REQUEST FOR QUALIFICATIONS (RFQ)

RFQ # 20-0009

Cooper Mountain Seismic General Contractor

RFQ Closing (Due Date & Time):

November 17, 2020 by 2:00 PM Pacific Time

Issued by:

Beaverton School District 48J
16550 SW Merlo Road
Beaverton Oregon 97003
October 16, 2020

Beaverton School District
Construction Purchasing Department
16550 SW Merlo Road Beaverton OR 97003

REQUEST FOR QUALIFICATION
Public Improvement
Solicitation No: RFQ 20-0009
Summary

The purpose of this Solicitation is to establish a Pre-Qualified List of Bidders for the provision of Construction Services for the Cooper Mountain Seismic Upgrades project.

A MANDATORY pre-qualification conference will be held on November 5, 2020 at 2:00 PM Pacific Time at Cooper Mountain ES, 7670 SW 170th Ave, Beaverton, OR 97007.

Interested Firms must submit Qualifications pursuant to the provisions of this RFQ **via email to: Contracts@beaverton.k12.or.us**, **PRIOR** to the Closing:

Statements of Qualifications (SoQ) DUE DATE & TIME (CLOSING): November 17, 2020 at 2:00 PM Pacific Time
LATE SUBMISSIONS WILL NOT BE ACCEPTED

Timely received Statements of Qualifications (SoQ) will be opened, recorded, and prepared for evaluation. The District will not read Qualifications aloud. The number of firms submitting Qualifications and their identities will be available within seven days. The contents of any Submission will not be disclosed to the public until all Qualifications have been evaluated.

Only firms that are Pre-Qualified under this RFQ may submit a Bid for the provision of Construction Services for ITB 20-0011 Cooper Mountain Seismic Upgrades that will be issued following this RFQ.

Firms that do not submit an SoQ to this RFQ or are deemed Not Qualified under this RFQ and will not be permitted to submit a Bid for the provision of Construction Services for Cooper Mountain Seismic Upgrades.

Contractors are solely responsible for ensuring that the Beaverton School District receives its Qualifications.

Firms must familiarize themselves with the entire RFQ document.

All questions and comments regarding this Solicitation must be directed ONLY IN WRITING by e-mail to: contracts@beaverton.k12.or.us.

THE DISTRICT MAY REJECT ANY QUALIFICATION NOT IN COMPLIANCE WITH ALL PRESCRIBED REQUIREMENTS.

1. **PROJECT OVERVIEW:**
The project consists of seismic upgrades to align with Oregon Seismic Rehabilitation Grant Program funding source, partial re-roof, and related work. The school is not expected to be occupied during construction. If the school is occupied, Contractors must have the flexibility/capability to perform occupied construction. The location of the project is Cooper Mountain Elementary, 7670 SW 170th Ave, Beaverton, OR 97007.

This procurement process will occur in two steps: Request for Qualifications (RFQ), to determine a list of Pre-Qualified contractors followed by a Formal Invitation to Bid (ITB), which will be awarded to the Pre-Qualified firm submitting the lowest responsive and responsible bid. Statements of Qualification (SoQ) in response to this RFQ must address all items listed in Section IV Item 3 Qualifications Content. All items will be scored as described in Sections IV and V.

2. **PROJECT CONSIDERATIONS:**
The school is expected to be vacated in mid-June 2021 and must be operational by August 30, 2021. A preliminary drawing set has been included for information only. Refer to ATTACHMENT C.
The District reserves the right to adjust this schedule in cooperation with the selected general contractor pursuant to restrictions or limitations posed by the COVID-19 pandemic, and Comprehensive Distance Learning.

3. **PROJECT TEAM:**
The Design Team has been selected and contracted to develop the design documents for this project. The members of the team are:

Owner's Representative Beaverton School District Facilities Development Department 16550 SW Merlo Road Beaverton, OR 97003	Architect Oh planning+design, architecture 115 NW First Avenue, Suite 300 Portland, OR 97209	Structural Engineer Holmes Structures 555 SE Martin Luther King Jr Blvd Suite 602 Portland, OR 97214
Mechanical, Electrical Plumbing Engineer KCL Engineering 2175 NW Raleigh Street, Suite 110 Portland, OR 97210		

4. **SOLICITATION AND SELECTION PROCESS SCHEDULE**:

Process Milestones	**Dates**
RFQ	
Issue RFQ	October 15, 2020
Pre-qualification Conference	October 29, 2020 at 2:00 p.m.
Deadline for Questions	November 6, 2020

Issue Addendum	November 10, 2020
Submit Qualifications	November 17, 2020 by 2:00 p.m.
Notice of Selected Pre-Qualified Bidders	on or about December 4, 2020

ITB*

Release ITB	December 15, 2020
Pre-Bid Conference	January 5, 2021 at 3:00 p.m. at Cooper Mountain
Deadline for Questions	January 12, 2021
Issue Addendum	January 15, 2021
Bids Due	January 21, 2021 by 2:00 p.m.
Notice of Intent to Award	January 22-28, 2021
School Board Approval	February 1, 2021
Award Contract	on or about February 3, 2021

5. CONSTRUCTION SCHEDULE MILESTONES*:

Milestones	**Dates**
Construction Start Date	June 15+/-, 2021
Construction Substantial Completion	August 13, 2021
Final Completion	August 28, 2021

*The dates under ITB and Construction Schedule Milestones are for reference only. The District may modify as needed.

1. **DESCRIPTION OF SERVICES**:
   Once the two-step solicitation process has been completed, the successful Bidder will have the responsibility for providing a complete project per the construction documents. This will include but not be limited to all materials, labor, equipment and will involve significant coordination with the District and the design team.

2. **PROJECT GOALS:** The District has the following goals regarding performance for this project:
   a. Complete project on time.
   b. Complete project within budget (e.g., with minimal change orders, etc.).
   c. High level of responsiveness and collaboration with District and Design team.
   d. Compliance with all financial, reporting and compliance requirements.
   e. Maintain a diverse, equitable, safe, and inclusive workplace with regard to race, ethnicity, and gender.
   f. Prompt provision of all required closeout documents.

3. **SPECIFIC CONSTRUCTION SERVICES DESCRIPTION:**
   a. Coordinate weekly construction meetings with the District and the Design team.
   b. Prepare site and building logistics plans to encompass all proposed activities and impacts to the site, adjacent properties, and neighboring streets.
   c. Fully coordinate the work of all subcontractors and suppliers. Provide regular and on-going quality inspection and assistance to the Design Team in ensuring that the work meets all specifications and applicable codes.
   d. Coordinate inspections with the Authority Having Jurisdiction (AHJ) and third-party special inspections (provided by the District).
   e. Review and expedite all change order requests and maintain logs.
   f. Coordinate with BSD FF&E and custodial efforts allowing for final clean prior to final completion.
   g. Monitor compliance with payment of prevailing wages on all contracts and subcontracts, per ORS 279C, and submit Certified Payroll reports as required.
   h. Maintain in a current condition all Project Records, including permits, construction documents, as-built records, meeting records, submittals, inspection reports, invoices, delivery receipts, daily activity logs, Requests for Information (RFI); RFI logs; Submittals; Submittal Logs; Inspection Reports; Change Order SoQs (COP); COP logs; Change Orders (CO); CO logs; Construction Change Directives (CCD); CCD logs; Architect's Supplemental Instructions (ASI); ASI logs; Permits; Project Allowance(s) Reconciliation; Project Contingency status reports; and Project Schedule updates.
   i. Deliver a structured and accountable program (e.g., Dreen Dot, Rise Up, etc.) and/or a set of trainings/policies/procedures, etc. that help maintain a worksite that is free from acts of hate, racism, sexism, discrimination, harassment, and bullying.
   j. Transmit copies of D/M/W/ESB/SDVBE Contact Logs, Career Learning Reports and Apprenticeship Program Logs monthly via eBuilder (as required).
   k. Intelligent and selective use of Building Information Modeling (BIM), where applicable.
   l. Use of the District's internet-based e-Builder Project Management System for coordination of efforts, approvals, and expedited communication is required.
   m. Provide and maintain a current construction schedule identifying impacts to critical path of project completion and formulate recovery schedules for identified impacts.
   n. Provide a risk mitigation plan for potential weather conditions affecting roofing as well as mitigation plans for moisture intrusion into building.

1. **GENERAL:**
   This Solicitation is issued pursuant to ORS 279A, ORS 279C and the Oregon Attorney General Model Rules Divisions 46 and 49. The term "District" or "Owner" throughout this document means Beaverton School District. The term "Applicant", "Contractor", "Person" or "Firm" means a Contractor that submits a response to this Request for Qualifications. The term "Qualifications", "Qualification Submission", "SoQ", or "Statement of Qualifications (SoQ)" means all required documents and information submitted in response to this Request for Qualifications.

2. **ELIGIBILITY TO PROPOSE:**
   a. **Construction Contracts**. The District shall not consider a Firm qualified to do Work as a Contractor, as defined in ORS 701.005(2), unless the Person has a current, valid certificate of registration issued by the Construction Contractors Board at the time the Qualifications are submitted.
   b. **Non-complying Entities**. The District shall deem a Qualification Submission received from a Person that fails to comply with this rule nonresponsive and shall reject the SoQ as stated in ORS 279C.365(1)(k), unless contrary to federal law or subject to different timing requirements set by federal funding agencies.

3. **PRE-QUALIFICATIONSOQ CONFERENCE:**
   a. **Purpose**. The District shall hold a MANDATORY pre-qualification conference with prospective Firms prior to Closing, to explain the requirements and/or obtain information.
   b. **Statements Not Binding**. Statements made by the District's representative at the pre-qualification conference do not change the Request for Qualifications unless the District confirms such statements by Written Addenda.

4. **ADDENDA:**
   a. **Issuance; Receipt**. The District may change this Solicitation only by Written Addenda. A Firm shall provide written acknowledgement of receipt of all issued Addenda with their submission on the Pre-Qualification Certification (ATTACHMENT A).
   b. **Notice and Distribution**. The District will publish notice of any and all Addenda on the ORPIN (Oregon Procurement Information Network) website (orpin.oregon.gov). Addenda may be downloaded off the ORPIN website. It is the Applicants responsibility to inquire about Addenda.

5. **REQUEST FOR CLARIFICATION**:
   a. **Clarification**. Prior to the deadline for submitting a written SoQ, a Applicant may request that the District clarify any provision of the solicitation document. The District's clarification to a Applicant, whether orally or in writing, does not change the solicitation and is not binding on the District unless the District amends the solicitation by Addendum.
   b. **Extension of Closing**. If the District receives a written request for clarification from a Applicant, the District may extend Closing if the District determines an extension is necessary to consider the request and issue an Addendum, if any, to the Solicitation.

6. **SUBMISSION:**
   a. **Applicant's Acknowledgement**. By submitting a SoQSoQ, the Applicant acknowledges they have read and understand the terms and conditions contained in the Solicitation and that they accept and agree to be bound by the terms and conditions of the Solicitation.

b. **Instructions.** A Applicant shall submit their SoQSoQ in accordance with Section IV.
c. **Forms.** Applicants shall submit the form(s) required under Section VI.
d. **Documents.** Applicants shall provide the District with all documents and descriptive literature requested.
e. **Facsimile**. The District will not accept facsimile SoQSoQs.
f. **Identification of SoQSoQs**.
    i. The District is not responsible for SoQSoQs submitted in any manner, format or to any delivery point other than as required in the Solicitation.
g. **Receipt of SoQSoQs**.
    i. The Applicant is responsible for ensuring that the District receives their SoQSoQ at the required delivery point prior to the closing due date and time. SoQSoQ shall be **emailed to: Contracts@beaverton.k12.or.us**
    ii. Timely received SoQSoQs will be opened, recorded and prepared for evaluation pursuant to Section III. The District will not read SoQSoQs aloud.
h. Failure to submit anSoQSoQ in accordance with the provisions of this RFQ shall be grounds to declare the Applicant non-responsive.
i. **Certification**. Applicants shall (on the Pre-Qualification Certification form enclosed – ATTACHMENT A):
    i. Identify that the Applicant is/or is not a "resident Applicant," as defined in ORS 279A.120(1);
    ii. Indicate that the Applicant will comply with Prevailing Wage Laws ORS 279C.840;
    iii. Provide certification of nondiscrimination in obtaining any required subcontractors in accordance with ORS 279A.110(4); and
    iv. Provide written acknowledgment of receipt of all Addenda.

7. MODIFICATION OR WITHDRAWAL:

a. **Modifications**. A Applicant may modify their SoQSoQ in writing prior to the Closing. A Applicant shall prepare and submit any modification to its SoQSoQ to the District in accordance with OAR 137-49-0280. Any modification shall include the Applicant's statement that the modification amends and supersedes the prior SoQSoQ. The Applicant shall email its modification and mark as follows:
    i. "SoQSoQ Modification"; and
    ii. Solicitation No.
b. **Withdrawals**.
    i. A Applicant may withdraw its SoQSoQ by Written notice submitted on the Applicants letterhead, signed by an authorized representative of the Applicant, hand delivered or mailed, and received by the District prior to the Closing. The Applicant or authorized representative of the Applicant may also withdraw its SoQSoQ in Person prior to the Closing, upon presentation of appropriate identification and satisfactory evidence of authority;
    ii. The District may release an unopened withdrawn SoQSoQ to the Applicant or its authorized representative and will confirm such release by email to the same address which originally submitted the SoQSoQ.
    iii. The Applicant shall mark the Written request to withdraw a SoQSoQ as follows:
        A. SoQSoQ Withdrawal; and
        B. Solicitation No.
c. **Documentation**. The District shall include all documents relating to the modification or

withdrawal of a SoQSoQ in the Solicitation file.

8. LATE SOQSOQS, WITHDRAWALS AND MODIFICATIONS:

Any SoQ received after the Closing date and time is late. A Applicants request for withdrawal or modification of a SoQSoQ received after Closing is late. The District shall not consider late SoQSoQs, withdrawals or modifications except as permitted in OAR 137-049-0350 or OAR 137-049-0390.

9. MISTAKES:

a. **Generally.** To protect the integrity of the competitive Procurement process and to assure fair treatment of Applicants, the District will carefully consider whether to permit waiver, correction or withdrawal of SoQSoQs for certain mistakes.

b. **District Treatment of Mistakes.** The District shall not allow a Applicant to correct or withdraw a SoQSoQ for an error in judgment. If the District discovers certain mistakes in a SoQSoQ after Opening, but before Award of the Contract, the District may take the following action:

i. The District may waive, or permit a Applicant to correct, a minor informality. A minor informality is a matter of form rather than substance that is evident on the face of the SoQSoQ, or an insignificant mistake that can be waived or corrected without prejudice to other Applicants. Examples of minor informalities include a Applicant's failure to:

A. Return the correct number of SoQSoQs or the correct number of other documents required by the Solicitation Document.

B. Sign the SoQSoQ in the designated block, provided a Signature appears elsewhere in the SoQSoQ, evidencing an intent to be bound; and

C. Acknowledge receipt of an Addendum to the Solicitation Document, provided that it is clear on the face of the SoQSoQ that the Applicant received the Addendum and intended to be bound by its terms; or the Addendum involved did not affect price, quality or delivery.

ii. The District may correct a clerical error if the error is evident on the face of the SoQSoQ or other documents submitted with the SoQSoQ, and the Applicant confirms the District's correction in Writing. A clerical error is a Applicant's error in transcribing a portion of its SoQSoQ. Examples include typographical mistakes, errors in extending unit prices, transposition errors, and math errors, instances in which the intended correct unit or amount is evident by simple arithmetic calculations. In the event of a discrepancy, unit prices shall prevail over extended prices.

iii. The District may permit a Applicant to withdraw a SoQSoQ based on one or more clerical errors in the SoQSoQ only if the Applicant shows with objective proof and by clear and convincing evidence:

A. The nature of the error;

B. That the error is not a minor informality under this subsection or an error in judgment;

C. That the error cannot be corrected or waived under subsection (ii) of this section;

D. That the Applicant acted in good faith in submitting a SoQSoQ that contained the claimed error and in claiming that the alleged error in the SoQSoQ exists;

E. That the Applicant acted without gross negligence in submitting a SoQSoQ that contained a claimed error;

F. That the Applicant will suffer substantial detriment if the District does not grant the Applicant permission to withdraw the SoQSoQ;

G. That the District's or the public's status has not changed so significantly that relief from

the forfeiture will work a substantial hardship on the District or the public it represents; and

H. That the Applicant promptly gave notice of the claimed error to the District.

c. **Rejection for Mistakes.** The District shall reject any SoQSoQ in which a mistake is evident on the face of the SoQSoQ and the intended correction to the SoQSoQ is not evident or cannot be substantiated from documents submitted with the SoQSoQ.

10. NOTICE OF PRE-QUALIFICATION:

a. **Notice**. On or about the date of Notice of Selected Pre-Qualified Bidders, the District shall issue a notice to each Applicant of their pre-qualification status.

b. **Form and Manner of Notice**. The form and manner of notice shall conform to customary practices within the District's procurement system, and may be made electronically.

c. **Finalizing Award**. The District's Award of a contract shall not be final until the Invitation to Bid for this project is awarded.

11. REJECTION OF SOQSOQS:

a. **Rejection of a SoQSoQ**.

i. The District may reject any SoQSoQ upon finding that to accept the SoQSoQ may impair the integrity of the Procurement process or that rejecting the SoQSoQ is in the public interest.

ii. The District shall reject a SoQ upon the District's finding that the SoQ:

A. Is contingent upon the District's acceptance of terms and conditions (including Specifications) that differ from the Solicitation Document;

B. Takes exception to terms and conditions (including Specifications);

C. Attempts to prevent public disclosure of matters in contravention of the terms and conditions of the Solicitation Document or in contravention of applicable law;

D. Offers Work that fails to meet the Specifications of the Solicitation Document;

E. Is late;

F. Is not in substantial compliance with the Solicitation Documents;

G. Is not in substantial compliance with all prescribed public Solicitation procedures.

iii. The District shall reject a SoQ upon the District's finding that the Applicant:

A. Has been Disqualified;

B. Has been declared ineligible under ORS 279C.860 by the Commissioner of Bureau of Labor and Industries and the Contract is for a Public Work;

C. Is listed as not qualified by the Construction Contractors Board, if the Contract is for a Public Improvement;

D. Has not met the requirements of ORS 279A.105 if required by the Solicitation Document;

E. Has failed to provide the certification required under Section 13. Paragraph c. (Certification of Non-Discrimination)

F. Is not Responsible. See OAR 137-049-0390(2) regarding District determination that the Applicant has met statutory standards of responsibility.

b. **Form of Business**. For purposes of this rule, the District may investigate any Person submitting a SoQ. The investigation may include that Person's officers, directors, owners, affiliates, or any other Person to determine application of this rule or to apply the Disqualification provisions of ORS 279C.440 to 279C.450 and OAR 137-049- 0370.

c. **Certification of Non-Discrimination**. The Applicant shall certify on the Pre-Qualification

Certification that the Applicant has not discriminated and will not discriminate against disadvantaged, minority, women, emerging small business enterprises, or service disabled veteran owned business enterprises in obtaining any required subcontracts. Failure to do so shall be grounds for disqualification.

d. **Rejection of all SoQs**. The District may reject all SoQs for good cause upon the District's Written finding it is in the public interest to do so. The District shall notify all Applicants of the rejection of all SoQs, along with the good cause justification and finding.
e. **Criteria for Rejection of All SoQs**. The District may reject all SoQs upon a Written finding that:
   i. The content of or an error in the Solicitation Document, or the Solicitation process unnecessarily restricted competition for the Contract;
   ii. The price, quality or performance presented by the Applicants is too costly or of insufficient quality to justify acceptance of the SoQs;
   iii. Misconduct, error, or ambiguous or misleading provisions in the Solicitation Document threaten the fairness and integrity of the competitive process;
   iv. Causes other than legitimate market forces threaten the integrity of the competitive Procurement process. These causes include, but are not limited to, those that tend to limit competition such as restrictions on competition, collusion, corruption, unlawful anti-competitive conduct and inadvertent or intentional errors in the Solicitation Document;
   v. The District cancels the Solicitation in accordance with OAR 137-049-0270; or
   vi. Any other circumstance indicating that awarding the Contract would not be in the public interest.

12. PROTEST OF CONTRACTOR DENIAL OF PRE-QUALIFICATION: Pursuant to OAR 137-049-0450

a. **Purpose**. An adversely affected or aggrieved Applicant shall exhaust all avenues of administrative review and relief before seeking judicial review of the District's Contractor Pre-Qualification decision.
b. **Notice of Pre-Qualification**. The District shall provide written notice, via email, to all Applicants of the status of their Pre-Qualification for the associated Invitation to Bid, and will publicly post such notice on ORPIN.
c. **Right to Protest Denial of Pre-Qualification**. Firms found not Pre-Qualified have the right to appeal the decision to deny, revoke or revise prequalification; hearing; costs; judicial review. Procedures will be provided to any firm found to be not qualified.

13. COSTS: The District is not liable for any costs incurred by the Applicant in its pre-qualification preparation.

14. BUSINESS EQUITY:

The Applicant understands that the District maintains a goal of engaging qualified disadvantaged, minority, women, emerging, service-disabled veteran businesses enterprises (D/M/W/ESB/SDVBE) as service providers in delivering services necessary to promote/provide business equity in our community. The District aspires to a goal of ten (10) percent D/M/W/ESB/SDVBE content, by contract value, in completing the work for this project, and the Contractor shall expend reasonable efforts to reach this content in the total value of their contracts with the District.

Additionally, the District will continue to partner with its contractors to provide career learning opportunities for students, providing them exposure to various potential career paths, including,

but not limited to, construction, architecture, engineering and related services, legal and accounting services through programmatic involvement with the District's Career Pathways Program and Career Related Learning Experiences.

1. GENERAL INFORMATION

This section prescribes the mandatory submission format of the Statements of Qualifications (SoQ) in response to this Solicitation. The purpose of the submission format is to ensure uniformity of the information from each Applicant and to aid in clear understanding and evaluation of the Statements of Qualifications (SoQs).

2. QUALIFICATIONS FORMAT

a. Applicants must submit an electronic copy of its Qualifications.
   i. Electronic copy shall be in a searchable PDF or Word format.
   ii. Brochures or other promotional presentations beyond that sufficient to present a complete and effective submission of Qualifications are not desired. Elaborate artwork and expensive visuals are not necessary.
b. Concise and direct answers are encouraged.
c. Failure to submit the SoQ in accordance with the provisions of the Solicitation document shall be grounds to declare the submission nonresponsive. Failure to provide any information requested in the Solicitation may result in rejection of the submission.

3. QUALIFICATION CONTENT

Applicants shall submit Qualifications, and submit all information as required, in the order listed.

a. **REQUIRED FORMS**. Applicants shall return the fully completed below listed forms. Failure to submit any of these forms or if the information is found unacceptable, the SoQ will be disqualified.
   i. Pre-Qualification Certification. The Pre-Qualification Certification (ATTACHMENT A) must be filled out and signed and accompany each SoQ. Failure to submit a signed Pre-Qualification Certification form will result in disqualification of the proposing firm.
   ii. Pre-Qualification Responsibility Form (ATTACHMENT B).

b. **DETAILED QUALIFICATION REQUIREMENTS & EVALUATION**. Every SoQ must reply to each of the following items. Responses must be in the same order listed below. Items will be evaluated by a selection committee based on strengths and weaknesses in each section. Points will be awarded per section as noted below:

   i. **Experience** (20 points): Applicant shall provide firm's past experience on at least 3 projects with similar scope and complexity. Projects should be seismic upgrades, preferably of K-12 schools. Include indication of Oregon Seismic Rehabilitation Grant Program (SRGP) experience. Address how the Applicant is capable of completing projects successfully with regards to similar schedule, quality, safety, cost and coordination with the AHJ. Example of metrics indicative of successful completion include, completing project on-time, within budget (e.g., with minimal change orders, etc.), high quality construction, worksite safety metrics (including both physical safety and safety from acts of hate, racism, sexism, discrimination, harassment, and bullying, as well as other measurable things that would add value to the District. If the Applicant has completed any similar projects with BSD identify those projects in this section.

   ii. **Understanding of Project** (20 points): Applicant shall provide a summary of understanding of the project, its goals, and its risk areas. Include sufficient information to familiarize the reviewers with the Applicant's project approach and ability to satisfy the technical and construction requirements. Identify potential sources of complexity and proposed solutions.

iii. **Quality Control Plan** (10 points): Applicant shall provide their company's quality control plan for review and provide explanation of the proposed implementation of the plan for this project. The most desirable Qualify Control Plans will include clarity, comprehensiveness, best practices in the quality field, and demonstrate measurable results relative to this project's requirements, metrics, goals, and risk areas.

iv. **Qualifications of Key Staff** (15 points): Applicants shall list the team's key staff and their qualifications, roles and responsibilities with projects of similar scope, schedule, and complexity. Clearly identify roles of key staff throughout the phases of the project and staffing requirements needed to complete the project effectively. Demonstrate how communication will occur internally, with subcontractors, with BSD and the Design Team. Provide a list of projects the proposed project team has completed as a unit. It is desired, but not required, that SoQs include staff with demonstrated qualifications/experience successfully completing projects of similar scope, schedule and complexity. It is also desired, but not required that SoQs include a staff diversity, equity, and inclusion plan with demonstrated success.. The District intends to require Key Staff in ITB 20-0011 who have been included in SoQs found to be Qualified. The District will reserve the right to approve changes to Key Staff included in Bids submitted in response to ITB 20-0011 at the time of Contract Award.

v. **Schedule Management** (25 points): Applicants shall provide a preliminary schedule showing the critical path including the Construction Schedule Milestone Dates provided in Section 1. Scoring will be the greatest to those who provide a clear understanding of the project and provide information on how to ensure the project schedule is met and project goals are achieved.

1. **EVALUATION OF QUALIFICATIONS**.

The District will form an evaluation committee, made up of not less than three members, representing the District, to evaluate and measure the merit of each Statement of Qualifications received on a points-based system. Firms that receive a "Pass" grade for both Required Forms and score 75 points or better in the Evaluation Criteria as delineated in Section IV Qualification Content Requirements will be deemed to have available the appropriate financial, material, equipment, facility and personnel resources and expertise, or can obtain the resources and expertise necessary to meet all contractual responsibilities. Eligible firms based on criteria stated above will be placed on the Pre-Qualified list to provide a bid to the District. The recommendations of this committee will be a consensus and will be final.

a. Forms (each will receive points-assigned grading)
   Pre-Qualification Certification
   Pre-Qualification Responsibility Form

b. Scoring

Pre-Qualified 75-100 points: SoQ meets RFQ requirements and offers an acceptable level of competency. The firm proposing has available the appropriate financial, material, equipment, facility and personnel resources and expertise, or has the ability to obtain the resources and expertise necessary to meet all the contractual responsibilities and will be Pre-Qualified to provide a Bid for the ITB process.

Not Pre-Qualified 0-74 points: SoQ is considered to contain insufficient qualifications. The Firm does not have available the appropriate financial, material, equipment, facility and personnel resources and expertise, or does not have the ability to obtain the resources and expertise necessary to meet all contractual responsibilities to the Owner's satisfaction. This firm will not be qualified to submit a bid for the ITB process.

ATTACHMENTS:

A	PRE-QUALIFICATION CERTIFICATION
B	PRE-QUALIFICATION RESPONSIBILITY FORM (all pages)
C	PRELIMINARY DRAWINGS/SPECIFICATIONS

PRE-QUALIFICATION CERTIFICATION

_____
(Contractor)

_____
(physical address)

_____
(city, state, zip)

1. The Contractor certifies that he or she has read and understands the Request for Qualifications, Drawings, Specifications, Addenda and all other documents pertaining to this Request for Qualifications.

2. The Contractor acknowledges that the Construction Schedule Milestones in SECTION I - INTRODUCTION includes certain specific dates and that these dates are acceptable dates unless modified by mutual agreement between Contractor and the Owner. All dates indicate 5:00 PM Pacific Time.

3. The Contractor certifies that Contractor has complied or will comply with all requirements of local, state, and national laws, and that no legal requirement has been or will be violated in making or accepting a Bid for this Project.

4. The Contractor is registered with the Construction Contractors Board, or is licensed by the State Landscape Contractors Board, or licensed under ORS 468A.720 (Air Quality), if required.
License Number_____. (The District will not receive or consider a Bid for a Public Improvement unless the Contractor is registered with the Construction Contractors Board, or is licensed by the State Landscape Contractors Board).

5. The Contractor, pursuant to ORS 279A.120 (1), (check one) is_____/is not_____ a resident Bidder. If not, indicate State of residency _____.

6. The Contractor agrees to be bound by and will comply with the provisions of Prevailing Wage Laws ORS 279C.

7. The Contractor certifies that it has not discriminated and will not discriminate, in violation of ORS 279A.110, against any minority, women or emerging small business enterprise in obtaining any required subcontract.

8. The Contractor agrees to comply with Oregon tax laws in accordance with ORS 305.385.

9. Any Bid of a contractor or subcontractor listed on BOLI's List of Ineligibles will be rejected.

10. The Contractor acknowledges receipt of the following addenda: (List by number and date appearing on the Addendum.)

Addendum #	Date Date	Addendum #	Date	Addendum#
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Respectfully submitted this _____ day of_____, 2017.

Signature: _____ Phone: _____

Name: _____ Title: _____
(print/type)

Email Address:
_____

PRE-QUALIFICATION RESPONSIBILITY FORM
(CONTRACTOR'S QUALIFICATIONS AND FINANCIAL INFORMATION)

DECLARATION AND SIGNATURES

The undersigned hereby declares that the he or she is duly authorized to complete and submit this Responsibility Form and that the statements contained herein are true and correct as of the date set forth below. Incomplete, incorrect or misleading information will be reason for a determination by the District of Disqualified.

Date:_____

By:_____
(Signature of authorized official)

Name:_____
(Please type or print)

Title:_____
(Please type or print)

For:_____
(Firm's name) (Please type or print)

CCB#:_____

Instructions

1. **The information provided in this form is part of the District's inquiry concerning responsibility. Please print clearly or type.**
2. **If you need more space, use plain paper. Submit completed form with Bid response.**
3. **Answer all questions. Submission of a form with unanswered questions, incomplete or illegible answers may result in a finding of Disqualified.**

CURRENT CONTRACTS IN FORCE

ITEM	CONTRACT 1		CONTRACT 2	
A. Work Location				
B. Scope of Work;				
Check box:	☐ New Construction	☐ Re-Construction	☐ New Construction	☐Re-Construction
C. Contract Amount	$		$	
D. Change Order Amount	$		$	
E. % Completed	%		%	
F. Est. Completion Date				
G. Owner's Name				
H. Owner Contact				
I. Telephone	( )		( )	
J. E-Mail Address				
ITEM	**CONTRACT 3**		**CONTRACT 4**	
A. Work Location				
B. Scope of Work;				
Check box:	☐ New Construction	☐ Re-Construction	☐ New Construction	☐ Re-Construction
C. Contract Amount	$		$	
D. Change Order Amount	$		$	
E. % Completed	%		%	
F. Est. Completion Date				
G. Owner's Name				
H. Owner Contact				
I. Telephone	( )		( )	
J. E-Mail Address				

LARGEST SIMILAR JOBS YOU HAVE COMPLETED IN THE LAST FIVE YEARS AS THE PRIME CONTRACTOR

ITEM	CONTRACT 1		CONTRACT 2	
A. Work Location				
B. Scope of Work;				
Check box:	☐ New Construction	☐ Re-Construction	☐ New Construction	☐ Re-Construction
C. Contract Amount	$		$	
D. Change Order Amount	$		$	
E. % Completed	%		%	
F. Completion Date				
G. Owner's Name				
H. Owner Contact				
I. Telephone	( )		( )	
J. E-Mail Address				

LIST COMPANIES FROM WHOM YOU OBTAIN SURETY BONDS

ITEM	SURETY COMPANY 1	SURETY COMPANY 2
A. Company Name		
B. Contact's Name		
C. Telephone	( )	( )
D. Fax	( )	( )
E. E-Mail Address		
PRESENT AMOUNT OF BONDING COVERAGE ($):	HAS YOUR APPLICATION FOR SURETY BOND EVER BEEN DECLINED *(If Yes, please provide detailed information in Remarks)* ☐ YES ☐ NO	DURING THE PAST 2 YEARS, HAVE YOU BEEN CHARGED WITH A FAILURE TO MEET THE CLAIMS OF YOUR SUBCONTRACTORS OR SUPPLIERS *(If Yes, please provide detailed information in Remarks)* ☐ YES ☐ NO

RELIABILITY

Has your company ever been declared in breach of any contract for unperformed or defective work? ☐ Yes. ☐ No.

If "yes", explain.

_____

_____

_____

Has any employee or agent of your company ever been convicted of a criminal offense arising out of obtaining, attempting to obtain, or performing a public or private contract or subcontract? ☐ Yes. ☐ No.

If "yes," explain.

_____

_____

_____

Has any employee or agent of your company been convicted under state or federal law of embezzlement, theft, forgery, bribery, falsification or destruction of records, receiving stolen property or any other offense indicating a lack of business integrity or business honesty? ☐ Yes. ☐ No.

If "yes," explain.

_____

_____

_____

Has your company or any employee or agent of your company been convicted under state or federal antitrust laws? ☐ Yes. ☐ No.

If "yes," explain.

_____

_____

_____

Has any Officer or Partner of your organization ever been an Officer or Partner of another Organization that failed to complete a construction contract? ☐ Yes. ☐ No.

If "yes," explain.

_____

_____

_____

FINANCIAL RESOURCES

Indicate the Contractors total bonding capacity amount: $_____

_____.

What portion of this amount remains available at time of completion of this form? $_____

_____.

Has your firm ever been at any time in the last ten years the debtor in a bankruptcy case? ☐ Yes.
☐ No.

If "yes," explain.

_____

_____

Does your firm have any outstanding judgments pending against it? ☐ Yes. ☐ No.

If "yes," explain.

_____

_____

In the past ten years, has your firm been a party to litigation, arbitration or mediation where the amount in dispute exceeded $10,000? ☐ Yes. ☐ No.

If "yes," explain.

(Include court, case number and party names.) _____

_____

_____

In the past ten years, has your firm been a party to litigation, arbitration or mediation on a matter related to payment to subcontractors or work performance on a contract? Check "yes" even if the matter proceeded to arbitration or mediation without court litigation. ☐ Yes. ☐ No.

If "yes," explain. (Include court, case number and party names.)

_____

_____

Have you or any of your affiliates discontinued business operation with outstanding debts? ☐ Yes.
☐ No.

If “yes,” explain.

_____

_____

KEY PERSONNEL

List the principal individuals of your company, their current job title, the total years of experience they have in the construction industry and their current primary responsibility for your company. Corporations list current officers and those who own 5% or more of the corporation's stock. Limited liability companies list members who own 5% or more of company. Partnerships list all partners. Joint ventures list each firm that is a member of the joint venture and the percentage of ownership the firm has in the joint venture.

ITEM	Principal Individual
A. Name	
B. Position	
C. Years in Construction	
D. Current Primary Responsibility	
ITEM	**Principal Individual**
A. Name	
B. Position	
C. Years in Construction	
D. Current Primary Responsibility	
ITEM	**Principal Individual**
A. Name	
B. Position	
C. Years in Construction	
D. Current Primary Responsibility	
ITEM	**Principal Individual**
A. Name	
B. Position	
C. Years in Construction	
D. Current Primary Responsibility	

List the individuals who will be in the following roles if your company is awarded this Contract:

ITEM	Contractor's Representative	Project Manger	Project Superintendent
A. Name			
B. Position			
C. Years in Position	N/A		
D. Largest Project Supervised	N/A	$	$

E. Largest number of employees ever supervised	N/A		

REFERENCE FORM

REFERENCE FORM FOR _____
(Insert Name of Contractor)

Provide five (3) references and use a separate copy of this form for each reference.

Date(s) Work Performed: _____

_____

_____

Name(s) of Project(s):

_____

_____

_____

Value of Project(s): $_____

Name of Company: _____

Address: _____

_____

Contact Name: _____

Telephone: _____

Email: _____

Method: Subjective Evaluation

Each reference may be checked for, but not limited to, adherence to contract terms and conditions, timelines, quality standards, overall customer service, project being of similar size, scope and complexity.

This page is Intentionally left blank. The contents of Attachment C begin on the following page.

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 00 01 01 - PROJECT TITLE PAGE

SECTION 00 01 03 - PROJECT TEAM

SECTION 00 01 07 - SEALS PAGE

SECTION 00 01 10 - TABLE OF CONTENTS

10 11 00 - Visual Display Units

10 26 00 - Wall and Door Protection

DIVISION 11 -- EQUIPMENT

None

DIVISION 12 -- FURNISHINGS

None

DIVISION 13 -- SPECIAL CONSTRUCTION

None

DIVISION 14 -- CONVEYING EQUIPMENT

None

DIVISION 21 -- FIRE SUPPRESSION

21 05 48 - Vibration and Seismic Controls for Fire Suppression Piping and Equipment

DIVISION 22 -- PLUMBING

22 05 17 - Sleeves and Sleeve Seals for Plumbing Piping

22 05 29 - Hangers and Supports for Plumbing Piping and Equipment

22 05 48 - Vibration and Seismic Controls for Plumbing Piping and Equipment

22 07 19 - Plumbing Piping Insulation

22 10 05 - Plumbing Piping

22 40 00 - Plumbing Fixtures

DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

23 05 17 - Sleeves and Sleeve Seals for HVAC Piping

23 05 29 - Hangers and Supports for HVAC Piping and Equipment

23 05 48 - Vibration and Seismic Controls for HVAC

23 07 13 - Duct Insulation

23 07 19 - HVAC Piping Insulation

23 11 23 - Facility Natural-Gas Piping

23 31 00 - HVAC Ducts and Casings

23 33 00 - Air Duct Accessories

23 37 00 - Air Outlets and Inlets

DIVISION 25 -- INTEGRATED AUTOMATION

None

DIVISION 26 -- ELECTRICAL

26 05 05 - Selective Demolition for Electrical

26 05 19 - Low-Voltage Electrical Power Conductors and Cables

26 05 26 - Grounding and Bonding for Electrical Systems

26 05 29 - Hangers and Supports for Electrical Systems

26 05 33.13 - Conduit for Electrical Systems

26 05 33.16 - Boxes for Electrical Systems

26 05 33.23 - Surface Raceways for Electrical Systems

26 05 48 - Vibration and Seismic Controls for Electrical Systems

26 05 53 - Identification for Electrical Systems

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

GENERAL REQUIREMENTS

A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:

Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.

Limit each request to a single proposed substitution item.

RESOLUTION

ACCEPTANCE

SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS

ELECTRONIC DOCUMENT SUBMITTAL SERVICE

All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.

Subcontractors, suppliers, and Architect's consultants are to be permitted to use the service at no extra charge.

Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.

Cost: The cost of the service is to be paid by Contractor; include the cost of the service in the Contract Sum.

REQUESTS FOR INFORMATION (RFI)

Definition: A request seeking one of the following:

An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.

A resolution to an issue which has arisen due to field conditions and affects design intent.

Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.

Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.

Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.

Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.

Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.

Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.

Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead

to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.

Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.

Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.

Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

SUBMITTAL SCHEDULE

Submit to Architect for review a schedule for submittals in tabular format.

SUBMITTALS FOR REVIEW

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

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

After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

SUBMITTALS FOR INFORMATION

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

SUBMITTALS FOR PROJECT CLOSEOUT

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

NUMBER OF COPIES OF SUBMITTALS

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.

Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.

After review, produce duplicates.

Retained samples will not be returned to Contractor unless specifically so stated.

SUBMITTAL PROCEDURES

General Requirements:

Use a single transmittal for related items.

Transmit using approved form.

Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.

Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.

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.

Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.

Provide space for Contractor and Architect review stamps.

When revised for resubmission, identify all changes made since previous submission.

Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.

SECTION 01 40 00 - QUALITY REQUIREMENTS

SECTION 01 60 00 - PRODUCT REQUIREMENTS

NEW PRODUCTS

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

PRODUCT OPTIONS

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

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.

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

SECTION 01 78 00 - CLOSEOUT SUBMITTALS

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

DIVISION 02 - EXISTING CONDITIONS

SECTION 02 41 00 - DEMOLITION

MATERIALS

Fill Material: As specified in Section 31 23 23 - Fill.

GENERAL PROCEDURES AND PROJECT CONDITIONS

Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.

Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

SECTION 03-1000
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 RELATED REQUIREMENTS

A. Section 01 3300 - Delegated Design.

B. Section 03-2000 - Concrete Reinforcing.

C. Section 03-3000 - Cast-in-Place Concrete.

D. Section 03-3800 - Post-Tensioned Concrete.

E. Section 04-2001 - Masonry Veneer: Spacing for veneer anchor reglets recessed in concrete.

F. Section 05-1200 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.

1.03 REFERENCE STANDARDS

A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).

B. ACI 301 - Specifications for Structural Concrete 2016.

C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).

D. ACI 347R - Guide to Formwork for Concrete 2014, with Errata (2017).

E. ASME A17.1 - Safety Code for elevators and escalators 2016.

F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.

G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on void form materials and installation requirements.

C. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

D. Designer's Qualification Statement.

E. Design Data: As required by authorities having jurisdiction.

F. Delegated Design Data: As required by authorities having jurisdiction and Section 01 3300 - Delegated Design Requirements.

1.05 QUALITY ASSURANCE

A. Designer Qualifications: Design formwork under direct supervision of a Professional Structural Engineer experienced in design of concrete formwork and licensed in Oregon.

B. Maintain one copy of each installation standard on site throughout the duration of concrete work.

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 347R, ACI 301 and ACI 318.

F. Comply with Highways standards of the State of Oregon.

2.02 WOOD FORM MATERIALS

A. Form Materials: At the discretion of the CM/GC.

2.03 REMOVABLE PREFABRICATED FORMS

A. Preformed Steel Forms: Minimum 16 gage, 0.0598 inch thick, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

B. Preformed Aluminum Forms: ASTM B221 (ASTM B221M), 6061-T6 alloy, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

C. Preformed Plastic Forms: Thermoplastic polystyrene form liner, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

D. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

E. Pan Type: Glass fiber, of size and profile indicated.

F. Void Forms: Moisture resistant treated paper faces, biodegradable, structurally sufficient to support weight of wet concrete mix until initial set; 2 inches thick.

2.04 FORMWORK ACCESSORIES

A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, 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.

1. Composition: Colorless reactive, mineral oil-based, soy-based or vegetable-oil based compound.
2. Do not use materials containing diesel oil or petroleum-based compounds.
3. VOC Content: None; water-based.

C. Filler Strips for Chamfered Corners: Rigid plastic type; x 3/4 x 3/4 inch size; maximum possible lengths.

D. Dovetail Anchor Slot: Galvanized steel, at least 22 gage, 0.0299 inch thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

E. Flashing Reglets: Galvanized steel, at least 22 gage, 0.0299 inch thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

G. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05-1200.

H. Waterstops: Rubber, minimum 1,750 psi tensile strength, minimum 50 degrees F to plus 175 degrees F working temperature range, 4 inch wide, maximum possible lengths, ribbed profile, preformed corner sections, heat welded jointing.

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. Earth forms are not permitted.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 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.

F. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.

G. Coordinate this section with other sections of work that require attachment of components to formwork.

H. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

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.

D. Position recessed anchor slots for brick veneer masonry anchors to spacing and intervals specified in Section 04-2001.

E. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

F. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement. Heat seal joints so they are watertight.

G. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

H. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean and protect permanent insulated concrete foam panel formwork per manufacturer's recommendations.

C. Clean formed cavities of debris prior to placing concrete.

1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

B. Construct permanent insulated foam panel formwork to maintain tolerances required by ACI 301.

C. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.

D. Camber slabs and beams in accordance with ACI 301.

3.08 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01-4000 - Quality Requirements.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

3.09 **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.

C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

SECTION 03-2000
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. See Structural Drawings for additional specification information.

B. Section 03-1000 - Concrete Forming and Accessories.

C. Section 03-3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete 2016.

B. ACI SP-66 - ACI Detailing Manual 2004.

C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2018.

D. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement 2016.

E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.

F. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel 2018.

G. CRSI (DA4) - Manual of Standard Practice 2009.

1.04 SUBMITTALS

A. See Section 01-3000 - 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.

C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301.

B. Welders' Certificates: Submit certifications for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

1. Deformed billet-steel bars.

B. Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars.

1. Unfinished.

C. Stirrup Steel: ASTM A1064/A1064M steel wire, unfinished.

D.

E. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.02 **RE-BAR SPLICING:**

A. Coupler Systems: Mechanical devices for splicing reinforcing bars; capable of developing full steel reinforcing design strength in tension and compression.

B. Dowel Bar Splicer with Dowel-Ins: Mechanical devices for connecting dowels; capable of developing full steel reinforcing design strength in tension and compression.

2.03 **FABRICATION**

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

B. Welding of reinforcement is permitted only with the specific approval of Architect. Perform welding in accordance with AWS D1.4/D1.4M.

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.

1. All reinforcing bars to be supported on chairs, dobies, or other approved support. "Hooking" and lifting of a reinforcing mat after placement is prohibited.

2. Do not bend or straighten reinforcing in any manner that will injure the material.

3. Install splices for reinforcing bars in accordance with drawings and ACI 3018. Stagger splices in adjacent bars 5'-0".

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 26-0526.

3.02 **FIELD QUALITY CONTROL**

A. An independent testing agency, as specified in Section 01-4000 - Quality Requirements, will inspect installed reinforcement for compliance with contract documents before concrete placement.

END OF SECTION

SECTION 03-3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete building frame members.

B. Elevated concrete slabs.

C. Floors and slabs on grade.

D. Concrete shear walls and foundation walls.

E. Joint devices associated with concrete work.

F. Miscellaneous concrete elements, including equipment pads, equipment pits, light pole bases, thrust blocks and manholes.

G. Concrete curing.

1.02 RELATED REQUIREMENTS

A. See Specifications on Structural Drawings.

B. Section 01 4000 - Quality Requirements: Testing and Inspections.

C. Section 03-1000 - Concrete Forming and Accessories: Forms and accessories for formwork.

D. Section 03-2000 - Concrete Reinforcing.

E. Section 03-3511 - Concrete Floor Finishes: Densifiers, hardeners, applied coatings, and polishing.

F. Section 07-9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

G. Section 09 9123 - Interior Painting:Sealer.

1.03 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).

B. ACI 301 - Specifications for Structural Concrete 2016.

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 2010.

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 and Commentary 2014 (Errata 2018).

I. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2012.

J. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.

K. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2018.

L. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2019a.

M. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens) 2016a.

N. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2015a.

O. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete 2016.

P. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2016.

Q. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete 2010a (Reapproved 2016).

R. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2017.

S. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2019.

T. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete 2015.

U. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete 2013.

V. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2017.

W. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures 2015.

X. ASTM D471 - Standard Test Method for Rubber Property--Effect of Liquids 2016a.

Y. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.

Z. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs 2018a.

AA. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs 2017.

BB. NSF 61 - Drinking Water System Components - Health Effects 2019.

CC. NSF 372 - Drinking Water System Components - Lead Content 2016.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.

2. For chemical-resistant waterstops, provide data on ASTM D471 test results.

C. Mix Design: Submit proposed concrete mix design for each element type listed in the Structural General Notes. Provide back-up data indicating that the submitted mixes have a history of achieving the specified strength and shrinkage characteristics (at exposed slabs).

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.

D. Samples: Submit samples of underslab vapor retarder to be used.

E. Samples: Submit two, 12 inch long samples of waterstops and construction joint devices.

F. Test Reports: Submit report for each test or series of tests specified.

G. Test Reports: Submit termite-resistant sheet manufacturer's summary of independent laboratory and field testing for effectiveness in subterranean termite exclusion.

H. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

I. Sustainable Design Submittal: If any fly ash, ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix designs to replace Portland cement, submit the total volume of concrete cast in place, mix design(s) used showing the quantity of portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used.

J. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

K. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 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.

D. For slabs required to include moisture vapor reduction admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for every day of placement.

1.06 MOCK-UP

A. If requested by Architect, cast concrete against mock-up panel. Obtain acceptance of resulting surface finish prior to erecting formwork.

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.

1.07 WARRANTY

A. See Section 01-7800 - Closeout Submittals, for additional warranty requirements.

1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.

2. Provide warranty by manufacturer of MVRA matching terms of flooring adhesive or primer manufacturer's material defect warranty.

B. Moisture Emission Reducing Curing and Sealing Compound: Provide warranty to cost of flooring delamination failures for 10 years.

1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03-1000.

2.02 REINFORCEMENT MATERIALS

A. Comply with requirements of Section 03-2000.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.

1. Acquire cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33/C33M.

C. Fly Ash: ASTM C618, Class C or F.

D. Calcined Pozzolan: ASTM C618, Class N.

E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.

F. 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. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

G. Accelerating Admixture: ASTM C494/C494M Type C.

H. Retarding Admixture: ASTM C494/C494M Type B.

I. Water Reducing Admixture: ASTM C494/C494M Type A.

J. Shrinkage Reducing Admixture:

1. ASTM C494/C494M, Type S.

K. Moisture Vapor Reduction Admixture (MVRA): Liquid, inorganic admixture free of volatile organic compounds (VOCs) and formulated to close capillary systems formed during curing to reduce moisture vapor emission and transmission with no adverse effect on concrete properties or finish flooring.

1. Provide admixture in slabs to receive adhesively applied flooring.

2.05 ACCESSORY MATERIALS

A. Underslab Vapor Retarder: Sheet material complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.

1. Installation: Comply with ASTM E1643.
2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
3. Manufacturers:
   a. Fortifiber Building Systems Group ; Moistop Ultra 10.
   b. Substitutions: See Section 01-6000 - Product Requirements.

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. Minimum Compressive Strength at 48 Hours, ASTM C109/C109M: 2,000 pounds per square inch.
3. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 7,000 pounds per square inch.

2.06 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.

B. Epoxy Bonding System:

1. Complying with ASTM C881/C881M and of Type required for specific application.

C. Waterstops: Bentonite and butyl rubber, complying with NSF 61 and NSF 372.

1. Configuration: As indicated on drawings.
2. Size: As indicated on drawings.

D. 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.

E. Slab Contraction Joint Device: Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.

F. 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.

1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
2. Height: To suit slab thickness.

2.07 CURING MATERIALS

A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining 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.

D. Water: Potable, not detrimental to concrete.

2.08 **CONCRETE MIX DESIGN**

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.

B. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

C. Normal Weight Concrete:

1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: See Structural General Notes.
2. Fly Ash or Slag Content: Maximum 30 percent of cementitious materials by weight.
3. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.
4. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.
5. Cement Content: As required to achieve specified strength.
6. Water-Cement Ratio: Maximum 40 percent by weight.
7. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
8. Maximum Slump: 4 inches (without add mixtures).
9. Maximum Aggregate Size: See Structural General Notes

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. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.

1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
2. Use latex bonding agent only for non-load-bearing applications.

D. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

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, waterstops, embedded parts and formed construction joint devices will not be disturbed during concrete placement.

F. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

G. 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.

1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.

D. Load Transfer Construction and Contraction Joints: Install load transfer devices as indicated; saw cut joint at surface as indicated for contraction joints.

E. 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.

F. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

3.05 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. Maximum Variation of Surface Flatness:

1. Exposed Concrete Floors: 1/4 inch in 10 feet.
2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet.
3. Under Carpeting: 1/4 inch in 10 feet.

B. Correct the slab surface if tolerances are less than specified.

C. 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, including tie holes, 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.

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 and seamless flooring.

2. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

F. Concrete Polishing: See Section 03-3511.

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.

a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.

b. Spraying: Spray water over floor slab areas and maintain wet.

c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.

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.

b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.08 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01-4000 - Quality Requirements.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

E. 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.

F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

H. Slab Testing: Cooperate with manufacturer of specified moisture vapor reduction admixture (MVRA) to allow access for sampling and testing concrete for compliance with warranty requirements.

3.09 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and CM/GC 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 CM/GC 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 05 12 00 - STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural steel framing members, wide flanges, channels, angles, tubes, pipes, plates and their connections..

B. Structural steel support members, suspension cables, sag rods, and struts.

C. Base plates, shear stud connectors and expansion joint plates.

D. Grouting under base plates.

1.02 RELATED REQUIREMENTS

A. Section 05 12 13 - Architecturally-Exposed Structural Steel Framing: Additional requirements for structural steel members designated as architecturally-exposed structural steel (AESS).

B. Section 05 12 13 Architecturally Exposed Structural Steel Framing

C. Section 05 21 00 - Steel Joist Framing.

D. Section 05 31 00 - Steel Decking: Support framing for small openings in deck.

E. Section 05 50 00 - Metal Fabrications: Steel fabrications affecting structural steel work.

F. Section 07 81 00 - Applied Fireproofing: Fireproof protection to framing and metal deck systems.

G. Section 31 31 16 - Termite Control: Field-applied termiticide and mildewcide for structural steel.

1.03 PRICE AND PAYMENT PROCEDURES

A. See Section 01 22 00 - Unit Prices, for additional unit price requirements.

B. Structural Steel Framing:
   1. Basis of Measurement: By the ton.
   2. Basis of Payment: Includes structural members fabricated, placed and anchored.

1.04 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; 2011.

B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.

C. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; 2010.

D. ASTM A1 - Standard Specification for Carbon Steel Tee Rails; 2000 (Reapproved 2010).

E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

G. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2013.

H. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

I. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

J. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel; 2004 (Reapproved 2009).

K. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.

L. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.

M. ASTM A449 - Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use; 2010.

N. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength; 2014a.

O. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.

P. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.

Q. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding; 2014.

R. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2014.

S. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2007a (Reapproved 2014).

T. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts [Metric]; 2007.

U. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2015.

V. ASTM A588/A588M - Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi (345 MPa) Minimum Yield Point, with Atmospheric Corrosion Resistance; 2015.

W. ASTM A759 - Standard Specification for Carbon Steel Crane Rails; 2010.

X. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).

Y. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.

Z. 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; 2014.

AA. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014.

AB. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures; 2010.

AC. ASTM E94 - Standard Guide for Radiographic Examination; 2004 (Reapproved 2010).

AD. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2013.

AE. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2012.

AF. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2014.

AG. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.

AH. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2016.

AI. ASTM F959/F959M - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric Series; 2017a.

AJ. ASTM F436 - Standard Specification for Hardened Steel Washers; 2011.

AK. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners; 2013.

AL. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2007a.

AM. ASTM F1852 - Standard Specification for "Twist Off" Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2011.

AN. ASTM F2280 - Standard Specification for “Twist Off” Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 150 ksi Minimum Tensile Strength; 2012.

AO. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

AP. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

AQ. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; International Accreditation Service, Inc; 2011.

AR. ITS (DIR) - Directory of Listed Products; current edition.

AS. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2009.

AT. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

AU. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

AV. SSPC-SP 1 - Solvent Cleaning; 2015.

AW. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

AX. SSPC-SP 3 - Power Tool Cleaning; 1982 (Ed. 2004).

AY. SSPC-SP 5 - White Metal Blast Cleaning; 2007.

AZ. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

BA. SSPC-SP 7 - Brush-Off Blast Cleaning; 2007.

BB. SSPC-SP 10 - Near-White Blast Cleaning; 2007.

BC. SSPC-SP 11 - Power Tool Cleaning to Bare Metal; 2012 (Ed. 2013).

BD. SSPC-SP 13 - Surface Preparation of Concrete; (Reaffirmed 2015); 2003.

BE. UL (FRD) - Fire Resistance Directory; current edition.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
   2. Connections not detailed.
   3. Indicate cambers.
   4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
   5. ASTM material designation for members and their connectors.
   6. Indicate components designated as Architecturally Exposed Structural Steel (AESS) on the Architectural drawings. Coordinate with Section 05 12 13.

C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

D. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

F. Designer's Qualification Statement.

G. Fabricator's Qualification Statement.

H. Design-build steel elements: submit structural drawings and calculations for the design-build steel elements. The design shall conform to the current edition of the Oregon Structural Specialty Code and project specific requirements noted on the structural and architectural drawings. The drawings and calculations shall be wet signed and stamped by a professional engineer licensed in the state of Oregon. The drawings and calculations shall be reviewed for general conformance with the stated design criteria not numerical accuracy or correctness. The drawings and calculations shall be concurrently submitted to the permitting authority for the purpose of obtaining a building permit.

I. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172 or provide shop inspection per IBC/OSSC requirements.

J. Provide quality assurance plan in accordance with Appendix Q of AISC 341

K. LEED Documentation: Submit product data and certification stating products meet LEED requirements referenced in Division 1 Section “Sustainable Design Requirements.”
   1. Materials & Resources Credit – Building Product Disclosure and Optimization - Environmental Product Declaration (EPD)
   2. Materials & Resources Credit – Building Product Disclosure and Optimization – Sourcing of Raw Materials
   3. Materials & Resources Credit – Building Product Disclosure and Optimization - Health Product Declaration (HPD) [Add. No. 2]

1.06 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."

B. Comply with Section 10 of AISC S303 "Code of Standard Practice for Steel Buildings and Bridges" and Section 05 12 13 for architecturally exposed structural steel.

C. Maintain one copy of each document on site.

D. Fabricator: Company specializing in performing the work of this section with minimum 10 years of documented experience.

E. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172 or provide shop inspection per IBC/OSSC requirements.

F. Erector: Company specializing in performing the work of this section with minimum 10 years of documented experience.

G. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Oregon.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Comply with UL (FRD) Assembly Design as shown on the drawings

2.02 MATERIALS

A. Steel Angles and Channels: ASTM A36/A36M

B. Steel W Shapes and Tees: ASTM A992/A992M.

C. Rolled Steel Structural Shapes: ASTM A992/A992M.

D. Steel Shapes, Plates, and Bars: ASTM A242/A242M high-strength, corrosion-resistant structural steel.

E. Steel Shapes, Plates, and Bars: ASTM A529/A529M high-strength, carbon-manganese structural steel, Grade 50.

F. Steel Plates: ASTM A572/A572M, Grade 50 (345) high-strength, columbium-vanadium steel. All gusset plates and collector connection plates.

G. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.

H. Hot-Formed Structural Tubing: ASTM A501/A501M, seamless or welded.

J. Steel Plate: ASTM A514/A514M.

K. Steel Sheet: ASTM A1011/A1011M, Designation SS, Grade 30 hot-rolled, or ASTM A1008/A1008M, Designation SS, Grade 30 cold-rolled.

L. Pipe: ASTM A53/A53M, Grade B, Finish black.

M. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.

N. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A with Weldability Supplement S1 and galvanized in compliance with ASTM A153/A153M, Class C.

O. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.

P. High-Strength Structural Bolts: ASTM A490 or ASTM A490M; Type 1 alloy steel, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436 washers.

Q. Tension Control Bolts: Twist-off type; ASTM F3125/F3125M.

R. Unheaded Anchor Rods: ASTM F1554, Grade 55, plain with Weladability Supplement S1, with matching ASTM A563 or ASTM A563M nuts and ASTM F436 Type 1 washers.

S. Headed Anchor Rods: ASTM F1554, Grade 55, plain with Weldability Supplement S1.

T. Load Indicator Washers: Provide washers complying with ASTM F959/F959M at connections requiring high-strength bolts.

U. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

V. Sliding Bearing Plates: Teflon coated.

AA. 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 according to ASTM C827/C827M:
      a. Maximum: Plus 4 percent.
      b. Minimum: Plus 1 percent.

AB. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C1107/C1107M and capable of developing a minimum compressive strength of 6000 psi at 28 days. Provide EUCO-NS or EUCO HI-FLOW manufactured by Euclid Chemical Company.

AC. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

AD. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

AE. Thermal Break Plate: Fiberglass-reinforced laminate composite thermal break plate
   1. Basis-of-Design Product: FRR by Armatherm; www.armatherm.com
   2. Other Approved Manufacturer: Fabreeka-TIM by Fabreeka International, Inc.; www.fabreeka.com
   3. Load Requirements: Refer to Structural Drawings.
   4. Performance Requirements:
      a. Tensile Strength: ASTM D638, 11,000 psi.
      b. Flexural Strength: ASTM D790, 25,000 psi.
      c. Compressive Strength: ASTM D695, 38,900 psi.
      d. Thermal Conductivity: ASTM C177 1.8 BTU/Hr/ft2/in/°F.

2.03 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Space shear stud connectors as specified on plan.

C. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

D. Fabricate connections for bolt, nut, and washer connectors.

E. All work shall be performed in accordance with the latest AISC 'Specifications' for design, fabrication, and erection of structural steel for buildings.

F. Welding shall conform with the latest edition of the A.N.S.I./A.W.S. D1.1 structural welding code. Use E70XX electrodes.

G. Develop required camber for members.

2.04 FINISH

A. Coordinate with Section 05 12 13 for Architecturally Exposed Structural Steel Framing (AESS). The following sub-sections indicate minimum finish requirements, unless otherwise noted.

B. Prepare structural component surfaces in accordance with SSPC-SP 3.

C. Paint steel (except galvanized steel and portions to be encased in concrete) with one coat of primer standard tnemec P10-99 or equivalent subject to engineer's approval. Alternates will be considered upon request and submission of the manufacturer's specifications. Do not paint surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.

D. All structural steel members exposed to weather or called out as hot dip galvanized (HDG) on plan or structural steel members located in exterior environments shall be HDF in accordance with ASTM A 123. Any member that has its HDF coating damaged or removed during transport or erection shall have its coating repaired using ZRC Galvilite repair compound or equal. Repair galvanizing after welding in accordance with ASTM A780.

E. All bolts for exterior use shall be zinc-coated by the bolt manufacturer by either the hot-dip process in accordance with ASTM A153, class C or the mechanical deposit process in accordance with the ASTM B695, class 50.

F. Leave structural steel members un-primed.

G. Galvanize structural steel members to comply with ASTM A123/A123M. Provide minimum 1.7 oz/sq ft galvanized coating.

H. Steel scheduled to receive "high performance paint," shall be primed with Carboline "859," Tnemec "90-97" or PPG “Amercoat 68 HS " at 3 mils dry film thickness after being surface prepared in accordance with SSPC SP-6.”

2.05 SOURCE QUALITY CONTROL

A. Provide shop testing and analysis of structural steel per IBC and OSSC requirements.

B. High-Strength Bolts: Provide testing and verification of shop-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts", testing at bolts at each connection per IBC requirements.

C. Welded Connections: Visually inspect all shop-welded connections and test at least 10 percent of welds using one of the following:
   1. Radiographic testing performed in accordance with ASTM E94.
   2. Ultrasonic testing performed in accordance with ASTM E164.
   3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
   4. Magnetic particle inspection performed in accordance with ASTM E709.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

A. Erect structural steel in compliance with AISC 303.

B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Field weld components and shear studs indicated on shop drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".

E. Do not field cut or alter structural members without approval of Structural Engineer.

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

H. Locate and install all anchor bolts, epoxy anchors, and mechanical anchors before fabricating steel connection elements.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.

B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts", testing at bolts per IBC requiements.

C. Welded Connections: Visually inspect all field-welded connections and test at least 100 percent of welds using one of the following:
   1. Radiographic testing performed in accordance with ASTM E94.
   2. Ultrasonic testing performed in accordance with ASTM E164.
   3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
   4. Magnetic particle inspection performed in accordance with ASTM E709.

D. Galvanized Steel:
   1. Any member that has had its hot dip galvanized coating damaged or removed during transport or erection shall have its coating repaired using ZRG galvilite repair compound or equal.
   2. Repair galvanizing after welding in accordance with ASTM A780
   3. Steel encased in concrete shall be clean of grease, paint, and other contaminants

END OF SECTION

SECTION 05-5000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items.

B. Downspout boots.

1.02 RELATED REQUIREMENTS

A. Section 03-3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 04-2001 - Masonry Veneer: Placement of metal fabrications in masonry.

1.03 REFERENCE STANDARDS

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements 2018.

B. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling; 2014.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.

D. ASTM A48/A48M - Standard Specification for Gray Iron Castings 2003 (Reapproved 2016).

E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2018.

F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.

G. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2018.

H. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2014.

I. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2019a.

J. ASTM A780/A780M-09 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

K. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

L. 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 2017.

M. ASTM D6386 - Practice for Preparation of Zinc (Hot-Dip Galvanized) Coating Iron and Steel Product and Hardware Surfaces for Painting.

N. ASTM D7803 - Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating.

O. 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 2019.

P. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2012.

Q. AWS D1.1/D1.1M - Structural Welding Code - Steel 2015 (with March 2016 Errata).

R. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; International Accreditation Service, Inc. 2017.

S. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 1999 (Ed. 2004).

T. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic") 2002 (Ed. 2004).

U. SSPC-SP 2 - Hand Tool Cleaning 2018.

1.04 **SUBMITTALS**

A. See Section 01-3000 - 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' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

D. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.05 **QUALITY ASSURANCE**

A. Design elements that are not fully detailed to meet AHJ requirements, under direct supervision of a Professional Engineer experienced in design of this Work and licensed in Oregon.

B. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 PRODUCTS

2.01 **MATERIALS - STEEL**

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Steel Plates: ASTM A6/A6M or ASTM A283/A283M.

D. Plates: ASTM A283/A283M.

E. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

F. Stainless Steel: ASTM A276/A276M.

G. Slotted Channel Framing: ASTM A653/A653M, Grade 33.

H. Slotted Channel Fittings: ASTM A1011/A1011M.

I. Fasteners: If not otherwise specified, then as required for each application.

J. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.

K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

L. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

M. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

N. Anchors: As required to suit and complete application.

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. Continuously seal joined members by intermittent welds and plastic filler.

D. 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.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply 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 **MISCELLANEOUS FABRICATED ITEMS**

A. Miscellaneous architectural and structural components as identified in drawings.

B. Elevator Pit Ladder: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; galvanized finish.

1. For elevator pit ladder comply with ASME A17.1 and ASHA 437 1910 27.

C. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; galvanized and field painted finish.

D. Ledge Angles, Shelf Angles, Channels, Plates and HSS tubes, and other shapes for support of brick and other ancillary construction; galvanized finish for items not within heated space.

1. Exposed portions of these components to be field painted (such as exposed angle at masonry veneer window heads).

E. Attachment blades for the support of balconies, sunshades, and other fabrications.

1. Galvanized.

2. Field paint portions that are visible prior to attaching primary fabrication.

F. Door Frames for Overhead Door Openings: Channel and Angle sections; galvanized finish.

1. Field Painted.

G. Elevator Hoistway Divider Beams: Beam sections; prime paint finish.

H. Elevator Grates at elevator pit sumps.

1. W-19-4 with 1-1/2 inch x 3/16 inch bearing bars.

2. Finish: galvanized.

I. Garage doors crash bar mounting bracket. Coordinate embeds.

1. Crash bar PVC suspended from chain with height and color warning sign.

J. Countertop support brackets and plates: steel plate.

2.04 **ARCHITECTURAL FABRICATED ITEMS**

A. Miscellaneous architectural components as identified in Drawings.

1. Exterior Fabricated Items Paint System: See Section 09-9113 Exterior Painting.

B. Balconies:

1. Materials:

a. Steel, as indicated in Drawings.

2. Finish:

C. Steel Canopies:

1. Materials:

a. Steel, as indicated in drawings.

b. Other components, as indicated in drawings.

2.05 LANDSCAPE AND PLAZA FABRICATED ITEMS

A. Exterior Pipe Railings: See Section 05 5213 - Pipe and Tube Railings.

B. Privacy Walls:

1. Materials:

a. Steel, as indicated in drawings.

b. Wood, See Section 06 2000 - Finish Carpentry.

c. Steel Finish: Galvanized.

2.06 DOWNSPOUT BOOTS

A. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover and tamper proof fasteners.

1. Configuration: See Drawings.

2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.

3. Color: To be selected by Architect from manufacturer's standard range.

2.07 FINISHES - STEEL

A. Prime paint steel items.

1. Exceptions: Galvanize items to be embedded in concrete, items to be imbedded in masonry and items specified for Galvanized finish.

2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

3. Prepare surfaces to be primed in accordance with SSPC-SP2.

4. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

5. Prime Painting: One coat.

6. See Section 09-9113 Exterior Paint, for Exterior Exposed Steel Paint Systems.

2.08 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.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

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. Field weld components as indicated on drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasionsand surfaces not shop primed or galvanized , 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 06-1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural dimension lumber framing.

B. Non-structural dimension lumber framing.

C. Rough opening framing for doors, windows, and roof openings.

D. Subflooring.

E. Roof-mounted curbs.

F. Roofing nailers.

G. Roofing cant strips.

H. Preservative treated wood materials.

I. Fire retardant treated wood materials.

J. Communications and electrical room mounting boards.

K. Concealed wood blocking, nailers, and supports.

L. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

A. Section 07-2500 - Weather Barriers: Water-resistive barrier over sheathing.

B. Section 07-6200 - Sheet Metal Flashing and Trim: Sill flashings.

1.03 REFERENCE STANDARDS

A. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings 2015.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2019a.

D. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2017).

E. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing 2018a.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2018b.

G. AWPA U1 - Use Category System: User Specification for Treated Wood 2018.

H. PS 1 - Structural Plywood 2009.

I. PS 2 - Performance Standard for Wood-Based Structural-Use Panels 2010.

J. PS 20 - American Softwood Lumber Standard 2015.

K. WWPA G-5 - Western Lumber Grading Rules 2017.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide technical data on insulated sheathing, wood preservative materials and application instructions.

C. Structural Composite Lumber: Submit manufacturer's published structural data including span tables, marked to indicate which sizes and grades are being used; if structural composite lumber is being substituted for dimension lumber or timbers, submit grading agency structural tables marked for comparison.

1.05 **DELIVERY, STORAGE, AND HANDLING**

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

1.06 **WARRANTY**

A. See Section 01-7800 - 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 **GENERAL REQUIREMENTS**

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.

1. Species: Douglas Fir, unless otherwise indicated.

2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.

3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (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. Grading Agency: Western Wood Products Association; WWPA G-5.

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: Kiln-dry or MC15.

D. Stud Framing (2 by 4 through 2 by 6):

1. Species: Douglas Fir.

2. Grade: No. 2.

E. Joist, Rafter and Small Beam Framing (2 by 6 through 4 by 16):

1. Species: Douglas Fir-Larch.

2. Grade: No. 1 and Better.

3. Species and Grades: As indicated on drawings for various locations.

F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:

1. Lumber: S4S, No. 2 or Standard Grade.
2. Boards: Standard or No. 3.

2.03 **TIMBERS FOR CONCEALED APPLICATIONS**

A. Grading Agency: Western Wood Products Association; WWPA G-5.

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry (23 percent maximum).

D. Beams and Posts 5 inches and over in thickness:

1. Grade: Select Structural.

2.04 **STRUCTURAL COMPOSITE LUMBER**

A. At CM/GC's option, structural composite lumber may be substituted for concealed dimension lumber and timbers.

B. Structural Composite Lumber: Factory fabricated beams, headers, and columns, of sizes and types indicated on drawings; structural capacity as published by manufacturer.

2.05 **CONSTRUCTION PANELS**

A. Subfloor/Underlayment Combination: Any PS 2 type, rated Single Floor.

1. Bond Classification: Exterior.
2. Span Rating: 48.
3. Performance Category: 1-1/8 PERF CAT.
4. Edges: Tongue and groove.

B. Wall Sheathing: Any PS 2 type.

1. Bond Classification: Exterior.
2. Grade: Structural I Sheathing.
3. Span Rating: 24.
4. Performance Category: 5/16 PERF CAT.
5. Edge Profile: Square edge.

C. 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.

D. 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.

2.06 **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. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.

3. Anchors: Toggle bolt type for anchorage to hollow masonry.

B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.

1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.

C. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.

1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.

D. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.

E. Sill Flashing: As specified in Section 07-6200.

F. Subfloor Adhesives: Waterproof, air cure type, cartridge dispensed; adhesives designed for subfloor applications and complying with either ASTM C557 or ASTM D3498.

G. Construction Adhesives: Adhesives complying with ASTM C557 or ASTM D3498.

H. Water-Resistive Barrier: As specified in Section 07-2500.

2.07 **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. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.

2. 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. Fire Retardant Treatment:

1. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.

a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.

b. Treat rough carpentry items as indicated .

c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

C. 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 exposed to weather.

c. Treat lumber in contact with roofing, flashing or waterproofing.

d. Treat lumber in contact with masonry or concrete.

e. Treat lumber less than 18 inches above grade.

f. 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 roofing, flashing or waterproofing.

c. Treat plywood in contact with masonry or concrete.

d. Treat plywood less than 18 inches above grade.

e. Treat plywood in other locations as indicated.

PART 3 EXECUTION

3.01 PREPARATION

A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.

B. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

C. 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 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes, AWC (WFCM) Wood Frame Construction Manual.

E. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.

F. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

G. Provide bridging at joists in excess of 8 feet span as detailed. Fit solid blocking at ends of members.

H. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 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 framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

D. 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.

E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

F. Provide the following specific non-structural 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.

3.05 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

3.06 INSTALLATION OF CONSTRUCTION PANELS

A. Subflooring/Underlayment Combination: Glue and nail to framing; staples are not permitted.

B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws or staples.

C. 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 and Location: As indicated on drawings.

3.07 **SITE APPLIED WOOD TREATMENT**

A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.

B. Allow preservative to dry prior to erecting members.

3.08 **TOLERANCES**

A. Framing Members: 1/4 inch from true position, maximum.

B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

C. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.09 **FIELD QUALITY CONTROL**

A. See Section 01-4000 - Quality Requirements, for additional requirements.

3.10 **CLEANING**

A. Waste Disposal: Comply with the requirements of Section 01-7419 - Construction Waste Management and Disposal.
1. Comply with applicable regulations.
2. Do not burn scrap on project site.
3. Do not burn scraps that have been pressure treated.
4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

SECTION 06 20 00 - FINISH CARPENTRY

FINISH CARPENTRY ITEMS

Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

SHEET MATERIALS

Softwood Plywood, Exposed to View: Face species as indicated, plain sawn, medium density fiberboard core; PS 1 Grade A-B, glue type as recommended for application.

PLASTIC LAMINATE MATERIALS

Plastic Laminate: NEMA LD 3; color as selected by Architect.

HARDWARE

Hardware: Comply with BHMA A156.9.

WOOD TREATMENT

Factory-Treated Lumber: Comply with requirements of AWPA U1 - Use Category System for pressure impregnated wood treatments determined by use categories, expected service conditions, and specific applications.

FABRICATION

Shop assemble work for delivery to site, permitting passage through building openings.

SECTION 06 41 00 - ARCHITECTURAL WOOD CASEWORK

CABINETS

Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

Paint grade

Exposed Surfaces: HPVA HP-1 Grade A, Ash, plain sliced, random-matched.
Semi-Exposed Surfaces: HPVA HP-1 Grade B, Ash, plain sliced, random-matched.

Cabinets at Music Room:

Finish - Exposed Exterior Surfaces: Wood.
Finish - Exposed Interior Surfaces: Wood.
Finish - Semi-Exposed Surfaces: Wood
Door and Drawer Front Edge Profiles: Square with T molding edge band unless noted otherwise.

LAMINATE MATERIALS

Thermally Fused Laminate (TFL): Melamine resin, NEMA LD 3, Type VGL laminate panels.

COUNTERTOPS

Plastic Laminate Countertops: Medium density fiberboard substrate covered with HPDL, conventionally fabricated and self-edge banded.

SHOP FINISHING

Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:

Opaque:

Color: As selected by Architect.
Sheen: Flat.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

SECTION 07 01 50.19 - PREPARATION FOR RE-ROOFING

COMPONENTS

Refer to following sections for additional information on components relating to this work:

Replacement and removal of existing roofing system in preparation for entire new roofing system, refer to Section 07 51 00.

Remove existing flashing and counterflashings in preparation for replacement of these materials as part of this work, refer to Section 07 62 00 for material requirements.

MATERIALS

Temporary Roofing Protection Materials:

Contractor's responsibility to select appropriate materials for temporary protection of roofing areas as determined necessary for this work.

Roofing Recover Materials:

Contractor's responsibility to select appropriate materials for roofing re-cover as determined necessary for this work.

MATERIAL REMOVAL

INSTALLATION

Coordinate scope of this work with requirements for installation of new roofing system, refer to Section 07 51 00 for additional requirements.

SECTION 07 21 00 - THERMAL INSULATION

FOAM BOARD INSULATION MATERIALS

Expanded Polystyrene (EPS) Board Insulation: Complies with ASTM C578.

Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.

Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.

Extruded Polystyrene (XPS) Continuous Insulation (CI) Board: Complies with ASTM C578, and manufactured using carbon black technology.

Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.

Board Size: 48 inch by 96 inch.

Board Thickness: 1-3/4 inch.

Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.

Board Size: 48 inch by 96 inch.

Board Thickness: 1.5 inch.

BATT INSULATION MATERIALS

SECTION 07 25 00 - WEATHER BARRIERS

WEATHER BARRIER ASSEMBLIES

Air Barrier:

On outside surface of sheathing of exterior walls use air barrier coating, fluid applied type.

AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.

Air Barrier Coating:

Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.

Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure B (Water Method) at 73.4 degrees F.

AIR BARRIER MATERIALS (AIR AND VAPOR BARRIER)

Air and Vapor Barrier Sheet, Fluid-Applied:

Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.

Water Vapor Permeance: 0.1 perm, maximum, when tested in accordance with ASTM E96/E96M Procedure A (Desiccant Method) at 73.4 degrees F.

Water Penetration Resistance Around Nails: Pass, when tested in accordance with ASTM D1970/D1970M.

SECTION 07 46 46 - FIBER-CEMENT SIDING

FIBER-CEMENT SIDING

Panel Siding: Vertically oriented panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.

Texture: stucco patterned, to match adjacent wall finish.

Length (Height): 96 inches, nominal.

Width: 48 inches.

Thickness: 5/16 inch, nominal.

Finish: intergral, throughbody..

Warranty: 50 year limited; transferable.

SECTION 07 54 00 - THERMOPLASTIC MEMBRANE ROOFING

ROOFING - UNBALLASTED APPLICATIONS

Thermoplastic Membrane Roofing: One ply membrane, fully adhered, over vapor retarder and insulation.

Acceptable Insulation Types - Constant Thickness Application:

Minimum 2 layers of polyisocyanurate board.

Acceptable Insulation Types - Tapered Application:

Tapered polyisocyanurate board.

MEMBRANE ROOFING AND ASSOCIATED MATERIALS

Membrane Roofing Materials:

TPO: Thermoplastic polyolefin (TPO) complying with ASTM D6878/D6878M, sheet contains reinforcing fabrics or scrims.

Thickness: 80 mil, 0.080 inch, minimum.

Color: White.

Seaming Materials: As recommended by membrane manufacturer.

Vapor Retarder: Material approved by roof manufacturer complying with requirements of fire rating classification; compatible with roofing and insulation materials.

COVER BOARDS

Cover Boards: Glass-mat faced gypsum panels complying with ASTM C1177/C1177M.

Thickness: 5/8 inch, Type X, fire-resistant.

INSULATION

Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.

Classifications:

Type II:

Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.

Board Thickness: 1.5 inch.

ACCESSORIES

Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

Roofing Nails: Galvanized, hot-dipped type, size and configuration as required to suit application.

Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

SHEET MATERIALS

Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gauge, (0.0239) inch thick base metal, shop pre-coated with Kynar 500 fluorocarbon coating.

Finish: Minimum thickness 0.70-mil over 0.25 mil prime coat.

FABRICATION

Form sections true to shape, accurate in size, square, and free from distortion or defects.

Form pieces in longest possible lengths.

Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

GUTTER AND DOWNSPOUT FABRICATION

Gutters: K-style Rectangular profile.

Downspouts: Rectangular profile.

Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM); minimum 5".

ACCESSORIES

Concealed Fasteners: Hot-dipped galvanized nails, cadmium plated screws.

Exposed Fasteners: Neoprene gasketed screws.

SECTION 07 72 00 - ROOF ACCESSORIES

ROOF HATCHES AND VENTS, MANUAL AND AUTOMATIC OPERATION

Roof Hatches and Smoke Vents: Factory-assembled galvanized steel frame and cover, complete with operating and release hardware.

Mounting: Provide frames and curbs suitable for mounting conditions as indicated on drawings.

Thermally Broken Hatches: Added insulation to frame and cover; available in each manufacturer's standard, single leaf sizes; special sizes available upon request

Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.

Material: Galvanized steel, 14 gauge, 0.0747 inch thick.

Safety Railing System: Roof hatch manufacturer's standard accessory safety rail system mounted directly to curb.

Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.

Hinges: Heavy duty pintle type.

Hold open arm with vinyl-coated handle for manual release.

Latch: Upon closing, engage latch automatically and reset manual release.

Locking: Padlock hasp on interior.

SECTION 07 84 00 - FIRESTOPPING

FIRESTOPPING SYSTEMS

Firestopping: Any material meeting requirements.

Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of

penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

SECTION 07 92 00 - JOINT SEALANTS

JOINT SEALANT APPLICATIONS

Scope:

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, the following items.

Wall expansion and control joints.
Joints between door, window, and other frames and adjacent construction.
Joints between different exposed materials.
Openings below ledge angles in masonry.
Other joints indicated below.

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.

Joints between door, window, and other frames and adjacent construction.
Other joints indicated below.

Do not seal the following types of joints.

Intentional weepholes in masonry.
Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
Joints where sealant is specified to be provided by manufacturer of product to be sealed.
Joints where installation of sealant is specified in another section.
Joints between suspended panel ceilings/grid and walls.

