

HCC Culinary Arts Shell Interior Buildout

HCC Project No. IFB 20-22
Culinary Arts Interior Shell Build Out

ADDENDUM 1

05/15/2020

Revisions included in this Addendum:

Please refer to drawings and specifications for more information. These specifications and drawings supersede any previously issued versions of the same spec or drawings. Please replace and refer to the most current drawings in your set. Please refer to specifications for more information.

Questions and Answers

- Engineers' Addendum Project No. IFB 20-22 Culinary Arts Interior Shell Build Out – Question and Answers No.1

Specifications

Project Manual Correction:

- Note Project's Name shall be changed from CULINARY SHELL SPACE BUILDOUT to HCC CULINARY ARTS SHELL INTRIOR BUILDOUT to match drawings.

Added Specifications to Project Manual:

- 00 91 00 General Commissioning Requirements
- 01 16 00 Project Construction Duration Schedule
- 01 21 00 Allowances
- 01 32 33 Photographic Documentation
- 05 50 00 Metal Fabrication
- 09 67 23 Urethane Flooring
- 10 14 23 Panel Signage
- 10 44 00 Fire Protection Specialties
- 22 08 00 Commissioning of Plumbing Systems
- 23 05 93 System Testing, Adjusting & Balancing
- 23 08 00 Commissioning of HVAC Systems

Removed Specifications from Project Manual

- 12 36 00 Countertop

Remove existing specifications and Replace with specifications below attached within this Addendum to the Project Manual:

- 00 01 05 Table of Contents
- 00 70 00 Contract Conditions
- 01 23 00 Alternates
- 06 41 00 Architectural Casework

Revision of specification by notation see remarks below from Food Service Consultant:

- 11 40 00.1 Foodservice Equipment (Culinary Arts Lab Only) Shall be changed to the following
 1. Item 122 Two Compartment Sink to be Owner Furnished / **Contractor** Installed.
 2. Item 201 Workstation: Line 11 to be revised as follows:
 11. One (1) Workstation across from Demo Counter to be **open base** and ADA code compliant.
 3. Item 704 Fryer: Lines 1 and 8 to be revised as follows:
 1. Analog controls **with electronic ignition.**
 8. **Portable filter system.**
 4. Item 808 Demo Counter to be Owner Furnished / **Contractor** Installed.
 5. Item 816 Ice Cream Freezer to be Owner Furnished / **Owner** Installed.
 6. Note of clarification Kitchen Suppliers/ Pre-Approved Stainless-Steel Fabricators having an existing history with HCC in good standing shall be approved for inclusion in the general contractors bid.

Revision of specification by notation see remarks below from Food Service Consultant:

- 11 40 00.2 Foodservice Equipment (Pastry Lab Only) Shall be changed to the following
 1. Item 616 Deck Oven to be Owner Furnished / **Contractor** Installed.
 2. Item 672 Rotating Rack Oven to be Owner Furnished / **Contractor** Installed.
 3. Item 801 Demo Counter to be Owner Furnished / **Contractor** Installed.
 4. Item 817 Sheeter to be Owner Furnished / **Owner** Installed
 5. Include pricing for **ADD ALTERNATE #2:**
 - a. Qty two (2) Item 193 Reach-In Refrigerator to have Remote Refrigeration.
 - b. Qty one (1) Item 639 Reach-In Freezer to have Remote Refrigeration.
 6. Note of clarification Kitchen Suppliers/ Pre-Approved Stainless-Steel Fabricators having an existing history with HCC in good standing shall be approved for inclusion in the general contractors bid.

Drawings

Remove existing drawing sheets and replace with Drawings Sheets below attached within this Addendum:

Architectural

A0.02 PARTITION TYPES
AD1.01 DEMOLITION PLAN
A1.01 SECOND FLOOR PLAN
A2.01 REFLECTED CEILING PLAN
A3.01 ROOF PLAN
A9.02 INTERIOR ELEVATIONS

FoodService

FS1.01 FS CULINARY EQUIPMENT PLAN
FS2.01 FS PASTRY EQUIPMENT PLANS
FS2.07 FS PASTRY ELECTRICAL PLAN

Mechanical

M1.02 SCHEDULES
M2.02 ENLARGED PLANS

Electrical

E1.03 PROPOSED ONE LINE DIAGRAM
E1.04 PANEL SCHEDULE
E2.01 ENLARGED PLANS – POWER
E2.02 ROOF PLAN – POWER
E4.01 ENLARGED PLANS - FIRE ALARM
E5.01 DETAILS

Plumbing

P1.01 SCHEDULE, NOTES, & LEGEND
P3.01 SECOND FLOOR - ENLARGED PLANS
P4.01 RISER DIAGRAMS

Technology/ AV

T1.03 - TECHNOLOGY - ENLARGED PLAN
T1.04 - AUDIO VISUAL - ENLARGED PLAN

END OF ADDENDUM 1

ENGINEER'S ADDENDUM
PROJECT NO. IFB 20-22
CULINARY ARTS INTERIOR SHELL BUILD OUT
QUESTIONS AND ANSWERS No. 1

Date: May 15, 2020

To: Prospective Bidders

From: Procurement Operations Department, Houston Community College

Subject: Questions and Answers Responses

- Q1. On Pg. 13 of 54 in IFB doc, there is a pricing element shown for task item 1. On specifications table of contents, it shows as not used. I assume this to be the case because the work is on the second floor. Is there concrete work?

Response: There is adjustment in the flooring/ leveling to mitigate areas around drains that have 2-3 inches of deviation to provide a flat substrate for the new flooring system that will be installed. This may require concrete if it can't be adjusted a with floor leveling compound. Contractor to price accordingly.

- Q2. IFB Doc Pg.13 – has a Metals pricing element. On table of contents it shows as not used. No metalwork?

Response: The Metal Fabrications specification has been added per this Addendum. Further note that A3.01 has been revised to show typical roof opening/ framing that will be required at the roof penetration for the exhaust fans and AHU duct on the roof.

- Q3. In the specifications, there is a division 12 – Furnishings (countertops), no pricing element on Pg. 13 for countertops?

Response: The Specification for Countertops has been removed.

- Q4. IFB Doc Pg. 13, has a Communications pricing element, but no Communication specifications in the specs other than what is referred to in the electrical section.

Response: Provide what is referred to in the electrical section. Drawings have been revised per this addendum to reflect scope provided.

- Q5. DWG. FP1.01, Sprinkler work is shown on drawings, but no sprinkler specifications.

Response: Existing sprinklers heads are being relocated per note on drawing.

- Q6. DWG E4.01, Fire Alarm work is shown on E4.01, but not fire alarm specifications.

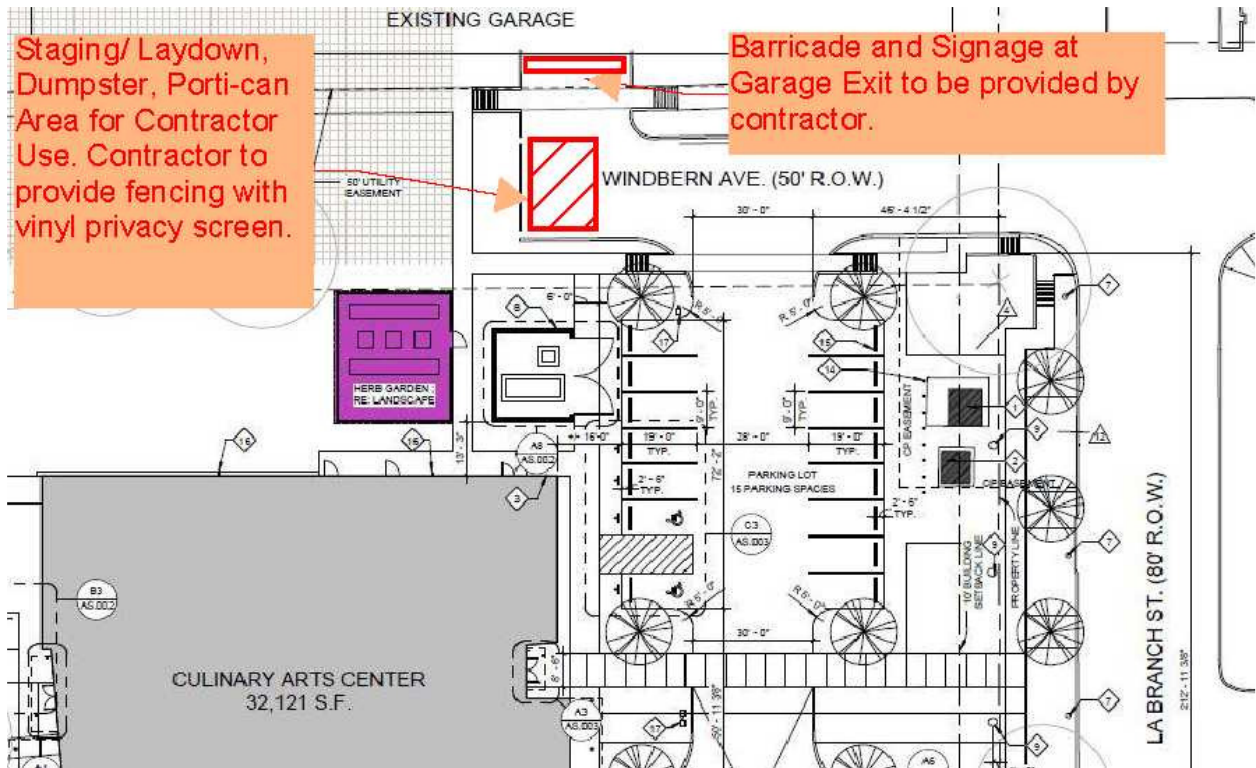
Response: Refer to the drawings for Fire Alarm work. Information has been added to E4.01 to provide more clarity.

Q7. Where is the contractor staging area? Possible locations are the pump room in the parking garage or in Whiteley Building Room 115, please confirm?

Response: Refer to attached sketch showing this information.

Q8. Where is the location for the construction dumpster?

Response: Refer to attached sketch showing this information. Construction dumpster shall be provided by the general contractor on the private street between the Culinary Arts building and Parking Garage. The Dumpster shall have a temporary chain link fence placed around all sides of the Construction Dumpster with Privacy Screen. Access gate shall be wide enough to accommodate removal activities trash vehicle. Contractor shall also provide a temporary traffic barricade at the exit of the parking garage that egresses to the private street. This will provide the space required.



Q9. Does the contractor need to provide portable toilets? Can contracts use the culinary restrooms or Whiteley restrooms? Is there any concern about the security of portable toilets being used by the vagrant population?

Response: Portable toilets shall be provided for in this project for the construction staff. Facilities inside of the building are prohibited. The contractor provide a larger fencing area as suggested in question 8 to provide space for both dumpster and toilets to address the vagrant concern.

Q10. Can contractors use the freight elevators?

Response: Contractors shall be able to use freight elevations. Precautions need to be address to protect walls and floor of the elevator. When the project is complete the existing finishes and condition of the elevator shall remain the same as before use by the Contractor.

Q11. All the culinary racks and loose equipment (mixers, platters, plates, etc.) and attic stock that are currently in the shell space for the culinary lab will need to be moved, confirm that HCC/mSP will handle internally. Where will these items be moved/stored?

Response: HCC shall remove all items and content from the rooms in the project scope.

Q12. Any constraints to site access?

Response: The contractor has use of the site at any time. Coordination with the College's Project manager with regards to construction activities is a must as events hosted by the college occur at variable times during the year.

Q13. Any limitations to construction hours?

Response: The contractor has no limitation on construction hours. Coordination with the College's Project manager with regards to construction activities is a must as events hosted by the college occur at variable times during the year.

Q14. Who will be responsible for removing the contents from the rooms in the project scope?

Response: HCC shall remove all items and content from the rooms in the project scope.

Q15. A9.01 – shows alternate urethane flooring systems. Architect stated on job walk they wanted the floor perfectly flat even at floor drains. Please confirm to raise all floor drains/floor sinks to floor level with both the urethane and floor tile?

Response: Confirmed for both flooring systems mentioned. The floors when finished shall be flat. Any drainage shall be directed to the drain by occupants.

Q16. A1.01 - drawing shows detail-showing DWG. A9.03, should this be A9.02?

Response: A1.01 has been corrected to reflect A9.02 for the interior elevations marks on this sheet.

Q17. A0.02 – Shows partition types but detail 5 does not show the size of the studs or what type #1 & #2 are?

Response: This wall type is here to show that the space is existing with steel studs and Cold Form Metal framing at exterior wall all receive 5/8" gypsum drywall within each of the shell space buildouts.

Q18. A2.01 – Does not show bulkhead detail for the ceiling at the north glass wall?

Response: This information has been added for this Addendum. See attached A2.01.

Q19. M4.01 – Occupancy sensors for the exhaust fans & AHU. Need location and controls.

Response: Occupancy sensors are to be provided by div 26 and the lighting controller needs to send a signal (occupancy status) to BAS

Q20. M1.02 – Fan schedule, Note 5, what is the existing ventilation control system? Where are the control panels located?

Response: Control panels for the existing Kitchen Ventilation Control System are in Level-2 Mechanical room. This system monitors/controls all the existing KEFs, air flow measuring stations and heating coils.

Q21. E2.01 – General, Note 11, Need location of fire alarm panel?

Response: The existing fire alarm panel is in the main electrical room.

Q22. E2.01 – Need location of panel 1LSL1, keynote 5?

Response: The existing panel 1LSL1 is in the main electrical room.

Q23. E2.02 – Does the transformer on the roof need structural steel supports added? In addition, what type of supports for disconnect?

Response: Refer to updated drawings.

Q24. E5.01, Detail 4 – shows VFD's, need location for VFD's?

Response: Coordinate with Mechanical for the location.

Q25. P4.01 – Riser details, nothing shown for floor sinks or trap primer?

Response: Floor drain is provided with trap guard as indicated on drawing P 1.01

Q26. FS1.02 – How far above ceiling does the wall go? (Tied into the 54" pony wall)

Response: The wall shall extend 6" above ceiling. Proper bracing is required for these walls to deck.

Q27. E1.02 – Need location of the existing 6 electrical panels in order to pull new feeders?

Response: Please see the sheet E2.01 more details:

Existing panel 2LAB4A, 2LAB4B are in the Culinary lab 2.

Existing panel 2LAB2, H1 in the electrical room, level 2.

New panel 2H2, 3LDP are in the electrical room, level 2.

Q28. Confirm after hours is mandatory for building shut down and tie in of various systems?

Response: This is mandatory as this building is occupied for classes and teaching during the day. Authorization from the College's Project manager with regards to these activities is need before proceeding with these activities. The contractor shall provide a duration of time before approval.

Q29. What is the height of the Urethane flooring systems on the walls (base)?

Response: A 6 inch base is required at all location where this flooring is to be provided. The base shall be equal to the tile wall face to provide for easy cleaning.

Q30. Itemize list of OFCI?

Response: See revised Food Service Drawings for owner furnished contractor installed items

Q31. FS1.01 & FS2.01 - Ice Cream Freezer & Sheeter to be relocated. Are we to assume the equipment will be in or brought to the work area by others?

Response: The Ice Cream Freezer & Sheeter will be furnished by the college. Relocation and Installation of this existing equipment will be by contractor.

Q32. Can you please provide a contact for the original contractor for the roofing and glazing on this building?

Response: See information below for contacts for all subcontractors used in the previous phase of work. This building is still under the 1 year warranty period from the previous construction of the main building. Contractors are to coordinate with previous subcontractors or find licensed subcontractors that can do the work and maintain the warranty of all the existing elements in-place.

Company		Address	City	State	Zip	Business Phone	Fax Number
Airline Louvers	Louvers	1020 Prince Frederick Blvd. Suite 305	Prince Frederick	Maryland	20678	(570) 420-7079	(570) 420-7078
BD Electric	Electrical Work	30340 Dobbin Huffsmith	Magnolia	Texas	77354	(281) 356-2925	(281) 259-6886
Camarata Masonry Systems	Masonry	16465 W. Hardy Road	Houston	Texas	77060	(281) 876-1111	(281) 876-1120
Cook Mechanical	HVAC	20200 Hempstead Rd. #34	Houston	Texas	77065	(832) 688-8628	(832) 779-8331
ECO Services	SWPPP	13810 Hollister Drive Suite 100	Houston	Texas	77086	(832) 456-1000	(832) 456-1010
Fire Proof Contractors	Water Proofing, Insulation	8100 Blakenship Dr.	Houston	Texas	77255	(713) 690-7600	(713) 690-7635
FireTron Life Safety Solutions	Fire Alarm	10101A Stafford Centre Drive	Staffprd	Texas	77477	(281) 499-1500	(281) 499-3711
Flexible Lifeline Systems	Fall Protection System	2437 Peyton Rd	Houston	Texas	77032	(832) 448-2900	
Har-Con Mechanical Contractors	Plumbing	9009 West Little York	Houston	Texas	77040	(832) 300-1060	(832) 300-1061
Kauffman Company	Sprinkler System	13225 FM 529 Suite A	Houston	Texas	77041	(713) 937-4144	(713) 937-4149
Mares Glass	Aluminum Storefront, Doors, Glass	11948 C Hempstead	Houston	Texas	77092	(713) 789-7119	(713) 789-2055
McIntosh Wood & Metal Works	Wall Metal Panels	2757 Ludelle Street	Fort Worth	Texas	76105	(817) 591-1393	(817) 413-7228
Meyer Hammer Excavation	Demolition and Earthwork	1795 N Fry Rd. Suite 308	Katy	Texas	77449	(832) 771-3287	(832) 201-8884
MSD Building Corporation	Structural Steel Fabrication and Erection	120 N. Main St.	Pasadena	Texas	77506	(713) 477-8335	(713) 477-1090
NCS	Telecommunication/Security	12626 Fuqua St	Houston	Texas	77034	(281) 484 1777	(281) 484 1776
Otis Elevator Company	Elevator	9001 Jameel Rd. Suite 100	Houston	Texas	77040	(281) 906-8142	(860) 353-0438
Peña's Concrete & Demolition	Concrete Work	P.O. Box 270184	Houston	Texas	77277	(713) 401-9581	(713) 552-9939
Reliable Commercial Roofing Services	Roofing System	PO Box 1246	Brookshire	Texas	77423	(281) 934-1495	(281) 934-1380
Texas Underground Utilities	Underground Site Utilities	8515 Cambridge Street	Houston	Texas	77054	(832) 487-9039	(713) 583-0115
Vivas Contractors	CFMF, Drywall, Fireproofing	5205 Spindle Dr.	Houston	Texas	77086	(281) 445-9554 x205	(281) 445-9584
Von Younger Landscaping	Landscaping/Irrigation	313 W. Donovan St.	Houston	Texas	44091	(713) 695-6918	

Q33. Can you confirm that Corner Guards are required and if so provide a Layout?

Response: Please refer to A9.02 General Finish Notes: ALL CORNERS SHALL RECIEVE 1 1/2" x 1 1/2"x 4' STAINLESS STEEL CORNER GUARDS.

Q34. Will the building be occupied during construction?

Response: Yes. Classes will be held while construction activities are on-going.

Q35. The only information provided for Div. 27 is the notes on the T Drawings. There are no specifications given as to manufacturer, category of cable, or any other specific requirements.

Response: Please see revised drawings as the information has been updated. HCC will provide the cabling and equipment. Provisions for conduit and pull strings at wall locations shall be made by the contractor.

Q36. Please provide floor to deck height.

Response: Approximately 16' – 18'. The structure slope to drain in one direction.

Q37. What is the intent of the self-leveling compound to be applied at the floors? Is it to remove uneven surface irregularities for the flooring installation, or is it to fill in the 2-3" floor dips and provide a level finish elevation across the floor? What is the degree of slope to drains required in the finished flooring?

Response: Fill the floor dips to achieve a level finish elevation. No slopes at drains.

Q38. Please confirm that the new 600A distribution panel will be able to fit in the existing electrical room.

Response: There is space in the Electrical room. Dimensions of panel manufacturers vary and will be evaluated during construction.

Q39. The proposed lighting does not match what has been installed for the rest of the building. Please confirm that we are to price the Lighting Schedule as shown on the drawings.

Response: Refer to the proposed lighting schedule.

Q40. What is Project Construction Duration?

Response: Refer to 01 16 00 Project Construction Duration Schedule for requested information.

SECTION 00 91 00 - GENERAL COMMISSIONING REQUIREMENTS

This section has been added with Addendum 1.

PART 1 - GENERAL

- A. This section includes general requirements that apply to the implementation of the commissioning process without regard to specific systems, assemblies, and components.
- B. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:
 - 1. Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by installing contractors.
 - 2. Verify and document proper performance of equipment and systems through functional performance testing which is executed by the Subcontractors and witnessed by the Commissioning Provider.
 - 3. Verify that O&M documentation left on site is complete.
 - 4. Verify that the Owner's operating personnel are adequately trained.
- C. Commissioning Provider directs and coordinates all commissioning activities; this Section describes some but not all of the Commissioning Provider's responsibilities. The Commissioning Provider is responsible for incorporating Commissioning requirements to coincide with the Contractor's schedule and managing and staffing the Commissioning activities respecting the Contractor's schedule commitment to the Owner.
- D. The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning product.
- E. Related divisions include the following:
 - 1. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division 1 specification sections, apply to this section.
 - 2. Division 23 MECHANICAL - 230800 Commissioning of HVAC Systems
 - 3. Division 22 PLUMBING – 220800 Commissioning of Plumbing Systems
- F. Reference guidelines:
 - 1. 2015 IECC
 - 2. Building Commissioning Association

1.02 DESCRIPTION

- A. Commissioning is a quality-oriented process for achieving, verifying, and documenting that the performance of facilities, systems, and assemblies meet defined objectives and criteria. The commissioning process includes specific tasks to be conducted during each phase in order to verify the owner's project requirements.
- B. Commissioning Team: Members of the commissioning team consist of the Commissioning Provider, Owner, Owner Representative, Construction Manager, General Contractor, Design Team (A/E) and Subcontractors responsible for installation of the systems to be commissioned, including the Test and Balance subcontractor. The Facilities Operation Staff are always encouraged to participate if possible. The contracted Commissioning Provider is hired by the

owner directly. The Commissioning Provider directs and coordinates the project commissioning activities and reports to the owner / design builder / etc. All team members work together to fulfill their contracted responsibilities and meet the objectives of the contract documents.

