTOURS
98.0	PROPOSED CONTOURS
921.10	EXIST. ELEV. PT
920.10	PROPOSED ELEV. PT.
920.10 G	PROP. GUTTER ELEV.
920.10 TC	PROP. TOP CURB ELEV.
920.10 FL	PROP. FLOW LINE ELEV.
920.10 TOG	PROP. TOP OF GRATE ELEV.
920.10 TOW	PROP. TOP OF WALL ELEV.
920.10 TW	PROP. TOP OF S/W ELEV.
920.10 G.B.	PROP. GRADE BREAK ELEV.
0.50%	PROP. CROSS SLOPE & FL SLOPE ARROW
-5.0%	PROP. SLOPE ARROW
	EXIST. FLOW LINE
	PROPOSED FLOW LINE
	PROPOSED RIDGE LINE
	PROPOSED DRAINAGE PIPE

SHEET NOTES:

1. THIS DOCUMENT USES COLOR HATCH AND LINE WORK TO IDENTIFY ITEMS. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN COLOR DOCUMENTS.
2. REFER TO SITE PLAN FOR HATCH LEGEND,

date issued						
12/18/2023	REV0					
01/15/2024	ADDENDUM 1					

Kingfisher County Extension Office 2023

300 South 13th Street, Kingfisher, Ok 73750

HOLTZEN ENGINEERING GROUP
C.A. #7050 EXP. 6/30/25
302 N. INDEPENDENCE ST. STE. 1100
ENID, OK 73701
P. 580.233.8533 F: 580.540.8906
www.HoltzenEngineering.com

HEG PROJECT NO.: 23.030

CORBIN ◆ MERZ ◆ HANEY
ARCHITECTURE INTERIOR DESIGN
302 NORTH INDEPENDENCE ENID, OK 73701 WWW.CORBINMERZHANEY.COM PH:(580)233-2362

LICENSED PROFESSIONAL ENGINEER
SCOTT E. HOLTZEN
23396
12/18/23
OKLAHOMA

GRADING PLAN

C2

of 5 sheet(s)

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ADDENDUM #2

Kingfisher County Extension Office 2023

January 26, 2024

Attachments:

1. MEP addendum number #2 (1 page)
2. Prebid Sign-in sheet (1 page)

Substitutions:

The following are approved product manufacturers. All substituted products must meet or exceed specified performance.

1. Refer to section 083613 - Sectional Doors.
    a. Overhead Door Corp.
2. Refer to section 102800 – Plastic Toilet Compartments
    a. Metpar

Clarifications:

1. Refer to Supplementary Conditions, Part #3, Item 3.01, A,1
    a. This project is tax exempt.
2. Refer to specifications, Division 21 Fire Suppression Systems:
    a. Fire suppression and monitoring system are not required.
    b. Delete fire suppression system and monitoring system from bid sum.
3. Refer to specifications, Division 10, Specialties, Section 101419, Dimensional Letter Signage, and architectural drawings 1/a02, 3/a06, 5/a06.1
    a. 1/2-inch depth on cut lettering is acceptable.
4. Refer to section 133419, metal building systems, architectural drawings of entry vestibule, structural drawings and design criteria.
    a. It is an acceptable option for the pre-engineered metal building supplier to supply primary framing of their own fabrication at the entry vestibule area where structural steel is indicated. It is required that the fabrications do not alter the exterior appearance of the building. The design must be provided to meet loading illustrated in the architectural details and meet design criteria as shown on structural drawings. All engineering is to be performed by a structural engineer licensed in the state of Oklahoma.
    b. It is the purview of the general contractor to assure a complete installation and coordinate pre-engineered metal building and structural steel scope if separate contractors are used.
5. Refer to specifications section 72100 Thermal Insulation, Part 2 Products, Item E:
    a. Revise R-27, 8” thick insulation “Eco-Touch” batts to R-25.
6. Refer to architectural drawings 1/a04, 3/a04
    a. Revise R-13 wall insulation shown at exterior walls of rooms #12 exhibition room, #13 storage to “Proliner” system defined in specifications section 72100 Thermal Insulation, Part 2 Products, Item 2.01 Applications, Item E, Insulation at pre-engineered building wall secondary framing.

    b. For exterior walls at rooms other than #12, #13, refer to 2/a04 and 4/a04.
7. Refer to specification division 03 concrete, Part D, Polished Concrete and finish plan architectural sheet a09.
    a. Polished concrete is not required for room #13 storage. Provide smooth troweled finish with sealer.
8. Refer to specifications section 015000 Temporary Facilities and Controls, Part 1.06 Fencing, Item A.
    a. Provide 6 foot high fence around the construction site; equip with vehicular and pedestrian gates with locks.
9. Refer to civil plan C1, trench paving repair detail 2/C5
    a. The concrete required for trench paving shall be included in the contractor's estimated bid.
10. Refer to section 329223 Sodding
    a. Provide 25,000 square feet of sodding.