Type ___ - Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.

Type ___ - Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

JOINT SEALANTS - GENERAL

DIVISION 08 - OPENINGS

SECTION 08 31 00 - ACCESS DOORS AND PANELS

WALL AND CEILING MOUNTED ACCESS UNITS

Wall and Ceiling Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.

Material: Steel.

Style: Exposed frame with door surface flush with frame surface.

Frames: 16 gauge, 0.0598 inch, minimum thickness.

Steel Finish: Primed.

Location: As required to service access valves, controls, filters, fire dampers, electrical junction boxes, and equipment.

Size: As required to for servicing and replacement of equipment. No smaller than 12 x 12 inches.

DIVISION 09 - FINISHES

SECTION 09 05 61 - COMMON WORK RESULTS FOR FLOORING PREPARATION

QUALITY ASSURANCE

Contractor may perform adhesive and bond test with Contractor's own personnel or hire a testing agency.

CONCRETE SLAB PREPARATION

Perform following operations in the order indicated:

Existing concrete slabs (on-grade and elevated) with existing floor coverings:

Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.

Removal of existing floor covering.

Preliminary cleaning.

Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.

Specified remediation, if required.

Patching, smoothing, and leveling, as required.

Other preparation specified.

Adhesive bond and compatibility test.

Protection.

Remediations:

Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.

Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.

SECTION 09 21 16 - GYPSUM BOARD ASSEMBLIES

BOARD MATERIALS

Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

Application: Use for vertical surfaces and ceilings, unless otherwise indicated.

Glass mat faced gypsum panels, as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.

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.

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

FRAMING MATERIALS

Non-Loadbearing Framing System Components: ASTM C645; 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.

SECTION 09 26 13 - GYPSUM VENEER PLASTERING

MATERIALS

Gypsum Veneer Plaster: ASTM C587, mixed in accordance with manufacturer's instructions.

Standard Gypsum Veneer Base: ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

Gypsum Veneer Base Trim Accessories: Zinc-coated steel or plastic, complying with ASTM C1047.

Gypsum Board Accessories: Complying with ASTM C1047, GA-216, GA-600, and ____.

Joint Reinforcing for Gypsum Veneer Base: As specified in ASTM C587.

Fasteners: As specified in ASTM C844.

SECTION 09 51 00 - ACOUSTICAL CEILINGS

PERFORMANCE REQUIREMENTS

Seismic Performance: Ceiling systems designed to withstand the effects of earthquake motions determined according to ASCE 7 for Seismic Design Category D, E, or F and complying with the following:

ACOUSTICAL UNITS

Acoustical Panels, Type AP: Painted mineral fiber, with the following characteristics:
- Classification: ASTM E1264 Type III.
  - Pattern: "D" - fissured.
- Size: 24 by 48 inch.

SUSPENSION SYSTEM(S)

Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.

SECTION 09 65 00 - RESILIENT FLOORING

TILE FLOORING

Vinyl Composition Tile: Homogeneous, with color extending throughout thickness.
- Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
- Size: 12 by 12 inch.
- Thickness: 0.125 inch.
- Color: As indicated on drawings.

RESILIENT BASE

Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; style as scheduled.
- Height: 4 inch.
- Thickness: 0.125 inch.
- Finish: Satin.
- Color: As indicated.

SECTION 09 68 16 - SHEET CARPETING

CARPET

Carpet, Type C-1: Tufted, Tile.
- Color: As indicated..
- Primary Backing:
  - Material: EcoFlex NXT.
- Total Weight: 20 oz/sq yd.

SECTION 09 84 30 - SOUND-ABSORBING WALL AND CEILING UNITS

FABRIC-COVERED SOUND-ABSORBING UNITS

General:
- Prefinished, factory assembled fabric-covered panels.

Fabric-Covered Acoustical Panels for Walls and Ceilings:
- Panel Core: Manufacturer's standard rigid or semi-rigid fiberglass core.
- Mounting Method: Back-mounted with mechanical fasteners.

SECTION 09 91 13 - EXTERIOR PAINTING

SECTION INCLUDES

Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:

Do Not Paint or Finish the Following Items:

Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
Items indicated to receive other finishes.
Items indicated to remain unfinished.
Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
Floors, unless specifically indicated.
Glass.
Concealed pipes, ducts, and conduits.

PAINTS AND FINISHES - GENERAL

Colors: To be selected from manufacturer's full range of available colors.

PAINT SYSTEMS - EXTERIOR

Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry units, brick, fiber cement siding, primed wood, and primed metal.

Primer: As recommended by top coat manufacturer for specific substrate.

PRIMERS

Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.

SECTION 09 91 23 - INTERIOR PAINTING

SECTION INCLUDES

Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

Surfaces inside cabinets.
Prime surfaces to receive wall coverings.

Do Not Paint or Finish the Following Items:

Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
Items indicated to receive other finishes.
Items indicated to remain unfinished.
Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
Floors, unless specifically indicated.
Glass.
Concealed pipes, ducts, and conduits.

PAINTS AND FINISHES - GENERAL

Colors: As indicated on Finish Schedule.

PAINT SYSTEMS - INTERIOR

Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry units, brick, wood, plaster, uncoated steel, shop primed steel, galvanized steel, aluminum, and acoustical ceilings.

Top Coat(s): High Performance Architectural Interior Latex; MPI #138, 139, 140, or 141.
Primer: As recommended by top coat manufacturer for specific substrate.

PRIMERS

Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.

SECTION 09 96 00 - HIGH-PERFORMANCE COATINGS

HIGH-PERFORMANCE COATINGS

MPI Standards: Provide products that comply with MPI standards indicated and are listed in "MPI Approved Products List."

TOP COAT MATERIALS

Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated; number of coats specified does not include primer or filler coat.

Epoxy Coating for Exterior Ferrous Metals:

Top Coat(s): High Performance Institutional, Two-Component, Water Based Epoxy Coating; MPI #254.

PRIMERS

Primers: Provide the following unless other primer is required or recommended by coating manufacturer.

DIVISION 10 - SPECIALTIES

SECTION 10 11 00 - VISUAL DISPLAY UNITS

VISUAL DISPLAY UNITS

Tackboards: Fine-grained, homogeneous natural cork.
Cork Thickness: To match existing inch.
Frame: Extruded aluminum, with concealed fasteners. To match existing.

MATERIALS

Adhesives: Type used by manufacturer.

SECTION 10 26 00 - WALL AND DOOR PROTECTION

PRODUCT TYPES

Corner Guards - Surface Mounted:
Material: Type 304 stainless steel, No. 4 finish, 16 gauge, _____ inch thick.
Width of Wings: 3 inches.
Corner: Radiused.
Height: 4 feet minimum, 6' minimum at kitchen and serivce/delivery areas.
Fasteners: Mechanically fastened with counter-sunk screws.

Protective Wall Panels:
Abrasion and impact resistant panels; Masonite or hardboard.
Height: 4 feet.
Fastening: Mechanical
Thickness: 0.075 inch.
Panel Size: 3 feet by 8 feet.

SECTION 21 0548
VIBRATION AND SEISMIC CONTROLS FOR FIRE SUPPRESSION PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Seismic control requirements.

B. Seismic restraint systems

1.02 DEFINITIONS

A. Fire Suppression Component: Where referenced in this section in regards to seismic controls, applies to any portion of the fire suppression system subject to seismic evaluation in accordance with applicable codes, including distributed systems (e.g., piping).

B. Seismic Restraint: Structural members or assemblies of members or manufactured elements specifically designed and applied for transmitting seismic forces between components and the seismic force-resisting system of the structure.

1.03 REFERENCE STANDARDS

A. ASCE 19 - Structural Applications of Steel Cables for Buildings 2016.

B. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications Most Recent Edition Cited by Referring Code or Reference Standard.

C. FEMA 412 - Installing Seismic Restraints for Mechanical Equipment 2002.

D. FEMA 413 - Installing Seismic Restraints for Electrical Equipment 2004.

E. FEMA 414 - Installing Seismic Restraints for Duct and Pipe 2004.

F. FEMA E-74 - Reducing the Risks of Nonstructural Earthquake Damage 2012.

G. FM 1950 - Seismic Sway Braces for Automatic Sprinkler Systems 2010.

H. MFMA-4 - Metal Framing Standards Publication 2004.

I. NFPA 13 - Standard for the Installation of Sprinkler Systems Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems 2008.

K. UL 203A - Standard for Sway Brace Devices for Sprinkler System Piping Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 SEISMIC CONTROL REQUIREMENTS

A. Design and provide fire suppression component restraints, supports, and attachments suitable for seismic loads determined in accordance with applicable codes, as well as gravity and operating loads and other structural design considerations of the installed location. Consider wind loads for outdoor fire suppression components.

B. Seismic Design Criteria: As indicated on drawings.

C. Component Importance Factor (Ip): Fire suppression components to be assigned a component importance factor (Ip) of 1.5 unless otherwise indicated.

D. Seismic Restraints:
   1. Provide seismic restraints for fire suppression components except where exempt according to applicable codes and specified seismic design criteria, as approved by authorities having jurisdiction.
   2. Seismic Restraint Exemptions, All Seismic Design Categories:
      a. Fire Suppression Piping Exemptions, All Seismic Design Categories:

1) Lateral sway bracing for piping individually supported within 6 inches (150 mm) of the structure measured between the top of pipe and the point of attachment to the structure, where all conditions for exception specified in NFPA 13 are met.
2) Lateral sway bracing for branch lines smaller than 2-1/2 inches (65 mm) in diameter, where branch line restraint is provided in accordance with NFPA 13.

3. Comply with applicable general recommendations of the following, where not in conflict with applicable codes, seismic design criteria, or other specified requirements:
   a. ASHRAE (HVACA).
   b. FEMA 412.
   c. FEMA 413.
   d. FEMA 414.
   e. FEMA E-74.
   f. SMACNA (SRM).
4. Seismic restraint capacities to be verified by a Nationally Recognized Testing Laboratory (NRTL) or certified by an independent third-party registered professional engineer acceptable to authorities having jurisdiction.
5. Seismic Restraint Systems:
   a. Arrange restraint elements to avoid obstruction of sprinklers in accordance with NFPA 13.
   b. Except where otherwise restricted, use of either cable or rigid restraints is permitted.
   c. Use only cable restraints to restrain vibration-isolated fire suppression components.
   d. Use only one restraint system type for a given fire suppression component or distributed system (e.g., piping) run; mixing of cable and rigid restraints on a given component/run is not permitted.
   e. Size restraint elements, including anchorage, to resist seismic loads as necessary to restrain fire suppression component in all lateral directions; consider bracket geometry in anchor load calculations.
   f. Use rod stiffener clips to attach bracing to hanger rods as required to prevent rod buckling from vertical (upward) compressive load introduced by cable or rigid restraints loaded in tension, in excess of downward tensile load due to supported fire suppression component weight.
   g. Select hanger rods and associated anchorage as required to accommodate vertical (downward) tensile load introduced by rigid restraints loaded in compression, in addition to downward tensile load due to supported fire suppression component weight.
   h. Clevis hangers may only be used for attachment of transverse restraints; do not use for attachment of longitudinal restraints.
   i. Where seismic restraints are attached to clevis hangers, provide clevis bolt reinforcement accessory to prevent clevis hanger deformation.
   j. Do not introduce lateral loads on open bar joist chords or the weak axis of beams, or loads in any direction at other than panel points unless approved by project Structural Engineer of Record.

E. Seismic Attachments:
   1. Comply with support and attachment requirements of NFPA 13.
   2. Attachments to be bolted, welded, or otherwise positively fastened without consideration of frictional resistance produced by the effects of gravity.
   3. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) or qualified evaluation service acceptable to authorities having jurisdiction for compliance with applicable building code, and qualified for seismic applications; concrete anchors to be qualified for installation in both cracked and uncracked concrete.
   4. Do not use power-actuated fasteners.
   5. Do not use friction clips (devices that rely on mechanically applied friction to resist loads). Beam clamps may be used for supporting sustained loads where provided with restraining straps, but not for sway bracing attachments as prohibited by NFPA 13.

6. Comply with anchor minimum embedment, minimum spacing, minimum member thickness, and minimum edge distance requirements.

F. Seismic Interactions:
   1. Include provisions to prevent seismic impact between fire suppression components and other structural or nonstructural components.
   2. Include provisions such that failure of a component, either essential or nonessential, does not cause the failure of an essential component.
   3. Comply with minimum clearance requirements between other equipment, distribution systems, and associated supports and fire protection sprinkler system drops and sprigs.

G. Seismic Relative Displacement Provisions:
   1. Use suitable fittings or flexible connections, in accordance with NFPA 13, to accommodate:
      a. Relative displacements at connections between components, including distributed systems (e.g., piping); do not exceed load limits for equipment utility connections.
      b. Relative displacements between component supports attached to dissimilar parts of structure that may move differently during an earthquake.
      c. Design displacements at seismic separations.
      d. Anticipated drifts between floors.
   2. Provide clearance around fire suppression system piping extending through walls, floors, platforms, and foundations in accordance with NFPA 13.

2.02 **SEISMIC RESTRAINT SYSTEMS**

A. Description: System components and accessories specifically designed for field assembly and attachment of seismic restraints.

B. Where required by NFPA 13, provide products listed as complying with UL 203A or FM 1950.

C. Cable Restraints:
   1. Comply with ASCE 19.
   2. Cables: Pre-stretched, galvanized steel wire rope with certified break strength.
   3. Cable Connections: Use only swaged end fittings. Cable clips and wedge type end fittings are not permitted in accordance with ASCE 19.
   4. Use protective thimbles for cable loops where potential for cable damage exists.

D. Rigid Restraints: Use MFMA-4 steel channel (strut), steel angle, or steel pipe for structural element; suitable for both compressive and tensile design loads.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Install products in accordance with manufacturer's instructions.

B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

C. Secure fasteners according to manufacturer's recommended torque settings.

D. Install flexible piping connections to provide sufficient slack for vibration isolation and/or seismic relative displacements as indicated or as required.

E. Seismic Controls:
   1. Provide specified snubbing element air gap; remove any factory-installed spacers, debris, or other obstructions.
   2. Use only specified components, anchorage, and hardware evaluated by seismic design. Comply with conditions of seismic certification where applicable.
   3. Where mounting hole diameter exceeds bolt diameter by more than 0.125 inch (3 mm), use epoxy grout, elastomeric grommet, or welded washer to reduce clearance to 0.125 inch (3 mm) or less.
   4. Equipment with Sheet Metal Housings:

a. Use Belleville washers to distribute stress over a larger surface area of the sheet metal connection interface as approved by manufacturer.
b. Attach additional steel as approved by manufacturer where required to transfer loads to structure.
c. Where mounting surface is irregular, do not shim housing; reinforce housing with additional steel as approved by manufacturer.

5. Seismic Restraint Systems:
   a. Do not attach seismic restraints and gravity supports to dissimilar parts of structure that may move differently during an earthquake.
   b. Install restraints within permissible angles in accordance with seismic design.
   c. Install cable restraints straight between component/run and structural attachment; do not bend around other nonstructural components or structural elements.
   d. Install cable restraints for vibration-isolated components slightly slack to prevent short-circuiting of isolation.
   e. Install hanger rod stiffeners where indicated using only specified clamps; do not weld stiffeners to hanger rod.

END OF SECTION

SECTION 22 0517
SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe sleeves.

PART 2 PRODUCTS

2.01 PIPE SLEEVES

A. Vertical Piping:
   1. Sleeve Length: 1 inch (25 mm) above finished floor.
   2. Provide sealant for watertight joint.
   3. Drilled Penetrations: Provide 1-1/2 inch (40 mm) angle ring or square set in silicone adhesive around penetration.

B. Sheet Metal: Pipe passing through interior walls, partitions, and floors, unless steel or brass sleeves are specified below.

PART 3 EXECUTION

3.01 INSTALLATION

A. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

B. Install piping to conserve building space, to not interfere with use of space and other work.

C. Install piping and pipe sleeves to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

D. Provide sleeves when penetrating footings, floors, walls, partitions, and [_____]. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.

E. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

END OF SECTION

SECTION 22 0529
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.

D. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings 1999, with Editorial Revision (2018).

E. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

H. MFMA-4 - Metal Framing Standards Publication 2004.

I. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018.

J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
   2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
   3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
   4. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
      a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
      c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
      d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Metal Channel (Strut) Framing Systems:
   1. Provide factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
   2. Comply with MFMA-4.
   3. Channel Material:
      a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
   4. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch (2.66 mm).

5. Minimum Channel Dimensions: 1-5/8 inch (41 mm) width by 13/16 inch (21 mm) height.

C. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
   1. Minimum Size, Unless Otherwise Indicated or Required:
      a. Equipment Supports: 1/2 inch (13 mm) diameter.
      b. Piping up to 1 inch (27 mm) nominal: 1/4 inch (6 mm) diameter.
      c. Piping larger than 1 inch (27 mm) nominal: 3/8 inch (10 mm) diameter.
      d. Trapeze Support for Multiple Pipes: 3/8 inch (10 mm) diameter.

D. Thermal Insulated Pipe Supports:
   1. General Construction and Requirements:
      a. Insulated pipe supports to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
      b. Surface Burning Characteristics: Flame spread index/smoke developed index of 5/30, maximum, when tested in accordance with ASTM E84 or UL 723.
      c. Pipe supports to be provided for nominally sized, 1/2 inch to 30 inch (12.7 mm to 762 mm) iron pipes.
      d. Insulation inserts to consist of rigid phenolic foam insulation surrounded by a 360 degree, PVC jacketing.
   2. PVC Jacket:
      a. Pipe insulation protection shields to be provided with a ball bearing hinge and locking seam.
      b. Moisture Vapor Transmission: 0.0071 perm inch (0.0092 ng/Pa s m), when tested in accordance with ASTM E96/E96M.
      c. Thickness: 60 mil (1.524 mm).

E. Pipe Supports:
   1. Liquid Temperatures Up To 122 degrees F (50 degrees C):
      a. Overhead Support: MSS SP-58 Types 1, 3 through 12.
      b. Support From Below: MSS SP-58 Types 35 through 38.

F. Offset Pipe Clamps: Double-leg design two-piece pipe clamp.

G. Strut Clamps: Two-piece pipe clamp.

H. Insulation Clamps: Two bolt-type clamps designed for installation under insulation.

I. Pipe Hangers: For a given pipe run, use hangers of the same type and material.
   1. Material: Malleable iron, ASTM A47/A47M; or carbon steel, ASTM A36/A36M.
   2. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.

J. Dielectric Barriers: Provide between metallic supports and metallic piping and associated items of dissimilar type; acceptable dielectric barriers include rubber or plastic sheets or coatings attached securely to pipe or item.

K. Pipe Shields for Insulated Piping:
   1. General Construction and Requirements:
      a. Surface Burning Characteristics: Comply with ASTM E84 or UL 723.
      b. Shields Material: UV-resistant polypropylene with glass fill.
      c. Maximum Insulated Pipe Outer Diameter: 12-5/8 inch (321 mm).
      d. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
      e. Maximum Service Temperature: 178 degrees F (81 degrees C).
      f. Pipe shields to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.

L. Anchors and Fasteners:
   1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
   2. Hollow Stud Walls: Use toggle bolts.

3. Wood: Use wood screws.
4. Plastic and lead anchors are not permitted.
5. Hammer-driven anchors and fasteners are not permitted.

END OF SECTION

SECTION 22 0548
VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 DEFINITIONS

A. Plumbing Component: Where referenced in this section in regards to seismic controls, applies to any portion of the plumbing system subject to seismic evaluation in accordance with applicable codes, including distributed systems (e.g., piping).

B. Seismic Restraint: Structural members or assemblies of members or manufactured elements specifically designed and applied for transmitting seismic forces between components and the seismic force-resisting system of the structure.

1.02 REFERENCE STANDARDS

A. ASCE 19 - Structural Applications of Steel Cables for Buildings 2016.

B. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications Most Recent Edition Cited by Referring Code or Reference Standard.

C. FEMA 412 - Installing Seismic Restraints for Mechanical Equipment 2002.

D. FEMA 413 - Installing Seismic Restraints for Electrical Equipment 2004.

E. FEMA 414 - Installing Seismic Restraints for Duct and Pipe 2004.

F. FEMA E-74 - Reducing the Risks of Nonstructural Earthquake Damage 2012.

G. MFMA-4 - Metal Framing Standards Publication 2004.

H. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems 2008.

PART 2 PRODUCTS

2.01 SEISMIC CONTROL REQUIREMENTS

A. Design and provide plumbing component restraints, supports, and attachments suitable for seismic loads determined in accordance with applicable codes, as well as gravity and operating loads and other structural design considerations of the installed location. Consider wind loads for outdoor plumbing components.

B. Seismic Design Criteria: As indicated on drawings.

C. Component Importance Factor (Ip): Plumbing components essential to life safety to be assigned a component importance factor (Ip) of 1.5 as indicated or as required. This includes but is not limited to:
   1. Plumbing components required to function for life safety purposes after an earthquake.
   2. Plumbing components that support or otherwise contain hazardous substances.

D. Seismic Restraints:
   1. Provide seismic restraints for plumbing components except where exempt according to applicable codes and specified seismic design criteria, as approved by authorities having jurisdiction.
   2. Seismic Restraint Exemptions:
      a. Exemptions for Seismic Design Category C:
         1) Plumbing components with component importance factor (Ip) of 1.0.
         2) Plumbing piping with component importance factor (Ip) of 1.5 and nominal pipe size of 2 inch (50 mm) or less; exemption does not apply to piping constructed of low-deformability materials (e.g., cast iron, glass, nonductile plastics).
      b. Exemptions for Seismic Design Category D, E, and F:
         1) Plumbing components with component importance factor (Ip) of 1.0 where all of the following apply:
            (a) The component is positively attached to the structure.
            (b) Flexible connections are provided between the component and associated ductwork, piping, and conduit.

(c) Either:
(1) The component weighs 400 pounds (1,780 N) or less and has a center of mass located 4 feet (1.22 m) or less above the adjacent floor level.
(2) The component weighs 20 pounds (89 N) or less or, in the case of a distributed system, 5 pounds per foot (73 N/m) or less.

2) Plumbing piping with component importance factor (Ip) of 1.0 and nominal pipe size of 3 inch (80 mm) or less, or with component importance factor (Ip) of 1.5 and nominal pipe size of 1 inch (25 mm) or less; exemption does not apply to piping constructed of low-deformability materials (e.g., cast iron, glass, nonductile plastics).

c. Plumbing Piping Exemptions, All Seismic Design Categories:
1) Trapeze supported piping weighing less than 10 pounds per foot (146 N/m), where all pipes supported meet requirements for exemption as single pipes described under specific seismic design category exemptions above.
2) Hanger supported piping where each hanger in the piping run is 12 inches (305 mm) or less in length from the pipe support to the supporting structure; rod hangers, where used, to be equipped with swivels.

3. Comply with applicable general recommendations of the following, where not in conflict with applicable codes, seismic design criteria, or other specified requirements:
a. ASHRAE (HVACA).
b. FEMA 412.
c. FEMA 413.
d. FEMA 414.
e. FEMA E-74.
f. SMACNA (SRM).
4. Seismic restraint capacities to be verified by a Nationally Recognized Testing Laboratory (NRTL) or certified by an independent third-party registered professional engineer acceptable to authorities having jurisdiction.
5. Seismic Restraint Systems:
a. Except where otherwise restricted, use of either cable or rigid restraints is permitted.
b. Use only cable restraints to restrain vibration-isolated plumbing components, including distributed systems.
c. Use only one restraint system type for a given plumbing component or distributed system (e.g., piping) run; mixing of cable and rigid restraints on a given component/run is not permitted.
d. Size restraint elements, including anchorage, to resist seismic loads as necessary to restrain plumbing component in all lateral directions; consider bracket geometry in anchor load calculations.
e. Use rod stiffener clips to attach bracing to hanger rods as required to prevent rod buckling from vertical (upward) compressive load introduced by cable or rigid restraints loaded in tension, in excess of downward tensile load due to supported plumbing component weight.
f. Select hanger rods and associated anchorage as required to accommodate vertical (downward) tensile load introduced by rigid restraints loaded in compression, in addition to downward tensile load due to supported plumbing component weight.
g. Clevis hangers may only be used for attachment of transverse restraints; do not use for attachment of longitudinal restraints.
h. Where seismic restraints are attached to clevis hangers, provide clevis bolt reinforcement accessory to prevent clevis hanger deformation.
i. Do not introduce lateral loads on open bar joist chords or the weak axis of beams, or loads in any direction at other than panel points unless approved by project Structural Engineer of Record.

E. Seismic Attachments:

1. Attachments to be bolted, welded, or otherwise positively fastened without consideration of frictional resistance produced by the effects of gravity.
2. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) or qualified evaluation service acceptable to authorities having jurisdiction for compliance with applicable building code, and qualified for seismic applications; concrete anchors to be qualified for installation in both cracked and uncracked concrete.
3. Do not use power-actuated fasteners.
4. Do not use friction clips (devices that rely on mechanically applied friction to resist loads). Beam clamps may be used for supporting sustained loads where provided with restraining straps.
5. Comply with anchor minimum embedment, minimum spacing, minimum member thickness, and minimum edge distance requirements.
6. Concrete Housekeeping Pads:
    a. Increase size of pad as required to comply with anchor requirements.
    b. Provide pad reinforcement and doweling to ensure integrity of pad and connection and to provide adequate load path from pad to supporting structure.

F. Seismic Interactions:
1. Include provisions to prevent seismic impact between plumbing components and other structural or nonstructural components.
2. Include provisions such that failure of a component, either essential or nonessential, does not cause the failure of an essential component.

G. Seismic Relative Displacement Provisions:
1. Use suitable fittings or flexible connections to accommodate:
    a. Relative displacements at connections between components, including distributed systems (e.g., piping); do not exceed load limits for equipment utility connections.
    b. Relative displacements between component supports attached to dissimilar parts of structure that may move differently during an earthquake.
    c. Design displacements at seismic separations.
    d. Anticipated drifts between floors.

2.02 **SEISMIC RESTRAINT SYSTEMS**

A. Description: System components and accessories specifically designed for field assembly and attachment of seismic restraints.

B. Cable Restraints:
1. Comply with ASCE 19.
2. Cables: Pre-stretched, galvanized steel wire rope with certified break strength.
3. Cable Connections: Use only swaged end fittings. Cable clips and wedge type end fittings are not permitted in accordance with ASCE 19.
4. Use protective thimbles for cable loops where potential for cable damage exists.

C. Rigid Restraints: Use MFMA-4 steel channel (strut), steel angle, or steel pipe for structural element; suitable for both compressive and tensile design loads.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Install products in accordance with manufacturer's instructions.

B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

C. Secure fasteners according to manufacturer's recommended torque settings.

D. Install flexible piping connections to provide sufficient slack for vibration isolation and/or seismic relative displacements as indicated or as required.

E. Seismic Controls:

1. Provide specified snubbing element air gap; remove any factory-installed spacers, debris, or other obstructions.
2. Use only specified components, anchorage, and hardware evaluated by seismic design. Comply with conditions of seismic certification where applicable.
3. Where mounting hole diameter exceeds bolt diameter by more than 0.125 inch (3 mm), use epoxy grout, elastomeric grommet, or welded washer to reduce clearance to 0.125 inch (3 mm) or less.
4. Equipment with Sheet Metal Housings:
    a. Use Belleville washers to distribute stress over a larger surface area of the sheet metal connection interface as approved by manufacturer.
    b. Attach additional steel as approved by manufacturer where required to transfer loads to structure.
    c. Where mounting surface is irregular, do not shim housing; reinforce housing with additional steel as approved by manufacturer.
5. Concrete Housekeeping Pads:
    a. Size in accordance with seismic design to meet anchor requirements.
    b. Install pad reinforcement and doweling in accordance with seismic design to ensure integrity of pad and associated connection to slab.
6. Seismic Restraint Systems:
    a. Do not attach seismic restraints and gravity supports to dissimilar parts of structure that may move differently during an earthquake.
    b. Install restraints within permissible angles in accordance with seismic design.
    c. Install cable restraints straight between component/run and structural attachment; do not bend around other nonstructural components or structural elements.
    d. Install cable restraints for vibration-isolated components slightly slack to prevent short-circuiting of isolation.
    e. Install hanger rod stiffeners where indicated using only specified clamps; do not weld stiffeners to hanger rod.

END OF SECTION

SECTION 22 0719
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping insulation.

1.02 REFERENCE STANDARDS

A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019.

B. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement 2007 (Reapproved 2013).

C. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement 2007 (Reapproved 2013).

D. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation 2019.

E. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel 2008 (Reapproved 2018).

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER

A. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
   1. K (Ksi) Value: ASTM C177, 0.24 at 75 degrees F (0.035 at 24 degrees C).
   2. Maximum Service Temperature: 850 degrees F (454 degrees C).
   3. Maximum Moisture Absorption: 0.2 percent by volume.

B. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches (0.029 ng/Pa s m).

C. Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch (300 mm) centers.

D. Vapor Barrier Lap Adhesive: Compatible with insulation.

E. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

F. Insulating Cement: ASTM C449.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.02 REFER TO DRAWINGS FOR DUCT INSULATION SCHEDULE

3.03 SCHEDULES

A. Plumbing Systems:
   1. Roof Drainage Above Grade:

END OF SECTION

SECTION 22 1005
PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe, pipe fittings, specialties, and connections for piping systems.
   1. Sanitary sewer.
   2. Domestic water.
   3. Storm water.
   4. Flanges, unions, and couplings.
   5. Pipe hangers and supports.

1.02 REFERENCE STANDARDS

A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300 2016.

B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2018.

C. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings 2018.

D. ASME B31.1 - Power Piping 2018.

E. ASME B31.9 - Building Services Piping 2017.

F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2018.

G. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings 2020.

H. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service 2019.

I. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes 2020.

J. ASTM B88 - Standard Specification for Seamless Copper Water Tube 2020.

K. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric) 2020.

L. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube 2016.

M. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings 2016.

N. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings 2020a.

O. ASTM F876 - Standard Specification for Crosslinked Polyethylene (PEX) Tubing 2019a.

P. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications 2017 (Revised 2018).

Q. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications 2012 (Revised 2018).

R. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018.

S. NSF 61 - Drinking Water System Components - Health Effects 2019.

T. NSF 372 - Drinking Water System Components - Lead Content 2016.

U. PPI TR-4 - PPI Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB), and Minimum Required Strength (MRS) Ratings For Thermoplastic Piping Materials or Pipe 2017.

1.03 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.02 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

A. Cast Iron Pipe: ASTM A74 extra heavy weight.
   1. Fittings: Cast iron.
   2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.

2.03 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron.
   2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.04 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

A. Copper Pipe: ASTM B42, hard drawn.
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.

B. Cross-Linked Polyethylene (PEX) Pipe: ASTM F876 or ASTM F877.
   1. PPI TR-4 Pressure Design Basis:

2.05 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), Drawn (H).

2.06 STORM WATER PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

A. Cast Iron Pipe: ASTM A74 extra heavy weight.
   1. Fittings: Cast iron.
   2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.

2.07 STORM WATER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron.
   2. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.08 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
   2. Joints: Threaded or welded to ASME B31.1.

2.09 FLANGES, UNIONS, AND COUPLINGS

A. No-Hub Couplings:
   1. Gasket Material: Neoprene complying with ASTM C564.
   2. Band Material: Stainless steel.
   3. Eyelet Material: Stainless steel.

B. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.10 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
   3. Trapeze Hangers: Welded steel channel frames attached to structure.
   4. Vertical Pipe Support: Steel riser clamp.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

C. Install water piping to ASME B31.9.

D. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.

END OF SECTION

SECTION 22 4000
PLUMBING FIXTURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sinks.

1.02 REFERENCE STANDARDS

A. ASME A112.19.3 - Stainless Steel Plumbing Fixtures 2017.

B. NSF 61 - Drinking Water System Components - Health Effects 2019.

C. NSF 372 - Drinking Water System Components - Lead Content 2016.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.02 REGULATORY REQUIREMENTS

A. Comply with applicable codes for installation of plumbing systems.

2.03 SINKS

A. Sink Manufacturers:
   1. Elkay.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Single Compartment Bowl: ; [_____] by [_____] by [_____] inch ([_____] by [_____] by [_____] mm) outside dimensions 20 gauge, 0.0359 inch (0.91 mm) thick, Type 302 stainless steel, self rimming and undercoated, with ledge back drilled for trim.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install components level and plumb.

END OF SECTION

SECTION 23 0517
SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

PART 1 GENERAL

1.01 **SECTION INCLUDES**

A. Pipe sleeves.

1.02 **REFERENCE STANDARDS**

A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2013a (Reapproved 2017).

PART 2 PRODUCTS

2.01 **PIPE SLEEVES**

A. Sheet Metal: Pipe passing through interior walls, partitions, and floors, unless steel or brass sleeves are specified below.

B. Clearances:
   1. Provide allowance for insulated piping.
   2. Wall, Floor, Floor, Partitions: 1 inch (25 mm) greater than external; pipe diameter.
   3. All Rated Openings: Caulked tight with fire stopping material in compliance with ASTM E814 in accordance with Section 07 8400 to prevent the spread of fire, smoke, and gases.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

B. Install piping to conserve building space, to not interfere with use of space and other work.

C. Install piping and pipe sleeves to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

D. Provide sleeves when penetrating footings, floors, walls, partitions, and [_____]. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.

E. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

END OF SECTION

SECTION 23 0529
HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.

D. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings 1999, with Editorial Revision (2018).

E. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

H. MFMA-4 - Metal Framing Standards Publication 2004.

I. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018.

J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
   2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
   3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
   4. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
      a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
      b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
   1. Provide factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
   2. Comply with MFMA-4.
   3. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch (2.66 mm).
   4. Minimum Channel Dimensions: 1-5/8 inch (41 mm) width by 13/16 inch (21 mm) height.

C. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
   1. Minimum Size, Unless Otherwise Indicated or Required:
      a. Equipment Supports: 1/2 inch (13 mm) diameter.

b. Piping up to 1 inch (27 mm) nominal: 1/4 inch (6 mm) diameter.
c. Piping larger than 1 inch (27 mm) nominal: 3/8 inch (10 mm) diameter.
d. Trapeze Support for Multiple Pipes: 3/8 inch (10 mm) diameter.

D. Steel Cable:

E. Thermal Insulated Pipe Supports:
1. General Construction and Requirements:
a. Insulated pipe supports to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
b. Surface Burning Characteristics: Flame spread index/smoke developed index of 5/30, maximum, when tested in accordance with ASTM E84 or UL 723.
c. Pipe supports to be provided for nominally sized, 1/2 inch to 30 inch (12.7 mm to 762 mm) iron pipes.
d. Insulation inserts to consist of rigid polyisocyanurate (urethane) insulation surrounded by a 360 degree, PVC jacketing.
2. PVC Jacket:
a. Pipe insulation protection shields to be provided with a ball bearing hinge and locking seam.
b. Moisture Vapor Transmission: 0.0071 perm inch (0.0092 ng/Pa s m), when tested in accordance with ASTM E96/E96M.
c. Thickness: 60 mil (1.524 mm).

F. Pipe Supports:
1. Liquid Temperatures Up To 122 degrees F (50 degrees C):
a. Overhead Support: MSS SP-58 Types 1, 3 through 12.
b. Support From Below: MSS SP-58 Types 35 through 38.
2. Operating Temperatures from 122 to 446 degrees F (50 to 230 degrees C):
a. Overhead Support: MSS SP-58 Type 1 or 3 through 12, with appropriate saddle of MSS SP-58 Type 40 for insulated pipe.

G. Offset Pipe Clamps: Double-leg design two-piece pipe clamp.

H. Strut Clamps: Two-piece pipe clamp.

I. Insulation Clamps: Two bolt-type clamps designed for installation under insulation.

J. Pipe Hangers: For a given pipe run, use hangers of the same type and material.
1. Material: Malleable iron, ASTM A47/A47M; or carbon steel, ASTM A36/A36M.
2. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.

K. Dielectric Barriers: Provide between metallic supports and metallic piping and associated items of dissimilar type; acceptable dielectric barriers include rubber or plastic sheets or coatings attached securely to pipe or item.

L. Pipe Shields for Insulated Piping:
1. General Construction and Requirements:
a. Surface Burning Characteristics: Comply with ASTM E84 or UL 723.
b. Shields Material: UV-resistant polypropylene with glass fill.
c. Maximum Insulated Pipe Outer Diameter: 12-5/8 inch (321 mm).
d. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
e. Maximum Service Temperature: 178 degrees F (81 degrees C).
f. Pipe shields to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.

M. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.

4. Hollow Masonry: Use toggle bolts.
5. Hollow Stud Walls: Use toggle bolts.
6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
7. Sheet Metal: Use sheet metal screws.
8. Wood: Use wood screws.
9. Plastic and lead anchors are not permitted.
10. Hammer-driven anchors and fasteners are not permitted.

END OF SECTION

SECTION 23 0548
VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 GENERAL

1.01 DEFINITIONS

A. HVAC Component: Where referenced in this section in regards to seismic controls, applies to any portion of the HVAC system subject to seismic evaluation in accordance with applicable codes, including distributed systems (e.g., ductwork, piping).

B. Seismic Restraint: Structural members or assemblies of members or manufactured elements specifically designed and applied for transmitting seismic forces between components and the seismic force-resisting system of the structure.

1.02 REFERENCE STANDARDS

A. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications Most Recent Edition Cited by Referring Code or Reference Standard.

B. FEMA 412 - Installing Seismic Restraints for Mechanical Equipment 2002.

C. FEMA 413 - Installing Seismic Restraints for Electrical Equipment 2004.

D. FEMA 414 - Installing Seismic Restraints for Duct and Pipe 2004.

E. FEMA E-74 - Reducing the Risks of Nonstructural Earthquake Damage 2012.

F. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems 2008.

PART 2 PRODUCTS

2.01 SEISMIC CONTROL REQUIREMENTS

A. Design and provide HVAC component restraints, supports, and attachments suitable for seismic loads determined in accordance with applicable codes, as well as gravity and operating loads and other structural design considerations of the installed location. Consider wind loads for outdoor HVAC components.

B. Seismic Design Criteria: As indicated on drawings.

C. Component Importance Factor (Ip): HVAC components essential to life safety to be assigned a component importance factor (Ip) of 1.5 as indicated or as required. This includes but is not limited to:
   1. HVAC components required to function for life safety purposes after an earthquake.
   2. HVAC components that support or otherwise contain hazardous substances.

D. Seismic Restraints:
   1. Provide seismic restraints for HVAC components except where exempt according to applicable codes and specified seismic design criteria, as approved by authorities having jurisdiction.
   2. Seismic Restraint Exemptions:
      a. Exemptions for Seismic Design Category C:
         1) HVAC components with component importance factor (Ip) of 1.0.
         2) HVAC piping with component importance factor (Ip) of 1.5 and nominal pipe size of 2 inch (50 mm) or less; exemption does not apply to piping constructed of low-deformability materials (e.g., cast iron, glass, nonductile plastics).
      b. Exemptions for Seismic Design Category D, E, and F:
         1) HVAC components with component importance factor (Ip) of 1.0 where all of the following apply:
            (a) The component is positively attached to the structure.
            (b) Flexible connections are provided between the component and associated ductwork, piping, and conduit.
            (c) Either:
               (1) The component weighs 400 pounds (1,780 N) or less and has a center of mass located 4 feet (1.22 m) or less above the adjacent

floor level.
(2) The component weighs 20 pounds (89 N) or less or, in the case of a distributed system, 5 pounds per foot (73 N/m) or less.

2) HVAC piping with component importance factor (Ip) of 1.0 and nominal pipe size of 3 inch (80 mm) or less, or with component importance factor (Ip) of 1.5 and nominal pipe size of 1 inch (25 mm) or less; exemption does not apply to piping constructed of low-deformability materials (e.g., cast iron, glass, nonductile plastics).

c. Ductwork Exemptions, All Seismic Design Categories:
1) Ductwork not designed to carry toxic, highly toxic, or flammable gases and not used for smoke control where any of the following apply:
(a) Trapeze supported ductwork weighing less than 10 pounds per foot (146 N/m).
(b) Hanger supported ductwork where each hanger in the duct run is 12 inches (305 mm) or less in length from the duct support to the supporting structure; rod hangers, where used, to be equipped with swivels.
(c) Ductwork having a cross sectional area of less than 6 square feet (0.557 sq m) or weighing 17 pounds per foot (248 N/m) or less, and where there are provisions to avoid impact with other ducts or mechanical components or to protect ducts in the event of such impact.

d. HVAC Piping Exemptions, All Seismic Design Categories:
1) Trapeze supported piping weighing less than 10 pounds per foot (146 N/m), where all pipes supported meet requirements for exemption as single pipes described under specific seismic design category exemptions above.
2) Hanger supported piping where each hanger in the piping run is 12 inches (305 mm) or less in length from the pipe support to the supporting structure; rod hangers, where used, to be equipped with swivels.

3. Comply with applicable general recommendations of the following, where not in conflict with applicable codes, seismic design criteria, or other specified requirements:
a. ASHRAE (HVACA).
b. FEMA 412.
c. FEMA 413.
d. FEMA 414.
e. FEMA E-74.
f. SMACNA (SRM).

4. Seismic restraint capacities to be verified by a Nationally Recognized Testing Laboratory (NRTL) or certified by an independent third-party registered professional engineer acceptable to authorities having jurisdiction.

5. Seismic Restraint Systems:
a. Except where otherwise restricted, use of either cable or rigid restraints is permitted.
b. Use only cable restraints to restrain vibration-isolated HVAC components, including distributed systems.
c. Use only one restraint system type for a given HVAC component or distributed system (e.g., ductwork, piping) run; mixing of cable and rigid restraints on a given component/run is not permitted.
d. Size restraint elements, including anchorage, to resist seismic loads as necessary to restrain HVAC component in all lateral directions; consider bracket geometry in anchor load calculations.
e. Use rod stiffener clips to attach bracing to hanger rods as required to prevent rod buckling from vertical (upward) compressive load introduced by cable or rigid restraints loaded in tension, in excess of downward tensile load due to supported HVAC component weight.
f. Select hanger rods and associated anchorage as required to accommodate vertical (downward) tensile load introduced by rigid restraints loaded in compression, in addition to downward tensile load due to supported HVAC component weight.

g. Clevis hangers may only be used for attachment of transverse restraints; do not use for attachment of longitudinal restraints.
h. Where seismic restraints are attached to clevis hangers, provide clevis bolt reinforcement accessory to prevent clevis hanger deformation.
i. Do not introduce lateral loads on open bar joist chords or the weak axis of beams, or loads in any direction at other than panel points unless approved by project Structural Engineer of Record.

6. Ductwork Applications:
   a. Provide independent support and seismic restraint for in-line components (e.g., fans, heat exchangers, humidifiers) having an operating weight greater than 75 pounds (334 N).
   b. Positively attach appurtenances (e.g., dampers, louvers, diffusers) with mechanical fasteners.

E. Seismic Attachments:
1. Attachments to be bolted, welded, or otherwise positively fastened without consideration of frictional resistance produced by the effects of gravity.
2. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) or qualified evaluation service acceptable to authorities having jurisdiction for compliance with applicable building code, and qualified for seismic applications; concrete anchors to be qualified for installation in both cracked and uncracked concrete.
3. Do not use power-actuated fasteners.
4. Do not use friction clips (devices that rely on mechanically applied friction to resist loads). Beam clamps may be used for supporting sustained loads where provided with restraining straps.
5. Comply with anchor minimum embedment, minimum spacing, minimum member thickness, and minimum edge distance requirements.
6. Concrete Housekeeping Pads:
   a. Increase size of pad as required to comply with anchor requirements.
   b. Provide pad reinforcement and doweling to ensure integrity of pad and connection and to provide adequate load path from pad to supporting structure.

F. Seismic Interactions:
1. Include provisions to prevent seismic impact between HVAC components and other structural or nonstructural components.
2. Include provisions such that failure of a component, either essential or nonessential, does not cause the failure of an essential component.

G. Seismic Relative Displacement Provisions:
1. Use suitable fittings or flexible connections to accommodate:
   a. Relative displacements at connections between components, including distributed systems (e.g., ductwork, piping); do not exceed load limits for equipment utility connections.
   b. Relative displacements between component supports attached to dissimilar parts of structure that may move differently during an earthquake.
   c. Design displacements at seismic separations.
   d. Anticipated drifts between floors.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

C. Secure fasteners according to manufacturer's recommended torque settings.

D. Install flexible piping connections to provide sufficient slack for vibration isolation and/or seismic relative displacements as indicated or as required.

E. Seismic Controls:
   1. Provide specified snubbing element air gap; remove any factory-installed spacers, debris, or other obstructions.
   2. Use only specified components, anchorage, and hardware evaluated by seismic design. Comply with conditions of seismic certification where applicable.
   3. Where mounting hole diameter exceeds bolt diameter by more than 0.125 inch (3 mm), use epoxy grout, elastomeric grommet, or welded washer to reduce clearance to 0.125 inch (3 mm) or less.
   4. Equipment with Sheet Metal Housings:
      a. Use Belleville washers to distribute stress over a larger surface area of the sheet metal connection interface as approved by manufacturer.
      b. Attach additional steel as approved by manufacturer where required to transfer loads to structure.
      c. Where mounting surface is irregular, do not shim housing; reinforce housing with additional steel as approved by manufacturer.
   5. Concrete Housekeeping Pads:
      a. Size in accordance with seismic design to meet anchor requirements.
      b. Install pad reinforcement and doweling in accordance with seismic design to ensure integrity of pad and associated connection to slab.

END OF SECTION

SECTION 23 0713
DUCT INSULATION

PART 1 GENERAL

1.01 **REFERENCE STANDARDS**

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2017.

B. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation 2014 (Reapproved 2019).

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

D. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 **REGULATORY REQUIREMENTS**

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 **GLASS FIBER, RIGID**

A. Insulation: ASTM C612; rigid, noncombustible blanket.
   1. K (Ksi) Value: 0.24 at 75 degrees F (0.036 at 24 degrees C), when tested in accordance with ASTM C518.

PART 3 EXECUTION

3.01 **EXAMINATION**

A. Test ductwork for design pressure prior to applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 **INSTALLATION**

A. Install in accordance with manufacturer's instructions.

3.03 **REFER TO DRAWINGS FOR DUCT INSULATION SCHEDULE.**

END OF SECTION

SECTION 23 0719
HVAC PIPING INSULATION

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus 2019.

B. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019.

C. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation 2019.

D. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel 2008 (Reapproved 2018).

E. ASTM D610 - Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces 2008 (Reapproved 2019).

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER, RIGID

A. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
   1. K (Ksi) Value: ASTM C177, 0.24 at 75 degrees F (0.035 at 24 degrees C).
   2. Maximum Service Temperature: 850 degrees F (454 degrees C).
   3. Maximum Moisture Absorption: 0.2 percent by volume.

2.03 ACCESSORIES

A. General Requirements:
   1. Provide required accessories in accordance with and subject to the recommendations of the insulation manufacturer.
   2. Furnish compatible materials which do not contribute to corrosion, soften, or otherwise attack surfaces to which applied, in either the wet or dry state.
   3. Supply materials that are asbestos free.

B. Corrosion Inhibitors:
   1. Corrosion Control Gel:
      a. Corrosion Protection: Comply with ASTM B117 and ASTM D610.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.02 REFER TO DRAWINGS FOR PIPE INSULATION SCHEDULE

END OF SECTION

SECTION 23 1123
FACILITY NATURAL-GAS PIPING

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300 2016.

B. ASME B31.1 - Power Piping 2018.

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2018.

D. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service 2019.

E. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements 2015.

F. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements 2015.

G. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements 2015.

H. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements 2016.

PART 2 PRODUCTS

2.01 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M, Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
   2. Joints: Threaded or welded to ASME B31.1.

2.02 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 Inches (80 mm) and Under:
   1. Ferrous Pipe: Class 150 malleable iron threaded unions.

B. Flanges for Pipe Size Over 1 Inch (25 mm):
   1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.

C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.03 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
   3. Trapeze Hangers: Welded steel channel frames attached to structure.
   4. Vertical Pipe Support: Steel riser clamp.

B. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
   1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
   2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
   3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
   4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
   5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

END OF SECTION

SECTION 23 3100
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 **REFERENCE STANDARDS**

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.

B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2018.

C. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2005 (Revised 2009).

PART 2 PRODUCTS

2.01 **DUCT ASSEMBLIES**

A. Regulatory Requirements: Construct ductwork to comply with NFPA 90A standards.

2.02 **MATERIALS**

A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.

2.03 **DUCTWORK FABRICATION**

A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.

B. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.

C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

D. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).

2.04 **MANUFACTURED DUCTWORK AND FITTINGS**

A. Spiral Ducts: Round spiral lockseam duct with galvanized steel outer wall.
   1. Manufacture in accordance with SMACNA (DCS).

B. Transverse Duct Connection System: SMACNA "E" rated rigidly class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips in accordance with SMACNA (DCS).

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Install, support, and seal ducts in accordance with SMACNA (DCS).

B. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.

C. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

END OF SECTION

SECTION 23 3300
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2018.

B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2005 (Revised 2009).

PART 2 PRODUCTS

2.01 AIR TURNING DEVICES/EXTRACTORS

A. Multi-blade device with radius blades attached to pivoting frame and bracket, steel construction, with push-pull operator strap.

2.02 FLEXIBLE DUCT CONNECTORS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

B. Flexible Duct Connections: Fabric crimped into metal edging strip.

C. Maximum Installed Length: 14 inch (356 mm).

2.03 VOLUME CONTROL DAMPERS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

B. Single Blade Dampers:

C. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch (200 by 1825 mm). Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

D. End Bearings: Except in round ducts 12 inches (300 mm) and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.

E. Quadrants:

2.04 MISCELLANEOUS PRODUCTS

A. Duct Opening Closure Film: Mold-resistant, self-adhesive film to keep debris out of ducts during construction.
   1. Thickness: 2 mils (0.6 mm).

PART 3 EXECUTION

3.01 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 23 3100 for duct construction and pressure class.

END OF SECTION

SECTION 23 3700
AIR OUTLETS AND INLETS

PART 1 GENERAL

PART 2 PRODUCTS

2.01 **WALL SUPPLY REGISTERS/GRILLES**

A. Type: Streamlined and individually adjustable blades, 3/4 inch (19 mm) minimum depth, 3/4 inch (19 mm) maximum spacing with spring or other device to set blades, vertical face, single deflection.

B. Fabrication: Steel with 20 gauge, 0.0359 inch (0.91 mm) minimum frames and 22 gauge, 0.0299 inch (0.76 mm) minimum blades, steel and aluminum with 20 gauge, 0.0359 inch (0.91 mm) minimum frame, or aluminum extrusions, with factory baked enamel finish.

2.02 **WALL EXHAUST AND RETURN REGISTERS/GRILLES**

A. Type: Streamlined blades, 3/4 inch (19 mm) minimum depth, 3/4 inch (19 mm) maximum spacing, with spring or other device to set blades, vertical face.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Install in accordance with manufacturer's instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.

END OF SECTION

SECTION 26 0505
SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical demolition.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that abandoned wiring and equipment serve only abandoned facilities.

B. Demolition drawings are based on casual field observation and existing record documents.

C. Report discrepancies to Architect before disturbing existing installation.

D. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

B. Coordinate utility service outages with utility company.
   1. Plan the installation of work so that interruptions of services to the building are kept to a minimum, and such interruptions shall occur at owner's conveniance.
   2. Interruptions shall be for as short of duration as possible.
   3. Service shutdown shall not commence without owner approval. Contractor shall obtain permission from the owner to shut off services to any location by notification in writing a minimum of two weeks prior to shutdown. Notification shall include the reason for and duration of the service shutdown.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.

E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Notify local fire service.

F. Existing Communications Systems: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Refer to electrical abbreviations on drawings for demolition tag descriptions: "E","R","RR", etc

B. Remove, relocate, and extend existing installations to accommodate new construction.

C. Remove abandoned wiring to source of supply.

D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

E. Remove abandoned surface mounted raceway. Where existing surface mounted raceway is installed and devices are shown to be removed, coordinate device removal with existing devices to remain. If removal of a device will effect the installation of remaining devices, notify the engineer prior to demolition.

F. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank Stainless Steel cover for abandoned junction boxes.

G. Disconnect and remove abandoned panelboards and distribution equipment.

H. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

I. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

J. Repair adjacent construction and finishes damaged during demolition and extension work.

K. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

END OF SECTION

SECTION 26 0519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 **SECTION INCLUDES**

A. Single conductor building wire.

B. Metal-clad cable.

C. Wiring connectors.

1.02 **RELATED REQUIREMENTS**

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

B. Section 07 8400 - Firestopping.

C. Section 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Additional requirements for grounding conductors and grounding connectors.

D. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 **REFERENCE STANDARDS**

A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire 2013 (Reapproved 2018).

B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft 2011 (Reapproved 2017).

C. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation 2004 (Reapproved 2020).

D. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape 2017.

E. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

F. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC) 2012.

G. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy 2009.

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

I. UL 44 - Thermoset-Insulated Wires and Cables Current Edition, Including All Revisions.

J. UL 83 - Thermoplastic-Insulated Wires and Cables Current Edition, Including All Revisions.

K. UL 486A-486B - Wire Connectors Current Edition, Including All Revisions.

L. UL 486C - Splicing Wire Connectors Current Edition, Including All Revisions.

M. UL 486D - Sealed Wire Connector Systems Current Edition, Including All Revisions.

N. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape Current Edition, Including All Revisions.

O. UL 1569 - Metal-Clad Cables Current Edition, Including All Revisions.

1.04 **SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

1.05 **DELIVERY, STORAGE, AND HANDLING**

A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

C. Metal-clad cable is permitted only as follows:
   1. Where not otherwise restricted, may be used:
      a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
      b. Where concealed in hollow stud walls, above accessible ceilings, and under raised floors for branch circuits up to 20 A.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

D. Comply with NEMA WC 70/ICEA S-95-658.

E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

G. Conductors for Grounding and Bonding: Also comply with Section 26 0526.

H. Conductor Material:
   1. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.

I. Minimum Conductor Size:
   1. Branch Circuits: 12 AWG.
      a. Exceptions:
         1) 20A, 120 V circuit longer than 100 ft (30 m): 10 AWG. for voltage drop.

J. Conductor Color Coding:
   1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
   2. Color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
   3. Color Code:
      a. 208Y/120 V, 3 Phase, 4 Wire System:
         1) Phase A: Black.
         2) Phase B: Red.
         3) Phase C: Blue.
         4) Neutral/Grounded: White.
      b. Equipment Ground, All Systems: Green.

2.03 SINGLE CONDUCTOR BUILDING WIRE

A. Description: Single conductor insulated wire.

B. Conductor Stranding:
   1. Feeders and Branch Circuits:
      a. Size 10 AWG and Smaller: Solid.
      b. Size 8 AWG and Larger: Stranded.

C. Insulation Voltage Rating: 600 V.

D. Insulation:
   1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2.

2.04 **METAL-CLAD CABLE**

A. Manufacturers:
   1. AFC Cable Systems Inc: www.afcweb.com/#sle.
   2. Encore Wire Corporation: www.encorewire.com/#sle.
   3. Southwire Company: www.southwire.com/#sle.

B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.

C. Conductor Stranding:
   1. Size 10 AWG and Smaller: Solid.
   2. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.

F. Grounding: Full-size integral equipment grounding conductor.

G. Armor: Steel, interlocked tape.

2.05 **WIRING CONNECTORS**

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Connectors for Grounding and Bonding: Comply with Section 26 0526.

C. Wiring Connectors for Splices and Taps:
   1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.

D. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F (105 degrees C) for standard applications and 302 degrees F (150 degrees C) for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
   1. Manufacturers:
      a. 3M: www.3m.com/#sle.
      b. Ideal Industries, Inc: www.idealindustries.com/#sle.
      c. NSI Industries LLC: www.nsiindustries.com/#sle.

2.06 **ACCESSORIES**

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Electrical Tape:
   1. Manufacturers:
      a. 3M: www.3m.com/#sle.
      b. Plymouth Rubber Europa: www.plymouthrubber.com/#sle.
   2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).

C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

D. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Circuiting Requirements:
   1. Unless dimensioned, circuit routing indicated is diagrammatic.

2. When circuit destination is indicated without specific routing, determine exact routing required.
3. Arrange circuiting to minimize splices.
4. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
5. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

B. Install products in accordance with manufacturer's instructions.

C. Perform work in accordance with NECA 1 (general workmanship).

D. Install metal-clad cable (Type MC) in accordance with NECA 120.

E. Installation in Raceway:
1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
2. Pull all conductors and cables together into raceway at same time.
3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

F. Exposed Cable Installation (only where specifically permitted):
1. Route cables parallel or perpendicular to building structural members and surfaces.
2. Protect cables from physical damage.

G. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

H. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

I. Terminate cables using suitable fittings.
1. Metal-Clad Cable (Type MC):
   a. Use listed fittings.
   b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.

J. Install conductors with a minimum of 6-inches (15 cm) of slack at each outlet.

K. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

L. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

M. Make wiring connections using specified wiring connectors.
1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
3. Do not remove conductor strands to facilitate insertion into connector.

N. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.

O. Insulate ends of spare conductors using vinyl insulating electrical tape.

P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

Q. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION

SECTION 26 0526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 **SECTION INCLUDES**

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

1.02 **RELATED REQUIREMENTS**

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

B. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding.

C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 **REFERENCE STANDARDS**

A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

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

C. UL 467 - Grounding and Bonding Equipment Current Edition, Including All Revisions.

1.04 **SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

1.05 **QUALITY ASSURANCE**

A. Comply with requirements of NFPA 70.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 PRODUCTS

2.01 **GROUNDING AND BONDING REQUIREMENTS**

A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

D. Bonding and Equipment Grounding:

1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

2.02 **GROUNDING AND BONDING COMPONENTS**

A. General Requirements:
   1. Provide products listed, classified, and labeled as suitable for the purpose intended.
   2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
   1. Use insulated copper conductors unless otherwise indicated.
      a. Exceptions:
         1) Use bare copper conductors where installed underground in direct contact with earth.
         2) Use bare copper conductors where directly encased in concrete (not in raceway).
      b. Where bare copper conductors are used for grounding systems, they shall comply with the following:
         1) Solid Conductors: ASTM B 3.
         2) Stranded Conductors: ASTM B 8.
         3) Tinend Conductors: ASTM B 33.
         4) Bonding Cable: 28 KCMIL, 14 strands of No. 17 AWG conductors, 1/4 inch in diameter.
         5) Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
         6) Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
         7) Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

C. Connectors for Grounding and Bonding:
   1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
   2. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.
   3. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
   1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
   2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
   3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

E. Make grounding and bonding connections using specified connectors.
   1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate

insertion into connector.

2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
    a. Applications:
        1) Underground connections(except at test wells and as otherwise indicated.
        2) Connections to structural steel.
4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
    a. Applications:
        1) Pipe and equipment grounding conductor terminations.

F. Identify grounding and bonding system components in accordance with Section 26 0553.

3.02 **EQUIPMENT GROUNDING:**

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

3.03 **FIELD QUALITY CONTROL**

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Tests and Inspection: After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
    1. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions

END OF SECTION

SECTION 26 0529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

A. Section 26 0533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.

B. Section 26 0533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.

C. Section 26 0548 - Vibration and Seismic Controls for Electrical Systems.

D. Section 26 5100 - Interior Lighting: Additional support and attachment requirements for interior luminaires.

1.03 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.

C. MFMA-4 - Metal Framing Standards Publication 2004.

D. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

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

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
   2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
   3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
   4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
   5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
      a. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.

C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.

D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
   1. Comply with MFMA-4.
   2. Channel Material:
      a. galvanized steel.
   3. Minimum Channel Dimensions: 1-5/8 inch (41 mm) width by 13/16 inch (21 mm) height.

E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.

F. Anchors and Fasteners:
   1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
   2. Hollow Stud Walls: Use toggle bolts.
   3. Steel: Use beam clamps complying with MSS SP-96.
   4. Sheet Metal: Use sheet metal screws.
   5. Wood: Use Fasten with lag screws or through bolts.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Do not provide support from piping, ductwork, or other systems.

D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

G. Equipment Support and Attachment:
   1. Strength and support assemblies: where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
   2. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMTs, IMCs, and RMCs as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
   3. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
   4. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
   5. Use slotted-channel racks attached to substrate to support equipment surface-mounted on hollow stud wallsand nonstructual building surfaces.
   6. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
   7. Unless otherwise indicated, mount floor-mounted equipment on properly sized 3 inch (80 mm) high concrete pad constructed in accordance with Section 03 3000 and as specified in this section.
   8. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
   9. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

10. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

H. Secure fasteners according to manufacturer's recommended torque settings.

I. Remove temporary supports.

END OF SECTION

SECTION 26 0533.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Galvanized steel rigid metal conduit (RMC).
B. Flexible metal conduit (FMC).
C. Liquidtight flexible metal conduit (LFMC).
D. Electrical metallic tubing (EMT).
E. Rigid polyvinyl chloride (PVC) conduit.
F. Surface Mounted Raceways
G. Conduit fittings.
H. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete encasement of conduits.
B. Section 07 8400 - Firestopping.
C. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.
D. Section 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.
    1. Includes additional requirements for fittings for grounding and bonding.
E. Section 26 0529 - Hangers and Supports for Electrical Systems.
F. Section 26 0533.16 - Boxes for Electrical Systems.
G. Section 26 0533.23 - Surface Raceways for Electrical Systems.
H. Section 26 0539 - Underfloor Raceways for Electrical Systems.
I. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
J. Section 26 2100 - Low-Voltage Electrical Service Entrance: Additional requirements for electrical service conduits.

1.03 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC) 2015.
B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S) 2015.
C. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT) 2013.
E. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.
F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
G. UL 1 - Flexible Metal Conduit Current Edition, Including All Revisions.
H. UL 6 - Electrical Rigid Metal Conduit-Steel Current Edition, Including All Revisions.
I. UL 360 - Liquid-Tight Flexible Steel Conduit Current Edition, Including All Revisions.
J. UL 514B - Conduit, Tubing, and Cable Fittings Current Edition, Including All Revisions.
K. UL 797 - Electrical Metallic Tubing-Steel Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

C. Concealed Within Masonry Walls: Use electrical metallic tubing (EMT).

D. Concealed Within Hollow Stud Walls: Use electrical metallic tubing (EMT).

E. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).

F. Interior, Damp or Wet Locations: Use intermediate metal conduit (IMC).

G. Exposed, interior, Located within finished spaces: Use Decorative Surface Mounted Raceway

H. Exposed, Interior, Not Subject to Physical Damage, Located within unfinished spaces(mechanical rooms/storage rooms): Use electrical metallic tubing (EMT).

I. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.

J. Exposed, Exterior: Use galvanized steel rigid metal conduit.

K. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit.

L. Connections to Vibrating Equipment and 3" trade size at equipment:
   1. Dry Locations: Use flexible metal conduit.
   2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
   3. Maximum Length: 6 feet (1.8 m) unless otherwise indicated.
   4. Vibrating equipment includes, but is not limited to:
      a. Transformers.
      b. Motors.
      c. Pneumatic Equipment
      d. Electric Solenoids.
      e. Hydraulic equipment.
   5. Equipment connections includes,
      a. Switchboards
      b. Panels
      c. Transformers

M. Fished in Existing Walls, Where Necessary: Use flexible metal conduit.

2.02 CONDUIT REQUIREMENTS

A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.

B. Fittings for Grounding and Bonding: Also comply with Section 26 0526.

C. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

D. Provide products listed, classified, and labeled as suitable for the purpose intended.

E. Minimum Conduit Size, Unless Otherwise Indicated:
   1. Branch Circuits: 1/2 inch (16 mm) trade size.

F. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 **GALVANIZED STEEL RIGID METAL CONDUIT (RMC)**

A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

B. Fittings:
   1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 **FLEXIBLE METAL CONDUIT (FMC)**

A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel.

2.05 **LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)**

A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel.

2.06 **ELECTRICAL METALLIC TUBING (EMT)**

A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel.
   3. Connectors and Couplings: Use compression (gland) or set-screw type.
      a. Do not use indenter type connectors and couplings.

2.07 **SURFACE MOUNTED RACEWAYS**

A. Provide all components, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

D. Surface Metal Raceways: Listed and labeled as complying with UL 5.

E. Surface Nonmetallic Raceways: Listed and labeled as complying with UL 5A.

F. Multioutlet Assemblies: Listed and labeled as complying with UL 111.
   1. Color: To be selected by architect prior to product order.
   2. Accessory Device Boxes: Suitable for the devices to be installed; color to match raceway.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

D. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated without specific routing, determine exact routing required.
   3. Conceal all conduits unless specifically indicated to be exposed.
   4. Install raceways square to enclosures and terminate with locknuts.
   5. Conduits in the following areas may be exposed, unless otherwise indicated:
      a. Electrical rooms.
      b. Mechanical equipment rooms.
      c. Within joists in areas with no ceiling.
   6. Unless otherwise approved, do not route conduits exposed:
      a. Across floors.
      b. Across roofs.
      c. Across top of parapet walls.
      d. Across building exterior surfaces.
   7. Arrange conduit to maintain adequate headroom, clearances, and access.
   8. Arrange conduit to provide no more than the equivalent of three 90 degree bends between pull points.
   9. Maintain minimum clearance of 6 inches (150 mm) between conduits and piping for other systems.
   10. Maintain minimum clearance of 12 inches (300 mm) between conduits and hot surfaces. This includes, but is not limited to:
      a. Heaters.
      b. Hot water piping.
      c. Flues.
   11. arrange stub-ups so curved portions of bends are not visible above finished slab.

E. Conduit Support:
   1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
   3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
   4. Use conduit strap to support single surface-mounted conduit.
      a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
   5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
   6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
   7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
   8. Use non-penetrating rooftop supports to support conduits routed across rooftops (only where approved).
   9. Support conduits within 12 inches of connected enclosure.

F. Connections and Terminations:
   1. Use approved conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
   2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
   3. Use suitable adapters where required to transition from one type of conduit to another.
   4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.

5. Terminate threaded conduits in boxes and enclosures using threaded hubs for dry locations and raintight hubs for wet locations.
6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
8. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

G. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Conceal bends for conduit risers emerging above ground.
5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

H. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
2. Where conduits are subject to earth movement by settlement or frost.

I. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
1. Where conduits pass from outdoors into conditioned interior spaces.
2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
3. Where conduits penetrate coolers or freezers.

J. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches (300 mm) at each end.

K. Provide grounding and bonding in accordance with Section 26 0526.

L. Surface Raceway Installation:
1. Install surface raceway with a minimum 2-inch radius control at bend points.
2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section.
3. Support raceway according to manufacturers written instructions. Tape and glue are not acceptable support methods.

END OF SECTION

SECTION 26 0533.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches (1,650 cu cm), including those used as junction and pull boxes.

B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches (1,650 cu cm).

C. Boxes and enclosures for integrated power, data, and audio/video.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2010.

C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.

D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports 2013.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2018.

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

G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.

H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.

I. UL 508A - UL Standard for Safety Industrial Control Panels 2018.

J. UL 514A - Metallic Outlet Boxes Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for floor boxes and underground boxes/enclosures.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Keys for Lockable Enclosures: Two of each different key.

PART 2 PRODUCTS

2.01 BOXES

A. General Requirements:
   1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
   2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
   3. Provide products listed, classified, and labeled as suitable for the purpose intended.
   4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
   5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
   1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.

2. Use cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
3. Use raised covers suitable for the type of wall construction and device configuration where required.
4. Use shallow boxes where required by the type of wall construction.
5. Do not use "through-wall" boxes designed for access from both sides of wall.
6. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
7. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
8. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
9. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
10. Minimum Box Size, Unless Otherwise Indicated:
    a. 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size
11. Wall Plates: Comply with Section 26 2726.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
2. NEMA 250 Environment Type, Unless Otherwise Indicated:
    a. Indoor Clean, Dry Locations: Type 1, painted steel.
    b. Outdoor Locations: Type 3R, painted steel.
3. Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
    a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
    a. Provide lockable hinged covers unless otherwise indicated.
    b. Back Panels: Painted steel, removable.
5. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide separate boxes for emergency power and normal power systems.

E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.

G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.

H. Box Locations:
1. Mount at heights indicated on drawings. If mounting heights are not individually indicated, Locate boxes to be accessible. Provide access panels in accordance with Section 08 3100 as requiredwhere approved by the Architect.
2. Unless dimensioned, box locations indicated are approximate.
3. Locate boxes so that wall plates do not span different building finishes.

4. Locate boxes so that wall plates do not cross masonry joints.
5. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
6. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches (150 mm) horizontal separation unless otherwise indicated.
7. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.

I. Box Supports:
1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
4. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
5. Do not support boses by conduit alone.

J. Install boxes plumb and level.

K. Flush-Mounted Boxes:
1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch (6 mm) or does not project beyond finished surface.
2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch (3 mm) at the edge of the box.

L. Install boxes as required to preserve insulation integrity.

M. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

N. Close unused box openings.

O. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

P. Provide grounding and bonding in accordance with Section 26 0526.

Q. Identify boxes in accordance with Section 26 0553.

END OF SECTION

SECTION 26 0533.23
SURFACE RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface raceway systems.

B. Wireways.

1.02 RELATED REQUIREMENTS

A. Section 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

B. Section 26 0529 - Hangers and Supports for Electrical Systems.

C. Section 26 0533.13 - Conduit for Electrical Systems.

D. Section 26 0533.16 - Boxes for Electrical Systems.

E. Section 26 2726 - Wiring Devices: Receptacles.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

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

C. UL 5 - Surface Metal Raceways and Fittings Current Edition, Including All Revisions.

D. UL 111 - Outline of Investigation for Multioutlet Assemblies Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including dimensions, knockout sizes and locations, materials, fabrication details, finishes, service condition requirements, and accessories.

1. Surface Raceway Systems: Include information on fill capacities for conductors and cables.

PART 2 PRODUCTS

2.01 RACEWAY REQUIREMENTS

A. Provide all components, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

2.02 SURFACE RACEWAY SYSTEMS

A. Surface Metal Raceways: Listed and labeled as complying with UL 5.

B. Multioutlet Assemblies: Listed and labeled as complying with UL 111.

C. Type [_____] - Surface Raceway System:

1. Raceway Type: Single channel, Galvanized Steel, Manufacturer standard enamel finish..
2. Length: As indicated on the drawings.
3. Color: To be selected by Architect.
4. Accessory Device Boxes: Suitable for the devices to be installed; color to match raceway.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

3.02 **APPLICATION:**

A. Unless indicated on drawings, provide surface mounted raceway, plug strips, or wireways only where specifically indicated or approved:

3.03 **INSTALLATION**

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install raceways plumb and level.

D. Surface Raceway:
   1. Install surface raceway with a minimum 2-inch radius control at bend points.
   2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.

E. Secure and support raceways in accordance with Section 26 0529 at intervals complying with NFPA 70 and manufacturer's requirements.

F. Close unused raceway openings.

G. Provide grounding and bonding in accordance with Section 26 0526.

END OF SECTION

SECTION 26 0548
VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Seismic control requirements.
   1. Includes requirements for seismic qualification of equipment not specified in this section.

B. Seismic restraint systems.

1.02 RELATED REQUIREMENTS

A. Section 26 0529 - Hangers and Supports for Electrical Systems.

1.03 DEFINITIONS

A. Seismic Restraint: Structural members or assemblies of members or manufactured elements specifically designed and applied for transmitting seismic forces between components and the seismic force-resisting system of the structure.

1.04 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications Most Recent Edition Cited by Referring Code or Reference Standard.

C. FEMA 413 - Installing Seismic Restraints for Electrical Equipment 2004.

D. FEMA E-74 - Reducing the Risks of Nonstructural Earthquake Damage 2012.

E. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

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

H. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems 2008.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for products, including materials, fabrication details, dimensions, and finishes.
   1. Seismic Controls: Include seismic load capacities.

C. Seismic Design Data:
   1. Compile information on project-specific characteristics of actual installed electrical components necessary for determining seismic design forces required to design appropriate seismic controls, including but not limited to the following.
      a. Component operating weight and center of gravity.
      b. Component importance factor (Ip).
   2. Include structural calculations, stamped or sealed by seismic controls designer, demonstrating suitability of seismic controls for seismic design forces.

PART 2 PRODUCTS

2.01 SEISMIC CONTROL REQUIREMENTS

A. Design and provide electrical component restraints, supports, and attachments suitable for seismic loads determined in accordance with applicable codes, as well as gravity and operating loads and other structural design considerations of the installed location. Consider wind loads for outdoor electrical components.

B. Seismic Design Criteria: ICC (IBC).

C. Component Importance Factor (Ip): Electrical components to be assigned a component importance factor (Ip) of 1.5 unless otherwise indicated.

D. Component Importance Factor (Ip): Electrical components essential to life safety to be assigned a component importance factor (Ip) of 1.5 as indicated or as required. This includes but is not limited to:
   1. Electrical components required to function for life safety purposes after an earthquake.
   2. Electrical components that support or otherwise contain hazardous substances.

E. Seismic Restraints:
   1. Provide seismic restraints for electrical components except where exempt according to applicable codes and specified seismic design criteria, as approved by authorities having jurisdiction.
   2. Comply with applicable general recommendations of the following, where not in conflict with applicable codes, seismic design criteria, or other specified requirements:
      a. ASHRAE (HVACA).
      b. FEMA 413.
      c. FEMA E-74.
      d. SMACNA (SRM).
   3. Seismic Restraint Systems:
      a. Except where otherwise restricted, use of either cable or rigid restraints is permitted.
      b. Use only cable restraints to restrain vibration-isolated electrical components, including distributed systems.
      c. Size restraint elements, including anchorage, to resist seismic loads as necessary to restrain electrical component in all lateral directions; consider bracket geometry in anchor load calculations.
      d. Use rod stiffener clips to attach bracing to hanger rods as required to prevent rod buckling from vertical (upward) compressive load introduced by cable or rigid restraints loaded in tension, in excess of downward tensile load due to supported electrical component weight.
      e. Select hanger rods and associated anchorage as required to accommodate vertical (downward) tensile load introduced by rigid restraints loaded in compression, in addition to downward tensile load due to supported electrical component weight.
      f. Clevis hangers may only be used for attachment of transverse restraints; do not use for attachment of longitudinal restraints.
      g. Where seismic restraints are attached to clevis hangers, provide clevis bolt reinforcement accessory to prevent clevis hanger deformation.
      h. Do not introduce lateral loads on open bar joist chords or the weak axis of beams, or loads in any direction at other than panel points unless approved by project Structural Engineer of Record.

F. Seismic Attachments:
   1. Attachments to be bolted, welded, or otherwise positively fastened without consideration of frictional resistance produced by the effects of gravity.
   2. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) or qualified evaluation service acceptable to authorities having jurisdiction for compliance with applicable building code, and qualified for seismic applications; concrete anchors to be qualified for installation in both cracked and uncracked concrete.
   3. Do not use power-actuated fasteners.
   4. Do not use friction clips (devices that rely on mechanically applied friction to resist loads). Beam clamps may be used for supporting sustained loads where provided with restraining straps.
   5. Comply with anchor minimum embedment, minimum spacing, minimum member thickness, and minimum edge distance requirements.

G. Seismic Interactions:

1. Include provisions to prevent seismic impact between electrical components and other structural or nonstructural components.
2. Include provisions such that failure of a component, either essential or nonessential, does not cause the failure of an essential component.

H. Seismic Relative Displacement Provisions:
1. Use suitable fittings or flexible connections to accommodate:
a. Relative displacements between component supports attached to dissimilar parts of structure that may move differently during an earthquake.
b. Design displacements at seismic separations.
c. Anticipated drifts between floors.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install products in accordance with applicable requirements of NECA 1 (general workmanship).

C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

D. Secure fasteners according to manufacturer's recommended torque settings.

E. Install flexible conduit and cable connections to provide sufficient slack for vibration isolation and/or seismic relative displacements as indicated or as required.

F. Seismic Controls:
1. Provide specified snubbing element air gap; remove any factory-installed spacers, debris or other obstructions.
2. Use only specified components, anchorage, and hardware evaluated by seismic design. Comply with conditions of seismic certification where applicable.
3. Where mounting hole diameter exceeds bolt diameter by more than 0.125 inch (3 mm), use epoxy grout, elastomeric grommet, or welded washer to reduce clearance to 0.125 inch (3 mm) or less.
4. Equipment with Sheet Metal Housings:
a. Use Belleville washers to distribute stress over a larger surface area of the sheet metal connection interface as approved by manufacturer.
b. Attach additional steel as approved by manufacturer where required to transfer loads to structure.
c. Where mounting surface is irregular, do not shim housing; reinforce housing with additional steel as approved by manufacturer.

END OF SECTION

SECTION 26 0553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical identification requirements.

B. Identification nameplates and labels.

C. Wire and cable markers.

D. Voltage markers.

1.02 RELATED REQUIREMENTS

A. Section 26 2726 - Wiring Devices - Lutron: Device and wallplate finishes; factory pre-marked wallplates.

B. Section 27 1000 - Structured Cabling: Identification for communications cabling and devices.

1.03 REFERENCE STANDARDS

A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs 2011.

B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels 2011.

C. UL 969 - Marking and Labeling Systems Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

C. Samples:
   1. Identification Nameplates: One of each type and color specified.
   2. Warning Signs and Labels: One of each type and legend specified.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

A. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
   2. Use identification label to identify overcurrent protective devices for branch circuits serving fire alarm circuits. Identify with text "FIRE ALARM CIRCUIT".

B. Identification for Conductors and Cables:
   1. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
      a. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
         1) Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
         2) Colors for 208/120-V Circuits:
            (a) Phase A: Black.
            (b) Phase B: Red.
            (c) Phase C: Blue.
         3) Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
   2. Identification for Communications Conductors and Cables: Comply with Section 27 1000.

3. Use identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
4. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
    a. Within boxes when more than one circuit is present.

C. Identification for Boxes:
1. Use voltage markers to identify highest voltage present.
2. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
    a. For exposed boxes in public areas, use only identification labels.

D. Identification for Devices:
1. Identification for Communications Devices: Comply with Section 27 1000.
2. Wiring Device and Wallplate Finishes: Comply with Section 26 2726.
3. Use identification label to identify serving branch circuit for all receptacles.
    a. For receptacles in areas as directed by Architect, provide identification on inside surface of wallplate. Verify with Architect prior to label application.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
1. Materials:
    a. Indoor Clean, Dry Locations: Use plastic nameplates.

B. Identification Labels:
1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
    a. Use only for indoor locations.
2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Receptacle Identification:
1. Minimum Size: 3/8 inch (10 mm) by 1.5 inches (38 mm).
2. Legend: Power source and circuit number or other designation indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch (5 mm).
5. Color: Black text on clear background.

2.03 WIRE AND CABLE MARKERS

A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl self-laminating type markers suitable for the conductor or cable to be identified.

B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

C. Legend: Power source and circuit number or other designation indicated.

D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

E. Minimum Text Height: 1/8 inch (3 mm).

F. Color: Black text on white background unless otherwise indicated.

2.04 VOLTAGE MARKERS

A. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.

B. Minimum Size:
1. Markers for Equipment: 1 1/8 by 4 1/2 inches (29 by 110 mm).
2. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches (29 by 110 mm).

3. Markers for Junction Boxes: 1/2 by 2 1/4 inches (13 by 57 mm).

C. Legend:
1. Markers for Voltage Identification: Highest voltage present.
2. Markers for System Identification:
a. Emergency Power System: Text "EMERGENCY".

D. Color: Black text on orange background unless otherwise indicated.

2.05 **WARNING SIGNS AND LABELS**

A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

B. Warning Signs:
1. Materials:
a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
3. Minimum Size: 7 by 10 inches (178 by 254 mm) unless otherwise indicated.

C. Warning Labels:
1. Materials: Use factory pre-printed or machine-printed self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

PART 3 EXECUTION

3.01 **PREPARATION**

A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 **INSTALLATION**

A. Install products in accordance with manufacturer's instructions.

B. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, drawings, shop drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout project.

C. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
1. Boxes: Outside face of cover.
2. Conductors and Cables: Legible from the point of access.
3. Devices: Outside face of cover.

D. Install identification products centered, level, and parallel with lines of item being identified.

E. Apply identification devices to surfaces that require finish after completing finish work.

F. Unless labels and nameplates are provided with self-adhesive means of attachment, fasten them with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

G. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

H. Mark all handwritten text, where permitted, to be neat and legible.

I. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

J. Equipment To Be Labeled:

1. Enclosures and electrical cabinets.
2. Access doors and panels for concealed electrical items.
3. Substations.
4. Emergency system boxes and enclosures.

END OF SECTION

SECTION 26 2726
WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Receptacles.

B. Wall plates.

1.02 RELATED REQUIREMENTS

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Manufactured wiring systems for use with access floor boxes with compatible pre-wired connectors.

B. Section 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

C. Section 26 0533.16 - Boxes for Electrical Systems.

D. Section 26 0533.23 - Surface Raceways for Electrical Systems: Surface raceway systems, including multioutlet assemblies.

E. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

A. FS W-C-596 - Connector, Electrical, Power, General Specification for 2017h.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

C. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2010.