1.03 DEFINITIONS

- A. Acceptance - A formal action, taken by a person with appropriate provider (which may or may not be contractually defined) to declare that some aspect of the project meets defined requirements, thus permitting subsequent activities to proceed.
- B. Approval - Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the contract documents.
- C. Basis of Design - A document that records the concepts, calculations, decisions, and product selections used to meet the owner's project requirements and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- D. Commissioning: A systematic process confirming that building systems have been installed, properly started, and consistently operated in strict accordance with the Contract Documents, that all systems are complete and functioning in accordance with the Contract Documents and that the Contractor has provided to the Owner the required system documentation and training. Commissioning includes deferred and/or seasonal tests as agreed between the Owner and Contractor.
- E. Commissioning Plan - Document prepared by Commissioning Provider and approved by Owner that provides the structure, expected duration, and coordination plan for the Commissioning Process from the construction phase through the warranty period. The Commissioning Plan will satisfy the Owner's test requirements. The Commissioning Provider is responsible for the development and review of the test requirements.
- F. Commissioning Process - A quality-focused process for enhancing the delivery of a project. The process focuses upon verifying and documenting that the facility and all of its systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the owner's project requirements.
- G. Commissioning Process Activities - Components of the commissioning process.
- H. Commissioning Process Progress Report - A written document that details activities completed as part of the commissioning process and significant findings from those activities that is continuously updated during the course of a project. Usually it is incorporated into the commissioning plan as an ongoing appendix.
- I. Commissioning Team: Working group made up of representative(s) from the project Commissioning Provider (CxP), Record Architect, the Contractor and responsible Subcontractors, Test, Adjust, and Balance (TAB) Firm, Building Management System (BMS) provider, specialty manufacturers and suppliers, and Owner.
- J. Construction Checklists (CCLs) or Pre-Functional Checklists (PFCs): A set of documents agreed upon between the Contractor and the Commissioning Provider. The construction checklist is a list of static inspections and material or component tests that verify proper installation of equipment (e.g., belt tension, oil levels, labels affixed, gages in place, sensors calibrated, etc.). The word Pre-Functional refers to before Functional tests. Construction Checklists must include the manufacturer's Start-up checklist(s). Contractor shall sign Construction Checklists as complete and submit with a Notification of Readiness.

- K. Construction Documents - This includes a wide range of documents, which will vary from project to project, with the owner's needs and with regulations, laws, and countries. Construction documents usually include the project manual (specifications), plans (drawings) and general terms and conditions of the contract.
- L. Contract Documents - This includes a wide range of documents, which will vary from project to project, with the owner's needs and with regulations, laws, and countries. Contract documents frequently include price agreements, construction management process, sub-contractor agreements or requirements, requirements and procedures for submittals, changes, and other construction requirements, timeline for completion, and the construction documents.
- M. Deferred Performance Tests (DPTs) - Performance tests that are performed, at the discretion of the Commissioning Provider, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design, or other site conditions that disallow the test from being performed.
- N. Deficiency - A condition in the installation or function of a component, piece of equipment, or system that is not in compliance with the contract documents.
- O. Factory Testing - Testing of equipment on-site or at the factory, by factory personnel, with or without an owner's representative present.
- P. Functional Performance Test (FPT) – A test designed to exercise the equipment or system's controllability or functionality. This test is designed using the approved engineered sequence of operations for a given system. The test procedure is most often unique and specific for a system with a given project. Generally speaking a functional test is required if a system has moving parts, environmental controls or input and output functions.
- Q. Integrated System Test: Test of dynamic function and operation of multiple systems operating together. Integrated System Tests are tested under various modes, such as fire alarm and emergency situations, life safety conditions, power failure, etc. Systems are integrally operated through all specified sequences of operation. Components are verified to be responding in accordance with Contract Documents. Integrated System Tests are executed after Functional Performance Tests are complete. Integrated System Tests provide verification that the integrated systems will properly function according to the Contract Documents.
- R. Integrated System Test Procedures: Commissioning protocols and detailed test procedures and instructions in tabular and script-type format that fully describe system configurations and steps required to determine if the interacting systems are performing and functioning properly. Commissioning Provider prepares these procedures to document Integrated System Tests.
- S. Issues Log - A formal and ongoing record of problems or concerns – and their resolution – that have been raised by members of the commissioning team during the course of the commissioning process.
- T. Notification of Readiness – A formal notification submitted by the contractor to the Owner stating that the equipment, systems, and controls integral to them, including control programming, have been correctly installed; operated as specified, tested, adjusted, and balanced; and are confirmed as ready for functional performance testing and other acceptance procedures.
- U. Owner's Project Requirements - A written document that details the functional requirements of a project and the expectations of how it will be used and operated. This includes project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

- V. Pre-Functional Verification Tests (PVT) – For contractors' use – A test designed to exercise the equipment or system's controllability or functionality prior to functional testing. This test is designed using the approved engineered sequence of operations for a given system. The test procedure is most often unique and specific for a system with a given project.
- W. Seasonal Performance Tests - Performance tests that are deferred until the system(s) will experience conditions closer to their design conditions based on weather conditions.
- X. Startup - The initial starting or activating of dynamic equipment which includes the use of construction checklists to document the startup process.
- Y. Test Procedure - A written protocol that defines methods, personnel, and expectations for tests conducted on components, equipment, assemblies, systems, and interfaces among systems. The test procedures are specified in the Technical Specifications sections of the contract documents. Performance testing covers the dynamic functions and operations of equipment and systems using manual or monitoring methods. Performance testing is the dynamic testing of systems under full operation. Systems are tested under various modes, such as during low cooling loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all the control system's sequences of operation and components are verified to respond as the sequences state.
- Z. Verification - The process by which specific documents, components, equipment, assemblies, systems, and interfaces among systems are confirmed to comply with the criteria described in the Owner's Project Requirements.
- AA. Trending – The monitoring, by a building management system or other electronic data gathering equipment, and analyzing of the data gathered over a period of time.
- BB. Vendor – Supplier of equipment.
- CC. Warranty Period – Guaranteed period after acceptance in which systems failures will be addressed and returned to design intent at no cost to the owner. Refer to project specification for requirements.

1.04 COORDINATION

- A. **Management.** The Commissioning Provider is hired by the Owner directly. The Commissioning Provider directs, coordinates and witnesses the commissioning activities and writes the reports to the Owner. All members work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents.
- B. **Scheduling.** The Commissioning Provider will work with the Contractor according to established protocols to schedule the commissioning activities. The Commissioning Provider will provide commissioning milestones to the Contractor for scheduling commissioning activities. The Contractor will integrate appropriate commissioning activities into the Integrated Master Schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the Commissioning process. The Commissioning Provider will provide the initial scheduling milestone criteria of primary commissioning activities to the Contractor, at the commissioning kickoff meeting. The Commissioning Plan—Construction Phase provides a format for this schedule. As construction progresses more detailed commissioning milestones are developed by the Commissioning Provider and the Contractor. The Commissioning Plan also provides a suggested format for detailed schedules.

1.05 COMMISSIONING PROCESS

- A. **Commissioning Plan.** The commissioning plan provides guidance in the execution of the Commissioning process. Just after the initial commissioning kickoff meeting the Commissioning Provider will update the plan which is then considered the "final" plan, though it will continue to evolve and expand as the project progresses. The Specifications will take precedence over the Commissioning Plan.
- B. **Commissioning Process.** The following narrative provides a brief overview of the typical commissioning tasks during construction and the general order in which they occur.
1. Commissioning during construction begins with a kickoff meeting conducted by the Commissioning Provider where the Commissioning Process is reviewed with the commissioning team members.
 2. Additional meetings will be required throughout construction, scheduled by the Commissioning Provider with necessary parties attending, to plan, scope, coordinate, schedule future activities, and resolve problems.
 3. The Commissioning Provider works with the Contractor and Subcontractors to review startup plans and startup documentation formats.
 4. In general, the checkout and performance verification proceeds from simple to more complex; from component level to equipment to systems and intersystem levels with Construction Checklists reports being completed BEFORE functional testing.
 5. The Subcontractors, under direction from the Contractor, execute and document the Construction Checklists and initial checkout. The Commissioning Provider documents that the checklists were completed according to the approved plans. This may include the Commissioning Provider witnessing start-up of selected equipment.
 6. The Commissioning Provider develops specific equipment and system functional performance test procedures. The Contractor and the Subcontractors review the procedures.
 7. The procedures are executed by the Contractor and the Subcontractors and are witnessed and documented by the Commissioning Provider.
 8. Items of non-compliance in material, installation, setup, or programming are corrected at the Contractor's expense.
 9. After the first round of functional testing the Commissioning Provider will send out a Preliminary Report including noted deficiencies as specified or required.
 10. Once deficient items are fixed and the Commissioning Provider is notified, the Commissioning Provider will verify the corrected items and retest equipment one time. See Paragraph 3.4 for non-conformance.
 11. Deferred testing is conducted, as specified or required.

1.06 SUBMITTALS

- A. Approved Submittals
1. The Commissioning Provider will require copies of approved submittals related to the commissioned equipment to aid in the development of functional testing procedures.
- B. Product Data: If submittals to Record Architect did not include the following, submit required copies:
1. Manufacturer's product data, cut sheets and shop drawings
 2. Startup, operating, and troubleshooting procedures
 3. Fan and pump curves
- C. Electrical requirement

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

- A. The Contractor or Subcontractors are to provide all standard testing equipment and calibration certifications required by the specifications to perform initial checkout, startup, required Functional Testing, and TAB verification; unless otherwise noted such testing equipment will NOT become the property of Owner.
- B. Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted in project specifications, the following minimum requirements apply:
 - 1. Digital Thermometers: Certified calibration within past year to accuracy of 0.5 deg F and resolution of plus/minus 0.1 deg F.
 - 2. Pressure Sensors: Accuracy of plus/minus 2.0 percent of the value range being measured (not full range of meter), calibrated within the last year.
 - 3. Calibration: According to the manufacturer's recommended intervals and when dropped or damaged; affix calibration tags and keep certificates readily available for inspection. A qualified testing laboratory must have calibrated test equipment within the previous twelve (12) months. Calibration shall be NIST traceable. Contractor must calibrate test equipment and instruments according to manufacturer's recommended intervals and whenever the test equipment is dropped or damaged.
- C. Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and left on site, except for stand-alone data logging equipment that may be used by the Commissioning Provider.
- D. Data loggers: Independent equipment and software for monitoring flows, currents, status, pressures, etc. of equipment.
 - 1. Data loggers that may be required for Functional Tests may be provided by the Commissioning Provider and will not become the property of Owner.

The Contractor and Subcontractor will be required to participate in a commissioning web-based document storage system. The intent is to help simplify the commissioning documentation and tracking process, specifically by providing "smart" checklists that display the assigned tasks the Subcontractor is responsible for signing. Contractor is responsible to make sure all subcontractors are filling out their portion of the construction checklists properly and also signing the construction checklists once 100% filled out.

PART 3 - EXECUTION

3.01 MEETINGS

- A. Initial Meeting. The Commissioning Provider, through the Owner/CM, will schedule, plan and conduct an initial commissioning kick-off meeting. The contractor and its responsible parties are required to attend.
- B. Miscellaneous Meetings. Other meetings may be planned and conducted by the Commissioning Provider as construction progresses. These meetings will cover coordination, deficiency resolution, and planning issues. Meetings will be held at least monthly with increasing frequency as the project moves toward substantial completion.
- C. Commissioning Controls Coordination Meeting: The Cx Team will schedule a meeting with the Project Engineer, Design Engineer, Controls Subcontractor, TAB firm, and Commissioning

GENERAL COMMISSIONING REQUIREMENTS

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ISSUED FOR PERMIT AND BIDDING - ADDENDUM 1

Provider to review the proposed functional test scripts and establish that the interpretations of the sequence of operations provided by the Design Engineer are clearly understood and properly implemented in the controls programming.

3.02 STARTUP, CONSTRUCTION CHECKLISTS, AND INITIAL CHECKOUT

- A. The following procedures apply to all equipment/systems to be commissioned.
- B. Requirements: The primary role of the commissioning process during startup is to ensure there is written documentation and to ensure that each of the manufacturer's recommended procedures have been completed.
 - 1. Construction Checklist and/or equipment startup/checkout forms are required for 100% of commissioned equipment. Construction Checklists are used during the checkout/startup process to verify that the equipment and systems are fully connected and operational. It ensures that Functional Performance Tests (in-depth system checkout) may proceed without unnecessary delays.
 - 2. The Construction Checklists for a given system must be successfully completed and approved prior commencement of the Functional Performance Tests of equipment or subsystems of the given system. No sampling strategies are used during the pre-functional process.
 - 3. The contractor/subcontractor responsible for the startup of the equipment shall combine manufacturer's detailed startup and checkout procedures with Construction Checklists.
- C. Sensor and Actuator Calibration.
 - 1. All field-installed temperature, relative humidity, CO, CO₂, refrigerant, O₂, and/or pressure sensors, gages, on/off status sensors and all actuators (dampers and valves) on all equipment shall be calibrated.
 - 2. Sensor Calibration Methods:
 - a. All Sensors- Verify that all sensor locations are appropriate and away from causes of erratic operation. Verify that sensors are calibrated according to project specification or manufacture's recommendations whichever is most stringent.
 - b. Sensors With or Without Transmitters- Standard Application. Make a reading with a calibrated test instrument as close as possible, no further than 6 inches from the sensor, to the site sensor. Verify that the sensor reading (via the building automation system (BAS) and local display) is within the tolerances listed in the project specification.
 - c. Critical Applications- For critical applications (process, manufacturing, laboratory, isolation rooms, clean rooms, etc.) more rigorous calibration techniques may be required for selected sensors. Refer to project specifications for calibration requirements.
 - d. On/Off Status Sensor: Confirm actual condition with BAS reported condition. For equipment being monitored simulate on/off and mismatch conditions, make adjustment as required to confirm condition reported in the BAS and/or locally matches the actual condition.
 - e. Valve and Damper Stroke Setup- For all valve and damper actuator positions check and verify the actual position against the BAS readout. Command valve or damper closed, visually verify that valve or damper is closed and adjust output zero signal as required. Command valve or damper open, verify position is full open and adjust output signal as required. Command valve or damper to a few intermediate positions. If actual valve or damper position doesn't reasonably correspond the deficiency will be recorded and resolved accordingly.

- D. Execution of Construction Checklists and/or Startup Reports (Startup, Construction Checklists and initial checkout).]
1. Prior to the scheduled start up and with sufficient time, the contractor shall coordinate startup and checkout with the Owner, GC/CM, A/E, and CxP. The execution and approval of the startup and checkout shall be directed and performed by the contractor, subcontractor or vendor. It is the responsibility of the GC/CM to provide final sign off after the subcontractors have completed their portion of the checklists.
 2. The Construction Checklist forms are provided by the CxP and the contractor, subcontractors and suppliers shall execute startup and provide the CxP with the completed Construction Checklists.
 3. Only individuals of the contractor (technicians, engineers, tradesmen, vendors, etc.) who have direct knowledge and witnessed that a line item task on the construction checklist was actually performed shall check off that item. It is not acceptable for witnessing supervisors to fill out these forms.
- E. Deficiencies, Non-Conformance, and Approval in Checklists and Startup (Master Issues Log).
1. The contractor shall ensure the subcontractors clearly list any outstanding items of the initial startup and construction checklist procedures that were not completed successfully, on an attached sheet. The form and any outstanding deficiencies shall be provided, through the owner/CM, to the Commissioning Provider within 3 days of test completion. The Commissioning Provider will review the report and issue either a non-compliance report or an approval form, through the CM, to the contractor. The installing subcontractors or vendors shall correct all areas that are deficient or incomplete in the checklists and tests in a timely manner and notify the owner/CM as soon as outstanding items have been corrected and resubmit an updated startup re-port with a Statement of Correction on the original non-compliance report. When satisfactorily completed, the Commissioning Provider will recommend approval of the execution of the checklists and startup of each system.

3.03 FUNCTIONAL PERFORMANCE TESTS

- A. The following procedures apply to all equipment/systems to be commissioned.
- B. Requirements. Functional Tests are required for 100% of commissioned equipment and systems. The Functional Performance Tests shall demonstrate that each system is operating according to the documented design intent and contract documents. Functional Performance Testing facilitates bringing the systems from a state of substantial start up completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems.
- C. Coordination and Scheduling. The contractor shall provide sufficient notice, regarding their completion schedule for the Construction Checklists and startup of all equipment and systems to allow scheduling of the Functional Performance Testing. The Functional Performance Tests procedures are executed by the Contractor and the Subcontractors. The Commissioning Provider shall oversee, witness, and document the Functional Performance Testing of all commissioned equipment and systems.
- D. Development of Test Procedures. Before functional test procedures are finalized, the Commissioning Provider will receive all requested documentation to include a current list of changes affecting equipment or systems, including an updated points list, control sequences, and testing parameters. Using the testing parameters and requirements contained in the approved sequence of operations the Commissioning Provider will develop project specific functional performance test procedures and forms. The commissioning team, as appropriate, shall provide assistance to the Commissioning Provider in developing the final functional

performance test procedures. Prior to finalization test procedures will be approved by the Owner and distributed to the GC/CM construction team.

- E. Test Methods.
 - 1. Functional Performance Tests and verification may be achieved by manual testing or by monitoring the performance and analyzing the results using the control system's trend log capabilities. The Commissioning Provider may substitute specified methods or require an additional method to be executed other than what was specified, with the approval of the A/E and owner. The Commissioning Provider will determine which method is most appropriate for tests that do not have a specified method.
 - 2. Simulated Conditions. Simulating conditions shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.
 - 3. Overridden Values. Overriding sensor values to simulate a condition, such as overriding the outside air temperature reading in a control system to be something other than it really is, is acceptable.
 - 4. Simulated Signals. Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overridden values.
 - 5. Altering Set points. Rather than overriding sensor values, and when simulating conditions is difficult, altering set points to test a sequence is acceptable.
 - 6. Indirect Indicators. Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the test parameters, that the indirect readings through the control system represent actual conditions and responses.
 - 7. Setup. Each Functional Performance Tests shall be performed under conditions that simulate actual conditions as closely as is practically possible. The contractor/subcontractor(s) in executing the test shall provide all necessary materials, system modifications, etc., to produce the necessary flows, pressures, temperatures, etc., necessary to execute the test according to the specified conditions. At completion of the test, the contractor/subcontractor(s) shall return all affected equipment and systems to their approved (normal or automatic) operating settings.
- F. Test Equipment. Refer to Part 2 for test equipment requirements.
- G. Problem Solving. Responsibility to solve, correct, and retest malfunctions/failures is with the contractor.

3.04 DOCUMENTATION, NON-CONFORMANCE, AND APPROVAL OF TESTS

- A. Documentation. Contractor shall provide a notice of completed and signed Construction Checklists to the Commissioning Provider prior to functional test. The Commissioning Provider shall witness and document the results of the functional performance tests using the developed functional performance test. All test forms will be included in the final commissioning report. A list of documentation to be included with the Construction Checklists include (as applicable):
 - 1. Notification of Readiness
 - 2. Manufacturer's Startup and/or Inspection Reports
 - 3. TAB Report / Controls Point to Point Check Documentation
- B. Non-Conformance.
 - 1. Corrections of minor deficiencies identified may be made during the tests at the discretion of the Commissioning Provider. In such cases the deficiency and resolution will be documented on the procedure form or on an attached sheet.

2. As tests progress and a deficiency is identified, the Commissioning Provider shall discuss the issue with the commissioning team, and the contractor.
 - a. When there is no dispute on the deficiency and the contractor accepts responsibility to correct it:
 - (1) The Commissioning Provider will document the deficiency and the contractor's response and intentions on the commissioning issues log. The Commissioning Provider will submit the issues log to the Owner/CM/GC, etc. The contractor corrects the deficiency and notifies the Commissioning Provider upon completion.
 - (2) The contractor shall reschedule the test; and the test repeated.
 - b. If there is a dispute about a deficiency, regarding whether or not it is a deficiency:
 - (1) The dispute shall be documented on the commissioning issues log with the contractor's response.
 - (2) Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority for acceptance is with the Owner/A/E or authorized Owner's representative.
 - (3) The Commissioning Provider documents the resolution process. Once the interpretation and resolution have been decided, the contractor corrects the deficiency as required and notifies the team when the issue has been resolved and ready for retesting. The contractor shall reschedule the test and the test repeated until satisfactory performance is achieved. See Paragraph 1.5.B.10 for retesting.
3. The contractor shall provide status updates, in writing, to the Owner/GC/CM, etc., for each deficiency log items as it pertains to associated trade. The deficiency log will be a topic for discussion during commissioning meeting; discussion shall cover explanations of any disagreement and proposals for their resolutions.
 - a. The Commissioning Provider retains the commissioning issues log until the end of the project.
 - b. Retesting shall not be considered a justified reason for a claim of delay or for a time extension by the contractor.
 - c. The cost of retesting shall be solely the responsibility of the CONTRACTOR.
- C. Failure Due to Manufacturer Defect. If 10% (or three, whichever is greater) of identical pieces of equipment fail to perform to the contract documents (mechanically or substantively) due to a manufacturing defect, not allowing it to meet its submitted performance specification, all identical units may be considered unacceptable by the Owner, A/E or CxP. In such case, the contractor shall provide the owner with the following:
 1. Within agreed upon time or sooner of notification from the owner/CM, the contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the CM within one week or sooner of the original notice.
 2. Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc., and all proposed solutions. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
 3. The A/E will determine whether a replacement of all identical units or a repair is acceptable.
 4. Two examples, as applicable, of the proposed solution shall be installed by the contractor and the A/E shall be allowed to test the installations for up to one week, upon which the A/E will decide whether to accept the solution.