Electrical & Mechanical Items

1. Refer to addendum number #2 for revised sheet notes.

End of Addendum

Integrated Consulting
Engineers, Inc.
349 South Hydraulic • Wichita, KS 67211
316.264.3588 • 316.264.3948 • www.iconengineers.net

January 25, 2024 **ADDENDUM NUMBER #2**

Subject: Kingfisher County Extension Office
Kingfisher, Oklahoma

REVISED SHEETS:

1. Sheet MP1.2 – Remove Detail 8 Fire Protection system riser from sheet.

2. Sheet MP1.4 – Spec section Fire Protection Systems 15500 shall be removed in its entirety.

3. Sheet P1.1 – Remove Entry Station from plans including corresponding note P15.

4. Sheet E1.1 – Existing overhead electric utility lines serving light fixtures on pole. Electrical contractor shall work with local electric utility company as required to re-locate existing power poles, electric lines, and lights as required to coordinate with new parking lot. Refer to civil plan ‘C1’ for additional information.

5. Sheet E1.5 – Sheet shall be omitted from the construction drawings. The sprinkler system has been removed from the project, so a sprinkler monitoring system is no longer required.

6. Sheet E2.1 – Storage Room #13 – Sprinkler Monitoring System and tamper/flow switches associated with the sprinkler system shall be removed from the sheet.

7. Sheet E2.1 – Door Operator – Contractor shall provide 120V 20A circuit to door operator associated with Door #01. Contractor shall provide line voltage connection as required. Contractor shall also provide back-box for pushplate on the north side of the door on both the exterior and interior. Conduits shall be provided from back boxes to door operator as required. Contractor shall coordinate exact requirements with door operator manufacturer and architect prior to rough in. New circuit associated with door operator shall be Panel ‘A’ circuit #45.

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KINGFISHER COUNTY EXTENSION OFFICE 2023

Prebid sign-in

January 24, 2024

Company	Contact	Email
Rick Scott Construction	Kristi Ostler	estimating@rickscottconstruction.com
Firebrand Construction	Bryan Huckabay	morgan@firebrandgc.com
L Wallace Construction	Lane Henson	lane@lwcgc.com
Luckinbill Construction	Mark Hannemman	Mark.hanneman@luckinbillconstruction.com
Downey Contracting	George Ablah	gablah@downeycontracting.com
SPM Services LLC	Alex Pinon	Alex_pinon@icloud.com
Henson Construction	Brian Henson	bid@hensonconstruction.com
W. L. McNatt & Co.	Jason Masterson	jason@wlmcnatt.com
CADE Construction	Austin Reid	austin@cadeconstructionlp.com
Calm Construction	Kayla Stoneking	estimating@calmconstruction.com
Crossfire Construction	Joseph D. Kalka	josephk@crossfireok.com
Topographic	Mike Storozyszyn	Mike.storozyszyn@topographic.com
Luckinbill Construction	Brian Carberry	Brian.carberry@luckinbillconstruction.com

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ARCHITECTURE INTERIOR DESIGN
302 NORTH INDEPENDENCE ENID, OK 73701 WWW.CORBINMERZHANEY.COM PH:(580)233-2362

ADDENDUM #3

Kingfisher County Extension Office 2023

January 30, 2024

Attachments

1. a06, a02, 24”x36” (2 pages)
2. Addendum NO. 3 (Structural) (1 page)

Clarifications

1. Refer to architectural drawing 4/a06 & structural items on attached addendum #3 (structural) dated Jan. 29, 2024.
    a. Revise HSS 4x4x3/16” columns to HSS 4x4x1/4”
    b. Revise base plates per addendum #3 (structural).

End of Addendum

ADDENDUM NO. 3 (Structural)

HEG Project No.: 23.030

HOLTZEN ENGINEERING GROUP

PLANS AND SPECIFICATIONS
for
Kingfisher County Extension Office 2023
300 South 13th Street, Kingfisher, Ok 73750

January 29, 2024

This Addendum forms a part of the contract documents as described above. The original contract documents remain in full force and effect except as modified herein.