D. NEMA WD 1 - General Color Requirements for Wiring Devices 1999 (Reaffirmed 2015).

E. NEMA WD 6 - Wiring Devices - Dimensional Specifications 2016.

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

G. UL 498 - Attachment Plugs and Receptacles Current Edition, Including All Revisions.

H. UL 514D - Cover Plates for Flush-Mounted Wiring Devices Current Edition, Including All Revisions.

I. UL 943 - Ground-Fault Circuit-Interrupters Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
   2. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
   3. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
   4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

1.06 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Products: Listed, classified, and labeled as suitable for the purpose intended.

PART 2 PRODUCTS

2.01 WIRING DEVICE APPLICATIONS

A. Provide wiring devices suitable for intended use and with ratings adequate for load served.

B. Provide weather resistant GFCI receptacles with specified weatherproof in use covers for receptacles installed outdoors or in damp or wet locations.

C. Provide tamper resistant receptacles.

D. Provide GFCI protection for receptacles installed within 6 feet (1.8 m) of sinks.

E. Provide GFCI protection for receptacles installed in commercial kitchens.

F. Provide GFCI protection for receptacles serving electric drinking fountains.

G. Unless noted otherwise, do not use combination switch/receptacle devices.

2.02 WIRING DEVICE FINISHES

A. Provide wiring device finishes as described below unless otherwise indicated.

B. Wiring Devices, Unless Otherwise Indicated: Gray with nylon wall plate, Verification during submittal process.

C. Wiring Devices Connected to Emergency Power: Red with red nylon wall plate factory marked "Emergency".

2.03 MODULAR CONNECTORS

A. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
   1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
   2. Devices shall comply with the requirements in this Section.

2.04 MANUFACTURERS:

A. Hubbell Incorporated: www.hubbell.com/#sle.

B. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.

C. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.

D. Eaton(Arrow Hart).

E. Substitutions: See Section 01 6000 - Product Requirements.

2.05 SOURCE LIMITATIONS

A. Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.06 PRODUCT GRADE:

A. Receptacles: Unless indicated otherwise, Industrial specification grade.

B. Switches: Unless indicated otherwise, Industrial specification grade.

2.07 RECEPTACLES

A. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
   1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
   2. NEMA configurations specified are according to NEMA WD 6.

B. Convenience Receptacles:
   1. Standard Convenience Receptacles: [_____], 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
   2. Weather Resistant Convenience Receptacles: Industrial specification grade, {CH#109268}{CH#109269}, listed and labeled as weather resistant type complying with

UL 498 Supplement SE suitable for installation in damp or wet locations; single or duplex as indicated{CH#109270}.

3. Tamper Resistant Convenience Receptacles: [_____], 20A, 125V, NEMA 5-20R, listed and labeled as tamper resistant type; single or duplex as indicated on the drawings.

C. GFCI Receptacles:
   1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
      a. Provide test and reset buttons of same color as device.
   2. Standard GFCI Receptacles: [_____], duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
   3. Weather Resistant GFCI Receptacles: [_____], duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.
   4. Tamper Resistant GFCI Receptacles: [_____], duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as tamper resistant type.

2.08 **WALL PLATES**

A. Wall Plates: Comply with UL 514D.
   1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
   2. Size: Standard; [_____].
   3. Screws: Metal with slotted heads finished to match wall plate finish.

B. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel unless indicated otherwise by architect during submittal process.

C. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.

D. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130.

B. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of wiring devices provided under this section.
   1. Mounting Heights: Unless otherwise indicated, as follows:
      a. Wall Switches: 48 inches (1200 mm) above finished floor.
      b. Receptacles: 18 inches (450 mm) above finished floor or 6 inches (150 mm) above counter where indicated.
   2. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
   3. Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
   4. Locate wall switches on strike side of door with edge of wall plate 3 inches (80 mm) from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
   5. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.

C. Install wiring devices in accordance with manufacturer's instructions.

D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

E. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. Where required, connect wiring devices using pigtails not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.
4. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
5. Existing Conductors:
    a. Cut back and pigtail, or replace all damaged conductors.
    b. Straighten conductors that remain and remove corrosion and foreign matter.
    c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.
    d. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.

F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

H. Unless otherwise indicated, GFCI receptacles may be connected to provide feed-through protection to downstream devices. Label such devices to indicate they are protected by upstream GFCI protection.

I. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

J. Install wiring devices plumb and level with mounting yoke held rigidly in place.

K. Install wall switches with OFF position down.

L. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.

M. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

N. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

O. Identify wiring devices in accordance with Section 26 0553.
1. Unless instructed differently by Architect, Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.02 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Inspect each wiring device for damage and defects.

C. Test each receptacle to verify operation and proper polarity.
1. Line voltage: Acceptable range is 105 to 132 V.
2. Ground Impedance: Values of up to 2 ohms are acceptable.
3. Voltage Drop: Under 15A load, a value of 6 percent or higher is unnacceptable.

D. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
1. Test for tripping values specified in UL 1436 and UL 943

E. Correct wiring deficiencies and replace damaged or defective wiring devices.

F. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete

3.03 **ADJUSTING**

A. Adjust devices and wall plates to be flush and level.

3.04 **CLEANING**

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

SECTION 26 5100
INTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior luminaires.

B. Ballasts and drivers.

C. Lamps.

D. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 26 0529 - Hangers and Supports for Electrical Systems.

B. Section 26 0533.16 - Boxes for Electrical Systems.

C. Section 26 2726 - Wiring Devices: Manual wall switches and wall dimmers.

1.03 REFERENCE STANDARDS

A. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products 2008.

B. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules 2015, with Errata (2017).

C. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems 2006.

D. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems 2006.

E. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts 2016.

F. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility 2012.

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

H. UL 1598 - Luminaires Current Edition, Including All Revisions.

I. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
3. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

1. LED Luminaires:
   a. Include estimated useful life, calculated based on IES LM-80 test data.

2. LED Retrofit Luminaire Conversion Kits: Include list of compatible luminaires and/or criteria for compatibility.

C. Project Record Documents: Record actual connections and locations of luminaires and any associated remote components.

1.06 **DELIVERY, STORAGE, AND PROTECTION**

A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.07 **FIELD CONDITIONS**

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.08 **WARRANTY**

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for LED luminaires, including drivers.

PART 2 PRODUCTS

2.01 **LUMINAIRE TYPES**

A. Furnish products as indicated in luminaire schedule included on the drawings.

2.02 **LUMINAIRES**

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. Recessed Luminaires:
1. Ceiling Compatibility: Comply with NEMA LE 4.
2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.
3. Luminaires Recessed in Sloped Ceilings: Provide suitable sloped ceiling adapters.

H. LED Luminaires:
1. Components: UL 8750 recognized or listed as applicable.
2. Tested in accordance with IES LM-79 and IES LM-80.
3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

I. LED Tape Lighting Systems: Provide all power supplies, drivers, cables, connectors, channels, covers, mounting accessories, and interfaces as necessary to complete installation.
1. LED Tape - General Requirements:
a. Listed.

2.03 **BALLASTS AND DRIVERS**

A. Ballasts/Drivers - General Requirements:
1. Provide ballasts containing no polychlorinated biphenyls (PCBs).

2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.
3. Electronic Ballasts/Drivers: Inrush currents not exceeding peak currents specified in NEMA 410.

2.04 **LAMPS**

A. Lamps - General Requirements:
1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the Architect to be inconsistent in perceived color temperature.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of luminaires provided under this section.

B. Install products in accordance with manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).

D. Provide required support and attachment in accordance with Section 26 0529.

E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

F. Recessed Luminaires:
1. Install trims tight to mounting surface with no visible light leakage.

G. Install accessories furnished with each luminaire.

H. Bond products and metal accessories to branch circuit equipment grounding conductor.

I. Emergency Lighting Units:
1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

J. Exit Signs:
1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

K. Install lamps in each luminaire.

3.02 **CLEANING**

A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.03 **PROTECTION**

A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

SECTION 27 0000
GENERAL REQUIREMENTS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Division 27 Specifications are provided to define the standards and criteria to be used to bid, plan, furnish, install, test, and document communication systems for 20083 - BSD Cooper Mountain Elementary Seismic. These specifications shall form the basis for implementation of the procurement, installation, inspection, and close-out process.

B. Division 27 has been designed and developed based on NFPA 70 (NEC), National Electrical Safety Code (NESC), Institute of Electronic and Electrical Engineers (IEEE), and a combination of ANSI/TIA Telecommunication Standards, and BICSI methodologies. The requirements within those documents are not superseded herein unless specifically stated. NEC and NESC code requirements are unable to be superseded by this document at any time. ANSI/TIA standards and BICSI methodologies are guidelines and recommendations for best practices and may be superseded, as specified, or may be made more stringent by this document.

C. Any use of the word “shall” marks a mandatory requirement. Use of the word “may” or “should” suggests optional elements. All conflicts within this document shall be resolved by the General Contractor in consultation with the Design Team. The standards of XYZ Corporation shall take precedence in the resolution of any dispute.

D. Unauthorized changes and/or deviations from these specifications, regardless of scale, may result in re-design, reconstruction, or re-installation of communications elements at the contractor’s expense. Contractors shall obtain formal written approval prior to bidding and prior to installation in order to deviate from these specifications or from ANSI/TIA standards and BICSI methodologies. Contractors shall not deviate from NEC and NESC requirements.

E. Division 27 Specifications address information transport pathways, multiple different types of communication systems, spaces, media, grounding, identification, testing, and documentation requirements in support of multiple information transport infrastructures.

F. Specific responsibilities of Division 27 include, but are not limited to:
   1. The procurement and installation of each communications system and the associated components and cabling to create a fully functional system.
   2. Thorough testing shall be conducted of each individual communications system to illustrate compliance with specific performance requirements.
   3. Definition and establishment of administration and labeling schemes, conforming to Owner’s requirements.
   4. Securing all necessary permits and licenses, payment of all fees, and provision of all construction work notifications.
   5. Compliance with all applicable laws, ordinances, rules, and regulations.
   6. Mandatory project manager attendance at a weekly project status meeting with the General Contractor.
   7. It is the intent of the project drawings and specifications to provide complete and fully functional Division 27 communication systems, ready for use. Any item, not specifically shown in the project drawings or called for in the project specifications but normally required for a complete system, is to be considered a part of this contract.

G. System Continuity:
   1. Reconnect all existing items that remain in use. Provide all materials and labor required to retain continuity of existing circuits or systems that are disrupted by these alterations even though not indicated on the drawings.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 00 & 01 Specification Sections, apply to this Section.

1.03 **ABBREVIATIONS AND ACRONYMS**

A. The following definitions are applicable to the work as indicated and as shown herein:
   1. ADA: Americans with Disabilities Act
   2. AFF: Above Finished Floor
   3. ANSI: American National Standards Institute
   4. ASTM: American Society for Testing & Materials (ASTM International)
   5. AWG: American Wire Gauge
   6. BET: Building Entrance Terminal
   7. BTU: British Thermal Unit
   8. dB: Decibel
   9. dBmV: Decibel Millivolt
   10. EMT: Electrical Metallic Tubing
   11. FCC: Federal Communications Commission
   12. Freq: Frequency
   13. HH: Hand Hole
   14. HVAC: Heating, Ventilation, and Air Conditioning
   15. Hz: Hertz
   16. IMC: Intermediate Metal Conduit
   17. IEEE: Institute of Electrical and Electronics Engineers
   18. ISO: International Organization for Standardization
   19. LAN: Local Area Network
   20. LCD: Liquid Crystal Display
   21. Mbps: Megabits per second
   22. MHz: Megahertz
   23. NEC: National Electrical Code, NFPA 70
   24. NESC: National Electric Safety Code
   25. NFPA: National Fire Protection Association
   26. NRTL: Nationally Recognized Testing Laboratory
   27. OSHA: Occupational Safety and Health Administration
   28. OSP: Outside cable Plant
   29. PR: Pair
   30. RFI: Radio Frequency Interference
   31. RH: Relative Humidity
   32. SE: Service Entrance
   33. SFP: Small Form-Factor Pluggable Transceiver
   34. TV: Television
   35. UL: Underwriters Laboratory
   36. UPS: Uninterruptible Power Supply
   37. WAP: Wireless Access Point

1.04 **DEFINITIONS**

A. The following definitions are applicable to the work as indicated and as shown herein:
   1. Attenuation: The decrease in power of a signal, light beam, or light wave, either absolutely or as a fraction of a reference value. Attenuation is the opposite of gain and is measured in decibels (dB).
   2. Backbone System: The cabling and connecting hardware that provides interconnection between Telecommunications Rooms, Equipment Room, and Entrance Facilities.
   3. BET: Building Entrance Terminal - Cable termination equipment used to terminate outside plant (OSP) cables at or near the point of building entry.
   4. Conduit Chase Pipe: Short section of bushed EMT conduit with sufficient size and capacity to support horizontal cabling bundles from ceiling space, through ceiling tile, onto the ladder tray system connecting wall to rack or cabinet.
   5. Design Team: A group of individuals comprised of Architect(s) and Engineer(s) involved in assembling the contract documents known as the drawings and specifications.

6. EF: Entrance facility - A location within a building for both public and private network service cables. A facility that provides all necessary mechanical and electrical services for the entry of telecommunications cables into a building and that complies with all relevant regulations. Also referred to as SE: Service Entrance.
7. J-Hook: A supporting device for horizontal cables that is shaped like a “J”. It is attached to some building structures. Horizontal cables are laid in the opening formed by the “J” to provide support for cables.
8. Minor Pathway Support Hardware: Anchors, support brackets, clamps, clips, cable ties, D-rings, rack screws, velcro straps and etc. used to dress and secure cabling, conduits and surface raceways.
9. Screen: A metallic layer, either a foil or braid, placed around a pair or group of conductors.
10. Shield: A metallic layer, either a foil or braid, placed around a group of conductors.
11. Splice: A joining of conductors meant to be permanent. A device that joins conducting or transmitting media. Also referred to as straight splice.
12. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.05 **CODE REFERENCES AND STANDARDS**

A. All work shall be in compliance with the following codes and agencies. Nothing contained within these specifications shall be misconstrued to permit work not in conformance with the most stringent of applicable codes and standards. It is assumed that bidders have access to, and specific knowledge of, the listed reference materials in order to ensure conformity with them.
   1. National Electrical Code (NEC)
   2. National Electrical Safety Code (NESC)
   3. National Fire Protection Association (NFPA)
   4. International Building Code (IBC)
   5. Iowa Administrative Code
   6. Federal, State, and Local Codes.
   7. National Electronic Manufacturer’s Association (NEMA)
   8. Institute of Electronic and Electrical Engineers (IEEE)
   9. American National Standards Institute/ Industries Association Telecommunication/ Electronic Industries Association (ANSI/TIA/EIA)
   10. Occupational Safety & Health Administration (OSHA)
   11. Federal Communications Commission (FCC)

B. All new materials, equipment, and installation practices shall meet the requirements of the following standards, unless specifically instructed otherwise by the Design Team.
   1. TIA-569-E - Telecommunications Pathways and Spaces (May 2019)
   2. NFPA 70 - National Electric Code (NEC)
   3. BICSI - Information Transport Systems Installation Manual 7th, or most recent, edition
   4. Federal, State, and local codes, rules, regulations, and ordinances.
      a. Perform all work in accordance with local jurisdiction requirements that is governing the work and as fully part of the specifications attached.

1.06 **ADMINISTRATIVE REQUIREMENTS**

A. Coordination: Coordinate the installation of the telephone and internet service provider pathway and entrance with the Electrical Contractor and the Owner's selected carrier.

B. Sequencing: Ensure that any wide area network, telephone service, and internet service connectivity cutover is achieved in a coordinated and orderly manner.

C. All Division 27 Contractor Project Managers shall schedule and conduct a coordination meeting with XYZ Corporation Information Technology Department to confirm and coordinate scope of work requirements prior to commencement of work. Project meetings shall be scheduled through the General Contractor.

1.07 **SUBMITTALS**

A. Refer to Division 1 for exact submittal procedures.

B. The Division 27 Contractor shall provide for review, without exception prior to material acquisition and installation, the following items. Failure to submit required items shall disqualify the bidder.
   1. Product Data Sheets (Catalog Cuts)
   2. Backbone Diagram
   3. Riser Diagram
   4. Cabling Diagram
   5. System Schematics
   6. Dimensioned plans, sections and elevations and fabrication details.
   7. Specification Sheets for Test Equipment
   8. Bill of Materials
   9. Contracting Firm Qualifications and Certifications
   10. Installation Team Qualifications by Individual
   11. Current Manufacturer Certifications

C. Provide prior to completion:
   1. Cable data base listing patch panel station cable assignments. Database shall be provided on compact disc or other electronic media format when requested by the General Contractor, XYZ Corporation or the Design Team. Database shall be submitted to the requesting party within seven (7) calendar days.
   2. Cable administration drawings, as requested to assist in the planning process. Drawings will be requested prior to final documentation.

D. Provide at completion of each construction phase area:
   1. Cable test and certification reports; summary hard copy or full test results on compact disc when requested by the owner or design team. Reports shall be submitted to the requesting party within seven (7) calendar days.
   2. One (1) set of record drawings of the actual installation of the Division 27 systems. Drawings shall be given as full size originals and on disk in AutoCAD format

E. Provide at final completion Closeout Submittals. This shall consist of three (3) bound sets of O&M (Operating and Maintenance) Manuals formatted as defined by Division 1 and one (1) electronic copy provided on a CD/DVD disc. Each copy of the O&M Manual shall include, at minimum, items listed as follows:
   1. Cable test and certification reports; summary hard copy and full test results on disc. Test results shall be delivered at the completion of each project phase and at any time when called for by the Owner.
   2. Provide one (1) full-size hard copy set of record drawings (as-builts) to be submitted to the Design Team for approval, immediately upon completion of the installation.
   3. Instruction manuals including equipment and schedules, operating instructions, and manufacturer's instructions.
   4. Manufacturer Warranty Certificate.
      a. Warranty contacts including but not limited to names, telephone numbers (office and mobile).
   5. Networked Devices
      a. Provide the owner a list of all networked devices including all IP addresses and passwords for devices and managing software.

1.08 **QUALITY ASSURANCE**

A. Contracting firm shall constitute a company with a minimum of five (5) years successful installation experience with projects utilizing infrastructure and systems work similar to that required for this project.

B. Service Qualifications: Installing and servicing contractor shall have a permanent office within a 120-mile radius of the project site.

C. Cabling Contractor shall have at least one (1) Registered Communications Distribution Designer and installers with Installer-level BICSI Certifications on staff responsible for this

project. Provide copies of these certificates in the submittal process.

D. Work crew, not involved in installing cable elements (e.g. laborers delivering/moving materials, installing grounding by an electrician, or workers installing pathway elements) do not require BICSI or manufacturer certification or registration.

E. Contractor shall provide a Manufacturer Certification for the system solution bid, issued directly in the bidder's company name, valid for the time frame in which the installation will be completed. Contractor shall be manufacturer certified in order to participate in the bid event.

F. The contractor shall be knowledgeable in local, state, regional, and national codes and regulations. All work shall comply with the latest revision of codes or regulations. When conflict exists between local or national codes or regulations, the most stringent codes or regulations shall apply.

G. Only installers trained and certified by the proposed manufacturer shall be allowed to install products. Installers must possess the highest level of certification available by the manufacturer for the specific solution being installed.

H. Only installers trained and certified by the proposed manufacturer shall be allowed to install firestop products.

I. Before bidding, the contractor shall study and compare all contract documents and promptly notify the Design Team of any discrepancies or deficiencies discovered by or made known to the contractor.

J. Discrepancies: Whenever a discrepancy or inconsistency exists between related information indicated on the contract drawings and/or specifications, this contractor shall obtain additional clarification and direction from the Design Team before proceeding. For bidding purposes, this contractor shall include the labor and materials necessary to comply with the solution that results in the greatest cost to the contract.
   1. If there is a conflict between applicable documents, then the more stringent requirement shall apply.
   2. The failure to question any controversial item will constitute acceptance by the bidder who shall execute it to the satisfaction of the owner after being awarded the contract.

K. Deficiencies: The contractor and associated subcontractors shall resolve all known deficiencies and omissions, including non-compliance with applicable codes, with the Design Team prior to ordering materials or proceeding with the work. Any work performed prior to receipt of instructions from the Design Team will be done so at the contractor's risk.
   1. If mention has been omitted pertaining to details, items or related accessories required for the completion of any system, it is understood such item and accessories are included in the contract. After the contract is awarded, claims based on insufficient data or incorrectly assumed conditions, or claims based on misunderstanding the nature of the work, will not be recognized.
   2. All devices, symbols and work illustrated shall be new work provided under this contract except work labeled existing to remain and equipment labeled to be furnished (or supplied) by others but installed by this contractor.

1.09 **DELIVERY, STORAGE, AND HANDLING**

A. Equipment, materials, and supplies shall be shipped, handled and stored in ways that shall prevent damage to the items.

B. All items shall be handled and stored as recommended by the manufacturer.

C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under manufacturer's specified conditions, and free from damage or deterioration.

D. Equipment, materials, and supplies to be incorporated in the area of work shall be new unless otherwise specified.

E. Equipment, materials, and supplies shall be produced in a good workmanlike manner.

F. When the quality of a material, process, or article is not specifically set forth in the Drawings or Specifications, the best available quality of the material, process, or article shall be provided.

1.10 **PROJECT CONDITIONS**

A. Conditions and Measurements: Visit the jobsite to verify installation conditions and confirm measurements for all required systems and associated cabling connectivity.

1.11 **WARRANTY**

A. The Contractor shall submit, in the bid documents, any additional contractor-specific warranties or guarantees to be offered on the project.

B. The Contractor shall supply any and all necessary documentation needed to process and record the warranty(s) and to verify the installation solution.

C. Data Cabling System Warranty
   1. All cabling systems shall include a minimum ten (10) year application assurance warranty as a manufacturer registered system installation. During the warranty period, and for non-conformities of which contractor has notice, contractor shall take all necessary and appropriate action; free of charge, to correct any non-conformity with the warranties contained in the manufacturer agreement. During the warranty period, contractor shall provide to the Owner, free of costs and charges, all support necessary to ensure that the cabling system meets the requirements specified in this document and performance guarantees provided by the contractors. During the warranty period, contractors shall furnish, or cause to be furnished, all maintenance, service, parts and replacements necessary to maintain the cabling system in good working condition, at no cost to the Owner.
   2. The contractor shall supply a full manufacturer’s application assurance warranty for all new installations, to include approved termination hardware and cabling media from the proposed manufacturer’s list of approved materials. Services to be provided by this contractor to the Owner during the warranty period shall include, without limitation, the following:
      a. Remedial Maintenance
         1) Contractor shall provide service on the Owner's site as necessary including, but not limited to, fault isolation, diagnosis, and repair.
      b. Maintenance Records
         1) Contractor shall maintain, at the jobsite, a current record of the cabling system configuration.
      c. Replacement Parts
         1) Contractor shall provide and install replacement parts, including new components.

D. All Other Communications Systems Warranty
   1. Unless listed elsewhere within these specifications, a warranty shall be provided for a minimum of one (1) year for all other communications systems listed. One year shall begin from the date of Substantial Completion. This warranty shall cover both product and service to address remedial maintenance and replacement parts as is appropriate to keep each system complete and fully functional.

PART 2 - PRODUCTS

2.01 **MANUFACTURERS**

A. If a Bidder proposes to Substitute an article, device, material, equipment, form of construction, fixture, or item other than the approved manufacturers and part numbers, listed and named in the Specifications, the Bidder shall certify that the proposed item is equal in quality and all aspects of performance and appearance, to the items specified. The Bidder shall submit a request for Substitution to the Design Team by following the instruction in Specification Section 01 6000, which must include:
   1. The name and complete description of the proposed Substitution including Drawings, performance and test data, and other information necessary for a complete evaluation;

and

2. A statement setting forth any changes that the Proposed Substitution will require in the Contract Documents or the project.

B. If the Design Team approves the Proposed Substitution, the Design Team shall issue an Addendum. If the Design Team does not approve the substitution, the Design Team shall inform the Bidder of its decision, which is final. The Design Team may reject a proposed Substitution because the Bidder failed to provide sufficient information to enable the Design Team to completely evaluate the Proposed Substitution without causing a delay in the scheduled bid opening.
   1. Proposed Substitutions received by the Design Team after the allotted time allowed by Section 01 6000 shall not be considered.

C. Bidder shall confirm all reference part numbers, listed within Division 27, as current and suitable for the items described and specified and shall file a formal RFI for all perceived discrepancies prior to bidding.
   1. All materials associated with reference parts shall be included so as to constitute a complete and functional system, whether or not specifically identified and itemized.

2.02 **ASSEMBLIES**

A. Sleeves and Pathways for Cabling:
   1. Where additional conduits are needed beyond those shown on the drawings to accommodate the installation of systems cabling, this contractor (Division 27) shall include such provisions in this contract. Provide conduit suitable for its application and sized in accordance with industry standards. Include nylon bushings at conduit ends and firestopping as required around conduits wherever building barriers are penetrated. If necessary, this contractor shall hire a qualified contractor to perform this work.

PART 3 - EXECUTION

3.01 **CLEANING**

A. Division 27 Contractor shall thoroughly clean all assemblies within the telecommunications room's space before they are turned over to the XYZ Corporation IT Services for operation. Cleaning shall include, but not be limited to, all ladder tray, racks and wire managers (both inside and out), copper and optical fiber panels (both inside and out). Should any telecommunications room or closet be completed prior to the balance of the floor space construction that it serves, racks, cabinets, and wall frames shall be covered with plastic sheeting to repel dust and other contaminants to which they will be subjected.

B. At the end of each workday or shift, the Contractor shall be required to clean-up the work area and remove all construction debris such that the site is clean and usable without hazard to workers.

3.02 **PROJECT CONDITIONS**

A. The Owner shall not be responsible for delays in work because of shutdowns due to unsafe working practices by Contractors.

B. The active information transport system and cabling associated with specific work beyond the construction area shall not be disrupted at any time.

C. Contractor shall clean work areas each day and remove debris properly and legally from the project site. Materials and supplies stored for use in the project shall be neatly stacked outside the circulation areas. All exits and paths shall be cleaned so as to prevent dirt from being tracked into the site.

D. It shall be the responsibility of the Contractor to secure any parking permits prior to the first day of work on-site.

E. Work outside of normal operating hours and days shall be coordinated with XYZ Corporation.

3.03 **SAFETY REQUIREMENTS**

A. All contract work shall be performed in accordance with the policies, procedures, and standards established by the Owner.

B. In construction areas, all Contractor personnel shall wear personnel protection devices, as deemed appropriate by the General Contractor and as required by OSHA for the work location and work operation being performed. Devices shall include, but not be limited to hardhats, work boots, safety eye protection, reflective vests, etc.

C. All exposed holes, pits, pipes, etc., either inside or outside the project site, shall be barricaded or plated and adequately secured when Contractor personnel are not present. All ladders, hanging wires, pipes, and other items protruding at a pedestrian level travel way most be removed or secured following the final shift of the day.

D. During breaks or when only a portion of work has been completed, tools shall not be left exposed where others may risk injury or attempt to use them. Windows and doors shall not be left unsecured or propped open during breaks. At the completion of the final shift each day, doors, windows, or other openings shall be adequately secured.

E. When driving on the Owner's property, Contractor personnel shall observe all traffic safety regulations and pay particular attention to pedestrians. All loose material and debris on vehicles shall be adequately secured and tied down.

END OF SECTION

SECTION 27 0505
SELECTIVE DEMOLITION OF COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Demolition and removal of selected portions of building or structure.

B. Demolition, temporary removal, relocation, or reconfiguration of selected site elements and/or Information Technology (IT), Security or other Special Systems or infrastructure.

C. Salvage of existing items to be reused or recycled.

D. Contractor shall include in the Bid all labor, materials, tools, transportation, storage costs, equipment, insurance, temporary protection, permits, inspections, taxes and all necessary and related items required to provide complete demolition and cutover of existing telecommunication systems shown and described in the drawings and specifications herein.

E. The Contractor is responsible for providing and coordinating phased activities and construction methods that minimize disruption to operations and provide complete and operational systems. Equipment and devices shall not be removed or reconfigured until removal or reconfiguration has been coordinated with owner and approval is given in writing.

F. The Contractor shall coordinate interfaces to existing systems that are being demolished in order to minimize disruption to the existing systems operations. Any systems outages shall be approved in advance and scheduled with XYZ Corporation.

1.02 RELATED REQUIREMENTS

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

B. The following documents shall also be considered as a part of and shall relate directly to this section:
   1. Section 27 0000 - GENERAL REQUIREMENTS FOR COMMUNICATIONS SYSTEMS

1.03 ABBREVIATIONS AND ACRONYMS

A. Reference Section 27 0000 - GENERAL REQUIREMENTS FOR COMMUNICATIONS SYSTEMS

1.04 DEFINITIONS

A. Reference Section 27 0000 - GENERAL REQUIREMENTS FOR COMMUNICATIONS SYSTEMS

1.05 CODE REFERENCES AND STANDARDS

A. Comply with Section 27 0000 - GENERAL REQUIREMENTS FOR COMMUNICATIONS SYSTEMS

1.06 ADMINISTRATIVE REQUIREMENTS

A. Pre-Demolition Meeting
   1. Conduct a pre-demolition meeting at Project Site with XYZ Corporation and all affected stakeholders.
      a. Inspect and discuss condition of construction to be selectively demolished.
      b. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
      c. Existing telecommunications rooms that have demolition work may involve electrical, mechanical and architectural demolition. Review and coordinate requirements of work performed by other trades.
      d. Review areas where existing construction is to remain and requires protection.
      e. Review procedures to be followed when critical systems are inadvertently interrupted. The Contractor shall be responsible for the coordination required with XYZ Corporation prior to device removal to ensure systems that must remain operational

are not compromised during the demolition process.

1.07 **QUALITY ASSURANCE**

A. Comply with Section 27 0000 - GENERAL REQUIREMENTS FOR COMMUNICATIONS SYSTEMS

1.08 **PROJECT CONDITIONS**

A. The owner WILL NOT occupy portions of building during selective demolition.

B. Conduct selective demolition so Owner's operations will not be disrupted.

C. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

D. Field verify the existing conditions, device equipment locations to determine the extent of the demolition required. Notify the Design Team of discrepancies between existing conditions and Drawings before proceeding with selective demolition. Proceeding with demolition indicates and acceptance of existing conditions by the contractor.

E. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. Hazardous materials will be removed by Owner before start of the Work.
   2. If suspected hazardous materials are encountered, do not disturb; immediately notify the Design Team. Hazardous materials will be removed by Owner under a separate contract.

F. Storage or sale of removed items or materials on-site is not permitted.

G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 **EXAMINATION**

A. Demolition and construction methods shall conform to XYZ Corporation requirements and all applicable building codes.

B. Verify that utilities have been disconnected and capped per approved procedures before starting selective demolition operations.

C. Survey existing condition of all communications systems related conduits and cables from origin to destination and correlate with requirements indicated to determine extent of selective demolition required.

D. Label all conduits and cables with origin, destination and what system they serve.

E. Consult with the Owner to determine whether systems can be disabled or whether a new parallel system needs to be installed.

F. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to the Design Team.

3.02 **PREPARATION**

A. Comply with requirements for access and protection.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

C. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.

D. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.

E. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

F. Cover and protect furniture, furnishings, and equipment that have not been removed.

G. Comply with requirements for temporary enclosures, dust control, heating, and cooling.

3.03 **SELECTIVE DEMOLITION**

A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Proceed with selective demolition systematically. Complete selective demolition operations above each floor or tier, before disturbing supporting members on the next lower level, if applicable. Remove all abandoned cable from origin to destination.
   2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
   3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and/or portable fire-suppression devices during flame-cutting operations.
   5. Maintain adequate ventilation when using cutting torches.
   6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
   7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
   8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   9. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner's designated storage area. Coordinate delivery of equipment with the Owner seven (7) days prior to delivery.
   5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:
   1. Clean and repair items to functional condition adequate for intended reuse.
   2. Pack or crate items after cleaning and repairing. Identify contents of containers.
   3. Protect items from damage during transport and storage.
   4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
   5. Perform testing on reinstalled active systems and get sign-off by the Owner or Owner’s representative inspector that systems are re-connected and working properly.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.04 **UTILITY SERVICES AND COMMUNICATION SYSTEMS**

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
   1. Comply with requirements for existing services/systems interruptions.
   2. For existing equipment with active components in them, provide dust protection and circulate cooling air with a portable air conditioning unit or other means to ensure equipment does not overheat.

B. Existing Services/Systems to Be Removed, or Relocated: Locate, identify, disconnect, and seal or cap off indicated utility services and communications systems serving areas to be selectively demolished.
   1. Owner will arrange to shut off indicated services/systems when requested by Contractor. Coordinate the disconnection of all electrical circuits with the Electrical Contractor prior to disconnection.
   2. Arrange to shut off indicated utilities with utility companies.
   3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.05 **DISPOSAL OF DEMOLISHED MATERIALS**

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
   1. Do not allow demolished materials to accumulate onsite.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
   3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.06 **CLEANING**

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

B. The contractor shall be required, on a daily basis, to dispose of any demolished material not required to be returned to the Owner. All materials shall be transported off of the Owner’s property at the expense of the Contractor.

C. Reference Section 27 0000 - GENERAL REQUIREMENTS FOR COMMUNICATIONS SYSTEMS.

END OF SECTION

SECTION 28 4600
FIRE DETECTION AND ALARM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire alarm system design and installation, including all components, wiring, and conduit.

B. Circuits from protected premises to supervising station, including conduit.

1.02 RELATED REQUIREMENTS

A. Section 07 8400 - Firestopping: Materials and methods for work to be performed by this installer.

B. Section 23 3300 - Air Duct Accessories: Smoke dampers monitored and controlled by fire alarm system.

1.03 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.

C. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits 2002 (Corrigendum 2012).

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

E. NFPA 72 - National Fire Alarm and Signaling Code Most Recent Edition Cited by Referring Code or Reference Standard.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Drawings must be prepared using AutoCAD Release [___].
   1. Owner will provide floor plan drawings for Contractor's use; verify all dimensions on Owner-provided drawings.

C. Evidence of designer qualifications.

D. Design Documents: Submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, and description of operation:
   1. Copy (if any) of list of data required by authority having jurisdiction.
   2. NFPA 72 "Record of Completion", filled out to the extent known at the time.
   3. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72 Appendix A-7-5-2.2(9), and complete listing of software required.
   4. System zone boundaries and interfaces to fire safety systems.
   5. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.
   6. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.
   7. List of all devices on each signaling line circuit, with spare capacity indicated.
   8. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.
   9. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.
   10. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.
   11. Certification by the manufacturer of the control unit that the system design complies with Contract Documents.

12. Certification by Contractor that the system design complies with Contract Documents.

E. Evidence of installer qualifications.

F. Inspection and Test Reports:
   1. Submit inspection and test plan prior to closeout demonstration.
   2. Submit documentation of satisfactory inspections and tests.
   3. Submit NFPA 72 "Inspection and Test Form," filled out.

G. Operating and Maintenance Data: See Section 01 7800 for additional requirements; revise and resubmit until acceptable; have one set available during closeout demonstration:
   1. Complete set of specified design documents, as approved by authority having jurisdiction.
   2. Additional printed set of project record documents and closeout documents, bound or filed in same manuals.
   3. Contact information for firm that will be providing contract maintenance and trouble call-back service.
   4. List of recommended spare parts, tools, and instruments for testing.
   5. Replacement parts list with current prices, and source of supply.
   6. Detailed troubleshooting guide and large scale input/output matrix.
   7. Preventive maintenance, inspection, and testing schedule complying with NFPA 72; provide printed copy and computer format acceptable to Owner.
   8. Detailed but easy to read explanation of procedures to be taken by non-technical administrative personnel in the event of system trouble, when routine testing is being conducted, for fire drills, and when entering into contracts for remodeling.

H. Project Record Documents: See Section 01 7800 for additional requirements; have one set available during closeout demonstration:
   1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
   2. "As installed" wiring and schematic diagrams, with final terminal identifications.
   3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.

I. Closeout Documents:
   1. Certification by manufacturer that the system has been installed in compliance with manufacturer's installation requirements, is complete, and is in satisfactory operating condition.
   2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.

1.05 **QUALITY ASSURANCE**

A. Copies of Design Criteria Documents: Maintain at the project site for the duration of the project, bound together, an original copy of NFPA 72, the relevant portions of applicable codes, and instructions and guidelines of authorities having jurisdiction; deliver to Owner upon completion.

B. Designer Qualifications: NICET Level III or IV (3 or 4) certified fire alarm technician or registered fire protection engineer, employed by fire alarm control panel manufacturer, Contractor, or installer , with experience designing fire alarm systems in the jurisdictional area of the authorities having jurisdiction.

C. Installer Qualifications: Firm with minimum 3 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.
   1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.
   2. Installer Personnel: At least 2 years of experience installing fire alarm systems.
   3. Supervisor: NICET level III or IV (3 or 4) certified fire alarm technician; furnish name and address.

1.06 **WARRANTY**

A. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 year after date of Substantial Completion.

B. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.

PART 2 PRODUCTS

2.01 **MANUFACTURERS**

A. Fire Alarm Control Units and Accessories - Basis of Design: Simplex.

B. Initiating Devices and Notification Appliances:
   1. Simplex, a brand of Johnson Controls; [_____]: www.simplex-fire.com/#sle.
   2. Same manufacturer as control units.
   3. Provide initiating devices and notification appliances made by the same manufacturer, where possible.

2.02 **FIRE ALARM SYSTEM**

A. Fire Alarm System: Provide a new automatic fire detection and alarm system:
   1. Provide all components necessary, regardless of whether shown in Contract Documents or not.
   2. Protected Premises: Entire building shown on drawings.
   3. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
      a. ADA Standards.
      b. The requirements of the local authority having jurisdiction , which is City of Urbandale.
      c. Applicable local codes.
      d. Contract Documents (drawings and specifications).
      e. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.
   4. Evacuation Alarm: Multiple smoke zones; allow for evacuation notification of any individual zone or combination of zones, in addition to general evacuation of entire premises.
   5. General Evacuation Zones: Each smoke zone is considered a general evacuation zone unless otherwise indicated, with alarm notification in all zones on the same floor, on the floor above, and the floor below.

B. Supervising Stations and Fire Department Connections:
   1. Public Fire Department Notification: By on-premises supervising station.
   2. On-Premises Supervising Station: Existing proprietary station operated by Owner, located at [_____].
   3. Means of Transmission to On-Premises Supervising Station: Directly connected noncoded system.

C. Circuits:
   1. Initiating Device Circuits (IDC): Class B, Style A.
   2. Signaling Line Circuits (SLC) Within Single Building: Class B, Style 0.5.
   3. Notification Appliance Circuits (NAC): Class B, Style W.

D. Power Sources:
   1. Primary: Dedicated branch circuits of the facility power distribution system.
   2. Secondary: Storage batteries.
   3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.
   4. Each Computer System: Provide uninterruptible power supply (UPS).

2.03 **FIRE SAFETY SYSTEMS INTERFACES**

A. Supervision: Provide supervisory signals in accordance with NFPA 72 for the following:
   1. Sprinkler water control valves.

B. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:
   1. Sprinkler water flow.
   2. Duct smoke detectors.

C. HVAC:
   1. Duct Smoke Detectors: Close dampers indicated; shut down air handlers indicated.

2.04 **COMPONENTS**

A. General:
   1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
   2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.

B. Fire Alarm Control Units: Analog, addressable type; listed, classified, and labeled as suitable for the purpose intended.

C. Master Control Unit: As specified for Basis of Design above, or equivalent.

D. Initiating Devices:
   1. Addressable Systems:
      a. Addressable Devices: Individually identifiable by addressable fire alarm control unit.
      b. Provide suitable addressable interface modules as indicated or as required for connection to conventional (non-addressable) devices and other components that provide a dry closure output.

E. Notification Appliances:
   1. Strobes: [_____].

F. Circuit Conductors: Copper; provide 200 feet (60 m) extra; color code and label.

G. Surge Protection: In accordance with IEEE C62.41.2 category B combination waveform and NFPA 70; except for optical fiber conductors.

H. Locks and Keys: Deliver keys to Owner.

I. Instruction Charts: Printed instruction chart for operators, showing steps to be taken when a signal is received (normal, alarm, supervisory, and trouble); easily readable from normal operator's station.
   1. Frame: Stainless steel or aluminum with polycarbonate or glass cover.
   2. Provide one for each control unit where operations are to be performed.
   3. Obtain approval of Owner prior to mounting; mount in location acceptable to Owner.
   4. Provide extra copy with operation and maintenance data submittal.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and Contract Documents.

B. Conceal all wiring, conduit, boxes, and supports where installed in finished areas.

C. Obtain Owner's approval of locations of devices, before installation.

D. Install instruction cards and labels.

3.02 **INSPECTION AND TESTING FOR COMPLETION**

A. Notify Owner 7 days prior to beginning completion inspections and tests.

B. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.

C. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.

D. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.

E. Provide all tools, software, and supplies required to accomplish inspection and testing.

F. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.

G. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

3.03 **CLOSEOUT**

A. Closeout Demonstration: Demonstrate proper operation of all functions to Owner.
   1. Be prepared to conduct any of the required tests.
   2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
   3. Have authorized technical representative of control unit manufacturer present during demonstration.
   4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.
   5. Repeat demonstration until successful.

END OF SECTION

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COOPER MOUNTAIN ELEMENTARY

SRGP IMPROVEMENTS

7670 SW 170th AVE
BEAVERTON, OR 97007
100% DESIGN DEVELOPMENT

GENERAL CONSTRUCTION NOTES

1. All work to comply with 2019 Oregon Structural Specialty Code.
2. All work shall conform to the contract documents which include the owner/contractor agreement, the drawings and specifications and all addenda and modifications issued by the designer.
3. The contractor shall review all documents and verify all dimensions and field conditions and shall confirm that work is buildable as shown. Any conflicts, discrepancies, or omissions, etc., within contract documents, drawings or between drawings and field conditions shall be immediately reported to the designer for clarification prior to the commencement of affected work.
4. All contract documents, including without limitation these general notes and the specifications shall apply not only to the general contractor but to all subcontractors and suppliers on this project. The word 'contractor' shall hereafter apply equally and without exception to all subs and suppliers. All contractors are responsible for familiarizing themselves with both these notes and specifications
5. No one drawing or specification section shall 'govern'. Contractor shall correlate work between architectural drawings and specifications and consultant drawings and specifications. Contractor shall also correlate work between drawings of different scales within each section. It is the explicit and specific responsibility of the contractor to examine the contract documents in their entirety, report all discrepancies encountered therein to the attention of the designer and await resolution before proceeding with any work affected by such discrepancies. Where the requirements of either the general notes or the specifications may be at variance with the general conditions, the more restrictive provision shall govern.
6. Contractor shall field verify all existing construction and related conditions prior to starting demolition or new construction.
7. General notes are an aid to the contractor in understanding the work and should not be construed as being complete in every detail. It is the explicit and specific responsibility of the contractor to visit the site, verify the existing conditions and familiarize himself thoroughly with the scope of work, and report all discrepancies between the drawings and the assumed or actual conditions to the attention of the designer (architect).
8. Substitutions, revisions or changes must be submitted to the designer for review (in conformance with specified procedures) prior to purchase, fabrication or installation.
9. The contractor shall maintain for the entire duration of the work all exits, exit lighting, fire protective devices and alarms in conformance with all applicable codes and ordinances.
10. Where interruption of the building's Life Safety System is required to perform the work as described in the construction documents, or to coordinate with owner's operations, the Contractor shall provide interim Life Safety measures to comply with local code and owner's requirements.
11. Protect the building, its systems, finishes and related and appurtenant items, so as not to cause damage derived from the work; comply with building rules and regulations.
12. Locate and verify existence and use of existing utilities. Take necessary measures to protect and preserve function and condition of any utilities to be repaired, replaced, or reused in new construction. Coordinate work with Architect, Engineer and Owner.
13. Contractor to coordinate installation and scheduling of Owner or Owner's vendor provided or installed fixtures and equipment.
14. Contractor shall be solely responsible for the design and construction of all shoring and bracing required for construction of the Work. Contractor shall not store construction materials or equipment in a manner such that the design live loads of the structure are exceeded.
15. 'Typical' or 'typ' shall mean that the condition is representative for similar conditions throughout unless noted otherwise. Details are usually keyed and noted 'typ' only once, when they first occur.
16. 'Similar' or 'Sim' means comparable characteristics for the conditions noted, verify dimensions and orientation on plans and elevations.
17. The contractor shall not be relieved of responsibility for deviations from requirements of the contract documents by the designer's review of shop drawings, product samples, or similar submittals unless the contractor has specifically informed the designer in writing of such deviation at the time of submittal and the designer has reviewed the specific deviation for the compliance with the intent of the contract documents. The contractor shall not be relieved of responsibility for errors or omissions in shop drawing, product samples, or similar submittals by the designer's review thereof.
18. It is the responsibility of the contractor to coordinate, request and forward to the designer for review shop drawing, product data, samples and similar submittals required by the contract documents with reasonable promptness and in such sequence as to cause no delay in the work or in the activities of the Owner or of separate contractors.
19. All open joints, penetrations and other openings in the building envelope resulting from the remodel and alterations shall be caulked, sealed, gasketed or weather stripped to limit air leakage.
20. All manufactured articles, material and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer unless herein specified to the contrary. In case of difference between the manufacturer's instruction and the contract documents, the contractor shall notify the designer before proceeding.
21. All lines, symbols, notes, tones and other graphic devices contained in the contract documents carry specific or inferential meaning. Items indicated in these are a part of the scope of work and will be required by the owner and designer to be included in the scope of the contractor's work whether they have been included in the contractor's original bid or not. Any items which require further clarification by the designer for the specific benefit of the contractor shall be brought to the attention of the designer for such clarification before commencement of any work.
22. Design work is the responsibility of the designer. The contractor shall assume design liability and all responsibility for changes in the scope of work not brought to the attention of the designer.
23. Dimensions are not adjustable without written approval from the designer.
24. The contractor shall pay specific attention to all dimensioned or inferential plan and sectional special relationships, and shall verify all alignments before commencing work.
25. Dimensions marked 'verify' are to be checked for accuracy by the contractor as work proceeds, and all discrepancies are to be brought to the attention of the designer before proceeding.
26. Dimensions marked 'clear' or minimum are not adjustable without the authorization from the designer. 'Align' means to accurately locate finished faces in same plane as indicated.
27. Contractor shall not scale the drawings, figured dimensions only are to be used for all aspects of the work. Large scale details take precedence over smaller scale drawings.
28. Contractor is responsible for all waste removal and site clean up during performance of and at completion of the work.
29. All features of the Work not fully shown shall be of the same type and character shown for similar conditions. In the event that additional work is required to complete the Work as intended or required by governing codes and safety regulations, yet omitted or not fully shown on the drawings, the contractor must still provide carpentry, mechanical, electrical and/or plumbing work as necessary for Certificate of Occupancy.
30. Keynotes are not sheet specific.

CONTACT INFORMATION

OWNER
Beaverton School District
6550 SW Merlo Road
Beaverton, Oregon 97003
Contact: Eric Bolken
Email: eric_bolken@beaverton.k12.or.us
Telephone: (503) 704-6783

ARCHITECT-OF-RECORD
Oh planning+design, architecture
115 NW First Avenue, Suite 300
Portland, OR 97209
Deb France, Principal
Email: deb.france@ohpd.net
Contact: Caitlin McGehee, Project Manager
Email: caitlin.mcgehee@ohpd.net
Telephone: (503) 551-2550

STRUCTURAL ENGINEER
Holmes Structures
555 SE MLK Blvd. Suite 602
Portland, OR 97214
Contact: Jennifer Eggers, Principal
Email: jennifer.eggers@holmesstructures.com
Telephone: (503) 850-9144

MEP ENGINEER
KCL Engineering
2175 NW Raleigh St. Suite 110
Portland, OR 97210
Contact: Stormy Shanks, Project Manager
Email: sshanks@kclengineering.com
Telephone: (971) 400-0416

CITY/STATE CONTACTS

CITY JURISDICTION: City of Beaverton
12725 SW Millikan Way
Beaverton, OR 97005
Telephone: (503) 526-2493

STATE FIRE MARSHAL: Office of the State Fire Marshal
11945 SW 70th Ave.
Tigard, OR 97223
Telephone: (503) 649-8577

LOCATION PLAN

APPLICABLE CODES

2019 Oregon Structural Specialty Code (OSSC)
2017 Oregon Electrical Specialty Code (OESC)
2019 Oregon Fire Code (OFC)
2019 Oregon Mechanical Specialty Code (OMSC)
2017 Oregon Plumbing Specialty Code (OPSC)
2016 ASHRAE 90.1 Energy Code
2019 Oregon Zero Energy Ready Commercial Code

PROJECT INFORMATION

Construction Type
Type - VB

Gross Building Area

FIRST FLOOR	45709 SF
FIRST FLOOR - MODULAR BULDING	5959 SF
SECOND FLOOR	1232 SF
Grand total	52900 SF

Refer to Code Sheet for more information

PROPERTY DATA

Address: 7670 SW 170th Ave
Beaverton, OR 97007

Assessor's Map: 1S119DD00300

Tax Lot: 1S119DD00300

Zoning: Urban Standard Density (R5)

Site Area: 9.5 Acres

PROJECT ALTERNATES

See specification section 01 23 00 for descriptions.

ALTERNATE #1 - Exterior facade at North Gym wall

PROJECT DESCRIPTION

Improve the structural deficiencies of the Cooper Mountain Elementary School in compliance with the Seismic Evaluation and Conceptual Seismic Strengthening Scheme dated November 14, 2018.

STRUCTURAL SEISMIC UPGRADES
- Strengthening of shear and cripple walls.
- Strengthening of roof diaphragm.
- Strengthening of steel columns.
- Provide positive anchorage to foundation.

NON-STRUCTURAL SEISMIC UPGRADES
- Bracing of suspended ceilings.
- Anchorage/bracing of mechanical systems, plumbing, fire protection piping, and electrical equipment.

SHEET INDEX KEY

AD-101

Discipline
G: General
C: Civil
L: Landscape
A: Architectural
S: Structural
M: Mechanical
P: Plumbing
E: Electrical

D: Demolition

Category
0: General Info./Site
1: Slab Edge Plans
2: Plans
3: Exterior Elevations
4: Sections
5: Vertical Circulation
6: Interior Elevations
7: Details
8: Schedules/Finishes
9: 3D Representations

Page #

SHEET INDEX

BEAVERTON SCHOOL DISTRICT

COOPER MOUNTAIN ELEMENTARY
7670 SW 170th AVE
BEAVERTON, OR 97007

OH PLANNING+DESIGN, ARCHITECTURE
115 NW 1st Ave, Ste. 300
Portland, OR 97209

Consultants:

COOPER MOUNTAIN ELEMENTARY SCHOOL
SRGP IMPROVEMENTS
100% DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Date: 09/28/2020
Project Number: 90060
Drawn By: BPS
Checked By: CSM

Revision Schedule:

Sheet Title:
COVER SHEET

Sheet Number:
G-000

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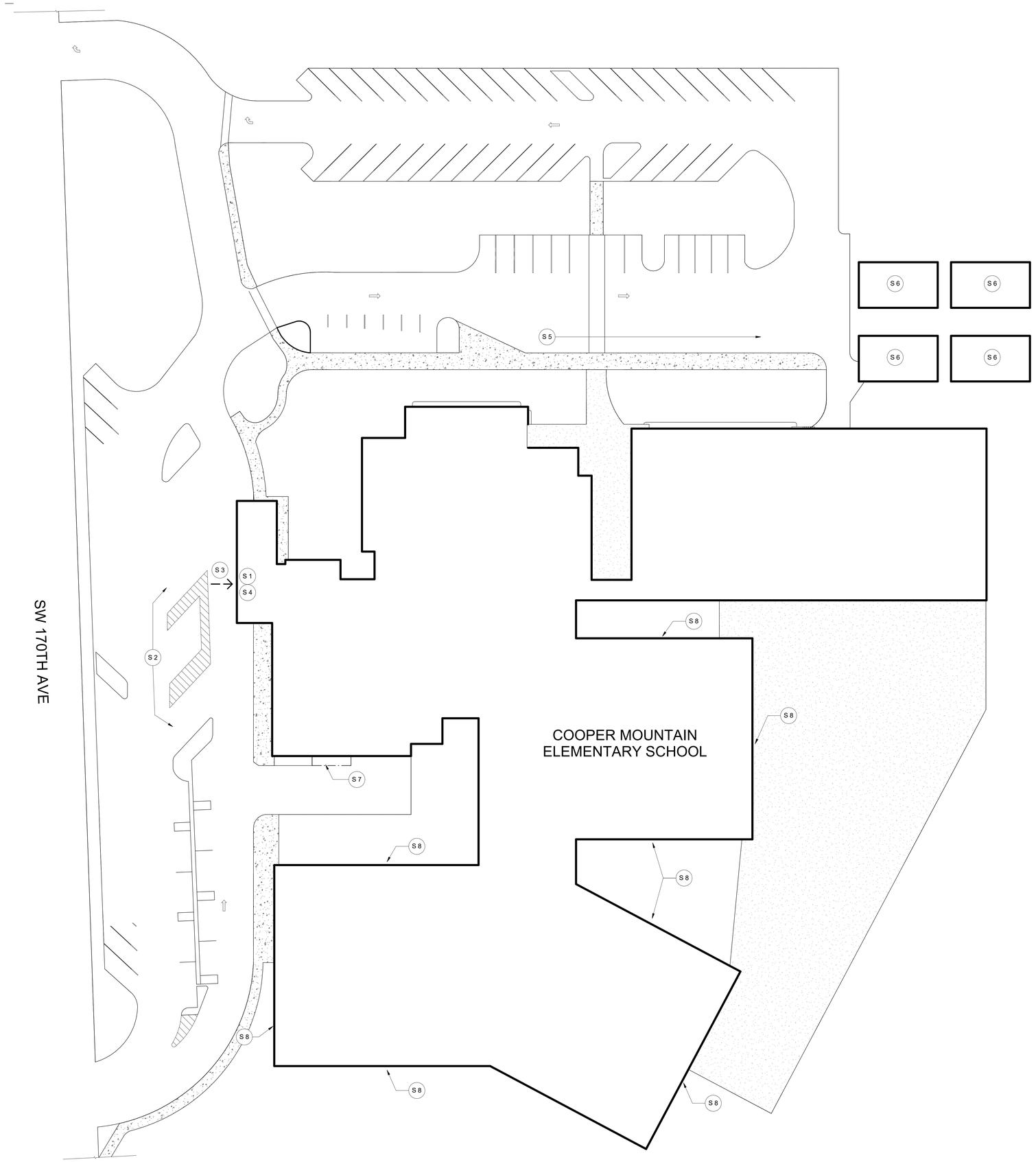


1 FIRST FLOOR - SITE PLAN
1" = 20'-0"

LEGEND - SITE PLAN

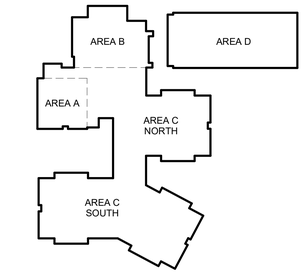
- CONCRETE
- ASPHALT

KEYNOTES - SITE PLAN

S # KEYNOTES - SITE PLAN

S 1	Accessible entrance.
S 2	Accessible parking.
S 3	Accessible pathway into building.
S 4	Main entrance.
S 5	Fire access drive.
S 6	Portable classrooms, not in scope
S 7	Existing fencing and mechanial to remain; protect during construction.
S 8	Foundation improvements at exterior. Reference Architectural floor plans and Structural for anchor details and material patching requirements.

KEY PLAN



BEAVERTON SCHOOL DISTRICT

COOPER MOUNTAIN ELEMENTARY
7670 SW 170th AVE
BEAVERTON, OR 97007

OH PLANNING+DESIGN, ARCHITECTURE
115 NW 1st Ave, Ste. 300
Portland, OR 97209

Consultants:

COOPER MOUNTAIN ELEMENTARY SCHOOL
SRGP IMPROVEMENTS

100% DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Date:	09/28/2020
Project Number:	90060
Drawn By:	BPS
Checked By:	CSM

Revision Schedule:

Sheet Title:
SITE PLAN

Sheet Number:
G-001

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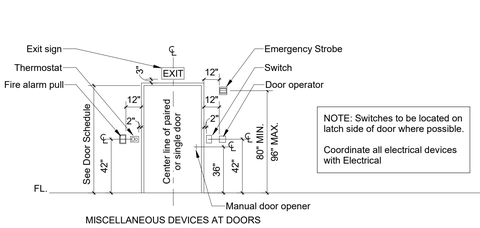
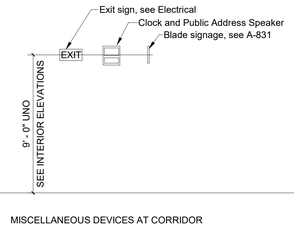
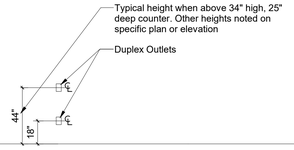


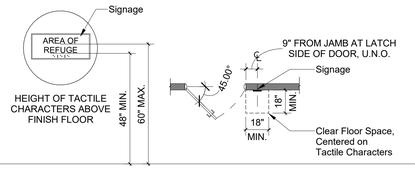
MISCELLANEOUS DEVICES AT DOORS



MISCELLANEOUS DEVICES AT CORRIDOR



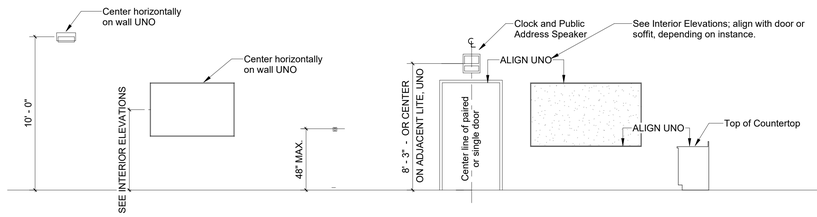
DUPLEX OUTLETS



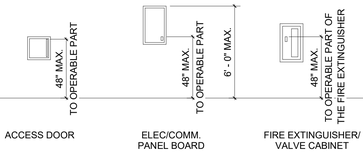
SIGNAGE WITH TACTILE CHARACTERS

ELECTRICAL SWITCHES AND ACCESSORIES

1/4" = 1'-0"

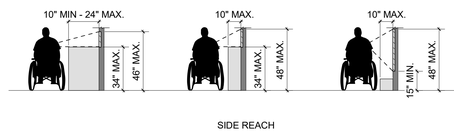


SIGNAGE



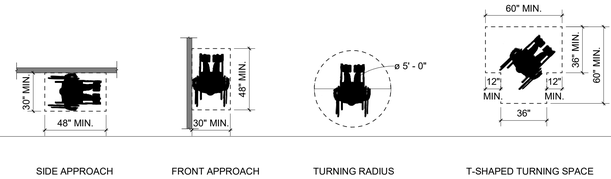
WALL-MOUNTED EQUIPMENT AND ACCESSORIES

1/4" = 1'-0"



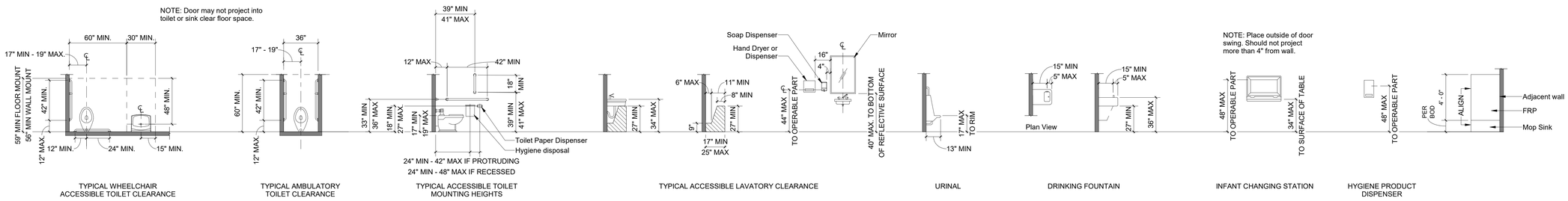
PANELS / WALL-MOUNTED EQUIPMENT CABINETS

1/4" = 1'-0"



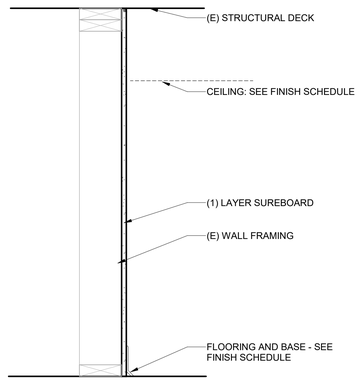
REACH RANGES AND CLEAR FLOOR SPACE

1/4" = 1'-0"



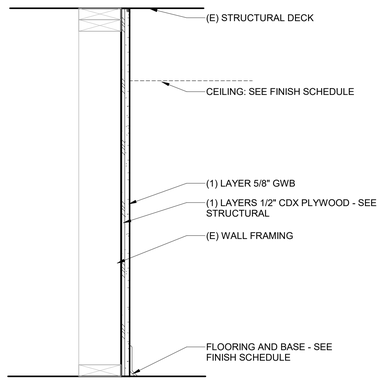
PLUMBING FIXTURES AND ACCESSORIES

1/4" = 1'-0"



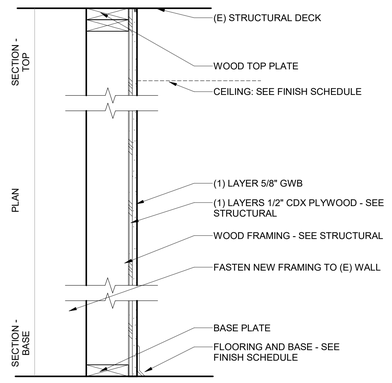
SECTION VIEW

PARTITION TYPE 03



SECTION VIEW

PARTITION TYPE 02



SECTION VIEW

PARTITION TYPE 01

BEAVERTON SCHOOL DISTRICT

COOPER MOUNTAIN ELEMENTARY
7670 SW 170th AVE
BEAVERTON, OR 97007

OH PLANNING+DESIGN, ARCHITECTURE
115 NW 1st Ave, Ste. 300
Portland, OR 97209

Consultants:

COOPER MOUNTAIN ELEMENTARY SCHOOL
SRGP IMPROVEMENTS

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Date:	09/28/2020
Project Number:	90060
Drawn By:	Author
Checked By:	CSM

Revision Schedule:

Sheet Title:

GENERAL MOUNTING HEIGHTS AND PARTITION TYPES

G-003

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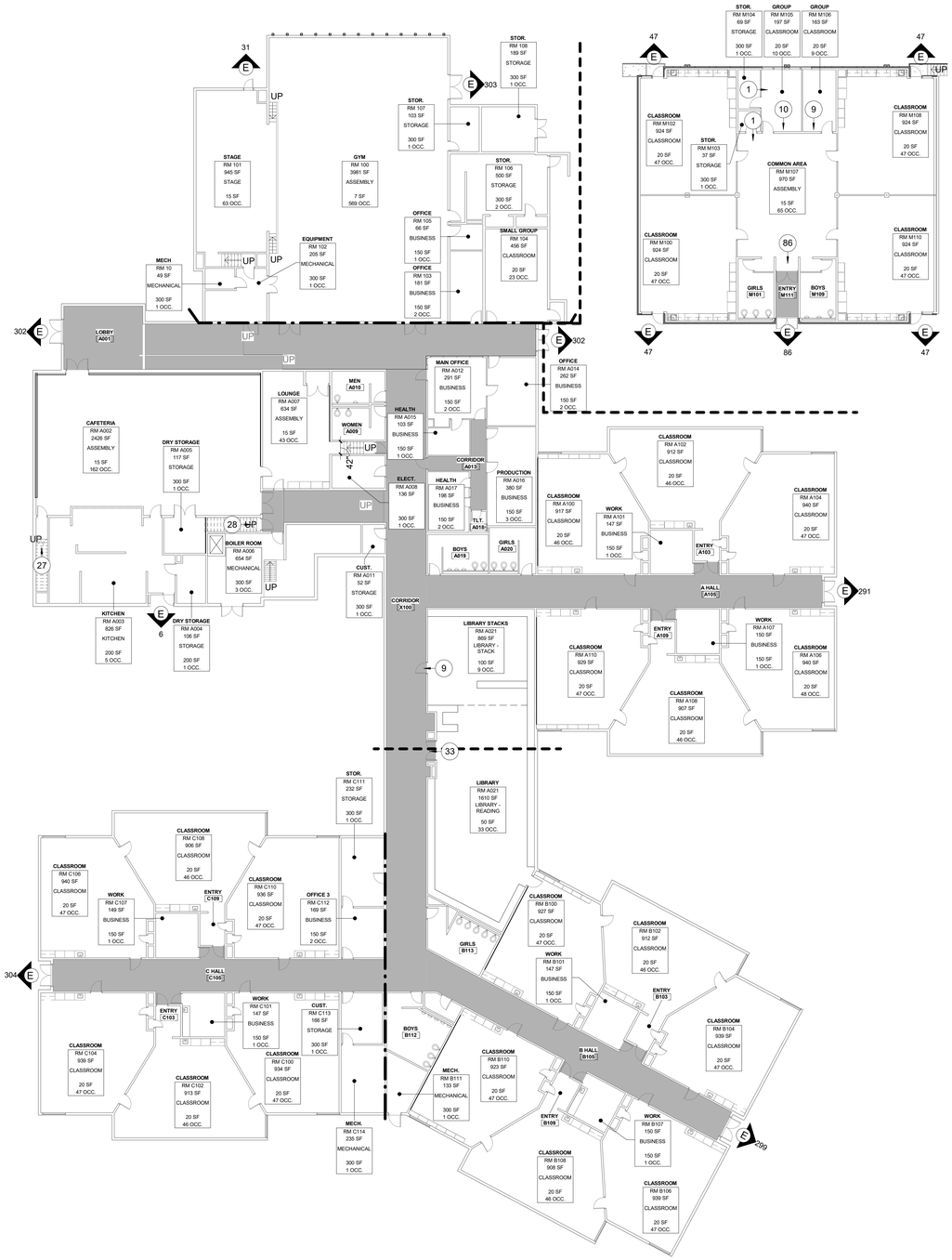
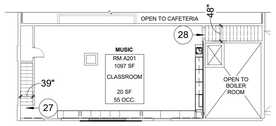


1 FIRST FLOOR PLAN
1/16" = 1'-0"

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



NO FIRE AND LIFE SAFETY IMPROVEMENTS WITHIN THE SCOPE OF THIS PROJECT.

Information in this Fire & Life Safety Code Sheet is based on permitted documents dated September 2003.

Sheets G-101 are for reference only. It has been prepared, in part, based on information furnished by the Owner and is based on previous permitted projects. The Architect does not ensure that all conditions have been noted or accurately documented. Users of these documents should independently verify all pertinent information and conditions. Do not construe information contained within this sheet to allow work not conforming to applicable codes or requirements of authorities having jurisdiction.

BUILDING HEIGHT AND AREA

BUILDING 'I'

Description	Allowed	Existing	Code Section	Comments
Base Allowable Building Area	9,500 SF	--	Table 506.2 OSSC	
Frontage Area Increase	4,370 SF	--	Section 506.3 OSSC	
Total Allowable Building Area	9,870 SF	30,275 SF		**Existing Exceeds Allowable
Allowable Building Height	40 Feet	22 Feet	504.3 OSSC	
Allowable Building Stories	1 Story	2 Stories	504.4 OSSC	**Existing Exceeds Allowable
Required Separation of Occupancy			Table 508.4 OSSC	

BUILDING 'II'

Description	Allowed	Existing	Code Section	Comments
Base Allowable Building Area	9,500 SF	--	Table 506.2 OSSC	
Frontage Area Increase	3,500 SF	--	Section 506.3 OSSC	
Total Allowable Building Area	13,000 SF	7,000 SF		
Allowable Building Height	40 Feet	30 Feet	504.3 OSSC	
Allowable Building Stories	1 Story	1 Stories	504.4 OSSC	
Required Separation of Occupancy			Table 508.4 OSSC	

BUILDING 'III'

Description	Allowed	Existing	Code Section	Comments
Base Allowable Building Area	9,500 SF	--	Table 506.2 OSSC	
Frontage Area Increase	4,750 SF	--	Section 506.3 OSSC	
Total Allowable Building Area	14,250 SF	8,220 SF		
Allowable Building Height	40 Feet	19 Feet	504.3 OSSC	
Allowable Building Stories	1 Story	1 Stories	504.4 OSSC	
Required Separation of Occupancy			Table 508.4 OSSC	

BUILDING 'IV'

Description	Allowed	Existing	Code Section	Comments
Base Allowable Building Area	9,500 SF	--	Table 506.2 OSSC	
Frontage Area Increase	1,235 SF	--	Section 506.3 OSSC	
Total Allowable Building Area	10,735 SF	5,820 SF		
Allowable Building Height	40 Feet	21 Feet	504.3 OSSC	
Allowable Building Stories	1 Story	1 Stories	504.4 OSSC	
Required Separation of Occupancy			Table 508.4 OSSC	

APPLICABLE CODES

2019 Oregon Structural Specialty Code (OSSC)
2017 Oregon Electrical Specialty Code (OESC)
2019 Oregon Fire Code (OFC)
2019 Oregon Mechanical Specialty Code (OMSC)
2017 Oregon Plumbing Specialty Code (OPSC)
2016 ASHRAE 90.1 Energy Code
2019 Oregon Zero Energy Ready Commercial Code

PROJECT INFORMATION

Construction Type

Type - VB

Occupancy Classification

Education, E

Project Area

52,615 SF

Gross Building Area

BUILDING 'I' FIRST FLOOR	30,275 SF
BUILDING 'I' SECOND FLOOR	1,300 SF
BUILDING 'II'	7,000 SF
BUILDING 'III'	8,220 SF
BUILDING 'IV'	5,820 SF
TOTAL AREA	52,615 SF

FIRE LIFE SAFETY LEGEND

NON-RATED EGRESS CORRIDOR

BUILDING AREA SEPARATION (ASSUMED (E) 2-HR RATING)

ROOM NAME
RM 101
999 SF
SPACE
XXX
XX OCC

TOTAL ROOM AREA
FUNCTION OF SPACE
OCCUPANT LOAD FACTOR
TOTAL OCCUPANTS IN SPACE

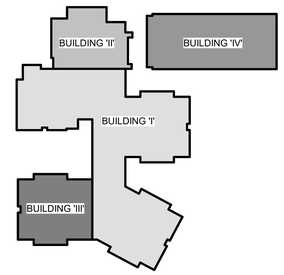
ROOM NAME
RM 101
999 SF
SPACE
XX
POSTED

NUMBER OF POSTED OCCUPANTS

0 — OCCUPANT LOAD FROM SPACE AND TRAVEL DIRECTION

E 0 — EXIT WITH OCCUPANT LOAD

BUILDING SEPARATION KEY PLAN



BEAVERTON SCHOOL DISTRICT

COOPER MOUNTAIN ELEMENTARY

7670 SW 170th AVE
BEAVERTON, OR 97007

OH PLANNING+DESIGN, ARCHITECTURE
115 NW 1st Ave, Ste. 300
Portland, OR 97209

Consultants:

COOPER MOUNTAIN ELEMENTARY SCHOOL
SRGP IMPROVEMENTS

100% DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Date: 09/28/2020
Project Number: 90060
Drawn By: SK, CDM
Checked By: CSM

Revision Schedule:

Sheet Title:
CODE SUMMARY

Sheet Number:
G-101

10/2/2020 12:32:17 PM

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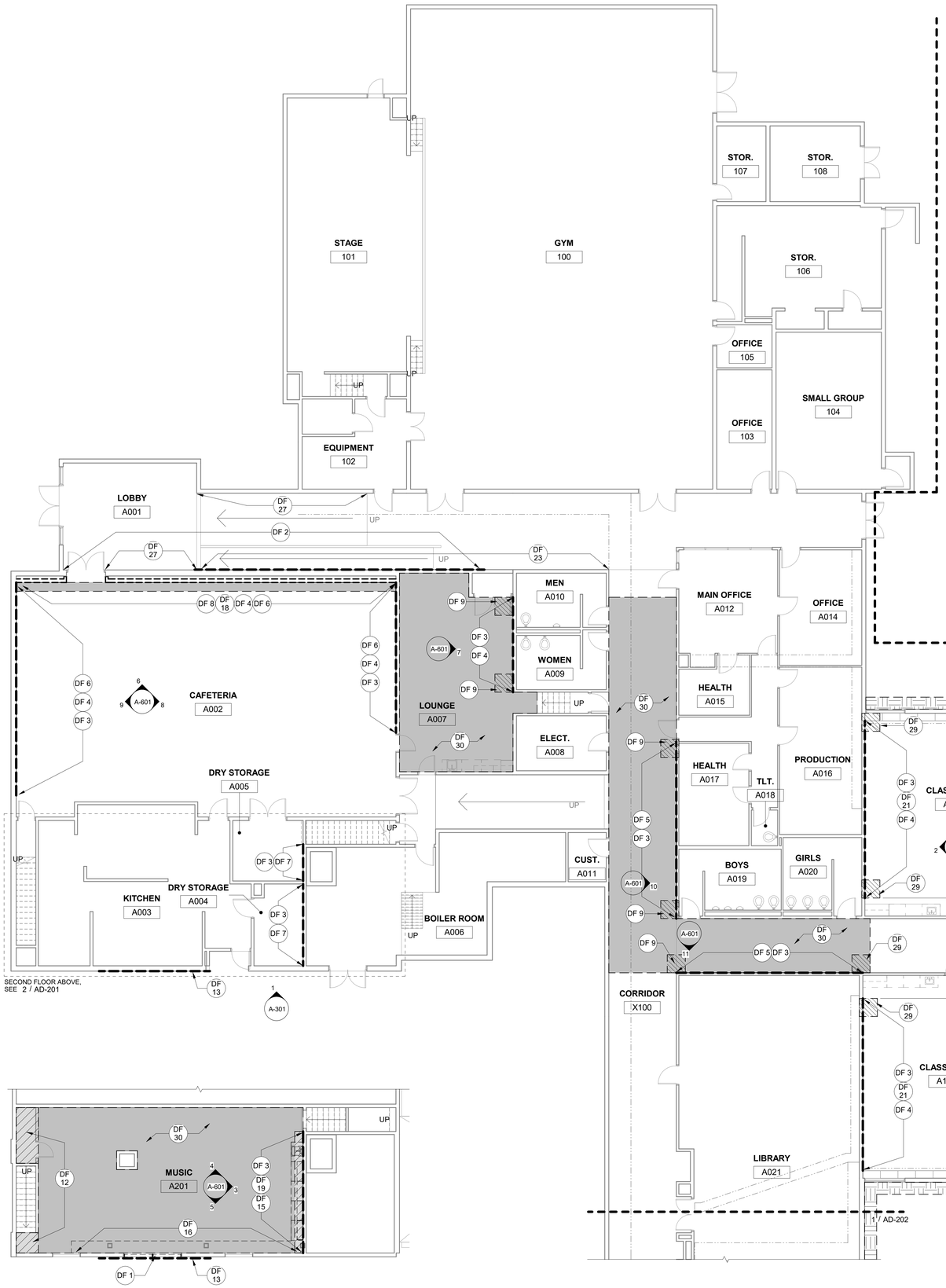

2 DEMOLITION FLOOR PLAN - AREA A SECOND FLOOR
1/8" = 1'-0"

1 DEMOLITION FLOOR PLAN - AREA A, B, C NORTH
1/8" = 1'-0"

SHEET NOTES - DEMOLITION PLAN

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E. Contractor to inform architect of any discrepancies within drawings or between drawings and field conditions before commencement of affected work.
F. For additional demolition information, see all consultant's drawings.
G. Locate and verify existence and use of existing utilities. Take necessary measures to protect and preserve function and condition of any utilities to be repaired, replaced, or reused in new construction. Coordinate work with architect, consultants and owner.
H. Coordinate with owner regarding any work that is to occur in the ceiling of the floor below so as not to disrupt the functions of the owner's occupied area. Contractor to replace ceiling to match existing adjacent construction and finish, unless noted otherwise.
I. Removal of existing plumbing fixtures shall include capping of piping and waste lines. See plumbing drawings for more information.
J. All acoustical ceilings and related support systems to be removed shall include ceiling tiles, light fixtures, grilles, diffusers, steel support grids and ceiling mounted equipment, unless noted otherwise.
K. Contractor shall take proper measures to protect areas outside the area of work from dust, air particulates, and debris. Coordinate with Architect, Engineer and Owner to protect against infiltration of all of the above into the remaining occupied areas.
L. Demolition Work to take place prior to interior improvements. Provide such measures as necessary to prevent property damage or bodily injury.
M. All interior Patching and Repair shall occur as part of this scope of work, U.N.O. Contractor shall protect all existing exposed construction from damage resulting from or related to demolition and construction operations.
N. Contractor shall repair or replace any existing construction to remain that is damaged in the course of the work to its original condition.
O. Where interruption of the building's Life Safety System is required to perform the work as described in the Construction Documents, or to coordinate with owner's operations, the Contractor shall provide interim Life Safety measures to comply with local code and owner's requirements.
P. Contractor is responsible for all waste removal and site clean up during performance of and at completion of the Work.

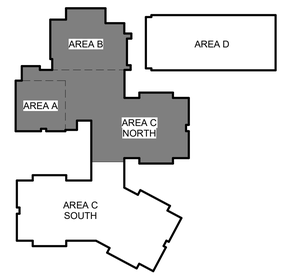
LEGEND - DEMOLITION PLAN

- EXISTING TO REMAIN
- EXISTING TO BE DEMOLISHED
- DEMOLISH EXISTING SHEATHING TO EXPOSE STRUCTURE FOR INSTALLATION OF SEISMIC BRACING - SEE STRUCTURAL.
- EXISTING AIR TUNNELS
- REMOVE FLOORING FINISH
- REMOVE FLOOR SHEATHING
- DEMOLISH EXISTING SLAB FOR CONCRETE FOOTING
- DEMOLISH EXISTING ASPHALT

DF # KEYNOTES - DEMOLITION PLAN

DF 1 Demolish existing window.
DF 2 Remove gypsum board as required to install new connection between base of wall and foundation - see Structural.
DF 3 Demolish 5/8" gypsum board, veneer plaster, and rubber base.
DF 4 Remove wall mounted equipment and devices; salvage and protect for reinstallation.
DF 5 Demolish tackable wall surface.
DF 6 Demolish wall mounted tectum acoustic panels.
DF 7 Remove shelving; salvage and protect for reinstallation.
DF 8 Demolish furred wall to expose structural framing.
DF 9 Demolish concrete slab for new structural footing - see Structural.
DF 10 Pull back soil and landscaping to provide access to foundation for structural improvements.
DF 11 Demolish exterior EIFS.
DF 12 Demolish (E) floor sheathing for installation of new blocking and nailing - see Structural.
DF 13 Demolish (E) cement plaster exterior finish.
DF 15 Remove upper casework; salvage and protect for reinstallation. Demolish lower casework, countertop, and sink.
DF 16 Demolish plastic laminate countertop. Existing lower casework to remain.
DF 17 Unsupported concrete wall. See Structural for detailing of seismic improvement at top of concrete wall.
DF 18 Demolish VCT flooring to nearest tile joint.
DF 19 Demolish floor sheathing to allow access for new wall sheathing.
DF 20 Remove carpet in classrooms and common area. Demolish floor sheathing as required for access to foundation work.
DF 21 Pull carpet back and protect during construction.
DF 22 Prepare (E) columns to receive welded plates and paint.
DF 23 Demolish protective wall covering. Protect decorative tiles above.
DF 24 Demolish asphalt for foundation anchor - see Structural for detailing.
DF 25 Demolish concrete for foundation anchors - see Structural for detailing.
DF 26 Demolish (E) asphalt to install new steel angles at (E) column base - see Structural, typical all columns at Covered Play.
DF 27 Protect (E) decorative tile. Contractor to provide protection to mitigate vibration of wall and damage of tile.
DF 28 Prepare CMU wall to have core full grout
DF 29 Demolish (E) slab to allow for new reinforced concrete footing extension doweled into (E) tunnel footing - see Structural.
DF 30 Demolish VCT flooring.