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5. Upon acceptance, the contractor and/or manufacturer shall replace or repair all identical items at their expense. The replacement/repair work shall proceed with reasonable speed beginning within one week of approval.
- D. Approval. The Commissioning Provider notes each satisfactorily demonstrated function on the test form. Final approval of the Functional Performance Tests by the owner is made after review by the Commissioning Provider and Owner.

3.05 DEFERRED TESTING

- A. **Unforeseen Deferred Tests. If any check or test cannot be completed due to the project completion level, required occupancy condition or other deficiency, execution of checklists and Functional Performance Tests may be delayed upon approval of the CxP, CM, AE, Owner and others as applicable. Tests will be conducted as soon as possible and services of necessary parties will be negotiated.**

END OF SECTION

SECTION 01 16 00 - PROJECT CONSTRUCTION DURATION SCHEDULE

This document has been added with Addendum 1.

PART 1 - GENERAL

1.01 CONSTRUCTION SCHEDULE

- A. Overall project construction duration is 136 calendar days.
- B. Project shall be substantially complete within 100 calendar days.
 - a. Substantial Completion Date for owner occupation and move in shall be December 4, 2020.
 - b. No time extentions shall be considered.
 - c. The substantial completion date is critical for Houston Community College Instructional schedules and Student Enrollment and shall remain firm.
- C. Final Completion shall be within 30 calendar days from Substantial Completion.
 - a. Final Completion Date shall be January 15, 2020.
 - b. All construction activities shall be complete by this time in preparation of school enrollment and occupation.

END OF DOCUMENT

SECTION 01 21 00 - ALLOWANCES

This section has been added with Addendum 1.

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Administrative and procedural requirements governing handling and processing allowances.
- B. Related Sections:
 - 1. Section 01 26 00 - Modification Procedures: Procedures for submitting and handling Change Orders.
 - 2. Section 01 40 00 - Quality Requirements: Use of allowances for inspection and testing agencies.

1.02 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.
- B. Submit invoices or delivery slips to indicate actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.03 CONTINGENCY ALLOWANCES

- A. Use the Owner's contingency allowance only as directed for the Owner's purposes, and only by Contingency Fund Change Orders which designate amounts to be charged to the allowance.
 - 1. The Contractor's related costs for products or equipment ordered by the Owner under the contingency allowance, including delivery, installation, taxes, insurance, equipment rental, and similar costs are not part of the Contract Sum.
 - 2. Allowance Expenditure Authorizations authorizing use of funds from the Owner's contingency allowance will not include the Contractor's related costs and reasonable overhead and profit margins. Contractor shall include in base bid, Contractor's overhead, profit, insurance, bond and other direct cost.
 - 3. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order or transfer the remaining amounts to other allowances as directed by the Architect.

1.04 UNUSED MATERIALS

- A. Return unused materials to the manufacturer or supplier for credit to the Owner, after installation has been completed and accepted.
- B. Where it is not economically feasible to return unused material for credit and when requested by the Architect, prepare unused material for the Owner's storage, and deliver to the Owner's storage space as directed. Otherwise, disposal of excess material is the Contractor's responsibility.

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PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 INSPECTION

- A. Inspect products covered by an allowance promptly upon delivery for damage or defects.

3.02 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related construction activities.

3.03 SCHEDULE OF ALLOWANCES

- A. Allowance Number 1 – Owner’s Contingency Allowance: Include the sum of \$100,000.00 of the Base Proposal Lump Sum amount that shall be utilized by the Owner.

END OF SECTION

SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

This section has been added with Addendum 1.

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
 - 3. Final completion construction photographs.
 - 4. Demonstration and training video recordings.
- B. Related Sections include the following:
 - 1. Division 01, Section "Submittal Procedures" for submitting photographic documentation.
 - 2. Division 01, Section "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.
 - 3. Division 01, Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.
 - 4. Division 02, Section "Structure Demolition" for photographic documentation before building demolition operations can commence.
 - 5. Division 02 Section "Selective Structure Demolition" for photographic documentation before selective demolition operations commence.
 - 6. Division 31, Section "Site Clearing" for photographic documentation before site clearing operations can commence.

1.02 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph and video recording. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
 - 1. Construction Photographs: Submit image files of each photographic view within three days of taking photographs. Digital Camera: Minimum sensor digital or high definition.
 - 2. Format: Minimum 1600 by 1200 pixels, 400 dpi minimum, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time- stamped, in folder named by date of photograph, accompanied by key plan file.
 - 3. Identification: Provide the following information with each image description in file metadata tag:
 - a. Name of Project
 - b. Name and address of photographer
 - c. Name of Architect
 - d. Name of Contractor
 - e. Date photograph was taken
 - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction
 - g. Unique sequential identifier keyed to accompanying key plan
- B. Construction Photographs: Submit approved electronic media and photo views concurrent with Application for Payment.
 - 1. Format shall be owner approved electronic media.

2. Identification: Provide the following information: properties of the submitted electronic media (example below).
 - a. Name of Project
 - b. Name of Architect
 - c. Name of Contractor
 - d. Date photograph was taken
 - e. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - f. Unique sequential identifier keyed to accompanying key plan.
- C. Video Recordings: Submit two copies of each video recording within seven days of recording. Coordinate with Owner for all final media submissions.
 1. Submit video recordings in digital video format acceptable to Owner.
 2. Identification: For each copy (electronic or disc), provide the following information:
 - a. Name of Project
 - b. Name of Architect
 - c. Name of Contractor
 - d. Date video recording was made
 - e. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - f. Weather conditions at time of recording.
- D. On monthly basis, provide aerial photos from two different views and deliver to LSCS.
- E. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities including temporary lighting required to produce clear, well-lit photographs without obscuring shadows.

1.03 USAGE RIGHTS

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

PART 2 - PRODUCTS

2.01 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 6.0 megapixels, and at an image resolution of not less than 1600 by 1200 pixels.
- B. Digital Video Recording Format: Provide high-resolution, digital video disc in format acceptable to Owner.
 1. Recording quality shall be adequate to create photographic prints to be made from individual frames.

PART 3 - EXECUTION

3.01 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 1. Maintain key plan with each set of construction photographs that identifies each photographic location.

- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in filename for each image.
 - 2. Field Office Images: Maintain one set of images in Owner approved media format in the field office at Project site, available at all times for reference. Identify images same as for those submitted to Architect.
- C. Preconstruction Photographs: Before commencement of site clearing, excavation and demolition, take color print and digital photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
 - 1. Flag excavation areas and construction limits before taking construction photographs.
 - 2. Take twelve photographs to show existing conditions adjacent to property before starting the Work.
 - 3. Take twelve photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
 - 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- D. Periodic Construction Photographs: Take 12 color print and digital photographs monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Final Completion Construction Photographs: Take twelve color photographs after date of Substantial Completion for submission as Project Record Documents. Architect will direct photographer for desired vantage points.
- F. Additional Photographs: Architect may issue requests for additional photographs, in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.
 - 1. Three days notice will be given, where feasible.
 - 2. In emergency situations, take additional photographs within 24 hours of request.
 - 3. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Special events planned at Project site.
 - b. Immediate follow-up when on-site events result in construction damage or losses.
 - c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
 - d. Substantial Completion of a major phase or component of the Work.
 - e. Extra record photographs at time of final acceptance.
 - f. Owner's request for special publicity photographs.

3.02 CONSTRUCTION VIDEO RECORDINGS

- A. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of construction. Display continuous running time and date. At start of each video recording, record weather conditions from local newspaper or television and the actual temperature reading at Project site.
- B. Preconstruction Videotape: Before starting site clearing, excavation, and selective site demolition, record videotape of Project site and surrounding properties from different vantage points, as directed by Architect.
 - 1. Flag excavation areas and construction limits before recording construction videotapes.
 - 2. Show existing conditions adjacent to Project site before starting the Work.

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3. Show existing buildings either on or adjoining Project site to accurately record physical conditions prior to the start of site clearing, excavation, and selective site demolition.
 4. Show protection efforts by Contractor.
- C. Periodic Construction Video Recordings: Record video recording monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last video recordings were recorded. Minimum recording time shall be a minimum of 30 minutes(s) to 24 hours.

END OF SECTION

SECTION 05 50 00 - METAL FABRICATIONS

This section has been added with Addendum 1.

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel items.

1.02 RELATED REQUIREMENTS

- A. Section 09 90 00 - Painting and Coating: Paint finish.

1.03 REFERENCE STANDARDS

- A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008.
- B. ASTM A361/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2013.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.
- F. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.
- G. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2014.
- H. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- I. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- J. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2007.
- K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2012.
- L. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2011 w/Errata.
- M. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).
- N. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).
- O. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).
- P. UL 1994 - Luminous Egress Path Marking Systems; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 30 00 - 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. Design Data: Provide framing member structural and physical characteristics, engineering calculations, dimensional limitations for ceiling hung equipment supports.

PART 2 - PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Fasteners: Match or be compatible with metals being fastened.
- F. Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1.
- G. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488, conducted by a qualified independent testing agency.
 - 1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633, Class Fe/Zn 5.
 - 2. Material for Anchors in Exterior Locations: Alloy Group 2 stainless-steel bolts complying with ASTM F593 and nuts complying with ASTM F594.
- H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

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

- A. The following is a list of principal items only. Refer to Drawings for items not specifically listed.
- B. Above ceiling supports for ceiling hung equipment and special conditions; prime painted.

2.04 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Exceptions: Galvanize items to be embedded in concrete and items to be imbedded in masonry.
 - 2. Exceptions: Galvanize items exposed to outside atmosphere or damp environments.
 - 3. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Non-structural Items Exposed to Outside Atmosphere: Galvanize after fabrication to ASTM A123/A123M requirements.

2.05 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- 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, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- G. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

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.

3.05 FIELD QUALITY CONTROL

- A. Expansion Anchors: Prior to installation, verify that the expansion anchor complies with the specified loading criteria for material, size, and length. During installation, verify 100 percent of the expansion anchors for the following:
 - 1. Drilled hole diameter is the same as the anchor diameter.
 - 2. Anchor is installed to the specified embedment depth.
 - 3. Verify the installation torque is in compliance with manufacturer's installation instructions.
 - 4. Anchor is installed in compliance with the manufacturer's printed instructions.
- B. If reinforcement steel, prestressing strands, or other embedded items are encountered in the concrete where the expansion anchor is to be located, notify the Architect and Engineer of such interference.

END OF SECTION

SECTION 09 67 23 - URETHANE FLOORING

This section has been added with Addendum 1.

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes one resinous flooring system, one with urethane body.
 - 1. Application Method: Metal, power or hand troweled four component ¼ inch polyurethane mortar system sealed with pigmented Bisphenol F Epoxy Sealer.

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
- B. Samples for Verification: For each resinous flooring system required, 6 inches (150 mm) square, applied to a rigid backing by Installer for this Project.
- C. Product Schedule: Use resinous flooring designations indicated in Part 2 and room designations indicated on Drawings in product schedule.
- D. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- E. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.04 QUALITY ASSURANCE

- A. No request for substitution shall be considered that would change the generic type of floor system specified (i.e. Urethane mortar based system with BIS F Sealer). Equivalent materials of other manufactures may be substituted only on approval of Architect or Engineer. Request for substitution will only be considered only if submitted 10 days prior to bid date. Request will be subject to specification requirements described in this section.
- B. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and who is acceptable to resinous flooring manufacturer.
 - 1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
 - 2. Contractor shall have completed at least 10 projects of similar size and complexity in a food production plant.

3. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer, with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- C. Manufacturer Field Technical Service Representatives: Resinous flooring manufacture shall retain the services of Field Technical Service Representatives who are trained specifically on installing the system to be used on the project.
 1. Field Technical Services Representatives shall be employed by the system manufacture to assist in the quality assurance and quality control process of the installation and shall be available to perform field problem solving issues with the installer.
- D. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Apply full-thickness mockups on 48-inch- (1200-mm-) square floor area selected by Architect.
 - a. Include 48-inch (1200-mm) length of integral cove base.
 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
 3. Sign off from Architect and Owner/Owners agent on texture for slip resistance must be complete before installation of flooring system.
- B. Pre-installation Conference:
 1. General contractor shall arrange a meeting not less than thirty days prior to starting work.
 2. Attendance:
 - a. General Contractor
 - b. Architect/Owner's Representative.
 - c. Manufacturer/Installer's Representative.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.
- B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.
- C. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
 - 1. Maintain material and substrate temperature between 65 and 85 deg F (18 and 30 deg C) during resinous flooring application and for not less than 24 hours after application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.
- D. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring if Insitu probe test reads above 80-85 relative moisture content.

1.07 WARRANTY

- A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of (1) full years from date of installation, or provide a joint and several warranty signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of (1) full year from date of installation. A sample warranty letter must be included with bid package or bid may be disqualified.

PART 2 - PRODUCTS

2.01 MANUFACTURES

- A. Acceptable Manufactures to review basis of design and provide equal materials or better shall be considered upon review by the Architect:
 - 1. Stonhard Inc.
 - 2. BASF – Master Builder Solutions
 - 3. Sika Corporation
- B. Basis of Design:
 - 1. Stonhard, Inc.; Stonclad UT®.

2.02 URETHANE FLOORING

- A. Available Products: Subject to compliance with requirements of troweled ¼ inch urethane mortar system. Multiple layers of liquids, Slurries and broadcasts will be rejected.
- B. Products: Subject to compliance with requirements:
 - 1. Stonhard, Inc.; Stonclad UT®.
- C. System Characteristics:
 - 1. Color and Pattern: Select from Mfg. Standards
 - 2. Wearing Surface: Light texture
 - 3. Integral Cove Base: 6 inches and as indicated in schedule and drawings.

4. Overall System Thickness: nominal 1/4".
- D. System Components: Manufacturer's standard components that are compatible with each other and as follows:
 1. Mortar:
 - a. Material design basis: Stonclad UT
 - b. Resin: Urethane.
Formulation Description: High solids.
 - c. Application Method: Screed, Trowel.
 - (1) Thickness of Coats: 1/4".
 - (2) Number of Coats: One.
 - d. Aggregates: Pigmented Blended aggregate.
 2. Topcoat:
 - a. Material design basis: Stonseal HT4
 - b. Resin: Bisphenol F Epoxy.
 - c. Formulation Description: 100% solids.
 - d. Type: pigmented.
 - e. Finish: standard.
 - f. Number of Coats: One.

2.03 ACCESSORY MATERIALS

- A. Primer: Type recommended by manufacturer for substrate and body coats indicated. Formulation Description: Stonclad UT urethane mortar is self-priming.
- B. Pitching and Leveling: Use a four component fast setting non Cementitious Urethane Grout (TG6). Moisture resistant polyurethane based grout designed for permanent repairs under flooring system. Stonhard, Stonset TG6. See drawings 1/4" per foot slope to drains. Use standard drain detail, saw-cut and chase.
- C. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated. Allowances should be included for Stonflex MP7 joint fill material, and Stonproof CT5 concrete crack treatment

PART 3 - EXECUTION

3.01 PREPARATION

- A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for resinous flooring application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
 1. Mechanically prepare substrates as follows:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Comply with ASTM C 811 requirements, unless manufacturer's written instructions are more stringent.

2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
 3. Verify that concrete substrates are dry.
 - a. Perform in situ probe test, ASTM F 2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 85 percent.
 - b. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 7 lb of water/1000 sq. ft. of slab in 24 hours.
 - c. Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing.
 4. Verify that concrete substrates have neutral Ph and that resinous flooring will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Allowances should be included for Stonflex MP7 joint fill material, and CT5 concrete crack treatment.

3.02 APPLICATION

- A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.
 - a. Apply joint sealant to comply with manufacturer's written recommendations.
- B. Apply primer where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate.
- C. Integral Cove Base and Curb Coating: Basis of design: Stonclad UT mortar, apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and top coating of cove base. Round internal and external corners. Requires Primer.
1. Integral Cove Base: 6 inches Or 45 Degree Cant on all metal walls.
- D. Mortar: Mix mortar material according to manufacturer's recommended procedures. Uniformly spread mortar over substrate at manufacturer's recommended height using specially designed trowel and or Screed box. Broadcast desired light texture directly into mortar base. Field verify texture needed.
- E. Apply topcoat Bisphenol F Epoxy Sealer in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.03 TERMINATIONS

- A. Chase edges to “lock” the coating system into the concrete substrate along lines of termination.
- B. Penetration Treatment: Lap and seal coating onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement. Install thermal isolation construction detail where applicable and indicated in detail drawings.
- C. Trenches: Continue coating system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks.
- D. Treat floor drains by chasing the coating to lock in place at point of termination. Install thermal isolation construction detail where applicable and indicated in detail drawings.

3.04 JOINTS AND CRACKS

- A. Treat control joints to bridge potential cracks and to maintain monolithic protection.
- B. Treat cold joints and construction joints to bridge potential cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.
- C. Discontinue floor coating system at vertical and horizontal contraction and expansion joints by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.

3.05 FIELD QUALITY CONTROL

- A. Material Sampling: Owner may at any time and any numbers of times during resinous flooring application require material samples for testing for compliance with requirements.
 - 1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
 - 3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.06 CLEANING, PROTECTING, AND CURING

- A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 18 hours.
- B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.
- C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer

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Issued: May 15, 2020

END OF SECTION

URETHANE FLOORING
09 67 23-7
ISSUED FOR PERMIT AND BIDDING - ADDENDUM 1

SECTION 10 14 23 - PANEL SIGNAGE

This section has been added with Addendum 1.

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Room-identification signs.

1.03 DEFINITIONS

- A. Accessible: In accordance with the accessibility standard.

1.04 COORDINATION

1.05 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For panel signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
 - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.
- C. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
 - 1. Room-Identification Signs: Full-size Sample.
- D. Sign Schedule: Use same designations specified or indicated on Drawings or in a sign schedule.

1.06 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.07 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

1.08 FIELD CONDITIONS

1.09 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of finishes beyond normal weathering.

- b. Deterioration of embedded graphic image.
- c. Separation or delamination of sheet materials and components.
2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 SIGNS

- A. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
- B. Basis-of-Design Product: To match existing signage on-site in dimension and layout.
 1. APCO Graphics, Inc.
 2. Best Sign Systems, Inc.
 3. InPro Corporation (IPC).
 4. Nelson-Harkins Industries.
 5. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated to acrylic backing sheet to produce composite sheet.
 - a. Composite-Sheet Thickness: 0.25 inch.
 - b. Surface-Applied Graphics: Applied vinyl film.
 - c. Color(s): As selected by Architect from manufacturer's full range.
 6. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition: Square cut.
 - b. Corner Condition in Elevation: Rounded to radius indicated.
 7. Mounting: Manufacturer's standard method for substrates indicated with hook-and-loop tape.
 8. Text and Typeface: Accessible raised characters and Braille typeface as indicated. Finish raised characters to contrast with background color, and finish Braille to match background color.
- C. Quantity: 8 signs shall be provided room name and number to be determined by the Architect.

2.02 PANEL-SIGN MATERIALS

- A. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- B. Vinyl Film: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back; die cut to form characters or images as indicated and suitable for exterior applications.
- C. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.03 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
 1. Use concealed fasteners and anchors unless indicated to be exposed.
- B. Hook-and-Loop Tape: Manufacturer's standard two-part tape consisting of hooked part on sign back and looped side on mounting surface.

2.04 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
 - 1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
 - 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.

2.05 GENERAL FINISH REQUIREMENTS

- A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Room-Identification Signs and Other Accessible Signage: Install in locations on walls as indicated and according to accessibility standard.
- C. Mounting Methods:
 - 1. Hook-and-Loop Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply sign component of two-part tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage; push to engage tape adhesive. Keep tape strips 0.250 inch away from edges to prevent visibility at sign edges when sign is initially installed or reinstalled. Apply substrate component of tape to substrate in locations aligning with tape on back of sign; push and rub well to fully engage tape adhesive to substrate.

3.03 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION

SECTION 10 44 00 - FIRE PROTECTION SPECIALTIES

This section has been added with Addendum 1.

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.

1.02 REFERENCE STANDARDS

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2011e.
- B. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.
- C. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements, and location.
- C. Product Data: Provide extinguisher operational features, color and finish, and anchorage details.
- D. Samples: Color charts showing manufacturer's full range of colors available.
- E. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.
- H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1.05 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.
- B. Do not install extinguishes on brackets or in cabinets until Substantial Completion.

1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide six year manufacturer warranty for hand portable fire extinguishers.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Amerex Corporation: www.amerex-fire.com .
 - 2. Badger Fire Protection: www.badgerfire.com .
 - 3. Kidde Fire Fighting: www.kidde-fire.com .
- B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Multi-purpose Dry Chemical Type Fire Extinguisher, FE Type-1: Polyester coated steel tank, with pressure gage.
 - 1. Class A:B:C.
 - 2. Size 10.
 - 3. UL Rating: UL-4A-80BC.
 - 4. Quantity: 12
 - 5. Anchorage: Wall Hung to match existing on site.
 - 6. Locations: As directed by Architect

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify locations with Architect before installation.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in locations and at mounting heights indicated or, if not indicated, at heights to comply with applicable regulations of governing authorities.
- C. Secure rigidly in place.