Structural Item No. 1:

Refer to Detail 10 on sheet S1.1 "Base Plate Details":

- Revise base plate BP1 and BP2 from 3/4" thick to 1" thick.

Structural Item No. 2:

Refer to sheet S2.0: Foundation Plan:

- HSS4x4 columns located at grids 6.1-1.2, 7.1-1.2, 6.1-1.3, & 6.1-1.3 shall be HSS4x4x1/4 columns.
- Base plates at grids 6.1-1.3 & 7.1-1.3 shall be BP1 shown on sheet S1.1
- Base plates at grids 6.1-1.3 & 7.1-1.3 shall be BP2 shown on sheet S1.1

Sincerely,

Scott E. Holtzen, P.E., S.E.

LICENSED STRUCTURAL ENGINEER
SCOTT E. HOLTZEN
23396
1/29/24
OKLAHOMA

94'-0"
snow and ice guard typical. location by snow guard manufacturer
AS-24 panel system 24 ga., galvalume finish w/ 1" thermal spacers
24 ga. LT3.3 corrugated siding with kynar finish
prefinished gutter and downspout
eave height 112'-0"
fin. flr. 100'-0"
prefinished metal barge trim
steel plate girder by mbs
bottom plate beam 108'-0"
prefinished metal cover plate
stacked bond and battered wall
aluminum storefront dark bronze anodized. 1" tempered insulating glass solar gray
prefinished alum. fixed window
insulating hm door & frame, galv. primer, paint
4 east elevation 1/4" = 1'-0"
3'-6"
24 ga. standing seam roofing panels, mechanically seamed galvalume plus finish w/ 1" thermal spacers
112'-0" eave height
116'-10" building height
prefinished alum. storefront window with insulating glass
insulating hm door & frame, galv. primer, paint
5'h chainlink fence
2'-0"
3 west elevation 1/4" = 1'-0"
no point (dead) loads such as roof hvac units are located on roofs or more specifically within 10'-0" of edges. typical for entire building. uniform collateral design for roof is 15 psf
10'-0"
face brick surround
5'h chain link fence
concrete bollard, see civil
10' x 12' upward acting door
2 south elevation 1/4" = 1'-0"
26'-6"
rowlock course in mainfield of face brick
4" brick surround
4x12 face brick #1
4x12 face brick #2
building elev. 116'-10"
8"x3/4" thick stand-off letter signage
3/8" steel plate beam
3/8" decorative web crippling 2" deep
brick lintel
sloped brick sill, typ.
KINGFISHER COUNTY EXTENSION
sloped brick sill
dimensions same as west pylon opposite hand
power to sign by contractor, sign by owner
aluminum storefront dark bronze anodized. 1" tempered insulating glass solar gray
pylon
wall mounted handicap push button door opener
5'h chain link fence
1 north elevation 1/4" = 1'-0"