KEY PLAN



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SRGP IMPROVEMENTS

100% DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Date: 09/28/2020
Project Number: 90060
Drawn By: BPS
Checked By: CSM

Revision Schedule:

Sheet Title:
DEMOLITION FLOOR PLANS - AREA A, B, C NORTH

Sheet Number:
AD-201

100% DESIGN DEVELOPMENT

10/2/2020 12:31:54 PM

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- DEMOLISH EXISTING SHEATHING TO EXPOSE STRUCTURE FOR INSTALLATION OF SEISMIC BRACING - SEE STRUCTURAL.
- EXISTING AIR TUNNELS
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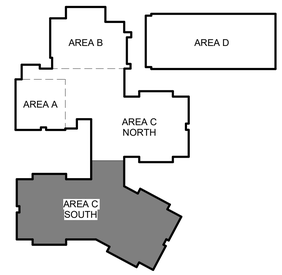
KEY PLAN



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Consultants:

COOPER MOUNTAIN ELEMENTARY SCHOOL
SRGP IMPROVEMENTS

100% DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Date: 09/28/2020
Project Number: 90060
Drawn By: BPS
Checked By: CSM

Revision Schedule:

Sheet Title:
DEMOLITION FLOOR PLANS - AREA C SOUTH

Sheet Number:
AD-202

100% DESIGN DEVELOPMENT

10/2/2020 12:31:57 PM

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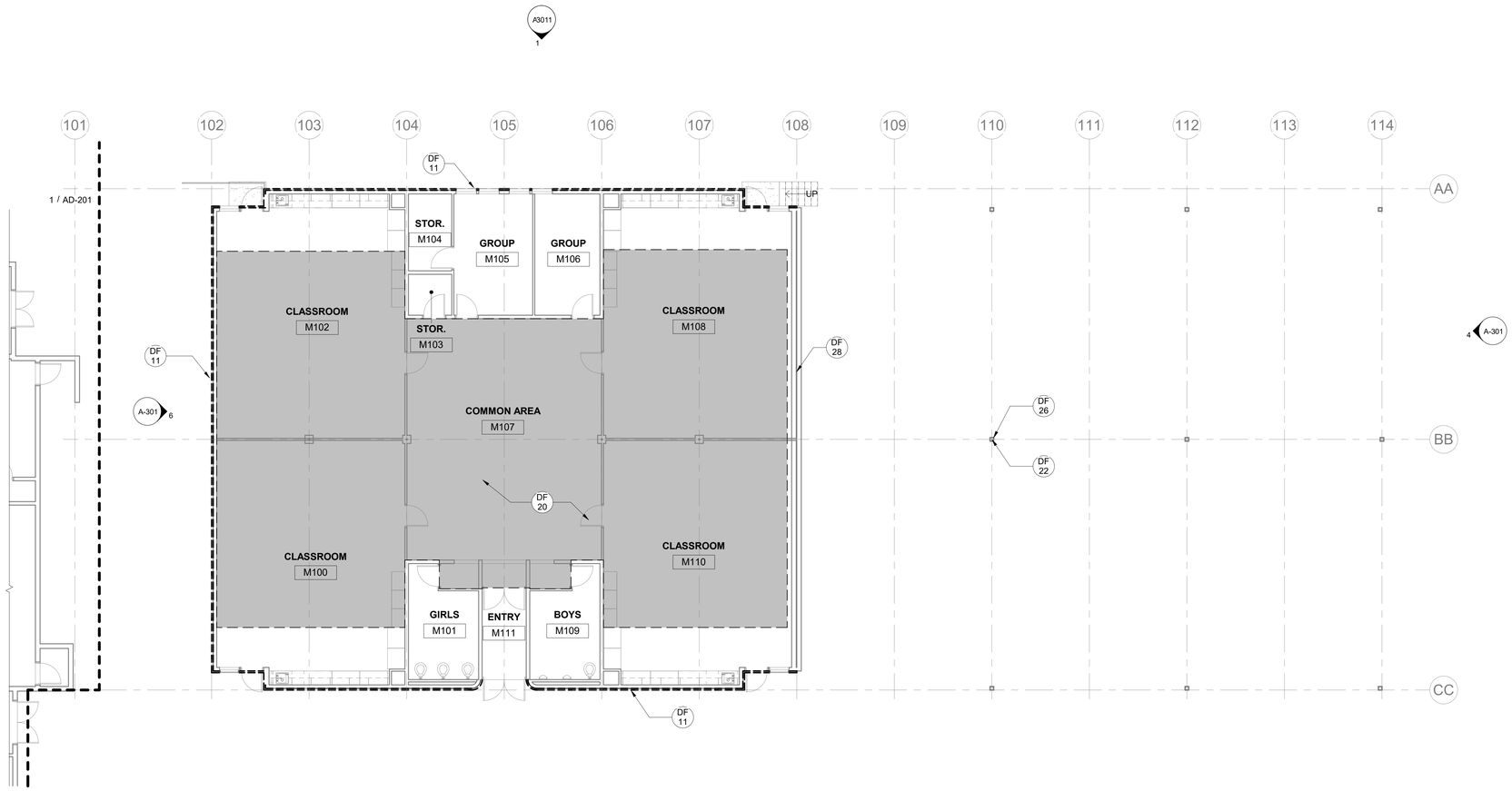

1 DEMOLITION FLOOR PLAN - AREA D
1/8" = 1'-0"

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- EXISTING AIR TUNNELS
- REMOVE FLOORING FINISH
- REMOVE FLOOR SHEATHING
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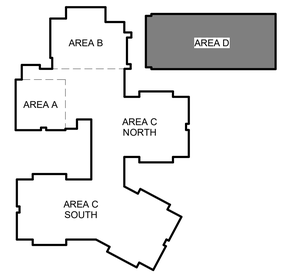
KEY PLAN



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Consultants:

COOPER MOUNTAIN ELEMENTARY SCHOOL
SRGP IMPROVEMENTS
100% DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Date: 09/28/2020
Project Number: 90060
Drawn By: BPS
Checked By: CSM

Revision Schedule:

Sheet Title:
DEMOLITION FLOOR PLANS - AREA D

Sheet Number:
AD-203

100% DESIGN DEVELOPMENT

10/2/2020 12:31:58 PM

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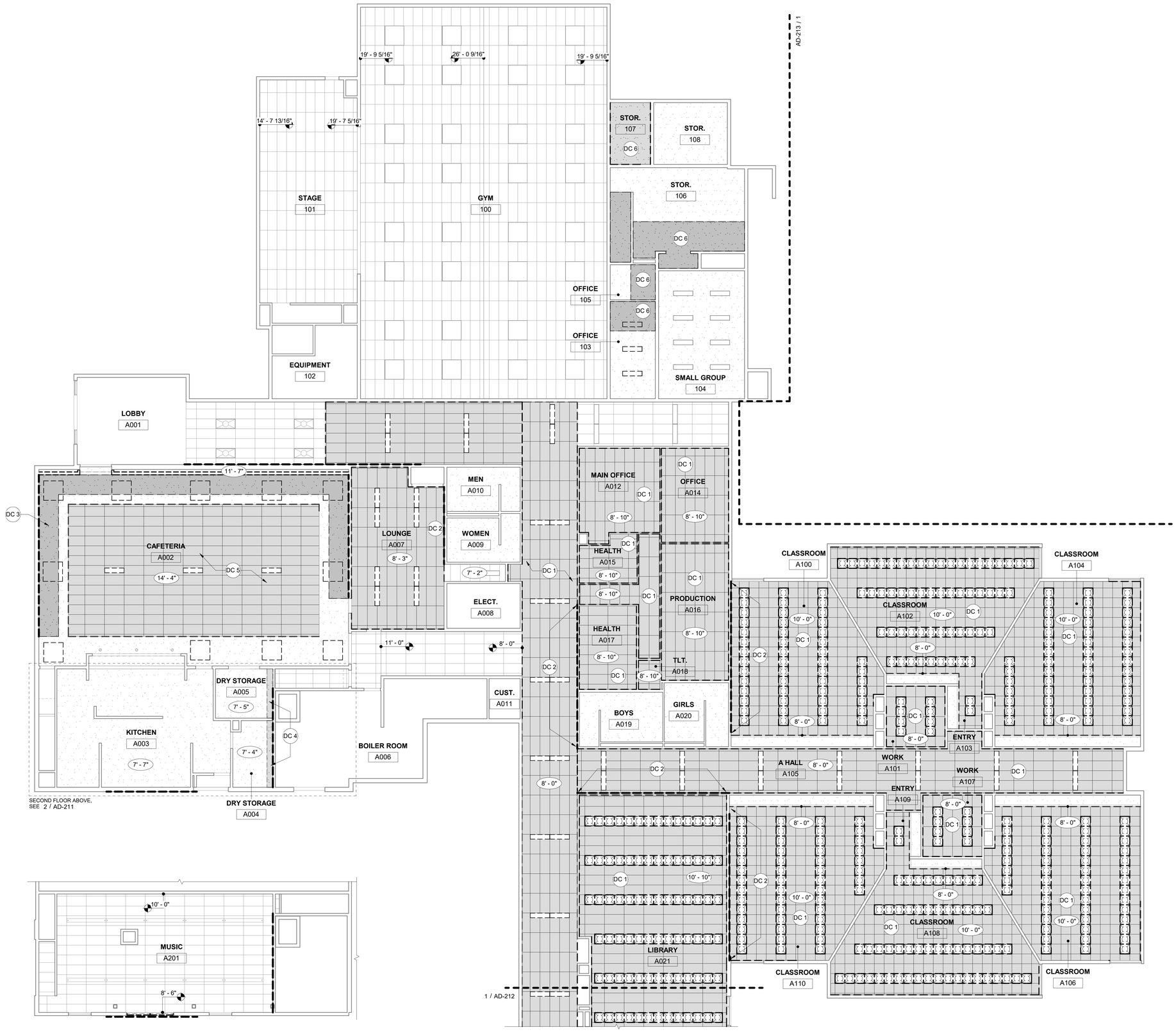


LEGEND - DEMOLITION RCP

- DEMOLISH EXISTING SHEATHING TO EXPOSE STRUCTURE FOR INSTALL OF SEISMIC BRACING PER STRUCTURAL.
- EXISTING TO REMAIN
- EXISTING CEILING TO BE DEMOLISHED
- DEMO 2X2 FLUORESCENT TYPICAL, SALVAGE FOR REUSE U.N.O.
- DEMO 1X4 FLUORESCENT TYPICAL, SALVAGE FOR REUSE U.N.O.
- DEMO 4X4 FLUORESCENT TYPICAL
- EXISTING TO REMAIN 2X2 FLUORESCENT TYPICAL
- EXISTING TO REMAIN 1X4 FLUORESCENT TYPICAL
- EXISTING TO REMAIN 4X4 FLUORESCENT TYPICAL

DC # KEYNOTES - DEMOLITION RCP

DC 1 Demolish all (E) lay-in ceiling tiles to provide access to underside of roof deck and grid bracing. (E) grid to remain. Salvage and protect all light fixtures and other ceiling mounted devices for reinstallation. Modify grid at perimeter for new seismic gap.

DC 2 Modify ceiling grid to allow for new shear wall installation.

DC 3 Demolish 4'-0" wide gypsum board soffit and associated 4x4 recessed light fixtures.

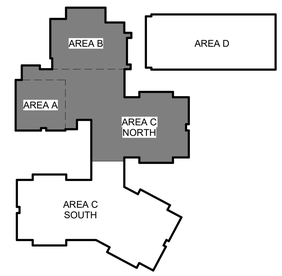
DC 4 Demolish gypsum ceiling for installation of new wall sheathing.

DC 5 Demolish existing lay-in ceiling tiles and grid to provide access to underside of roof deck and grid bracing. Salvage and protect all light fixtures and other ceiling mounted devices for reinstallation

DC 6 Demolish ceiling as required to brace top of unsupported CMU walls - see Structural. Salvage and protect all light fixtures and other ceiling mounted devices for reinstallation.

DC 7 Demolish ceiling as required to brace top of unsupported concrete wall - see Structural. Salvage and protect all light fixtures and other ceiling mounted devices for reinstallation.

KEY PLAN



2 DEMOLITION RCP - SECOND FLOOR
1/8" = 1'-0"

1 DEMOLITION RCP - AREA A, B, C NORTH
1/8" = 1'-0"

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SRGP IMPROVEMENTS

100% DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Date: 09/28/2020
Project Number: 90060
Drawn By: BPS
Checked By: CSM

Revision Schedule:

Sheet Title:
DEMOLITION CEILING PLANS - AREA A, B, C NORTH

Sheet Number:
AD-211

100% DESIGN DEVELOPMENT

10/2/2020 12:32:01 PM

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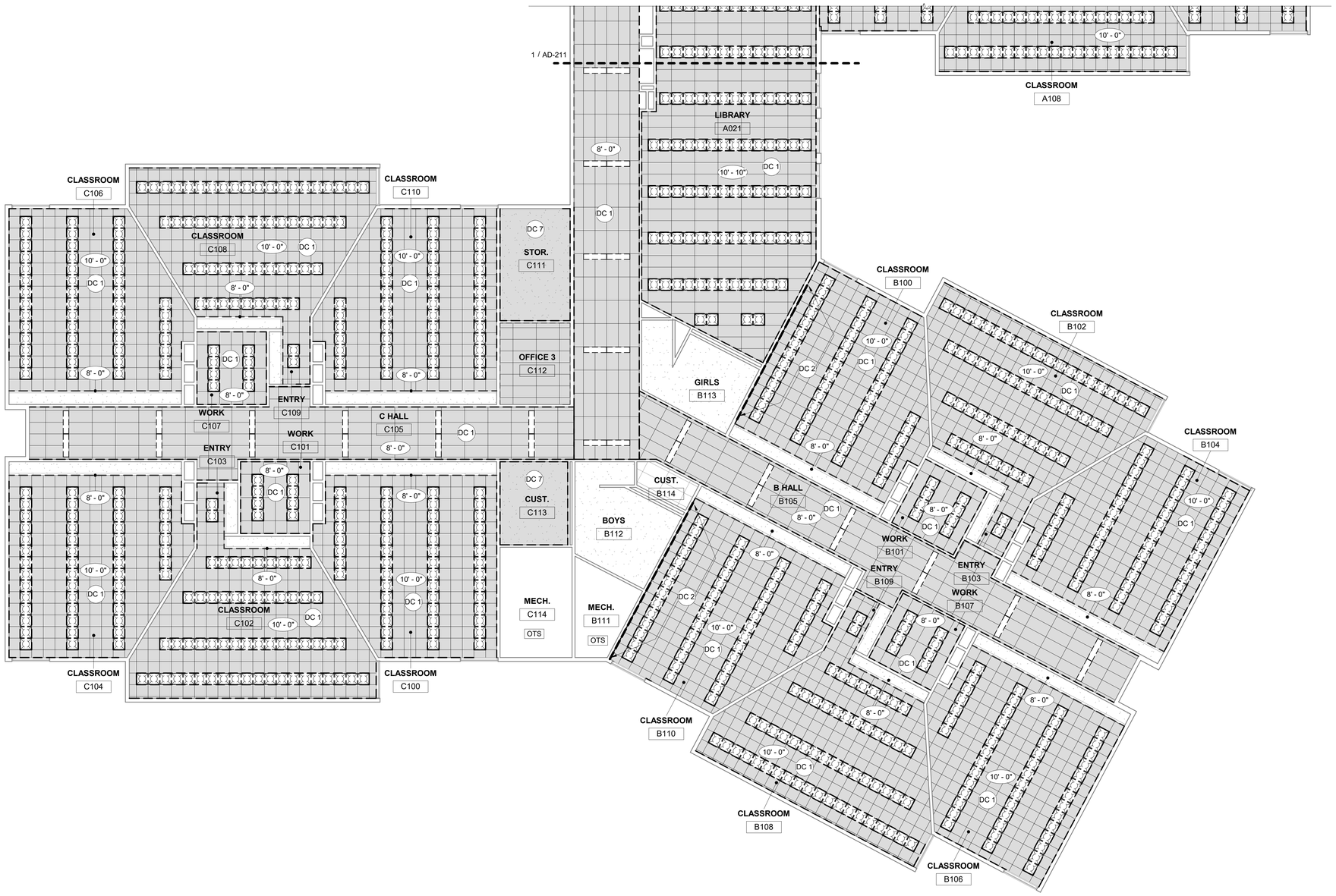

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1/8" = 1'-0"

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DC # KEYNOTES - DEMOLITION RCP

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DC 2 Modify ceiling grid to allow for new shear wall installation.
DC 3 Demolish 4'-0" wide gypsum board soffit and associated 4x4 recessed light fixtures.
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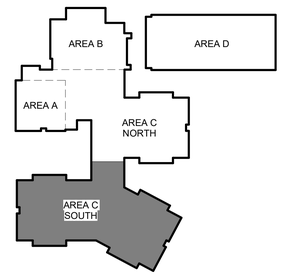

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SRGP IMPROVEMENTS

100% DESIGN DEVELOPMENT

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Date: 09/28/2020
Project Number: 90060
Drawn By: BPS
Checked By: CSM

Revision Schedule:

Sheet Title:
DEMOLITION CEILING PLAN - AREA C SOUTH

Sheet Number:
AD-212

10/2/2020 12:32:05 PM

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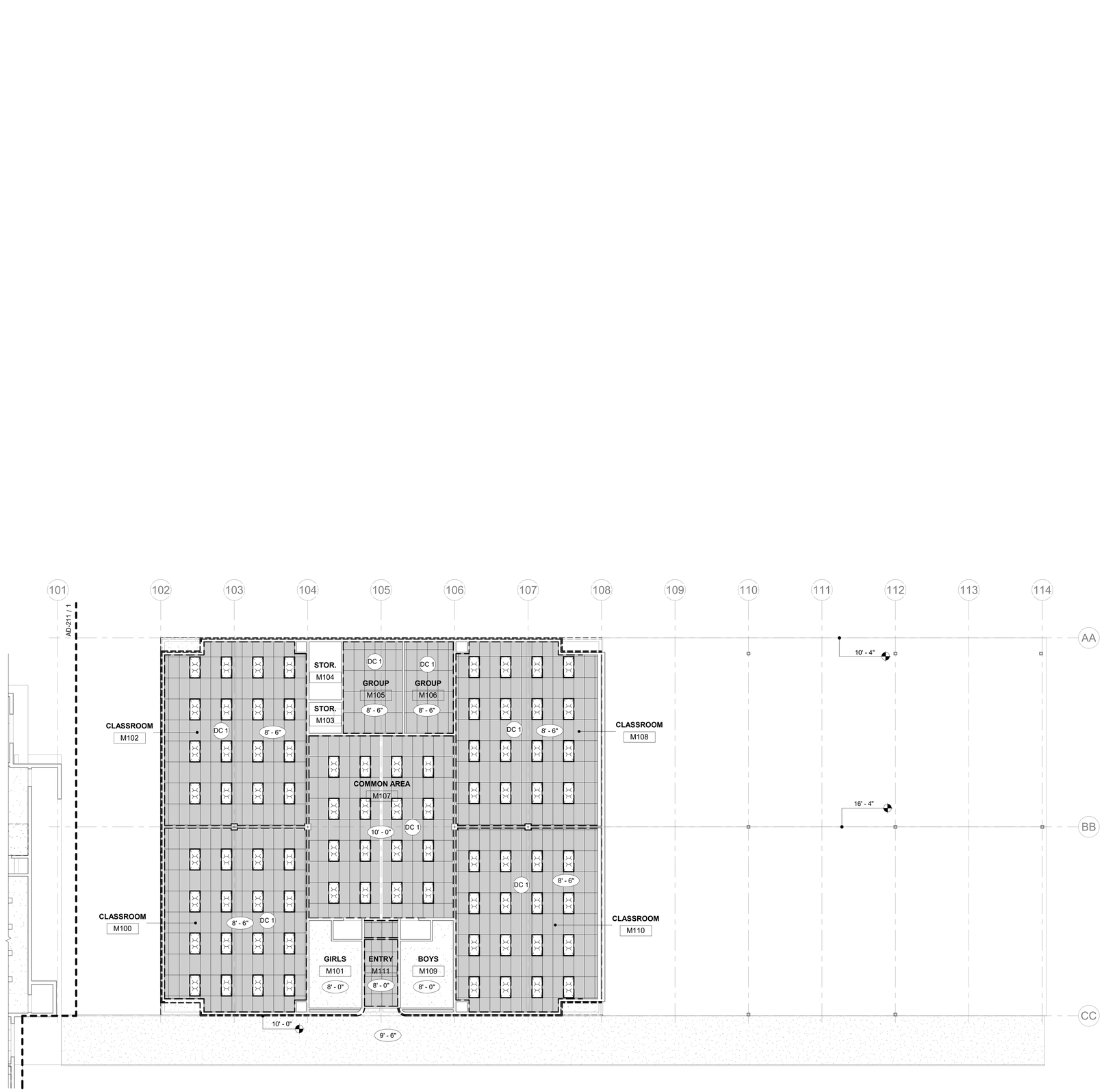


1 DEMOLITION RCP - AREA D
1/8" = 1'-0"

LEGEND - DEMOLITION RCP

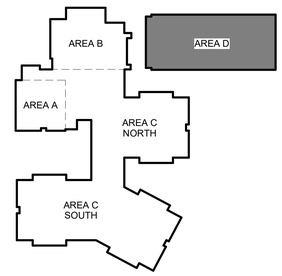
- DEMOLISH EXISTING SHEATHING TO EXPOSE STRUCTURE FOR INSTALL OF SEISMIC BRACING PER STRUCTURAL.
- EXISTING TO REMAIN
- EXISTING CEILING TO BE DEMOLISHED
- DEMO 2X2 FLUORESCENT TYPICAL, SALVAGE FOR REUSE U.N.O.
- DEMO 1X4 FLUORESCENT TYPICAL, SALVAGE FOR REUSE U.N.O.
- DEMO 4X4 FLUORESCENT TYPICAL
- EXISTING TO REMAIN 2X2 FLUORESCENT TYPICAL
- EXISTING TO REMAIN 1X4 FLUORESCENT TYPICAL
- EXISTING TO REMAIN 4X4 FLUORESCENT TYPICAL

KEYNOTES - DEMOLITION RCP

(DC #)

- DC 1 Demolish all (E) lay-in ceiling tiles to provide access to underside of roof deck and grid bracing. (E) grid to remain. Salvage and protect all light fixtures and other ceiling mounted devices for reinstallation. Modify grid at perimeter for new seismic gap.
- DC 2 Modify ceiling grid to allow for new shear wall installation.
- DC 3 Demolish 4'-0" wide gypsum board soffit and associated 4x4 recessed light fixtures.
- DC 4 Demolish gypsum ceiling for installation of new wall sheathing.
- DC 5 Demolish all existing lay-in ceiling tiles and grid to provide access to underside of roof deck and grid bracing. Salvage and protect all light fixtures and other ceiling mounted devices for reinstallation
- DC 6 Demolish ceiling as required to brace top of unsupported CMU walls - see Structural. Salvage and protect all light fixtures and other ceiling mounted devices for reinstallation.
- DC 7 Demolish ceiling as required to brace top of unsupported concrete wall - see Structural. Salvage and protect all light fixtures and other ceiling mounted devices for reinstallation.

KEY PLAN



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Consultants:

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Date:	09/28/2020
Project Number:	90060
Drawn By:	BPS
Checked By:	CSM

Revision Schedule:

Sheet Title:
DEMOLITION CEILING PLAN - AREA D

Sheet Number:
AD-213

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10/2/2020 12:32:06 PM

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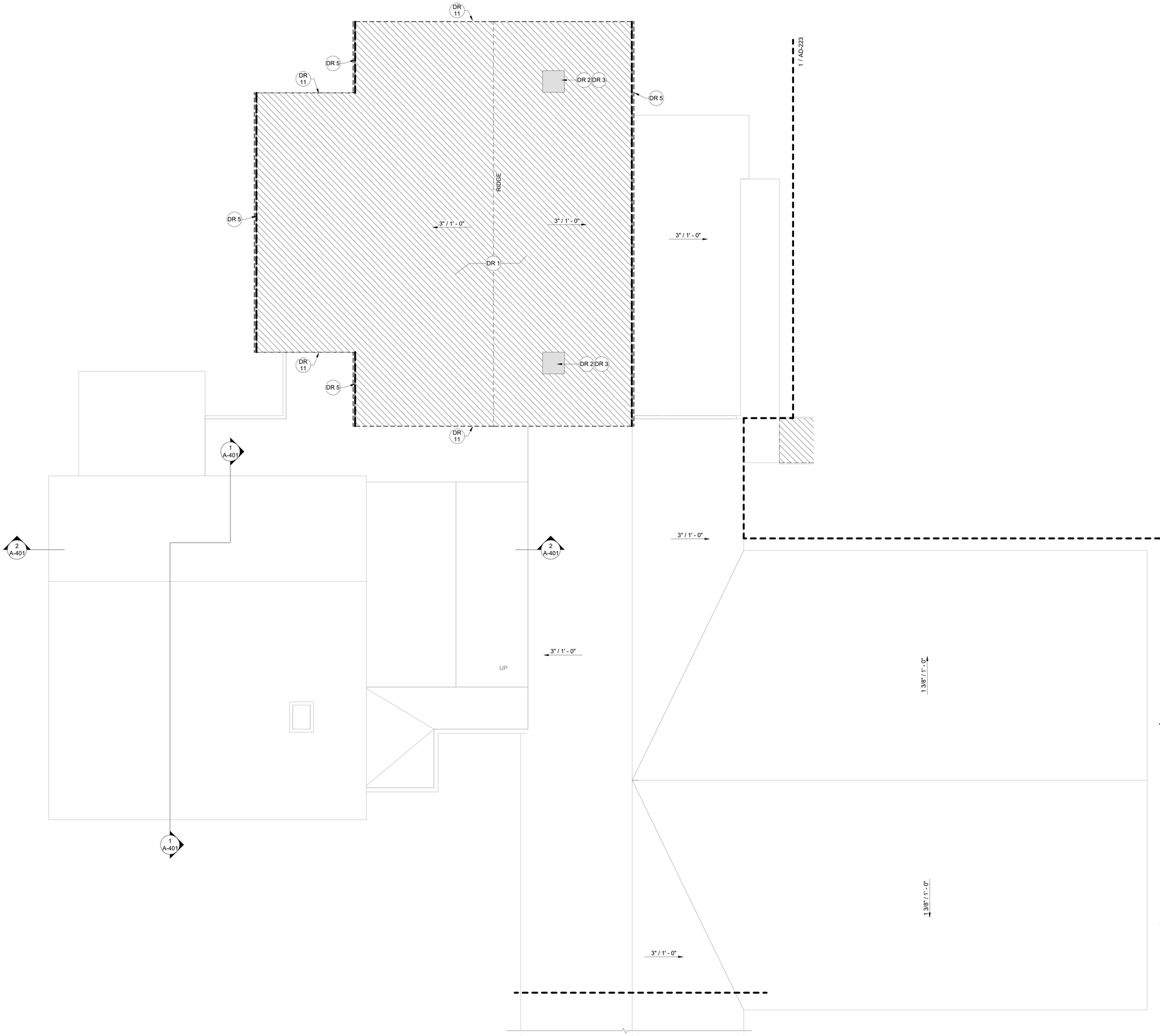


1 DEMOLITION ROOF PLAN - AREA A, B, C NORTH
1/8" = 1'-0"

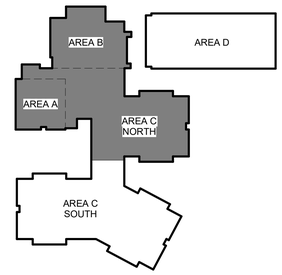
LEGEND - DEMOLITION ROOF PLAN

- DEMOLISH EXISTING GUTTER
- DEMOLISH EXISTING PARAPET FLASHING
- SURFACE AREA OF ROOF
- DEMOLISH (E) ROOFING TO (E) SUBSTRATE
- EXISTING ROOF EQUIPMENT

KEYNOTES - DEMOLITION ROOF PLAN

DR # — DR 1 Demolish standing seam roof.
DR 2 Remove roof-top exhaust fans; salvage and protect for reinstallation.
DR 3 Demolish mechanical curb to roof deck.
DR 4 Demolish ballast roofing.
DR 5 Demolish gutter.
DR 6 Demolish sheet metal parapet and intermediate ridge flashing.
DR 7 Remove roof hatch; salvage and protect for reinstallation.
DR 8 Remove rooftop mechanical unit; salvage and protect for reinstallation.
DR 9 Remove rooftop mechanical screen; salvage and protect for reinstallation.
DR 11 Demolish Fascia.

KEY PLAN



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Date:	09/28/2020
Project Number:	90060
Drawn By:	BPS
Checked By:	CSM

Revision Schedule:

Sheet Title:
DEMOLITION ROOF PLANS - AREA A, B, C NORTH

Sheet Number:
AD-221

10/2/2020 12:32:07 PM

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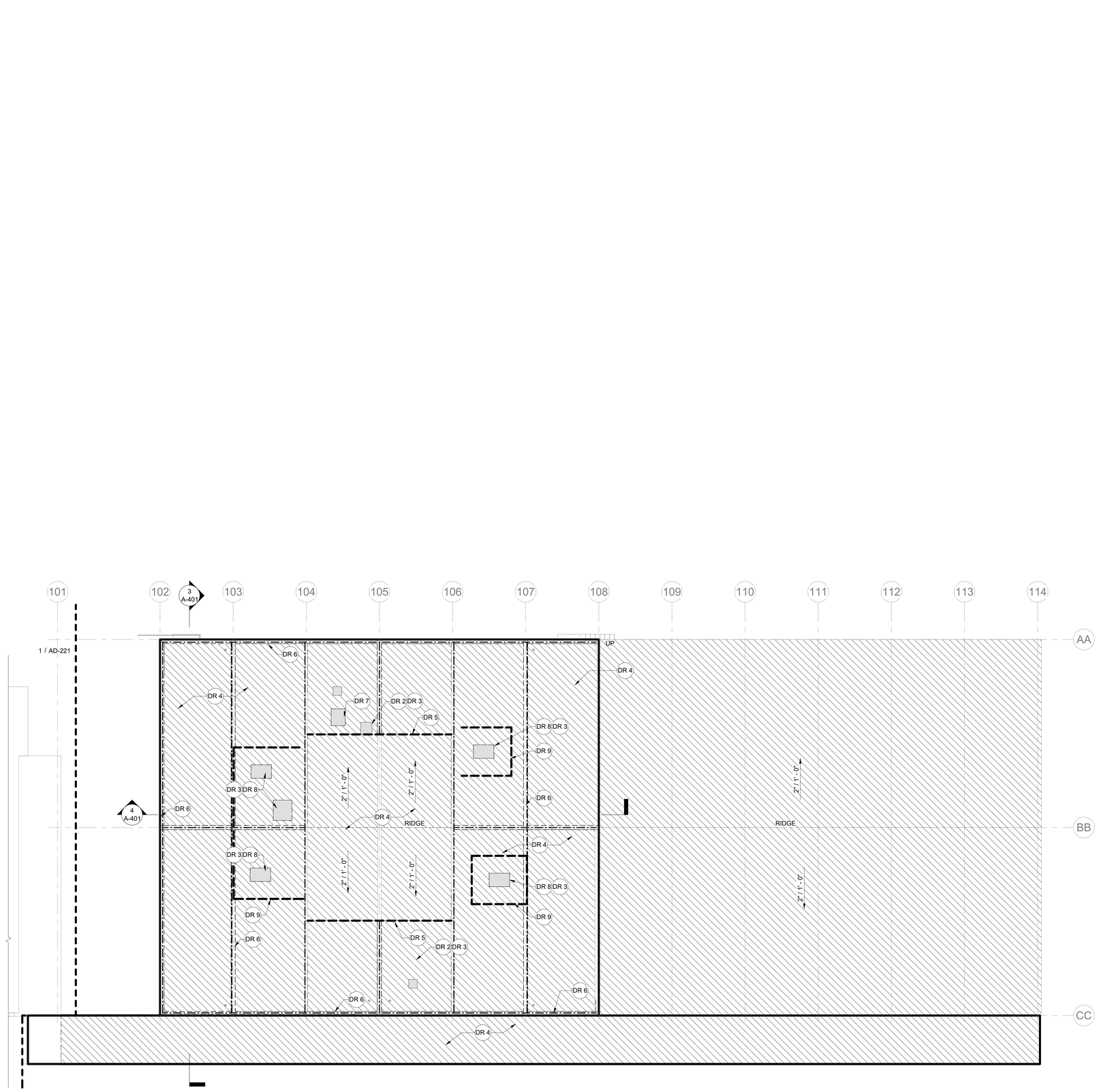


1 DEMOLITION ROOF PLAN - AREA D
1/8" = 1'-0"

LEGEND - DEMOLITION ROOF PLAN

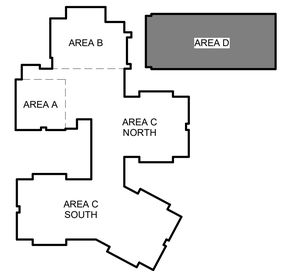
- DEMOLISH EXISTING GUTTER
- DEMOLISH EXISTING PARAPET FLASHING
- SURFACE AREA OF ROOF
- DEMOLISH (E) ROOFING TO (E) SUBSTRATE
- EXISTING ROOF EQUIPMENT

KEYNOTES - DEMOLITION ROOF PLAN

DR #

DR 1	Demolish standing seam roof.
DR 2	Remove roof-top exhaust fans; salvage and protect for reinstallation.
DR 3	Demolish mechanical curb to roof deck.
DR 4	Demolish ballast roofing.
DR 5	Demolish gutter.
DR 6	Demolish sheet metal parapet and intermediate ridge flashing.
DR 7	Remove roof hatch; salvage and protect for reinstallation.
DR 8	Remove rooftop mechanical unit; salvage and protect for reinstallation.
DR 9	Remove rooftop mechanical screen; salvage and protect for reinstallation.
DR 11	Demolish Fascia.

KEY PLAN



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Date:	09/28/2020
Project Number:	90060
Drawn By:	BPS
Checked By:	CSM

Revision Schedule:

Sheet Title:
DEMOLITION ROOF PLANS - AREA D

Sheet Number:
AD-223

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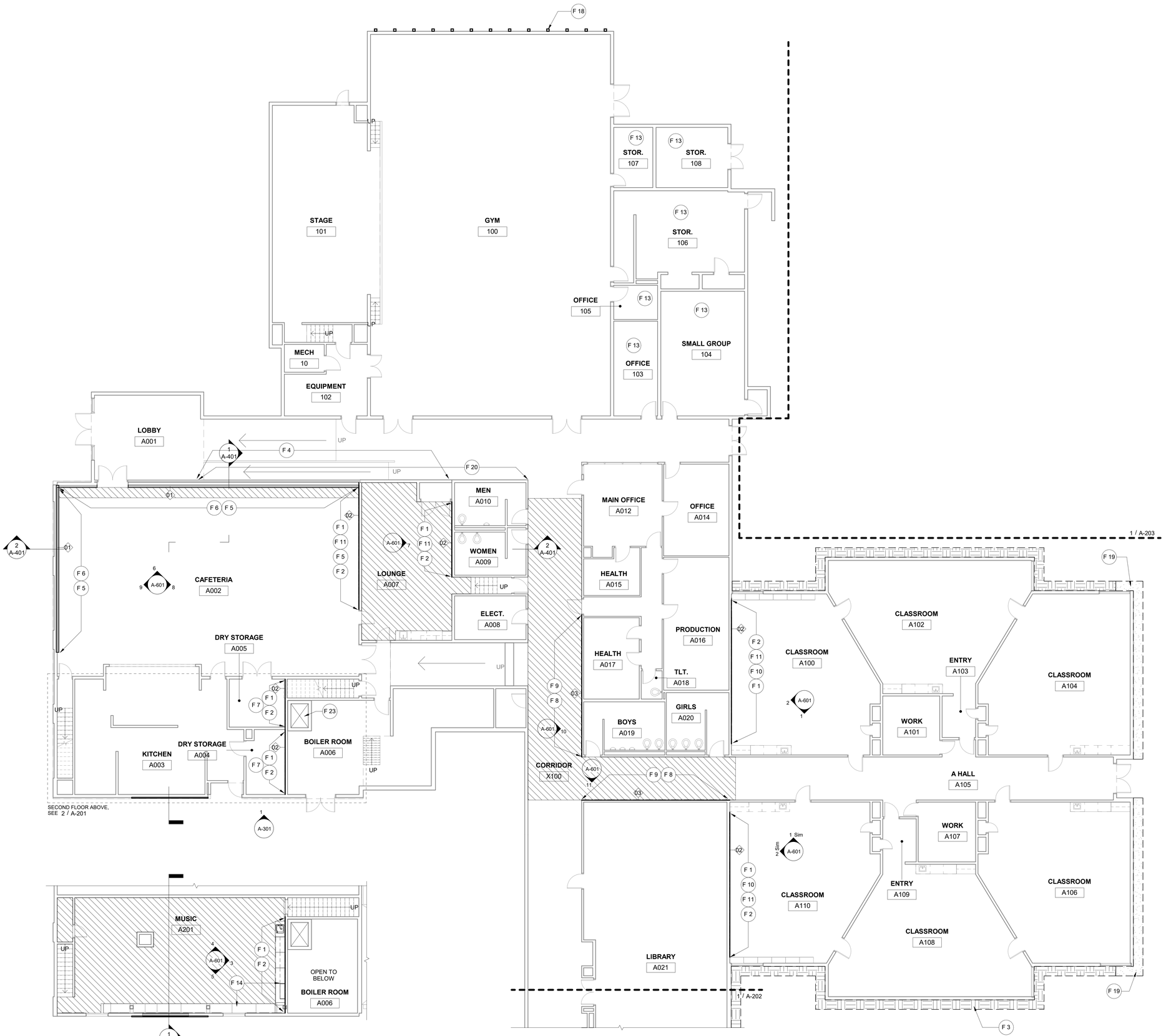


SHEET NOTES - FLOOR PLAN

A. All dimensions are to gridlines or face of core, U.N.O.
B. All dimensions to be field verified.
C. Keynotes are not sheets specific.
D. See Enlarged Plans, where applicable, for wall types, notes, and dimensions.
E. Coordinate all work with other trades.
F. Dimensions are to face of finish, U.N.O.

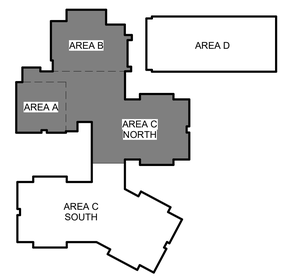
LEGEND - FLOOR PLAN

- EXISTING WALL TO REMAIN
- SEISMIC BRACE WALL
- NEW SHEATHING ON EXISTING WALL
- HSS TO BE PLACED PER STRUCTURAL
- NEW FLOORING, SEE FINISH FLOOR PLAN
- WALL TAG, REFER TO SEE PARTITION TYPES SHEET

KEYNOTES - FLOOR PLAN

F 1 Provide new 5/8" gypsum board over new sheathing. Provide new rubber base and paint wall to match existing.
F 2 Provide new 1/2" plywood sheathing.
F 3 Install new steel plates and anchors at base of wall - see Structural. Paint with high-performance coating to match existing adjacent wall. Patch and repair soil and landscaping where necessary.
F 4 Install new steel plates and anchors at wall base - see Structural. Patch and repair gypsum finish and paint to match existing.
F 5 Install new wall mounted acoustic panels.
F 6 Build new full-height 2x6 framed wall. New rubber base. Paint to match existing.
F 7 Install new full-height wall protection to match existing.
F 8 Install new Sureboard sheathing panels. Provide new rubber base and paint wall to match existing adjacent walls.
F 9 Install new 4'-6" tackable wall protection to match existing.
F 10 Patch and repair slab at area of new footing work. Roll existing carpet back over floor with new adhesive.
F 11 Reinstall all salvaged wall-mounted equipment and devices.
F 12 Install new steel plates and anchors at base of wall - see Structural. Paint with high-performance coating to match existing adjacent wall. Patch and repair concrete where necessary.
F 13 New angles at CMU wall base. Paint to match existing wall. Grind all edges to avoid protruding objects.
F 14 Reinstall upper cabinets. New countertop and sink. New base cabinets at east wall. Repaint existing base cabinets at south wall.
F 15 Install new fiber cement panel siding and continuous insulation over new plywood sheathing.
F 16 Install new plywood sheathing at areas of foundation access. Provide insulation at underside of plywood. Install new carpet throughout.
F 17 High performance coating at columns, typ.
F 18 New HSS strongbacks on exterior side of north wall. HSS to be full height and bolted to existing concrete tile wall - see Structural. Painted with high-performance coating to match existing exterior wall.
F 19 Install new steel plates and anchors at base of wall - see Structural. Paint with high-performance coating to match existing adjacent wall. Patch and repair asphalt where necessary.
F 20 New protective wall covering, to match existing adjacent walls.
F 21 Core and fully grouted (E) CMU wall
F 22 Seismic improvements above existing concrete wall. Reference structural for detailing.
F 23 See Structural for chase scope.

KEY PLAN



2 SECOND FLOOR PLAN - AREA A
1/8" = 1'-0"

1 FIRST FLOOR PLAN - AREA A, B, C NORTH
1/8" = 1'-0"

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Consultants:

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Date:	09/28/2020
Project Number:	90060
Drawn By:	BPS
Checked By:	CSM

Revision Schedule:

Sheet Title:
FLOOR PLANS - AREA A, B, C NORTH

Sheet Number:
A-201

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1 FIRST FLOOR PLAN - AREA C SOUTH
1/8" = 1'-0"

SHEET NOTES - FLOOR PLAN

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LEGEND - FLOOR PLAN

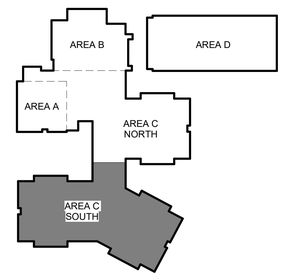
- EXISTING WALL TO REMAIN
- SEISMIC BRACE WALL
- NEW SHEATHING ON EXISTING WALL
- HSS TO BE PLACED PER STRUCTURAL
- NEW FLOORING, SEE FINISH FLOOR PLAN
- WALL TAG, REFER TO SEE PARTITION TYPES SHEET

KEYNOTES - FLOOR PLAN

(F #)

F 1 Provide new 5/8" gypsum board over new sheathing. Provide new rubber base and paint wall to match existing.
F 2 Provide new 1/2" plywood sheathing.
F 3 Install new steel plates and anchors at base of wall - see Structural. Paint with high-performance coating to match existing adjacent wall. Patch and repair soil and landscaping where necessary.
F 4 Install new steel plates and anchors at wall base - see Structural. Patch and repair gypsum finish and paint to match existing.
F 5 Install new wall mounted acoustic panels.
F 6 Build new full-height 2x6 framed wall. New rubber base. Paint to match existing.
F 7 Install new full-height wall protection to match existing.
F 8 Install new Sureboard sheathing panels. Provide new rubber base and paint wall to match existing adjacent walls.
F 9 Install new 4'-6" tackable wall protection to match existing.
F 10 Patch and repair slab at area of new footing work. Roll existing carpet back over floor with new adhesive.
F 11 Reinstall all salvaged wall-mounted equipment and devices.
F 12 Install new steel plates and anchors at base of wall - see Structural. Paint with high-performance coating to match existing adjacent wall. Patch and repair concrete where necessary.
F 13 New angles at CMU wall base. Paint to match existing wall. Grind all edges to avoid protruding objects.
F 14 Reinstall upper cabinets. New countertop and sink. New base cabinets at east wall. Repaint existing base cabinets at south wall.
F 15 Install new fiber cement panel siding and continuous insulation over new plywood sheathing.
F 16 Install new plywood sheathing at areas of foundation access. Provide insulation at underside of plywood. Install new carpet throughout.
F 17 High performance coating at columns, typ.
F 18 New HSS strongbacks on exterior side of north wall. HSS to be full height and bolted to existing concrete tile wall - see Structural. Painted with high-performance coating to match existing exterior wall.
F 19 Install new steel plates and anchors at base of wall - see Structural. Paint with high-performance coating to match existing adjacent wall. Patch and repair asphalt where necessary.
F 20 New protective wall covering, to match existing adjacent walls.
F 21 Core and fully grouted (E) CMU wall
F 22 Seismic improvements above existing concrete wall. Reference structural for detailing.
F 23 See Structural for chase scope.

KEY PLAN



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Date:	09/28/2020
Project Number:	90060
Drawn By:	BPS
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Revision Schedule:

Sheet Title:
FLOOR PLANS - AREA C SOUTH

Sheet Number:
A-202

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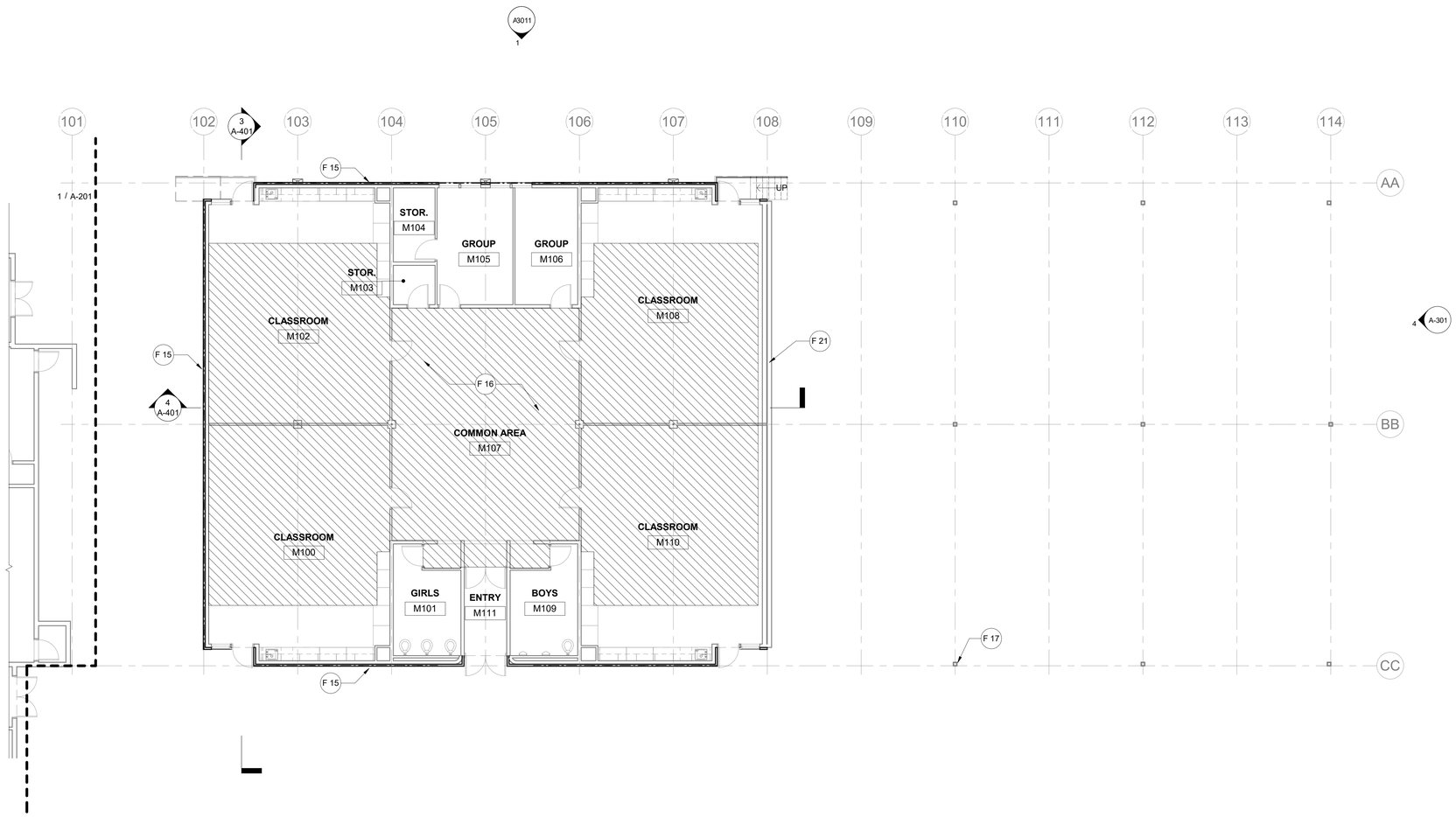

1 FIRST FLOOR PLAN - AREA D
1/8" = 1'-0"

SHEET NOTES - FLOOR PLAN

A. All dimensions are to gridlines or face of core, U.N.O.
B. All dimensions to be field verified.
C. Keynotes are not sheets specific.
D. See Enlarged Plans, where applicable, for wall types, notes, and dimensions.
E. Coordinate all work with other trades.
F. Dimensions are to face of finish, U.N.O.

LEGEND - FLOOR PLAN

- EXISTING WALL TO REMAIN
- SEISMIC BRACE WALL
- NEW SHEATHING ON EXISTING WALL
- HSS TO BE PLACED PER STRUCTURAL
- NEW FLOORING, SEE FINISH FLOOR PLAN
- 1 WALL TAG, REFER TO SEE PARTITION TYPES SHEET

F # KEYNOTES - FLOOR PLAN

F 1 Provide new 5/8" gypsum board over new sheathing. Provide new rubber base and paint wall to match existing.
F 2 Provide new 1/2" plywood sheathing.
F 3 Install new steel plates and anchors at base of wall - see Structural. Paint with high-performance coating to match existing adjacent wall. Patch and repair soil and landscaping where necessary.
F 4 Install new steel plates and anchors at wall base - see Structural. Patch and repair gypsum finish and paint to match existing.
F 5 Install new wall mounted acoustic panels.
F 6 Build new full-height 2x6 framed wall. New rubber base. Paint to match existing.
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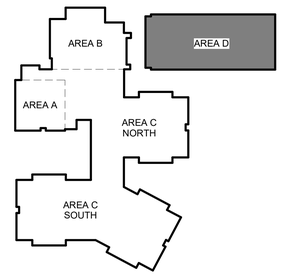
F 14 Reinstall upper cabinets. New countertop and sink. New base cabinets at east wall. Repaint existing base cabinets at south wall.
F 15 Install new fiber cement panel siding and continuous insulation over new plywood sheathing.
F 16 Install new plywood sheathing at areas of foundation access. Provide insulation at underside of plywood. Install new carpet throughout.
F 17 High performance coating at columns, typ.
F 18 New HSS strongbacks on exterior side of north wall. HSS to be full height and bolted to existing concrete tile wall - see Structural. Painted with high-performance coating to match existing exterior wall.
F 19 Install new steel plates and anchors at base of wall - see Structural. Paint with high-performance coating to match existing adjacent wall. Patch and repair asphalt where necessary.
F 20 New protective wall covering, to match existing adjacent walls.
F 21 Core and fully grouted (E) CMU wall
F 22 Seismic improvements above existing concrete wall. Reference structural for detailing.
F 23 See Structural for chase scope.

KEY PLAN



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Date: 09/28/2020
Project Number: 90060
Drawn By: BPS
Checked By: CSM

Revision Schedule:

Sheet Title:
FLOOR PLANS - AREA D

Sheet Number:
A-203

10/2/2020 12:31:30 PM

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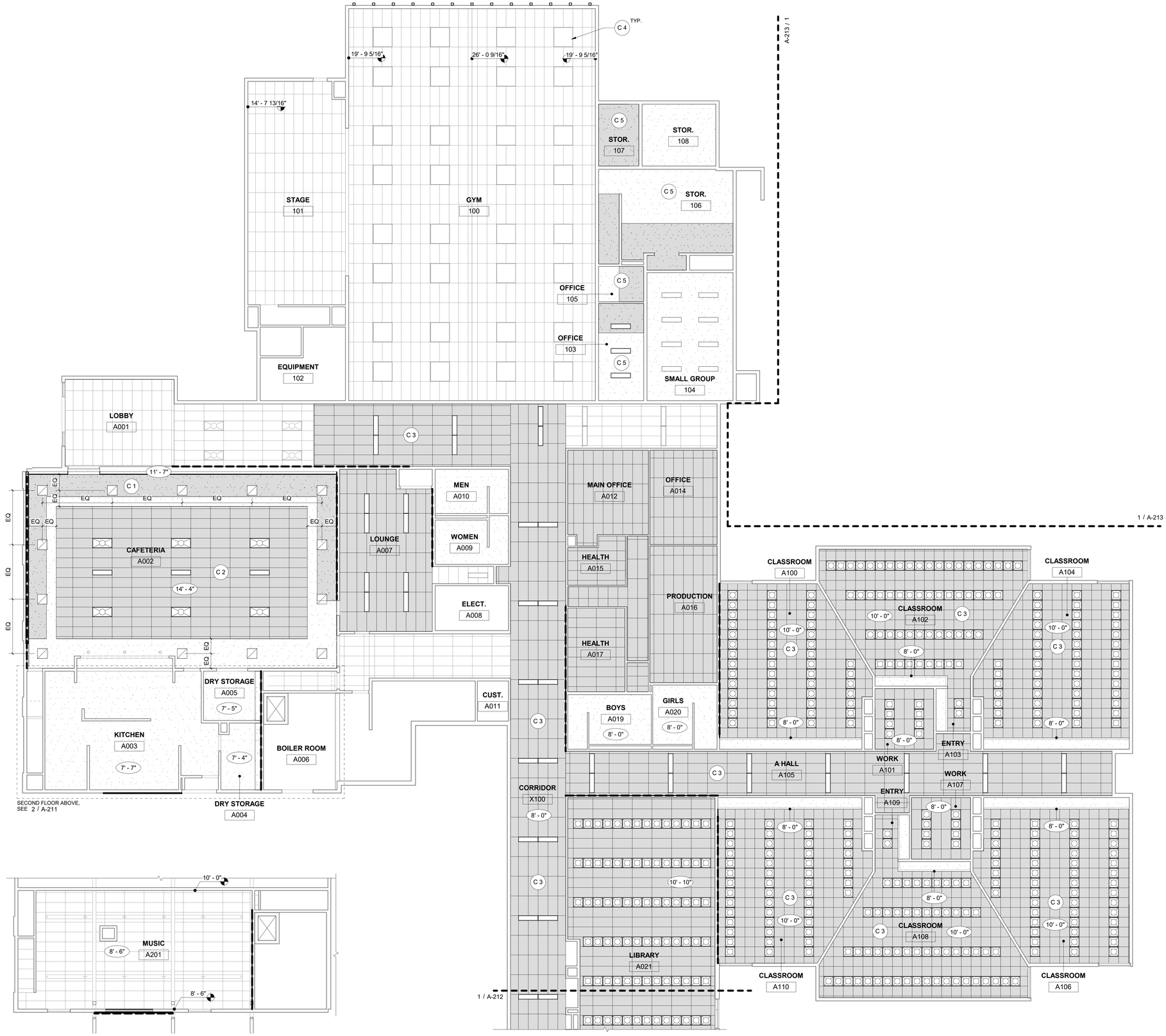


SHEET NOTES - RCP

A. Keynotes are not sheet specific.
B. All heights shown are to bottom of grid system or gyp bd AFF, relative to the floor that the ceiling plan is shown on, UNO.
C. "Downlight" or "wall-washer" ceiling fixtures, smoke detectors, life safety speakers, AV speakers, exit signs, sprinklers, mirrors, fire alarm or signal devices, or other ceiling mounted devices are to be centered in an apparent ceiling tile, UNO.
D. Door exit signs to be located 12" clear from, and centered on, the door to which exit is indicated, UNO.
E. Contractor to coordinate Owner's telecom and security contractor's work.
F. Refer to electrical engineer's documents for lighting & lighting control specifications.
G. Refer to mechanical engineer's documents for HVAC & plumbing equipment & control specifications.
H. Refer to owner's technology engineer's documents for lighting & lighting control specifications.
I. Relocate (E) sprinklers, smoke detectors, and speakers as required for ceiling layout

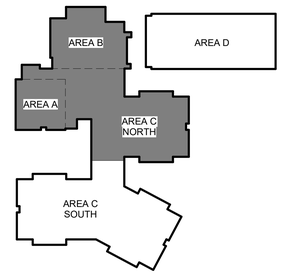
LEGEND - RCP

- EXISTING WALL TO REMAIN
- SEISMIC BRACE WALL
- DEMOLISH EXISTING SHEATHING TO EXPOSE STRUCTURE FOR INSTALL OF SEISMIC BRACING PER STRUCTURAL.
- EXISTING 2X4 ACOUSTIC CEILING TILE TO REMAIN
- EXISTING GYPSUM BOARD CEILING TO REMAIN
- EXISTING 2X2 ACOUSTIC CEILING TILE TO REMAIN
- NEW 2X4 ACOUSTIC CEILING TILE, IN EXISTING GRID U.N.O.
- NEW GYPSUM BOARD CEILING
- NEW 2X2 ACOUSTIC CEILING TILE, IN EXISTING GRID U.N.O.
- EXISTING 2X2 FLUORESCENT
- EXISTING 1X4 FLUORESCENT
- EXISTING 96" PENDANT
- EXISTING 4X4 FLUORESCENT
- EXISTING CAN LIGHT
- REINSTALLED EXISTING 2X2 FLUORESCENT
- REINSTALLED EXISTING 1X4 FLUORESCENT
- REINSTALLED EXISTING 96" PENDANT
- NEW 2X2 VTL

C # KEYNOTES - RCP

C 1 Install new 4'-0" wide dropped 5/8" soffit with 4x4 recessed light fixtures.
C 2 Install new ACT and suspended ceiling grid. Reinstall salvaged light fixtures.
C 3 Install new ceiling tiles in existing ceiling grid. Provide gap and closure angle at perimeter. Modify grid at perimeter as required at new shear wall improvements. Re-install salvaged light fixtures.
C 4 New protective grills at existing light fixtures.
C 5 Install new gypsum ceiling and reinstall salvaged light fixtures.

KEY PLAN



2 REFLECTED CEILING PLAN - SECOND FLOOR
1/8" = 1'-0"

1 REFLECTED CEILING PLAN - AREA A, B, C NORTH
1/8" = 1'-0"

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Date:	09/28/2020
Project Number:	90060
Drawn By:	BPS
Checked By:	CSM

Revision Schedule:

Sheet Title:
REFLECTED CEILING PLANS - AREA A, B, C NORTH

Sheet Number:
A-211

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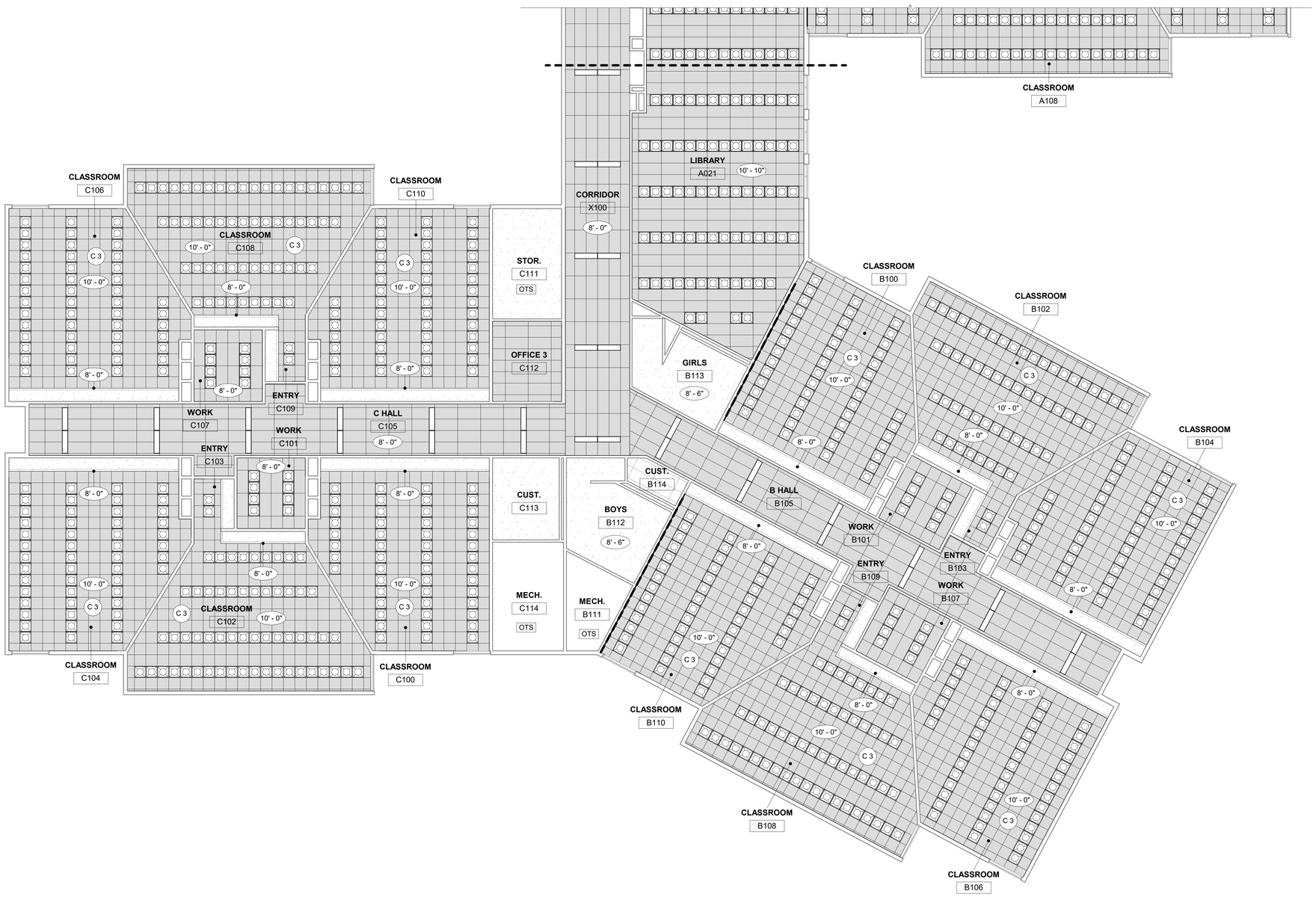


1 REFLECTED CEILING PLAN - AREA C SOUTH
1/8" = 1'-0"

SHEET NOTES - RCP

A. Keynotes are not sheet specific.
B. All heights shown are to bottom of grid system or gyp bd AFF, relative to the floor that the ceiling plan is shown on, UNO.
C. "Downlight" or "wall-washer" ceiling fixtures, smoke detectors, life safety speakers, AV speakers, exit signs, sprinklers, mirrors, fire alarm or signal devices, or other ceiling mounted devices are to be centered in an apparent ceiling tile, UNO.
D. Door exit signs to be located 12" clear from, and centered on, the door to which exit is indicated, UNO.
E. Contractor to coordinate Owner's telecom and security contractor's work.
F. Refer to electrical engineer's documents for lighting & lighting control specifications.
G. Refer to mechanical engineer's documents for HVAC & plumbing equipment & control specifications.
H. Refer to owner's technology engineer's documents for lighting & lighting control specifications.
I. Relocate (E) sprinklers, smoke detectors, and speakers as required for ceiling layout

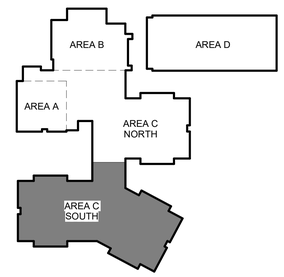
LEGEND - RCP

- EXISTING WALL TO REMAIN
- SEISMIC BRACE WALL
- DEMOLISH EXISTING SHEATHING TO EXPOSE STRUCTURE FOR INSTALL OF SEISMIC BRACING PER STRUCTURAL.
- EXISTING 2X4 ACOUSTIC CEILING TILE TO REMAIN
- EXISTING GYPSUM BOARD CEILING TO REMAIN
- EXISTING 2X2 ACOUSTIC CEILING TILE TO REMAIN
- NEW 2X4 ACOUSTIC CEILING TILE, IN EXISTING GRID U.N.O.
- NEW GYPSUM BOARD CEILING
- NEW 2X2 ACOUSTIC CEILING TILE, IN EXISTING GRID U.N.O.
- EXISTING 2X2 FLUORESCENT
- EXISTING 1X4 FLUORESCENT
- EXISTING 96" PENDANT
- EXISTING 4X4 FLUORESCENT
- EXISTING CAN LIGHT
- REINSTALLED EXISTING 2X2 FLUORESCENT
- REINSTALLED EXISTING 1X4 FLUORESCENT
- REINSTALLED EXISTING 96" PENDANT
- NEW 2X2 VTL

C # KEYNOTES - RCP

C 1 Install new 4'-0" wide dropped 5/8" soffit with 4x4 recessed light fixtures.
C 2 Install new ACT and suspended ceiling grid. Reinstall salvaged light fixtures.
C 3 Install new ceiling tiles in existing ceiling grid. Provide gap and closure angle at perimeter. Modify grid at perimeter as required at new shear wall improvements. Re-install salvaged light fixtures.
C 4 New protective grills at existing light fixtures.
C 5 Install new gypsum ceiling and reinstall salvaged light fixtures.

KEY PLAN



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Portland, OR 97209

Consultants:

COOPER MOUNTAIN ELEMENTARY SCHOOL
SRGP IMPROVEMENTS

100% DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Date: 09/28/2020
Project Number: 90060
Drawn By: BPS
Checked By: CSM

Revision Schedule:

Sheet Title:
REFLECTED CEILING PLAN - AREA C SOUTH

Sheet Number:
A-212

100% DESIGN DEVELOPMENT

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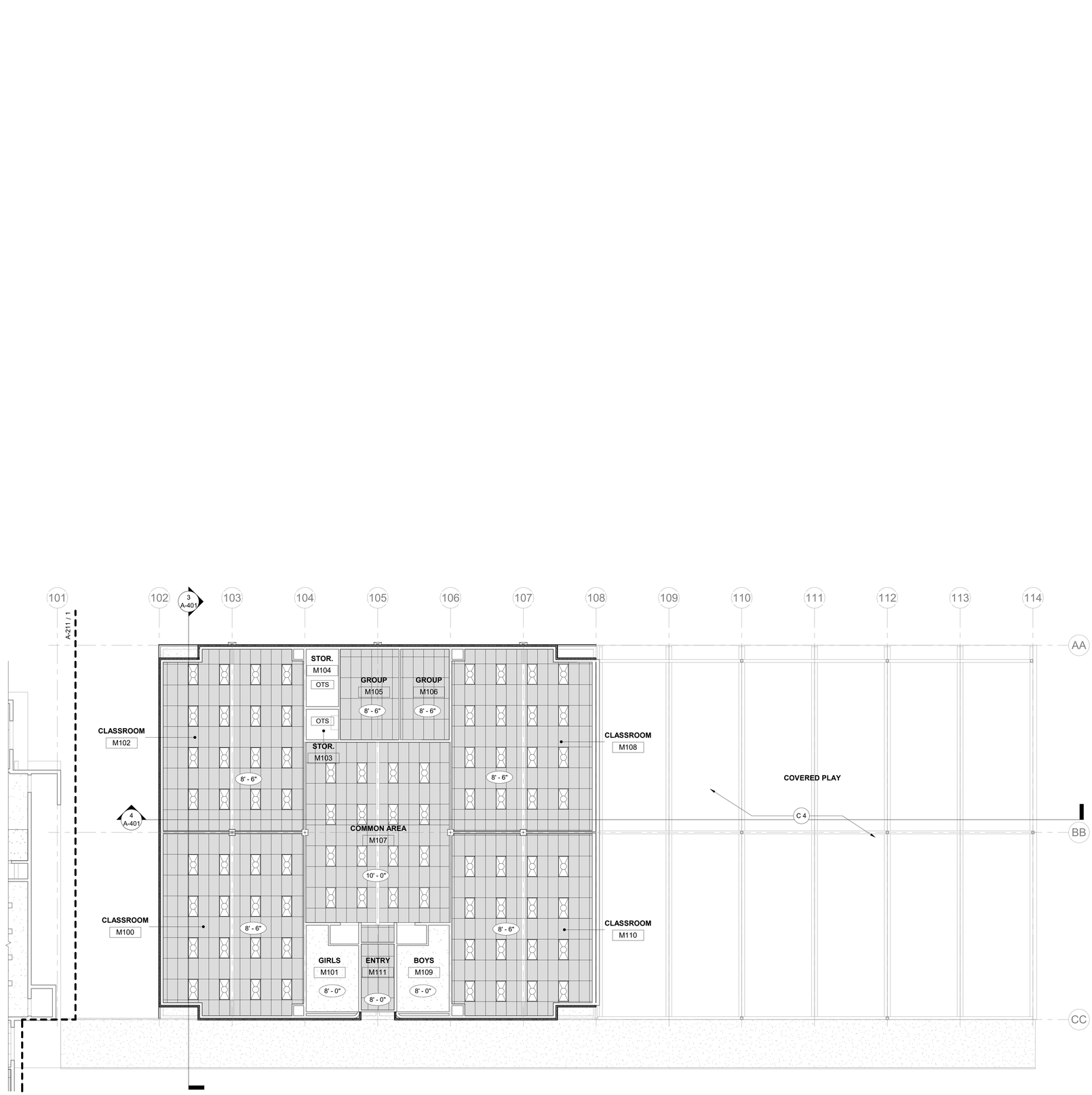

1 REFLECTED CEILING PLAN - AREA D
1/8" = 1'-0"

SHEET NOTES - RCP

A. Keynotes are not sheet specific.
B. All heights shown are to bottom of grid system or gyp bd AFF, relative to the floor that the ceiling plan is shown on, UNO.
C. "Downlight" or "wall-washer" ceiling fixtures, smoke detectors, life safety speakers, AV speakers, exit signs, sprinklers, mirrors, fire alarm or signal devices, or other ceiling mounted devices are to be centered in an apparent ceiling tile, UNO.
D. Door exit signs to be located 12" clear from, and centered on, the door to which exit is indicated, UNO.
E. Contractor to coordinate Owner's telecom and security contractor's work.
F. Refer to electrical engineer's documents for lighting & lighting control specifications.
G. Refer to mechanical engineer's documents for HVAC & plumbing equipment & control specifications.
H. Refer to owner's technology engineer's documents for lighting & lighting control specifications.
I. Relocate (E) sprinklers, smoke detectors, and speakers as required for ceiling layout

LEGEND - RCP

- EXISTING WALL TO REMAIN
- SEISMIC BRACE WALL
- DEMOLISH EXISTING SHEATHING TO EXPOSE STRUCTURE FOR INSTALL OF SEISMIC BRACING PER STRUCTURAL.
- EXISTING 2X4 ACOUSTIC CEILING TILE TO REMAIN
- EXISTING GYPSUM BOARD CEILING TO REMAIN
- EXISTING 2X2 ACOUSTIC CEILING TILE TO REMAIN
- NEW 2X4 ACOUSTIC CEILING TILE, IN EXISTING GRID U.N.O.
- NEW GYPSUM BOARD CEILING
- NEW 2X2 ACOUSTIC CEILING TILE, IN EXISTING GRID U.N.O.
- EXISTING 2X2 FLUORESCENT
- EXISTING 1X4 FLUORESCENT
- EXISTING 96" PENDANT
- EXISTING 4X4 FLUORESCENT
- EXISTING CAN LIGHT
- REINSTALLED EXISTING 2X2 FLUORESCENT
- REINSTALLED EXISTING 1X4 FLUORESCENT
- REINSTALLED EXISTING 96" PENDANT
- NEW 2X2 VTL

C # KEYNOTES - RCP

C 1 Install new 4'-0" wide dropped 5/8" soffit with 4x4 recessed light fixtures.
C 2 Install new ACT and suspended ceiling grid. Reinstall salvaged light fixtures.
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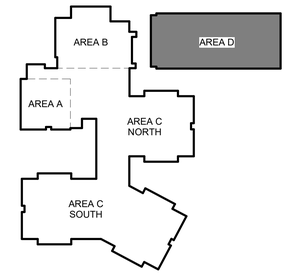
C 4 New protective grills at existing light fixtures.
C 5 Install new gypsum ceiling and reinstall salvaged light fixtures.

KEY PLAN



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Consultants:

COOPER MOUNTAIN ELEMENTARY SCHOOL
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NOT FOR CONSTRUCTION

Date: 09/28/2020
Project Number: 90060
Drawn By: BPS
Checked By: CSM

Revision Schedule:

Sheet Title:
REFLECTED CEILING PLAN - AREA D

Sheet Number:
A-213

100% DESIGN DEVELOPMENT

10/2/2020 12:31:38 PM

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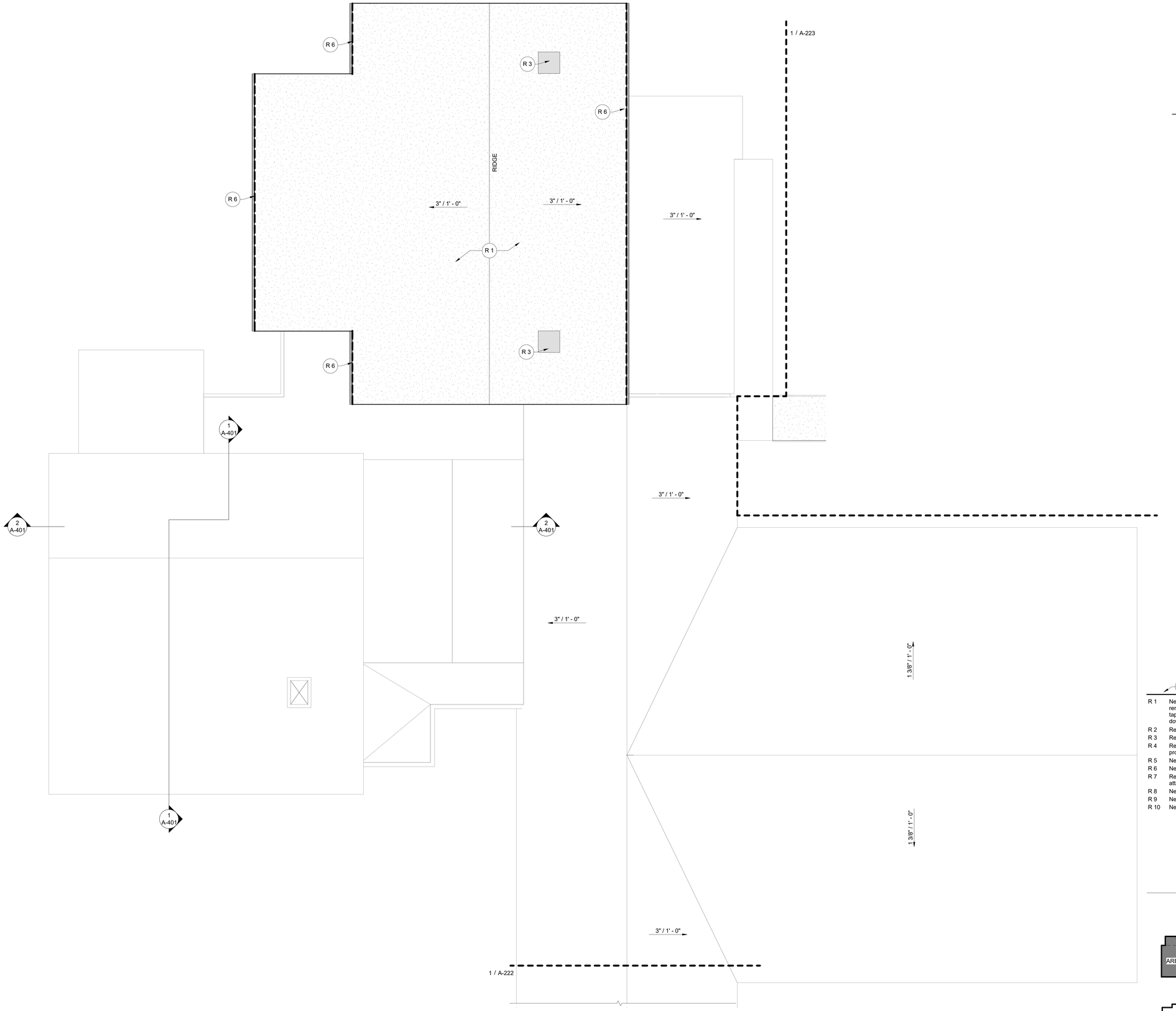


LEGEND - ROOF PLAN

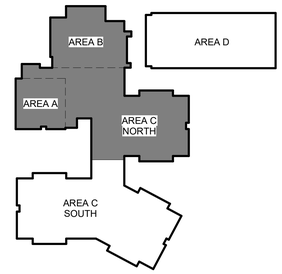
- NEW TPO ROOFING
- NEW CRICKETS
- NEW METAL GUTTER
- EXISTING ROOF EQUIPMENT

KEYNOTES - ROOF PLAN

(R #)

R 1	New TPO roofing on new R-30 rigid insulation. (E) sheathing to remain; provide strapping and blocking - see Structural. Provide tapered insulation as required to slope to (E) scupper and downspouts.
R 2	Reinstall (E) rooftop mechanical unit on new curb.
R 3	Reinstall (E) exhaust fan on new curb.
R 4	Reinstall (E) roof access hatch on new curb. Provide new fall protection rail.
R 5	New sheet metal parapet and intermediate ridge flashing.
R 6	New metal gutter and downsout.
R 7	Reinstall (E) mechanical screen. Modify frame as required for attachment to new curb.
R 8	New through-wall scupper and flashing.
R 9	New TPO roofing on tapered insulation; drain to edge gutter.
R 10	New flashing into (E) gutter.

KEY PLAN



1 ROOF PLAN - AREA A, B, C NORTH

1/8" = 1'-0"

10/2/2020 12:31:39 PM

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Date:	09/28/2020
Project Number:	90060
Drawn By:	BPS
Checked By:	CSM

Revision Schedule:

Sheet Title:

ROOF PLANS - AREA A, B, C NORTH

Sheet Number:

A-221

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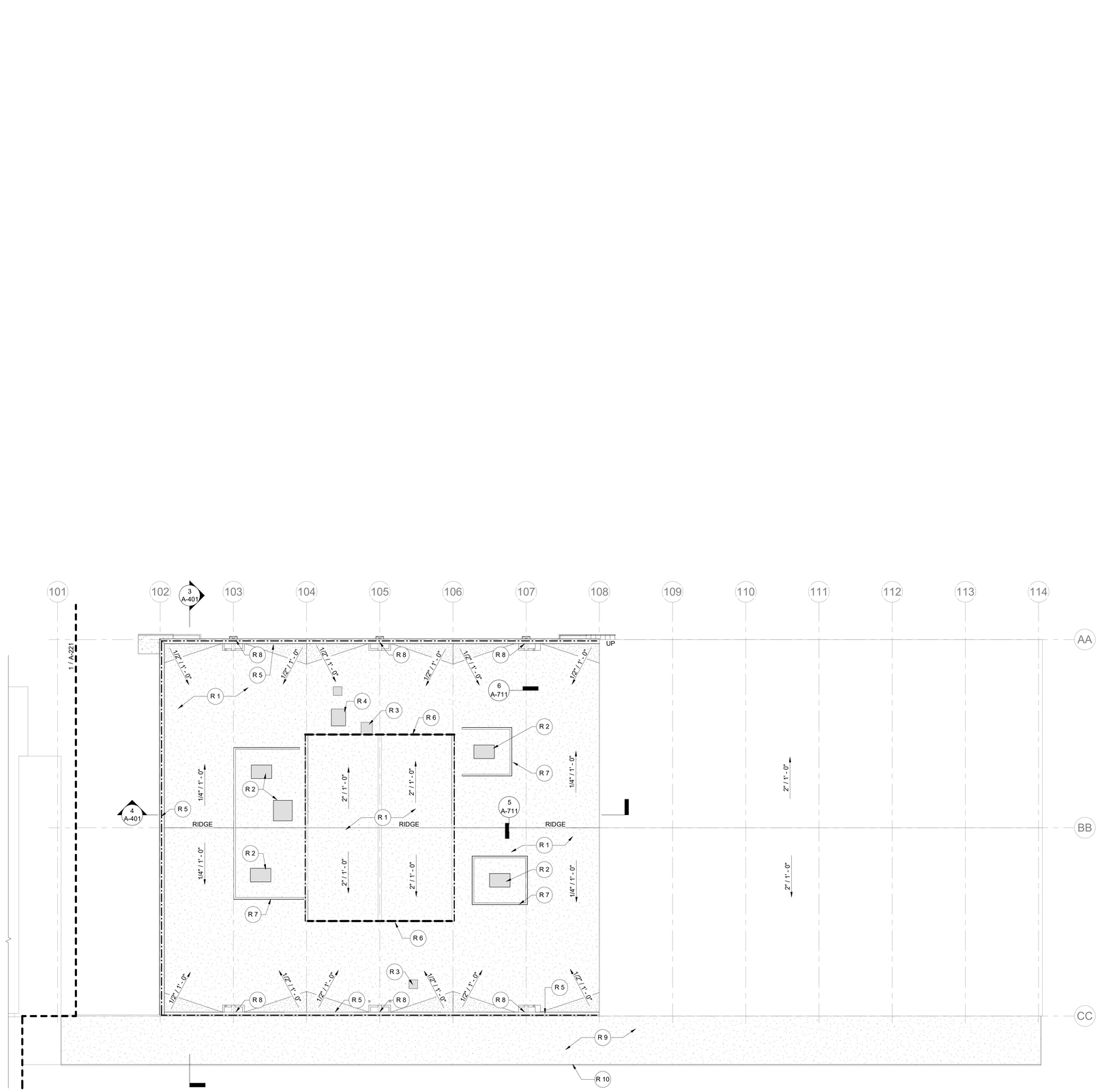


1 ROOF PLAN - AREA D
1/8" = 1'-0"

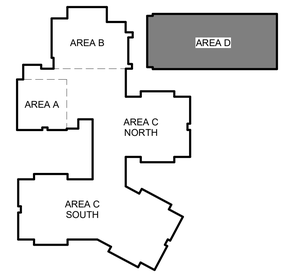
LEGEND - ROOF PLAN

- NEW TPO ROOFING
- NEW CRICKETS
- NEW METAL GUTTER
- EXISTING ROOF EQUIPMENT

R # KEYNOTES - ROOF PLAN

R 1	New TPO roofing on new R-30 rigid insulation. (E) sheathing to remain; provide strapping and blocking - see Structural. Provide tapered insulation as required to slope to (E) scupper and downspouts.
R 2	Reinstall (E) rooftop mechanical unit on new curb.
R 3	Reinstall (E) exhaust fan on new curb.
R 4	Reinstall (E) roof access hatch on new curb. Provide new fall protection rail.
R 5	New sheet metal parapet and intermediate ridge flashing.
R 6	New metal gutter and downsout.
R 7	Reinstall (E) mechanical screen. Modify frame as required for attachment to new curb.
R 8	New through-wall scupper and flashing.
R 9	New TPO roofing on tapered insulation; drain to edge gutter.
R 10	New flashing into (E) gutter.