END OF SECTION

SECTION 22 08 00 - COMMISSIONING OF PLUMBING SYSTEMS

This section has been added with Addendum 1.

PART 1 - GENERAL

1.01 SUMMARY

- A. The purpose of this Section is to define Contractor's and Division 22 "Plumbing" subcontractor's responsibilities in the commissioning process. Other plumbing system testing is required under other Division 22 "Plumbing" Specification Sections.
- B. Related Documents:
 - 1. Drawings and general provisions of the Subcontract apply to this Section.
 - 2. Review these documents for coordination with additional requirements and information that apply to work under this Section.
- C. Section Includes:
 - 1. General requirements that apply to implementation of commissioning of plumbing equipment, systems, assemblies and components.
- D. Related Sections:
 - 1. Division 01 Section ["General Requirements."]
 - 2. Division 01 Section ["Special Procedures."]
 - 3. Division 22 Plumbing equipment, systems, assemblies and components.

1.02 REFERENCES

- A. General:
 - 1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
 - 2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
 - 3. Refer to Division 01 for the list of applicable regulatory requirements.
 - 4. Refer to Division 22 Section for codes and standards, and other general requirements.
 - 5. Refer to 2015 IECC

1.03 DESCRIPTION

- A. The purpose of commissioning is to ensure that work has been completed as specified and that systems are functioning in the manner as described in the contract documents and specified system operating criteria. It will assist operating staff training and familiarization with new systems. It will serve as a tool to reduce post-occupancy critical systems operational difficulty or failure. It will, also, be used to develop test protocol and record the associated test data in an effort to advance the building systems from a state of substantial completion to a full dynamic operation.
- B. Functional Performance Testing will commence after Construction Checklists or approved equipment startup reports and preliminary punch list items have been completed by Subcontractors.

- C. The Commissioning Team will include representatives of the A&E, Construction and Installing Subcontractors. Equipment manufacturer's representatives will be present for start-up as specified in the equipment specification sections and for equipment training.

1.04 SUBMITTALS

- A. Refer to Section 01 91 00 "General Commissioning Requirements" 'Submittals' Article for specific requirements. In addition, provide the following:
 1. Inspection reports.
 2. Documentation of completion of installation, prestart, and startup activities.
 3. Field checkout sheet forms used by factory or field technicians.
 4. Shop drawings and product submittal data related to systems to be commissioned.
 5. O&M manuals.
 6. Notification of Readiness Forms
 7. Test reports as required in the plumbing specifications.

1.05 COORDINATION

- A. Refer to Section 01 91 00 "General Commissioning Requirements" for requirements pertaining to coordination during the commissioning process.

1.06 DEFINITIONS

- A. Refer to Section 01 91 00 "General Commissioning Requirements" for definitions.

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

- A. All standard testing equipment required to perform startup; initial checkout and construction checklists shall be provided by the subcontractor for the equipment being tested. For example, the subcontractor of Division 22 "Plumbing" shall ultimately be responsible for all standard testing equipment for the plumbing system. Sufficient and reliable communication devices shall be provided by each subcontractor.
- B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the Owner and left on site.
- C. Proprietary test equipment and software required by any equipment manufacturer for programming and/or startup, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the Owner upon completion of the commissioning process.
- D. Data logging equipment and software required to test equipment will be provided by the Commissioning Provider and Cx consultants but shall not become the property of the Owner.
- E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the job specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5 deg F and a resolution of + or - 0.1 deg F. Pressure sensors shall have an accuracy of + or - 2.0 percent of the value range being measured (not full range of meter).

- F. The Contractor and Subcontractor will be required to participate in a commissioning web-based document storage system. The intent is to help simplify the commissioning documentation and tracking process, specifically by providing "smart" checklists that display the assigned tasks the Subcontractor are responsible for signing off on.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Subcontractors shall be responsible for performing testing procedures presented in specification and contract drawings as detailed in the Functional Performance Tests (FPT). Members of the designated Commissioning Team shall witness various portions of the functional tests. Responsibilities for these activities are listed in the following paragraphs. Commissioning Team members shall sign-off on appropriate sections after verifying installation, operation, or documentation. Final sign-off shall be by the general contractor prior to the Commissioning Provider's (CxP) review.
- B. Any test ports, gauges, test equipment, etc., needed to accomplish the functional performance tests shall be provided by Subcontractors.
- C. Subcontractors shall provide to the Commissioning Team documentation of calibration of controls. Documentation shall include dates, setpoints, calibration coefficients, control loop verification, and other data required to verify system check-out. Documentation shall be dated and initialed by field engineer or technician performing the work.
- D. Subcontractors shall provide proof that all commissioned systems have been pretested by filling out Commissioning Provider's functional performance test prior to scheduling functional testing.

3.02 INSTRUMENTATION

- A. Instrumentation, required for testing, shall be provided by the Subcontractor. Instruments used for measurements shall be accurate. Calibration histories for each instrument shall be available for examination.

3.03 DOCUMENTATION

- A. The installing Subcontractor shall be responsible for collection of pertinent data during system start-up and functional performance testing. The Subcontractor shall upload to the cloud based commissioning software the documentation of tests performed prior to and after system start-up. Documentation shall also include start-up procedures as required by the Contract Documents and approved by Commissioning Team.
- B. Documentation is to be properly named and uploaded in PDF form. Indicate equipment/system name and document purpose. Example: DHW-01 – Startup Report. If two documents have the same name, the date of testing must be included in the name of the document.

3.04 INSTALLATION VERIFICATION

- A. General Commissioning responsibilities:
 - 1. Before system start-up begins, the Contractor shall conduct a final installation verification audit. The Subcontractor shall be responsible for completion of work including change orders and punch list items. The Contractor audit shall include, but not be limited to, checking of:
 - a. Control sensor types and location.

- b. Identification of piping, valves, equipment, controls, etc.
 - c. Major equipment, pumps, valves, starters, gauges, thermometers, etc.
 - d. Documentation of prestart-up tests performed, including manufacturer's factory tests.
2. If work is found to be incomplete, incorrect, or non-functional, the Subcontractor shall correct the deficiency before system start-up work proceeds.

3.05 SYSTEM STARTUP

- A. The following procedures apply to all equipment/systems to be commissioned.
 1. Requirements: The primary role of the commissioning process during startup is to ensure there is written documentation and to ensure that each of the manufacturer's recommended procedures have been completed.
 2. Construction Checklist and/or equipment startup/checkout forms are required for 100% of commissioned equipment. Construction Checklists are used during the checkout/startup process to verify that the equipment and systems are fully connected and operational. It ensures that Functional Performance Tests (in-depth system checkout) may proceed without unnecessary delays.
 3. The Construction Checklists for a given system must be successfully completed and approved prior commencement of the Functional Performance Tests of equipment or subsystems of the given system. No sampling strategies are used during the pre-functional process.
 4. The Construction Checklist forms are provided by the CxP and the contractor/subcontractors shall execute startup and provide the CxP with the completed Construction Checklists.
 5. The contractor/subcontractor responsible for the startup of the equipment shall combine manufacturer's detailed startup and checkout procedures with Construction Checklists.

3.06 FUNCTIONAL PERFORMANCE TESTING

- A. General Commissioning Responsibilities:
 1. Functional Performance Testing begins after start-up, operational testing, adjusting, and balancing of the systems have been completed by the Subcontractors. It is the responsibility of the contractor to perform pre-verification testing by filling out Commissioning Provider's functional performance test prior to scheduling functional testing. A Notification of Readiness form shall be filled out and submitted by the Contractor to the Commissioning Provider prior to functional testing. (Refer to Section 01 91 00 "General Commissioning Requirements" for definitions.)
 2. The objective of the Functional Performance Testing is to verify equipment/systems are operating per design documents. Functional testing shall include full load and part load conditions.
 3. Attaining this objective will be accomplished by developing individual systems testing protocols which, when implemented by the Subcontractor, will allow the Commissioning Team to observe, evaluate, identify deficiencies, recommend modifications, tune, and document the systems and systems equipment performance over a range of load and functional levels.
 4. Functional Performance tests for the systems to be commissioned are defined in the Commissioning Plan. These tests are intended to be conclusive but may require minor modifications as system operation dictates.

3.07 RETESTING / DEFERRED TESTING

A. General Commissioning Responsibilities:

1. Functional Performance Retesting begins after contractor has confirmed that ALL deficiencies have been corrected. An issues log, containing all commissioning issues with date corrected and a description of how the deficiency was corrected, shall be filled out and submitted by, the Contractor, to the Commissioning Provider prior to functional performance retesting.
2. The objective of the Functional Performance Retesting is to verify deficiencies found during commissioning have been corrected and equipment/systems are now operating per design documents.
3. Attaining this objective will be accomplished through the coordination of the commissioning team. Subcontractor shall correct issues and Contractor shall verify issue has been properly corrected prior to giving notice for retesting. Commissioning provider may recommend solutions to deficiencies, but contractors are not obligated to perform said solutions.
4. Unforeseen Deferred Tests. If any check or test cannot be completed due to the project completion level, required occupancy condition or other deficiency, execution of checklists and Functional Performance Tests may be delayed upon approval of the CxP, CM, AE, Owner and others as applicable. Tests will be conducted as soon as possible and services of necessary parties will be negotiated

END OF SECTION

SECTION 23 05 93 - SYSTEMS TESTING, ADJUSTING AND BALANCING

This section has been added with Addendum 1.

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Contract Documents, General Requirements for Building Construction and Related Work, apply to work specified in this section.
- B. Coordinate with Commissioning Requirements indicated in Section 019113. This Contractor is responsible to comply with all requirements for the above section.

1.02 SCOPE

- A. Testing, Adjusting and Balancing (TAB) contractor shall bid work specified under this section direct to Lonestar Collage. TAB Contractor shall not be hired by General Contractor or any subcontractor. Mechanical Contractor shall provide all assistance and information requested by the TAB Contractor.
- B. This Section provides for the testing and balancing, of all systems and equipment. Refer to Section 23 08 00 for commissioning requirements.
- C. These tests are required to determine that all systems and equipment involved may be safely energized and equipment.
- D. Perform tests by and under the supervision of fully experienced and qualified personnel. Advise each respective manufacturer's representative of tests on their equipment.
- E. Record all test data.
- F. Each section of Division 23 that has the products or systems listed herein, incorporate this section by reference and is incomplete without the required tests stated herein.
- G. This Section includes testing, adjusting, balancing HVAC systems and alarm point reporting verification to produce design objectives, including the following:
 - 1. Balancing airflow and water flow within distribution systems, including sub-mains, branches, and terminals, to indicated quantities according to specified tolerances.
 - 2. Adjusting total HVAC systems to provide indicated quantities.
 - 3. Measuring electrical performance of HVAC equipment.
 - 4. Testing, adjusting, and balancing of Hydraulic piping systems.
 - 5. Testing, adjusting, and balancing of refrigerating systems.
 - 6. Measurement of final operating condition of HVAC systems.
 - 7. Sound measurement of equipment operating conditions.
 - 8. Setting quantitative performance of HVAC equipment.
 - 9. Verifying that automatic control devices are functioning properly and perform their intended functions.
 - 10. Calibrating automatic temperature control sensors.
 - 11. Verification of building alarm and alarm remote monitoring.

1.03 QUALIFICATIONS

- A. The independent testing, adjusting, and balancing agency certified by National Environmental Balancing Bureau (NEBB) or by the Associated Air Balance Council (AABC) in those testing

and balancing disciplines required for this project, and having at least one Professional Engineer registered in the State in which the services are to be performed, certified by NEBB or AABC as a Test and Balance Engineer.

- B. The TAB firm shall have operated a minimum of five (5) years under its current Firm name, and shall be in good standing with the State of Texas, Franchise Tax Board. The firm shall submit their full incorporated name, Charter Number and Taxpayer's I.D. Number for proper verification of the firm's status.
- C. The TAB firm shall be capable of providing a performance bond, by a bonding company licensed to do business in the State of Texas, if determined by the Owner that such a bond is required. The amount of the bond which may be required shall be equal to the cost of the proposal submitted, or in the case of more than one proposal, the sum of all such proposals and any awarded work in progress.
- D. All personnel used on the job site shall be either professional engineers or engineering technicians, who shall have been permanent, full time employees of the firm for a minimum of six (6) months prior to the start of work for this specific project.
- E. The TAB firm shall submit biographical data on the individual proposed who will directly supervise the TAB work, as well as other personnel scheduled to perform the technical work under the contract. It shall also submit a background record of at least five (5) years of specialized experience in the field of air hydronic system balancing, and shall possess properly calibrated instrumentation. The supervisory personnel for the TAB firm shall be registered engineers in the mechanical field and all of the employees used in the TAB firm shall be permanent, full-time employees of the firm.
- F. Pre-Balancing Conference: Prior to beginning of testing, adjusting, and balancing procedures, schedule and conduct a conference with the Engineer and representatives of installers of the mechanical systems. The objective of the conference is final coordination and verification of the system operation and readiness for testing, adjusting, and balancing.
- G. Test, adjust, and balance the air systems before hydronic and refrigerant systems.
- H. Test, adjust and balance air conditioning systems during summer season and heating systems during winter season, including at least a period of operation at outside conditions within five degrees Fahrenheit (5 deg-F) wet bulb temperature of maximum summer design condition, and within ten degrees Fahrenheit (10 deg-F) dry bulb temperature of minimum winter design condition. Take final temperature reading during seasonal operation.
- I. Approved TAB Contractors:
 - 1. Engineered Air Balance.
 - 2. National Precisionaire, LLC.

1.04 SERVICES OF THE MECHANICAL CONTRACTOR

- A. Mechanical Contractor is responsible for coordinating work with the TAB Contractor. Mechanical contractor requirements are specified herein.
- B. Contractor shall provide all volume dampers, balancing dampers, balancing valves, test ports and Pete's plugs as required by the Testing and Balancing Firm.
- C. Contractor shall furnish a set of sheet metal shop drawings and HVAC piping drawings to the Testing and Balancing Firm during the submittal phase and incorporate the Testing and Balancing Firm's mark-ups and requests into the project.

- D. Contractor shall provide all required equipment to facilitate Testing and Balancing Firm's work. This coordination shall be included in the Contractor's base bid price.
- E. Provide, correct, repair or replace deficient items or conditions found during the testing and balancing.
- F. Provide replacement sheaves as directed by TAB Contractor to achieve scheduled air volumes.
- G. For motors with a variable frequency drive, Contractor shall provide belt and sheave adjustment such that units deliver their design CFM when speed drive is at 60 hertz.
- H. The General Contractor and appropriate sub-contractors shall turn over the completed job to the TAB Contractor before testing begins. The General Contractor shall ensure the system is fully operational, has been cleaned and new air filters installed in all air-handling units prior to requesting the TAB Contractor to perform his work
- I. Verify systems are complete and operable before commencing work. Verify the following:
 - 1. Systems are started and operating in safe and normal condition.
 - 2. Temperature control systems are installed complete and operable.
 - 3. Proper thermal overload protection is in place for electrical equipment.
 - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 - 5. Duct systems are clean of debris.
 - 6. Fans are rotating correctly.
 - 7. Fire and volume dampers are in place and open.
 - 8. Air coil fins are cleaned and combed.
 - 9. Access doors are closed and duct end caps are in place.
 - 10. Air outlets are installed and connected.
 - 11. Duct system leakage is minimized.
 - 12. Hydronic systems are flushed, filled, and vented.
 - 13. Pumps are rotating correctly.
 - 14. Proper strainer baskets are clean and in place or in normal position.
 - 15. Service and balancing valves are open.
 - 16. Re-sheave.
- J. It shall be the responsibility of the General Contractor and appropriate sub-contractors to cooperate with the Owner's TAB Contractor in furnishing personnel during the test and balancing to make such adjustments and corrections specified by the TAB, including but not limited to sheave changes.

1.05 REPORTS

- A. The TAB firm shall, as a requirement of the TAB contract, arrange with the Architect to compile one (1) set of mechanical specifications, all pertinent change orders, and the following:
 - 1. One (1) complete set of Drawings less the structural sheets.
 - 2. One (1) set of mechanical floor plans of the conditioned spaces. These Drawings shall be hard copy and PDF type to facilitate marking.
- B. Approved submittal data on equipment installed, and related changes as required to accomplish the test procedures outlined in this Specification Section will be available through the Construction Inspector.
- C. Submit test report forms for review a minimum of thirty (30) days prior to requesting a final review by the Architect/ Engineer.

- D. Furnish six (6) individually bound copies of test data. Neatly type and arrange data. Include with the data the date tested, personnel present, weather conditions, nameplate record of test instrument and list all measurements take, both prior to and after any corrections are made to the system. Record all failures and corrective action taken to remedy incorrect situation.
- E. The Architect will retain on (1) copy and the Engineer will retain one (1) copy. The remaining four (4) copies will be returned to the Contractor for inclusion in the operation and maintenance manuals. Refer to Division 01 – Closeout Submittals.

1.06 REFERENCES

- A. AABC - National Standards for Total System Balance, 7th edition, 2016.
- B. ASHRAE 111-2008 (RA2017) - Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning and Refrigeration Systems.
- C. CTI - Cooling Technology Institute Code ATC-105
- D. IMC – International Mechanical Code, 2015 edition with City of Stafford, Texas amendments.
- E. NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.

1.07 RESPONSIBILITIES OF THE TAB FIRM

- A. The TAB personnel shall check, adjust, and balance the components of the air conditioning system which will result in optimal noise, temperature, and airflow conditions in the conditioned spaces of the building while the equipment of the system is operating economically. This is intended to be accomplished after the system components are installed and operating as provided for in the contract documents. It is the responsibility of the Mechanical Contractor to place the equipment into service. Variable air volume systems shall be balanced in accordance with AABC Standards.
- B. Liaison and Early Inspection:
 - 1. The TAB firm personnel shall support on the job the commissioning authority responsible to act as liaison between the Owner, Architect and Contractor. The following reviews (observations) and tests shall be performed by the TAB Agency:
 - a. During the design stage, before the documents are finalized, review the mechanical Drawings and Specifications for balance ability and provide commentary.
 - b. During construction, review all HVAC submittals such as control diagrams, air handling devices, etc., that pertain to commissioning work and balance ability.
 - c. Allow for a fixed number of trips to the project site, over and above those required for testing and balancing for inspection of installation of the mechanical piping systems, sheet metal work, temperature controls and other component parts of the heating, air conditioning and ventilating systems during the construction stage. These inspections shall be made prior to and/or at the above ceiling inspection. Commentary will be provided to the Owner's Designated Representative of each observation.
 - 2. During the balancing process, as abnormalities and malfunctions of equipment or components are discovered by the TAB personnel, the Construction Inspector shall be advised in writing so that the condition can be corrected by the Mechanical Contractor. The written document need not be formal, but must be understandable and legible. Data from malfunctioning equipment shall not be recorded in the final TAB report. The TAB firm shall not instruct or direct the Contractor in any of the work, but will make such reports as are necessary to the Owner.

1.08 VIBRATION TESTS

- A. Location of Points for Air Handling Unit Fans and all other Fans:
 - 1. Fan bearing, drive end.
 - 2. Fan bearing, opposite end.
 - 3. Motor bearing, center (if applicable)
 - 4. Motor bearing, drive end.
 - 5. Motor bearing, opposite end.
- B. Test Readings.
 - 1. Horizontal, velocity and displacement.
 - 2. Vertical, velocity and displacement.
 - 3. Axial, velocity and displacement.
- C. Normally acceptable readings, velocity and acceleration.
- D. Unusual conditions at time of test.
- E. Vibration sources (if non-complying)

1.09 FINAL AIR BALANCE

- A. General: When systems are complete and ready for operation, the TAB Consultant will perform a final air balance for all air systems and record the results. The outside, supply, exhaust and return air volume for each air handling unit, supply fan and exhaust fan and the supply, exhaust or return air volume for each distribution device shall be adjusted to within +5% of the value shown on the drawings. Air handling unit and fan volumes shall be adjusted by changing fan speed and adjusting volume dampers associated with the unit. Air distribution device volume shall be adjusted using the spin-in tap damper for flexible duct connected devices and the device OBD for duct connected devices. Air distribution devices shall be balanced with air patterns as specified. Duct volume dampers shall be adjusted to provide air volume to branch ducts where such dampers are shown. The general scope of balancing by the TAB Consultant will include, but is not limited to, the following:
 - 1. Filters: Check air filters and filter media and balance only system with essentially clean filters and filter media. The Division 23 Contractor shall install new filters and filter media prior to the final air balance.
 - 2. Blower Speed: Measure RPM at each fan or blower to design requirements. Where a speed adjustment is required, the Division 23 Contractor shall make any required changes.
 - 3. Ampere Readings: Measure and record full load amperes for motors.
 - 4. Static Pressure: Static pressure gains or losses shall be measured across each supply fan, cooling coil, heating coil, return air fan, air handling unit filter and exhaust fan. These readings shall be measured and recorded for this report at the furthest air device or terminal unit from the air handler supplying that device. Static pressure readings shall also be provided for systems which do not perform as designed.
 - 5. Equipment Air Flow: Adjust and record exhaust, return, outside and supply air CFM (s) and temperatures, as applicable, at each fan, blower and coil.
 - 6. Coil Temperatures: Set controls for full cooling and for full heating loads. Read and record entering and leaving dry bulb and wet bulb temperatures (cooling only) at each cooling coil, heating coil and HVAC terminal unit. At the time of reading record water flow and entering and leaving water temperatures (In variable flow systems adjust the water flow to design for all the above readings).
 - 7. Zone Air Flow: Adjust each zone of multizone units, each HVAC terminal unit and air handling unit for design CFM.