date issued:	1-17-2024

Kingfisher County Extension Office 2023

300 South 13th Street, Kingfisher, OK 73750

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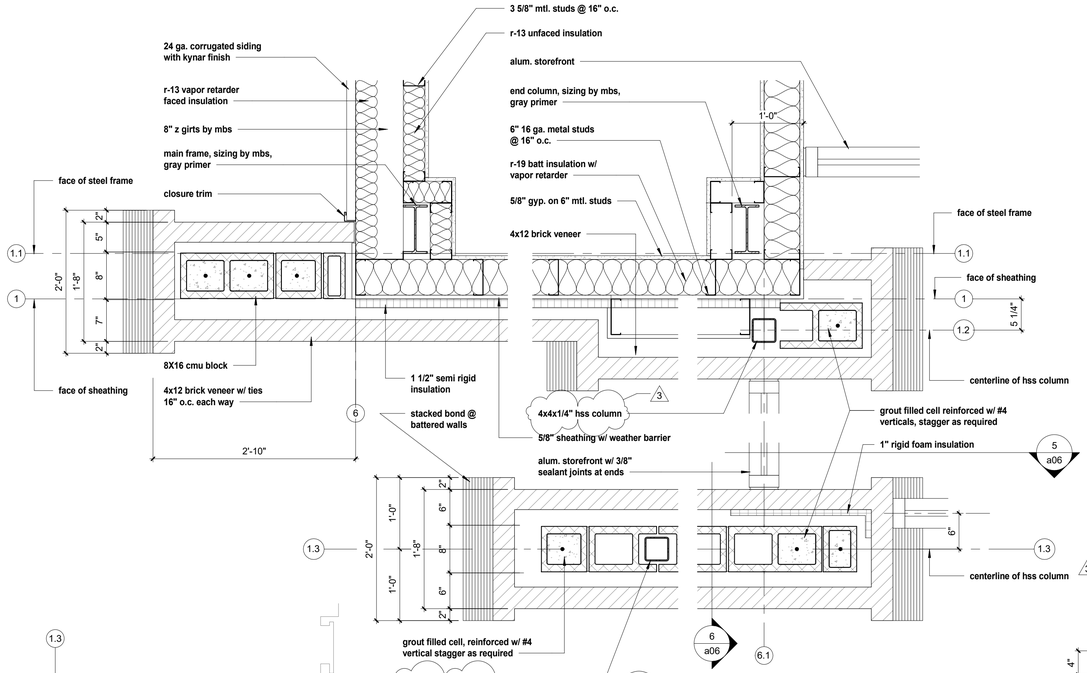
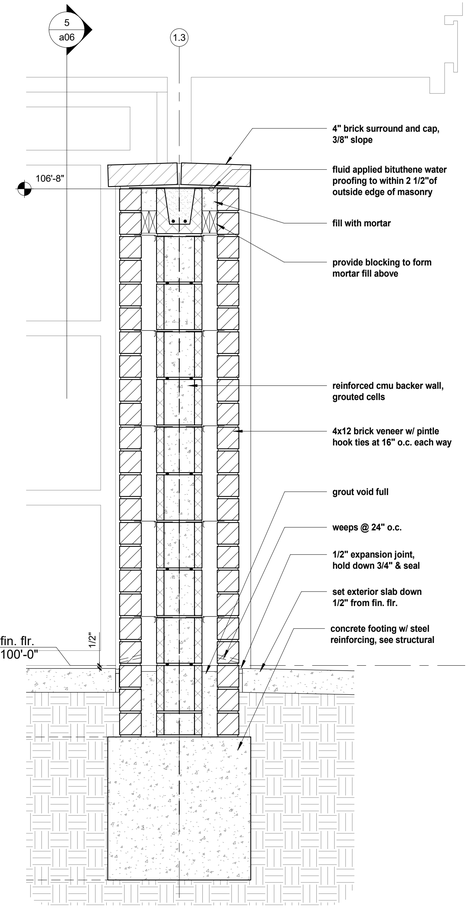
302 NORTH INDEPENDENCE ENID, OK 73701 WWW.CORBINMERZHANEY.COM PH.(580)233-2362

STATE OF OKLAHOMA KENNETH CLARK CORBIN 1249 LICENSED ARCHITECT

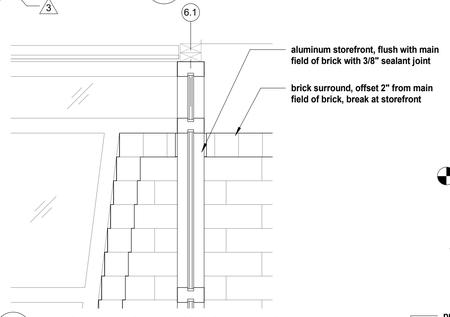
a02



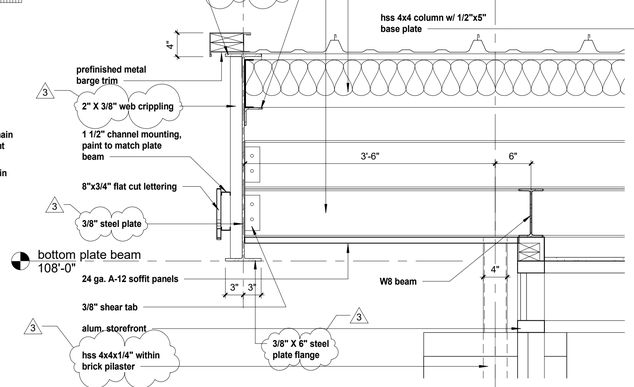
4 plan detail at pilasters & mtl. stud wall
1" = 1'-0"