KEY PLAN



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100% DESIGN DEVELOPMENT

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Date:	09/28/2020
Project Number:	90060
Drawn By:	BPS
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Revision Schedule:

Sheet Title:
ROOF PLANS - AREA D

Sheet Number:
A-223

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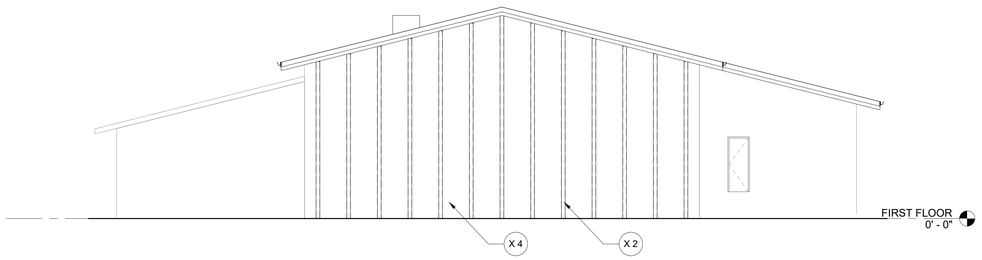
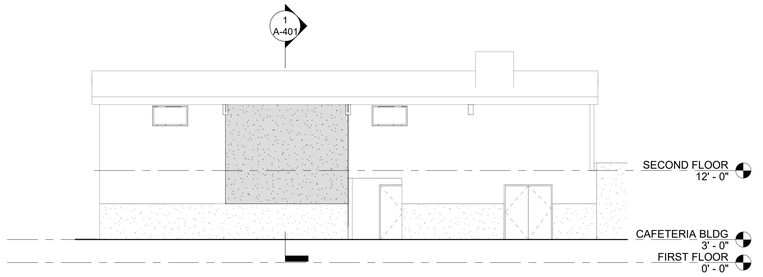
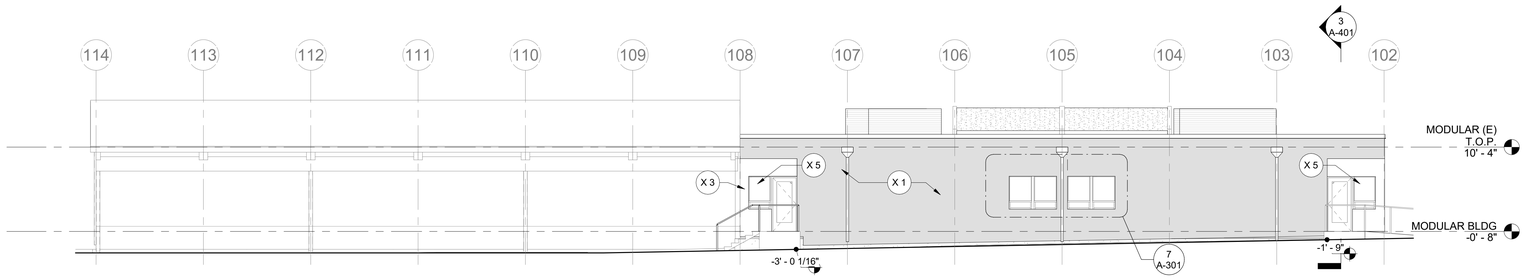


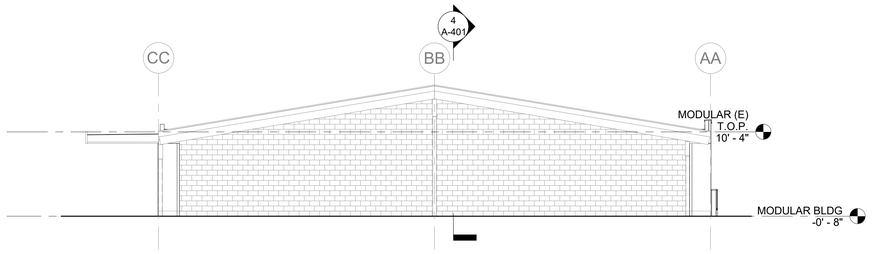
2 GYM (AREA B) - NORTH ELEV
1/8" = 1'-0"



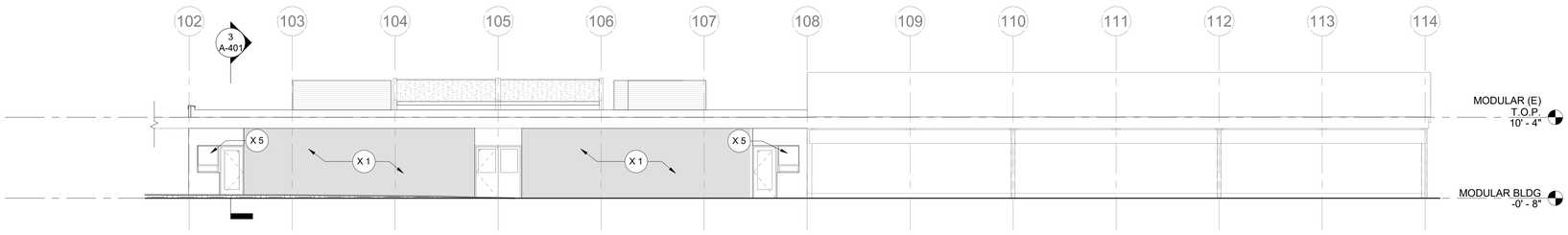
1 KITCHEN (AREA A) - SOUTH ELEV
1/8" = 1'-0"



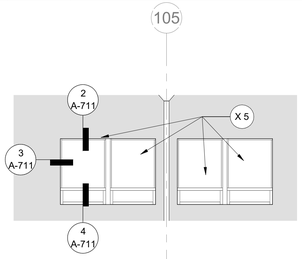
3 1986 ADDITION (AREA D) - NORTH ELEV
1/8" = 1'-0"



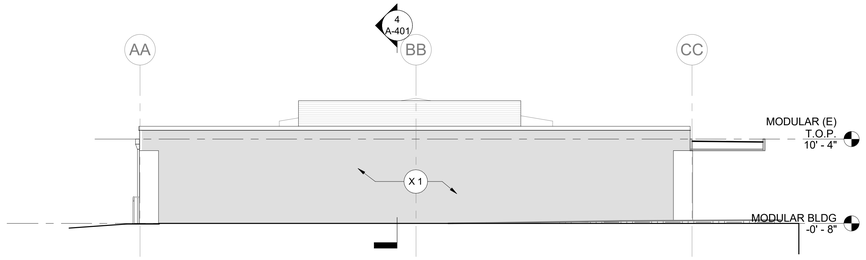
4 1986 ADDITION (AREA D) - EAST ELEV
1/8" = 1'-0"



5 1986 ADDITION (AREA D) - SOUTH ELEV
1/8" = 1'-0"



7 AREA D - ENLARGED WINDOW ELEVATION
1/4" = 1'-0"



6 1986 ADDITION (AREA D) - WEST ELEV
1/8" = 1'-0"

KEYNOTES - EXTERIOR ELEVATION

X 1	New fiber cement panel siding and continuous insulation over new plywood sheathing.
X 2	New HSS strongbacks on exterior side of north wall. HSS to be full height and bolted to existing concrete tile wall - see structural. Painted with high-performance coating to match existing exterior wall. Alt: enclose HSS posts with new sheathing and siding.
X 3	(E) siding to remain. Install vertical trim and continuous bead of sealant between new and existing siding systems. Paint to match new siding.
X 4	Alternate - Provide fiber cement panels to enclose HSS at north facade.
X 5	(E) Windows to be removed to install new wall materials. Re-install windows with new finishes

LEGEND - EXTERIOR ELEVATION

NEW STUCCO SIDING TO MATCH (E)

NEW FIBER CEMENT PANEL

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Consultants:

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SRGP IMPROVEMENTS

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Date: 09/28/2020
Project Number: 90060
Drawn By: BPS
Checked By: CSM

Revision Schedule:

Sheet Title:
EXTERIOR ELEVATIONS

Sheet Number:
A-301

10/2/2020 12:31:42 PM

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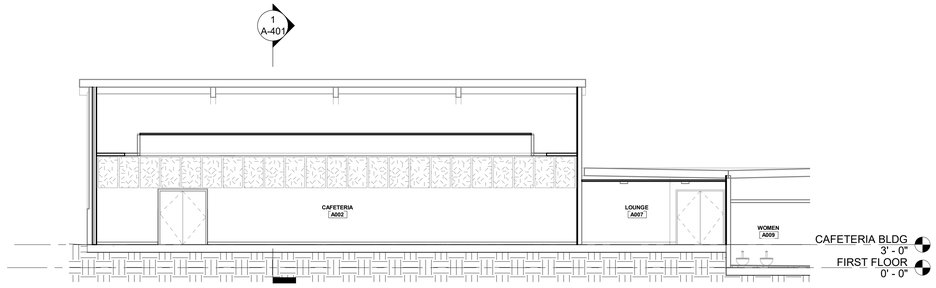
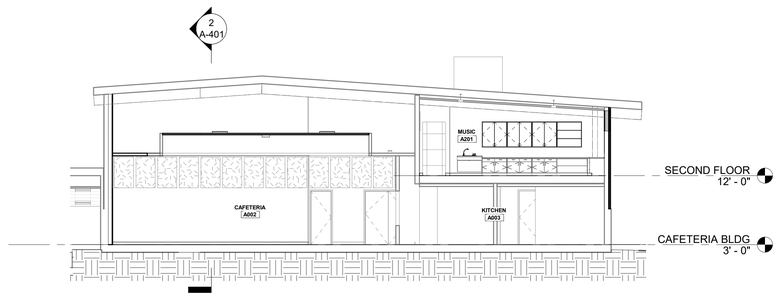
SHEET NOTES - BUILDING SECTION

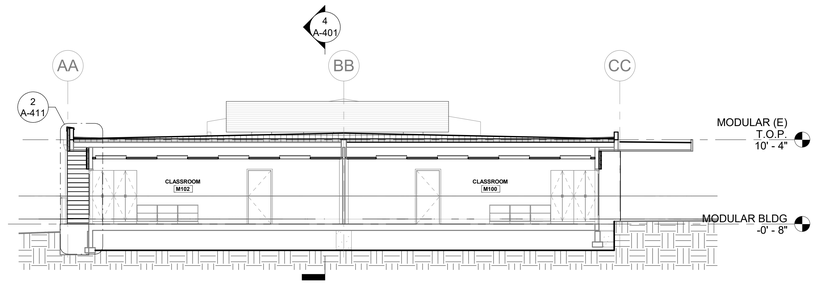
A. Keynotes are not sheet specific.



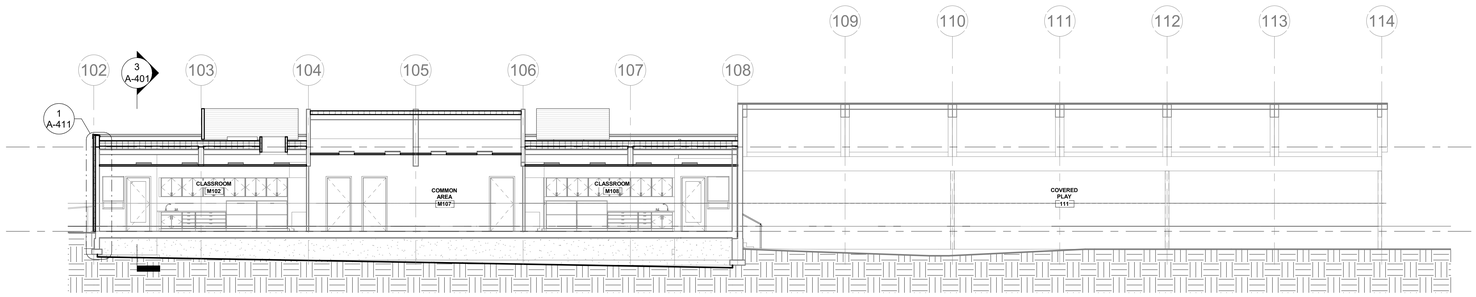
2 E-W SECTION - AREA A CAFETERIA
1/8" = 1'-0"



1 N-S SECTION - AREA A CAFETERIA
1/8" = 1'-0"



3 N-S SECTION - AREA D MODULAR
1/8" = 1'-0"



4 E-W SECTION - AREA D MODULAR
1/8" = 1'-0"

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Consultants:

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Date: 09/28/2020
Project Number: 90060
Drawn By: Author
Checked By: CSM

Revision Schedule:

Sheet Title:
BUILDING SECTIONS

Sheet Number:
A-401

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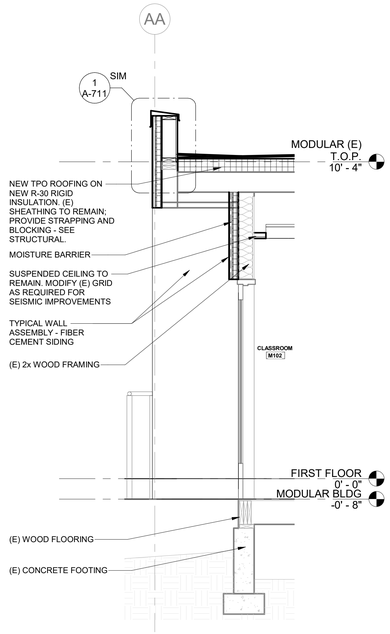
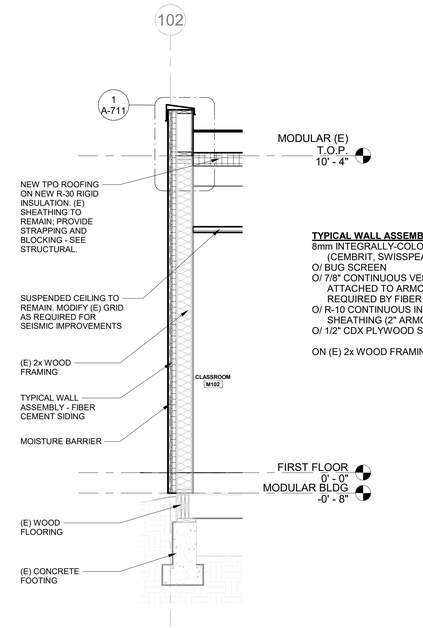


2 WALL SECTION - AREA D ALCOVE
1/2" = 1'-0"



1 WALL SECTION - AREA D TYP. WALL
1/2" = 1'-0"

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Date:	09/28/2020
Project Number:	90060
Drawn By:	SKB
Checked By:	CSM

Revision Schedule:

Sheet Title:
WALL SECTIONS

Sheet Number:
A-411

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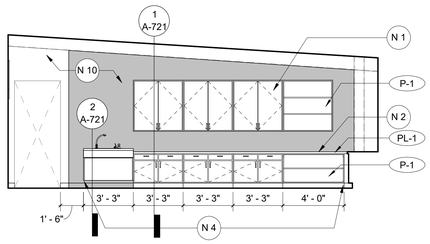
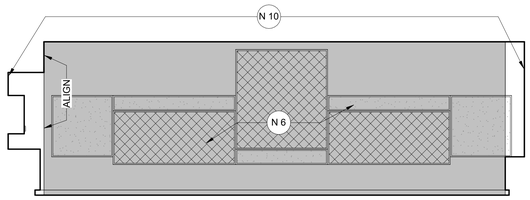
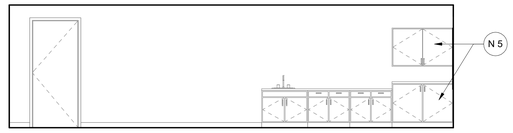


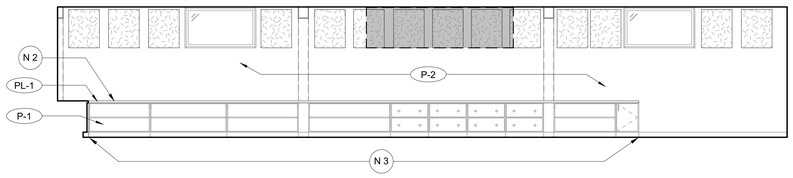
3 MUSIC ROOM - A201 EAST
1/4" = 1'-0"



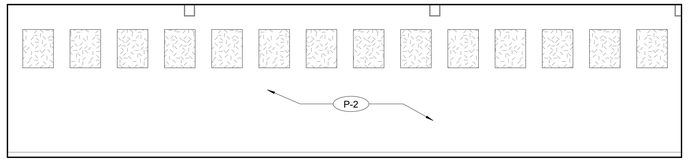
2 CLASSROOM A100 - WEST
1/4" = 1'-0"



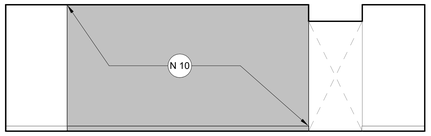
1 CLASSROOM A100 - SOUTH
1/4" = 1'-0"



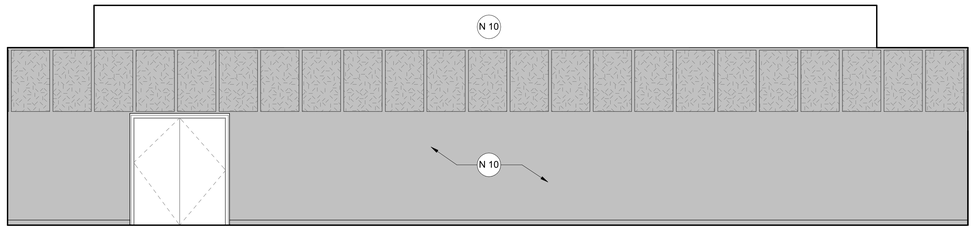
5 MUSIC ROOM - A201 SOUTH
1/4" = 1'-0"



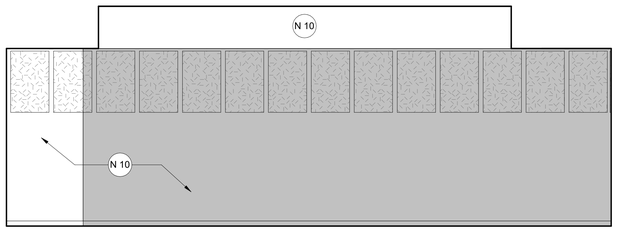
4 MUSIC ROOM - A201 NORTH
1/4" = 1'-0"



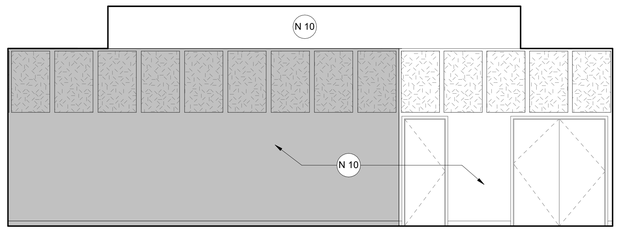
7 LOUNGE - EAST
1/4" = 1'-0"



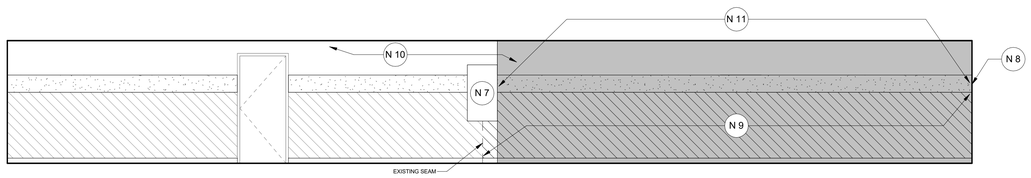
6 CAFETERIA - NORTH
1/4" = 1'-0"



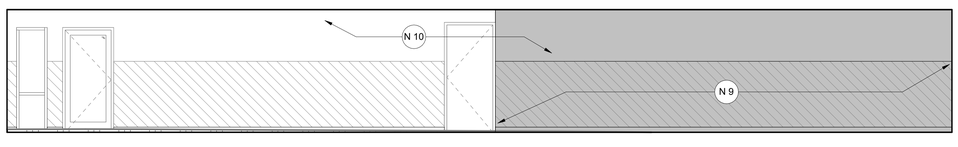
9 CAFETERIA - WEST
1/4" = 1'-0"



8 CAFETERIA - EAST
1/4" = 1'-0"



11 A HALL - SOUTH
1/4" = 1'-0"



10 CORRIDOR X100 - EAST
1/4" = 1'-0"

SHEET NOTES - INTERIOR ELEVATION

A. All work to comply with 2010 Oregon Structural Specialty Code.
B. Keynotes are not sheet specific.
C. All dimensions shown are to face of finish U.N.O. Do not measure drawings to determine dimensions. Large scale details take precedence over smaller scale drawings.
D. Contractor shall field verify all existing construction and related conditions prior to starting demolition or new construction.
E. Contractor to inform architect of any discrepancies within drawings or between drawings and field conditions before commencement of affected work.
F. Locate and verify existence and use of existing utilities. Take necessary measures to protect and preserve function and condition of any utilities to be repaired, replaced, or reused in new construction. Coordinate work with Architect, Engineer and Owner.
G. All interior patching and repair shall occur in the interior improvements scope of work. Contractor shall protect all existing exposed construction from damage resulting from or related to demolition and construction operations.
H. Contractor shall repair or replace any existing construction to remain that is damaged in the course of the work to its original condition.
I. Where interruption of the building's Life Safety System is required to perform the work as described in the construction documents, or to coordinate with owner's operations, the Contractor shall provide interim Life Safety measures to comply with local code and owner's requirements.
J. Contractor is responsible for all waste removal and site clean up during performance of and at completion of the work.
K. Contractor to coordinate installation and scheduling of Owner or Owner's vendor provided or installed fixtures and equipment.
L. Contractor shall be solely responsible for the design and construction of all shoring and bracing required for construction of the Work. Contractor shall not store construction materials or equipment in a manner such that the design live loads of the structure are exceeded.
M. All features of the Work not fully shown shall be of the same type and character shown for similar conditions. In the event that additional work is required to complete the Work as intended or required by governing codes and safety regulations, yet omitted or not fully shown on the drawings. Contractor must still provide carpentry, mechanical, electrical and/or plumbing work as necessary for Certificate of Occupancy.

LEGEND - INTERIOR ELEVATION

- WALL PROTECTION
- NEW SHEATHING AND GYPSUM BOARD
- ACOUSTIC PANEL
- TACK BOARD
- WHITE BOARD

KEYNOTES - INTERIOR ELEVATION

N # — N 1 Existing upper cabinets. Removed and protected during construction.
N 2 New plastic laminate countertop.
N 3 Existing base cabinets to remain; protect during construction. Paint to match adjacent new base cabinets.
N 4 New base cabinets and plumbing.
N 5 Protect existing casework during construction.
N 6 Remove, salvage, and reinstall all existing wall mounted equipment and devices.
N 7 Existing electrical panel; protect during construction.
N 8 Add trim piece at corner of tack board and wall protection
N 9 New wall protection, to match existing
N 10 Paint wall to match existing.
N 11 New tack board, to match existing

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Consultants:

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Date: 09/28/2020
Project Number: 90060
Drawn By: BPS
Checked By: CSM

Revision Schedule:

Sheet Title:
INTERIOR ELEVATIONS

Sheet Number:
A-601

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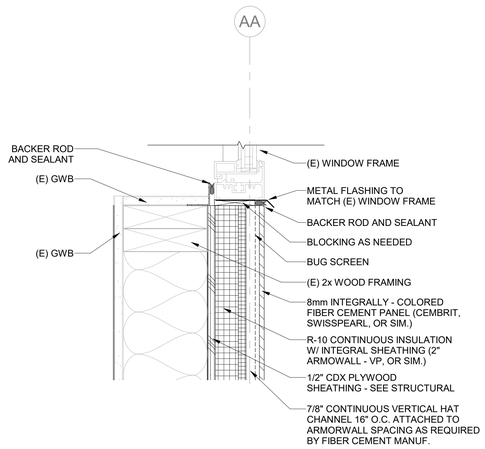
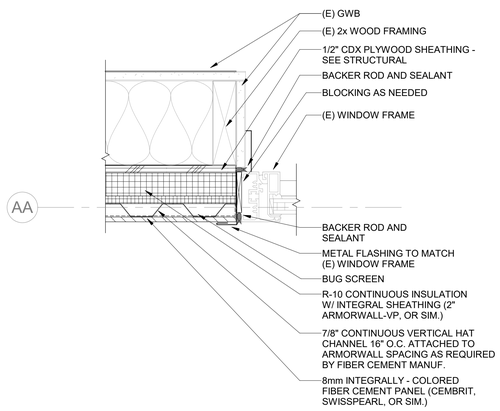
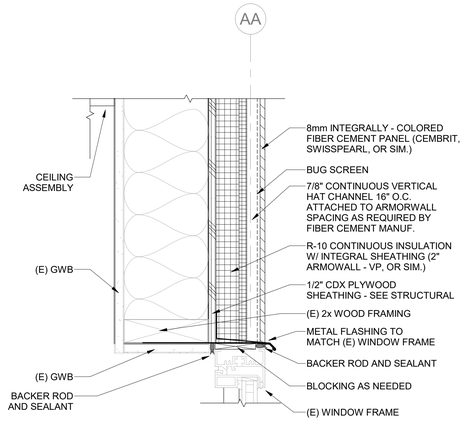


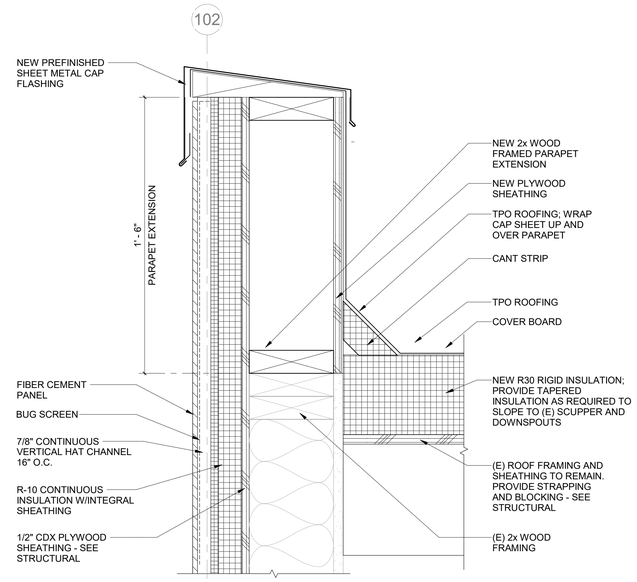
4 SIDING DETAIL AT WINDOW SILL - AREA D
3" = 1'-0"



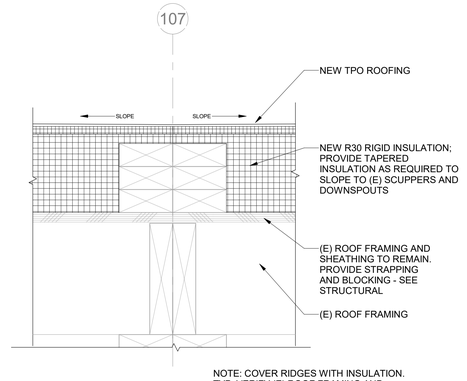
3 SIDING DETAIL AT WINDOW JAMB - AREA D
3" = 1'-0"



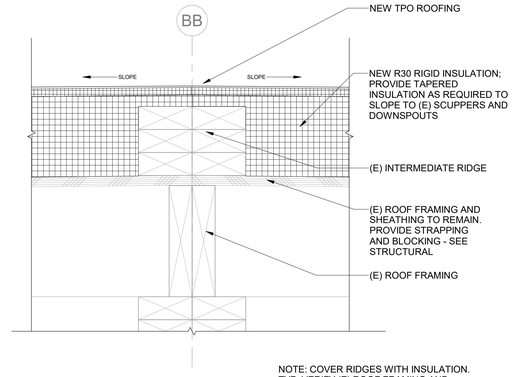
2 SIDING DETAIL AT WINDOW HEAD - AREA D
3" = 1'-0"



1 AREA D - TYP. PARAPET EXTENSION DETAIL
3" = 1'-0"



6 AREA D - TYP. RIDGE DETAIL 2
3" = 1'-0"



5 AREA D - TYP. RIDGE DETAIL 1
3" = 1'-0"

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Date: 09/28/2020
Project Number: 90060
Drawn By: SKB
Checked By: CSM

Revision Schedule:

Sheet Title:
EXTERIOR DETAILS

Sheet Number:
A-711

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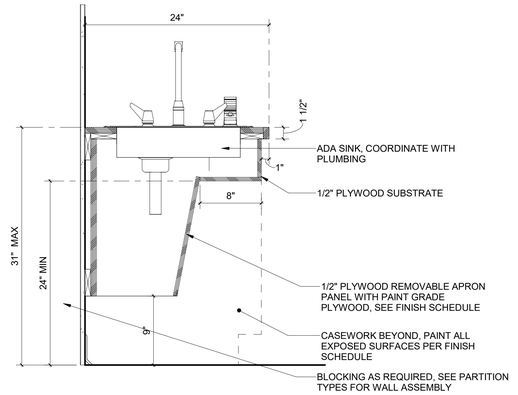
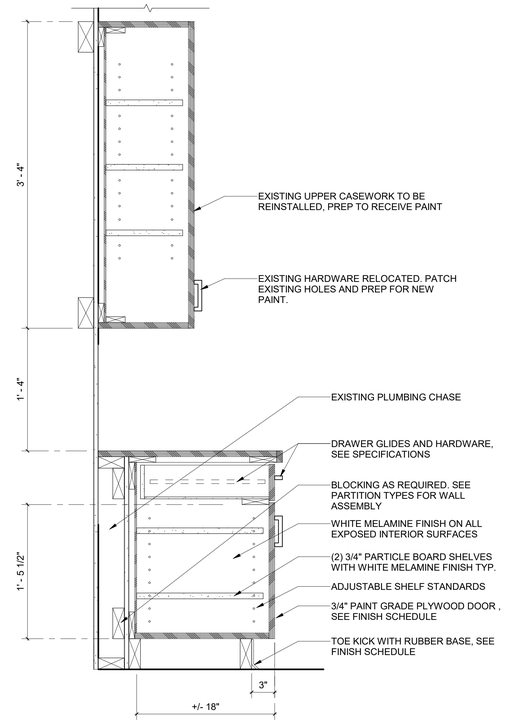


2 TYP. CASEWORK AT ADA SINK
1 1/2" = 1'-0"



1 TYP. CASEWORK AT MUSIC ROOM
1 1/2" = 1'-0"

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Date:	09/28/2020
Project Number:	90060
Drawn By:	BPS
Checked By:	CSM

Revision Schedule:

Sheet Title:
INTERIOR DETAILS

Sheet Number:
A-721

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2 SECOND FLOOR FINISH PLAN
1/8" = 1'-0"

1 FIRST FLOOR FINISH PLAN - AREA A, B, C NORTH
1/8" = 1'-0"

SHEET NOTES - FINISH PLAN

A. Keynotes are not sheet specific.
B. All interior patching and repair shall occur in the interior improvements scope of work.
C. Visual requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.
D. Protection: Contractor shall protect all existing construction from damage resulting from or related to demolition, construction operations, and cutting and patching. Provide protection from adverse weather conditions for portions of the project that might be exposed during cutting and patching operations. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be remodeled or relocated until provisions have been made to bypass them.
E. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
F. Contractor shall repair or replace any existing construction to remain that is damaged in the course of the work to its original condition.
G. Patching: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
H. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
I. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat.
J. For specific requirements and instructions see all drawings and specifications.
K. Contractor to refer to Reflected Ceiling Plans for ceiling type and height.
L. Contractor to refer to Finish Floor Plans and Elevations for additional information regarding finish location.

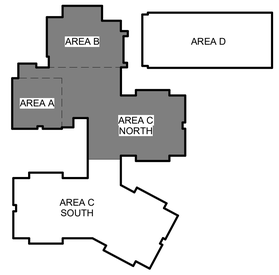
LEGEND - FINISH PLAN

- EXISTING FLOORING (PROTECTED DURING CONSTRUCTION)
- CARPET, CPT-1
- 12x12 VINYL TILE, VCT-1
- 12x12 VINYL TILE, VCT-2
- 12x12 VINYL TILE, VCT-3

FF # KEYNOTES - FINISH PLAN

FF 1 (E) rubber flooring to remain

KEY PLAN



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Consultants:

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Date:	09/28/2020
Project Number:	90060
Drawn By:	BPS
Checked By:	CSM

Revision Schedule:

Sheet Title:
FINISH FLOOR PLANS - AREA A, B, C NORTH

Sheet Number:
A-811

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LEGEND - FINISH PLAN

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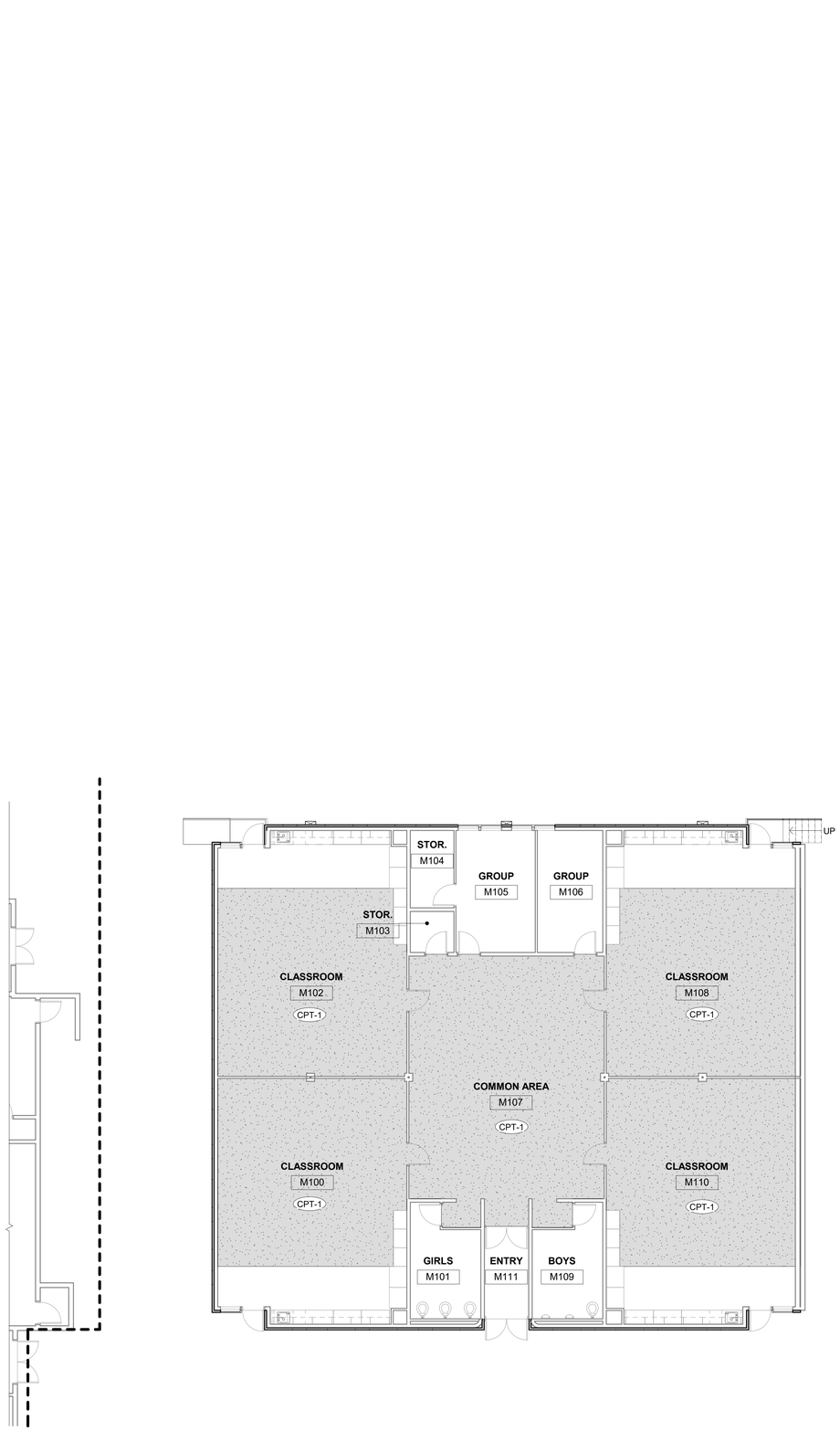
- CARPET, CPT-1
- 12x12 VINYL TILE, VCT-1
- 12x12 VINYL TILE, VCT-2
- 12x12 VINYL TILE, VCT-3

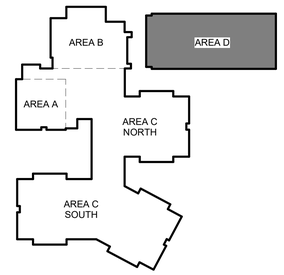


1 FIRST FLOOR FINISH PLAN - AREA D
1/8" = 1'-0"

FF # KEYNOTES - FINISH PLAN

FF 1 (E) rubber flooring to remain

KEY PLAN



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Date:	09/28/2020
Project Number:	90060
Drawn By:	BPS
Checked By:	CSM

Revision Schedule:

Sheet Title:
FINISH FLOOR PLANS - AREA D

Sheet Number:
A-813

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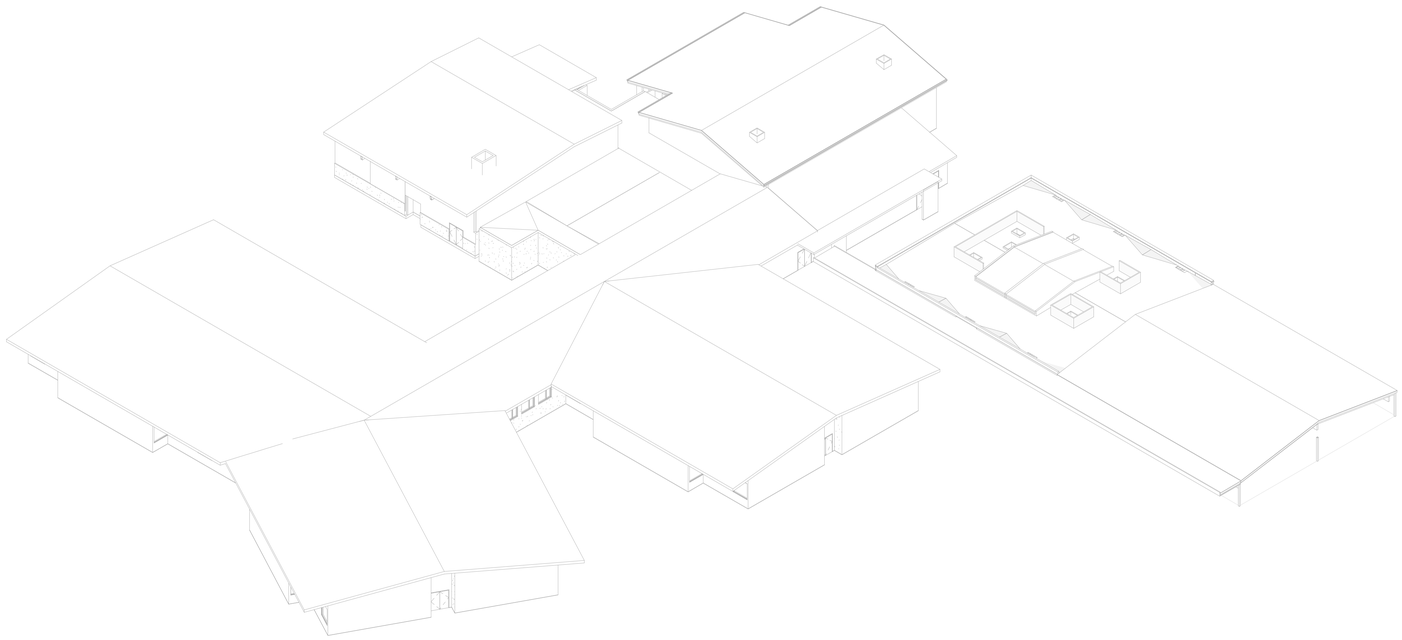
Holmes Structures Portland



OVERALL ISOMETRIC

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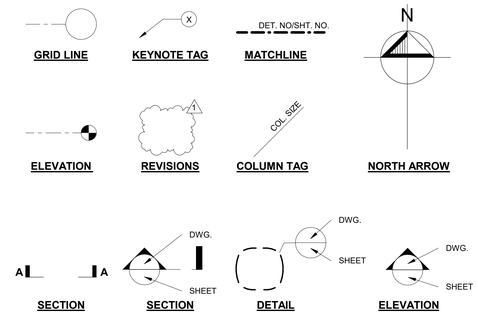
S-002	GENERAL NOTES
S-003	GENERAL NOTES
S-004	SPECIAL INSPECTIONS
S-101	BUILDING YEAR PLAN
S-201	FLOOR PLAN - AREA A, B, C NORTH
S-202	FLOOR PLAN - AREA C SOUTH
S-203	FLOOR PLAN - AREA D
S-221	ROOF PLAN - AREA A, B, C NORTH
S-222	ROOF PLAN - AREA C SOUTH
S-223	ROOF PLAN - AREA D
S-501	DETAILS
S-601	WOOD DETAILS
S-701	STEEL DETAILS



GENERAL SYMBOLS

1/4" = 1'-0"

(A)	ABOVE
A.B.	ANCHOR BOLT
ADD'L	ADDITIONAL
ADJ.	ADJACENT
A.F.F.	ARCHITECTURAL FINISHED FLOOR
APPROX.	APPROXIMATE
ARCH.	ARCHITECT
A.T.R.	ALL THREAD ROD
(B)	BELOW
BLDG.	BUILDING
BLKG.	BLOCKING
BM.	BEAM
B.N.	BOUNDARY NAILING
B.O.	BOTTOM OF
BOT.	BOTTOM
BTWN.	BETWEEN
℄	CENTERLINE
C.F.	CUBIC FEET
C.I.P.	CAST IN PLACE
C.J.	CONSTRUCTION JOINT
CLR.	CLEAR
CMU	CONCRETE MASONRY UNIT
CNTR.	CENTER
COL.	COLUMN
CNTRSNK.	COUNTER SUNK
COLL.	COLLECTOR
COMP.	COMPACTED
CONC.	CONCRETE
COND.	CONDITION
CONN.	CONNECTION
CONT.	CONTINUOUS
DBL.	DOUBLE
DET.	DETAIL
DIA. Ø	DIAMETER
DIAPH.	DIAPHRAGM
DIM.	DIMENSION
DN.	DOWN
DWG.	DRAWING
(E)	EXISTING
EA.	EACH
E/E	EACH END
E/F	EACH FACE
EL.	ELEVATION
EMB.	EMBEDMENT
E.N.	EDGE NAILING
EQ.	EQUAL
EQUIV.	EQUIVALENT
E/S	EACH SIDE
E/W	EACH WAY
EXT.	EXTERIOR
FDN.	FOUNDATION
FIN.	FINISH
FLR.	FLOOR
F.N.	FIELD NAILING
F.S.	FAR SIDE
FT.	FEET
FTG.	FOOTING
GA.	GAUGE
GALV.	GALVANIZED
G.L.	GRID LINE
GLB	GLUED LAMINATED BEAM
HD	HOLDOWN
H.D.G.	HOT DIP GALVANIZED
HDR.	HEADER
HORIZ.	HORIZONTAL
HT.	HEIGHT
HSS	HOLLOW STRUCTURAL STEEL
I.D.	INSIDE DIAMETER
IN.	INCH
INT.	INTERIOR
LB	POUND
LONG.	LONGITUDINAL
LLV	LONG LEG VERTICAL
LV.	LEVEL
L.S.	LAG SCREW
LVL	LAMINATED VENEER LUMBER
L.W.	LIGHT WEIGHT
MAX.	MAXIMUM
M.B.	MACHINE BOLT
MECH.	MECHANICAL
MIN.	MINIMUM
MISC.	MISCELLANEOUS
ML	MICROLLAM
MTL.	METAL
(N)	NEW
N.I.C.	NOT IN CONTRACT
N.S.	NEAR SIDE
N.T.S	NOT TO SCALE
N.W.	NORMAL WEIGHT
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
OPNG.	OPENING
OPP.	OPPOSITE
PAR.	PARALLEL
PERP.	PERPENDICULAR
PL	PLATE
PSL	PARALLEL STRAND LUMBER
PLYWD.	PLYWOOD
P.T.	PRESSURE TREATED
P/T	POST TENSIONED
REF.	REFERENCE
R.C.	RELATIVE COMPACTION
REINF.	REINFORCING
REQ'D	REQUIRED
REV.	REVISION
S.A.D.	SEE ARCHITECTURAL DRAWINGS
S.C.D.	SEE CIVIL DRAWINGS
S.L.D.	SEE LANDSCAPE DRAWINGS
S.M.D	SEE MECHANICAL DRAWINGS
SCH.	SCHEDULE
SHT.	SHEET
SHTG.	SHEATHING
SIMP.	SIMPSON
SIM.	SIMILAR
S.O.G.	SLAB ON GRADE
SPEC.	SPECIFICATIONS
SQ.	SQUARE
STAG.	STAGGERED
STD.	STANDARD
STIFF.	STIFFENER
STL.	STEEL
S.W.	SHEAR WALL
SYM.	SYMMETRIC
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROOVE
THK	THICK
THRD.	THREADED
THRU	THROUGH
T.O.	TOP OF
T.O.C	TOP OF CONCRETE
T.O.S.	TOP OF SLAB/STEEL
TRNSV.	TRANSVERSE
TS	TUBE STEEL
TYP.	TYPICAL
U.O.N	UNLESS OTHERWISE NOTED
VERT.	VERTICAL
V.I.F.	VERIFY IN FIELD
V.W.A.	VERIFY WITH ARCHITECT
W/	WITH
WD.	WOOD
W/O	WITHOUT
W.P.	WORKING POINT
WT.	WEIGHT

ABBREVIATIONS

N.T.S.

9/22/2020 2:15:09 PM

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SEISMIC SRGP IMPROVEMENTS

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Date:	09-22-2020
Project Number:	20138.10
Drawn By:	IK
Checked By:	JE

Revision Schedule:

Sheet Title:

COVER SHEET

Sheet Number:

S-001

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GENERAL STRUCTURAL NOTES

THE FOLLOWING IS INTENDED AS A SUMMARY SPECIFICATION. REFER TO THE PROJECT SPECIFICATION FOR FULL DETAILS. NOTIFY THE ARCHITECT WHERE THERE IS A CONFLICT BETWEEN THE PROJECT SPECIFICATION AND THE STRUCTURAL GENERAL NOTES.

SCOPE OF WORK: VOLUNTARY SEISMIC RETROFIT OF EXISTING BUILDINGS.

GOVERNING CODE:

THE STRUCTURAL DESIGN OF BUILDING COMPONENTS DESCRIBED ON THESE DRAWINGS IS IN ACCORDANCE WITH THE 2019 OREGON STRUCTURAL SPECIALTY CODE (OSSC) AND 2018 INTERNATIONAL BUILDING CODE (IBC)

LIMITATIONS:

THE LATERAL FORCE RESISTING SYSTEM SHOWN ON THESE DRAWINGS IS DESIGNED TO ACHIEVE MINIMUM REQUIRED STANDARDS FOR STRUCTURAL SEISMIC RESISTANCE, AND IS INTENDED TO REDUCE THE RISK OF LIFE LOSS OR INJURY. THIS WORK WILL NOT NECESSARILY PREVENT LOSS OF LIFE OR INJURY, NOR PREVENT EARTHQUAKE DAMAGE TO NEW OR REHABILITATED BUILDINGS.

1. GENERAL

MATERIALS AND WORKMANSHIP TO CONFORM TO THE BUILDING CODE DEFINED ABOVE AND THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

A. THESE NOTES APPLY TO ALL DRAWINGS AND GOVERN UNLESS OTHERWISE NOTED OR SPECIFIED. WHENEVER THERE APPEARS TO BE A CONFLICT BETWEEN THE NOTES, DRAWINGS, OR SPECIFICATIONS, CONTACT THE ENGINEER FOR CLARIFICATION.

B. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND PROPOSED DIMENSIONS AT JOB SITE. COMPARE STRUCTURAL DRAWINGS WITH ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS BEFORE COMMENCING WORK. NOTIFY ENGINEER OF ANY DISCREPANCIES AND DO NOT PROCEED WITH AFFECTED WORK UNTIL THEY ARE RESOLVED. DO NOT SCALE DRAWINGS.

C. DRAWINGS INDICATE GENERAL AND TYPICAL DETAILS OF CONSTRUCTION. WHERE CONDITIONS ARE NOT SPECIFICALLY INDICATED BUT ARE OF SIMILAR CHARACTER TO DETAILS SHOWN, USE SIMILAR DETAILS OF CONSTRUCTION, SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER.

D. DETAILS NOTED AS “TYPICAL” IN THEIR TITLE OR ON SHEETS TITLED “TYPICAL DETAILS” APPLY TO SITUATIONS OCCURRING ON THE PROJECT THAT ARE THE SAME OR SIMILAR TO THOSE SPECIFICALLY REFERENCED. SUCH DETAILS ARE NOT NOTED AT EACH LOCATION THAT THEY OCCUR.

E. ALL ELEMENTS INDICATED ON THE DRAWINGS SHALL BE ASSUMED “NEW” UNLESS OTHERWISE NOTED.

F. SAFETY MEASURES: AT ALL TIMES THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR THE CONDITIONS OF THE JOB SITE INCLUDING, BUT NOT LIMITED TO:
a) SAFETY OF THE PERSONS AND PROPERTY,
b) MEANS AND METHODS OF CONSTRUCTION,
c) COMPLIANCE WITH APPLICABLE CAL/OSHA REQUIREMENTS AND GUIDELINES,
d) ALL NECESSARY INDEPENDENT ENGINEERING REVIEWS OF THESE CONDITIONS.

THE CONTRACTOR SHALL BRACE OR SHORE THE CONSTRUCTION AS REQUIRED TO PROVIDE A SAFE AND TRUE STRUCTURE. WHERE BRACING OR SHORING IS INDICATED IN THE DRAWINGS, IT IS DONE SO ONLY AS A COURTESY TO THE CONTRACTOR AND SHALL NOT RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY TO COORDINATE THE WORK WITH THE AFOREMENTIONED PROVISIONS. THE ARCHITECT'S OR ENGINEER'S JOB SITE REVIEW IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES.

2. SUBMITTALS

A. SUBMIT IN ACCORDANCE WITH DIVISION 1 OF THE SPECIFICATIONS.

B. SUBSTITUTION REQUESTS SHALL DEMONSTRATE THE REQUESTED SUBSTITUTION’S ABILITY TO MEET OR EXCEED THE REQUIREMENTS OF THE ORIGINALLY SPECIFIED ITEM. THE REQUEST SHALL ALSO INCLUDE A ROUGH COST SAVINGS ESTIMATE TO THE OWNER, REFERENCES TO DETAILS WHERE SUBSTITUTION IS PROPOSED TO BE APPLIED, AND ALL SUPPORTING DOCUMENTATION REQUIRED FOR THE ITEM BY THIS SECTION OF THE NOTES.

C. SHOP DRAWINGS, MILL CERTIFICATES, AND/OR OTHER RELEVANT CERTIFICATIONS SHALL BE SUBMITTED FOR REVIEW AND APPROVAL BEFORE FABRICATION, FOR THE FOLLOWING ITEMS:

NOTE: SUBMITTING COPIES OF THE STRUCTURAL DRAWINGS IS UNACCEPTABLE AND WILL BE REJECTED FOR COMPLETE REVISION.

1) STRUCTURAL AND MISCELLANEOUS STEEL
   a. MILL CERTIFICATIONS FOR ALL STEEL AND ALL FASTENERS.
   b. SHOP DRAWINGS INCLUDING AT A MINIMUM ASTM MATERIAL DESIGNATIONS, MEMBER SIZES, SIZES AND TYPES OF WELDS, SIZES AND TYPES OF BOLTS, AND DIMENSIONS.
   c. WELD PROCEDURE SPECIFICATIONS FOR EACH TYPE OF WELD TO BE USED AND PRODUCT DATA FOR WELDING FILLER METAL.
   d. MANUFACTURER’S PRODUCT DATA FOR PRIMER AND FINISH PAINT, INCLUDING COLOR CHARTS.
   e. CONTRACTOR SHALL ESTABLISH AND VERIFY REQUIRED TOP OF STEEL (T.O.S.) ELEVATIONS, WHETHER INDICATED ON THE DRAWINGS OR NOT, AGAINST ARCHITECTURAL FINISHED FLOOR AND ROOF ELEVATIONS, AND THE STRUCTURAL DETAILS, INCLUDING ANY SPECIFIED OFFSET OR PRE-CAMBER. NOTIFY THE ARCHITECT/ENGINEER OF ANY DISCREPANCIES.

2) REINFORCING STEEL
   a. MATERIAL CERTIFICATES FOR REINFORCING STEEL.
   b. DRAWINGS FOR FABRICATION, BENDING, AND PLACEMENT OF REINFORCING STEEL IN ACCORDANCE WITH ACI 315.

3) CAST-IN-PLACE CONCRETE AND SHOTCRETE
   a. MIX DESIGNS FOR EACH TYPE OF CONCRETE ON THE PROJECT INCLUDING RESULTS OF SLUMP, COMPRESSION, AND SHRINKAGE TESTS AND OTHER PROJECT SPECIFIC CRITERIA
   b. MATERIAL CERTIFICATES
   c. PROPOSED CONSTRUCTION AND CONTROL JOINT LOCATIONS
   d. CURING MATERIALS AND METHODS
   e. PRODUCT DATA FOR NON-SHRINK GROUT
   f. FORMWORK TYPE, FORMWORK, JOINT LOCATIONS, CHAIRS, FORM TIES, ETC.
   g. PROPOSED ROUGHENING METHODS AND TECHNIQUES TO PREPARE EXISTING SURFACES TO RECEIVE NEW CONCRETE, IN ACCORDANCE WITH AMPLITUDE NOTED IN THE CONCRETE SECTION OF THESE NOTES.

4) MECHANICAL ANCHORS AND EPOXY ANCHORS
   a. PRODUCT DATA FOR EACH TYPE OF SYSTEM INCLUDING ANCHOR TESTING IN ACCORDANCE WITH ACI 355.2 FOR MECHANICAL ANCHORS AND ACI 355.4 FOR EPOXY ANCHORS.
   b. CERTIFICATION OF ANCHOR INSTALLERS PER ACI/CRSI WHERE ANCHORS ARE INSTALLED IN HORIZONTAL OR VERTICAL CONDITIONS WITH SUSTAINED TENSION.

3. SPECIAL INSPECTION REQUIREMENTS AND TESTING

A. PROVIDE SPECIAL INSPECTIONS AND TESTING FOR ALL ITEMS AS REQUIRED BY THE GOVERNING JURISDICTION. JURISDICTION SPECIFIC SPECIAL INSPECTION FORM SHALL SUPPLEMENT SPECIAL INSPECTION REQUIREMENTS NOTED IN THIS SECTION.

B. THE OWNER SHALL BE RESPONSIBLE FOR RETAINING AN INDEPENDENT, QUALIFIED INSPECTOR AND/OR TESTING LAB TO PERFORM ALL REQUIRED TESTING AND SPECIAL INSPECTIONS.

C. IF INITIAL TESTS OR INSPECTIONS MADE BY THE OWNER’S TESTING AGENCY REVEAL THAT ANY PORTION OF THE WORK DOES NOT COMPLY WITH THE CONTRACT DOCUMENTS, ADDITIONAL TESTS, INSPECTIONS, AND NECESSARY REPAIRS WILL BE MADE AT THE CONTRACTOR’S EXPENSE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND OWNER OF NON-CONFORMING WORK. THIS NOTIFICATION SHALL SPECIFICALLY ADDRESS THE NON-CONFORMING WORK AND SHALL BE SEPARATE FROM THE SPECIAL INSPECTION REPORTS.

D. SPECIAL INSPECTION REPORTS SHALL BE SENT TO THE ENGINEER AT THE TIME OF COMPLETION FOR REVIEW OF CONFORMANCE WITH THE REQUIREMENTS OF THE STRUCTURAL DRAWINGS.

E. THE CONTRACTOR SHALL NOTIFY THE TESTING LAB A MINIMUM OF 48 HOURS PRIOR TO TIME OF INSPECTION.

F. THE FOLLOWING SPECIFIC ITEMS SHALL BE INSPECTED AND/OR TESTED BY THE TESTING LAB:

1) CONCRETE:
   a. SAMPLE AND TEST CONCRETE AS FOLLOWS:
      1 FABRICATE SPECIMENS FOR STRENGTH TESTS PER ACI 318.
      2 PERFORM SLUMP AND AIR CONTENT TESTS.
      3 DETERMINE TEMPERATURE OF THE CONCRETE.
   b. REINFORCING STEEL AND WELDED WIRE MESH (INCLUDING PRE STRESSING TENDONS).
      1 PLACEMENT (CONTINUOUS INSPECTION FOR SPECIAL MOMENT FRAMES)
      2 OBTAIN AND REVIEW MILL TEST REPORTS.
      3 WELDING.
   c. CONCRETE PLACEMENT (CONTINUOUS INSPECTION).
   d. CAST-IN-PLACE ANCHOR BOLTS.
   e. CURING TEMPERATURE AND TECHNIQUES AND DURATION.
   f. REVIEW MIX DESIGN FOR EACH CLASS OF CONCRETE.
   g. REVIEW THE TICKET OF EACH BATCH OF CONCRETE DELIVERED.

   NOTE: TESTING DURING CONSTRUCTION IS NOT REQUIRED FOR FOUNDATION CONCRETE, EXCLUDING CAST-IN-PLACE DRILLED PILES OR CAISSONS, WHERE THE STRUCTURAL DESIGN IS BASED ON F'C NO GREATER THAN 2500 PSI AND NON-STRUCTURAL SLABS-ON-GRADE.

2) NON-SHRINK GROUT
   a. PLACEMENT
   b. CAST AND TEST SPECIMENS FOR COMPRESSION STRENGTH

3) ALL STRUCTURAL WELDING INCLUDING, BUT NOT LIMITED TO THE FOLLOWING:
   a. CONTINUOUS INSPECTION FOR ALL BUTT WELDS, COMPLETE AND PARTIAL PENETRATION WELDS, GROOVE WELDS AND PLUG WELDS, INCLUDING WELDING OF REINFORCEMENT.
   b. CONTINUOUS INSPECTION AND 100% ULTRASONIC TESTING FOR ALL COMPLETE PENETRATION WELDS BETWEEN THE PRIMARY MEMBERS OF MOMENT-RESISTING FRAMES, EXCEPT WHEN THE THICKNESS OF THE MATERIALS TO BE WELDED IS LESS THAN 5/16". IN ADDITION, MAGNETIC PARTICLE TESTING SHALL BE PERFORMED ON 25% OF ALL BEAM-TO-COLUMN COMPLETE PENETRATION WELDS.
   c. CONTINUOUS INSPECTION OF ALL FILLET WELDS EXCEEDING 5/16".
   d. PERIODIC VISUAL INSPECTION OF THE FOLLOWING ITEMS:
      1 SINGLE-PASS FILLET WELDS NOT EXCEEDING 5/16".
      2 FLOOR AND ROOF DECK WELDING.
      3 WELDED STUDS WHEN USED FOR THE STRUCTURAL DIAPHRAGM OR COMPOSITE CONNECTIONS.
      4 WELDED SHEET METAL STEEL FOR COLD-FORMED STUDS AND JOISTS.
      5 WELDING OF STAIRS AND RAILING SYSTEMS.

      2 APPLICATION

5) POST INSTALLED ANCHORS. WHERE ANCHORS ARE LOADED IN SUSTAINED TENSION, INSPECTION SHALL BE CONTINUOUS. REFER TO THE DRAWINGS FOR LOCATIONS.
   a. BRICK MASONRY
      1 EPOXY THREADED RODS SHALL BE TESTED PER TESTING SCHEDULE IN TYPICAL DETAILS.
   b. CONCRETE
      1 EPOXY REBAR AND THREADED RODS
      2 MECHANICAL ANCHORS

6) STRUCTURAL WOOD
   a. PERIODIC SPECIAL INSPECTION FOR NAILING, BOLTING, ANCHORING AND OTHER FASTENING OF COMPONENTS WITHIN THE SEISMIC FORCE RESISTING SYSTEM, INCLUDING WOOD SHEAR WALLS, WOOD DIAPHRAGMS DRAG STRUTS, BRACES, SHEAR PANELS AND HOLD-DOWNS.

7) ALL EXCAVATIONS AND EARTH FORMS SHALL BE INSPECTED BY THE LOCAL BUILDING INSPECTOR AND INSPECTED BY THE GEOTECHNICAL ENGINEER AND/OR ENGINEER PRIOR TO PLACING CONCRETE.

4. STRUCTURAL OBSERVATIONS

A. STRUCTURAL OBSERVATIONS WILL BE UNDERTAKEN BY PERSONNEL UNDER THE SUPERVISION OF THE ENGINEER OF RECORD. STRUCTURAL OBSERVATIONS ARE SEPARATE FROM THE SPECIAL INSPECTION REQUIREMENTS OUTLINED ABOVE.

B. THE PURPOSE OF STRUCTURAL OBSERVATIONS IS TO REVIEW THE OVERALL PROGRESS OF CONSTRUCTION AND ASCERTAIN ITS GENERAL COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS, THESE GENERAL NOTES, AND OTHER SPECIFICATIONS, WHERE APPLICABLE. OBSERVATIONS WILL BE NOTED IN REGULAR SITE REPORTS ISSUED TO THE OWNER’S REPRESENTATIVE.

C. UNLESS OTHERWISE AGREED UPON, THE ENGINEER OF RECORD SHALL BE ENGAGED TO PROVIDE, AT MINIMUM, A LEVEL OF CONSTRUCTION INVOLVEMENT NEEDED TO OBSERVE THE FOLLOWING AT SIGNIFICANT MILESTONES DURING THE CONSTRUCTION PROCESS:

1) FOUNDATION REINFORCEMENT AND CONSTRUCTION
2) MASONRY/CONCRETE WALL/SLAB REINFORCEMENT AND CONSTRUCTION
3) STRUCTURAL STEEL FRAMING
4) LATERAL FORCE RESISTING ELEMENTS
5) WOOD FRAMING

ADDITIONAL ENGINEER INVOLVEMENT MAY BE DESIRED. ANY AGREEMENT TO THAT EFFECT SHALL BE MADE PRIOR TO THE START OF CONSTRUCTION.

D. THE CONTRACTOR SHALL NOTIFY THE ENGINEER A MINIMUM OF 3 DAYS PRIOR TO TIME OF OBSERVATION AND PROVIDE ACCESS FOR THE OBSERVATIONS.

E. AN OWNER’S REPRESENTATIVE MAY BE DESIGNATED, BY THE OWNER'S SPECIFIC AUTHORIZATION PRIOR TO THE START OF CONSTRUCTION, WHO WILL HAVE THE AUTHORITY TO REQUEST ADDITIONAL ENGINEER INVOLVEMENT OUTSIDE OF THE NORMAL DUTIES ASSOCIATED WITH STRUCTURAL OBSERVATION.

5. DESIGN BASIS

A. CONSTRUCT IN CONFORMANCE WITH THE BUILDING CODE NOTED ABOVE.

B. DESIGN LIVE LOADS (PSF):

ROOF 20

C. DESIGN DEAD LOADS

1) SUPERIMPOSED DEAD LOADS PER STRUCTURAL CALCULATIONS

D. EARTHQUAKE DESIGN DATA

1) SEISMIC IMPORTANCE FACTOR, AREA A-C: 1.5
   AREA D: 1.0

2) RISK CATEGORY: AREA A-C: III
   AREA D: II

3) ASCE 41 PERFORMANCE OBJECTIVE: BPOE

4) USGS MCEr SPECTRAL RESPONSE ACCELERATIONS:
   i. Ss = **X.XX** g
   ii. S1 = **X.XX** g

5) SITE CLASS: **X**

6) ASCE 7 DESIGN SPECTRAL RESPONSE ACCELERATIONS:
   i. SDS = **X.XX** g
   ii. SD1 = **X.XX** g

6) SEISMIC DESIGN CATEGORY:	X
7) BASIC SEISMIC-FORCE RESISTING SYSTEM:	XXX
8) RESPONSE MODIFICATION FACTOR, R:	X.XX
9) SEISMIC RESPONSE COEFFICIENT, Cs (AT STRENGTH LEVEL):	X.XX
10) DESIGN BASE SHEAR:	XXX
X) (ASCE 41 PROJECTS) BASE SHEAR, V @ BSE-2E:	XXX
X) (ASCE 41 PROJECTS) BASE SHEAR, V @ BSE-1E:	XXX
11) ANALYSIS PROCEDURE USED:	XXX
12) DESIGN STORY DRIFT:	2.5%

E. WIND:

1) RISK CATEGORY:	X
2) BASIC WIND SPEED:	XXX MPH
3) WIND DIRECTIONALITY FACTOR, Kd:	X.XX
4) EXPOSURE CATEGORY TYPE:	X
5) TOPOGRAPHIC FACTOR, Kzt:	X.XX
6) ENCLOSURE CLASSIFICATION:	XXX

F. FOUNDATIONS: MODIFY AS REQ’D

1) SPREAD FOOTING: XXXX PSF

G. DESIGN SNOW LOADS

1) GROUND SNOW LOAD, Pg: 25 PSF

6. FOUNDATION, FILL, AND SITE WORK

FOUNDATION DESIGN IS BASED ON A GEOTECHNICAL REPORT PREPARED BY:
DATED:

A. EXCEPT WHERE OTHERWISE SHOWN, EXCAVATIONS SHALL BE MADE AS NEAR AS POSSIBLE TO THE NEAT LINES REQUIRED BY THE SIZE AND SHAPE OF THE STRUCTURE. ALL FOUNDATIONS SHALL BE POURED WITHOUT THE USE OF SIDE FORMS WHEREVER POSSIBLE. IF THE TRENCHES CANNOT STAND, FULLY FORM SIDES TO DIMENSIONS SHOWN.

B. DO NOT ALLOW WATER TO STAND IN TRENCHES. IF BOTTOMS OF TRENCHES BECOME SOFTENED DUE TO RAIN OR SLURRY OR OTHER WATER BEFORE CONCRETE IS CAST, EXCAVATE SOFTENED MATERIAL AND REPLACE WITH PROPERLY COMPACTED BACKFILL OR CONCRETE AT NO COST TO OWNER.

C. WHERE SITEWORK IS REQUIRED, COMPLY WITH THE FOLLOWING:

1) STRIP THE AREA TO BE BUILT OVER OF ALL ORGANIC MATERIAL AND TOP SOIL.
2) SCARIFY THE TOP 6 INCHES OF STRIPPED SURFACE; BRING TO CORRECT MOISTURE CONTENT; THEN RE-COMPACT TO AT LEAST 95% UNDER FOOTINGS AND 90% ELSEWHERE.
3) FILL MATERIAL TO BE PLACED IN 6 INCH LAYERS AND COMPACTED.
4) FILL MATERIAL SHALL BE FREE OF PLASTIC CLAYS, VEGETATION, AND OTHER DELETERIOUS MATERIAL; IT SHALL BE OF SUCH QUALITY THAT IT WILL COMPACT THOROUGHLY WHEN WATERED AND ROLLED. THE FILL SHALL NOT CONTAIN ROCKS OR LUMPS OVER 2 INCHES IN GREATEST DIMENSION.

D. PLACE BACKFILL BEHIND RETAINING WALLS AFTER CONCRETE HAS ATTAINED FULL DESIGN STRENGTH. BRACE BUILDING AND PIT WALLS BELOW GRADE FROM LATERAL LOADS UNTIL ATTACHED FLOORS AND SLABS ON GRADE HAVE ATTAINED FULL DESIGN STRENGTH.

E. FOR SHALLOW FOUNDATIONS, THE TOP SURFACE OF FOOTINGS SHALL BE LEVEL. THE BOTTOM SURFACE OF FOOTINGS SHALL BE PERMITTED TO HAVE A SLOPE NOT EXCEEDING ONE UNIT VERTICAL IN 10 UNITS HORIZONTAL (10-PERCENT SLOPE). FOOTINGS SHALL BE STEPPED WHERE IT IS NECESSARY TO CHANGE THE ELEVATION OF THE TOP SURFACE OF THE FOOTING OR WHERE THE SURFACE OF THE GROUND SLOPES MORE THAN ONE UNIT VERTICAL IN 10 UNITS HORIZONTAL.

7. CONCRETE

A. EXCEPT WHERE NOTED OTHERWISE ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF ACI 301 - SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS. UNLESS OTHERWISE NOTED, COMPLY WITH CONSTRUCTION TOLERANCES AS SPECIFIED IN ACI 117 “SPECIFICATION FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS”.

B. REINFORCE ALL CONCRETE. INSTALL ALL INSERTS, BOLTS, ANCHORS, AND REINFORCING AND SECURELY TIE PRIOR TO PLACING CONCRETE.

C. PORTLAND CEMENT SHALL CONFORM TO ASTM C-150 TYPE I OR II.

D. CONCRETE SHALL BE HARDROCK CONCRETE AND CONFORM TO ALL REQUIREMENTS OF ASTM C-33, UNLESS OTHERWISE NOTED. WHERE LIGHTWEIGHT CONCRETE IS SPECIFIED, IT SHALL CONFORM TO ASTM C-330. FLY ASH SHALL COMPLY WITH ASTM C618; SLAG SHALL COMPLY WITH ASTM C989. PROPORTION CONCRETE IN ACCORDANCE WITH ACI 211.1, INCLUDING ANY REQUIRED ADMIXTURES. CONCRETE SHALL SATISFY THE FOLLOWING PROPERTIES:

DELETE ANY OF THESE VALUES THAT ARE NOT APPLICABLE OR ARE CONTAINED IN THE TABLE

ADMIXTURES WITH CHLORIDE IONS:	NOT PERMITTED
MIN. STRENGTH AT 28 DAYS (f'c):	3000 PSI
MIN. STRENGTH AT 56 DAYS:	3000 PSI
MIN. SLUMP:	2½”
MAX. SLUMP:	7”
MAX. AGGREGATE SIZE:	1”
MAX. WATER/CEMENTITIOUS (W/CM) RATIO:	0.50
MIN. FLY ASH OR SLAG REPLACEMENT:	20%

INSERT TABLE (CONC-MIX)

E. THE ACTUAL SLUMP AND TOLERANCE SHALL BE ESTABLISHED BY THE CONTRACTOR AND CONCRETE SUPPLIER, AS REQUIRED TO SATISFY THE CONTRACTOR’S MEANS AND-METHODS FOR PLACEMENT, FIELD AND INSTALLATION CONDITIONS (INCLUDING REINFORCING CONGESTION), FINISH REQUIREMENTS, AND AS REQUIRED TO SATISFY THE PERFORMANCE CRITERIA SPECIFIED ABOVE.

F. IN AREAS OF HEAVY REINFORCING AND CONGESTION, CONTRACTOR SHALL PROVIDE ADEQUATE MEANS AND METHODS TO PROPERLY INSTALL CONCRETE (I.E., HIGH-RANGE WATER-REDUCING ADMIXTURE, FORM VIBRATORS, ETC.) AT SUCH LOCATIONS, THE CONTRACTOR MAY USE 3/8” MINIMUM CRUSHED ROCK OF NOT LESS THAN 1500 POUNDS/CU. YD. NO WATER SHALL BE ADDED AT THE TIME OF INSTALLATION WITHOUT WRITTEN APPROVAL OF THE ENGINEER OF RECORD.ALL CONCRETE WITH EXPOSED SURFACES SHALL HAVE HIGH-RANGE WATER-REDUCING ADMIXTURE (SUPERPLASTICIZER): ASTM C494, TYPE F OR TYPE G. PRODUCTS INCLUDE THE FOLLOWING:
1) EUCON 37/1037 OR PLASTOLSERIES, EUCLID CHEMICAL COMPANY,
2) DARACEM, W.R. GRACE COMPANY, OR
3) SIKAMENT 300, SIKA CORP.

G. WHEN PLACING NEW CONCRETE OR SHOTCRETE AGAINST EXISTING CONCRETE, AND/OR CONCRETE MASONRY, ROUGHEN EXISTING MATERIAL TO 1/4" AMPLITUDE. REMOVE ALL LOOSE CEMENTITIOUS MATERIALS AND AGGREGATES. PRESSURE WASH SURFACE AND REMOVE STANDING WATER IMMEDIATELY PRIOR TO PLACING NEW CONCRETE. AT EXISTING BRICK, ROUGHENING IS NOT REQUIRED IF EXISTING BRICK HAS A NATURAL ROUGH SURFACE (APPROXIMATELY 1/4" AMPLITUDE). THE ROUGHENED SURFACE IS SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER.

I. CONTRACTOR SHALL CONSTRUCT CONCRETE FLOORS AND SLABS PER RECOMMENDATIONS OF ACI 302.1R. CONTRACTOR SHALL SUBMIT LOCATIONS OF PROPOSED CONSTRUCTION JOINTS FOR ENGINEERS REVIEW AND APPROVAL.

J. FINISH SCHEDULE: COORDINATE WITH ARCHITECT.

9. FORMWORK

A. DESIGN AND CONSTRUCT FORMWORK IN ACCORDANCE WITH ACI 347 “RECOMMENDED PRACTICE FOR CONCRETE FORMWORK” AND ACI 301 “SPECIFICATIONS FOR STRUCTURAL CONCRETE”, UNLESS OTHERWISE NOTED.

B. AS REQUIRED, PROVIDE POUR POCKETS IN FORMS AND UNDER EXISTING MEMBERS TO PREVENT AIR POCKETS OR “HONEYCOMBS”. CONCRETE CAST WITH AIR POCKETS OR HONEYCOMBS IS NOT ACCEPTABLE.

C. PROVIDE ¾ INCH BY ¾ INCH CHAMFER STRIPS ON ALL EXTERNAL CORNERS OF BEAMS, COLUMNS, AND WALLS, UNLESS OTHERWISE NOTED.

D. REMOVE FORMS AND SHORES IN ACCORDANCE WITH THE FOLLOWING:

1) POST-TENSIONED SLABS, BEAMS, AND GIRDERS – REMOVE FORMS AND SHORES NO SOONER THAN 72 HOURS, F’C = 4000 PSI MINIMUM, OR MEMBERS HAVE BEEN TENSIONED.
2) BOTTOM FORMS AND SHORES FOR MILDLY REINFORCED SLABS, BEAMS, AND GIRDERS – REMOVE FORMS AND SHORES NO SOONER THAN 7 DAYS AND F’C = 3000 PSI MINIMUM.
3) COLUMNS AND WALLS – REMOVE FORMS AND SHORES NO SOONER THAN 72 HOURS.
4) FOOTINGS, PILE CAPS, AND GRADE BEAMS – REMOVE FORMS AND SHORES NO SOONER THAN 48 HOURS.

E. CONCRETE SHALL BE CONTINUOUSLY CURED FOR 10 DAYS AFTER PLACING IN ANY APPROVED MANNER IN ACCORDANCE WITH ACI 301, INCLUDING CURING COMPOUND, CURING PAPER, WATER SPRAY, FLOODING WITH WATER (FOR SLABS), ETC. PROVIDE CURING WHERE FORMS ARE REMOVED IN LESS THAN 7 DAYS.
NOTE: FOOTINGS ARE EXEMPTED FROM THIS REQUIREMENT.

10. REINFORCING STEEL

A. ALL REINFORCING STEEL BARS, UNLESS OTHERWISE NOTED, SHALL CONFORM WITH THE LATEST STANDARD SPECIFICATIONS FOR DEFORMED BILLET STEEL FOR CONCRETE REINFORCEMENT, ASTM DESIGNATION A615 AND SHALL BE MINIMUM GRADE 60.
HEADED SHEAR STUD REINFORCING SHALL COMPLY WITH ASTM A1044

B. ALL REINFORCING STEEL THAT IS TO BE WELDED, OR USED IN SEISMIC FRAME MEMBERS AND SHEARWALL BOUNDARY ELEMENTS, SHALL CONFORM TO THE LATEST STANDARD FOR LOW-ALLOY STEEL DEFORMED BARS FOR CONCRETE REINFORCEMENT ASTM A706 (GRADE 60 ONLY). BILLET STEEL ASTM A615 REINFORCEMENT MAY BE SUBSTITUTED FOR LOW ALLOY ASTM A706 IF (1) THE ACTUAL YIELD STRENGTH BASED ON MILL TESTS DOES NOT EXCEED THE SPECIFIED YIELD STRENGTH BY MORE THAN 18,000 PSI, (2) THE RATIO OF THE ACTUAL ULTIMATE TENSILE STRESS TO THE ACTUAL YIELD STRENGTH IS NOT LESS THAN 1.25, AND (3) MINIMUM ELONGATION IN 8 INCHES SHALL BE AT LEAST 14 PERCENT FOR BAR SIZES #3 THROUGH #6, AT LEAST 12 PERCENT FOR BAR SIZES #7 THROUGH #11, AND AT LEAST 10 PERCENT FOR BAR SIZES #14 AND #18.

C. WELDED WIRE MESH SHALL CONFORM TO LATEST EDITION OF ASTM A1064.

D. SUITABLE DEVICES (DOBIES, CHAIRS, ETC.) OF SOME STANDARD MANUFACTURE SHALL BE USED TO HOLD REINFORCEMENTS IN ITS TRUE HORIZONTAL AND VERTICAL POSITIONS. THESE DEVICES SHALL BE SUFFICIENTLY RIGID AND NUMEROUS TO PREVENT DISPLACEMENT OF THE REINFORCING DURING PLACING OF CONCRETE. ALL SUCH DEVICES HAVE PRIOR APPROVAL FROM THE ARCHITECT AND ENGINEER.

E. LAP SPLICE ALL BARS IN CONCRETE PER STANDARD DETAILS SCHEDULE, USING LAP TYPE "TOP" UNLESS OTHERWISE NOTED. WHEN LAPPING BARS OF DIFFERENT SIZES, USE THE LAP LENGTH OF THE LARGER BAR.

F. UNLESS OTHERWISE DEMONSTRATED BY SUCCESSFUL PLACEMENT OF A REPRESENTATIVE TEST PANEL, LAP SPLICES FOR SHOTCRETE WALLS SHALL BE PER NON-CONTACT SPLICE METHOD. THE LAPPED BARS SHALL BE SPACED A MINIMUM OF 2 INCHES BETWEEN THEM AND THE LAP LENGTH SHALL BE PER THE SCHEDULE USING LAP CLASS B, "TOP".

G. IN LIEU OF LAP SPLICES, REBAR COUPLERS MAY BE USED. ERICO’S AND/ OR ERICO’S CADWELD LENTON. DAYTON BAR-LOCKS AND SIMILAR DEVICES MAY BE USED ONLY IF REINFORCING DETAILER ACCOUNTS FOR COUPLER SIZE, 24 INCH STAGGERING OF COUPLERS AND REINFORCING BAR SPACING. ALTERNATES WILL BE CONSIDERED UPON SUBMITTAL OF MANUFACTURER’S TESTING REPORT. FOR APPLICATIONS IN SEISMIC FRAME MEMBERS AND BOUNDARY ELEMENTS OF SHEAR WALLS, THE COUPLERS SHALL DEVELOP THE LARGER OF 100% OF THE ULTIMATE TENSILE STRENGTH OR 125% OF THE SPECIFIED YIELD STRENGTH OF THE REBAR. FOR ALL OTHER APPLICATIONS, THE COUPLERS SHALL DEVELOP 125% OF THE SPECIFIED YIELD STRENGTH OF THE REBAR.

H. IN LIEU OF COUPLERS, MAIN LONGITUDINAL REINFORCING BARS OF ASTM A706 STEEL MAY BE WELDED PER AWS D1.4. WELDED SPLICES SHALL NOT BE USED WITHIN A JOINT OF THE SEISMIC FRAME, OR WITHIN A DISTANCE OF ONE BEAM/COLUMN DEPTH FROM A JOINT.

I. SPIRAL REINFORCEMENT

1) LAP SPLICES FOR SPIRAL REINFORCEMENT ARE NOT PERMITTED WITHOUT SPECIFIC AUTHORIZATION FROM ENGINEER.
2) SPIRALS SHALL BE TERMINATED WITH A MINIMUM OF (3) TIGHT TIES AND A 135° HOOK UNLESS OTHERWISE NOTED.

J. HOOK DISCONTINUOUS ENDS OF REINFORCING STEEL PER TYPICAL DETAIL, UNLESS OTHERWISE NOTED. WHERE SPECIFIED OR WHERE REINFORCING IS IN A CONGESTED ZONE SO AS NOT TO PERMIT HOOK BARS, PROVED A “T-HEAD” TERMINATOR: LENTON "D6" OR “D16" TERMINATOR OR APPROVED EQUAL.

K. DETAIL ACCORDING TO THE LATEST ACI STANDARD 315, MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES. PLACE REINFORCEMENT PER ACI 301, “SPECIFICATION FOR STRUCTURAL CONCRETE”, UNLESS OTHERWISE NOTED.

L. REBAR PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT.

M. REBAR SHALL ONLY BE BENT ONCE. REBAR SHALL NOT BE BENT AND STRAIGHTENED FOR CONSTRUCTION UNLESS EXPLICITLY NOTED ON THE CONSTRUCTION DOCUMENTS.