8. Outlet Air Flow: Adjust each exhaust inlet and supply diffuser, register and grille to within +5% of design air CFM. Include all terminal points of air supply and all points of exhaust. Note: For Labs and Rooms that are negative exhaust air flow shall be set to design +10% and supply to design -5%. Positive areas will have opposite tolerances.
9. Pitot Tube Traverses: For use in future troubleshooting by maintenance personnel, all exhaust ducts, main supply ducts and return ducts shall have air velocity and volume measured and recorded by the traverse method. Locations of these traverse test stations shall be described on the sheet containing the data.
10. Maximum and minimum airflow on terminal boxes.

1.10 FINAL CHILLED AND HEATING HOT WATER BALANCE

- A. General: When systems are completed and ready for operation, the TAB Consultant will perform a final water balance for each chilled and hot water system. The general scope of balancing by the TAB Consultant will include, but not be limited to, the following:
 1. Adjusted System Tests: Adjust balancing valves at each coil and heat exchanger for design flow, +5%. Adjust balancing valves at pumps to obtain design water flow. Record pressure rise across pumps and GPM flow from pump curve. Permanently mark the balanced position for each valve (Note: If discharge valves on the pumps are used for balancing record the head being restricted by the valves).
 2. Temperature Readings: Read and record entering and leaving water temperature at each water coil, converter and heat exchanger. Adjust as necessary to secure design and conditions. Provide final readings at all thermometer well locations.
 3. Pressure Readings: Water pressure shall be recorded at all gauge connections. Pressure readings at coils and pumps shall be related to coil and pump curves in terms of GPM flow through flow measuring status, if provided and installed, at each air handler. The flow of water through all water coils shall be adjusted by manipulating valves until the rated pressure drops across each coil is obtained and total water flow is verified by flow measuring status. For coils equipped with 3-way valves, the rated pressure drop shall first be adjusted through the coils. The bypass valve shall then be adjusted on each coil until an equal pressure drop between supply and return connections is the same as with the flow through the coil.
 4. Ampere Readings: Reading and record full load amperes for each pump motor.

1.11 SOUND VIBRATION AND ALIGNMENT

- A. Sound: Read and record sound levels at up to 15 locations in the building designated by the Engineer. All measurements shall be made using an Octave Band Analyzer. All tests shall be conducted when the building is quiet in the presence of the Engineer, if he so desires.
- B. Vibration: Read and record vibration for all water circulating pumps, air handling units, and fans which have motors larger than 10 HP. Include equipment vibration, bearing housing vibration, foundation vibration, building structure vibration, and other tests as directed by the Engineer. Readings will be made using portable IRD (or approved equal) equipment capable of filtering out various unwanted frequencies and standard reporting forms. Maximum vibration at any point listed above, or specified, shall not exceed 1 mil on fans and 1 mil on pumps unless otherwise specified. Equipment manufacturers shall rectify all systems exceeding vibration tolerances.

1.12 TESTING OF TEMPERATURE CONTROL SYSTEMS

- A. In the process of performing the TAB work, the TAB Agency shall:

1. Work with the Temperature Control Contractor to ensure the most effective total system operation within the design limitations, and to obtain mutual understanding of intended control performance.
 2. Verify that all control devices are properly connected.
 3. Verify that all dampers, valves and other controlled devices are operated by the intended controller.
 4. Verify that all dampers and valves are in the position indicated by the controller (open, closed or modulating).
 5. Verify the integrity of valves and dampers in terms of tightness of close-off and full-open positions. This includes dampers in multizone units, terminal boxes and fire/smoke dampers.
 6. Observe that all valves are properly installed in the piping system in relation to direction of flow and location.
 7. Observe the calibration of all controllers.
 8. Verify the proper application of all normally opened and normally closed valves.
 9. Observe the locations of all thermostats and humidistats for potential erratic operation from outside influences such as sunlight, drafts or cold walls.
 10. Observe the locations of all sensors to determine whether their position will allow them to sense only the intended temperatures or pressures of the media. Control Contractor will relocate as deemed necessary by the TAB Agency.
 11. Verify that the sequence of operation for any control mode is in accordance with approved shop drawings and specifications. Verify that no simultaneous heating and cooling occurs.
 12. Verify that all controller setpoints meet the design intent.
 13. Check all dampers for free travel.
 14. Verify the operation of all interlock systems.
 15. Perform variable volume system verification to assure the system and its components track with changes from full flow to minimum flow.
- B. A systematic listing of the above testing and verification shall be included in the final TAB report.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SERVICES OF THE MECHANICAL CONTRACTOR

- A. Examine the contract documents to become familiar with Project requirements and to discover conditions in systems design that may preclude proper TAB of systems and equipment.
- B. Examine the approved submittals for HVAC systems and equipment.
- C. Verify systems are complete and operable before commencing work. Verify the following:
 1. Systems are started and operating in safe and normal condition.
 2. Temperature control systems are installed complete and operable.
 3. Proper thermal overload protection is in place for electrical equipment.
 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 5. Duct systems are clean of debris.
 6. Fans are rotating correctly.
 7. Fire and volume dampers are in place and open.
 8. Air coil fins are cleaned and combed.

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9. Access doors are closed and duct end caps are in place.
 10. Air outlets are installed and connected.
 11. Duct system leakage is minimized.
 12. Hydronic systems are flushed, filled, and vented.
 13. Pumps are rotating correctly.
 14. Proper strainer baskets are clean and in place or in normal position.
 15. Service and balancing valves are open.
 16. Re-sheave.
- D. Contractor shall provide all volume dampers, balancing dampers, balancing valves, test ports and Pete's plugs as required by the Testing and Balancing Firm. Contractor shall furnish a set of sheet metal shop drawings and HVAC piping drawings to the Testing and Balancing Firm during the submittal phase and incorporate the Testing and Balancing Firm's mark-ups and requests into the project. Contractor shall provide all required equipment to facilitate Testing and Balancing Firm's work. This coordination shall be included in the Contractor's base bid price.
- E. Provide, correct, repair or replace deficient items or conditions found during the testing and balancing.
- F. Provide replacement sheaves as directed by TAB Contractor to achieve scheduled air volumes.
- G. For motors with a variable frequency drive, contractor shall provide belt and sheave adjustment such that units deliver their design cfm when speed drive is at 60 hertz.

3.02 SERVICES OF THE TESTING AND BALANCING CONTRACTOR

- A. Furnish instruments required for testing, adjusting, and balancing operations.
- B. Make instruments available to Architect/Engineer to facilitate spot checks during testing.
- C. Complete system-readiness checks and prepare reports. Verify the following:
1. Permanent electrical-power wiring is complete.
 2. Hydronic systems are filled, clean, and free of air.
 3. Automatic temperature-control systems are operational.
 4. Equipment and duct access doors are securely closed.
 5. Balance, smoke, and fire dampers are open.
 6. Isolating and balancing valves are open and control valves are operational.
 7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 8. Windows and doors can be closed so indicated conditions for system operations can be met.

3.03 INSTALLATION TOLERANCES

- A. Set HVAC system's air flow rates and water flow rates within the following tolerances:
1. Supply, Return, and Exhaust fans and Equipment with Fans: +/- 5%
 2. Air Outlets and Inlets: +/- 5%
 3. Heating-Water Flow Rate: +/- 5%
 4. Cooling-Water Flow Rate: +/- 5%

3.04 ADJUSTING

- A. Verify recorded data represents actual measured or observed conditions.

- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. After adjustment, take measurements to verify balance has not been disrupted. If disrupted, verify correcting adjustments have been made.
- D. Report defects and deficiencies noted during performance of services, preventing system balance.
- E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.05 PREPARATION

- A. Follow industry standard practices and procedures for testing, balancing, as listed in Part 1 of this Section.
- B. The A/E must be notified a minimum of 72 hours prior to any tests being conducted.
- C. The TAB Contractor must be notified a minimum of five (5) working days prior to conduction any duct leakage tests and same must be present to witness all duct leakage tests.

3.06 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Adjust air handling and distribution systems to obtain required or design supply, return, and exhaust air quantities.
- B. Make air quantity measurements in main ducts by pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts.
- E. Use volume control devices to regulate air quantities only to extent adjustments do not create objectionable air motion or sound levels. Effect volume control by using volume dampers located in ducts.
- F. Vary total system air quantities by adjustment of fan speeds. Provide sheave drive changes to vary fan speed. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- K. Measure building static pressure and adjust supply, return, and exhaust air systems to obtain required relationship between each to maintain approximately 0.05 inches W.G. positive static pressure near building entries in clean rooms.

3.07 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.
 - a. Where sufficient space in ducts is unavailable for pitot tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.
 - b. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
 - c. Measure static pressure directly at the fan outlet or through the flexible connection.
 - d. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
 - e. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
2. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
 - a. Report the cleanliness status of filters and the time static pressures are measured.
 - b. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
 - c. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
 - d. Obtain approval from Construction Manager for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 - e. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, sub-main ducts, and major branch ducts to indicated airflows within specified tolerances.
 1. Measure airflow of sub-main and branch ducts.
 2. Where sufficient space in sub-main and branch ducts is unavailable for pitot tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 3. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
 4. Re-measure each sub-main and branch duct after all have been adjusted. Continue to adjust sub-main and branch ducts to indicated airflows within specified tolerances.
- C. Measure air outlets and inlets without making adjustments.
 1. Measure air outlets and inlets without making adjustments.
- D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
 1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
 2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.08 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

- A. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at minimum set-point airflow with the remainder at maximum-airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced-airflow terminal units so they are distributed evenly among the branch ducts.
- B. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:
 - 1. Set outdoor-air dampers at minimum and set return- and exhaust-air dampers at a position that simulates full-cooling load.
 - 2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
 - 3. Measure total system airflow. Adjust to within indicated airflow.
 - 4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
 - 5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow the same as described for constant-volume air systems.
 - 6. If air outlets are out of balance at minimum airflow, report the condition but leave outlets balanced for maximum airflow.
 - 7. Re-measure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.
 - 8. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.
 - 9. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure that adequate static pressure is maintained at the most critical unit.
 - 10. Record final fan-performance data.

3.09 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

- A. Prepare test reports with pertinent design data, and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against the approved pump flow rate. Correct variations that exceed plus or minus 5 percent.
- B. Prepare schematic diagrams of systems' "as-built" piping layouts.
- C. Prepare hydronic systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:
 - 1. Open all manual valves for maximum flow.
 - 2. Check liquid level in expansion tank.
 - 3. Check makeup water-station pressure gage for adequate pressure for highest vent.
 - 4. Check flow-control valves for specified sequence of operation and set at indicated flow.
 - 5. Set differential-pressure control valves at the specified differential pressure. Do not set at fully closed position when pump is positive-displacement type unless several terminal valves are kept open.

6. Set system controls so automatic valves are wide open to heat exchangers.
7. Check pump-motor load. If motor is overloaded, throttle main flow-balancing device so motor nameplate rating is not exceeded.
8. Check air vents for a forceful liquid flow exiting from vents when manually operated.

3.10 PROCEDURES FOR CONSTANT-FLOW HYDRONIC SYSTEMS

- A. Measure water flow at pumps. Use the following procedures except for positive-displacement pumps:
 1. Verify impeller size by operating the pump with the discharge valve closed. Read pressure differential across the pump. Convert pressure to head and correct for differences in gage heights. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.
 - a. If impeller sizes must be adjusted to achieve pump performance, obtain approval from Owner/Engineer and comply with requirements in "Hydronic Pump Specification."
 2. Check system resistance. With all valves open, read pressure differential across the pump and mark pump manufacturer's head-capacity curve. Adjust pump discharge valve until indicated water flow is achieved.
 - a. Monitor motor performance during procedures and do not operate motors in overload conditions.
 3. Verify pump-motor brake horsepower. Calculate the intended brake horsepower for the system based on pump manufacturer's performance data. Compare calculated brake horsepower with nameplate data on the pump motor. Report conditions where actual amperage exceeds motor nameplate amperage.
 4. Report flow rates that are not within plus or minus 10 percent of design.
- B. Measure flow at all automatic flow control valves to verify that valves are functioning as designed.
- C. Measure flow at all pressure-independent characterized control valves, with valves in fully open position, to verify that valves are functioning as designed.
- D. Set calibrated balancing valves, if installed, at calculated pre-settings.
- E. Measure flow at all stations and adjust, where necessary, to obtain first balance.
 1. System components that have Cv rating or an accurately cataloged flow-pressure-drop relationship may be used as a flow-indicating device.
- F. Measure flow at main balancing station and set main balancing device to achieve flow that is 5 percent greater than indicated flow.
- G. Adjust balancing stations to within specified tolerances of indicated flow rate as follows:
 1. Determine the balancing station with the highest percentage over indicated flow.
 2. Adjust each station in turn, beginning with the station with the highest percentage over indicated flow and proceeding to the station with the lowest percentage over indicated flow.
 3. Record settings and mark balancing devices.
- H. Measure pump flow rate and make final measurements of pump amperage, voltage, rpm, pump heads, and systems' pressures and temperatures including outdoor-air temperature.
- I. Measure the differential-pressure-control-valve settings existing at the conclusion of balancing.
- J. Check settings and operation of each safety valve. Record settings.

3.11 PROCEDURES FOR VARIABLE-FLOW HYDRONIC SYSTEMS

- A. Balance systems with automatic two- and three-way control valves by setting systems at maximum flow through heat-exchange terminals and proceed as specified above for hydronic systems.

3.12 PROCEDURES FOR PRIMARY-SECONDARY HYDRONIC SYSTEMS

- A. Balance the primary circuit flow first and then balance the secondary circuits.

3.13 PROCEDURES FOR CHILLERS

- A. Balance water flow through each evaporator and condenser to within specified tolerances of indicated flow with all pumps operating. With only one chiller operating in a multiple chiller installation, do not exceed the flow for the maximum tube velocity recommended by the chiller manufacturer. Measure and record the following data with each chiller operating at design conditions:
1. Evaporator-water entering and leaving temperatures, pressure drop, and water flow.
 2. For water-cooled chillers, condenser-water entering and leaving temperatures, pressure drop, and water flow.
 3. Evaporator and condenser refrigerant temperatures and pressures, using instruments furnished by chiller manufacturer.
 4. Power factor if factory-installed instrumentation is furnished for measuring kilowatts.
 5. Kilowatt input if factory-installed instrumentation is furnished for measuring kilowatts.
 6. Capacity: Calculate in tons of cooling.
 7. For air-cooled chillers, verify condenser-fan rotation and record fan and motor data including number of fans and entering- and leaving-air temperatures

3.14 PROCEDURES FOR COOLING TOWERS

- A. A complete CTI certified test of the cooling tower will be performed by others at the expense of the cooling tower manufacturer. A copy of this test (provided by others) shall be included in the final TAB report. Balance the flow over and through bypass connections of the tower.

3.15 PROCEDURES FOR MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
1. Manufacturer's name, model number, and serial number.
 2. Motor horsepower rating.
 3. Motor rpm.
 4. Efficiency rating.
 5. Nameplate and measured voltage, each phase.
 6. Nameplate and measured amperage, each phase.
 7. Starter thermal-protection-element rating.
- B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.16 MECHANICAL EQUIPMENT

- A. Verify the following:
1. Equipment is operable and in safe and normal condition.
 2. Temperature control systems are installed complete and operable.

3. Proper thermal overload protection is in place for electrical equipment.
 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 5. Duct systems are clean of debris.
 6. Correct fan rotation.
 7. Fire and volume dampers are in place and open.
 8. Coil fins have been cleaned and combed.
 9. Access doors are closed and duct end caps are in place.
 10. Air outlets are installed and operable.
 11. Duct system leakage has been minimized.
 12. Pretest components in the VFD. Provide factory certification of testing the entire VFD with varying induction motor loads for 24 hours prior to shipment.
 13. Proper sequencing and operation of all DDC Control System components and equipment as required by ASHRAE Standard on Total Building Mechanical System operation.
 14. Perform sound power level tests and provide required data on each occupied space adjacent to, above, or below mechanical/ air handling unit equipment rooms.
 15. Perform vibration test and provide required data on each piece of air handling/ ventilation equipment or fan. Vibration testing must be complete in compliance with the requirements of ASHRAE – 1999 HVAC applications Handbook Chapter 46, Sound and Vibration Control and the maximum listed RMS values listed herein.
- B. Duct Leakage:
1. Test all supply air ductwork, to include, but not limited to, downstream of all single zone and multi-zone air handling units, downstream of all VAV air handling units and upstream of fan powered terminal units at 2-1/2 inches of static pressure (except where this requirement would exceed the ductwork design pressure classification) to have a total leakage value not to exceed 2% of the total system airflow.
 2. Test all supply, return, and exhaust air ductwork, to include, but not limited to, downstream of fan coil units and fan powered terminal units, upstream of air handling units, and upstream and downstream (where applicable) of fans at 1-1/2 inches of static pressure to have a total leakage value not to exceed 2% of the total system design airflow.
 3. Ductwork that initially fails these tests shall be replaced, modified, resealed, etc. as required to meet the leakage requirement and then re-tested to ensure compliances.

3.17 HYDRONIC SYSTEM TESTING

- A. Pressure test all chilled water and heating hot water piping prior to insulation. Test in place with 125 psi hydrostatic test at the low point. Maintain pressure without pumping for two (2) hours.
- B. Provide all required pipe cleaning chemical, chemical feed equipment, materials, and labor necessary to clean and stylize the piping as herein specified. In addition, permanently install necessary chemical injection fittings complete with stop valves.
- C. After chilled water, heating hot water piping have been pressure tested and approved for tightness, thoroughly clean and flush as follows:
 1. After pressure testing is complete, drain the system until empty.
 2. Add chemical pipe cleaning compound Mogul C-641 or approved equal compound to the system simultaneously with the filling of the system so that a minimum dosage of 50 pounds of compound per 1000 gallons of water is attained in the system.
 3. The cleaning compound shall then be circulated in the system for the recommended time period, but in no case for less than 48 hours.
 4. The system shall then be drained until empty.

5. Fill the system again with fresh water and flush thoroughly until clean water is obtained. Maintain continuous blow-down and make-up as required during flushing operation. A strainer element at end of drain hose shall be utilized to confirm that discharge water is free of foreign material.
6. The cleaning and flushing procedure shall be approved in writing by the chemical manufacturer. The chemical manufacturer's representative shall supervise and certify in writing the cleaning and flushing of the piping system.