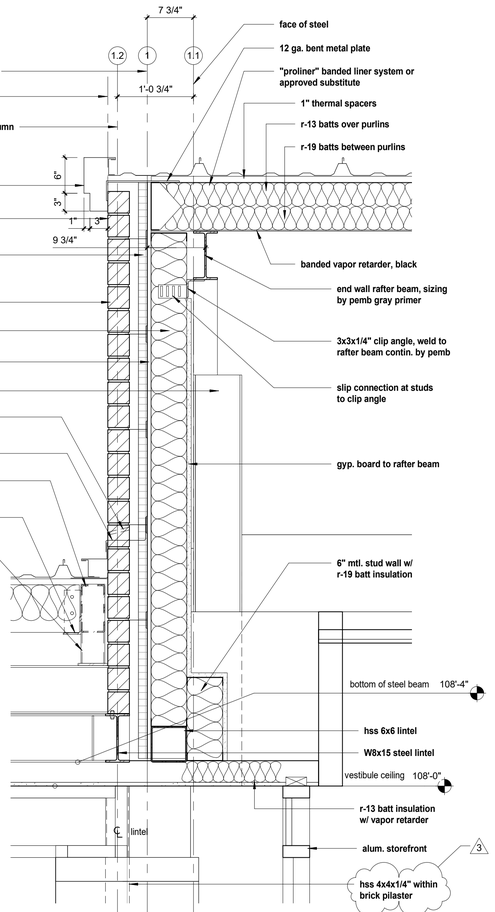
6 section detail at masonry pylon
1" = 1'-0"

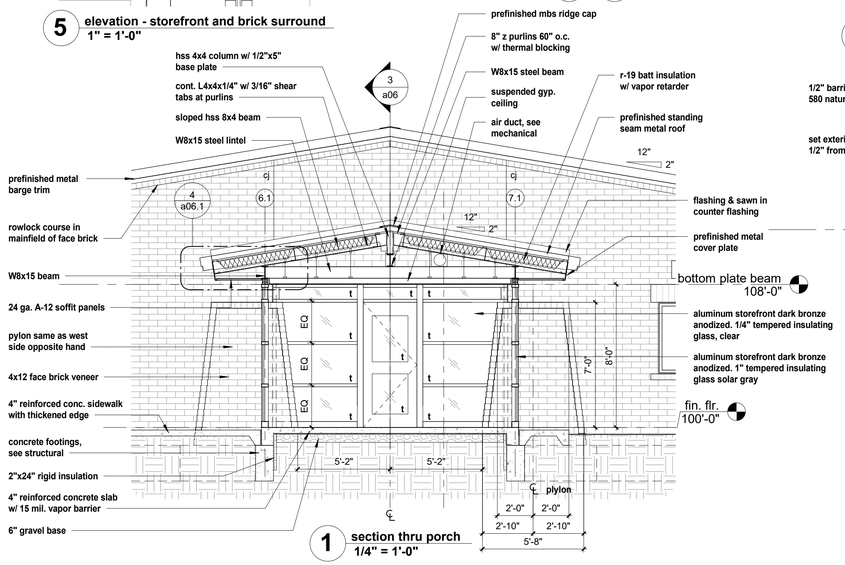


5 elevation - storefront and brick surround
1" = 1'-0"

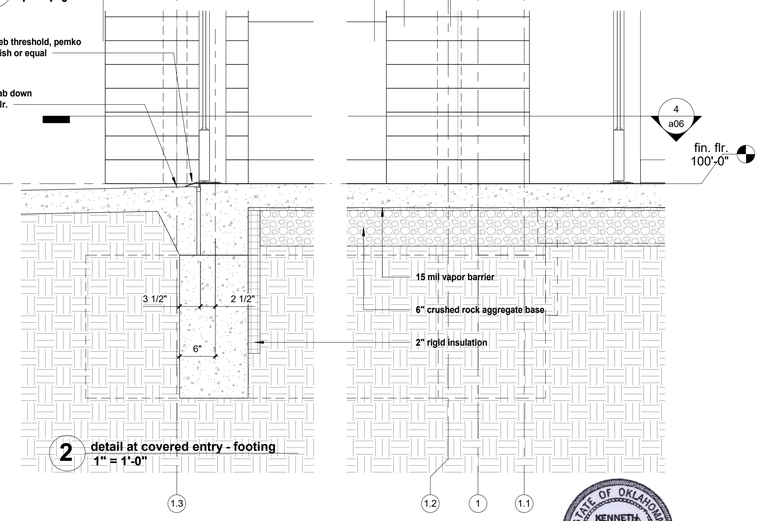


3 detail at covered entry
1" = 1'-0"





1 section thru porch
1/4" = 1'-0"



2 detail at covered entry - footing
1" = 1'-0"

date issued:	1-17-2024				

Kingfisher County Extension Office 2023

300 South 13th Street, Kingfisher, OK 73750

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STATE OF OKLAHOMA KENNETH CLARK CORBIN 1249 REGISTERED ARCHITECT

a06