N. MAINTAIN COVERAGE TO FACE OF BARS, INCLUDING SLEEVES AND PENETRATIONS, AS FOLLOWS, UNLESS OTHERWISE NOTED:

1) CAST-IN-PLACE CONCRETE
   a. 3 INCHES WHERE CONCRETE IS DEPOSITED AGAINST EARTH EXCEPT SLAB-ON-GRADE.
   b. 2-1/2 INCHES FOR CAST-IN-PLACE DEEP FOUNDATION ELEMENTS NOT ENCLOSED BY A STEEL PIPE, TUBE OR PERMANENT CASING.
   c. 2 INCHES FOR FORMED CONCRETE WHICH IS EXPOSED TO EARTH OR WEATHER FOR #6 BAR THROUGH #18 BAR. REDUCED TO 1-1/2 FOR #5 BAR, W31 OR D31 WIRE AND SMALLER.
   d. 1-1/2 INCHES FOR INTERIOR BEAMS AND COLUMNS.
   e. 1-1/2 INCHES FOR INTERIOR SLABS AND WALLS FOR #14 AND #18 BAR. REDUCED TO 3/4 INCH FOR #11 BAR AND SMALLER.
   f. 1-1/2 INCHES FOR SLAB-ON-GRADE.

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COOPER MOUNTAIN ELEMENTARY SCHOOL
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Date:	09-22-2020
Project Number:	20138.10
Drawn By:	IK
Checked By:	JE

Revision Schedule:

Sheet Title:
GENERAL NOTES

Sheet Number:
S-002

100% DD SUBMITTAL

9/22/2020 2:15:10 PM

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2) PRESTRESSED CONCRETE
   a. 3 INCHES WHERE CONCRETE IS DEPOSITED AGAINST EARTH.
   b. 1 INCH WHERE FORMED CONCRETE IS EXPOSED TO EARTH OR WEATHER FOR SLABS AND WALLS.
   c. 1-1/2 INCHES WHERE FORMED CONCRETE IS EXPOSED TO EARTH OR WEATHER FOR BEAMS AND COLUMNS.
   d. 3/4 INCH FOR INTERIOR SLABS AND WALLS.
   e. 1-1/2 INCHES FOR PRIMARY REINFORCEMENT IN INTERIOR BEAMS AND COLUMNS. 1 INCH FOR TIES AND STIRRUPS.

O. PROVIDE FIBER-REINFORCING WHERE INDICATED ON THE DRAWINGS. COMPLY WITH ASTM C1116 . FIBER-REINFORCING SHALL BE FIBERMESH 300 BY PROPEX (MINIMUM DOSAGEOF 1.5 LBS/YD^3 U.O.N.) OR APPROVED EQUIVALENT.

11. NON-SHRINK GROUT

A. NON-SHRINK GROUT SHALL ACHIEVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS (F'c) OF 7,000 PSI.

B. NON-SHRINK GROUT SHALL COMPLY WITH ONE OF THE FOLLOWING.

1) DRY PACK NON-SHRINK GROUT SHALL BE EUCLID CHEMICAL COMPANY'S "EUCO-NS", L&M CRYSTEX, MASTER BUILDERS' "MASTERFLOW 713", SIMPSON'S "FX-228", OR FIVE STAR GROUT.
2) WHERE HIGH FLUIDITY OR INCREASED PLACING TIME IS REQUIRED, USE EUCLID CHEMICAL COMPANY'S "EUCO HI-FLOW GROUT" OR MASTER BUILDERS' "MASTERFLOW 928".

C. COMPLY WITH MANUFACTURER'S INSTALLATION RECOMMENDATIONS AND REQUIREMENTS.

12. PATCHING OF CONCRETE

A. ALL INSERT HOLES, SHE-BOLTS, ETC., AND OTHER IMPERFECTIONS ON THE SURFACES OF THE CONCRETE SHALL BE FILLED WITH GROUT, BRUSHED AND SACKED TO A UNIFORM FINISH. ALL HOLES THROUGH TO THE OUTSIDE OF THE BUILDING MUST BE MADE WATERTIGHT.

B. MATERIALS AND METHODS USED FOR PATCHING OF CONCRETE IN THE EVENT OF SPALLING, HONEYCOMBING, LARGE CRACKS, ETC., SHALL BE BY MASTER BUILDERS, SIKA, OR EQUIVALENT. FINAL FINISHED APPEARANCE SUBJECT TO APPROVAL. SUBSTITUTES WILL BE CONSIDERED UPON SUBMITTAL OF MANUFACTURER'S TESTING REPORT.

13. FRAMING LUMBER

A. ALL FRAMING LUMBER SHALL BE GRADED PER WCLIB GRADING RULES NO. 17.

B. ALL FRAMING LUMBER SHALL HAVE A MAXIMUM MOISTURE CONTENT OF 19% AT TIME OF INSTALLATION.

C. ALL POSTS AND BEAMS SHALL BE DOUGLAS FIR, #1.

D. ALL FLOOR AND ROOF JOISTS SHALL BE DOUGLAS FIR, #1.

E. ALL STUDS, PLATES, ETC., SHALL BE DOUGLAS FIR, CONSTRUCTION GRADE.

F. ENGINEERED WOOD PRODUCTS MAY BE USED AS SUBSTITUTES FOR SAWN LUMBER UPON REQUEST BY THE CONTRACTOR AND APPROVAL FROM THE ARCHITECT AND ENGINEER OF RECORD. CONTRACTOR SHALL SUBMIT MANUFACTURER'S TESTING REPORTS FOR APPROVAL.

14. PLYWOOD (PW) OR ORIENTED STRAND BOARD (OSB)

A. EACH PANEL SHALL BE IDENTIFIED WITH THE APPROPRIATE GRADE, TRADEMARK OF THE AMERICAN PLYWOOD ASSOCIATION, AND SHALL MEET THE REQUIREMENTS OF THE LATEST EDITION OF THE U.S. PRODUCT STANDARD PS-1. PLYWOOD GRADE SHALL CONFORM TO CD-X FOR PLYWOOD OR TYPE 2-M-W FOR ORIENTED STRAND BOARD, UNLESS OTHERWISE NOTED.

B. WHERE PLYWOOD IS PERMANENTLY EXPOSED TO WEATHER, IT SHALL BE EXTERIOR TYPE. OTHERWISE, PANEL SHEATHING SHALL BE EXPOSURE 1. PLYWOOD TO BE CC GRADE AT LOCATIONS EXPOSED TO WEATHER; CC OR CD GRADE ELSEWHERE.

C. PANELS TO BE 5-PLY MINIMUM, EXCEPT 3/8" PANELS TO BE 3-PLY MINIMUM.

D. PLYWOOD SHEETS AT FLOORS AND ROOFS SHALL BE LAID WITH FACE GRAIN PERPENDICULAR TO JOISTS AND RAFTERS. PLYWOOD AT FLOORS SHALL BE GLUED TO FRAMING BELOW (USE SOLVENT BASED GLUE COMPLYING WITH ASTM D3498 AND VOLATILE ORGANIC COMPOUND (VOC) LIMITS PER CALGREEN). LN-950 BY LIQUID NAILS OR APPROVED EQUIVALENT, UNLESS OTHERWISE SPECIFIED BY THE ARCHTIECT. PROVIDE RING-SHANK NAILS AT FLOOR AND ROOF SHEATHING.

E. PLYWOOD SHEETS ON WALLS SHALL BE LAID WITH LONG DIMENSION VERTICAL. BLOCK ALL EDGES WITH A MINIMUM OF 3X BLOCK AND/MEMBERS. ALL NAILING SHALL HAVE 3/8 INCH EDGE DISTANCE FOR FRAMING, BLOCKING AND PLYWOOD EDGES. USE SMOOTH-SHANK NAILS FOR PLYWOOD WALL SHEATHING.

F. STAPLES FOR PLYWOOD DIAPHRAGMS SHALL BE 14 GAGE ROUND SEMI-FLATTENED OR FLATTENED, PLAIN OR ZINC-COATED STEEL WIRE, WITH A NOMINAL CROWN WIDTH OF 7/16", DRIVEN BY PNEUMATIC OR MECHANICAL DEVICE.

G. PROVIDE 1/8" GAP BETWEEN PANELS UNLESS OTHERWISE NOTED.

H. PANELS SHALL HAVE THE FOLLOWING PROPERTIES UNLESS OTHERWISE NOTED.

1) 3/8 INCH NOMINAL SHALL BE 3/8 INCH ACTUAL THICKNESS WITH 24/0 SPAN RATING.
2) 1/2 INCH NOMINAL SHALL BE 15/32 INCH ACTUAL THICKNESS WITH 32/16 SPAN RATING.
3) 5/8 INCH NOMINAL SHALL BE 19/32 INCH ACTUAL THICKNESS WITH 40/20 SPAN RATING.
4) 3/4 INCH NOMINAL SHALL BE 23/32 INCH ACTUAL THICKNESS WITH 48/24 SPAN RATING.
5) 1-1/8 INCH NOMINAL SHALL BE 1-1/8 INCH ACTUAL THICKNESS WITH 48 O.C. FLOOR SPAN RATING.

15. ROUGH CARPENTRY

A. FOR SCHEDULE OF MINIMUM NAILING TABLE 2304.10.1 OF THE **2019 CBC/2018 IBC** 16d VINYL COATED SINKERS MAY BE SUBSTITUTED FOR 16d BOX OR COMMON NAILS FOR ROUGH FRAMING. SINKERS SHALL NOT BE USED WITH METAL CONNECTORS.

B. SILLS AND LEDGERS ON CONCRETE OR MASONRY SHALL BE PRESSURE-TREATED DOUGLAS FIR. SILLS AND LEDGERS SHALL BE FASTENED TO THE CONCRETE WITH A MINIMUM OF TWO FASTENERS PER PIECE AND A FASTENER NO FURTHER THAN 9 INCHES FROM END OF EACH PIECE, UNLESS OTHERWISE NOTED.

C. PLACE JOISTS WITH CROWN UP.

D. RE-TIGHTEN ALL BOLTS PRIOR TO CLOSING IN WALLS.

E. WHEN METAL CONNECTORS, ANCHORS OR FASTENERS ITEMS ARE EXPOSED TO WEATHER AND/OR PRESSURE TREATED LUMBER THE METAL ITEMS ARE TO BE OF HOT DIPPED ZINC-COATED GALVANIZED STEEL, STAINLESS STEEL, SILICON BRONZE OR COPPER. THE COATING WEIGHTS FOR ZINC-COATED FASTENERS SHALL BE IN ACCORDANCE WITH ASTM A153. SEE ADDITIONAL COATING REQUIREMENTS AS NOTED IN THE PRESSURE TREATMENT SECTION.

F. DOUBLE ALL JOISTS UNDER ALL PARALLEL PARTITIONS UNLESS NOTED OTHERWISE.

G. BLOCK ALL JOISTS AT SUPPORTS AND UNDER ALL PARTITIONS WITH MINIMUM 2x SOLID BLOCKING. BLOCK AND BRIDGE ROOF JOISTS AT 10 FEET AND FLOOR JOISTS AT 8 FEET UNLESS OTHERWISE NOTED.

H. 2x JOISTS SHALL BE SISTERED (VERTICAL NAIL LAMINATED) WITH SDWS 0.220x3 MIN. LENGTH AT 6" O.C. IN (2) ROWS STAGGERED UNLESS OTHERWISE NOTED.

I. ALL POSTS LOCATED OVER WOOD WALLS SHALL HAVE A POST OF EQUAL OR GREATER SIZE LOCATED IN THE WALL DIRECTLY BELOW UNLESS OTHERWISE NOTED.

J. THE STRUCTURAL DESIGN ASSUMES THAT ALL FLOORS AND ROOFS ARE CONSTRUCTED AND LOADED WITH FINISHES (OR EQUIVALENT WEIGHT) FOR A MINIMUM OF SEVEN (7) DAY PRIOR TO THE TIME OF DOOR AND WINDOW INSTALLATION.

K. ALL TIMBER FASTENERS NOT SPECIFICALLY DETAILED ON THE DRAWINGS SHALL BE SIMPSON STRONG-TIE'S STANDARD FASTENERS OR APPROVED EQUIVALENT INSTALLER PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. USP LUMBER CONNECTORS WITH REFERENCE NUMBERS FOR SUBSTITUTION MAY BE USED IN LIEU OF SIMPSON HARDWARE. ENGINEER MAY APPROVE OF OTHER SUBSTITUTIONS UPON THE FOLLOWING:
1) WRITTEN REQUEST FOR OTHER BRANDS
2) SUBMISSION OF MANUFACTURER'S TESTING REPORTS
3) REFERENCES TO PERTINENT DETAILS WHERE SUBSTITUTIONS ARE TO BE APPLIED.

L. ALL STRUCTURAL WOOD WALLS SHALL BE FRAMED WITH 2x4 MINIMUM STUDS AT 16" ON CENTER UNLESS OTHERWISE NOTED.

M. PRE-DRILL HOLES AS REQUIRED TO PREVENT SPLITTING OF WOOD.

16. PRESSURE TREATMENT

A. ALL LUMBER EXPOSED TO WEATHER SHALL BE PRESSURE TREATED IN ACCORDANCE WITH A.W.P.A. STANDARD U1, WITH A PRESERVATIVE AND RETENTION SUITABLE FOR THE APPLICATION (SEE BELOW). ALL CUT ENDS SHALL ALSO BE FIELD TREATED WITH A PRESERVATIVE. AS AN ALTERNATE, CONTRACTOR MAY USE REDWOOD OF EQUIVALENT STRENGTH PROPERTIES AS THOSE SHOWN ABOVE, AND AN APPROVED PRIMER.
THE FOLLOWING USE CATEGORIES SHALL BE REQUIRED BASED ON THE APPLICATION:
1) UC1 – INTERIOR DRY
2) UC2 – INTERIOR DAMP
3) UC3A – EXTERIOR ABOVE GROUND – PROTECTED
4) UC3B – EXTERIOR ABOVE GROUND - UNPROTECTED
5) UC4A – GROUND CONTACT, GENERAL USE
6) UC4B – GROUND CONTACT, HEAVY DUTY USE
7) UC4C – GROUND CONTACT, EXTREME DUTY
8) UC5A – MARINE USE, NORTHERN WATERS

B. ALL EXTERIOR GLUED LAMINATED BEAMS EXPOSED TO WEATHER SHALL BE PRESSURE TREATED WITH A PRESERVATIVE, PENTACHLOROPHENOL WITH A MINIMUM NET RETENTION OF 0.40#/CU. FT. FOR BOTH GROUND USE. ALL CUT ENDS SHALL ALSO BE TREATED WITH A PRESERVATIVE. AS AN ALTERNATE, GLU-LAM BEAMS MAY BE FABRICATED OF ALASKAN, OR PORT ORFORD CEDAR, AND FIELD PAINTED WITH AN APPROVED PRIMER.

C. ALL PLYWOOD EXPOSED TO WEATHER SHALL BE PRESSURE TREATED.

D. WHEN METAL CONNECTOR, ANCHOR OR FASTENER ITEMS ARE IN CONTACT WITH PRESSURE TREATED LUMBER AND/OR CORROSIVE ENVIRONMENTS THE CONTRACTOR SHALL USE CORROSION RESISTANT METAL ITEMS AS NOTED:

1) WHEN LUMBER IS TREATED WITH CHROMATED COPPER ARSENATE (CCA-C) OR DOT SODIUM ARSENATE (SBX) THE METAL ITEMS SHALL HAVE A MINIMUM G90 (0.90 OZ/SQFT) ZINC COATING OR ENGINEER APPROVED EQUIVALENT.
2) WHEN LUMBER IS TREATED WITH ALKALINE COPPER QUAT (ACQ-C OR ACQ-D), COPPER AZOLE (CBA-A OR CA-B) OR OTHER BORATE (NON-DOT) TREATMENT THE METAL ITEMS SHALL HAVE A MINIMUM G185 (1.85 OZ/SQFT) ZINC COATING OR ENGINEER APPROVED EQUIVALENT.
3) WHEN LUMBER IS TREATED WITH OTHER TREATMENTS (NOT AMMONIACAL COPPER ZINC ARSENATE (ACZA) SEE 4 BELOW) OR IS EXPOSED TO CORROSIVE ENVIRONMENTS NOT LIST ABOVE THE METAL ITEMS SHALL BE TYPE 316L STAINLESS STEEL OR ENGINEER APPROVED EQUIVALENT.
4) AMMONIACAL COPPER ZINC ARSENATE (ACZA) IS NOT PERMITTED UNLESS APPROVED BY THE ENGINEER.
5) CONTRACTOR IS TO CONFIRM LUMBER PRESSURE TREATMENT TYPE PRIOR TO PURCHASE OF METAL ITEMS.
6) AS AN ALTERNATIVE, FOR THE SITUATION WHEN THE BASE OF A HOLDOWN IS IN CONTACT WITH A PRESSURE TREATED SILL PLATE THE CONTRACTOR CAN PROVIDE A PRESSURE TREATMENT BARRIER BETWEEN THE BASE OF THE HOLDOWN AND THE SILL PLATE.

17. STRUCTURAL STEEL

A. STRUCTURAL STEEL SHALL CONFORM TO FOLLOWING ASTM DESIGNATIONS, UNLESS OTHERWISE NOTED:

1) PLATES AND BARS, INCLUDING DOUBLER PLATES, CONTINUITY PLATES, BASE PLATES, GUSSET PLATES, AND SHEAR TABS: ASTM A572 GRADE 50.
2) WIDE FLANGES (W): ASTM A992 (Fy = 50 KSI).
3) MISCELLANEOUS (M), AMERICAN STANDARD (S), CHANNEL (C), MISCELLANEOUS CHANNEL (MC), AND ANGLES (L): ASTM A36 (Fy = 36 KSI).
4) BEARING PILES (HP): ASTM A572 GRADE 50 (Fy = 50 KSI).
5) RECTANGULAR AND ROUND HSS (HSS): ASTM A1085 (Fy = 50 KSI).
6) PIPE (P): ASTM A53 GRADE B (Fy = 35 KSI)
7) STRUCTURAL TEES (WT, MT, AND ST) SHALL CONFORM TO THE ASTM SPECIFICATION OF THE CORRESPONDING FULL DEPTH SHAPE (WT SHALL CONFORM TO ASTM SPECIFICATION FOR W, ETC.)

B. STRUCTURAL FASTENERS INCLUDING BOLTS, THREADED RODS, AND ANCHOR RODS SHALL CONFORM TO THE FOLLOWING ASTM DESIGNATIONS, UNLESS OTHERWISE NOTED.

1) ERECTION, GROUTED, AND TIMBER CONNECTION BOLTS: ASTM A307 WITH WELDABILITY SUPPLEMENT S1 GRADE A.
2) HIGH STRENGTH BOLTS: ASTM F3125 A325; WHERE TWIST-OFF TYPE BOLTS ARE SPECIFIED, PROVIDE ASTM F3125 F1852.
3) THREADED RODS: ASTM A36.
4) HIGH STRENGTH THREADED RODS: ASTM A193 GRADE B7.
5) STEEL HEADED STUD ANCHORS: ASTM A108.
6) ANCHOR RODS AND ANCHOR BOLTS: ASTM F1554 WITH WELDABILITY SUPPLEMENT S1 GRADE 55.

C. WHEN PRETENSIONED ASTM F3125 A490 BOLTS ARE SPECIFIED F436 WASHERS SHALL BE USED UNDER BOTH THE BOLT HEAD AND NUT.

D. ALL BOLTS FOR EXTERIOR USE SHALL BE ZINC-COATED BY THE BOLT MANUFACTURER BY EITHER THE HOT-DIP PROCESS IN ACCORDANCE WITH ASTM A153, CLASS C OR THE MECHANICAL DEPOSIT PROCESS IN ACCORDANCE WITH ASTM B695, CLASS 50.

E. ALL STRUCTURAL STEEL MEMBERS EXPOSED TO WEATHER OR CALLED OUT AS HOT DIP GALVANIZED (HDG) ON PLAN OR STRUCTURAL STEEL MEMBERS LOCATED IN EXTERIOR ENVIRONMENTS SHALL BE HDG IN ACCORDANCE WITH ASTM A 123. ANY MEMBER THAT HAS HAD ITS HDG COATING DAMAGED OR REMOVED DURING TRANSPORT OR ERECTION SHALL HAVE ITS COATING REPAIRED USING ZRC GALVILITE REPAIR COMPOUND OR EQUAL. REPAIR GALVANIZING AFTER WELDING IN ACCORDANCE WITH ASTM A780.

F. PAINT STEEL (EXCEPT GALVANIZED STEEL AND PORTIONS TO BE ENCASED IN CONCRETE) WITH ONE COAT OF PRIMER STANDARD TNEMEC P10-99 OR EQUIVALENT SUBJECT TO ENGINEER'S APPROVAL. ALTERNATES WILL BE CONSIDERED UPON REQUEST AND SUBMISSION OF THE MANUFACTURER'S SPECIFICATIONS.

G. ALL CONCRETE ENCASED STEEL SHALL BE CLEAN OF GREASE, PAINT AND OTHER CONTAMINANTS.

H. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST AISC 'SPECIFICATIONS' FOR DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS.

I. WELDING SHALL CONFORM TO THE LATEST EDITION OF THE ANSI/AWS D1.1 STRUCTURAL WELDING CODE. USE E70XX ELECTRODES. WELDING OF METAL DECK AND OTHER SHEET METAL SHALL CONFORM TO THE LATEST EDITION OF AWS D1.3, USE E70XX ELECTRODES.

J. ALL STAIR STRINGERS SHALL BE EITHER A CHANNEL OR MISCELLANEOUS CHANNEL SECTION OR BENT PLATE WITH TOP AND BOTTOM FLANGES OF MINIMUM WIDTH OF 3/4 INCH. THE DESIGN AND USE OF STAIR STRINGERS, TREADS, GUARDRAILS, AND THEIR ATTACHMENTS TO THE BASE BUILDING STRUCTURE SHALL BE DOCUMENTED AND SUPPORTED WITH CALCULATIONS AND DRAWINGS THAT ARE STAMPED AND SIGNED BY A CIVIL/STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONSTRUCTION.

K. LOCATE AND INSTALL ALL ANCHOR BOLTS, EPOXY ANCHORS, AND MECHANICAL ANCHORS BEFORE FABRICATING STEEL CONNECTION ELEMENTS.

L. STRUCTURAL STEEL AND CONNECTIONS EXPOSED TO VIEW IN THE COMPLETED BUILDING ARE DESIGNATED ARCHITECTURALLY EXPOSED STRUCTURAL STEEL (AESS) AND ARE SUBJECT TO THE AISC AESS REQUIREMENTS.

18. MECHANICAL ANCHORS

A. EXPANSION ANCHORS INTO CONCRETE SHALL BE
   a. HILTI KB-TZ
   b. SIMPSON STRONG-BOLT 2
   c. DeWalt POWER-STUD+ SD2
   INSTALL ANCHORS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

B. SCREW ANCHORS INTO CONCRETE SHALL BE:
   a. HILTI KH-EZ
   b. SIMPSON TITEN HD
   c. DeWalt SCREWBOLT+
   INSTALL SCREWS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

C. PRIOR TO INSTALLING MECHANICAL ANCHORS IN POST TENSIONED CONCRETE ELEMENTS THE CONTRACTOR SHALL SCAN THE STRUCTURE AND LOCATE THE TENDONS. THE CONTRACTOR SHALL AVOID TENDON LOCATIONS.

D. PROVIDE STAINLESS (AISI 316) STEEL FASTENERS FOR EXTERIOR USE OR WHEN EXPOSED TO WEATHER OR IN CHEMICALLY CORROSIVE ENVIRONMENTS. PROVIDE ZINC COATED OR GALVANIZED CARBON STEEL ANCHORS AT OTHER LOCATIONS, UNLESS OTHERWISE NOTED. WHERE STAINLESS STEEL FASTENERS ARE USED IN CONJUNCTION WITH GALVANIZED OR OTHER DISSIMILAR BASE METALS, PROVIDE ELECTRICAL ISOLATION AS NOTED ON THE DRAWINGS. NOTIFY THE ENGINEER FOR CLARIFICATION IF NO ELECTRICAL ISOLATION IS SPECIFIED.

E. IF REINFORCEMENT IS ENCOUNTERED DURING DRILLING, ABANDON AND SHIFT THE HOLE LOCATION TO AVOID THE REINFORCEMENT. PROVIDE A MINIMUM OF 2 ANCHOR DIAMETERS OR 1 INCH, WHICHEVER IS LARGER, OF SOUND CONCRETE BETWEEN THE DOWEL AND THE ABANDONED HOLE. FILL THE ABANDONED HOLE WITH NON-SHRINK GROUT. DO NOT CUT EXISTING REINFORCEMENT. IF THE ANCHOR OR DOWEL MAY NOT BE SHIFTED AS NOTED ABOVE, THE ENGINEER WILL DETERMINE A NEW LOCATION.

F. LOCATE REINFORCEMENT AND CONFIRM FINAL ANCHOR LOCATIONS PRIOR TO FABRICATING PLATES, MEMBERS, OR OTHER STEEL ASSEMBLIES ATTACHED WITH MECHANICAL ANCHORS.

19. EPOXY GROUTING OF DOWELS, REBAR AND ANCHOR BOLTS

A. INSTALLATION OF POST-INSTALLED DOWELS, REBAR AND ANCHOR BOLTS (EPOXY ANCHORS) SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII). WHERE THERE IS A CONFLICT BETWEEN THESE NOTES AND THE MPII, SEE MPII FOR CLARIFICATION.

B. EPOXY ANCHORS SHALL MEET THE REQUIREMENTS OF ACI 355.4 AND THE FOLLOWING INSTALLATION REQUIREMENTS, UNLESS OTHERWISE NOTED.

1) MINIMUM AGE OF CONCRETE: 21 DAYS
2) CONCRETE TEMPERATURE RANGE: 50-80 DEGREES FAHRENHEIT
3) MOISTURE CONDITION OF CONCRETE: DRY

C. EPOXY GROUTING WILL BE USED IN ALL LOCATIONS WHERE EITHER ALL-THREAD ROD OR REBAR ARE BEING EMBEDDED INTO EXISTING CONCRETE, CMU, OR BRICK.

D. IN CONCRETE, HOLES SHALL BE DRILLED WITH ROTARY HAMMER UNLESS NOTED OTHERWISE.

E. IN BRICK, HOLES SHALL BE DRILLED WITH NON-IMPACT TOOLS, NO ROTARY HAMMERS.

F. EPOXY GROUT FOR DOWNWARD HOLES SHALL BE EITHER NON-SAG OR LIQUID TYPE, NORMAL SET. HORIZONTAL OR OVERHEAD HOLES SHALL BE NON-SAG TYPE. FOR OVERHEAD APPLICATIONS A PISTON PLUG SHALL BE USED.

G. UNLESS OTHERWISE NOTED, EPOXY TYPES SHALL BE AS FOLLOWS:
FOR DOWELS AND REBAR IN CONCRETE, EPOXY SHALL BE:
   a. HILTI HIT-RE 500 V3

FOR ANCHOR BOLTS IN CONCRETE, EPOXY SHALL BE
   a. SIMPSON SET-XP
   b. HILTI HIT-HY 200
   c. DeWalt PURE 110+

FOR UNREINFORCED MASONRY (URM), EPOXY SHALL BE:
   a. SIMPSON SET
   b. HILTI HIT-HY 70
   c. DeWalt AC100+ GOLD

FOR CONCRETE MASONRY UNITS (CMU), EPOXY SHALL BE SIMPSON SET OR POWERS PURE 100+.ALTERNATES WILL BE CONSIDERED UPON REQUEST AND SUBMISSION OF PRODUCT EVALUATION REPORT IN ACCORDANCE WITH ACI 355.4.

1) WHEN INSTALLING ANCHORS, USE CARE AND CAUTION TO AVOID CUTTING OR DAMAGING THE EXISTING REINFORCING BARS OR POST TENSIONING TENDONS. IN POST TENSION ELEMENTS THE CONTRACTOR SHALL SCAN PRIOR TO LOCATE THE EXISTING TENDONS PRIOR TO INSTALLING THE ANCHOR.
2) IF REINFORCEMENT IS ENCOUNTERED DURING DRILLING, ABANDON AND SHIFT THE HOLE LOCATION TO AVOID THE REINFORCEMENT. PROVIDE A MINIMUM OF 2 ANCHOR DIAMETERS OR 1 INCH, WHICHEVER IS LARGER, OF SOUND CONCRETE BETWEEN THE DOWEL AND THE ABANDONED HOLE. FILL THE ABANDONED HOLE WITH NON-SHRINK GROUT. IF THE ANCHOR OR DOWEL MAY NOT BE SHIFTED AS NOTED, THE ENGINEER WILL DETERMINE A NEW LOCATION.
3) LOCATE EXISTING REINFORCEMENT AND CONFIRM FINAL ANCHOR LOCATIONS PRIOR TO FABRICATING PLATES, MEMBERS, OR OTHER STEEL ASSEMBLIES ATTACHED WITH ANCHORS.

20. FINISHES - FOR WORK ON EXISTING BUILDINGS

A. REPLACE ALL DAMAGED FINISH MATERIALS WITH NEW MATERIALS OF EQUIVALENT QUALITY AND KIND. SUBMIT SAMPLES AND/OR PRESENT SAMPLE INSTALLATION TO OWNER FOR APPROVAL PRIOR TO INSTALLATION.

9/22/2020 2:15:10 PM

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100% DD SUBMITTAL

NOT FOR CONSTRUCTION

Date:	09-22-2020
Project Number:	20138.10
Drawn By:	IK
Checked By:	JE

Revision Schedule:

Sheet Title:
GENERAL NOTES

Sheet Number:
S-003

100% DD SUBMITTAL

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REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION (2014 OSSC SECTION 1705.2.1 AND AISC 360-10 CHAPTER N)[a]

VERIFICATION AND INSPECTION	PERFORM[b]	OBSERVE[c]	REF. STANDARD
1. FABRICATOR AND ERECTOR DOCUMENTS: VERIFY REPORTS, CERTIFICATIONS, SPECIFICATIONS AND QUALIFICATIONS LISTED IN AISC 360-10 SECTION N3 FOR COMPLIANCE WITH CONSTRUCTION DOCUMENTS.	-	X	AISC 360 N3
2. MATERIAL VERIFICATION OF STRUCTURAL STEEL.	-	X	
3. VERIFY MEMBER LOCATIONS, BRACES, STIFFENERS, AND APPLICATION OF JOINT DETAILS AT EACH CONNECTION COMPLY WITH CONSTRUCTION DOCUMENTS.	-	X	AISC 360 N5.7
4. WELDING			AISC 360 N5.4
A. INSPECTION TASKS PRIOR TO WELDING			AISC TABLE N5.4-1
1. WELDING PROCEDURE SPECIFICATIONS (WPSs) AVAILABLE.	X	-	
2. MANUFACTURER CERTIFICATIONS FOR WELDING CONSUMABLES AVAILABLE.	X	-	
3. MATERIAL IDENTIFICATION (TYPE/GRADE).	-	X	
4. WELDER IDENTIFICATION SYSTEM (FABRICATOR SHALL BE ABLE TO IDENTIFY WELDERS PERFORMING WELDING OF JOINTS OR MEMBERS).	-	X	
5. FIT-UP OF 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), AND BACKING TYPE AND FIT (IF APPLICABLE).	-	X	
6. CONFIGURATION AND FINISH OF ACCESS HOLES.	-	X	
7. FIT-UP OF FILLET WELDS: DIMENSIONS (ALIGNMENT, GAPS AT ROOT), CLEANLINESS (CONDITION OF STEEL SURFACES), AND TACKING (TACK WELD QUALITY AND LOCATION).	-	X	
8. CHECK WELDING EQUIPMENT.	N/A	N/A	
B. INSPECTION TASKS DURING WELDING			AISC TABLE N5.4-2
1. USE OF QUALIFIED WELDERS.	-	X	
2. CONTROL AND HANDLING OF WELDING CONSUMABLES: PACKAGING, AND EXPOSURE CONTROL.	-	X	
3. NO WELDING OVER CRACKED TACK WELDS.	-	X	
4. ENVIRONMENTAL CONDITIONS: WIND SPEED WITHIN LIMITS, AND PRECIPITATION AND TEMPERATURE.	-	X	
5. WPS FOLLOWED: SETTINGS ON WELDING EQUIPMENT, TRAVEL SPEED, SELECTED WELDING MATERIALS, SHIELDING GAS TYPE/FLOW RATE, PREHEAT APPLIED, INTERPASS TEMPERATURE MAINTAINED (MIN/MAX), AND PROPER POSITION (F,V,H,OH).	-	X	
6. WELDING TECHNIQUES: INTERPASS AND FINAL CLEANING, EACH PASS WITHIN PROFILE LIMITATIONS, AND EACH PASS MEETS QUALITY REQUIREMENTS.	-	X	
C. INSPECTION TASKS AFTER WELDING			AISC TABLE N5.4-3
1. WELDS CLEANED.	-	X	
2. SIZE, LENGTH, AND LOCATION OF WELDS.	X	-	
3. WELDS MEET VISUAL ACCEPTANCE CRITERIA: CRACK PROHIBITION, WELD/BASE-METAL FUSION, CRATER CROSS SECTION, WELD PROFILES, WELD SIZE, UNDERCUT, AND POROSITY.	X	-	
4. ARC STRIKES.	X	-	
5. k-AREA (WHEN WELDING OF DOUBLER PLATES, CONTINUITY PLATES, OR STIFFENERS HAS BEEN PERFORMED IN THE k-AREA, VISUALLY INSPECT THE WEB k-AREA FOR CRACKS WITHIN 3" OF THE WELD).	X	-	
6. BACKING REMOVED AND WELD TABS REMOVED (IF REQUIRED).	X	-	
7. REPAIR ACTIVITIES.	X	-	
8. DOCUMENT ACCEPTANCE OR REJECTION OF WELDED JOINT OR MEMBER.	X	-	
D. NONDESTRUCTIVE TESTING OF WELDED JOINTS (EXCEPTION NDT OF WELDS COMPLETED IN AN APPROVED FABRICATOR'S SHOP. SEE AISC 360-10 N7):			AISC 360 N5.5
1. COMPLETE PENETRATION GROOVE WELDS 5/16" OR GREATER IN RISK CATEGORY III OR IV. UT ON 100% MAY BE REDUCED TO 25% PER AISC 360-10 N5e.	X	-	
2. COMPLETE PENETRATION GROOVE WELDS 5/16" OR GREATER IN RISK CATEGORY II. UT ON 10%, MAY INCREASE TO 100% PER AISC 360-10 N5f.	X	-	
3. THERMALLY CUT SURFACES OF ACCESS HOLES WHEN MATERIAL t>2".	X	-	
4. WELDED JOINTS SUBJECT TO FATIGUE WHEN REQUIRED BY AISC 360, APPENDIX 3, TABLE A-3.1.	X	-	
5. FABRICATOR'S NDT REPORTS WHEN FABRICATOR PERFORMS NDT.	X	-	

4 S-004 **MINIMUM TESTS AND SPECIAL INSPECTION OF STEEL CONSTRUCTION** N.T.S.

VERIFICATION AND INSPECTION	PERFORM[b]	OBSERVE[c]	REF. STANDARD
5. BOLTING			AISC 360 N5.6
A. INSPECTION TASKS BEFORE BOLTING			AISC TABLE N5.6-1
1. MANUFACTURER'S CERTIFICATIONS AVAILABLE FOR FASTENER MATERIALS.	X	-	
2. FASTENERS MARKED IN ACCORDANCE WITH ASTM REQUIREMENTS.	-	X	
3. PROPER FASTENERS SELECTED FOR THE JOINT DETAIL (GRADE, TYPE, BOLT LENGTH IF THREADS ARE TO BE EXCLUDED FROM SHEAR PLANE).	-	X	
4. PROPER BOLTING PROCEDURE SELECTED FOR JOINT DETAIL.	-	X	
5. CONNECTING ELEMENTS, INCLUDING THE APPROPRIATE FAYING SURFACE CONDITION AND HOLE PREPARATION, IF SPECIFIED, MEET APPLICABLE REQUIREMENTS.	-	X	
6. PRE-INSTALLATION VERIFICATION TESTING BY INSTALLATION PERSONNEL OBSERVED AND DOCUMENT FOR FASTENER ASSEMBLIES AND METHODS USED.	-	X	
7. PROPER STORAGE PROVIDED FOR BOLTS, NUTS, WASHERS, AND OTHER FASTENER COMPONENTS.	-	X	
B. INSPECTION TASKS DURING BOLTING			AISC TABLE N5.6-2
1. FASTENER ASSEMBLIES, OF SUITABLE CONDITION, PLACED IN ALL HOLES AND WASHERS (IF REQUIRED) ARE POSITIONED AS REQUIRED.	-	X	
2. JOINT BROUGHT TO THE SNUG-TIGHT CONDITION PRIOR TO THE PRETENSIONING OPERATION.	-	X	
3. FASTENER COMPONENT NOT TURNED BY THE WRENCH PREVENTED FROM ROTATING.	-	X	
4. FASTENERS ARE PRETENSIONED IN ACCORDANCE WITH THE RCSC SPECIFICATION, PROGRESSING SYSTEMATICALLY FROM THE MOST RIGID POINT TOWARD THE FREE EDGES.	-	X	
C. INSPECTION TASKS AFTER BOLTING: DOCUMENT ACCEPTANCE OR REJECTION OF BOLTED CONNECTIONS.	X	-	AISC TABLE N5.6-3
6. PLACEMENT OF ANCHOR RODS AND OTHER EMBEDMENTS SUPPORTING STRUCTURAL STEEL, VERIFY AS A MINIMUM DIAMETER, GRADE, TYPE, AND LENGTH OF THE ANCHOR ROD OR EMBEDDED ITEM, AND THE EXTENT OR DEPTH OF EMBEDMENT INTO THE CONCRETE.	X	-	AISC 360 N5.7

a. SEE AISC 360-10 CHAPTER N FOR ADDITIONAL INFORMATION NOT SHOWN HEREIN.

b. "PERFORM" INDICATES PERFORMANCE OF THE TASK FOR EACH STEEL ELEMENT, MEMBER, WELDED JOINT, OR BOLTED CONNECTION.

c. "OBSERVE" INDICATES OBSERVATION OF ITEM ON A RANDOM BASIS. OPERATIONS NEED NOT BE DELAYED PENDING THESE INSPECTIONS. THIS REQUIRES PURPOSEFUL, REGULAR, RANDOM INSPECTION WITH FREQUENCY THAT IS APPROPRIATE TO ASSURE THAT THE PROCESS IS BEING PERFORMED CORRECTLY.

REQUIRED VERIFICATION AND INSPECTION FOR SEISMIC RESISTANCE (2014 OSSC SECTION 1705.12)

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC[a]	REFERENCED STANDARD
1. STRUCTURAL WOOD SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE:			OSSC SEC. 1705.12.2
a. INSPECTION OF FIELD GLUING OPERATIONS OF ELEMENTS OF THE SEISMIC-FORCE RESISTING SYSTEM.	X	-	
b. INSPECTION OF NAILING, BOLTING, ANCHORING AND OTHER FASTENING OF COMPONENTS WITHIN THE SEISMIC-FORCE RESISTING SYSTEM, INCLUDING WOOD SHEAR WALLS*, WOOD SHEAR PANELS*, WOOD DIAPHRAGMS*, DRAG STRUTS, AND HOLD-DOWNS.	-	X	* NOT REQUIRED WHERE FASTENER SPACING OF SHEATHING IS MORE THAN 4" O.C.
2. DESIGNATED SEISMIC SYSTEMS VERIFICATIONS: INSPECT AND VERIFY THAT THE COMPONENT LABEL, ANCHORAGE OR MOUNTING CONFORMS TO THE CERTIFICATE OF COMPLIANCE IN ACCORDANCE WITH SECTION 1705.12.4.	-	X	OSSC SEC. 1705.12.4
3. ARCHITECTURAL COMPONENTS SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE:			OSSC SEC. 1705.12.5
a. INSPECTION DURING ERECTION AND FASTENING OF EXTERIOR CLADDING.	-	X	
b. INSPECTION DURING ERECTION AND FASTENING OF INTERIOR AND EXTERIOR VENEER.	-	X	
c. INSPECTION DURING THE ERECTION AND FASTENING OF INTERIOR AND EXTERIOR NONBEARING WALLS.	-	X	
d. INSPECTION DURING ANCHORAGE OF ACCESS FLOORS.	-	X	
4. PLUMBING, MECHANICAL AND ELECTRICAL COMPONENTS SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE:			OSSC SEC. 1705.12.6
a. INSPECTION DURING THE ANCHORAGE OF ELECTRICAL EQUIPMENT FOR EMERGENCY OR STANDBY POWER SYSTEMS.	-	X	
b. INSPECTION DURING THE ANCHORAGE OF OTHER ELECTRICAL EQUIPMENT.	-	X	
c. INSPECTION DURING INSTALLATION AND ANCHORAGE OF PIPING SYSTEMS DESIGNED TO CARRY HAZARDOUS MATERIALS, AND THEIR ASSOCIATED MECHANICAL UNITS.	-	X	
d. INSPECTION DURING THE INSTALLATION AND ANCHORAGE OF HVAC DUCTWORK THAT WILL CONTAIN HAZARDOUS MATERIALS.	-	X	
e. INSPECTION DURING THE INSTALLATION AND ANCHORAGE OF VIBRATION ISOLATION SYSTEMS.	-	X	

a. "O" INDICATES AN ACTIVITY THAT IS EITHER A ONE-TIME ACTIVITY OR ONE WHOSE FREQUENCY IS ON A RANDOM BASIS OR IS DEFINED IN SOME OTHER MANNER (SEE REFERENCED CODE SECTION).

3 S-004 **MINIMUM INSPECTION FOR SEISMIC RESISTANCE** N.T.S.

REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION (2014 OSSC TABLE 1705.3)

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD	OSSC REFERENCE
1. INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND PLACEMENT.	-	X	ACI 318: CH. 20, 25.2, 25.3, 26.5.1-26.5.3	1908.4
2. REINFORCING BAR WELDING:				
a. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706.	-	X	AWS D1.4 ACI 318: 26.5.4	-
b. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16".	-	X		
c. INSPECT ALL OTHER WELDS.	X	-		
3. INSPECT ANCHORS CAST IN CONCRETE.	-	X	ACI 318: 17.8.2	-
4. INSPECTION OF ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS[a].				
a. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED 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	-
5. VERIFY USE OF REQUIRED MIX DESIGN.	-	X	ACI 318: CH.19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
6. 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: 26.4.5, 26.12	1908.10
7. INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	-	ACI 318: 26.4.5	1908.6, 1908.7, 1908.8
8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	-	X	ACI 318: 26.4.7-26.4.9	1908.0
9. INSPECT FORMWORK FOR SHAPE LOCATION, AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	-	X	ACI 318: 26.10.1(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 ACI 318-14 SECTION 17.8.2, OR OTHER QUALIFICATION PROCEDURES. WHERE SPECIFIC 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. SPECIAL INSPECTIONS FOR EPOXY ADHESIVE ANCHORS SHALL BE CONTINUOUS UNLESS NOTED OTHERWISE.

2 S-004 **MINIMUM TEST AND SPECIAL INSPECTIONS OF CONCRETE CONSTRUCTION** N.T.S.

STATEMENT OF SPECIAL INSPECTIONS

1. SPECIAL INSPECTIONS AND TESTS SHALL BE PERFORMED BY AN INDEPENDENT QUALIFIED INSPECTION AND/OR TESTING AGENCY APPROVED BY THE JURISDICTION FOR SUCH WORK,AND IN ACCORDANCE WITH CHAPTER 17 OF THE CODE. THESE SPECIAL INSPECTIONS AND TESTS ARE IN ADDITION TO THE INSPECTIONS PERFORMED BY THE BUILDING OFFICIAL.
2. THE OWNER SHALL BE RESPONSIBLE FOR RETAINING THE SPECIAL INSPECTION AND/OR TESTING AGENCY.
3. THE SPECIAL INSPECTION AND/OR TESTING AGENCY SHALL KEEP RECORDS AND SUBMIT SPECIAL INSPECTION AND TEST REPORTS TO THE BUILDING OFFICIAL AND THE STRUCTURAL ENGINEER OF RECORD IN ACCORDANCE WITH SECTIONS 1704.2.4 AND 1704.5 OF THE CODE AND JURISDICTION-SPECIFIC REQUIREMENTS.
4. THE CONTRACTOR SHALL NOTIFY THE TESTING LAB A MINIMUM OF 48 HOURS PRIOR TO TIME OF INSPECTION.
5. THE CONSTRUCTION OR WORK FOR WHICH SPECIAL INSPECTION OR TESTING IS REQUIRED SHALL REMAIN ACCESSIBLE AND EXPOSED FOR SPECIAL INSPECTION OR TESTING PURPOSES UNTIL COMPLETION OF THE REQUIRED SPECIAL INSPECTIONS OR TESTS.
6. IF INITIAL TESTS OR INSPECTIONS MADE BY THE OWNER'S TESTING OR INSPECTION AGENCY REVEAL THAT ANY PORTION OF THE WORK DOES NOT COMPLY WITH THE CONTRACT DOCUMENTS, ADDITIONAL TESTS, INSPECTIONS, AND NECESSARY REPAIRS SHALL BE MADE AT THE CONTRACTOR'S EXPENSE. CONTRACTOR SHALL NOTIFY THE ENGINEER AND OWNER IMMEDIATELY OF NON-CONFORMING WORK. THIS NOTIFICATION SHALL SPECIFICALLY ADDRESS THE NON-CONFORMING WORK AND SHALL BE SEPARATE FROM THE SPECIAL INSPECTION REPORTS.
7. SPECIAL INSPECTION REPORTS SHALL BE SENT TO THE ENGINEER AT THE TIME OF COMPLETION FOR REVIEW OF CONFORMANCE WITH THE REQUIREMENTS OF THE STRUCTURAL DRAWINGS.
8. SPECIAL INSPECTIONS AND TESTS FOR SEISMIC RESISTANCE SHALL BE PERFORMED FOR THE DESIGNATED SEISMIC SYSTEM/SEISMIC FORCE RESISTING COMPONENT WHEN APPLICABLE AND AS PER SECTIONS 1705.12 & 1705.13 OF THE CODE.
   a. DESIGNATED SEISMIC SYSTEM/SEISMIC FORCE RESISTING SYSTEM: **WRITE IN APPLICABLE SYSTEM(S) OR "N/A".**
      SEE THE ABOVE-REFERENCED CODE SECTIONS FOR ADDITIONAL SPECIAL INSPECTION AND TEST REQUIREMENTS FOR STRUCTURAL STEEL, STRUCTURAL WOOD, COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION, DESIGNATED SEISMIC SYSTEMS, ARCHITECTURAL COMPONENTS, MEP COMPONENTS, STORAGE RACKS, SEISMIC ISOLATIONS SYSTEMS, AND COLD-FORMED STEEL SPECIAL BOLTED MOMENT FRAMES.
9. SPECIAL INSPECTIONS FOR WIND RESISTANCE SHALL BE PERFORMED FOR THE MAIN WIND FORCE RESISTING SYSTEM AND WIND RESISTING COMPONENTS WHEN APPLICABLE AND AS PER SECTION 1705.11 OF THE CODE.
   a. MAIN WIND FORCE RESISTING SYSTEM/WIND RESISTING COMPONENT: **WRITE IN APPLICABLE SYSTEM(S) OR "N/A".**
      SEE THE ABOVE-REFERENCED CODE SECTIONS FOR ADDITIONAL SPECIAL INSPECTION REQUIREMENTS FOR STRUCTURAL WOOD, COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION, AND WIND-RESISTING COMPONENTS.
10. EACH CONTRACTOR RESPONSIBLE FOR THE CONSTRUCTION OF A MAIN WIND OR SEISMIC FORCE RESISTING SYSTEM, DESIGNATED SEISMIC SYSTEM, OR A WIND OR SEISMIC RESISTING COMPONENT LISTED ABOVE SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE BUILDING OFFICIAL AND THE OWNER PRIOR TO THE COMMENCEMENT OF WORK ON THE SYSTEM OR COMPONENT. THE CONTRACTOR'S STATEMENT OF RESPONSIBILITY SHALL CONTAIN ACKNOWLEDGMENT OF AWARENESS OF THE SPECIAL REQUIREMENTS CONTAINED IN THIS STATEMENT OF SPECIAL INSPECTIONS.
11. STEEL CONSTRUCTION: SPECIAL INSPECTIONS FOR STEEL ELEMENTS OF BUILDINGS AND STRUCTURES SHALL BE AS REQUIRED BY SECTION 1705.2 OF THE CODE AND IN ACCORDANCE WITH THE QUALITY ASSURANCE INSPECTION REQUIREMENTS OF AISC 360-10, INCLUDING THE SPECIAL INSPECTION TABLE SHOWN HEREIN. SEE ALSO REQUIREMENTS NOTED FOR SEISMIC AND WIND RESISTANCE OF INSPECTION NOTES #8 AND #9.
12. CONCRETE CONSTRUCTION: SPECIAL INSPECTIONS AND VERIFICATIONS FOR CONCRETE CONSTRUCTION SHALL BE AS REQUIRED BY SECTION 1705.3 OF THE CODE, INCLUDING THE SPECIAL INSPECTION TABLE SHOWN HEREIN.
    CONCRETE SPECIAL INSPECTIONS AND TESTS ARE NOT REQUIRED FOR:
    a. ISOLATED SPREAD FOOTINGS OF BUILDINGS 3 STORIES OR LESS ABOVE GRADE PLANE THAT ARE FULLY SUPPORTED ON EARTH OR ROCK.
    b. NONSTRUCTURAL CONCRETE SLABS SUPPORTED DIRECTLY ON THE GROUND, INCLUDING PRESTRESSED SLABS ON GRADE WHERE THE EFFECTIVE PRESTRESS IN THE CONCRETE IS LESS THAN 150 PSI.
    c. CONCRETE PATIOS, DRIVEWAYS AND SIDEWALKS, ON GRADE.
13. MASONRY CONSTRUCTION: SPECIAL INSPECTIONS AND VERIFICATIONS FOR MASONRY CONSTRUCTION SHALL BE AS REQUIRED BY SECTION 1705.4 OF THE CODE AND IN ACCORDANCE WITH TMS 402/ACI 530/ASCE 5 AND TMS 602/ACI 530.1/ASCE 6 QUALITY ASSURANCE REQUIREMENTS, INCLUDING THE SPECIAL INSPECTION TABLES SHOWN HEREIN.
14. WOOD CONSTRUCTION: SPECIAL INSPECTIONS FOR WOOD CONSTRUCTION SHALL BE AS REQUIRED BY SECTION 1705.5 OF THE CODE. SEE ALSO REQUIREMENTS NOTED FOR SEISMIC AND WIND RESISTANCE OF INSPECTION NOTES #8 AND #9.
15. SOILS: SPECIAL INSPECTIONS FOR EXISTING SOIL CONDITIONS, FILL PLACEMENT, AND LOAD BEARING REQUIREMENTS SHALL BE AS REQUIRED BY SECTIONS 1705.6 THROUGH 1705.9 OF THE CODE, INCLUDING THE SPECIAL INSPECTION TABLES SHOWN HEREIN.

1 S-004 **STATEMENT OF SPECIAL INSPECTIONS** N.T.S.

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Date: 09-22-2020
Project Number: 20138.10
Drawn By: IK
Checked By: JE

Revision Schedule:

Sheet Title:
SPECIAL INSPECTIONS

Sheet Number:
S-004

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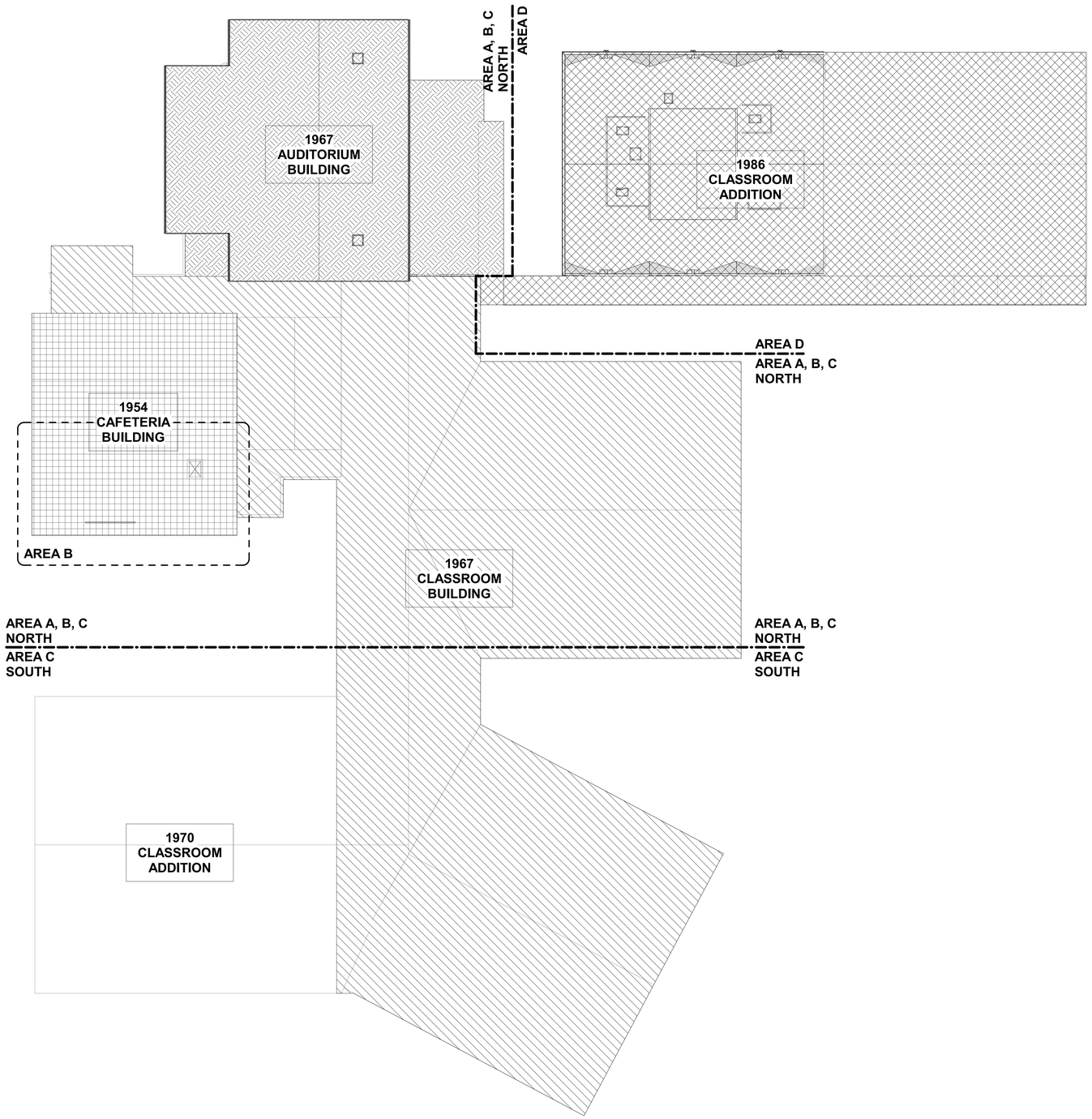

1 S-101 **BUILDING YEAR PLAN**

1/16" = 1'-0"

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Date:	09-22-2020
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BUILDING YEAR PLAN

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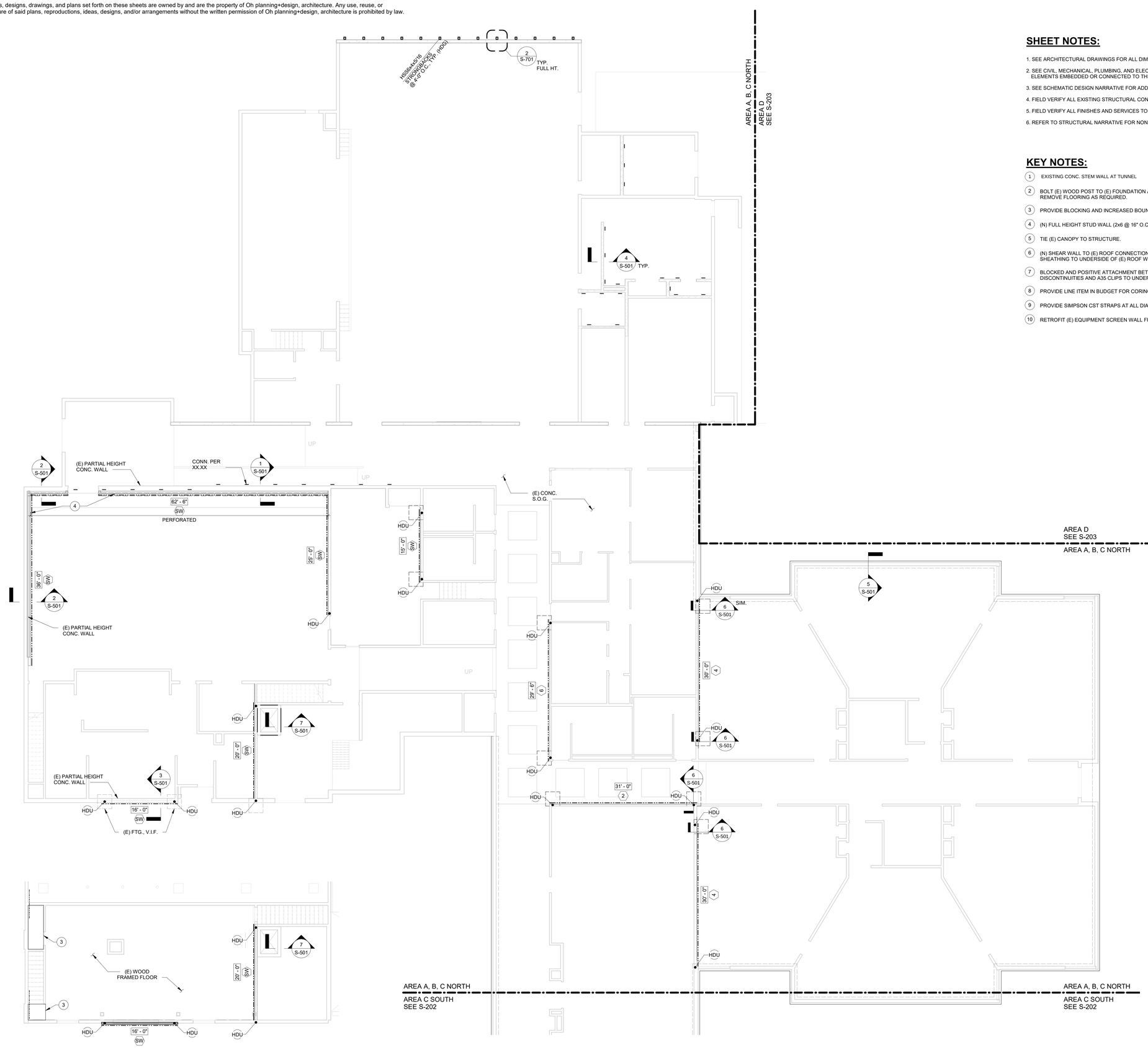

2 S-201 **SECOND FLOOR PLAN - AREA A**

1/8" = 1'-0"

1 S-201 **FIRST FLOOR PLAN - AREA A, B, C NORTH**

1/8" = 1'-0"

SHEET NOTES:

1. SEE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE CIVIL, MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR RELATED NON-STRUCTURAL ELEMENTS EMBEDDED OR CONNECTED TO THE STRUCTURE.
3. SEE SCHEMATIC DESIGN NARRATIVE FOR ADDITIONAL INFORMATION.
4. FIELD VERIFY ALL EXISTING STRUCTURAL CONDITIONS.
5. FIELD VERIFY ALL FINISHES AND SERVICES TO BE RELOCATED OR REPLACED FOR CONSTRUCTION.
6. REFER TO STRUCTURAL NARRATIVE FOR NON-STRUCTURAL ITEMS REQUIRING RETROFIT.

KEY NOTES:

1. EXISTING CONC. STEM WALL AT TUNNEL
2. BOLT (E) WOOD POST TO (E) FOUNDATION AND PROVIDE BRACING WHERE NOT PROVIDED. ACCESS TO AREA IS LIMITED, REMOVE FLOORING AS REQUIRED.
3. PROVIDE BLOCKING AND INCREASED BOUNDARY NAILING, REPLACE SHEATHING AS REQUIRED, WORK DONE FROM ABOVE.
4. (N) FULL HEIGHT STUD WALL (2x6 @ 16" O.C.), FASTEN TO PARTIAL HEIGHT CONCRETE WALL BEHIND.
5. TIE (E) CANOPY TO STRUCTURE.
6. (N) SHEAR WALL TO (E) ROOF CONNECTION FROM BELOW. CUT (E) RAFTER NON-LOAD-BEARING TAILS TO ALLOW FOR CONT. SHEATHING TO UNDERSIDE OF (E) ROOF WHERE OCCURS.
7. BLOCKED AND POSITIVE ATTACHMENT BETWEEN STACKED ROOF MEMBERS. INCLUDE STRAPPING ACROSS ALL DISCONTINUITIES AND A35 CLIPS TO UNDERSIDE OF (E) SHEATHING.
8. PROVIDE LINE ITEM IN BUDGET FOR CORING AND FULLY GROUTING CMU WALL IF REQUIRED.
9. PROVIDE SIMPSON CST STRAPS AT ALL DIAPHRAGM DISCONTINUITIES (MODULE BOUNDARIES), BLOCK UNDER STRAPS.
10. RETROFIT (E) EQUIPMENT SCREEN WALL FRAMES. REMOVE ATTACHMENTS FROM CABINET WALLS AND SUPPORT OFF ROOF.

LEGEND:

- (E) CONC. WALL
- (E) CMU WALL
- (E) STUD WALL
- (E) WALL (B)
- (N) STUD WALL
- (N) WALL (B)
- (N) 1/2" CDX PLYWOOD SHTG. OVER (E) WOOD WALL, SEE S-601
- SW / X'-XX" — S.W. MARK / MIN. LENGTH
- SHEAR WALL BRACING PENDING CONFIRMATION OF (E) CONDITIONS
- (E) WD. COLUMN
- (E) TS COLUMN
- (E) COLUMN (B)
- W1xx — WF COLUMN
- HDU — HOLDOWN & POST AT SHEAR WALL END, EPOXY DOWEL AT (E) FOOTINGS
- X — WALL TO DIAPHRAGM CONN. PER KEY NOTE X
- PLYWOOD
- (N) 3'-0" SQ. x 18" THK. CONC. FOOTING
- (E) DIAPHRAGM STRENGTHENING
- SIMP. STRAP

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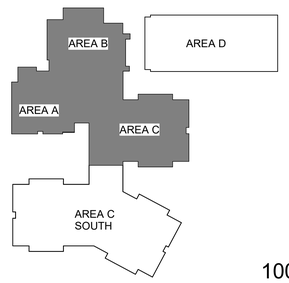
KEY PLAN



Sheet Title:

FLOOR PLAN - AREA A, B, C NORTH

Sheet Number:

S-201

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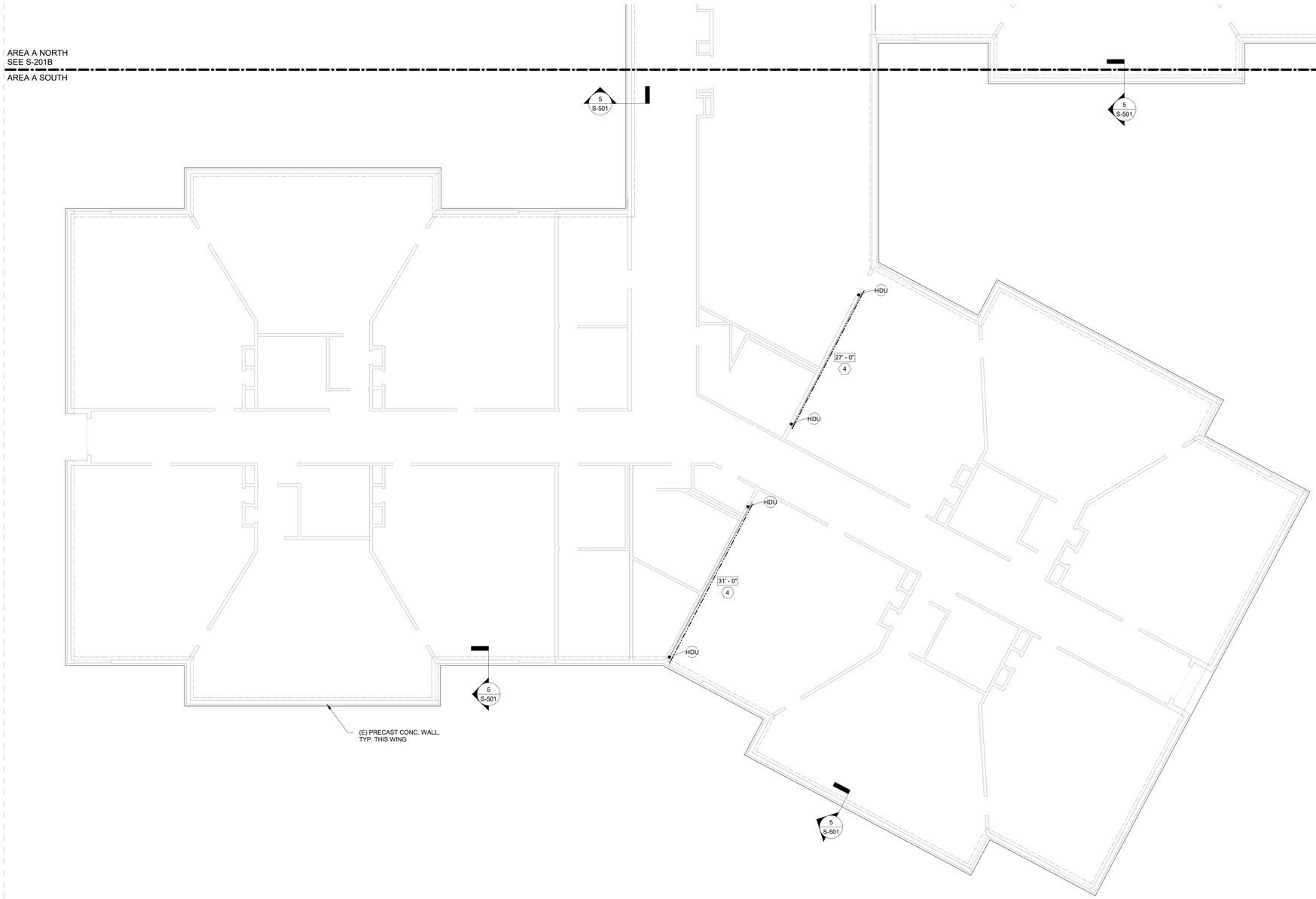
SHEET NOTES:

1. SEE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE CIVIL, MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR RELATED NON-STRUCTURAL ELEMENTS EMBEDDED OR CONNECTED TO THE STRUCTURE.
3. SEE SCHEMATIC DESIGN NARRATIVE FOR ADDITIONAL INFORMATION.
4. FIELD VERIFY ALL EXISTING STRUCTURAL CONDITIONS.
5. FIELD VERIFY ALL FINISHES AND SERVICES TO BE RELOCATED OR REPLACED FOR CONSTRUCTION.
6. REFER TO STRUCTURAL NARRATIVE FOR NON-STRUCTURAL ITEMS REQUIRING RETROFIT.

KEY NOTES:

5. LOCAL INFILL OF (E) TUNNEL TO CREATE FOOTING.
2. BOLT (E) WOOD POST TO (E) FOUNDATION AND PROVIDE BRACING WHERE NOT PROVIDED. ACCESS TO AREA IS LIMITED, REMOVE FLOORING AS REQUIRED.
3. PROVIDE BLOCKING AND INCREASED BOUNDARY NAILING, REPLACE SHEATHING AS REQUIRED, WORK DONE FROM ABOVE.
4. (N) FULL HEIGHT STUD WALL (2x6 @ 16" O.C.), FASTEN TO PARTIAL HEIGHT CONCRETE WALL BEHIND.
5. TIE (E) CANOPY TO STRUCTURE.
6. (N) SHEAR WALL TO (E) ROOF CONNECTION FROM BELOW. CUT (E) RAFTER NON-LOAD-BEARING TAILS TO ALLOW FOR CONT. SHEATHING TO UNDERSIDE OF (E) ROOF WHERE OCCURS.
7. BLOCKED AND POSITIVE ATTACHMENT BETWEEN STACKED ROOF MEMBERS. INCLUDE STRAPPING ACROSS ALL DISCONTINUITIES AND A35 CLIPS TO UNDERSIDE OF (E) SHEATHING.
8. PROVIDE LINE ITEM IN BUDGET FOR CORING AND FULLY GROUTING CMU WALL IF REQUIRED.
9. PROVIDE SIMPSON CST STRAPS AT ALL DIAPHRAGM DISCONTINUITIES (MODULE BOUNDARIES), BLOCK UNDER STRAPS.
10. RETROFIT (E) EQUIPMENT SCREEN WALL FRAMES. REMOVE ATTACHMENTS FROM CABINET WALLS AND SUPPORT OFF ROOF.



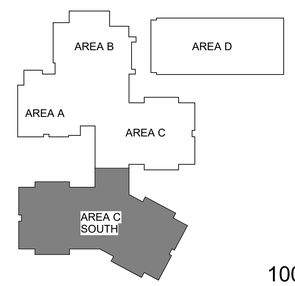
1 S-202 **FIRST FLOOR PLAN - AREA C SOUTH**

1/8" = 1'-0"

LEGEND:

- (E) CONC. WALL
- (E) CMU WALL
- (E) STUD WALL
- (E) WALL (B)
- (N) STUD WALL
- (N) WALL (B)
- (N) 1/2" CDX PLYWOOD SHTG. OVER (E) WOOD WALL, SEE S-601
- SW / X'-XX" — S.W. MARK / MIN. LENGTH
- SHEAR WALL BRACING PENDING CONFIRMATION OF (E) CONDITIONS
- (E) WD. COLUMN
- (E) TS COLUMN
- (E) COLUMN (B)
- W XXX — WF COLUMN
- HDU — HOLDOWN & POST AT SHEAR WALL END, EPOXY DOWEL AT (E) FOOTINGS
- X — WALL TO DIAPHRAGM CONN. PER KEY NOTE X
- PLYWOOD
- (N) 3'-0" SQ. x 18" THK. CONC. FOOTING
- (E) DIAPHRAGM STRENGTHENING
- SIMP. STRAP

KEY PLAN



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Date:	09-22-2020
Project Number:	20138.10
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Checked By:	JE

Revision Schedule:

Sheet Title:
FLOOR PLAN - AREA C SOUTH

Sheet Number:
S-202

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5. FIELD VERIFY ALL FINISHES AND SERVICES TO BE RELOCATED OR REPLACED FOR CONSTRUCTION.
6. REFER TO STRUCTURAL NARRATIVE FOR NON-STRUCTURAL ITEMS REQUIRING RETROFIT.