3.18 FINAL TAB REPORT

- A. General: The activities described in this section shall culminate in a certified final written report to be provided in quadruplicate (4) individually bound to the RCM. Tabulate and divide the report into separate sections for tested systems and balanced systems..
 1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 2. Include with the data the date tested, personnel present, weather conditions, nameplate record of test instruments used and list all measurements taken after all corrections are made to the system.
 3. Record all failures and corrective action taken to remedy incorrect situation. The intent of the final report is to provide a reference of actual operating conditions for the Owner's operations personnel.
 4. All measurements and recorded readings (of air, water, electricity, etc.) that appear in the reports must have been made onsite by the permanently employed technicians or engineers of the firm.
 5. At the option of the Construction Inspector, all data sheets tabulated each day by TAB personnel shall be submitted for initial by the Construction Inspector. Those work sheets so initialed, or copies thereof, shall be presented as a supplement to the final TAB report.
- B. Final Report Contents: In addition to certified field-report data, include the following:
 1. Pump curves.
 2. Fan curves.
 3. Manufacturers' test data.
 4. Field test reports prepared by system and equipment installers.
 5. Other information relative to equipment performance; do not include Shop Drawings and product data.
- C. General Report Data: Submit reports on forms approved by the Owner & Engineer which will include the following information as a minimum:
 1. Title Page
 - a. Company Name
 - b. Company Address
 - c. Company telephone number
 - d. Project name
 - e. Project location
 - f. Project Manager
 - g. Project Architect
 - h. Project Engineer
 - i. Project Contractor's Name and Address
 - j. Project Identification Number

- k. Report date.
 - l. Signature of TAB supervisor who certifies the report.
2. Instrument List
- a. Instrument
 - b. Manufacturer
 - c. Model
 - d. Serial Number
 - e. Range
 - f. Calibration date
 - g. What test instrument was used for
3. Fan Data (Supply and Exhaust)
- a. Location
 - b. Manufacturer
 - c. Model
 - d. Air flow, specified and actual
 - e. Total static pressure (total external), specified and actual
 - f. Inlet pressure
 - g. Discharge pressure
 - h. Fan RPM
4. Return Air/Outside Air Data (If fans are used, same data as for 3 above)
- a. Identification/location
 - b. Design return air flow
 - c. Actual return air flow
 - d. Design outside air flow
 - e. Return air temperature
 - f. Outside air temperature
 - g. Required mixed air temperature
 - h. Actual mixed air temperature
5. Electric Motors
- a. Manufacturer
 - b. HP/BHP
 - c. Phase, voltage, amperage, nameplate, actual
 - d. RPM
 - e. Service factor
 - f. Starter size, heater elements, rating
6. V-Belt Drive
- a. Identification/location
 - b. Required driven RPM
 - c. Driven sheave, diameter and RPM
 - d. Belt, size and quantity

- e. Motor sheave, diameter and RPM
 - f. Center-to-center distance, maximum, minimum and actual
7. Duct Traverse
- a. System zone/branch
 - b. Duct size
 - c. Area
 - d. Design velocity
 - e. Design air flow
 - f. Test velocity
 - g. Test air flow
 - h. Duct static pressure
 - i. Air temperature
 - j. Air correction factor
8. Air Monitoring Station Data
- a. Identification/location
 - b. System
 - c. Size
 - d. Area
 - e. Design velocity
 - f. Design air flow
 - g. Test velocity
 - h. Test air flow
 - i.
9. Air Distribution Test Sheet
- a. Air terminal number
 - b. Room number/location
 - c. Terminal type
 - d. Terminal size
 - e. Area factor
 - f. Design velocity
 - g. Design air flow
 - h. Test (final) velocity
 - i. Test (final) air flow
 - j. Pump Data
 - k. Identification/number
 - l. Manufacturer
 - m. Size/model
 - n. Impeller
 - o. Service
 - p. Design flow rate, pressure drop, BHP
 - q. Actual flow rate, pressure drop, BHP
 - r. Discharge pressure
 - s. Suction pressure
 - t. Total operating head pressure
 - u. Shut off, discharge and suction pressure

- v. Shut off, total head pressure
- w. Pressure differential settings

10. Cooling Coil Data

- a. Identification/number
- b. Location
- c. Service
- d. Manufacturer
- e. Entering air DB temperature, design and actual
- f. Entering air WB temperature, design and actual
- g. Leaving air DB temperature, design and actual
- h. Leaving air WB temperature, design and actual
- i. Water pressure flow, design and actual
- j. Water pressure drop, design and actual
- k. Entering water temperature, design and actual
- l. Leaving water temperature, design and actual
- m. Air pressure drop, design and actual

11. Heating Coil Data

- a. Identification/number
- b. Location
- c. Service
- d. Manufacturer
- e. Air flow, design and actual
- f. Water flow, design and actual
- g. Water pressure drop, design and actual
- h. Entering water or steam temperature, design and actual
- i. Leaving water temperature, design and actual
- j. Entering air temperature, design and actual
- k. Leaving air temperature, design and actual
- l. Air pressure drop, design and actual

12. Sound Level Report

- a. Location (Location established by the design engineer)
- b. NC curve for eight (8) bands - equipment off
- c. NC curve for eight (8) bands - equipment on

13. Vibration Test on equipment having 10 HP motors or above

- a. Location of points:
 - (1) Fan bearing, drive end
 - (2) Fan bearing, opposite end
 - (3) Motor bearing, center (if applicable)
 - (4) Motor bearing, drive end
 - (5) Motor bearing, opposite end
 - (6) Casing (bottom or top)

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- (7) Casing (side)
 - (8) Duct after flexible connection (discharge)
 - (9) Duct after flexible connection (suction)
 - b. Test readings:
 - (1) Horizontal, velocity and displacement
 - (2) Vertical, velocity and displacement
 - (3) Axial, velocity and displacement
 - c. Normally acceptable readings, velocity and acceleration
 - d. Unusual conditions at time of test
 - e. Vibration source (if non-complying)
14. Control verification indicating date performed and any abnormalities identified.
- a. Point Location/Description
 - b. EMS Readout (Setpoint and Actual)
 - c. Actual Readout
 - d. Interlocks
 - e. Safeties
 - (1) VSD Normal Operation
 - (2) VSD Bypass Operation
 - f. Alarms
 - g. Sequences of Operation

END OF SECTION

SECTION 23 05 93 - COMMISSIONING OF HVAC SYSTEMS

This section has been added with Addendum 1.

PART 1 - GENERAL

1.01 SUMMARY

- A. The purpose of this Section is to define Contractor's and Division 23 "Mechanical" subcontractor's responsibilities in the commissioning process. Other mechanical system testing is required under other Division 23 "Mechanical" Specification Sections.
- B. Related Documents:
 - 1. Drawings and general provisions of the Subcontract apply to this Section.
 - 2. Review these documents for coordination with additional requirements and information that apply to work under this Section.
- C. Section Includes:
 - 1. General requirements that apply to implementation of commissioning of HVAC systems, assemblies and components.
- D. Related Sections:
 - 1. Division 01 Section "General Commissioning Requirements."
 - 2. Division 23 HVAC Sections.
 - 3. Division 25 Integrated Automation

1.02 REFERENCES

- A. General:
 - 1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
 - 2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
 - 3. Refer to Division 01 for the list of applicable regulatory requirements.
 - 4. Refer to Division 23 Section for codes and standards, and other general requirements.
 - 5. Refer to 2015 IECC

1.03 DESCRIPTION

- A. The purpose of commissioning is to ensure that work has been completed as specified and that systems are functioning in the manner as described in the contract documents and specified system operating criteria. It will assist operating staff training and familiarization with new systems. It will serve as a tool to reduce post-occupancy critical systems operational difficulty or failure. It will, also, be used to develop test protocol and record the associated test data in an effort to advance the building systems from a state of substantial completion to a full dynamic operation.
- B. Functional Performance Testing will commence after Construction Checklists or approved equipment startup reports and preliminary punch list items have been completed by Subcontractors.

- C. The Commissioning Team will include representatives of the A&E, Construction and Installing Subcontractors, Test and Balance Subcontractor and Controls Subcontractor. Equipment manufacturer's representatives will be present for start-up as specified in the equipment specification sections and for equipment training.

1.04 SUBMITTALS

- A. Refer to Section 01 91 00 "General Commissioning Requirements" 'Submittals' Article for specific requirements. In addition, provide the following:
 - 1. Inspection reports.
 - 2. Documentation of completion of installation, prestart, and startup activities.
 - 3. Field checkout sheet forms used by factory or field technicians.
 - 4. Shop drawings and product submittal data related to systems to be commissioned.
 - 5. O&M manuals.
 - 6. Test, Adjust and Balance (TAB) Reports
 - 7. Final TAB Reports
 - 8. Notification of Readiness Forms
 - 9. Test reports as required in the mechanical specifications.
 - 10. COORDINATION
- B. Refer to Section 01 91 00 "General Commissioning Requirements" for requirements pertaining to coordination during the commissioning process.

1.05 DEFINITIONS

- A. Refer to Section 01 91 00 "General Commissioning Requirements" for definitions.

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

- A. All standard testing equipment required to perform startup; initial checkout and construction checklists shall be provided by the subcontractor for the equipment being tested. For example, the subcontractor of Division 23 "Mechanical" shall ultimately be responsible for all standard testing equipment for the HVAC systems except for equipment specific to and used by TAB consultant in their testing responsibilities. Sufficient and reliable communication devices shall be provided by each subcontractor.
- B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the Owner and left on site.
- C. Proprietary test equipment and software required by any equipment manufacturer for programming and/or startup, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the Owner upon completion of the commissioning process.
- D. Data logging equipment and software required to test equipment will be provided by the Commissioning Provider and Cx consultants or TAB consultant but shall not become the property of the Owner.
- E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the job specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall

have a certified calibration within the past year to an accuracy of 0.5 deg F and a resolution of + or - 0.1 deg F. Pressure sensors shall have an accuracy of + or - 2.0 percent of the value range being measured (not full range of meter).

- F. The Contractor and Subcontractor will be required to participate in a commissioning web-based document storage system. The intent is to help simplify the commissioning documentation and tracking process, specifically by providing "smart" checklists that display the assigned tasks the Subcontractor are responsible for signing off on.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Subcontractors shall be responsible for performing testing procedures presented in specification and contract drawings as detailed in the Functional Performance Tests (FPT). Members of the designated Commissioning Team shall witness various portions of the functional tests. Responsibilities for these activities are listed in the following paragraphs. Commissioning Team members shall sign-off on appropriate sections after verifying installation, operation, or documentation. Final sign-off shall be by the general contractor prior to the Commissioning Provider's (CxP) review.
- B. Any test ports, gauges, test equipment, etc., needed to accomplish the functional performance tests shall be provided by Subcontractors.
- C. Subcontractors shall provide to the Commissioning Team documentation of calibration of controls. Documentation shall include dates, setpoints, calibration coefficients, control loop verification, and other data required to verify system check-out. Documentation shall be dated and initialed by field engineer or technician performing the work.
- D. Subcontractors shall provide proof that all commissioned systems have been pretested (through pre-verification testing) by filling out Commissioning Provider's functional performance test prior to scheduling functional testing.

3.02 INSTRUMENTATION

- A. Instrumentation, required for testing, shall be provided by the Subcontractor. Instruments used for measurements shall be accurate. Calibration histories for each instrument shall be available for examination. Calibration and maintenance of instruments shall be in accordance with the requirements of NEBB or AABC Standards.
- B. Application of instruments and accuracy of measurements shall be in accordance with NEBB or AABC Standards.

3.03 DOCUMENTATION

- A. The installing Subcontractor shall be responsible for collection of pertinent data during system start-up and functional performance testing. The Subcontractor shall upload to the cloud based commissioning software the documentation of tests performed prior to and after system start-up. Documentation shall also include start-up procedures as required by the Contract Documents and approved by Commissioning Team.
- B. Documentation is to be properly named and uploaded in PDF form. Indicate equipment/system name and document purpose. Example: AHU-01 – Startup Report. If two documents have the same name, the date of testing must be included in the name of the document.

3.04 INSTALLATION VERIFICATION

- A. General Commissioning responsibilities:
1. Before system start-up begins, the Contractor shall conduct a final installation verification audit. The Subcontractor shall be responsible for completion of work including change orders and punch list items. The Contractor audit shall include, but not be limited to, checking of:
 - a. Piping specialties including balance, control, and isolation valves.
 - b. Ductwork specialty items including turning devices, balance, fire, smoke, control dampers, and access doors.
 - c. Control sensor types and location.
 - d. Identification of piping, valves, equipment, controls, etc.
 - e. Major equipment, pumps, valves, starters, gauges, thermometers, etc.
 - f. Documentation of prestart-up tests performed, including manufacturer's factory tests.
 2. If work is found to be incomplete, incorrect, or non-functional, the Subcontractor shall correct the deficiency before system start-up work proceeds.

3.05 SYSTEM STARTUP

- A. The following procedures apply to all equipment/systems to be commissioned.
1. Requirements: The primary role of the commissioning process during startup is to ensure there is written documentation and to ensure that each of the manufacturer's recommended procedures have been completed.
 2. Construction Checklist and/or equipment startup/checkout forms are required for 100% of commissioned equipment. Construction Checklists are used during the checkout/startup process to verify that the equipment and systems are fully connected and operational. It ensures that Functional Performance Tests (in-depth system checkout) may proceed without unnecessary delays.
 3. The Construction Checklists for a given system must be successfully completed and approved prior commencement of the Functional Performance Tests of equipment or subsystems of the given system. No sampling strategies are used during the pre-functional process.
 4. The Construction Checklist forms are provided by the CxP and the contractor/subcontractors shall execute startup and provide the CxP with the completed Construction Checklists.
 5. The contractor/subcontractor responsible for the startup of the equipment shall combine manufacturer's detailed startup and checkout procedures with Construction Checklists.

3.06 FUNCTIONAL PERFORMANCE TESTING

- A. General Commissioning Responsibilities:
1. Functional Performance Testing begins after start-up, operational testing, adjusting, and balancing of the systems have been completed by the Subcontractors. It is the responsibility of the contractor to perform pre-verification testing by filling out Commissioning Provider's functional performance test prior to scheduling functional testing. A Notification of Readiness form shall be filled out and submitted by the Contractor to the Commissioning Provider prior to verification of functional testing.
 2. The objective of the Functional Performance Testing is to verify equipment/systems are operating per design documents. Functional testing shall include full load and part load conditions.

3. Attaining this objective will be accomplished by developing individual systems testing protocols which, when implemented by the Subcontractor, will allow the Commissioning Team to observe, evaluate, identify deficiencies, recommend modifications, tune, and document the systems and systems equipment performance over a range of load and functional levels.
4. Functional Performance tests for the systems to be commissioned are defined in the Commissioning Plan. These tests are intended to be conclusive but may require minor modifications as system operation dictates.

3.07 RETESTING / DEFERRED TESTING

A. General Commissioning Responsibilities:

1. Functional Performance Retesting begins after contractor has confirmed that ALL deficiencies have been corrected. An issues log, containing all commissioning issues with date corrected and a description of how the deficiency was corrected, shall be filled out and submitted by, the Contractor, to the Commissioning Provider prior to functional performance retesting.
2. The objective of the Functional Performance Retesting is to verify deficiencies found during commissioning have been corrected and equipment/systems are now operating per design documents.
3. Attaining this objective will be accomplished through the coordination of the commissioning team. Subcontractor shall correct issues and Contractor shall verify issue has been properly corrected prior to giving notice for retesting. Commissioning provider may recommend solutions to deficiencies, but contractors are not obligated to perform said solutions.
4. Unforeseen Deferred Tests. If any check or test cannot be completed due to the project completion level, required occupancy condition or other deficiency, execution of checklists and Functional Performance Tests may be delayed upon approval of the CxP, CM, AE, Owner and others as applicable. Tests will be conducted as soon as possible, and services of necessary parties will be negotiated

END OF SECTION

SECTION 00 01 05 - TABLE OF CONTENTS

This section has been revised with Addendum 1.

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 (O) Specification Provided by Owner
 (M) Specifications Provided by Mechanical Engineer
 (E) Specifications Provided by Electrical Engineer
 (P) Specifications Provided by Plumbing Engineer
 (FS) Specifications Provided by Food Service Consultant

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END OF SECTION

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SECTION 00 70 00 - CONTRACT CONDITIONS

This section has been revised with Addendum 1.

PART 1 - GENERAL

1.01 CONTRACT FOR CONSTRUCTION

1. A Contract for Construction will be executed by the Owner and the Contractor identified in the Agreement IFB 20-22 from HCC's Procurement Office.

1.02 CONSTRUCTION BONDS

1. Payment Bond is required.
2. Performance Bond is required.

1.03 INSURANCE

1. Required insurance including types, amounts, and verification are as required by the Owner.

END OF DOCUMENT 00 70 00

SECTION 01 23 00 - ALTERNATES

This section has been revised with Addendum 1.

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.02 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.03 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Contractor to provide urethane flooring system and remove base option of quarry tile flooring and associated grout and mortar bed. Flooring preparation at floor sinks and floor drains shall remain unchanged to provide a flat and level floor for new flooring system.
- B. Add Alternate #2: Contractor to provide for remote refrigeration for the following Foodservice equipment:
 - a. Qty two (2) Item193 Reach-In Refrigerator to have Remote Refrigeration.
 - b. Qty one (1) Item 639 Reach-In Freezer to have Remote Refrigeration.

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c. See revised FS2.01 for locations.

SECTION 06 10 00 - ARCHITECTURAL WOOD CASEWORK

This section has been revised with Addendum 1.

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Cabinet hardware.
- C. Finish carpentry items.
- D. Preparation for installing utilities.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 12 36 00 - Countertops.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2009.
- B. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.
- C. AWI (QCP) - Quality Certification Program, www.awiqcp.org; current edition at www.awiqcp.org.
- D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- E. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.9).
- F. LMA SAT-1 - Voluntary Product Standard and Typical Physical Properties of Saturated Paper Overlays; Laminating Materials Association; 1998.
- G. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.
- H. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

1.05 DEFINITIONS

- A. The following definitions relate to AWI Quality Standards, Premium Grade.
- B. Exposed Surfaces:
 - 1. Surfaces visible when drawers and opaque doors (if any) are closed, including visible edges of web frames, ends, divisions, tops, shelves and hanging stiles.
 - 2. Surfaces visible behind clear glass doors.

3. Underside of bottoms of cabinets 42 inch or more above finish floor.
 4. Tops of cabinets less than 78 inch above finish floor.
 5. Tops of cabinets 78 inch or more above finish floor and visible from an upper building level or floor.
 6. Visible sloping tops of cabinets
 7. Interior faces of hinged doors.
 8. Shelves: Tops and bottom faces plus front edges.
- C. Semi-Exposed Surfaces:
1. Surfaces which become visible when opaque doors are open, or drawers are extended, including:
 - a. Drawer sides, sub-fronts, backs, bottoms.
 - b. Cabinet interior ends, backs, bottoms, divisions.
 - c. Cabinet interior shelves: top and bottom edges plus front edges.
 2. Underside of bottoms of cabinets between 30 inch and 42 inch above finish floor.
- D. Concealed Surfaces:
1. Surfaces not visible after installation.
 2. Bottoms of cabinets less than 30 inch above finish floor.
 3. Tops of cabinets 78 inch or more above finish floor and not visible from an upper building level or floor.
 4. Toe strips, unless noted otherwise.
 5. The three non-visible edges of adjustable shelves.

1.06 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
1. Minimum Scale of Detail Drawings: 1-1/2 inch to 1 foot.
 2. Provide the information required by AWI/AWMAC/WI (AWS).
 3. Include certification program label.
- C. Product Data: Provide data for hardware accessories, adhesive, and plastic laminate.
- D. Samples:
1. Plastic laminate: Color/pattern, two, 12 x 12 inch.
 2. PVC edging: Two each color, 6 inch long.

1.07 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- B. Quality Certification: Provide AWI Quality Certification Program (QCP) inspection report and quality certification of completed work.
1. Provide labels or certificates indicating that the work complies with requirements of AWS Grade or Grades specified.
 2. Upon contract award, register the work of this Section with the AWI Quality Certification Program (QCP) at www.awiqcp.org.
 3. Prior to delivery to the site provide shop drawings with certification labels.
 4. Provide labels on each product when required by certification program.

5. Upon completion of installation provide certificate certifying that the installation and products meet the specified requirements.
6. Arrange and pay for inspections required for certification.
7. Replace, repair, or rework all work for which certification is refused.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage.

1.09 FIELD CONDITIONS

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 - PRODUCTS

2.01 BASIS OF DESIGN

- A. Contractor to match existing Pastry Lab casework to new space. Basis of design AWF (All Wood Fast) Cabinets by Costco. Model numbers are located on the drawings.

2.02 CABINETS

- A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI//AWMAC/WI (AWS) for Premium Grade.
- B. Plastic Laminate Faced Cabinets :
 1. Finish - Exposed Exterior Surfaces: Decorative laminate.
 2. Finish - Exposed Interior Surfaces: Decorative laminate.
 3. Finish - Concealed Surfaces: Manufacturer's option.
- C. Cabinets:
 1. Door and Drawer Front Edge Profiles: Square edge with PVC edge banding.
 2. Door and Drawer Front Retention Profiles: Fixed panel.
 3. Casework Construction Type: Type A - Frameless.
 4. Interface Style for Cabinet and Door: Style 1 - Overlay; flush overlay.
 5. Cabinet Design Series: As indicated on drawings.
 6. Adjustable Shelf Loading: 50 lbs. per sq. ft..
 - a. Deflection: L/144.
 7. Cabinet Style: Flush overlay.
 8. Cabinet Doors and Drawer Fronts: Flush style.
 9. Drawer Side Construction: Multiple-dovetailed.
 10. Drawer Construction Technique: Dovetail joints.

2.03 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.
- B. Products containing added urea formaldehyde are prohibited.
- C. Adhesive products containing polyvinyl chloride or other halogenated compounds are prohibited.

2.04 LUMBER MATERIALS

- A. Softwood Lumber: NIST PS 20; Graded in accordance with AWI/AWMAC/WI Architectural Woodwork Standards, Grade I/Premium; moisture content of maximum 12 percent; species as recommended by manufacturer.
- B. Hardwood Lumber: NHLA; Graded in accordance with AWI/AWMAC/WI Architectural Woodwork Standards, Grade I/Premium; moisture content of maximum 12 percent; species as scheduled.

2.05 PANEL MATERIALS

- A. Hardwood Faced Plywood: HPVA HP-1; graded in accordance with AWI/AWMAC/WI Architectural Woodwork Standards, core of veneer; moisture content of maximum 12 percent, type of glue recommended for specific application; thickness as indicated; face veneer as scheduled.
- B. Medium Density Fiberboard (MDF): ANSI A208.2; type as specified in AWI/AWMAC/WI Architectural Woodwork Standards; Grade MD, density 48 pounds per cubic foot, composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces; thickness as indicated.
 - 1. Use for painted components and concealed components.
 - 2. Use as backing for plastic laminate unless otherwise indicated.
- C. Hardboard: ANSI A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth two sides (2); use for drawer bottoms, dust panels, and other components indicated on drawings.

2.06 ACCESSORY MATERIALS

- A. Pegboard: Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick with 1/4 inch diameter holes 1 inch on center in both directions.

2.07 LAMINATE MATERIALS

- A. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- B. Provide specific types as follows:
 - 1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
 - 2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
 - 3. Cabinet Liner: CLS, 0.020 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
- C. Low Pressure Laminate: Thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
 - 1. Panolam Industries International, Inc\Nevamar: www.nevamar.com .
 - 2. Wilsonart International, Inc: www.wilsonart.com .

2.08 ACCESSORIES

- A. Contact Adhesive: solvent release type. Use installation adhesives that comply with the following limits for VOC content when calculated according to South Coast Air Quality Management District Rule #1168:

1. Wood Glues: 30 g/L.
2. Contact Adhesive: 250 g/L.
- B. PVC Edge Banding: Extruded thermoplastic PVC (Polyvinyl Chloride Plastic) edge banding, flat shaped, smooth finish; of width to match component thickness. Back surface primer etch treated for secure bonding during hot melt adhesive process. Top surface coated with UV cured resin. Available in solid colors, woodgrain and pattern finishes as selected.
 1. Color: Match component plastic laminate color.
 2. Thickness: 1 and 3 mm.
 3. Manufacturer: Rehau Industries, LLC: www.rehau.com .
- C. Fasteners: Size and type to suit application.
- D. Nails: ASTM F547, size and type to suit application.
- E. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; non-corrosive finish in exterior, high-humidity and treated wood locations and plain finish at other interior locations.
- F. Concealed Joint Fasteners: Threaded steel.
- G. Screw Caps: Snap-on plastic caps to conceal screw head. Color: White.
- H. Metal Inlays, Trim and Reveals: Stainless steel, ASTM A264, Type 304, commercial grade, minimum 16 gage, No.4. Refer to drawings for profiles.

2.09 HARDWARE

- A. Manufacturers:
 1. Accuride International Inc.: www accuride.com .
 2. Allen Field Company, Inc.: www.allenfield.com .
 3. Amerock: www.amerock.com .
 4. Blum: www.blum.com .
 5. Doug Mockett and Company: www.mockett.com .
 6. Engineered Products Co. (EPC0): www.epcohardware.com .
 7. Hafele America, Co.: www.hafele.com/us.
 8. Knappe and Vogt: www.knappeandvogt.com .
- B. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- C. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated shelf rests, nickel plated finish, 1/4 inch diameter holes for nominal 2 inch spacing adjustments.
 1. Product: No. 255 and 256 manufactured by Knappe and Vogt.
- D. Adjustable Shelf Supports: Standard back-mounted system using recessed metal shelf standards or surface mounted metal shelf standards and coordinated cantilevered shelf brackets, stainless steel finish, for nominal 1 inch spacing adjustments.
 1. Product: No. 87 and 187 Super Duty Industrial Grade Shelf Standards and Brackets manufactured by Knappe and Vogt.
- E. Adjustable Shelf Supports:
 1. Product: KV-256NP manufactured by Knappe and Vogt.
- F. Drawer and Door Edge Pulls: Extruded aluminum pull, full width of drawer, satin finish..
 1. Product: Continuous Handle 126.27.936 manufactured by Hafele.
 2. Finish: Anodized Matte Silver.
 3. Cabinet Locks: Keyed cylinder, two keys per lock, steel with satin finish.

4. Manufacturers:
 - a. Hafele America Co.
 - b. CompX National: www.nclnet.com .
 - c. CCL Security Products: www.cclsecurity.com .
- G. Drawer and Door Silencers: Clear Plastic, self-adhesive back, 3/8 inch diameter
 1. Product: No. SJ5312 manufactured by Blum
 2. Other Manufacturers: 3M.
- H. Drawer Slides:
 1. Static Load Capacity: Commercial grade.
 - a. Pencil Drawer, 45 lb. load rating; 2632 manufactured by Accuride.
 - b. Box Drawer, 100 lb. load rating; 7434 manufactured by Accuride.
 - c. File Drawer, 200 lb. load rating; 3640 manufactured by Accuride.
 2. Mounting: Side mounted.
 3. Stops: Integral type.
 4. Features: Provide self closing/stay closed type.
 5. Products:
 - a. Accuride International, Inc: www accuride.com .
 - b. Grass America Inc: www.grassusa.com .
 - c. Knappe & Vogt Manufacturing Company: www.knappeandvogt.com .
 - d. Hardware Resources: www.hardwareresources.com .
 - e. Substitutions: See Section 01 60 00 - Product Requirements.
- I. Hinges: Concealed (fully mortised) self-closing type, capable of 3-way adjustment, 165-170 degree opening. Provide two per door; three at doors over 32 inch high.
 1. Products:
 - a. Grass America Inc; 3903/3904 series: www.grassusa.com .
 - b. Blum; Product Clip top 170 Blumotion: www.blum.com .
 - c. Hafele America Co.; Product Duomatic No. 329.07.609/329.07.618: www.hafele.com/us.
 - d. Salice America Inc.; Product C2PFA99-165/SC: www.saliceamerica.com .
- J. Coat Rods:
 1. Manufacturer: Hafele America Co.
 2. Rod: No. 801.12.205
 3. Rod End Supports: No. 803.52.213
 4. Rod Center Support: No. 802.02.250
- K. Base Leveler:
 1. Product: No. 637.05.108 with knock-in nut 039.02.065 manufactured by Hafele America Co.

2.10 FABRICATION

- A. Cabinet Substrate: Minimum 3/4 inch thick medium density fiberboard (MDF).
- B. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- C. Shelf Support Type: One of the following methods, Contractor's Option.
 1. Bored-hole and pin shelf support system.
 2. Metal standard and clip support system.
- D. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

- E. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- F. Use exposed fastening devices or nails only when unavoidable. Arrange neatly.
- G. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
 - 1. Apply laminate backing sheet or low-pressure laminate to reverse side of plastic laminate finished surfaces.
 - 2. Cap exposed plastic laminate finish edges with machine applied PVC edging of same color and pattern.
 - a. 1 mm thickness: Cabinet body edges.
 - b. 3 mm thickness: Cabinet door and drawer front edges. Countertop edges. Exposed shelf edges.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

- A. Conform to requirements of AWI Quality Standards, Section 10, Execution.
- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- F. Secure cabinets to floor using appropriate angles and anchorages.
- G. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.
 - 1. Install plastic screw caps to conceal screw heads at cabinet mounting fasteners.
- H. Install standing and running trim with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns and miter at corners.

3.03 ADJUSTING

- A. Adjust installed work.

3.04 CLEANING

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

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ARCHITECTURAL WOOD CASEWORK
06 41 00-8
ISSUED FOR PERMIT AND BIDDING - ADDENDUM 1

CONSULTANTS:

MEP ENGINEERS
Infrastructure Associates
(713) 622-0120

STRUCTURAL ENGINEERS
Dally + Associates
(713) 337-8881

FOOD SERVICE
Foodservice Design Professionals
(281) 350-2323

PROFESSIONAL SEAL:

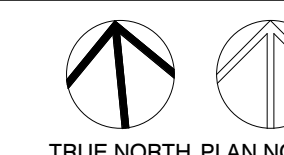


A PROJECT FOR:

CULINARY
ARTS SHELL
INTERIOR
BUILDOUT

#	Date	ISSUED FOR
1	4/15/2020	PERMIT AND BIDDING
2	05/15/2020	ADDENDUM 1

KEY PLAN



Project Number	19012
Drawn By	Author
Checked By	Checker
Approved By	Approver
Drawing Title	

PARTITION TYPES

Drawing Number **A0.02**

GENERAL PARTITION NOTES

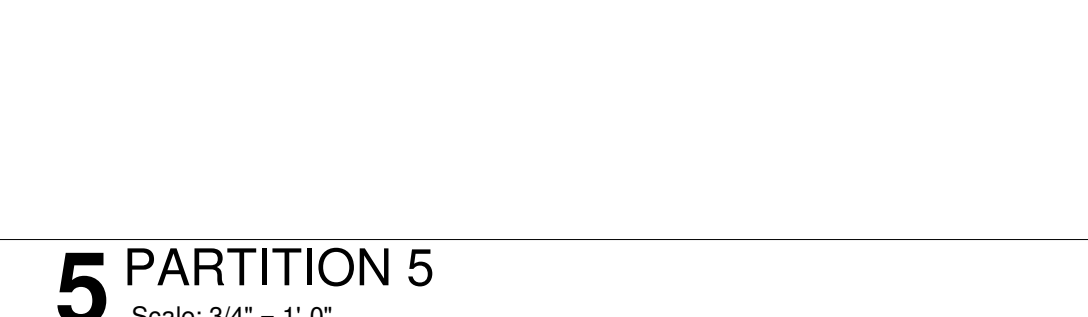
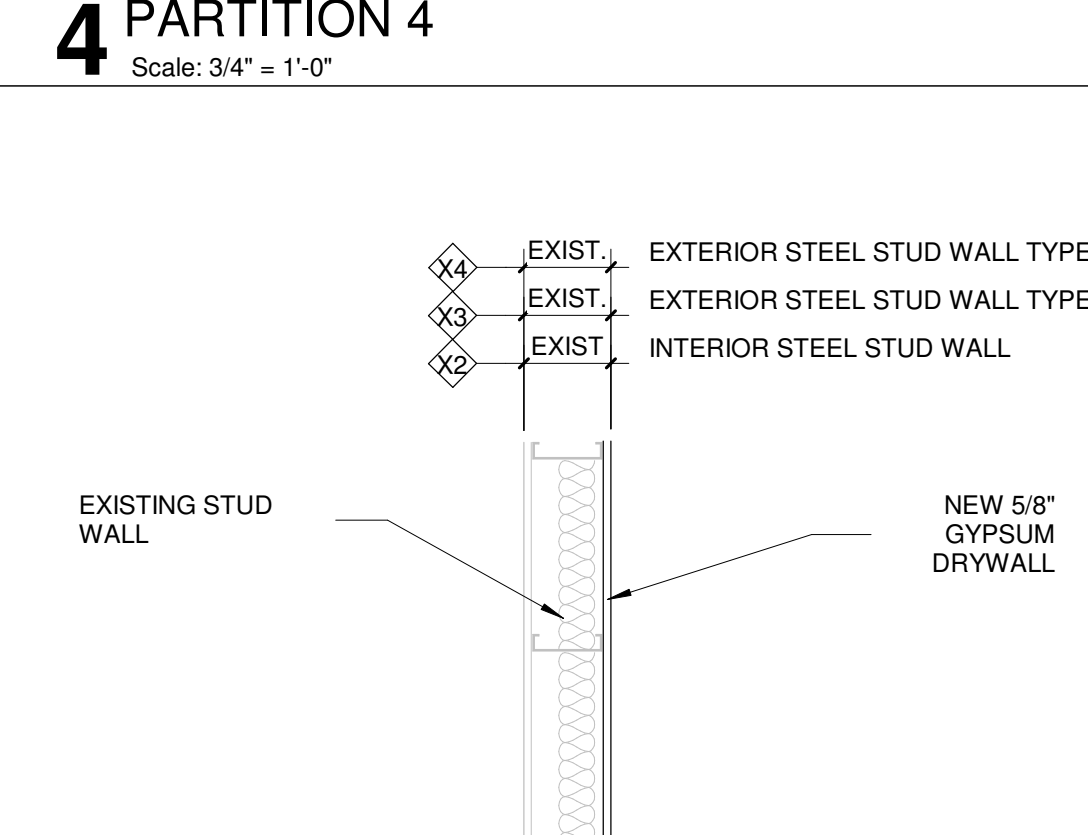
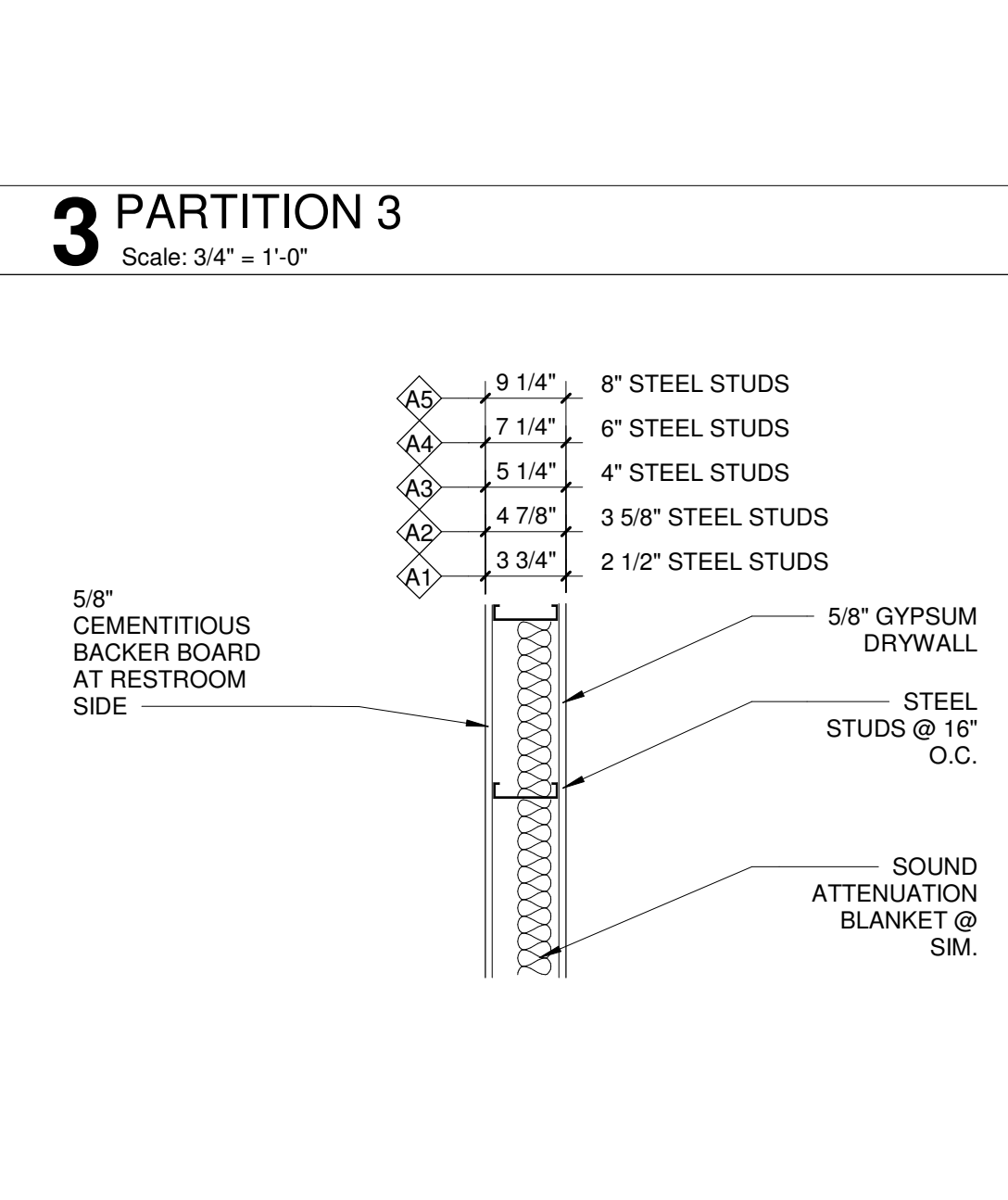
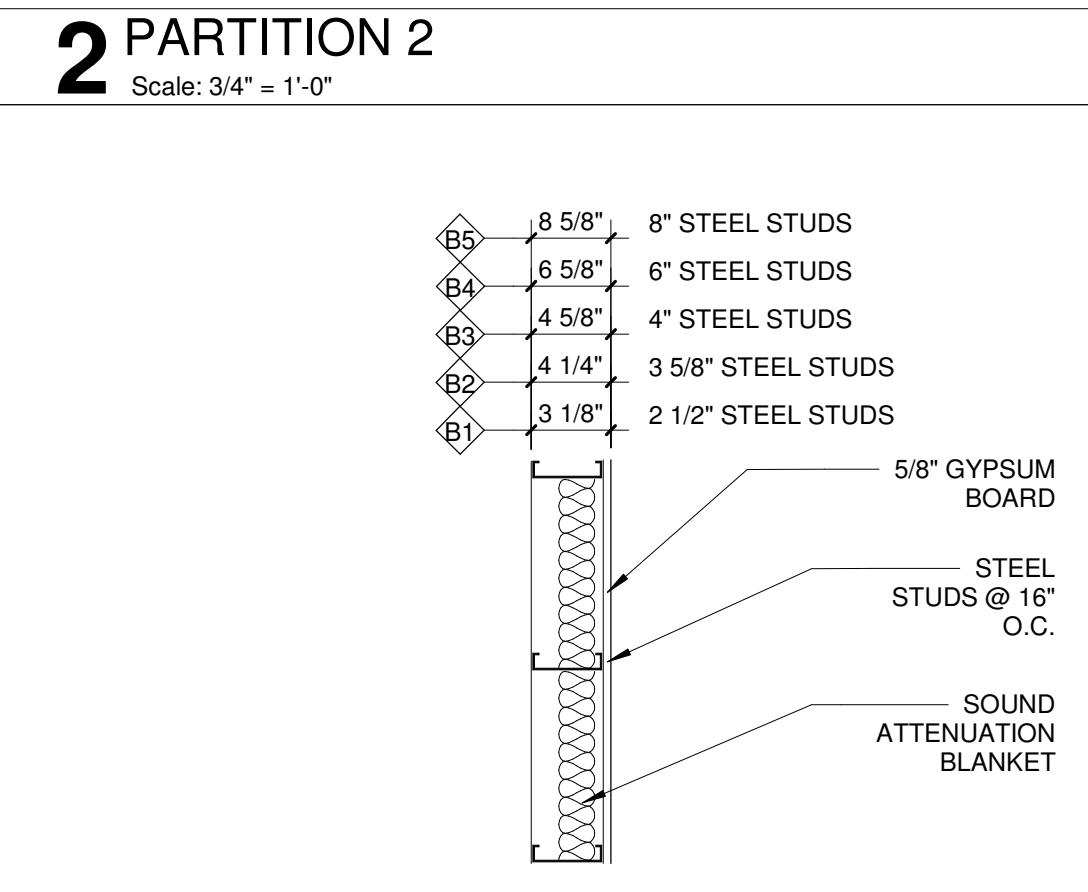
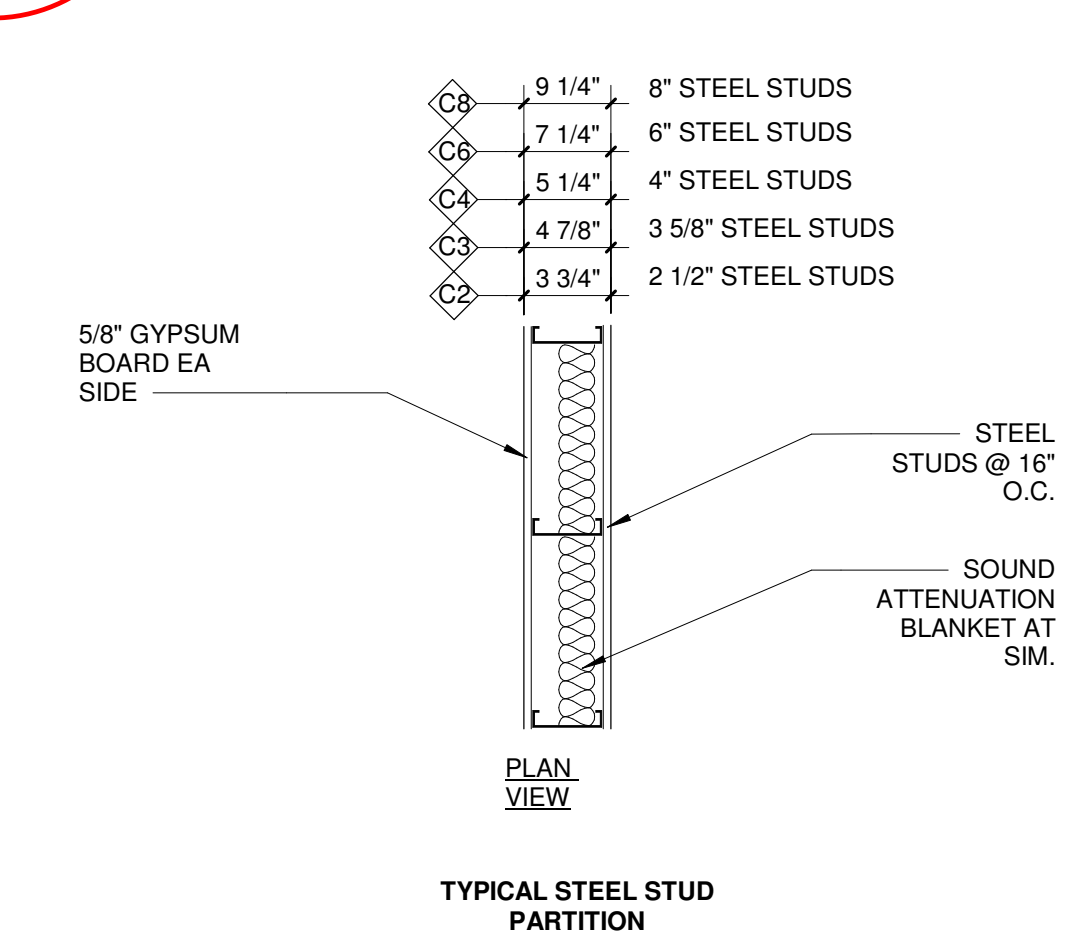
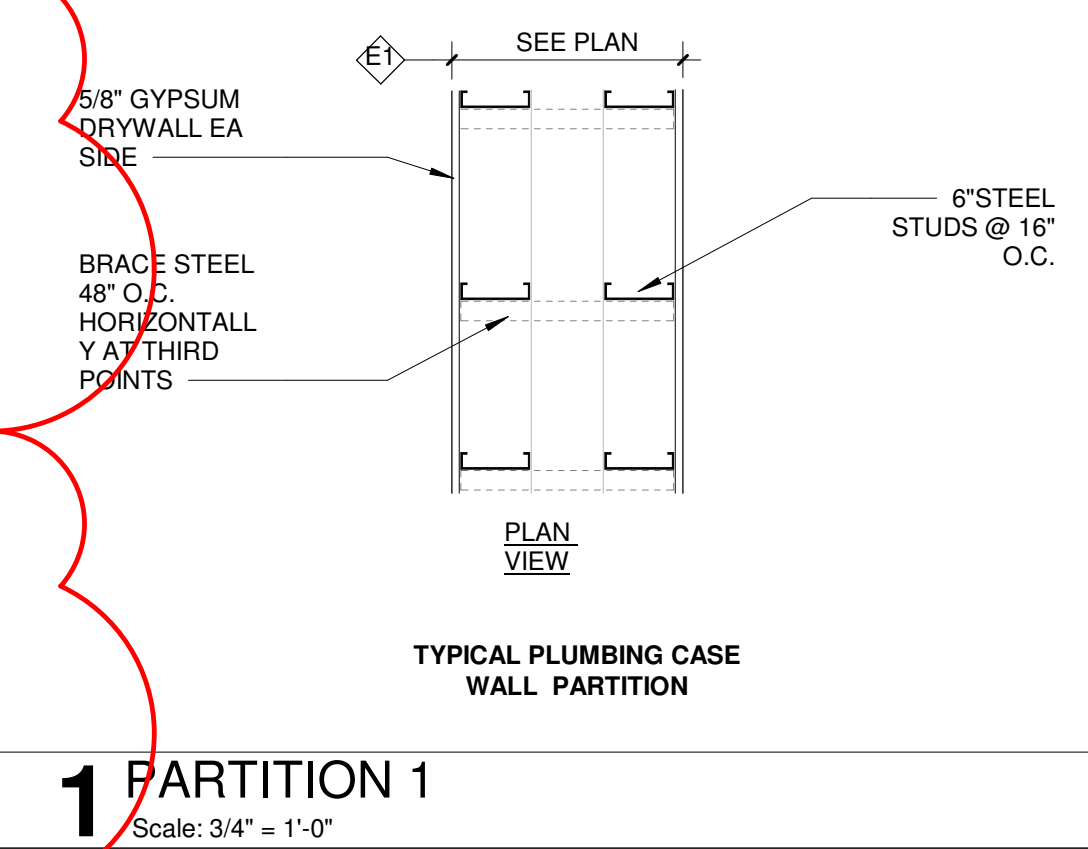
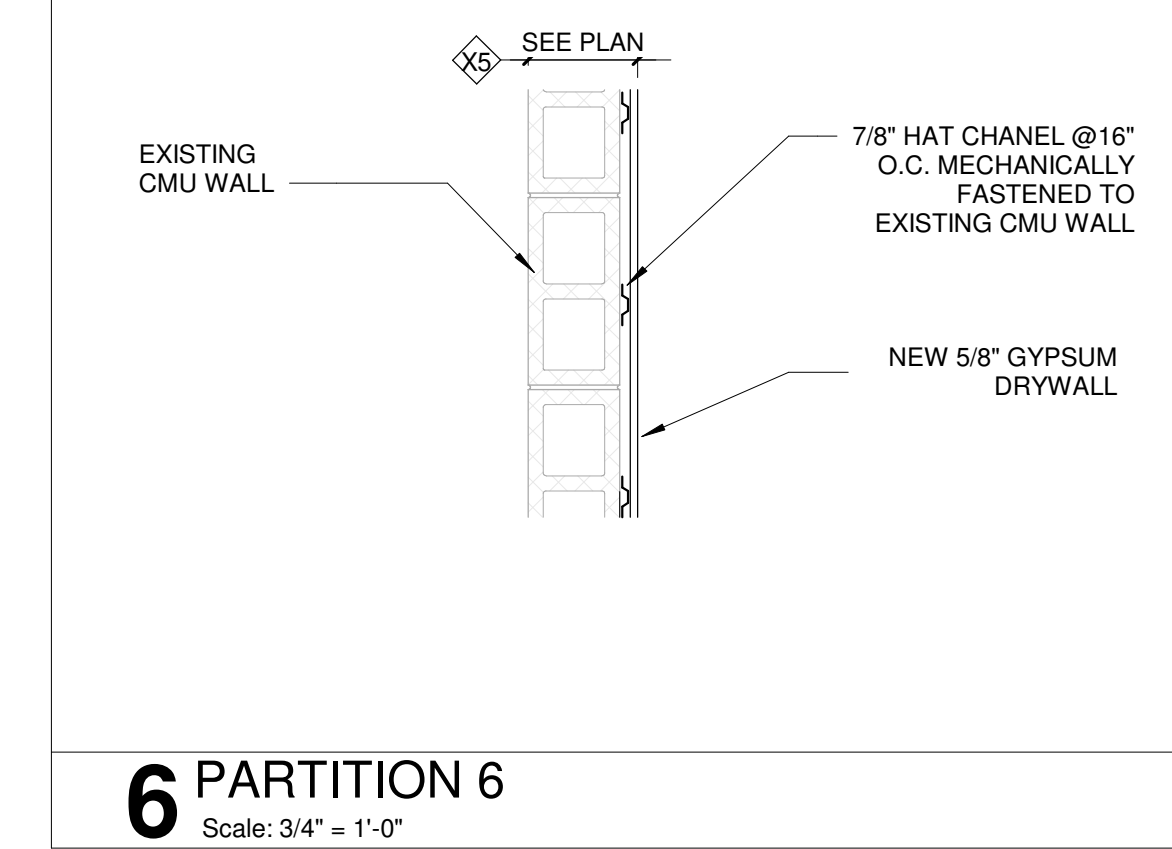
1. WALLS SHALL EXTEND FULL HEIGHT FROM FLOOR SLAB TO FLOOR OR ROOF DECK ABOVE UNLESS OTHERWISE NOTED. IN CORRIDORS, EXTEND COLUMN CHASE AND LOCKER WALLS 8" ABOVE CEILING ONLY.
2. REFER TO OVERALL CODE REVIEW AND FLOOR PLANS FOR IDENTIFICATION AND LOCATION OF ALL FIRE PARTITIONS, FIRE BARRIERS AND FIRE WALLS.
3. SEE WALL SECTIONS AND DETAILS FOR EXTERIOR WALL TYPES.
4. THESE WALL TYPES ARE GENERAL IN NATURE AND DO NOT COVER EVERY VARIATION THAT MAY OCCUR THROUGHOUT THE PROJECT. SEE WALL SECTIONS AND DETAILS FOR ADDITIONAL INFORMATION.
5. TYPICAL CMU INTERIOR PARTITIONS SHALL BE - UNLESS OTHERWISE NOTED BY WALL TYPE SYMBOLS, WALL SECTIONS OR OTHER DETAILS.
6. TYPICAL GYPSUM BOARD WALL PARTITION SHALL BE TYPE - UNLESS OTHERWISE NOTED BY WALL TYPE SYMBOL, WALL SECTIONS OR OTHER DETAILS.
7. WALL TYPES MAY NOT HAVE BEEN INCLUDED IN THIS SCHEDULE FOR INTERIOR WALL TYPES WHICH ARE COVERED BY WALL SECTIONS.
8. THESE WALL TYPES DO NOT SHOW LATERAL BRACING OR WALL REINFORCING. SEE STRUCTURAL AND OTHER DRAWINGS FOR INFORMATION NOT SHOWN.
9. REFER TO FINISH SCHEDULE AND INTERIOR ELEVATIONS FOR FINISHES TO BE APPLIED TO THESE WALL TYPES.
10. ALL WALLS WITH FIRE RATINGS INDICATED SHALL BE BUILT IN THE STRICT CONFORMANCE WITH A U.L. TESTED ASSEMBLY OR OTHER TESTED ASSEMBLY WHICH PROVIDES THE FIRE RATING INDICATED.
11. FURRING CHANNELS AND STUDS SHALL BE 16" O.C. MAXIMUM UNLESS SPECIFICALLY UNLESS OTHERWISE NOTED.
12. THE GAUGE OF ALL METAL STUDS SHALL BE SIZED SO THAT THE DEFLECTION OF THE WALL SHALL NOT EXCEED 1/240 PER ASTM C645 UNLESS A HEAVIER GAGE IS INDICATED ON THE WALL TYPE OR DETAILS.
13. IN WALLS WITH SOUND ATTENUATION BLANKETS OR AN STC RATING LISTED, OUTLETS, SWITCHES, ETC. SHALL NOT BE LOCATED BACK TO BACK. OUTLETS SHALL BE OFFSET AND SEALED. PERIMETERS OF WALL (AT ADJACENT WALLS, COLUMNS, CEILING, ETC.) SHOULD BE SEALED. ADDITIONALLY, WALL PENETRATIONS SHALL BE SEALED WITH APPROPRIATE TYPE OF ACCOUSTIC SEALANT.
14. CONTRACTOR SHALL PROVIDE SPACE FOR DEFLECTION OF BEAMS, JOISTS, AND STEEL DECK @ TOP OF WALLS THAT RUN TO THE DECK. FILL GAP WITH NON-COMBUSTIBLE, COMPRESSIBLE FILLER ON NON-RATED WALLS AND APPROVED FIRE SAFING ON RATED WALLS - SEE TYP. DETAILS THIS SHEET.
15. FOR CASES WHEN WALLS ARE INDICATED TO EXTENT FULL HEIGHT TO DECK BUT STOP AT A STRUCTURAL MEMBER, SEE TYPICAL DETAILS ON THIS SHEET FOR APPROPRIATE CLOSURE CONDITIONS. IF EXACT CONDITION IS NOT INDICATED, MODIFY CLOSEST CONDITION FOR SPECIFIC APPLICATION.
16. PROVIDE 4" HIGH x 18GA. x LENGTH REQUIRED STEEL PLATE BLOCKING OR 2x FRT WOOD BLOCKING IN ALL STUD WALLS WHERE ACCESSORIES AND ANY OTHER ITEM WHICH REQUIRE SECURE ATTACHMENT TO WALLS.
17. IN ROOMS WHERE NO FINISH CEILING IS PROVIDED, EXTEND ALL CHASE WALLS FROM FLOOR TO ROOF DECK ABOVE.
18. PROVIDE CONTINUOUS SEALANT AT BASE OF ALL GYPSUM BOARD WALLS (BOTH SIDES), TYPICAL.
19. UNLESS SPECIFICALLY NOTED TO REMAIN EXPOSED, ENCLOSE ALL VERTICAL MECHANICAL PIPE, RAIN LEADERS, ETC. WITH CHASE WALLS TO MATCH SURROUNDING CONSTRUCTION.
20. PROVIDE NEW GYPSUM BOARD CASE WALLS OVER ALL INTERIOR FACES OF EXISTING PARTITIONS TO REMAIN.