KEY NOTES:

5. LOCAL INFILL OF (E) TUNNEL TO CREATE FOOTING.
2. BOLT (E) WOOD POST TO (E) FOUNDATION AND PROVIDE BRACING WHERE NOT PROVIDED. ACCESS TO AREA IS LIMITED, REMOVE FLOORING AS REQUIRED.
3. PROVIDE BLOCKING AND INCREASED BOUNDARY NAILING, REPLACE SHEATHING AS REQUIRED, WORK DONE FROM ABOVE.
4. (N) FULL HEIGHT STUD WALL (2x6 @ 16" O.C.), FASTEN TO PARTIAL HEIGHT CONCRETE WALL BEHIND.
5. TIE (E) CANOPY TO STRUCTURE.
6. (N) SHEAR WALL TO (E) ROOF CONNECTION FROM BELOW. CUT (E) RAFTER NON-LOAD-BEARING TAILS TO ALLOW FOR CONT. SHEATHING TO UNDERSIDE OF (E) ROOF WHERE OCCURS.
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9. PROVIDE SIMPSON CST STRAPS AT ALL DIAPHRAGM DISCONTINUITIES (MODULE BOUNDARIES), BLOCK UNDER STRAPS.
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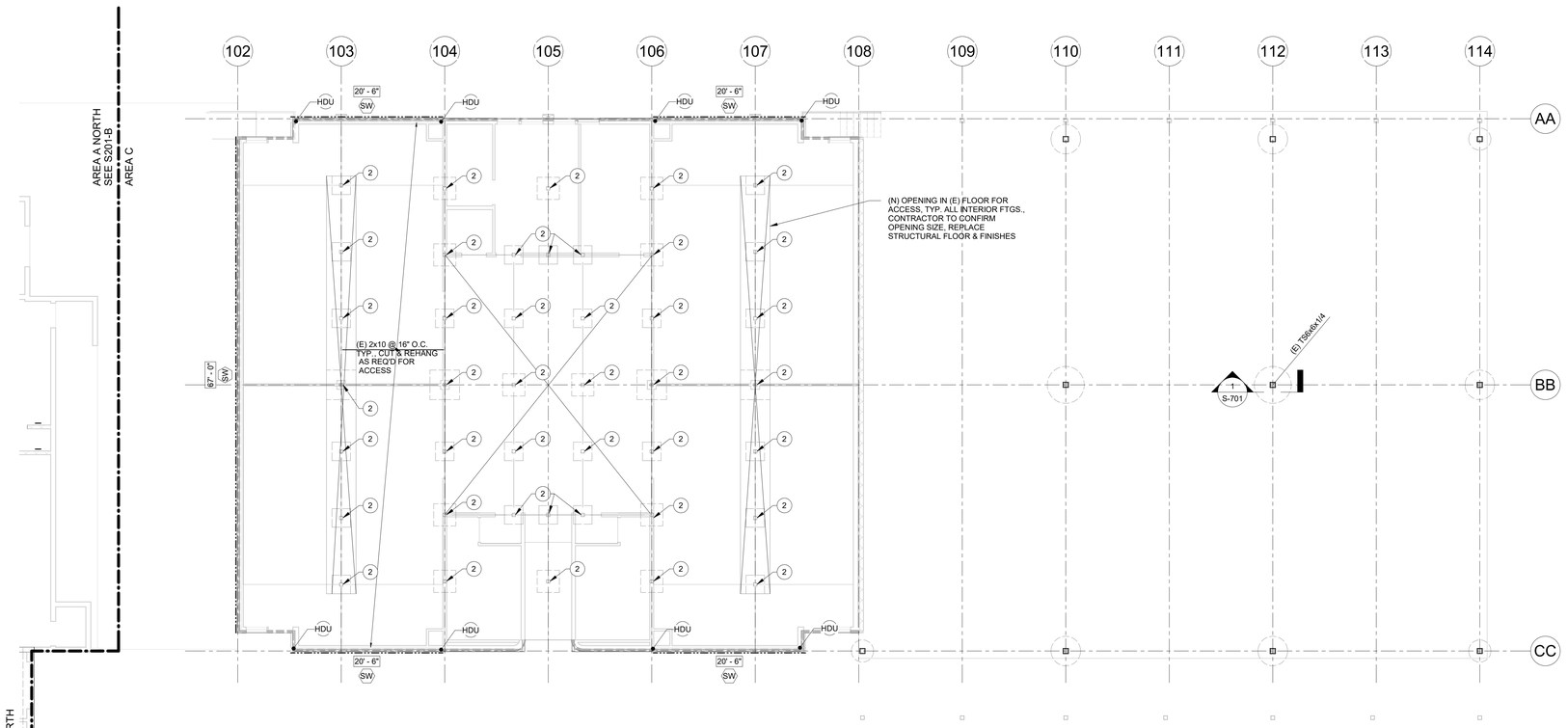
LEGEND:

- (E) CONC. WALL
- (E) CMU WALL
- (E) STUD WALL
- (E) WALL (B)
- (N) STUD WALL
- (N) WALL (B)
- (N) 1/2" CDX PLYWOOD SHTG. OVER (E) WOOD WALL, SEE S-601
- SW — S.W. MARK
- X'-XX" — MIN. LENGTH
- SHEAR WALL BRACING PENDING CONFIRMATION OF (E) CONDITIONS
- (E) WD. COLUMN
- (E) TS COLUMN
- (E) COLUMN (B)
- WFXXX — WF COLUMN
- HDU — HOLDOWN & POST AT SHEAR WALL END, EPOXY DOWEL AT (E) FOOTINGS
- X — WALL TO DIAPHRAGM CONN. PER KEY NOTE X
- PLYWOOD
- (N) 3'-0" SQ. x 18" THK. CONC. FOOTING
- (E) DIAPHRAGM STRENGTHENING
- SIMP. STRAP



1 S-203 **FLOOR PLAN - AREA D**

1/8" = 1'-0"

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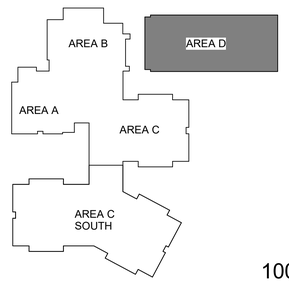
Drawn By:	IK
Checked By:	JE

Revision Schedule:

KEY PLAN



Sheet Title:
FLOOR PLAN - AREA D

Sheet Number:
S-203

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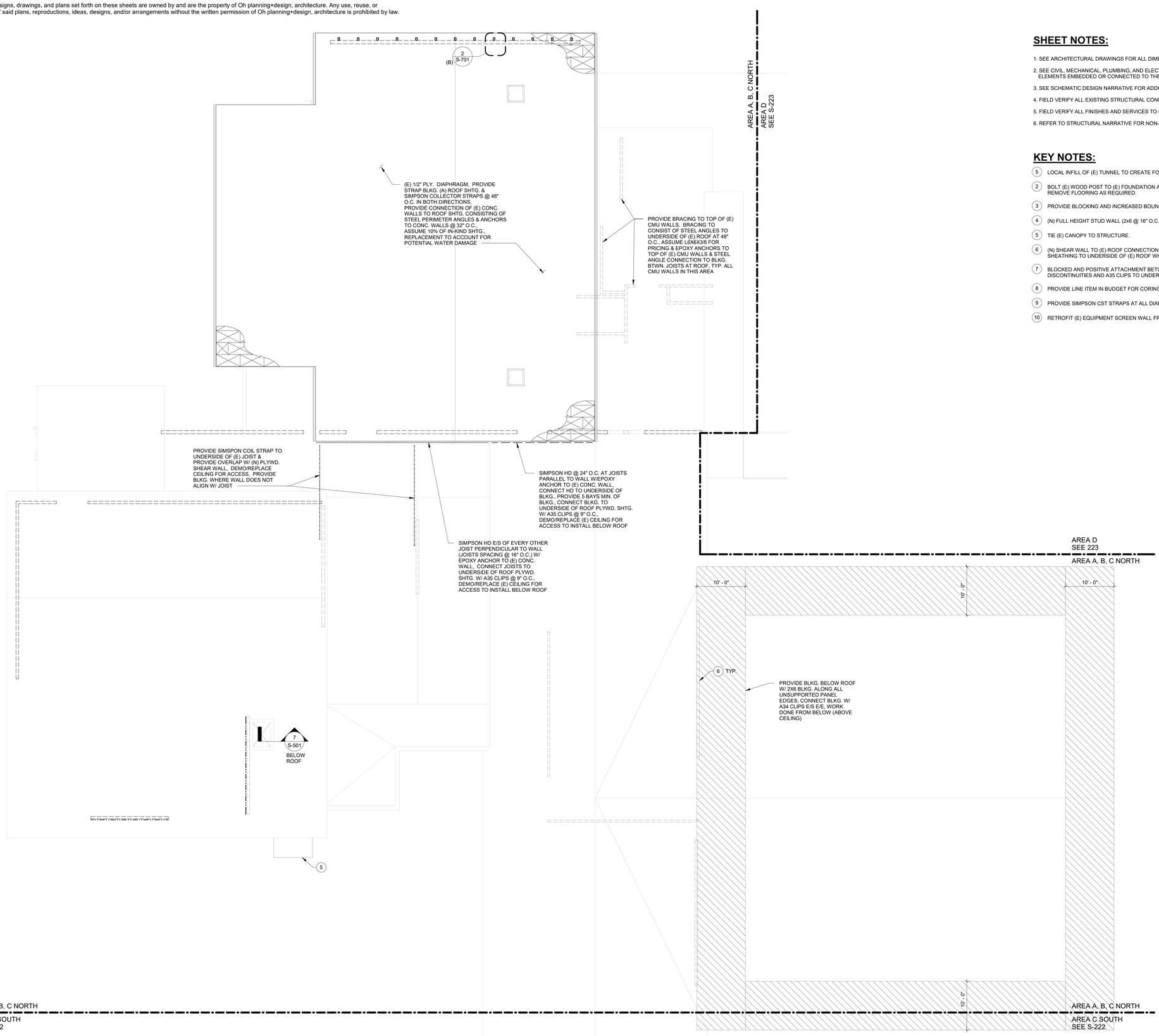

1 S-221 **ROOF PLAN - AREA A, B, C NORTH**

1/8" = 1'-0"

SHEET NOTES:

1. SEE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE CIVIL, MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR RELATED NON-STRUCTURAL ELEMENTS EMBEDDED OR CONNECTED TO THE STRUCTURE.
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KEY NOTES:

5. LOCAL INFILL OF (E) TUNNEL TO CREATE FOOTING.
2. BOLT (E) WOOD POST TO (E) FOUNDATION AND PROVIDE BRACING WHERE NOT PROVIDED. ACCESS TO AREA IS LIMITED, REMOVE FLOORING AS REQUIRED.
3. PROVIDE BLOCKING AND INCREASED BOUNDARY NAILING, REPLACE SHEATHING AS REQUIRED, WORK DONE FROM ABOVE.
4. (N) FULL HEIGHT STUD WALL (2x6 @ 16" O.C.), FASTEN TO PARTIAL HEIGHT CONCRETE WALL BEHIND.
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LEGEND:

- (E) CONC. WALL
- (E) CMU WALL
- (E) STUD WALL
- (E) WALL (B)
- (N) STUD WALL
- (N) WALL (B)
- (N) 1/2" CDX PLYWOOD SHTG. OVER (E) WOOD WALL, SEE S-601
- SW — S.W. MARK
- X'-XX" — MIN. LENGTH
- SHEAR WALL BRACING PENDING CONFIRMATION OF (E) CONDITIONS
- (E) WD. COLUMN
- (E) TS COLUMN
- (E) COLUMN (B)
- W12XX — WF COLUMN
- HDU — HOLDOWN & POST AT SHEAR WALL END, EPOXY DOWEL AT (E) FOOTINGS
- X — WALL TO DIAPHRAGM CONN. PER KEY NOTE X
- PLYWOOD
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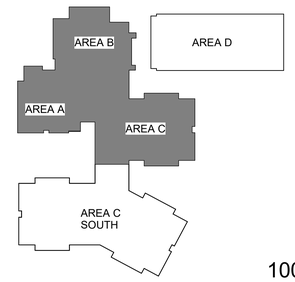
- SIMP. STRAP

KEY PLAN



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Date:	09-22-2020
Project Number:	20138.10
Drawn By:	IK
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Revision Schedule:

Sheet Title:
ROOF PLAN - AREA A, B, C NORTH

Sheet Number:
S-221

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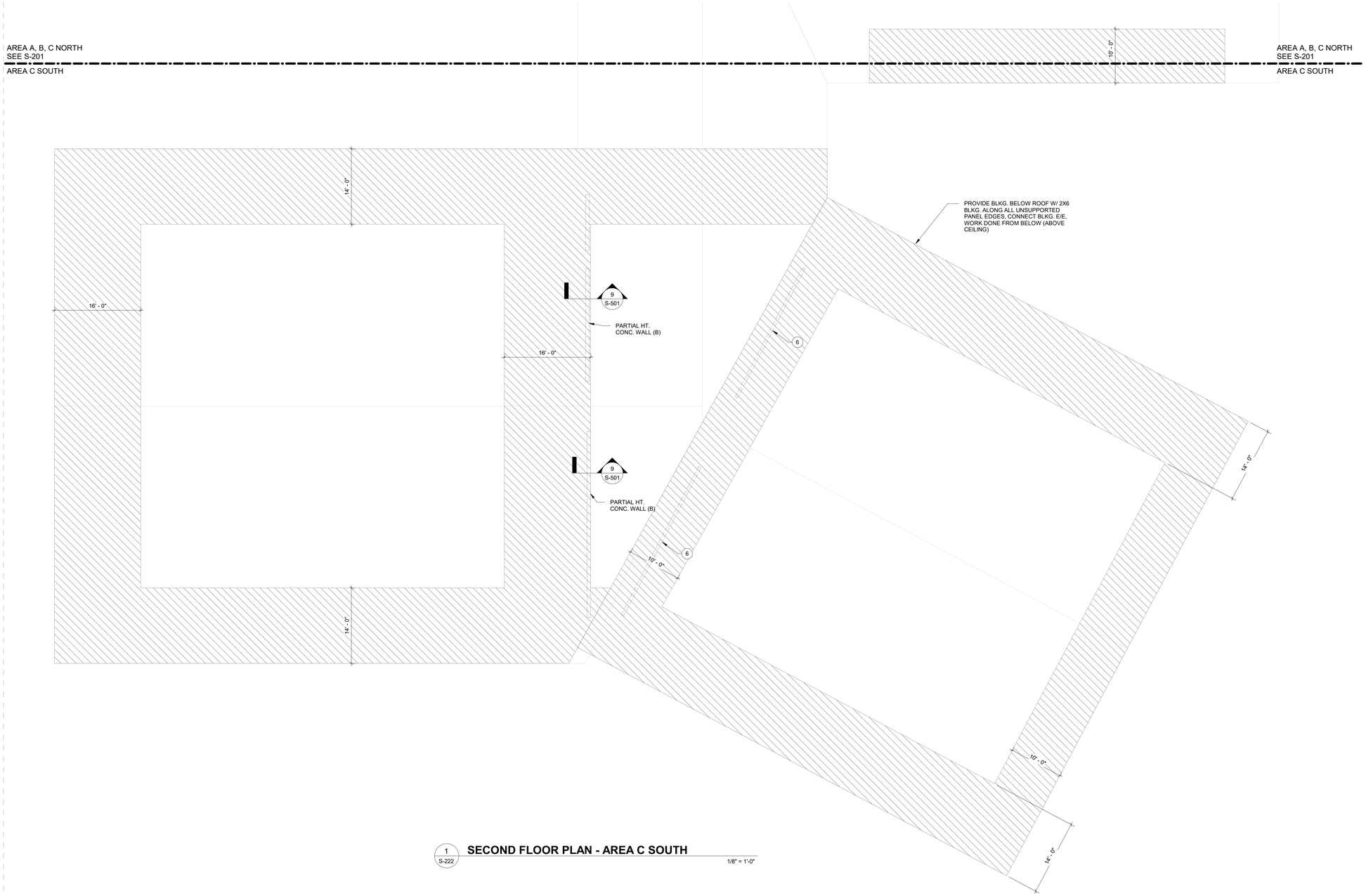

1 S-222 **SECOND FLOOR PLAN - AREA C SOUTH**

1/8" = 1'-0"

LEGEND:

- (E) CONC. WALL
- (E) CMU WALL
- (E) STUD WALL
- (E) WALL (B)
- (N) STUD WALL
- (N) WALL (B)
- (N) 1/2" CDX PLYWOOD SHTG. OVER (E) WOOD WALL, SEE S-601
- SW X'-XX" — S.W. MARK / MIN. LENGTH
- SHEAR WALL BRACING PENDING CONFIRMATION OF (E) CONDITIONS
- (E) WD. COLUMN
- (E) TS COLUMN
- (E) COLUMN (B)
- W XXX — WF COLUMN
- HDU — HOLDOWN & POST AT SHEAR WALL END, EPOXY DOWEL AT (E) FOOTINGS
- X — WALL TO DIAPHRAGM CONN. PER KEY NOTE X
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- (N) 3'-0" SQ. x 18" THK. CONC. FOOTING
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- SIMP. STRAP

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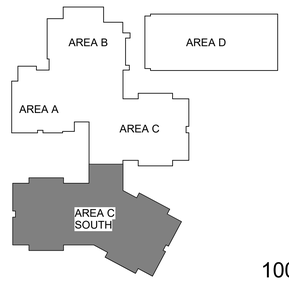
Drawn By:	IK
Checked By:	JE

Revision Schedule:

KEY PLAN



Sheet Title:
ROOF PLAN - AREA C SOUTH

Sheet Number:
S-222

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- (N) WALL (B)
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- (E) TS COLUMN
- (E) COLUMN (B)
- W8XX — WF COLUMN
- HDU — HOLDOWN & POST AT SHEAR WALL END, EPOXY DOWEL AT (E) FOOTINGS
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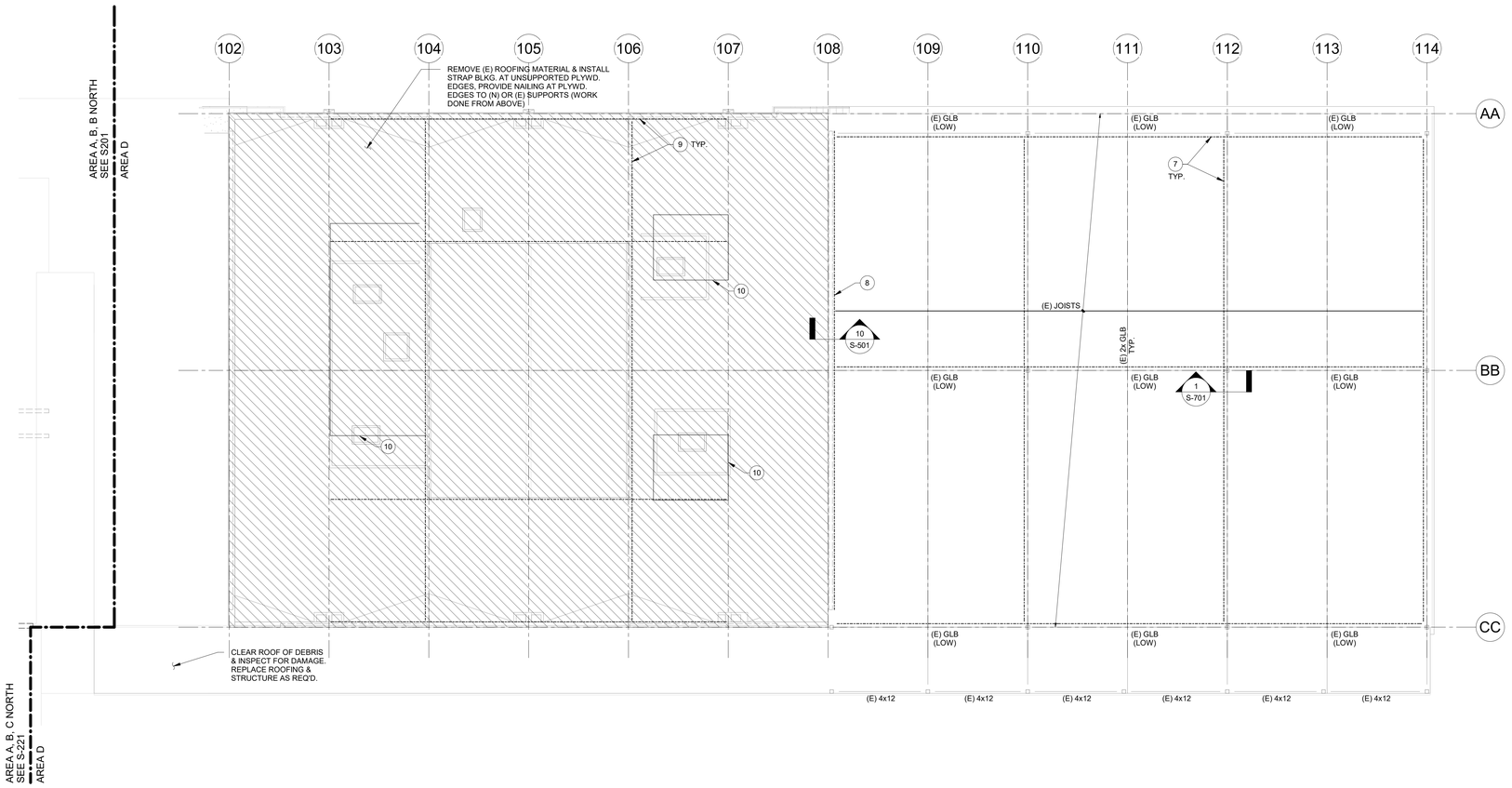
- PLYWOOD
- (N) 3'-0" SQ. x 18" THK. CONC. FOOTING
- (E) DIAPHRAGM STRENGTHENING
- SIMP. STRAP



1 S-223 **ROOF PLAN - AREA D**

1/8" = 1'-0"

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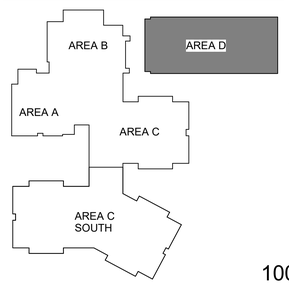

Sheet Title:
ROOF PLAN - AREA D

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S-223

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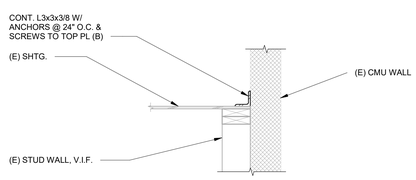
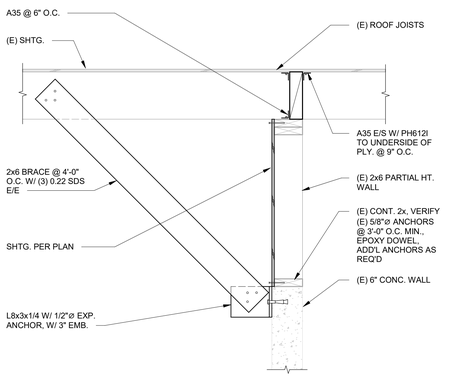
13 S-501 **NEW TO EXISTING SLAB ON GRADE**

1"= 1'-0"



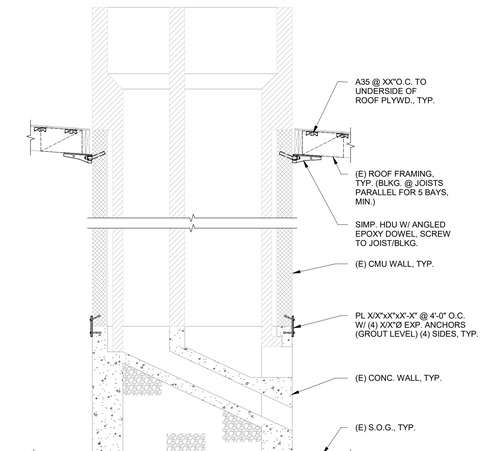
10 S-501 **(E) CMU AT (N) ROOF DIAPHRAGM**

1" = 1'-0"



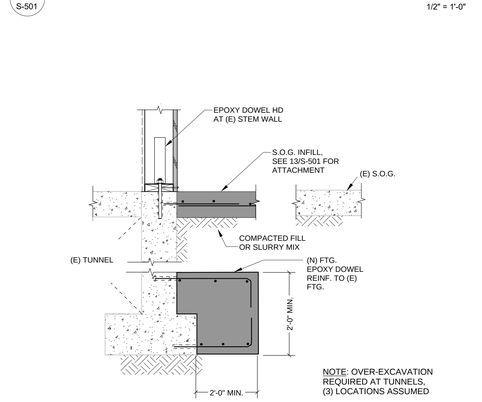
9 S-501 **SUPPORT AT UNBRACED CONC. WALL**

1" = 1'-0"



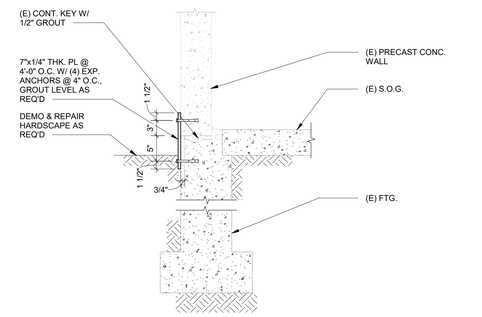
7 S-501 **CHIMNEY CONNECTIONS**

1/2" = 1'-0"



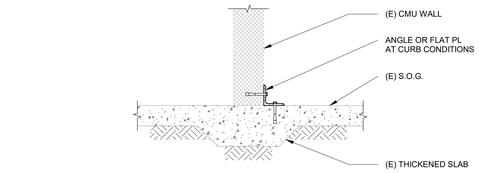
6 S-501 **NEW TO FOOTING AT (E) TUNNEL**

NTS



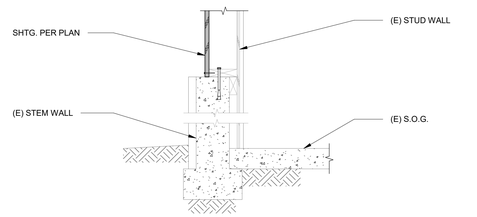
5 S-501 **WALL TO FOUNDATION (AREA C)**

1" = 1'-0"



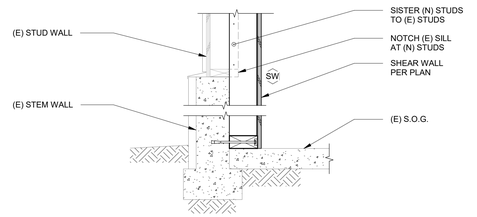
4 S-501 **CMU WALL ANCHORAGE - SLAB ON GRADE**

1" = 1'-0"



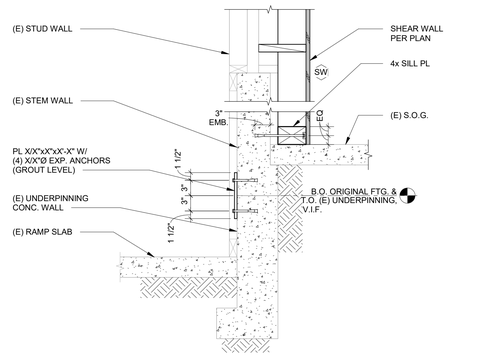
3 S-501 **SECTION AT SOUTH WALL (AREA A)**

1" = 1'-0"



2 S-501 **SECTION AT WEST WALL (AREA A)**

1" = 1'-0"



1 S-501 **SECTION AT RAMP (AREA A)**

1" = 1'-0"

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Date: 09-22-2020
Project Number: 20138.10
Drawn By: IK
Checked By: JE

Revision Schedule:

Sheet Title:
DETAILS

Sheet Number:
S-501

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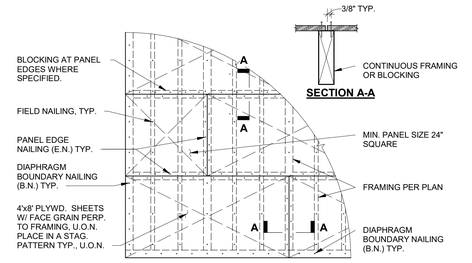
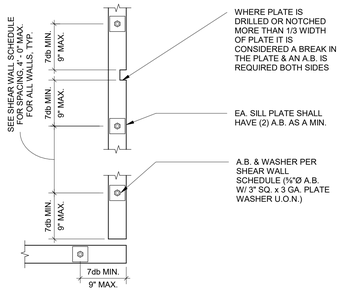


4 S-601 **TYP. DIAPHRAGM**

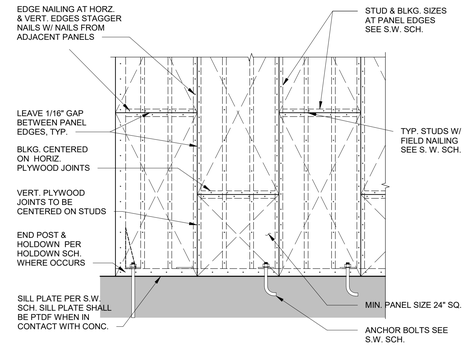
N.T.S.



NOTES:
1. Ø REFERS TO A.B. Ø.
2. SILL PLATES IN CONTACT W/ CONCRETE SHALL BE P.T.D.F. OR FOUNDATION GRADE REDWOOD.
3. IF 7db MIN./12" MAX. DIM. W/ HD THEN MEASURE FROM CENTERLINE HD A.B.
4. SILL BOLTS SHALL BE 5/8"Ø L-BOLTS W/ 7" EMB. INTO FTG. (BELOW SLAB WHERE OCCURS) AT 4'-0" MAX. SPACING.

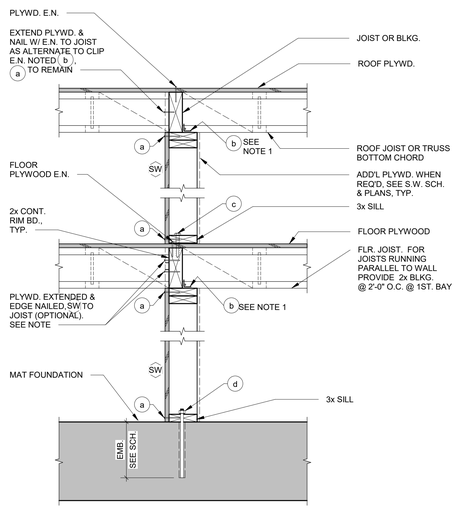
7 S-601 **TYP. SILL BOLTING LAYOUT**

1" = 1'-0"



3 S-601 **TYPICAL PLYWD. SHEAR WALL ELEV.**

N.T.S.



NOTES:
1. THIS CONN. MAY BE OMITTED AT FLR. (NOT AT ROOF) IF JOISTS ARE PARALLEL TO WALL & PLYWD. IS EXTENDED UP & EDGE NAILED,TO JOISTS. DOES NOT APPLY TO WALLS W/ PLYWD. ON BOTH SIDES.
2. CONNECTIONS INDICATED W/ LETTERS ARE DEFINED IN S.W. SCH.

5 S-601 **TYPICAL INTERIOR SHEAR WALL**

1" = 1'-0"

MARK	(a) EDGE NAILING (E.N.) SEE NOTE 2	CAPACITY (PLF)	(b) RIM CONN. SPACING (SIMP. A35, LTP4 OR LS50)	(c) SILL PL CONN. SPACING (SIMP. SDWS 0.220 x 6) SEE NOTE 5	(d) FDN. ANCHOR SPACING. SEE NOTE 4
6	10d @ 6" O.C.	310	24" O.C.	16" O.C.	48" O.C.
4	10d @ 4" O.C.	460	16" O.C.	12" O.C.	48" O.C.
3	10d @ 3" O.C.	600	12" O.C.	8" O.C.	32" O.C.
2	10d @ 2" O.C.	770	8" O.C.	8" O.C.	24" O.C.
6 6	10d @ 6" O.C. B/S	620	12" O.C.	8" O.C.	32" O.C.
4 4	10d @ 4" O.C. B/S	920	8" O.C.	6" O.C.	24" O.C.
3 3	10d @ 3" O.C. B/S	1200	6" O.C.	4" O.C.	16" O.C.
2 2	10d @ 2" O.C. B/S	1540	4" O.C.	4" O.C.	12" O.C.

NOTES:
1. USE ½" CDX PLYWD.
2. E.N. ACROSS ALL PANEL EDGES, FIELD NAILING IS 12" O.C. ALL NAILS ARE COMMON WIRE NAILS, MAY USE 10d SHORTS (2 1/8" MIN. LENGTH) W/ FULL HEADS.
3. ALL MEMBERS RECEIVING E.N. INCLUDING SILL PLATE SHALL BE 3x AS A MIN. NAILING SHALL BE STAGGERED. EXCEPTION: WHERE PLYWOOD IS APPLIED TO ONLY ONE SIDE OF WALL AND NAIL SPACING IS 6" O.C. MEMBERS RECEIVING EDGE NAILING CAN BE 2x.
4. ALL FDN. ANCHOR BOLTS ARE ⅝"Ø L-BOLTS W/ A 2" HOOK OR ALL THREAD ROD WITH A NUT, WASHER AND NUT ON THE EMBEDDED END. WHEN SHEAR WALLS ARE LOCATED ON (E) CONCRETE ⅝"Ø ALL THREAD ROD WITH SIMPSON SET-XP EPOXY MAY BE USED. ANCHORS SHALL HAVE A MIN. EMBEDMENT OF 7", A MIN. EDGE DISTANCE OF 1¾" AND SHALL HAVE A 3" SQ. x 3 GA. PLATE WASHER AT THE SILL. CONTRACTOR MAY USE BP¾-3 OR BPS¾-3 SIMPSON WASHERS. PLATE WASHER SHALL EXTEND TO WITHIN 1/2" OF THE EDGE OF THE BOTTOM PLATE ON THE SIDE(S) WITH SHEATHING. WHERE WALL IS GREATER THAN 2x4 AND SHEATHING OCCURS ON BOTH SIDES, ANCHOR BOLTS SHALL BE STAGGERED. A.B. & WASHER SHALL BE HOT DIPPED GALVANIZED.
5. SILL CONNECTION IS FOR WOOD TO WOOD CONNECTION ONLY, TYP. BTWN. FLOORS. WHERE SPACING IS CLOSER THAN 8" O.C. RIM OR RIM BLOCKING SHALL BE 3½" MIN. WIDTH AND FASTENERS SHALL BE STAGGERED. SDS 1/4 x 6 MAY BE USED IN LIEU OF SDWS 0.220 x 6 AT CONTRACTOR'S DISCRETION.

1 S-601 **SHEAR WALL SCHEDULE**

N.T.S.

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Date: 09-22-2020
Project Number: 20138.10
Drawn By: IK
Checked By: JE

Revision Schedule:

Sheet Title:
WOOD DETAILS

Sheet Number:
S-601

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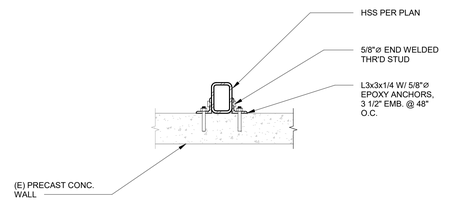
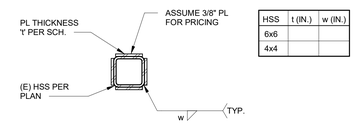


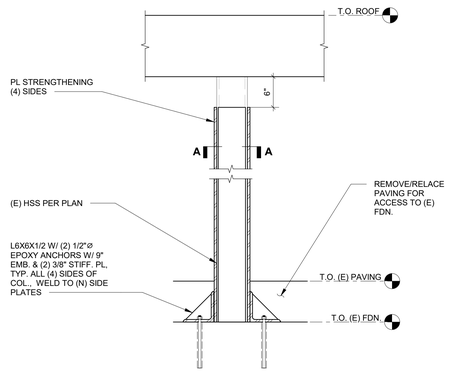
2 S-701 **HSS TO (E) CONC. WALL**

1" = 1'-0"



HSS	t (IN.)	w (IN.)
6x6		
4x4		

SECTION A-A



1 S-701 **HSS STRENGTHENING**

1" = 1'-0"

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Date: 09-22-2020
Project Number: 20138.10
Drawn By: IK
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Revision Schedule:

Sheet Title:
STEEL DETAILS

Sheet Number:
S-701

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HVAC - NOTES

1. CONTRACTOR TO COORDINATE INSTALLATION WITH ALL OTHER TRADES AS DESCRIBED IN MECHANICAL GENERAL NOTE #1.
2. MECHANICAL CONTRACTOR TO PROVIDE SUPPLY, RETURN, EXHAUST, AND VENTILATION DUCTWORK, SUPPORTS, HANGERS, DIFFUSERS, GRILLES, REGISTERS, AND ALL APPURTENANCES. INSTALL ALL EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. INSTALL SYSTEM TO MEET ALL CITY AND STATE CODES AND REQUIREMENTS.
3. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF DUCT SYSTEM. INDICATED DUCT LOCATIONS, CONFIGURATIONS, AND ARRANGEMENTS WERE USED TO SIZE DUCTS AND CALCULATE FRICTION LOSS FOR AIR-HANDLING EQUIPMENT SIZING AND FOR OTHER DESIGN CONSIDERATIONS.
4. ALL DUCT DIMENSIONS LISTED ARE INTERIOR FREE AREA DUCT DIMENSIONS AND DO NOT INCLUDE INSULATION REQUIREMENTS.
5. CONTRACTOR TO SEAL ALL WALL DUCT PENETRATIONS. PROVIDE FIRE CAULKING ASSEMBLIES FOR PENETRATIONS OF RATED WALLS. REFER TO ARCHITECTURAL DRAWINGS FOR WALL RATINGS. DUCT INSULATION TO CONTINUE THRU WALL PENETRATIONS UNBROKEN, EXCEPT WHERE FIRE OR FIRE/SMOKE DAMPERS ARE INSTALLED. SEAL AROUND DUCT INSULATION AT WALL PENETRATIONS.

PLUMBING - NOTES

1. CONTRACTOR TO COORDINATE INSTALLATION WITH ALL OTHER TRADES AS DESCRIBED IN MECHANICAL GENERAL NOTE #1.
2. CONTRACTOR TO PROVIDE PIPE, INSULATION, HANGERS, SUPPORTS, EQUIPMENT, WATER HEATERS, FIXTURES, MIXING VALVES, VALVES, AND ALL APPURTENANCES. INSTALL ALL EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. SIZE AND INSTALL PLUMBING SYSTEM PER PLUMBING CODE. COMPLY WITH ALL LOCAL AND STATE CODES AND REQUIREMENTS.
3. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF PLUMBING SYSTEM.
4. EXISTING PIPING AND EQUIPMENT LOCATIONS SHOWN ARE BASED ON ORIGINAL DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR LOCATING PIPING UNDER GROUND OR IN WALLS/CHASES WHERE WORK IS REQUIRED.
   CONTRACTOR TO SEAL ALL WALL PIPE PENETRATIONS. PROVIDE FIRE CAULKING ASSEMBLY FOR PENETRATIONS OF FIRE RATED WALLS. REFER TO ARCHITECTURAL DRAWINGS FOR WALL RATINGS. PIPE INSULATION TO CONTINUE THRU WALL PENETRATIONS UNBROKEN. SEAL AROUND PIPE INSULATION AT WALL PENETRATIONS.

MECHANICAL – DEMOLITION NOTES

1. MECHANICAL DEMOLITION DRAWINGS SHOWING EXISTING CONDITIONS HAVE BEEN PREPARED BASED ON FIELD OBSERVATION AND ORIGINAL DRAWINGS. ADDITIONAL COMPONENTS MAY EXIST, WHICH MAY NOT BE SHOWN, AND SUCH ITEMS SHALL BE DEALT WITH IN A MANNER SIMILAR TO THOSE ITEMS WHICH DO SHOW. CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS.
2. CONTRACTOR SHALL BE FAMILIAR WITH EXISTING MECHANICAL SYSTEMS WHICH WILL BE AFFECTED BY THE DEMOLITION WORK. CONTRACTOR SHALL OBTAIN PERMISSION FROM OWNER'S REPRESENTATIVE TO SHUT OFF SERVICES OR SYSTEMS WHICH MAY AFFECT OTHER AREAS BEYOND THE LIMITS OF THE IMMEDIATE DEMOLITION AREA. SUCH PERMISSION WILL BE GRANTED ONLY AFTER OWNER'S REPRESENTATIVE IS INFORMED OF THE REASON FOR AND DURATION OF THE SHUTDOWN AND IS SATISFIED THAT THE SHUTDOWN CAN BE MADE WITH AS LITTLE INCONVENIENCE TO OTHER AREAS AS POSSIBLE.
3. PIPING, HANGERS, DUCTWORK, GRILLES, REGISTERS, DIFFUSERS, ETC., SHOWN ON PLANS SHALL BE REMOVED UNLESS NOTED OTHERWISE. REMOVAL SHALL BE DONE IN A TIMELY MANNER IN ACCORDANCE WITH THE GENERAL DEMOLITION WORK. COORDINATE WITH THE OWNER AND OTHER CONTRACTORS.
4. EQUIPMENT AND/OR MATERIALS SCHEDULED FOR ABANDONMENT AND REMOVAL ARE TO BECOME CONTRACTOR'S SALVAGE AND SHALL BE HAULED AWAY FROM THE SITE PROMPTLY. EXCEPTION SHALL BE THE EQUIPMENT LISTED FOR DISTRICT SALVAGE.
5. REMOVE ALL ABANDONED PIPING AND DUCTWORK. REFER TO ARCH PLANS FOR CEILINGS TO BE REMOVED.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH REPAIR OR REPLACEMENT OF TELECOMMUNICATIONS FACILITIES OR EQUIPMENT FOUND TO BE DAMAGED OR NON-FUNCTIONAL AFTER SUBSTANTIAL COMPLETION.

MECHANICAL - GENERAL NOTES

1. COORDINATE LOCATION/INSTALLATION OF MECHANICAL AND ELECTRICAL WORK WITH ALL OTHER TRADES. NO ASPECT OF A SYSTEM INSTALLATION OR ITS ROUGH-IN SHALL COMMENCE UNTIL PROPER AND TIMELY COORDINATION WITH ALL TRADES ASSOCIATED WITH THE INSTALLATION HAS TRANSPIRED. ITEMS TO BE COORDINATED SHALL INCLUDE BUT NOT BE LIMITED TO: BUILDING STRUCTURE, SHEET METAL, ALL PIPING SYSTEMS, LIGHT FIXTURES, CONDUITS, CABLE TRAYS, ETC. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT. ANY REWORK OF INSTALLED EQUIPMENT WILL BE AT CONTRACTORS EXPENSE.
2. INCORPORATE INTO INSTALLATION MECHANICAL SPECIFICATIONS, DRAWINGS, STATE AND LOCAL CODES, AND OTHER APPLICABLE REQUIREMENTS.
3. WARNING - CALL 48 HOURS BEFORE YOU DIG: LAW REQUIRES ANYONE DOING ANY EXCAVATION, FENCING, PLANTING OR DRILLING TO CALL 48 HOURS IN ADVANCE. HAND DIG WITHIN 18 INCHES OF ANY LOCATE MARK OR FLAG. ONE CALL 811.
4. REFER TO ARCHITECTURAL SPECIFICATIONS FOR FIRESTOPPING AND TO ARCHITECTURAL CODE PLAN FOR FIRE RATED WALLS AND FLOORS. EACH TRADE IS RESPONSIBLE TO FIRESTOP PENETRATIONS THROUGH RATED ASSEMBLIES.
5. EACH TRADE IS RESPONSIBLE TO MAKE PENETRATIONS WHERE REQUIRED IN EXISTING WALLS, FLOORS, AND CEILINGS. PENETRATIONS SHALL BE NEAT. ANY OVERCUT SHALL BE CONCEALED OR CAULKED.
6. ALL EXPOSED WALL PENETRATIONS SHALL BE COVERED BY ESCUTCHEONS OR SHEET METAL AS APPROPRIATE.
7. ALL CONCEALED AND EXPOSED PIPING AND DUCT WALL PENETRATIONS SHALL BE CAULKED TO PREVENT NOISE TRANSFER BETWEEN SPACES.
8. CONTRACTOR SHALL BE RESPONSIBLE TO CREATE NECESSARY OPENINGS TO THE BUILDING TO REMOVE EXISTING ITEMS AND TO BRING IN NEW EQUIPMENT. ALL OPENINGS CREATED SHALL BE PATCHED AND FINISHED WITH MATERIALS TO MATCH EXISTING CONDITIONS. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR THIS WORK.

MECHANICAL PIPING ACCESSORY LEGEND

- PIPE ANCHOR
- ALIGNMENT GUIDE
- FLEX CONNECTOR
- EXPANSION - LOOP
- THERMOMETER
- T — THERMOMETER WELL
- PSD — PUMP SUCTION DIFFUSER
- FLOAT THERMOSTATIC TRAP
- EXPANSION - JOINT
- INLINE PUMP
- MV — AIR VENT - MANUAL
- A — AIR VENT - AUTOMATIC
- FS — FLOW SWITCH
- PS — PRESSURE SWITCH

MECHANICAL ABBREVIATIONS

ABSOR	ABSORPTION	FS	FLOOR SINK
ACU	AIR CONDITIONING UNIT	FT	FINTUBE
AD	ACCESS DOOR OR AREA DRAIN	FTG	FOOTING
AFF	ABOVE FINISHED FLOOR	GA	GAGE
AFG	ABOVE FINISHED GRADE	GAL	GALLON
AHU	AIR HANDLING UNIT	GALV	GALVANIZED
AV	AIR VENT	GC	GENERAL CONTRACTOR
BOT	BOTTOM	GW	GREASE WASTE
BTU	BRITISH THERMAL UNIT	GPH	GALLONS PER HOUR
BTUH	BTU PER HOUR	GPM	GALLONS PER MINUTE
BV	BALL VALVE	HR	HOUR
CA	COMPRESSED AIR	HTG	HEATING
CB	CATCH BASIN	HB	HOSE BIBB
CENT	CENTRIFUGAL	ISP	INTERNAL STATIC PRESSURE
CFM	CUBIC FEET PER MINUTE	JR	JANITOR RECEPTOR
CI	CAST IRON	LAV	LAVATORY
CL	CENTER LINE	LDBT	LEAVING DRY BULB TEMPERATURE
COND	CONDENSATE	LWT	LEAVING WATER TEMPERATURE
CO	CLEAN OUT	LWBT	LEAVING WET BULB TEMPERATURE
CONC	CONCRETE	MB	MOP BASIN
CONTR	CONTRACTOR	MBH	1000 BTUH
CP	CONDENSATE PUMP/CIRC. PUMP	MC	MECHANICAL CONTRACTOR
CU	COPPER	MECH	MECHANICAL
CUH	CABINET UNIT HEATER	MH	MANHOLE
CWP	CIRCULATING WATER PUMP	NTS	NOT TO SCALE
DDC	DIRECT DIGITAL CONTROLS	OA	OUTSIDE AIR
DN	DOWN	OD	OVERFLOW ROOF DRAIN
DR	DRAIN	PSI	POUNDS PER SQUARE INCH
DS	DOWNSPOUT	PRV	POWER ROOF VENTILATOR
EA	EXHAUST AIR	PRV	PRESSURE REDUCING VALVE
EAT	EXHAUST AIR TEMPERATURE	PV	PRESSURE VENT
EC	ELECTRICAL CONTRACTOR	PVC	POLYVINYL CHLORIDE
EDBT	ENTERING DRY BULB TEMPERATURE	RA	RETURN AIR
EEW	EMERGENCY EYE WASH	RD	ROOF DRAIN
EF	EXHAUST FAN	RH	RELATIVE HUMIDITY
EJ	EXPANSION JOINT	RTU	ROOF TOP UNIT
EQUIP	EQUIPMENT	RV	RELIEF VALVE
ESE	EMERGENCY SHOWER/EYEWASH	RVT	ROOF VENT TERMINATION
EST	EXTERNAL STATIC PRESSURE	SK	SINK
EWBT	ENTERING WET BULB TEMPERATURE	SA	SUPPLY AIR
EWC	ELECTRIC WATER COOLER	SH	SHOWER
EWT	ENTERING WATER TEMPERATURE	SO	STORM OVERFLOW
EX	EXISTING	ST	STORM
EXH	EXHAUST	TCC	TEMPERATURE CONTROL CONTRACTOR
EXP	EXPANSION	TYP	TYPICAL
FAI	FRESH AIR INTAKE	UH	UNIT HEATER
FCU	FAN COIL UNIT	UR	URINAL
FD	FLOOR DRAIN	UV	UNIT VENTILATOR
FDC	FIRE DEPARTMENT CONNECTION	VA	VENTILATION AIR
FLEX	FLEXIBLE	VTR	VENT THROUGH ROOF
FLR	FLOOR	WB	WALL BOX – CONDENSATE
FPM	FEET PER MINUTE	WC	WATER CLOSET
FPS	FEET PER SECOND	WH	WATER HEATER

GENERAL NOTE:

UNDERGROUND FACILITIES, STRUCTURES, AND UTILITIES HAVE BEEN SHOWN BASED UPON INFORMATION OBTAINED FROM FIELD LOCATIONS BY UTILITY COMPANIES, AVAILABLE SURVEYS AND RECORDS. THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. IT IS ALSO POSSIBLE THAT THERE MAY BE OTHER UNDERGROUND FACILITIES, STRUCTURES, AND UTILITIES IN EXISTENCE THAT ARE NOT SHOWN. IT IS THE RESPONSIBILITY OF EACH INDIVIDUAL PARTY REFERENCING THIS PLAN TO DETERMINE THE EXACT LOCATION AND TYPE OF UNDERGROUND FACILITIES ON THE SITE. HAND EXCAVATE AT CRITICAL POINTS AS NECESSARY TO VERIFY LOCATIONS, SIZES, ELEVATIONS, FLOW LINES, ETC. IF A PROBLEM OR INTERFERENCE EXISTS, NOTIFY ARCHITECT/ENGINEER BEFORE PROCEEDING.

PIPING LEGEND - FIRE PROTECTION

FPD	FIRE PROTECTION DRY
FPP	FIRE PROTECTION PRE-ACTION
FPW	FIRE PROTECTION WET

PLUMBING ACCESSORY LEGEND

- HB — HOSE BIBB
- RH — ROOF HYDRANT
- CO — CLEAN OUT
- FCO — FLOOR CLEAN OUT
- FD — FLOOR DRAIN
- VTR — VENT THRU ROOF (X DENOTES IDENTIFICATION)
- RD — ROOF DRAIN
- ORD — OVERFLOW ROOF DRAIN
- COMBO ROOF/OVERFLOW DRAIN
- LT — LAMB TONGUE
- BACKFLOW PREVENTER

H.V.A.C. / DUCTWORK SYMBOLS

- RECT. RND. OVAL — SUPPLY (SA), OUTSIDE (OA), VENTILATION (VA) AIR DUCT (UP / DOWN / SECTION)
- RETURN (RA) AIR DUCT (UP / DOWN / SECTION)
- EXHAUST (EA) AIR DUCT (UP / DOWN / SECTION)
- 10/6 SA — RECTANGULAR DUCT (WIDTH / HEIGHT / SYSTEM)
- 10 Ø SA — ROUND DUCT (DIAMETER / SYSTEM)
- 10/6 Ø SA — FLAT OVAL DUCT (WIDTH / HEIGHT / SYSTEM)
- SUPPLY DIFFUSER
- SUPPLY REGISTER OR GRILLE
- RETURN REGISTER OR GRILLE
- EXHAUST REGISTER OR GRILLE
- AD — DUCT ACCESS DOOR
- DUCT END CAP
- TURNING VANES
- VAV TERMINAL UNIT
- FLEXIBLE DUCTWORK
- R — ELEVATION CHANGE (RISE OR DROP)
- HIGH EFF. TAKE OFF FITTING w/ VOLUME DAMPER
- BD — BACKDRAFT DAMPER
- OPPOSED BLADE DAMPER
- PARALLEL BLADE DAMPER
- VOLUME CONTROL DAMPER
- FD — FIRE DAMPER
- SD — SMOKE DAMPER
- FSD — FIRE/SMOKE DAMPER
- M — MOTORIZED ACTUATOR
- T — THERMOSTAT
- C — CARBON DIOXIDE SENSOR
- H — HUMIDISTAT
- SIDE WALL DIFFUSER
- ROUND DIFFUSER
- EXTERIOR LOUVER
- X - # / #x#/CFM — FIXTURE IDENTIFICATION TAG / NECK SIZE / CFM

GENERAL SYMBOLS

- EXISTING = HALFTONE LINEWORK
- NEW = DARK LINEWORK
- DEMO = DASHED DARK LINEWORK
- BELOW GRADE = LONG DASHED DARK LINEWORK
- NEW CONNECTION POINT
- POINT OF DISCONNECT
- # — KEYNOTE
- XXX / X — EQUIPMENT IDENTIFICATION TAG
- 1 / A101 SIM — DETAIL DRAWING REFERENCE TAG, SIM-SIMILAR, TYP-TYPICAL, OPP-OPPOSITE / SHEET REFERENCE
- 1 / A101 SIM — SECTION CUT REFERENCE TAG, SIM-SIMILAR, TYP-TYPICAL, OPP-OPPOSITE / SHEET REFERENCE
- A101 / 1 INTERIOR ELEVATION DRAWING REFERENCE TAG

PIPING LEGEND - MECHANICAL

CWR	CHILLED WATER RETURN
CWS	CHILLED WATER SUPPLY
CD	CONDENSATE DRAIN
PC	PUMPED CONDENSATE
HWR	HYDRONIC RETURN
HWS	HYDRONIC SUPPLY

PIPING LEGEND - PLUMBING

CW	DOMESTIC COLD WATER
HW	DOMESTIC HOT WATER
G	NATURAL GAS
GV	NATURAL GAS VENT
RHW	RECIRULATING HOT WATER
SAN	SANITARY
ST	STORM
SO	STORM OVERFLOW
P	TRAP PRIMER
V	VENT

FITTINGS

- ELBOW
- ELBOW - DOUBLE BRANCH
- ELBOW - OUTLET DOWN
- ELBOW - OUTLET UP
- ELBOW - LONG RADIUS
- ELBOW - SHORT RADIUS
- 45° ELBOW
- TEE - VENT
- TEE - SANITARY
- TEE - OUTLET DOWN
- TEE - OUTLET UP
- TEE - SIDE OUTLET DOWN
- TEE - SIDE OUTLET UP
- CROSS - VENT
- CROSS - SANITARY
- LATERAL
- TEE - SINGLE SWEEP "COMBO WYE"
- REDUCER - CONCENTRIC
- REDUCER - ECCENTRIC
- CAPPED CONNECTION
- FLANGED CONNECTION

NOTE: NOT ALL SYMBOLS APPLY TO THIS PROJECT

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Date: 09/22/2020
Project Number: 90060
Drawn By: MK
Checked By: SLS

Revision Schedule:

Sheet Title:
MECHANICAL GENERAL NOTES AND SYMBOLS

Sheet Number:
M-000

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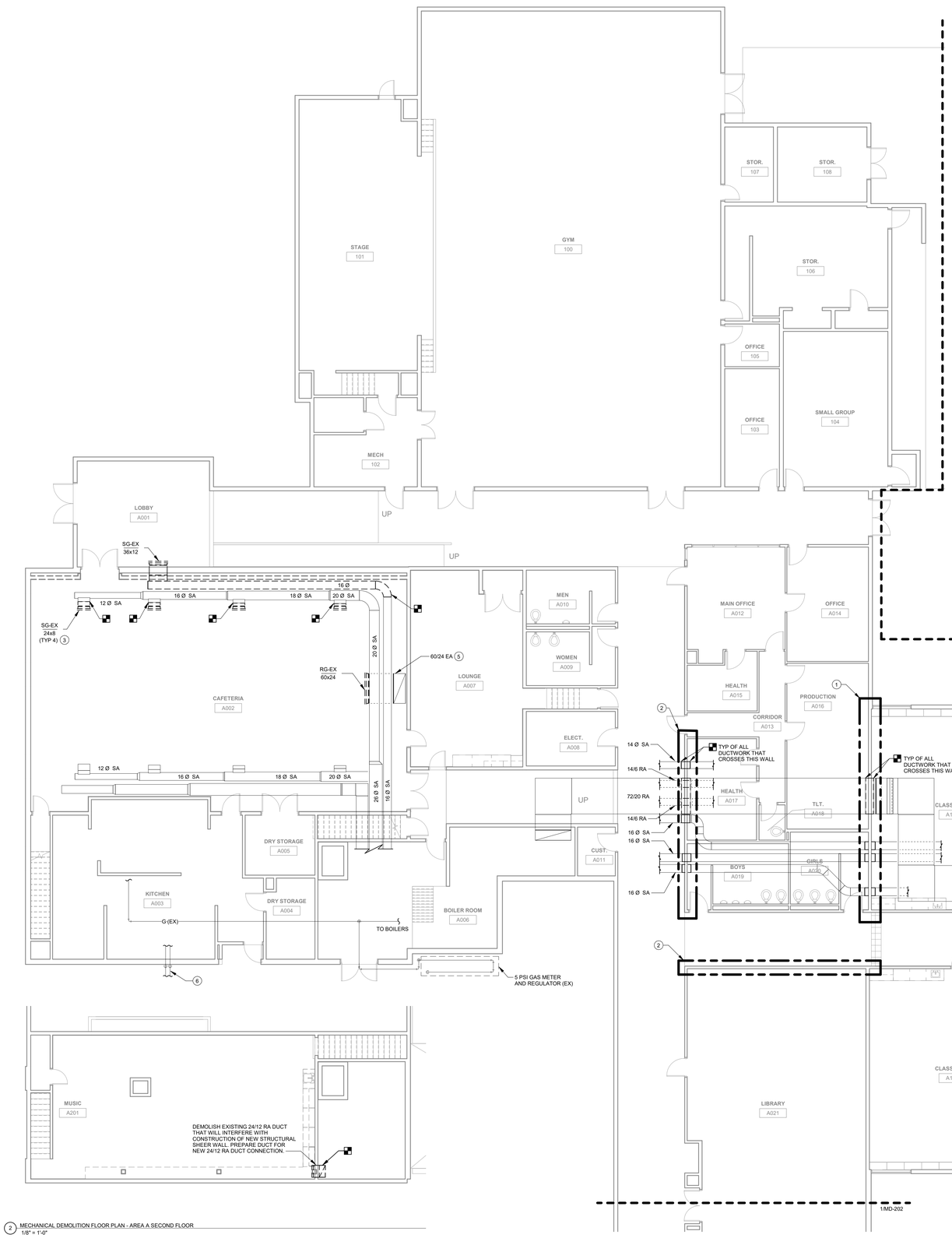
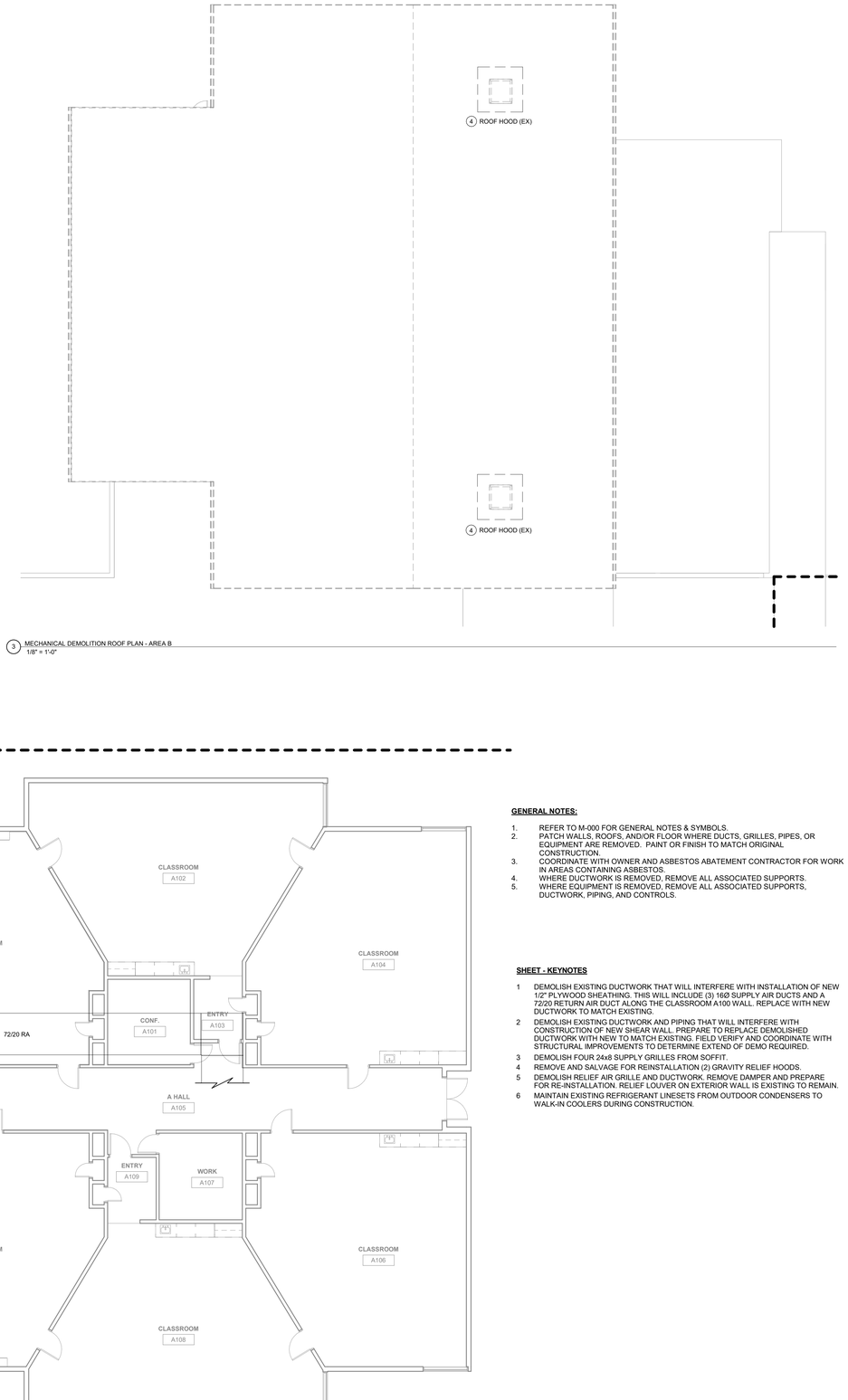


2 MECHANICAL DEMOLITION FLOOR PLAN - AREA A SECOND FLOOR
1/8" = 1'-0"

1 MECHANICAL DEMOLITION FLOOR PLAN - AREA A, B, C NORTH
1/8" = 1'-0"



3 MECHANICAL DEMOLITION ROOF PLAN - AREA B
1/8" = 1'-0"

GENERAL NOTES:

1. REFER TO M-000 FOR GENERAL NOTES & SYMBOLS.
2. PATCH WALLS, ROOFS, AND/OR FLOOR WHERE DUCTS, GRILLES, PIPES, OR EQUIPMENT ARE REMOVED. PAINT OR FINISH TO MATCH ORIGINAL CONSTRUCTION.
3. COORDINATE WITH OWNER AND ASBESTOS ABATEMENT CONTRACTOR FOR WORK IN AREAS CONTAINING ASBESTOS.
4. WHERE DUCTWORK IS REMOVED, REMOVE ALL ASSOCIATED SUPPORTS.
5. WHERE EQUIPMENT IS REMOVED, REMOVE ALL ASSOCIATED SUPPORTS, DUCTWORK, PIPING, AND CONTROLS.

SHEET - KEYNOTES

1 DEMOLISH EXISTING DUCTWORK THAT WILL INTERFERE WITH INSTALLATION OF NEW 1/2" PLYWOOD SHEATHING. THIS WILL INCLUDE (3) 16Ø SUPPLY AIR DUCTS AND A 72/20 RETURN AIR DUCT ALONG THE CLASSROOM A100 WALL. REPLACE WITH NEW DUCTWORK TO MATCH EXISTING.

2 DEMOLISH EXISTING DUCTWORK AND PIPING THAT WILL INTERFERE WITH CONSTRUCTION OF NEW SHEAR WALL. PREPARE TO REPLACE DEMOLISHED DUCTWORK WITH NEW TO MATCH EXISTING. FIELD VERIFY AND COORDINATE WITH STRUCTURAL IMPROVEMENTS TO DETERMINE EXTEND OF DEMO REQUIRED.

3 DEMOLISH FOUR 24x8 SUPPLY GRILLES FROM SOFFIT.

4 REMOVE AND SALVAGE FOR REINSTALLATION (2) GRAVITY RELIEF HOODS.

5 DEMOLISH RELIEF AIR GRILLE AND DUCTWORK. REMOVE DAMPER AND PREPARE FOR RE-INSTALLATION. RELIEF LOUVER ON EXTERIOR WALL IS EXISTING TO REMAIN.

6 MAINTAIN EXISTING REFRIGERANT LINESETS FROM OUTDOOR CONDENSERS TO WALK-IN COOLERS DURING CONSTRUCTION.

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Date:	09/22/2020
Project Number:	90060
Drawn By:	MK
Checked By:	SLS

Revision Schedule:

Sheet Title:
MECHANICAL DEMOLITION PLANS - AREA A, B, C NORTH

Sheet Number:
MD-201

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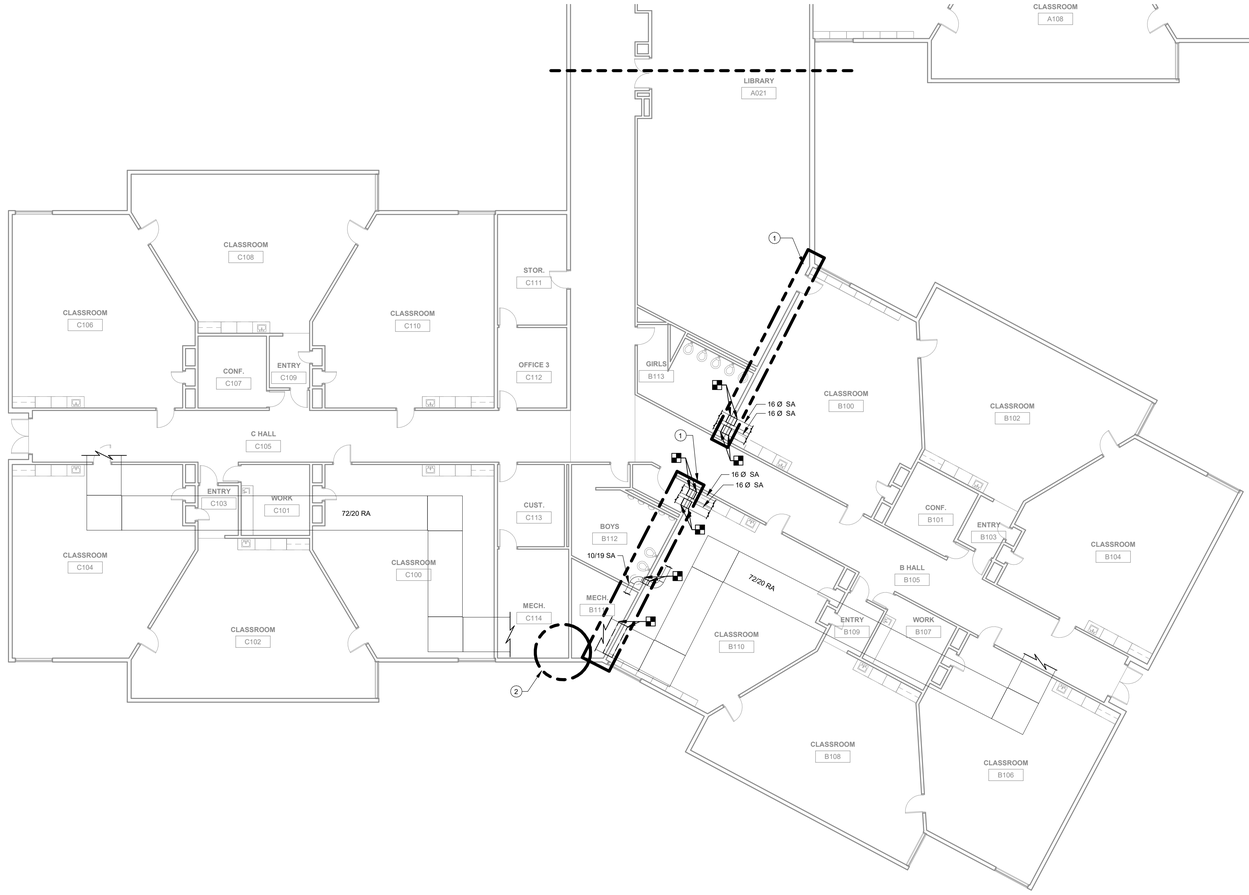
3. COORDINATE WITH OWNER AND ASBESTOS ABATEMENT CONTRACTOR FOR WORK IN AREAS CONTAINING ASBESTOS.
4. WHERE DUCTWORK IS REMOVED, REMOVE ALL ASSOCIATED SUPPORTS.
5. WHERE EQUIPMENT IS REMOVED, REMOVE ALL ASSOCIATED SUPPORTS, DUCTWORK, PIPING, AND CONTROLS.

SHEET - KEYNOTES

1 DEMOLISH EXISTING DUCTWORK THAT WILL INTERFERE WITH INSTALLATION OF NEW 1/2" PLYWOOD SHEATHING. PREPARE TO REPLACE DEMOLISHED DUCTWORK WITH NEW TO MATCH EXISTING.

2 FIELD VERIFY LOCATION OF 3/4" COLD WATER LINE BELOW THE SLAB THAT SERVES HOSE BIBB. COORDINATE AND POSSIBLY RELOCATE WITH NEW STRUCTURAL IMPROVEMENTS IN THIS AREA.



1 MECHANICAL DEMOLITION FLOOR PLAN - AREA C SOUTH
3/32" = 1'-0"

9/22/2020 11:07:59 AM

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Date: 09/22/2020
Project Number: 90060
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Revision Schedule:

Sheet Title:
MECHANICAL DEMOLITION FLOOR PLAN - AREA C SOUTH

Sheet Number:
MD-202

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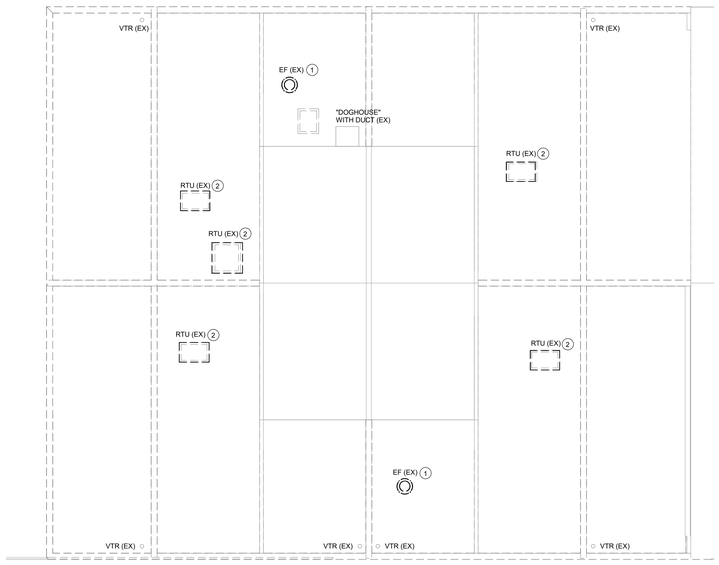
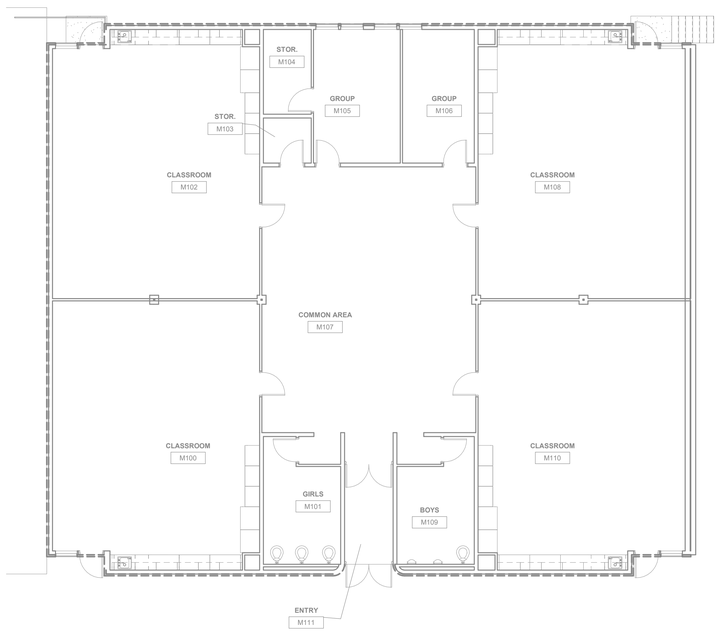


2 MECHANICAL DEMOLITION ROOF PLAN - AREA D
1/8" = 1'-0"



1 MECHANICAL DEMOLITION FLOOR PLAN - ZONE D
1/8" = 1'-0"

GENERAL NOTES:

1. REFER TO M-000 FOR GENERAL NOTES & SYMBOLS.
2. PATCH WALLS, ROOFS, AND/OR FLOOR WHERE DUCTS, GRILLES, PIPES, OR EQUIPMENT ARE REMOVED. PAINT OR FINISH TO MATCH ORIGINAL CONSTRUCTION.
3. COORDINATE WITH OWNER AND ASBESTOS ABATEMENT CONTRACTOR FOR WORK IN AREAS CONTAINING ASBESTOS.
4. WHERE DUCTWORK IS REMOVED, REMOVE ALL ASSOCIATED SUPPORTS.
5. WHERE EQUIPMENT IS REMOVED, REMOVE ALL ASSOCIATED SUPPORTS, DUCTWORK, PIPING, AND CONTROLS.

SHEET - KEYNOTES

1 REMOVE EXHAUST FAN AND SALVAGE FOR REINSTALLATION FOLLOWING ROOF REPLACEMENT.

2 REMOVE AND SALVAGE FOR REINSTALLATION (5) ROOF TOP AIR HANDLING UNITS AND ASSOCIATED SCREENING.

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Date:	09/22/2020
Project Number:	90060
Drawn By:	MK
Checked By:	SLS

Revision Schedule:

Sheet Title:
MECHANICAL DEMOLITION PLANS - AREA D

Sheet Number:
MD-203

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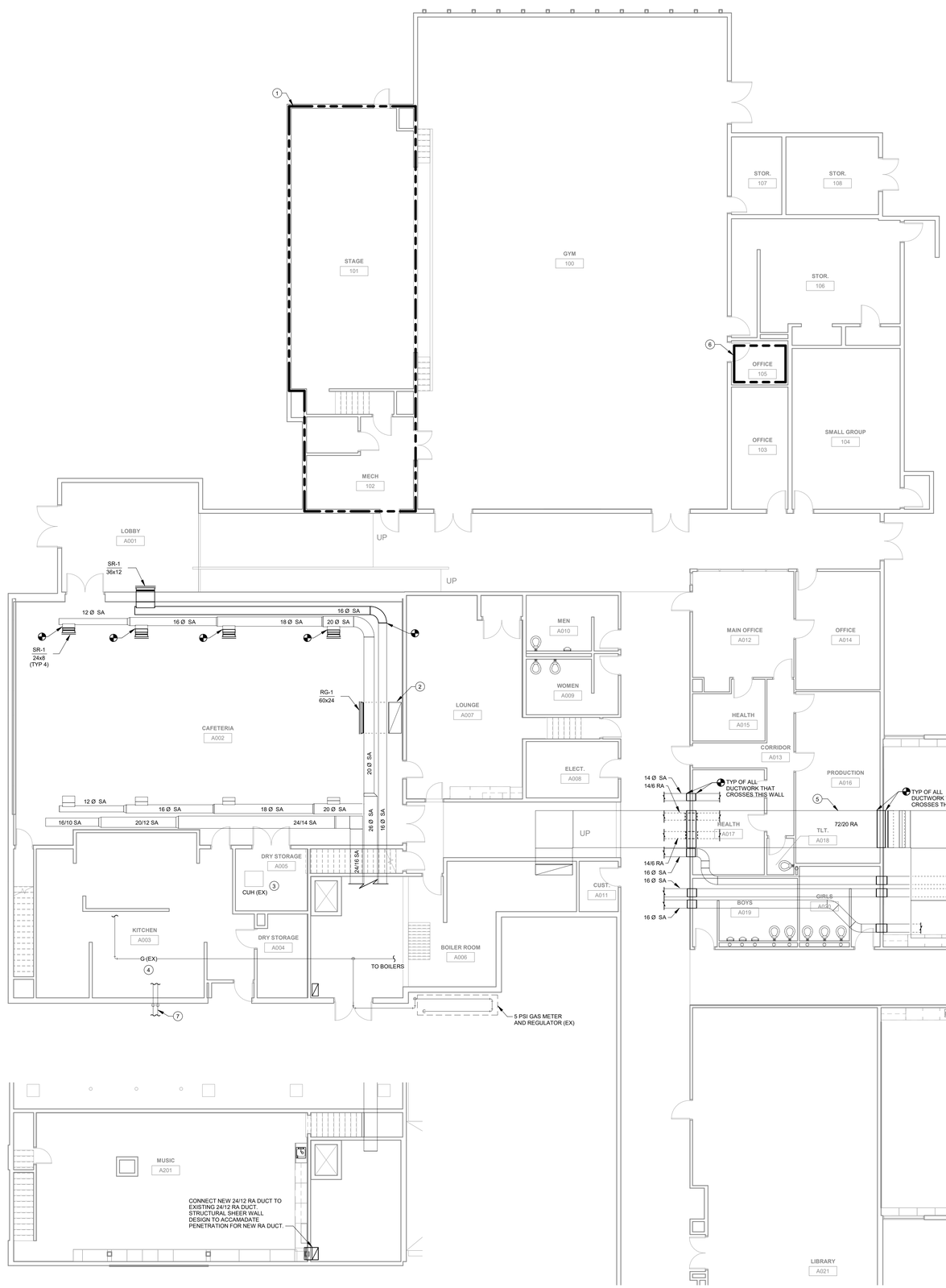
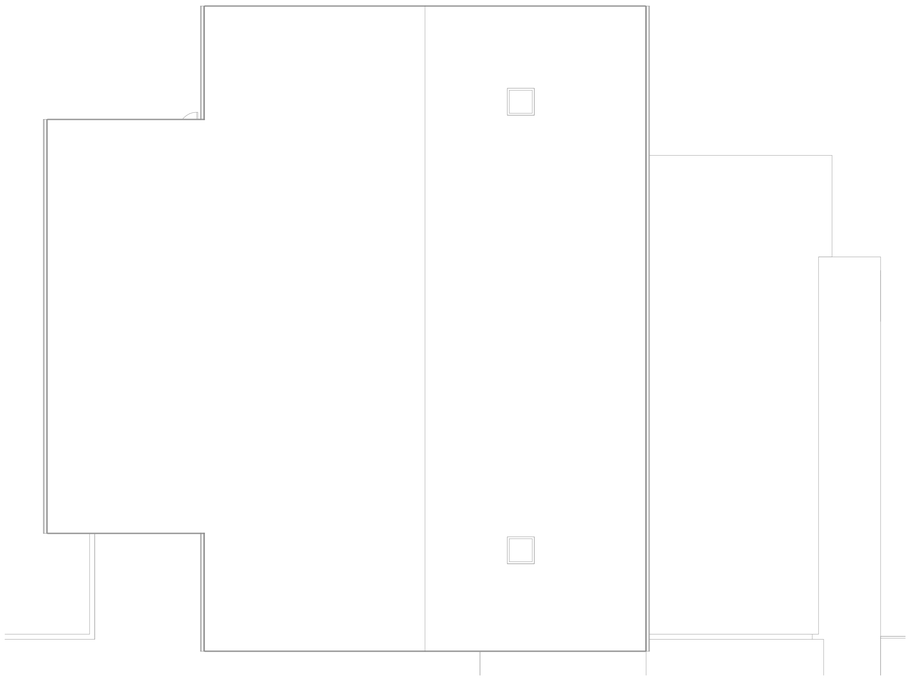


2 MECHANICAL FLOOR PLAN - AREA A SECOND FLOOR
1/8" = 1'-0"

1 MECHANICAL FLOOR PLAN - AREA B
1/8" = 1'-0"



3 MECHANICAL ROOF PLAN - AREA B
1/8" = 1'-0"

GENERAL NOTES:

1. REFER TO M-000 FOR GENERAL NOTES & SYMBOLS.
2. REFER TO M-300 FOR MECHANICAL DETAILS.
3. REFER TO M-500 FOR MECHANICAL SCHEDULES.
4. BRANCH DUCTS TO AIR TERMINALS TO MATCH NECK SIZE OF GRILLE, REGISTER OR DIFFUSER UNLESS OTHERWISE NOTED.
5. MAXIMUM FLEXIBLE DUCT LENGTH TO DIFFUSER IS 60".

SHEET - KEYNOTES

1 INSTALL SEISMIC CONTROLS ON FIRE SPRINKLER PIPING IN STAGE AREA.
2 INSTALL NEW 60x24 RELIEF GRILLE AND DUCTWORK. REINSTALL DAMPER. CONNECT TO EXISTING LOUVER ON EXTERIOR WALL.
3 INSTALL SEISMIC CONTROLS AT EXISTING SUSPENDED CABINET UNIT HEATER
4 ADD SEISMIC CONTROLS AT ALL EXISTING GAS PIPING IN KITCHEN AND BOILER ROOM.
5 ADD SEISMIC CONTROLS AT RECTANGULAR RETURN AIR DUCT THAT EXCEEDS 6 SQ. FT. CROSS SECTIONAL AREA.
6 ADD SEISMIC CONTROLS AT HEATING AND VENTILATING UNIT AND HEATING COILS SUSPENDED FROM ROOF STRUCTURE ABOVE THE OFFICE CEILING.
7 MAINTAIN EXISTING REFRIGERANT LINESETS FROM OUTDOOR CONDENSERS TO WALK-IN COOLERS DURING CONSTRUCTION.

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Date: 09/22/2020
Project Number: 90060
Drawn By: MK
Checked By: SLS

Revision Schedule:

Sheet Title:
MECHANICAL PLANS - AREA A, B, C NORTH

Sheet Number:
M-201

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1. REFER TO M-000 FOR GENERAL NOTES & SYMBOLS.
2. REFER TO M-300 FOR MECHANICAL DETAILS.
3. REFER TO M-500 FOR MECHANICAL SCHEDULES.
4. BRANCH DUCTS TO AIR TERMINALS TO MATCH NECK SIZE OF GRILLE, REGISTER OR DIFFUSER UNLESS OTHERWISE NOTED.
5. MAXIMUM FLEXIBLE DUCT LENGTH TO DIFFUSER IS 60".

SHEET - KEYNOTES

1 INSTALL SEISMIC CONTROLS ON 72/20 RETURN AIR DUCT. ITS CROSS SECTIONAL AREA EXCEEDS 6 SQ. FT.

1 MECHANICAL FLOOR PLAN - AREA C SOUTH
3/32" = 1'-0"

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Project Number:	90060
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Revision Schedule:

Sheet Title:
MECHANICAL FLOOR PLAN - AREA C SOUTH

Sheet Number:
M-202

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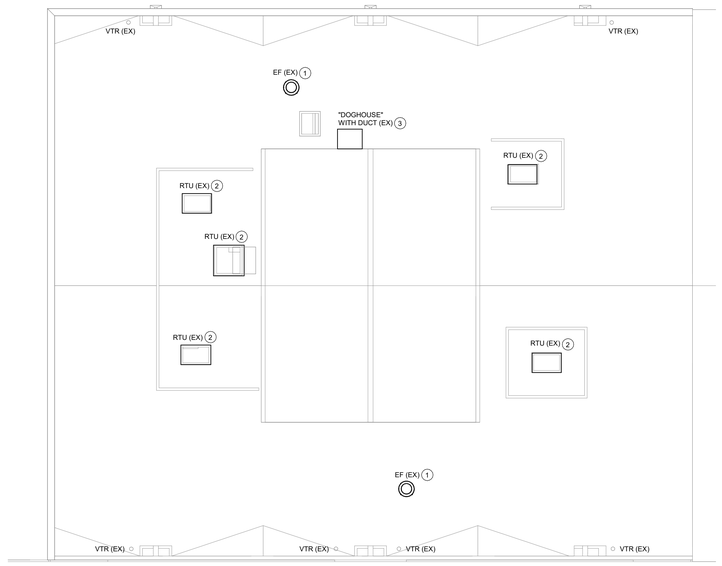

2 MECHANICAL ROOF PLAN - AREA D
1/8" = 1'-0"

1 MECHANICAL FLOOR PLAN - AREA D
1/8" = 1'-0"

GENERAL NOTES:

1. REFER TO M-000 FOR GENERAL NOTES & SYMBOLS.
2. REFER TO M-300 FOR MECHANICAL DETAILS.
3. REFER TO M-500 FOR MECHANICAL SCHEDULES.
4. BRANCH DUCTS TO AIR TERMINALS TO MATCH NECK SIZE OF GRILLE, REGISTER OR DIFFUSER UNLESS OTHERWISE NOTED.
5. MAXIMUM FLEXIBLE DUCT LENGTH TO DIFFUSER IS 60".

SHEET - KEYNOTES

1 REINSTALL EXHAUST FANS. PROVIDE NEW CURBS 12" HIGH ABOVE ROOF SURFACE.
2 REINSTALL ROOFTOP HVAC UNITS AND SCREENING. PROVIDE NEW ROOF CURB 12" HIGH ABOVE ROOF SURFACE. RECONNECT DUCTWORK TO EXISTING. CLEAN AND COMB RTU CONDENSER FINS. CLEAN OUTDOOR AIR SCREENS. REPLACE CONDENSATE TRAPS.
3 ROOF "DOGHOUSE" CONTAINING DUCT. PROVIDE NEW CURB AND ENCLOSURE TO MAINTAIN EXISTING DUCT ROUTING.

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Date: 09/22/2020
Project Number: 90060
Drawn By: MK
Checked By: SLS

Revision Schedule:

Sheet Title:
MECHANICAL PLANS - AREA D

Sheet Number:
M-203

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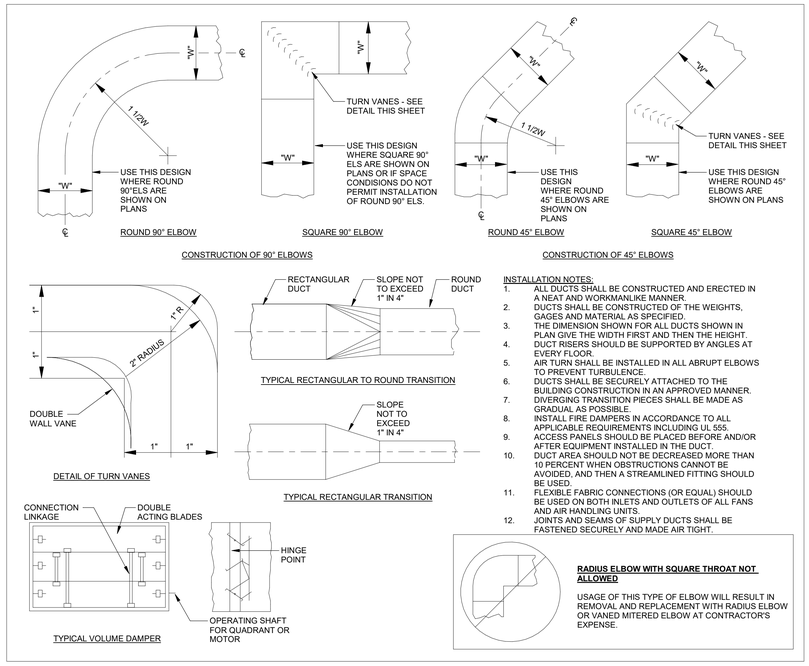

INSTALLATION NOTES:

1. ALL DUCTS SHALL BE CONSTRUCTED AND ERECTED IN A NEAT AND WORKMANLIKE MANNER.
2. DUCTS SHALL BE CONSTRUCTED OF THE WEIGHTS, GAGES AND MATERIAL AS SPECIFIED.
3. THE DIMENSION SHOWN FOR ALL DUCTS SHOWN IN PLAN GIVE THE WIDTH FIRST AND THEN THE HEIGHT.
4. DUCT RISERS SHOULD BE SUPPORTED BY ANGLES AT EVERY FLOOR.
5. AIR TURN SHALL BE INSTALLED IN ALL ABRUPT ELBOWS TO PREVENT TURBULENCE.
6. DUCTS SHALL BE SECURELY ATTACHED TO THE BUILDING CONSTRUCTION IN AN APPROVED MANNER.
7. DIVERGING TRANSITION PIECES SHALL BE MADE AS GRADUAL AS POSSIBLE.
8. INSTALL FIRE DAMPERS IN ACCORDANCE TO ALL APPLICABLE REQUIREMENTS INCLUDING UL 555.
9. ACCESS PANELS SHOULD BE PLACED BEFORE AND/OR AFTER EQUIPMENT INSTALLED IN THE DUCT.
10. DUCT AREA SHOULD NOT BE DECREASED MORE THAN 10 PERCENT WHEN OBSTRUCTIONS CANNOT BE AVOIDED, AND THEN A STREAMLINED FITTING SHOULD BE USED.
11. FLEXIBLE FABRIC CONNECTIONS (OR EQUAL) SHOULD BE USED ON BOTH INLETS AND OUTLETS OF ALL FANS AND AIR HANDLING UNITS.
12. JOINTS AND SEAMS OF SUPPLY DUCTS SHALL BE FASTENED SECURELY AND MADE AIR TIGHT.

RADIUS ELBOW WITH SQUARE THROAT NOT ALLOWED

USAGE OF THIS TYPE OF ELBOW WILL RESULT IN REMOVAL AND REPLACEMENT WITH RADIUS ELBOW OR VANED MITERED ELBOW AT CONTRACTOR'S EXPENSE.

① LOW VELOCITY DUCT LAYOUT DETAILS
12" = 1'-0"

PLUMBING FIXTURE SCHEDULE

REFERENCE	MFR	MODEL	DESCRIPTION	TRIM
SK-1 (ADA)	ELKAY	DRKAD222065C	SINGLE BOWL, COUNTER TOP MOUNT, 18-GAUGE STAINLESS STEEL SINK WITH FAUCET AND BUBBLER. VERIFY FINAL DIMENSIONS FROM ARCH ELEVATION AND MILWORK DRAWINGS. COORDINATE ALL REQUIRED HOLES FOR TRIM AND INDICATE IN SUBMITTAL. REMOVEABLE STAINLESS STEEL BASKET STRAINER AND TAIL PIECE.	NA

NOTES:

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Date: 09/22/2020
Project Number: 90060
Drawn By: MK
Checked By: SLS

Revision Schedule:

Sheet Title:
MECHANICAL DETAILS

Sheet Number:
M-300

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9/22/2020 11:07:56 AM

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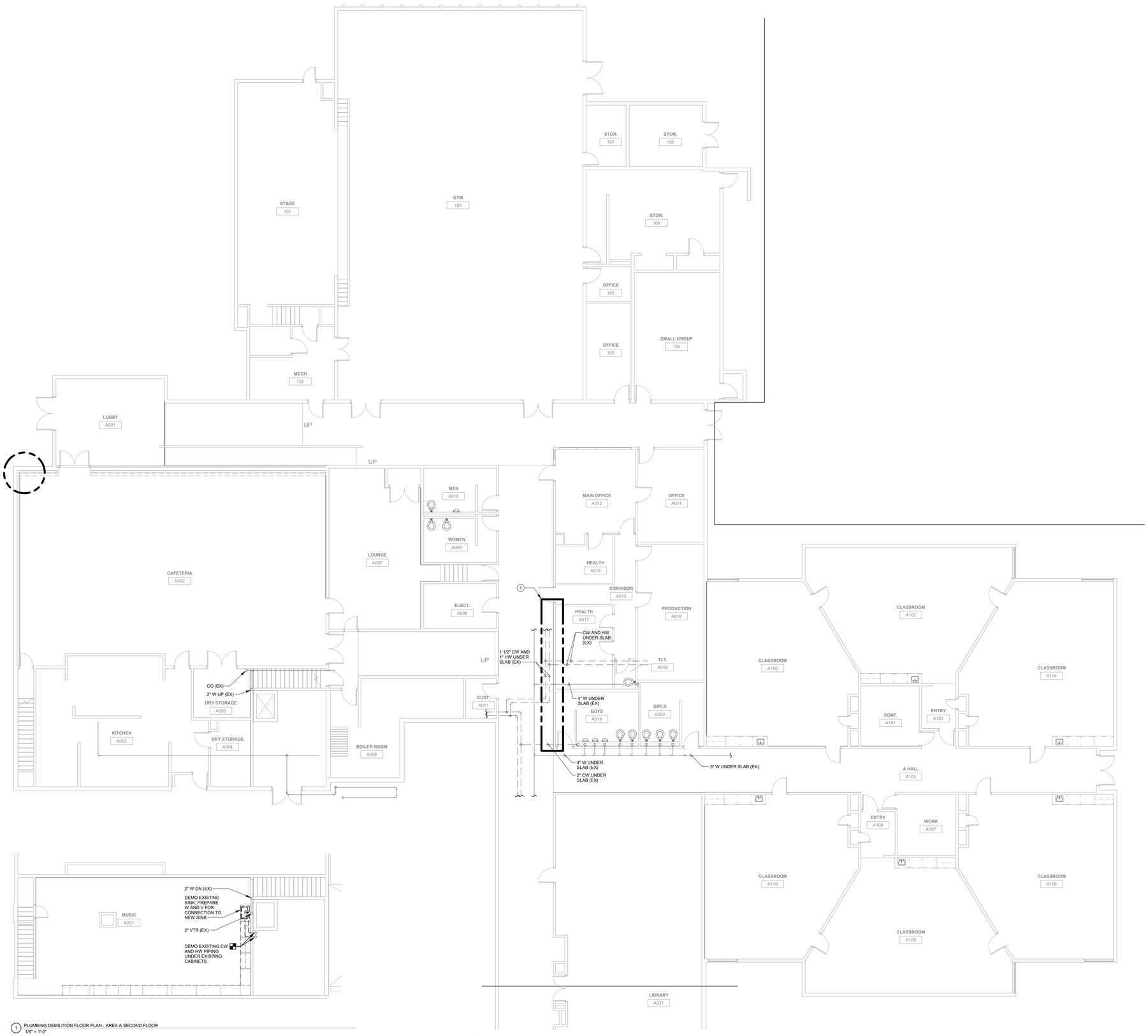

1 PLUMBING DEMILITION FLOOR PLAN - AREA A SECOND FLOOR
1/8" = 1'-0"

2 PLUMBING DEMOLITION FLOOR PLAN - AREA B
1/8" = 1'-0"

GENERAL NOTES:

1. REFER TO M-000 FOR GENERAL NOTES & SYMBOLS.
2. PATCH WALLS, ROOFS, AND/OR FLOOR WHERE DUCTS, GRILLES, PIPES, OR EQUIPMENT ARE REMOVED. PAINT OR FINISH TO MATCH ORIGINAL CONSTRUCTION.
3. COORDINATE WITH OWNER AND ASBESTOS ABATEMENT CONTRACTOR FOR WORK IN AREAS CONTAINING ASBESTOS.
4. WHERE DUCTWORK IS REMOVED, REMOVE ALL ASSOCIATED SUPPORTS.
5. WHERE EQUIPMENT IS REMOVED, REMOVE ALL ASSOCIATED SUPPORTS, DUCTWORK, PIPING, AND CONTROLS.

SHEET - KEYNOTES

1 DEMOLISH ALL PLUMBING THAT WILL INTERFERE WITH CONSTRUCTION OF NEW SHEAR WALL. THIS WILL INCLUDE (1) 2" COLD WATER LINE AND (2) 4" WASTE LINES THAT MAY NEED TO BE RELOCATED. AND (1) SET OF COLD AND HOT WATER LINES. FIELD VERIFY ALL SIZING AND REPLACE WITH NEW TO MATCH EXISTING.

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Date:	08/05/20
Project Number:	90060
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Checked By:	Checker

Revision Schedule:

Sheet Title:
PLUMBING DEMO FLOOR PLAN - AREA A, B. C NORTH

Sheet Number:
PD-201

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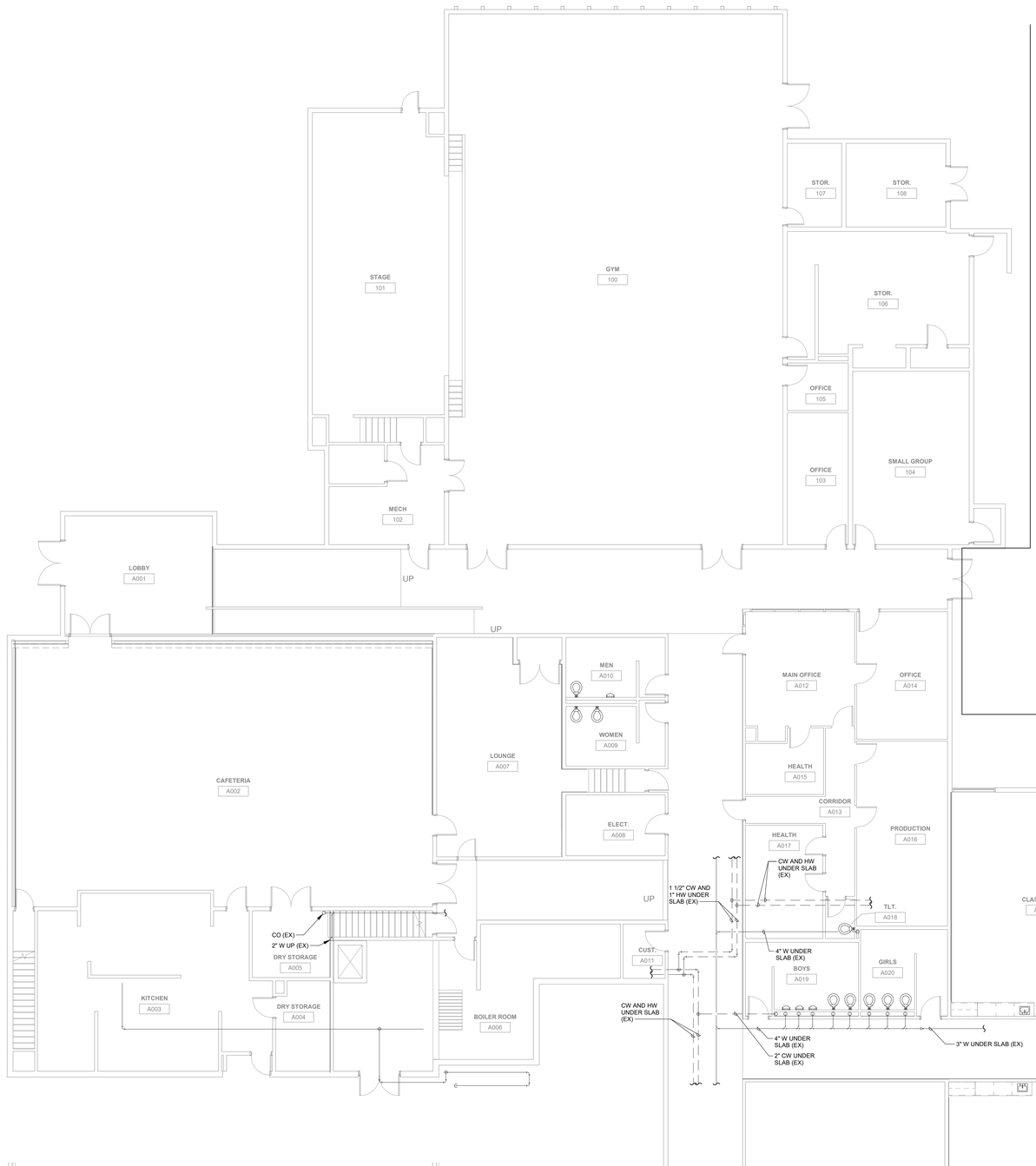

1 PLUMBING FLOOR PLAN - AREA A SECOND FLOOR
1/8" = 1'-0"

2 PLUMBING FLOOR PLANS - AREA B
1/8" = 1'-0"

GENERAL NOTES:

1. REFER TO M-000 FOR GENERAL NOTES & SYMBOLS.
2. REFER TO P-300 FOR PLUMBING DETAILS.
3. REFER TO P-500 FOR PLUMBING SCHEDULES.
4. COORDINATE PIPE ROUTING WITH DUCTWORK. DUCTWORK HAS PRIORITY OVER PRESSURE PIPING.
5. BRANCH PIPING SHALL BE TAKEN OFF THE TOP OF MAIN PIPING.

SHEET - KEYNOTES

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COOPER MOUNTAIN ELEMENTARY SCHOOL
SEISMIC SRGP IMPROVEMENTS

100% DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Date: 08/05/20
Project Number: 90060
Drawn By: Author
Checked By: Checker

Revision Schedule:

Sheet Title:
PLUMBING FLOOR PLAN - AREA A, B, C NORTH

Sheet Number:
P-201

100% DESIGN DEVELOPMENT

9/3/2020 10:56:39 AM

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PLUMBING FIXTURE SCHEDULE

REFERENCE	MFR	MODEL	DESCRIPTION	TRIM
SK-1 (ADA)	ELKAY	DRKAD222065C	SINGLE BOWL, COUNTER TOP MOUNT, 18-GAUGE STAINLESS STEEL SINK WITH FAUCET AND BUBBLER. VERIFY FINAL DIMENSIONS FROM ARCH ELEVATION AND MILWORK DRAWINGS. COORDINATE ALL REQUIRED HOLES FOR TRIM AND INDICATE IN SUBMITTAL. REMOVEABLE STAINLESS STEEL BASKET STRAINER AND TAIL PIECE.	NA

NOTES:

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Date: 08/05/20
Project Number: 90060
Drawn By: Author
Checked By: Checker

Revision Schedule:

Sheet Title:
PLUMBING SCHEDULES

Sheet Number:
P-500

100% DESIGN DEVELOPMENT

9/3/2020 10:56:40 AM

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DEMOLITION AND RENOVATION NOTES - ELECTRICAL

A. THE ELECTRICAL DEMOLITION DRAWING SHOWING EXISTING CONDITIONS HAVE BEEN PREPARED BASED ON FIELD OBSERVATION AND ORIGINAL DRAWINGS. ADDITIONAL COMPONENTS MAY EXIST WHICH ARE NOT SHOWN, AND SUCH ITEMS SHALL BE DEALT WITH IN A MANNER SIMILAR TO THOSE ITEMS WHICH ARE SHOWN.

B. CONTRACTOR SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH EXISTING ELECTRICAL SYSTEM WHICH WILL BE AFFECTED BY THE DEMOLITION WORK. CONTRACTOR SHALL OBTAIN PERMISSION FROM OWNER'S REPRESENTATIVE TO SHUT OFF SERVICES OR SYSTEMS WHICH MAY AFFECT OTHER AREAS BEYOND THE LIMITS OF THE DEMOLITION AREA. SUCH PERMISSION WILL BE GRANTED ONLY AFTER OWNER'S REPRESENTATIVE IS INFORMED OF THE REASON FOR AND DURATION OF THE SHUTDOWN AND IS SATISFIED THAT THE SHUTDOWN CAN BE MADE WITH AS LITTLE INCONVENIENCE TO OTHER AREAS AS POSSIBLE.

C. PROVIDE PLANT, LABOR, AND MATERIALS TO REMOVE ELECTRICAL FACILITIES AND CLEAR THE AREA TO RECEIVE THE NEW WORK TO BE PROVIDED UNDER THIS CONTRACT.

D. CONDUITS, BOXES, ETC., SHALL BE REMOVED AS REQUIRED BY WALL AND CEILING DEMOLITION AND ADJACENT REMOVALS. REMOVE EXISTING WIRING FOR REMOVED DEVICES.

E. INSTALL NEW CONDUCTORS FOR NEW CIRCUITS IN REMODELED AREAS UNLESS SPECIFICALLY NOTED OTHERWISE. EXISTING CONDUITS IN GOOD CONDITION MAY BE RETAINED FOR CONTINUED USE AS APPLICABLE.

F. BRANCH CIRCUITS TO BE DISCONNECTED SHALL BE IDENTIFIED AS TO LOCATION OR ITEM SERVED BEFORE DISCONNECTING.

G. CIRCUITS SERVING AREAS BEYOND THE DEMOLITION AREA SHALL BE MAINTAINED. EXTEND AND/OR RECONNECT NEW WIRING TO EXISTING AS REQUIRED TO MAINTAIN EXISTING CIRCUITS.

H. EXISTING BUILDING SYSTEMS THAT ARE NOT AFFECTED BY THE SCOPE OF THE PROJECT ARE TO BE KEPT OPERATIONAL IN OCCUPIED AREAS OF THE BUILDING THROUGH THE DURATION OF THE PROJECT. COORDINATE REQUIRED OUTAGES WITH THE OWNER IN ADVANCE OF SHUT DOWN.

I. DO NOT CUT EXISTING TELECOMMUNICATION WIRING, CABLES OR CONDUIT AS EXISTING SYSTEMS SHALL REMAIN OPERATIONAL DURING ALL PHASES OF CONSTRUCTION. CONTRACTOR WHO CUTS IN-SERVICE CABLES SHALL BE RESPONSIBLE FOR DOWNTIME AND COSTS TO REPAIR.

J. INSTALL STAINLESS STEEL COVER PLATE OVER HOLE AT REMOVED DEVICE LOCATIONS, INCLUDING BUT NOT LIMITED TO, CLOCKS, RECEPTACLES, SWITCHES, JUNCTION BOXES, ETC.

K. PROVIDE CUTTING AND PATCHING OF EXISTING CONSTRUCTION AS REQUIRED FOR THE PROPER COMPLETION OF THE DEMOLITION WORK AND THE INSTALLATION OF THE NEW WORK.

L. EQUIPMENT AND DEVICES SHOWN AS EXISTING OR AS REMOVE/RELOCATE SHALL BE PROTECTED AND HANDLED WITH APPROPRIATE CARE SO AS TO MAINTAIN FULL FUNCTIONAL AND AESTHETIC INTEGRITY OF THE DEVICE.

M. REMOVED EQUIPMENT AND SYSTEMS SHALL REMAIN THE PROPERTY OF THE OWNER UNLESS OTHERWISE NOTED. ALL MATERIALS NOT SALVAGED BY THE OWNER SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR FOR PROPER DISPOSAL.

N. REMOVE AND REINSTALL CEILING TILES REQUIRED FOR THE WORK BEING DONE UNDER THIS CONTRACT. DAMAGED CEILING TILES SHALL BE REPLACED TO MATCH EXISTING.

GENERAL NOTES - ELECTRICAL

A. COORDINATE LOCATION/INSTALLATION OF MECHANICAL AND ELECTRICAL WORK WITH ALL OTHER TRADES. NO ASPECT OF A SYSTEM INSTALLATION OR ITS ROUGH-IN SHALL COMMENCE UNTIL PROPER AND TIMELY COORDINATION WITH ALL TRADES ASSOCIATED WITH THE INSTALLATION HAS OCCURRED. ITEMS TO BE COORDINATED SHALL INCLUDE BUT NOT BE LIMITED TO: BUILDING STRUCTURE, SHEET METAL, ALL PIPING SYSTEMS, LIGHT FIXTURES, CONDUITS, CABLE TRAYS, ETC. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT. ANY REWORK OF INSTALLED EQUIPMENT OR SYSTEMS WILL BE AT THE CONTRACTORS EXPENSE.

B. NOTE THAT THE ELECTRICAL DRAWINGS ARE ONLY A PORTION OF THE COMPLETE SET OF PLANS CONTRACT DOCUMENTS. THE COMPLETE SET CONTRACT OF DOCUMENTS SHALL BE USED TO DEFINE THE ELECTRICAL SCOPE OF WORK. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO, USING THE ARCHITECTURAL PLANS FOR DIMENSIONS AND DETAILS; EQUIPMENT PLANS FOR ROUGH-IN REQUIREMENTS, AND THE MECHANICAL PLANS FOR EQUIPMENT SIZES AND LOCATIONS.

INSTALLATION NOTES - LIGHTING

A. UNLESS NOTED OTHERWISE, CONNECT ALL EMERGENCY BATTERY FIXTURES WITH AN UN-SWITCHED LEG OF THE LIGHTING CIRCUIT THAT SERVES THE SPACE THE EMERGENCY FIXTURE IS LOCATED WITHIN. NORMAL SWITCHING SCHEME SHOULD BE MAINTAINED UNDER NORMAL OPERATING OF EMERGENCY FIXTURES DESIGNATED. WIRE PER EMERGENCY FIXTURE OR TRANSFER DEVICE INSTRUCTIONS.

B. VERIFY CEILING TYPE (IE. GRID, GYP) WITH ARCHITECTURAL REFLECTED CEILING PLANS PRIOR TO RELEASE OF LIGHTING FIXTURE EQUIPMENT PACKAGE. ADJUST FIXTURE TYPE, CONSTRUCTION, FLANGE, OR OTHER COORDINATION DETAILS AS REQUIRED FOR CEILING TYPE.

C. OCCUPANCY SENSORS SHOWN ON PLANS ARE SUGGESTED LOCATIONS ONLY AND MUST BE VERIFIED WITH SPECIFIC MANUFACTURER GUIDELINES AND INSTALLATION RECOMMENDATIONS AS NOTED IN LIGHTING CONTROL SHOP DRAWINGS. ADJUST LOCATIONS AS REQUIRED TO MEET MANUFACTURER GUIDELINES.

D. LIGHTING CONTROL SYSTEMS SHALL BE PROVIDED AS A COMPLETE OPERATING SYSTEM AND INCLUDE MATERIAL AND INSTALLATION FOR ALL POWER PACKS, ACCESSORIES, CONTROLLERS, AND WIRING REQUIRED FOR THE SYSTEM.

INSTALLATION NOTES - ELECTRICAL

A. CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH EXISTING CONDITIONS PRIOR TO BID.

B. INCREASE CONDUCTOR SIZES ON 120V-1 PHASE CIRCUITS EXCEEDING 100 FEET TO CENTER OF LOAD TO ACCOUNT FOR VOLTAGE DROP.

C. RACEWAYS AND BOXES ARE SHOWN DIAGRAMMATICALLY ONLY AND INDICATE THE GENERAL AND APPROXIMATE LOCATION. THE LAYOUT DOES NOT NECESSARILY SHOW THE TOTAL NUMBER OF RACEWAYS OR BOXES FOR THE CIRCUITS REQUIRED, NOR ARE THE LOCATIONS OF INDICATED RUNS INTENDED TO SHOW THE ACTUAL ROUTING OF THE RACEWAYS.

D. LIGHT FIXTURES, SWITCHES, DEVICES, ETC. ARE SHOWN IN PREFERRED LOCATION. E.C. RESPONSIBLE FOR MODIFYING CONDUIT, HANGERS, CIRCUITING, ETC. TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM.

E. PROVIDE A DEDICATED GREEN INSULATED GROUND CONDUCTOR TO ALL DEVICES. THE CONDUIT SYSTEM SHALL NOT BE USED AS THE ONLY EQUIPMENT GROUNDING METHOD.

F. DO NOT INSTALL DEVICES BACK TO BACK ON OPPOSITE SIDES OF WALL. MAINTAIN MINIMUM OF 8" DISTANCE BETWEEN WHEREVER APPLICABLE.

G. BALANCE THE LOAD ON PANELS AS EVENLY AS POSSIBLE DURING INSTALLATION. CIRCUIT NUMBERING SHOWN ON PLANS MAY BE ADJUSTED.

H. PROVIDE FINAL TYPED PERMANENT PANEL DIRECTORY AT PROJECT COMPLETION.
I. CONTRATOR IS RESPONSIBLE FOR OPENINGS IN WALLS CREATED BY THEIR WORK.

J. PENETRATIONS SHALL BE SEALED IN ACCORDANCE WITH THE RATINGS OF THE AFFECTED WALL. REFER TO ARCHITECTURAL CODE PLAN FOR RATED WALLS.

CODE NOTES - ELECTRICAL

A. THE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND NATIONAL CODES.

B. THE CURRENT ADOPTED EDITION OF THE ELECTRICAL CODE SHALL BE THE STANDARD FOR THE ELECTRICAL INSTALLATION. VERIFY WITH LOCAL OFFICIALS WHEN PERMITS ARE OBTAINED. NOTIFY DESIGN TEAM OF ANY DESCREPANCIES BETWEEN THE PROJECT MANUAL OR DRAWINGS AND THE GOVERNING CODE.

C. INSTALLATION SHALL FOLLOW ALL REQUIREMENTS OF THE ADAAG – AMERICANS WITH DISABILITIES ACT.

D. REFER TO PROJECT MANUAL AND PROJECT CODE REVIEW SHEET FOR LIST OF APPLICABLE CODES.

ELECTRICAL ABBREVIATIONS

A	DEVICE MOUNTED +8" ABOVE COUNTER TOP (VERIFY LOCATION)	NIC	NOT IN CONTRACT
AFF	ABOVE FINISHED FLOOR	NM	NONMETALLIC
ATS	AUTOMATIC TRANSFER SWITCH	NTS	NOT TO SCALE
C	CEILING	OC	ON CENTER
CB	CIRCUIT BREAKER	OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
CT	CURRENT TRANSFORMER	OFOI	OWNER FURNISHED, OWNER INSTALLED
E	EXISTING ITEM TO REMAIN	R	EXISTING ITEM TO BE REMOVED
EC	ELECTRICAL CONTRACTOR	RR	EXISTING ITEM TO BE REMOVED AND RELOCATED
EM	EMERGENCY LIGHT FIXTURE	RN	EXISTING ITEM TO BE REMOVED AND REPLACED WITH NEW
ER	NEW LOCATION OF EXISTING ITEM	SCCR	SHORT CIRCUIT CURRENT RATING
F	ROUGH IN FOR FUTURE DEVICE	T	TAMPER PROOF DEVICE
FAAP	FIRE ALARM ANNUNCIATOR PANEL	TCC	TEMPERATURE CONTROL CONTRACTOR
FACP	FIRE ALARM CONTROL PANEL	TV	TELEVISION
FSD	FIRE SMOKE DAMPER	TYP	TYPICAL
G	GROUND FAULT CIRCUIT INTERRUPTER	UPS	UNINTERRUPTIBLE POWER SUPPLY
GND	GROUND	V	VOLTS
KVA	KILO-VOLT-AMPERES	VA	VOLT-AMPERES
KW	KILOWATTS	WG	WIREGUARD COVER
MC	MECHANICAL CONTRACTOR	WP	WEATHERPROOF DEVICE
MCB	MAIN CIRCUIT BREAKER	WR	WEATHER RESISTANT DEVICE
MDP	MAIN DISTRIBUTION PANEL	+24"	INDICATES MOUNTING HEIGHT CENTER LINE OF DEVICE TO FINISHED FLOOR
MLO	MAIN LUGS ONLY		
N	NEW DEVICE IN EXISTING LOCATION		

POWER SYMBOLS

- SINGLE RECEPTACLE, WALL MOUNT +18", OR AS NOTED
- DUPLEX RECEPTACLE, CEILING MOUNT
- DUPLEX RECEPTACLE, TAMPER-RESISTANT, WALL MOUNT +18", OR AS NOTED
- SR — DUPLEX RECEPTACLE, SURFACE RACEWAY, WALL MOUNT +18", OR AS NOTED
- G — DUPLEX GFCI RECEPTACLE, TAMPER-RESISTANT, WALL MOUNT +18", OR AS NOTED
- EWC — DUPLEX RECEPTACLE, MOUNTED WITHIN WATER COOLER HOUSING, VERIFY HEIGHT. CONNECT TO GFCI, CIRCUIT BREAKER OR REMOTE WALL DEVICE.
- W — DUPLEX GFCI RECEPTACLE WITH WEATHER-PROOF IN-USE COVER, TAMPER-RESISTANT, WALL MOUNT +24", OR AS NOTED
- QUADRAPLEX RECEPTACLE, TAMPER-RESISTANT, WALL MOUNT +18", OR AS NOTED
- QUADRAPLEX GFCI RECEPTACLE, TAMPER-RESISTANT, WALL MOUNT +18", OR AS NOTED
- EQUIPMENT CONNECTION, REFER TO ELECTRICAL EQUIPMENT CONNECTION SCHEDULE FOR CONNECTION TYPE
- EQUIPMENT CONNECTION, WALL MOUNT +18", OR AS NOTED, REFER TO ELECTRICAL EQUIPMENT CONNECTION SCHEDULE FOR CONNECTION TYPE
- JUNCTION BOX, WITH PULL STRING, WALL MOUNT, REFER TO PLAN OR DETAIL FOR MOUNTING HEIGHT
- GROUND BAR
- T — UTILITY TRANSFORMER
- M — UTILITY METER
- SAFETY DISCONNECT SWITCH
- PLUG STRIP, SURFACE MOUNTED. ELEVATION AS NOTED.
- PANELBOARD - SURFACE MOUNTED
- PANELBOARD - RECESSED IN WALL
- DISTRIBUTION PANELBOARD/SWITCHBOARD - SURFACE MOUNTED AS NOTED.

FIRE DETECTION AND ALARM SYMBOLS

- F — MANUAL FIRE ALARM PULL STATION
- S — SMOKE DETECTOR
- S — SMOKE DETECTOR - WALL MOUNTED
- H — HORN - WALL MOUNTED
- COMBINATION HORN WITH STROBE - WALL MOUNTED
- C — COMBINATION HORN WITH STROBE - CEILING MOUNTED
- STROBE - WALL MOUNTED
- FAA — FIRE ALARM ANNUNCIATOR PANEL
- FACP — FIRE ALARM CONTROL PANEL + EMERGENCY COMMUNICATIONS PANEL

LIGHTING SYMBOLS

- a — RECESSED LIGHT FIXTURE, LETTER INDICATES SWITCH LEG (TYPICAL), SHADING INDICATES EMERGENCY LIGHT (TYPICAL)
- SURFACE MOUNTED STRIP FIXTURE
- SQUARE LIGHT FIXTURE - SURFACE MOUNTED
- EMERGENCY LIGHT FIXTURE, WALL MOUNT, +96" OR AS NOTED
- EMERGENCY LIGHT FIXTURE, CEILING MOUNT
- EXIT SIGN, WALL MOUNT +96", SHADED AREAS INDICATE NUMBER OF FACES, ARROWS INDICATE SIGN ARROWS
- EXIT SIGN, CEILING MOUNT, SHADED AREAS INDICATE NUMBER OF FACES, ARROWS INDICATE SIGN ARROWS
- INTERIOR LIGHT FIXTURE, WALL MOUNT
- $ a — SINGLE POLE SWITCH, WALL MOUNT +48", OR AS NOTED, LETTER INDICATES SWITCH LEG
- 3 $ b — THREE WAY SWITCH, WALL MOUNT +48", OR AS NOTED, LETTER INDICATES SWITCH LEG
- P $ c — PILOT LIGHT SWITCH, WALL MOUNT +48", OR AS NOTED, LETTER INDICATES SWITCH LEG
- D $ d — DIMMER SWITCH, WALL MOUNT +48", OR AS NOTED, LETTER INDICATES SWITCH LEG
- 1 c — OCCUPANCY SENSOR, WALL MOUNT +48" OR AS NOTED, NUMBER INDICATES TYPE, LETTER INDICATES SWITCH LEG, REFER TO LIGHTING CONTROLS SCHEDULE
- 1 a — OCCUPANCY SENSOR, CEILING MOUNT, NUMBER INDICATES TYPE, LETTER INDICATES SWITCH LEG, REFER TO LIGHTING CONTROLS SCHEDULE

TELECOMMUNICATIONS INFRASTRUCTURE SYMBOLS

- # — DATA OUTLET
- WAP — WIRELESS ACCESS POINT
- TV — CABLE TELEVISION LOCATION - RADIO GRADE CABLING

WIRED/WIRELESS CLOCKS SYMBOLS

- C 2 — CLOCK - WALL MOUNTED - "2" INDICATES DUAL FACE
- C 2 — CLOCK - CEILING MOUNTED - "2" INDICATES DUAL FACE

NOTE: NOT ALL SYMBOLS APPLY TO THIS PROJECT

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Date: 09/22/2020
Project Number: 90060
Drawn By: NB
Checked By: AK

Revision Schedule:

Sheet Title:
ELECTRICAL GENERAL NOTES AND SYMBOLS

Sheet Number:
E-000

100% DESIGN DEVELOPMENT

9/22/2020 11:45:07 AM

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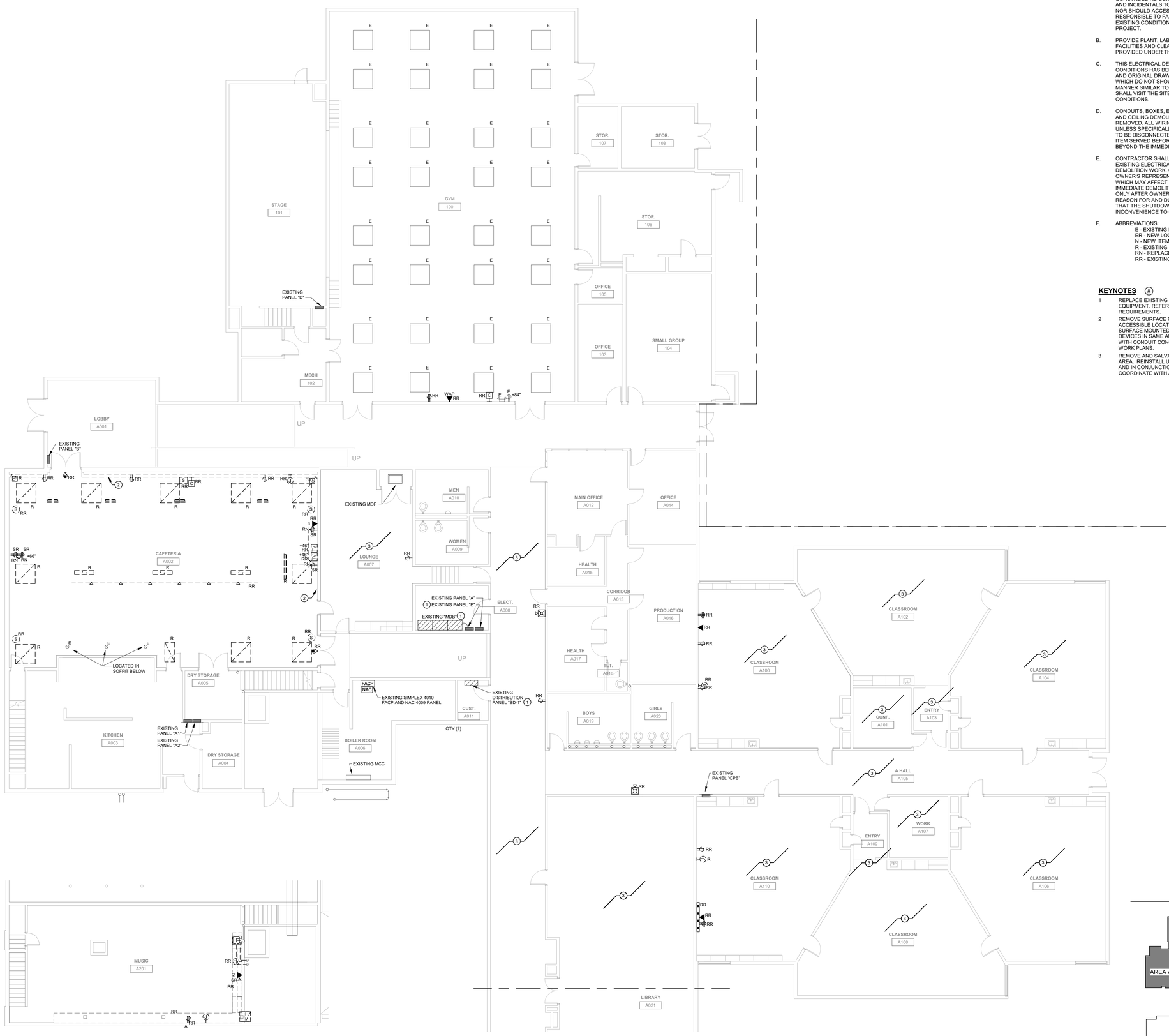

ELECTRICAL DEMOLITION NOTES

A. DEMOLITION DRAWINGS PRESENT LAYOUT OF EXISTING CONDITIONS AND MAJOR MECHANICAL/ELECTRICAL ITEMS. THEY ARE NOT TO BE CONSTRUED AS COMPLETE IN REPRESENTATION OF ACCESSORIES AND INCIDENTALS TO BE REMOVED, REPLACED, OR REWORKED. NOR SHOULD ACCESSIBILITY BE INFERRED. THE CONTRACTOR IS RESPONSIBLE TO FAMILIARIZE THEMSELVES WITH THE BUILDING AND EXISTING CONDITIONS, PRIOR TO THE SUBMITTING OF A BID FOR THIS PROJECT.

B. PROVIDE PLANT, LABOR, AND MATERIALS TO REMOVE ELECTRICAL FACILITIES AND CLEAR THE AREA TO RECEIVE THE NEW WORK TO BE PROVIDED UNDER THIS CONTRACT.

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D. CONDUITS, BOXES, ETC., SHALL BE REMOVED AS REQUIRED BY WALL AND CEILING DEMOLITION AND REMOVALS. WIRING SHALL BE REMOVED. ALL WIRING FOR THE REMODELED AREAS SHALL BE NEW UNLESS SPECIFICALLY NOTED OTHERWISE. ALL BRANCH CIRCUITS TO BE DISCONNECTED SHALL BE IDENTIFIED AS TO LOCATION OR ITEM SERVED BEFORE DISCONNECTING. CIRCUITS SERVING AREAS BEYOND THE IMMEDIATE DEMOLITION AREA SHALL BE MAINTAINED.

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F. ABBREVIATIONS:
- E - EXISTING ITEM TO REMAIN
- ER - NEW LOCATION OF EXISTING ITEM
- N - NEW ITEM IN EXISTING LOCATION
- R - EXISTING ITEM TO BE REMOVED, PATCH AND/OR COVER
- RN - REPLACE EXISTING WITH NEW
- RR - EXISTING ITEM TO BE REMOVED AND RELOCATED

KEYNOTES (#)

1 REPLACE EXISTING RIGID CONDUIT CONNECTION(S) AT EQUIPMENT. REFER TO ONE-LINE DIAGRAM FOR REQUIREMENTS.

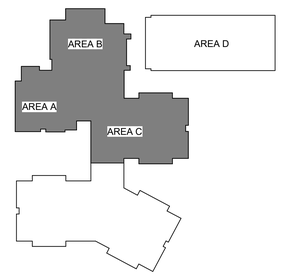
2 REMOVE SURFACE RACEWAY AND EXPOSED CONDUIT TO ACCESSIBLE LOCATION ALONG THIS WALL. REPLACE SURFACE MOUNTED DEVICES WITH NEW RECESSED DEVICES IN SAME APPROXIMATE LOCATION AS EXISTING WITH CONDUIT CONCEALED IN NEW WALL. REFER TO NEW WORK PLANS.

3 REMOVE AND SALVAGE EXISTING CEILING LIGHTING IN THIS AREA. REINSTALL UPON COMPLETION OF SEISMIC WORK AND IN CONJUNCTION WITH CEILING INSTALLATION. COORDINATE WITH ARCHITECTURAL REQUIREMENTS.

2 SECOND FLOOR ELECTRICAL DEMOLITION PLAN - AREA A
1/8" = 1'-0"

1 FIRST FLOOR ELECTRICAL DEMOLITION PLAN - AREA A, B, C NORTH
1/8" = 1'-0"

KEY PLAN



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100% DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Date: 09/22/2020
Project Number: 90060
Drawn By: NB
Checked By: AK

Revision Schedule:

Sheet Title:
ELECTRICAL DEMOLITION PLANS - AREA A, B, C NORTH

Sheet Number:
ED-201

100% DESIGN DEVELOPMENT

9/22/2020 11:45:15 AM

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1 FIRST FLOOR ELECTRICAL DEMOLITION PLAN - AREA C SOUTH
1/8" = 1'-0"

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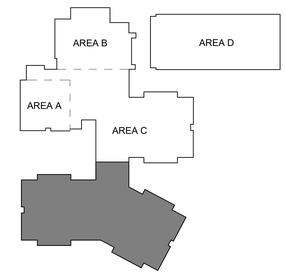
- RR - EXISTING ITEM TO BE REMOVED AND RELOCATED

KEYNOTES (#)

1 REMOVE AND SALVAGE EXISTING CEILING LIGHTING IN THIS AREA. REINSTALL UPON COMPLETION OF SEISMIC WORK AND IN CONJUNCTION WITH CEILING INSTALLATION. COORDINATE WITH ARCHITECTURAL REQUIREMENTS.

2 REMOVE AND SALVAGE EXISTING IDF CABINET, COMMUNICATIONS CABLING, AND CONNECTIONS. REINSTALL UPON COMPLETION OF WALL MODIFICATIONS.

KEY PLAN



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100% DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Date:	09/22/2020
Project Number:	90060
Drawn By:	NB
Checked By:	AK

Revision Schedule:

Sheet Title:
ELECTRICAL DEMOLITION PLAN - AREA C SOUTH

Sheet Number:
ED-202

100% DESIGN DEVELOPMENT

9/22/2020 11:45:16 AM

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ELECTRICAL DEMOLITION NOTES

A. DEMOLITION DRAWINGS PRESENT LAYOUT OF EXISTING CONDITIONS AND MAJOR MECHANICAL/ELECTRICAL ITEMS. THEY ARE NOT TO BE CONSTRUED AS COMPLETE IN REPRESENTATION OF ACCESSORIES AND INCIDENTALS TO BE REMOVED, REPLACED, OR REWORKED. NOR SHOULD ACCESSIBILITY BE INFERRED. THE CONTRACTOR IS RESPONSIBLE TO FAMILIARIZE THEMSELVES WITH THE BUILDING AND EXISTING CONDITIONS, PRIOR TO THE SUBMITTING OF A BID FOR THIS PROJECT.

B. PROVIDE PLANT, LABOR, AND MATERIALS TO REMOVE ELECTRICAL FACILITIES AND CLEAR THE AREA TO RECEIVE THE NEW WORK TO BE PROVIDED UNDER THIS CONTRACT.

C. THIS ELECTRICAL DEMOLITION DRAWING SHOWING EXISTING CONDITIONS HAS BEEN PREPARED BASED ON FIELD OBSERVATION AND ORIGINAL DRAWINGS. ADDITIONAL COMPONENTS MAY EXIST WHICH DO NOT SHOW, AND SUCH ITEMS SHALL BE DEALT WITH IN A MANNER SIMILAR TO THOSE ITEMS WHICH DO SHOW. CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS.

D. CONDUITS, BOXES, ETC., SHALL BE REMOVED AS REQUIRED BY WALL AND CEILING DEMOLITION AND REMOVALS. WIRING SHALL BE REMOVED. ALL WIRING FOR THE REMODELED AREAS SHALL BE NEW UNLESS SPECIFICALLY NOTED OTHERWISE. ALL BRANCH CIRCUITS TO BE DISCONNECTED SHALL BE IDENTIFIED AS TO LOCATION OR ITEM SERVED BEFORE DISCONNECTING. CIRCUITS SERVING AREAS BEYOND THE IMMEDIATE DEMOLITION AREA SHALL BE MAINTAINED.

E. CONTRACTOR SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH EXISTING ELECTRICAL SYSTEM WHICH WILL BE AFFECTED BY THE DEMOLITION WORK. CONTRACTOR SHALL OBTAIN PERMISSION FROM OWNER'S REPRESENTATIVE TO SHUT OFF SERVICES OR SYSTEMS WHICH MAY AFFECT OTHER AREAS BEYOND THE LIMITS OF THE IMMEDIATE DEMOLITION AREA. SUCH PERMISSION WILL BE GRANTED ONLY AFTER OWNER'S REPRESENTATIVE IS INFORMED OF THE REASON FOR AND DURATION OF THE SHUTDOWN AND IS SATISFIED THAT THE SHUTDOWN CAN BE MADE WITH AS LITTLE INCONVENIENCE TO OTHER AREAS AS POSSIBLE.

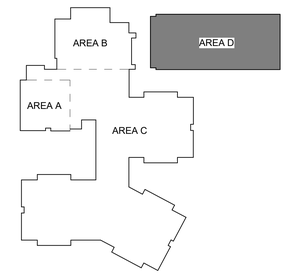
F. ABBREVIATIONS:
- E - EXISTING ITEM TO REMAIN
- ER - NEW LOCATION OF EXISTING ITEM
- N - NEW ITEM IN EXISTING LOCATION
- R - EXISTING ITEM TO BE REMOVED, PATCH AND/OR COVER
- RN - REPLACE EXISTING WITH NEW
- RR - EXISTING ITEM TO BE REMOVED AND RELOCATED

KEYNOTES (#)

1 REMOVE AND SALVAGE EXISTING CEILING LIGHTING IN THIS AREA. REINSTALL UPON COMPLETION OF SEISMIC WORK AND IN CONJUNCTION WITH CEILING INSTALLATION. COORDINATE WITH ARCHITECTURAL REQUIREMENTS.

1 FIRST FLOOR ELECTRICAL DEMOLITION PLAN - AREA D
1/8" = 1'-0"

KEY PLAN



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Date:	09/22/2020
Project Number:	90060
Drawn By:	NB
Checked By:	AK

Revision Schedule:

Sheet Title:
ELECTRICAL DEMOLITION PLAN - AREA D

Sheet Number:
ED-203

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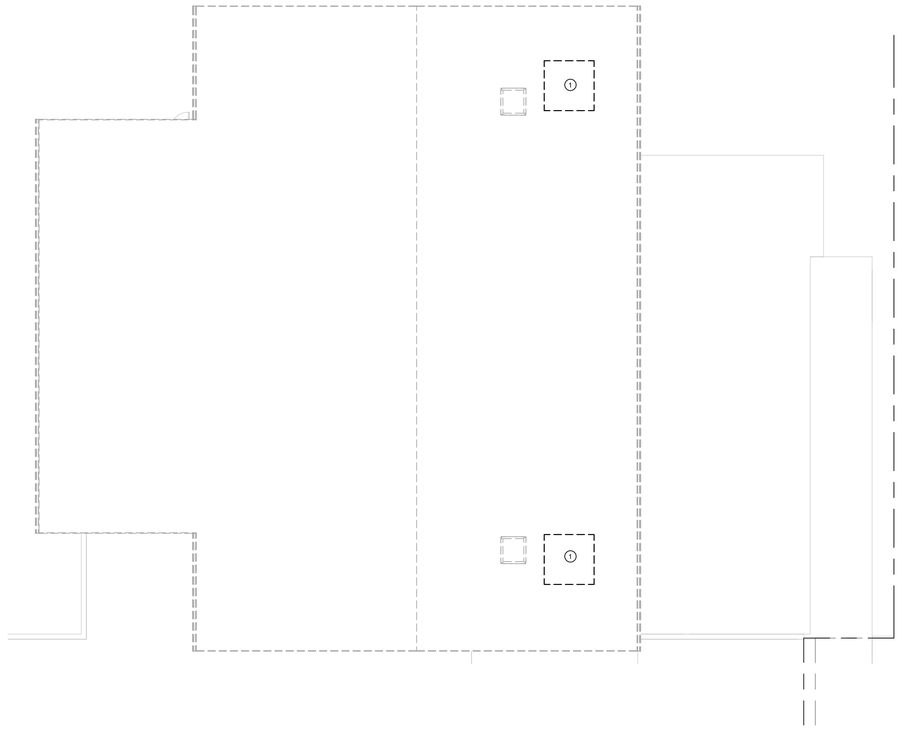
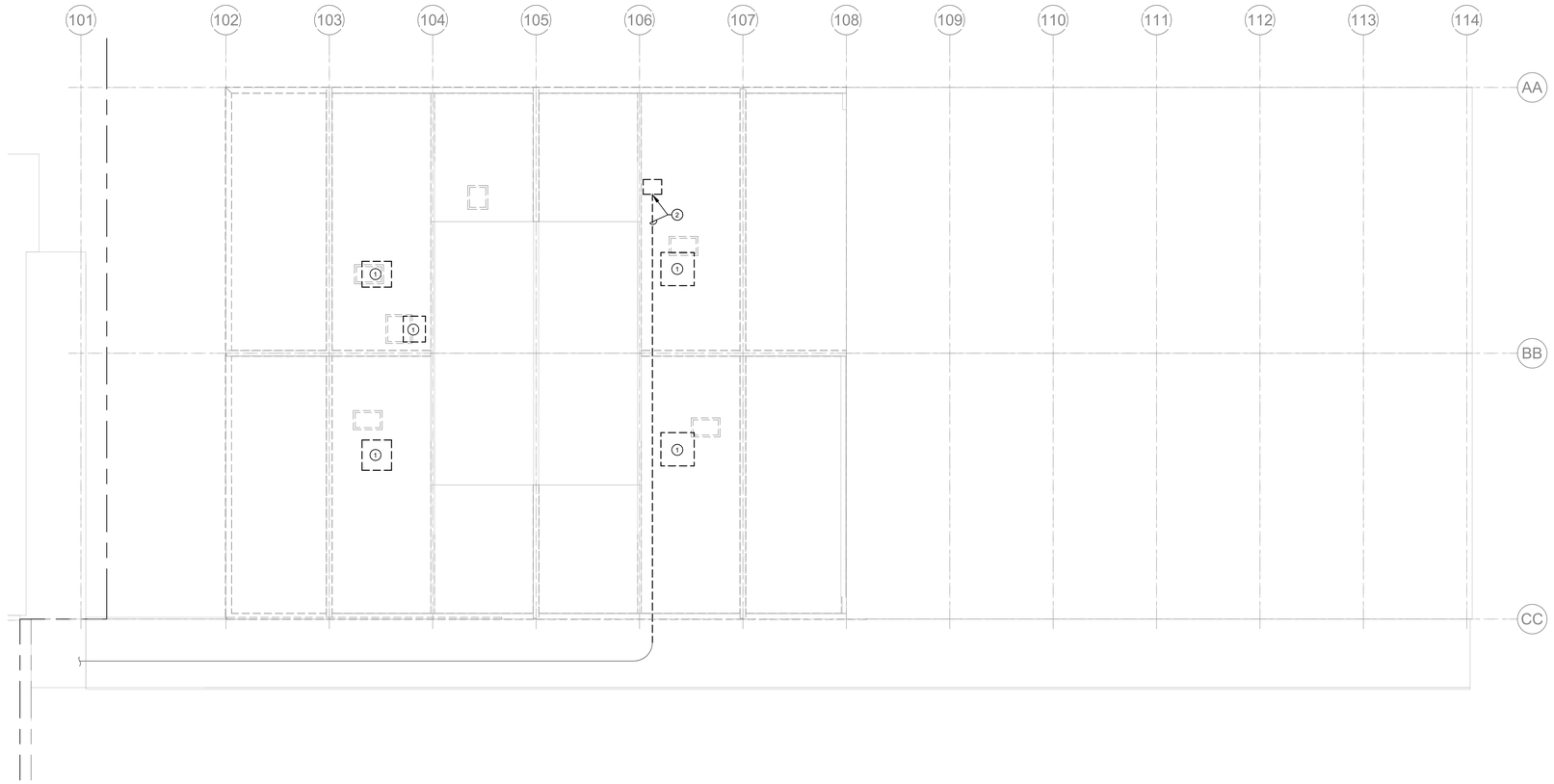


1 ROOF ELECTRICAL DEMOLITION PLAN - AREA B
1/8" = 1'-0"



2 ROOF ELECTRICAL DEMOLITION PLAN - AREA D
1/8" = 1'-0"

ELECTRICAL DEMOLITION NOTES

A. DEMOLITION DRAWINGS PRESENT LAYOUT OF EXISTING CONDITIONS AND MAJOR MECHANICAL/ELECTRICAL ITEMS. THEY ARE NOT TO BE CONSTRUED AS COMPLETE IN REPRESENTATION OF ACCESSORIES AND INCIDENTALS TO BE REMOVED, REPLACED, OR REWORKED, NOR SHOULD ACCESSIBILITY BE INFERRED. THE CONTRACTOR IS RESPONSIBLE TO FAMILIARIZE THEMSELVES WITH THE BUILDING AND EXISTING CONDITIONS, PRIOR TO THE SUBMITTING OF A BID FOR THIS PROJECT.

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D. CONDUITS, BOXES, ETC., SHALL BE REMOVED AS REQUIRED BY WALL AND CEILING DEMOLITION AND REMOVALS. WIRING SHALL BE REMOVED. ALL WIRING FOR THE REMODELED AREAS SHALL BE NEW UNLESS SPECIFICALLY NOTED OTHERWISE. ALL BRANCH CIRCUITS TO BE DISCONNECTED SHALL BE IDENTIFIED AS TO LOCATION OR ITEM SERVED BEFORE DISCONNECTING. CIRCUITS SERVING AREAS BEYOND THE IMMEDIATE DEMOLITION AREA SHALL BE MAINTAINED.

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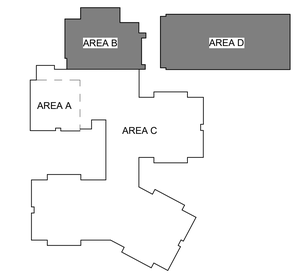
- ER - NEW LOCATION OF EXISTING ITEM
- N - NEW ITEM IN EXISTING LOCATION
- R - EXISTING ITEM TO BE REMOVED; PATCH AND/OR COVER
- RN - REPLACE EXISTING WITH NEW
- RR - EXISTING ITEM TO BE REMOVED AND RELOCATED

KEYNOTES (#)

1 REMOVE AND PULL BACK ELECTRICAL CONNECTIONS TO ROOF MOUNTED EQUIPMENT TO ALLOW FOR STRUCTURAL REINFORCEMENT AND ROOF REPLACEMENT.

2 REMOVE AND REPLACE EXPOSED COMMUNICATIONS FIBER AND COAX CABLING AT ROOF WITH NEW TO MATCH EXISTING. REFER TO NEW WORK DRAWINGS FOR ADDITIONAL INFORMATION.

KEY PLAN



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Date:	09/22/2020
Project Number:	90060
Drawn By:	NB
Checked By:	AK

Revision Schedule:

Sheet Title:
ELECTRICAL DEMOLITION ROOF PLANS - AREA B, D

Sheet Number:
ED-220

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9/22/2020 11:45:18 AM

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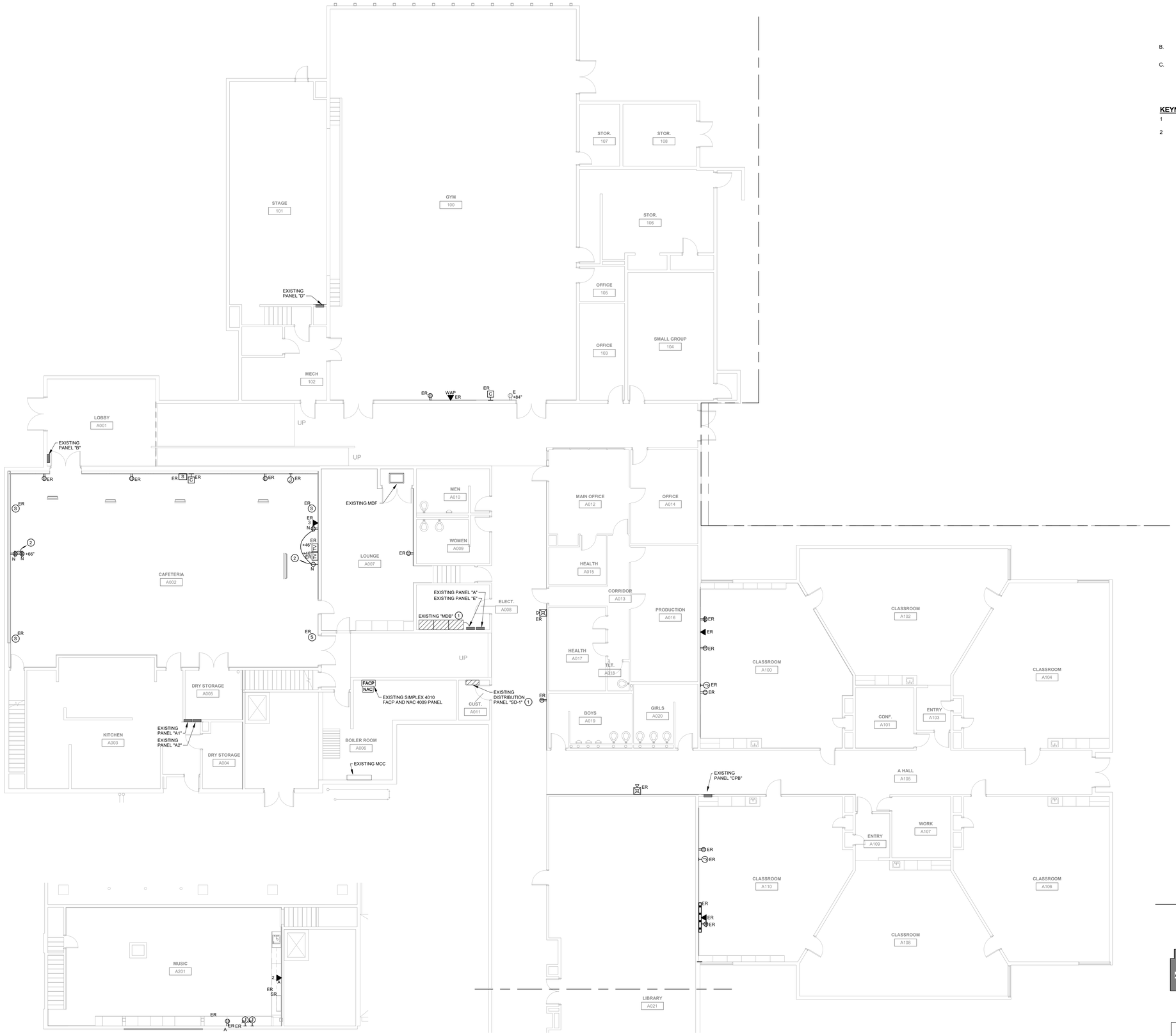
B. COORDINATE ELECTRICAL REQUIREMENTS FOR MECHANICAL UNITS WITH M.C. AND FINAL MECHANICAL SHOP DRAWINGS.

C. PROVIDE THE REQUIRED PENETRATIONS WHILE ROUTING CABLING THROUGH THE BUILDING. COORDINATE FIRE RATED WALL PENETRATIONS. PROVIDE CONDUIT SLEEVES AND FIRE STOPPING TO MAINTAIN THAT RATING.

KEYNOTES (#)

1 PROVIDE NEW CONDUIT CONNECTION(S) AT EQUIPMENT. REFER TO ONE-LINE DIAGRAM FOR REQUIREMENTS.

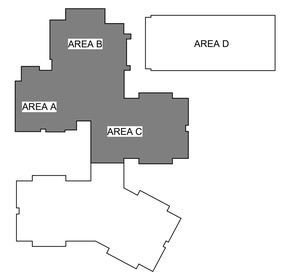
2 RECONNECT TO EXISTING CIRCUIT. TRANSITION TO CONCEALED MC CABLING FROM ACCESSIBLE LOCATION TO NEW DEVICES. EXTEND CONDUCTORS AS REQUIRED.



2 SECOND FLOOR ELECTRICAL PLAN - AREA A
1/8" = 1'-0"

1 FIRST FLOOR ELECTRICAL PLAN - AREA A, B, C NORTH
1/8" = 1'-0"

KEY PLAN



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Date: 09/22/2020
Project Number: 90060
Drawn By: NB
Checked By: AK

Revision Schedule:

Sheet Title:
ELECTRICAL FLOOR PLANS - AREA A, B, C NORTH

Sheet Number:
E-201

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9/22/2020 11:45:08 AM

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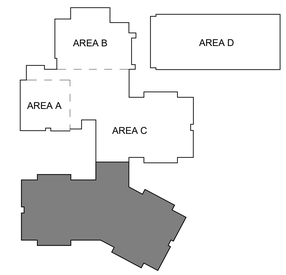
B. COORDINATE ELECTRICAL REQUIREMENTS FOR MECHANICAL UNITS WITH M.C. AND FINAL MECHANICAL SHOP DRAWINGS.

C. PROVIDE THE REQUIRED PENETRATIONS WHILE ROUTING CABLING THROUGH THE BUILDING. COORDINATE FIRE RATED WALL PENETRATIONS. PROVIDE CONDUIT SLEEVES AND FIRE STOPPING TO MAINTAIN THAT RATING.

KEYNOTES (#)

1 FIRST FLOOR ELECTRICAL PLAN - AREA C SOUTH
1/8" = 1'-0"

KEY PLAN



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Date:	09/22/2020
Project Number:	90060
Drawn By:	NB
Checked By:	AK

Revision Schedule:

Sheet Title:
ELECTRICAL FLOOR PLAN - AREA C SOUTH

Sheet Number:
E-202

9/22/2020 11:45:09 AM

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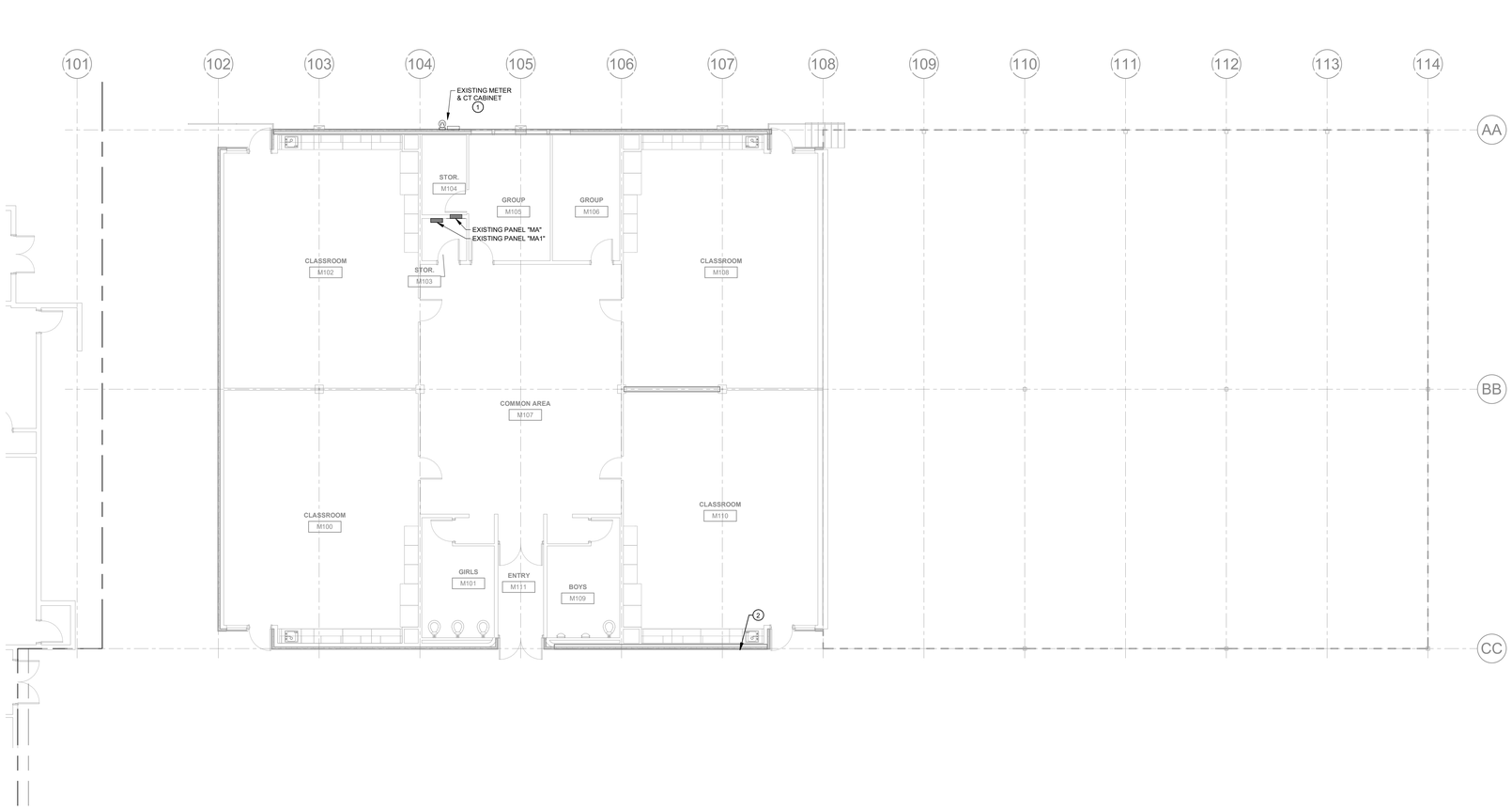
B. COORDINATE ELECTRICAL REQUIREMENTS FOR MECHANICAL UNITS WITH M.C. AND FINAL MECHANICAL SHOP DRAWINGS.

C. PROVIDE THE REQUIRED PENETRATIONS WHILE ROUTING CABLING THROUGH THE BUILDING. COORDINATE FIRE RATED WALL PENETRATIONS. PROVIDE CONDUIT SLEEVES AND FIRE STOPPING TO MAINTAIN THAT RATING.

KEYNOTES (#)

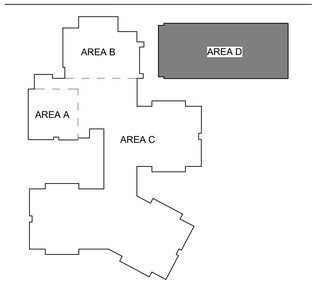
1 REMOVE AND SALVAGE EXISTING ELECTRICAL SERVICE AND METERING EQUIPMENT. REINSTALL UPON COMPLETION OF EXTERIOR WALL MODIFICATION.

2 REMOVE AND SALVAGE EXISTING WALL MOUNTED SPEAKER. REINSTALL UPON COMPLETION OF EXTERIOR WALL MODIFICATION.



1 FIRST FLOOR ELECTRICAL PLAN - AREA D
1/8" = 1'-0"

KEY PLAN



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Date: 09/22/2020
Project Number: 90060
Drawn By: NB
Checked By: AK

Revision Schedule:

Sheet Title:
ELECTRICAL FLOOR PLAN - AREA D

Sheet Number:
E-203

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9/22/2020 11:45:10 AM

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LIGHTING GENERAL NOTES

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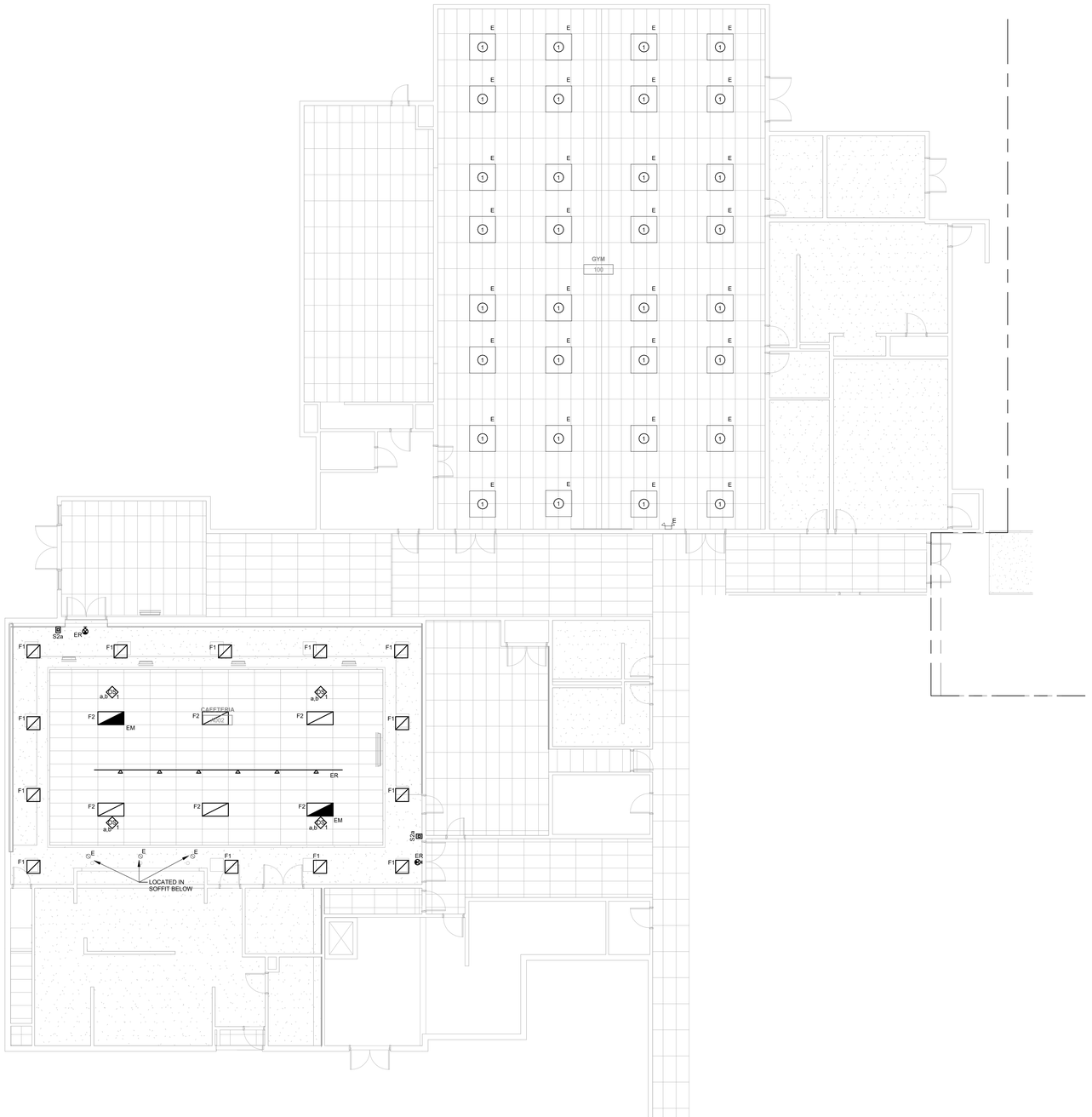
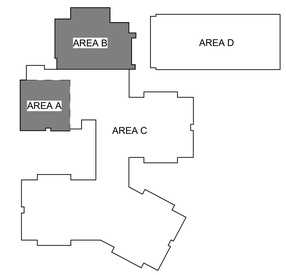
KEYNOTES (#)

1 INSTALL NEW PROTECTIVE WIRE CAGE COVER OVER EXISTING LIGHT FIXTURE. PROVIDE WITH CUSTOM DIMENSIONS BY STI OR APPROVED EQUAL.



1 FIRST FLOOR LIGHTING PLAN - AREA A, B
1/8" = 1'-0"

KEY PLAN



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Date:	09/22/2020
Project Number:	90060
Drawn By:	NB
Checked By:	AK

Revision Schedule:

Sheet Title:
LIGHTING CEILING PLAN - AREA A, B, C NORTH

Sheet Number:
E-211

100% DESIGN DEVELOPMENT

9/22/2020 11:45:11 AM

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KEYNOTES (#)

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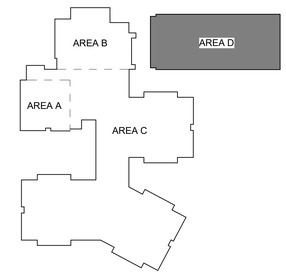
2 INSTALL NEW PROTECTIVE WIRE CAGE COVER OVER EXISTING LIGHT FIXTURE. PROVIDE WITH CUSTOM DIMENSIONS BY STI OR APPROVED EQUAL.

1 FIRST FLOOR LIGHTING PLAN - AREA D
1/8" = 1'-0"

KEY PLAN



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Date: 09/22/2020
Project Number: 90060
Drawn By: NB
Checked By: AK

Revision Schedule:

Sheet Title:
LIGHTING CEILING PLAN - AREA D

Sheet Number:
E-213

100% DESIGN DEVELOPMENT

9/22/2020 11:45:12 AM

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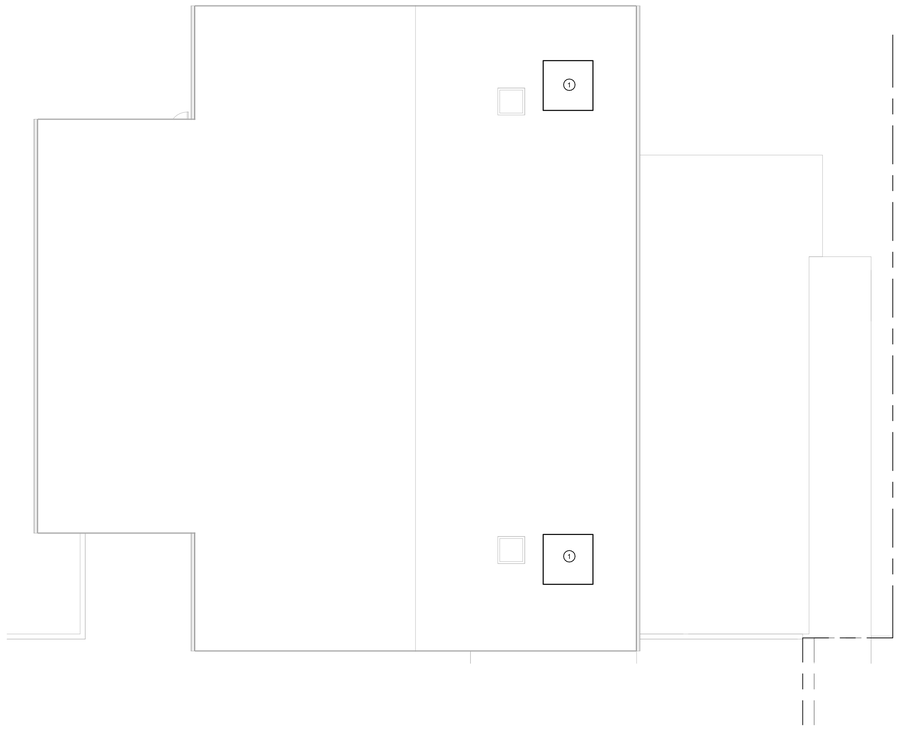
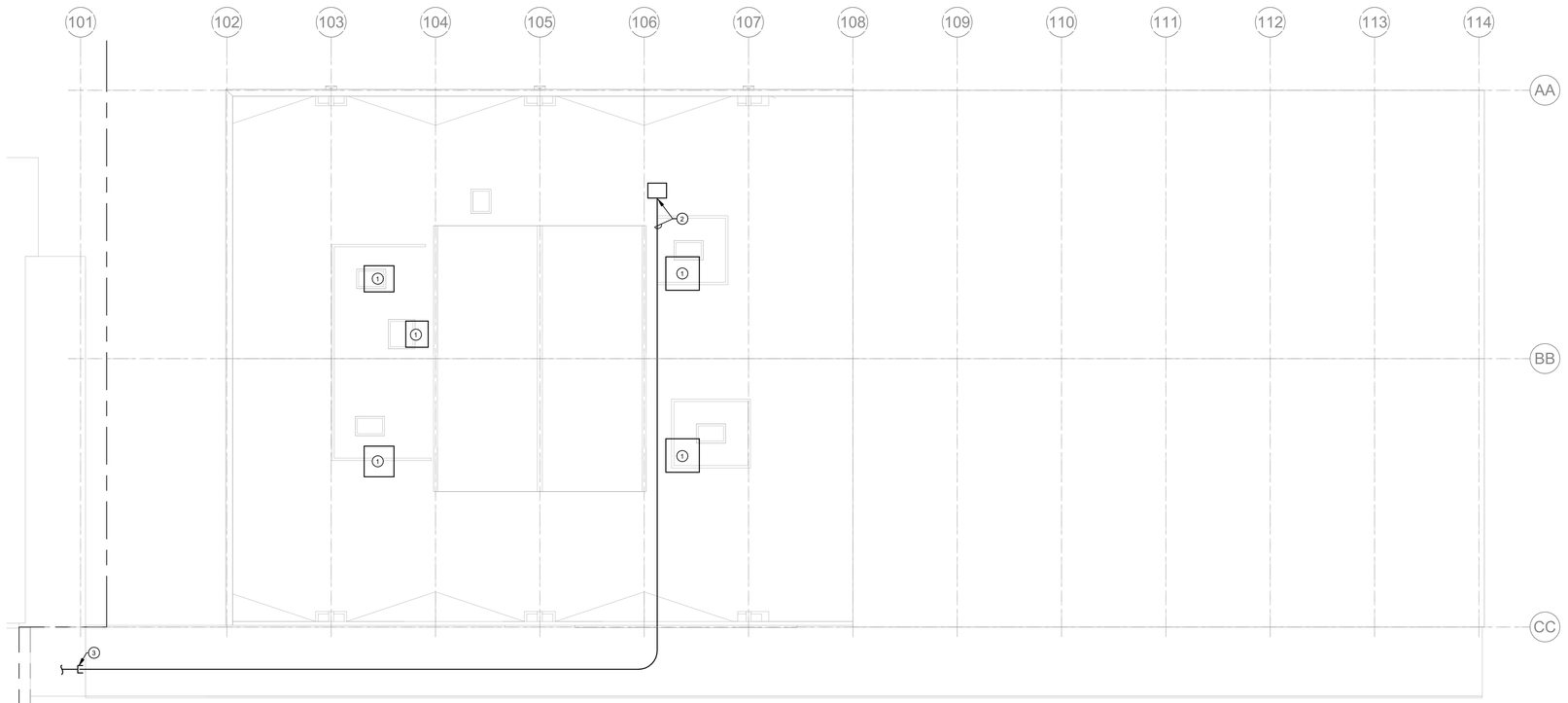


1 ROOF ELECTRICAL PLAN - AREA B
1/8" = 1'-0"



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1/8" = 1'-0"

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B. COORDINATE ELECTRICAL REQUIREMENTS FOR MECHANICAL UNITS WITH M.C. AND FINAL MECHANICAL SHOP DRAWINGS.

C. PROVIDE THE REQUIRED PENETRATIONS WHILE ROUTING CABLING THROUGH THE BUILDING. COORDINATE FIRE RATED WALL PENETRATIONS. PROVIDE CONDUIT SLEEVES AND FIRE STOPPING TO MAINTAIN THAT RATING.

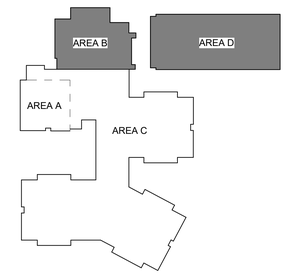
KEYNOTES (#)

1 REINSTALL ELECTRICAL CONNECTIONS TO MECHANICAL UNIT. REINSTALL EXISTING CONDUCTORS IN NEW CONDUIT.

2 REINSTALL COMMUNICATIONS FIBER AND COAX CABLING. PROTECT IN 2-1/2" TYPE EMT CONDUIT MOUNTED ON RUBBERIZED SLEEPERS. REPLACE WEATHERHEAD WITH NEW SCREW-COVER 16x16x6 NEMA 3R JUNCTION BOX AT ROOF CONDUIT PENETRATION.

3 STUB INTO ACCESSIBLE CEILING SPACE AT BUILDING. REPLACE CABLING BACK TO MDF RACK NEAR CAFETERIA. TERMINATE AND TEST AT EACH END.

KEY PLAN



BEAVERTON SCHOOL DISTRICT

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COOPER MOUNTAIN ELEMENTARY SCHOOL
SEISMIC SRGP IMPROVEMENTS

100% DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Date:	09/22/2020
Project Number:	90060
Drawn By:	NB
Checked By:	AK

Revision Schedule:

Sheet Title:
ELECTRICAL ROOF PLANS - AREA B, D

Sheet Number:
E-220

100% DESIGN DEVELOPMENT

9/22/2020 11:45:13 AM

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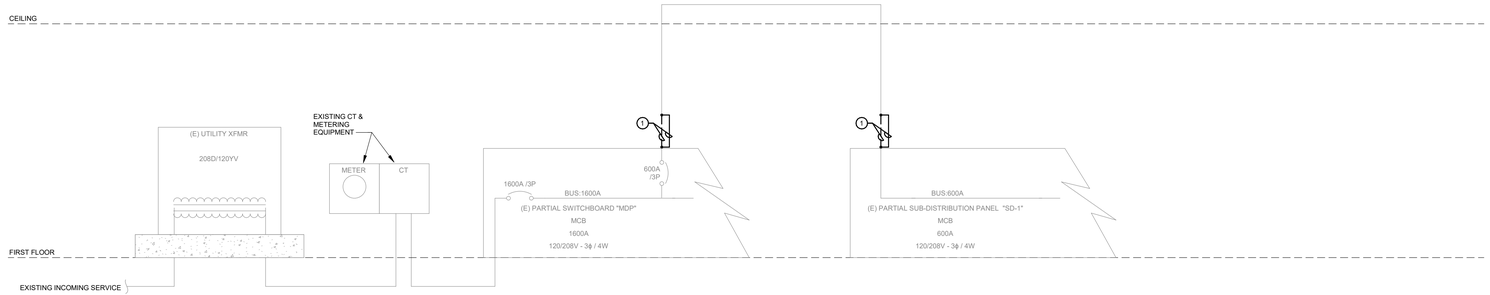

1 PARTIAL ONE-LINE DIAGRAM
1/8" = 1'-0"

ELECTRICAL RISER DIAGRAM NOTES

A. DIAGRAM INDICATES OVERALL LAYOUT OF ELECTRICAL DISTRIBUTION SYSTEM. REFER TO FLOOR PLANS FOR EQUIPMENT LOCATIONS.

POWER RISER KEYED NOTES: (P)

1. REPLACE (2) EXISTING 4" RIGID CONDUIT CONNECTIONS TO EQUIPMENT WITH 2FT OF FLEXIBLE METAL CONDUIT. DISCONNECT, PULL BACK AND RETERMINATE CONDUCTORS TO ALLOW CONDUIT WORK.

LIGHTING FIXTURE SCHEDULE

NOTES:

1. ALL FIXTURES SHALL BE U.L. OR SIMILARLY LISTED.
2. REFER TO ARCHITECTURAL DOCUMENTS FOR EXACT MOUNTING LOCATIONS, DETAILS, AND CONFIGURATIONS OF ALL LUMINAIRES. IF ARCHITECTURAL DRAWINGS DO NOT CLARIFY EXACT MOUNTING LOCATION OR DETAIL, ISSUE AN RFI FOR ARCHITECT TO SPECIFICALLY CLARIFY PRIOR TO FIXTURE ROUGH-IN.
3. VERIFY COMPATIBILITY OF LIGHT FIXTURES WITH CEILING MATERIAL, ADJACENT CONSTRUCTION, AND ADJACENT FINISHES PRIOR TO SHOP DRAWINGS SUBMITTAL NOTIFY THE ARCHITECT OF ANY CONFLICTS WITH THE PROPOSED INSTALLATION.
4. CONTRACTOR IS RESPONSIBLE FOR ALL MISCELLANEOUS HARDWARE NECESSARY TO INSTALL AND SUPPORT THE LUMINAIRES.
5. AIM AND TARGET ADJUSTABLE INTERIOR AND EXTERIOR LIGHT FIXTURES UNDER THE OBSERVATION AND IN COMPLIANCE WITH RECOMMENDATIONS OF THE ARCHITECT. INCLUDE LABOR AND MATERIAL COSTS MADE NECESSARY BY THIS REQUIREMENT.
6. CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND FILLING OUT ALL UTILITY REBATE FORMS FOR OWNER.

DESIGNED BY: INITIALS

TYPE	MANUFACTURER	MODEL	DESCRIPTION	VOLTAGE	LOAD-VA	LAMP TYPE	APPROVED EQUALS
F1	LITHONIA	2VTL2-60L-ADP-EZ1-LP840	RECESSED 2X2 ARCHITECTURAL TROFFER, 4000K, 80CRI. COLD ROLLED STEEL COATED POLYESTER, SINGLE ARCYLIC DIFFUSER, WIDE DISTRIBUTION.	120 V	49 VA	LED, 6000LM	AS APPROVED BY ENGINEER
F2	LITHONIA	2VTL4-72L-ADP-EZ1-LP840	RECESSED 2X4 ARCHITECTURAL TROFFER, 4000K, 80CRI. COLD ROLLED STEEL COATED POLYESTER, SINGLE ARCYLIC DIFFUSER, WIDE DISTRIBUTION.	120 V	60 VA	LED, 7200LM	AS APPROVED BY ENGINEER

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Revision Schedule:

Sheet Title:
ELECTRICAL ONE-LINE DIAGRAM & SCHEDULES

Sheet Number:
E-300

9/22/2020 11:45:13 AM