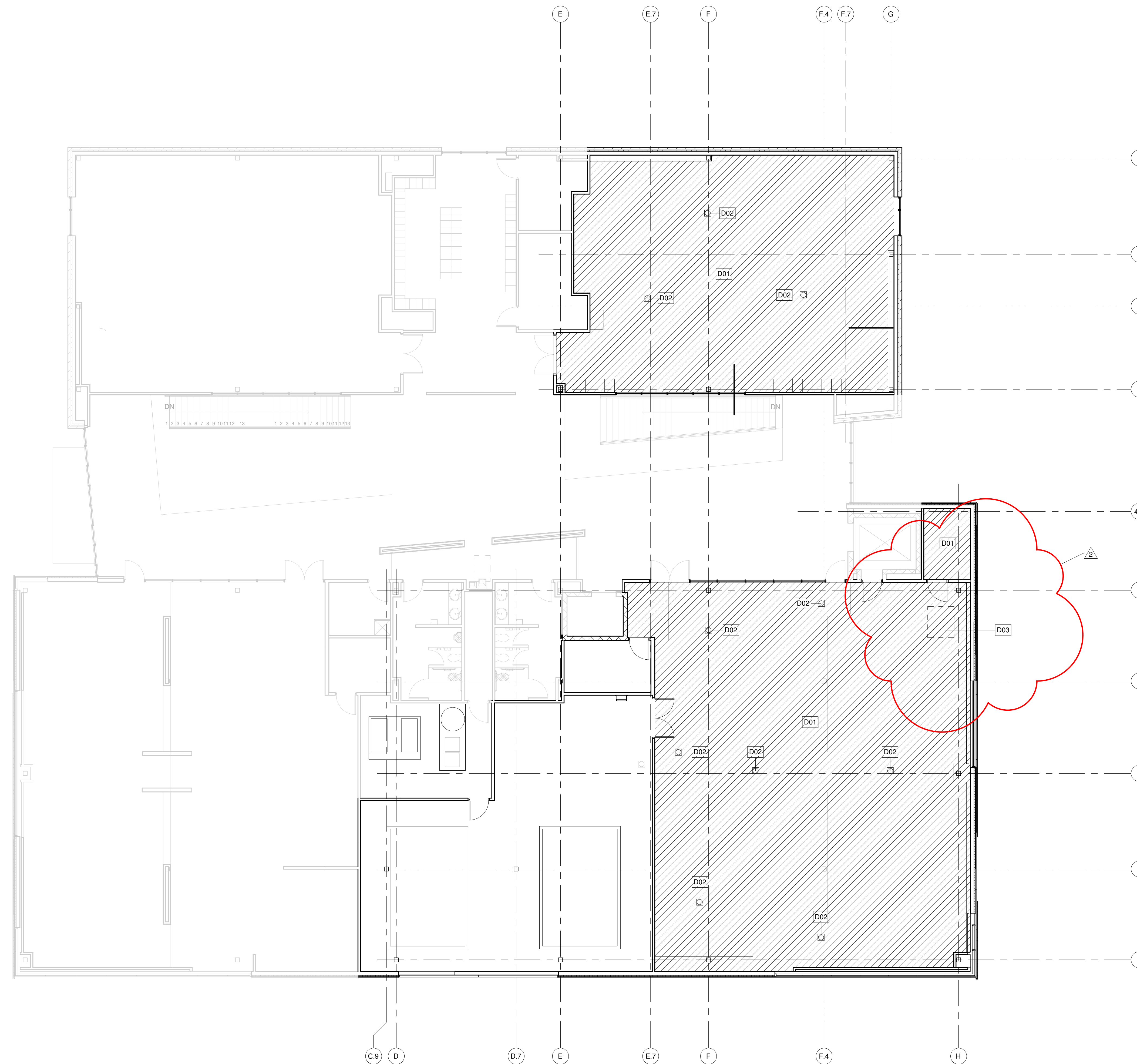
FIRE RATED PARTITION NOTES

TYPICAL FIRE RATED PARTITION NOTES: SEE OVERALL CODE REVIEW FOR LOCATION OF RATED WALLS.
WHERE FIRE RATED WALLS OF GYPSUM BOARD ON STEEL STUD CONSTRUCTION ARE INDICATED, COMPLY WITH THE FOLLOWING:
A. 1HR - U.L. #U465 (ANY STUD SIZE)
B. 2HR - U.L. #U412 (ANY STUD SIZE)

PARTITION TERMINATION NOTES

1. USE THESE TYPICAL WALL TERMINATION DETAILS FOR ALL WALLS INDICATED TO EXTEND TO ROOF OR FLOOR DECK ABOVE, UNLESS OTHERWISE NOTED.
2. SEE WALL TYPES FOR ACTUAL WALL CONSTRUCTION.
3. AT FIRE WALLS, FIRE SEPARATION WALLS, SMOKE BARRIER WALLS AND WALLS REQUIRED TO RESIST THE PASSAGE OF SMOKE, ALL COMPRESSIBLE, NON-COMPRESSIBLE MATERIALS REFERENCED IN THE WALL TERMINATION DETAILS SHALL BE MATERIALS PROVIDED IN ACCORDANCE WITH THE APPROVED FIRE RESISTIVE JOINT SYSTEM.
4. IF A WALL REQUIRING A FIRE RATING IS LOCATED DIRECTLY UNDER A BEAM THE FIRE RATING OF THE WALL SHALL BE MAINTAINED TO THE DECK BY EXTENDING THE WALL AROUND THE BEAM. CONSULT ARCHITECT FOR EXACT REQUIREMENTS TO MAINTAIN RATING.

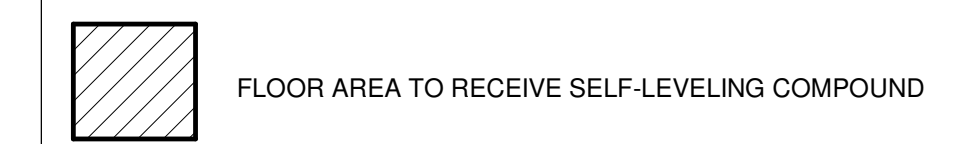




GENERAL PLAN DEMOLITION NOTES

1. ALL WORK SHOWN IS EXISTING TO REMAIN UNLESS NOTED OR INDICATED AS DASHED LINES TO BE REMOVED. THE EXTENT OF DEMOLITION WORK SHALL INCLUDE ALL INCIDENTAL DEMOLITION WORK NECESSARY TO PROPERLY PROVIDE ALL NEW WORK SHOWN AND SPECIFIED, TO INCLUDE MECHANICAL, ELECTRICAL, AND PLUMBING ITEMS.
2. DEMOLITION WORK SHOWN IS BASED ON EXISTING DRAWINGS AND INSPECTIONS. THE CONTRACTOR SHALL VISUALLY INSPECT ALL EXISTING CONDITIONS, AND IS RESPONSIBLE FOR PERFORMING THE INDICATED DEMOLITION WORK EVEN IF ACTUAL CONDITIONS DIFFER FROM THOSE SHOWN ON THE DRAWINGS.
3. DEMOLITION CONTRACTOR SHALL COORDINATE WITH NEW WORK SECTIONS FOR ADDITIONAL INFORMATION RELATED TO EXTENT OF DEMOLITION.
4. REFER TO ALL OTHER DRAWINGS IN THIS SET FOR INCIDENTAL DEMOLITION WORK NOT NOTED ON THE DEMOLITION PLANS.
5. THE OWNER HAS THE FIRST RIGHT OF REFUSAL OF ALL SALVAGE ITEMS. THE CONTRACTOR SHALL PROPERLY DISPOSE OF ALL DEBRIS. DO NOT STOCKPILE DEBRIS ON SITE.
6. ITEMS TO BE DEMOLISHED SHALL BE REMOVED COMPLETELY INCLUDING ALL ANCHORS, HANGERS, FASTENERS, PIPES, CONDUITS, DUCTS, ETC. UNLESS OTHERWISE INDICATED TO BE ABANDONED IN PLACE.
7. CONCRETE SLAB PATCHES MUST BE FLUSH WITH REMAINING SURFACES TO PERMIT APPLICATION OF FINISHES. PROVIDE WELED WIRE MESH IN PATCH AREAS LARGER THAN (4) FOUR SQUARE FEET.
8. CONCRETE SLABS TO REMAIN SHALL BE PATCHED, SCRAPPED, LEVELED, AND CLEANED TO PROVIDE A SURFACE SUITABLE FOR NEW FINISHES. WHERE RENOVATED AREAS ARE RECEIVING NEW UNDERGROUND MECHANICAL, PLUMBING, ELECTRICAL OR ADDITIONAL FOUNDATION WORK, SEE MECHANICAL, PLUMBING AND STRUCTURAL DRAWINGS, AS WELL AS ARCHITECTURAL DRAWINGS TO DETERMINE EXTENT OF REQUIRED CUT AND PATCH OF EXISTING SLAB. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL CONCRETE SLAB DEMOLITION AND REPLACEMENT NECESSARY TO INSTALL THE NEW WORK. BACKFILL ALL BELOW GRADE DEMOLITION WORK WITH SUITABLE FILL MEETING STRUCTURAL REQUIREMENTS FOR NEW WORK.
9. PARTITIONS SHOWN TO BE REMOVED SHALL BE CONFIRMED BY THE CONTRACTOR AS TO TYPE OF PARTITION AND EXACT LOCATION. COMPLETELY REMOVE PARTITIONS FROM FLOOR TO STRUCTURE ABOVE INCLUDING BASE, ALL FASTENERS, GROUT, SEALANTS, ETC., UNLESS OTHERWISE NOTED. MASONRY PARTITIONS WHICH EXTEND THROUGH THE SLAB SHALL BE REMOVED TO BELOW FINISH FLOOR. FILL SLAB OPENING WITH CONCRETE FILL TO REEIVE FINISH FLOOR. WHERE WALLS SCHEDULED TO BE REMOVED SIT ON SLAB, GRIND SLAB TO REEIVE FINISH FLOOR.
10. REMOVE, PATCH AND REPAIR PORTIONS OF WALL PARTITIONS WHICH CONFLICT WITH NEW WORK TO BE INSTALLED, EVEN IF NOT SPECIFICALLY NOTED TO BE DEMOLISHED ON PLANS.
11. WALL REMOVED FROM INTERSECTING WALLS SHALL INCLUDE TOOTHED IN REPLACEMENT OF DAMAGED MASONRY ON WALL TO REMAIN AND REMOVAL OF TIES PROJECTING FROM WALLS. SEE DETAILS FOR ADDITIONAL CONDITIONS.
12. WALLS TO BE PARTIALLY REMOVED SHALL BE TERMINATED WITH FINISHED MASONRY ENDS BY TOOTHING IN NEW MASONRY UNITS. TO MATCH ADJACENT MASONRY. SEE DETAILS FOR OTHER CONDITIONS. NO WALLS SHALL BE TERMINATED WITH EXPOSED OPEN CELLS OR DAMAGED MASONRY UNITS.
13. WHERE NEW OPENINGS ARE SHOWN IN EXISTING WALL, CAREFULLY REMOVE TO NEAREST JOINT LINE WITHOUT DISTURBING ADJACENT WORK SO THAT NEW WORK CAN BE PATCHED IN TO MATCH. ALL NEW MASONRY WORK SHALL BE TOOTHED IN.
14. ALL EXISTING STRUCTURE SHALL REMAIN, UNLESS OTHERWISE NOTED.
15. COORDINATE DEMOLITION OF ALL STRUCTURAL ITEMS (COLUMNS, BEAMS, SLABS, ETC.) WITH STRUCTURAL DRAWINGS. EXTENT OF DEMOLITION AREA SHALL BE IN ACCORDANCE WITH STRUCTURAL REQUIREMENTS AND COORDINATED WITH ALL NEW WORK.
16. TEMPORARILY SUPPORT ALL BEAMS, LINTELS, PORTIONS OF WALLS ETC., TO BE DISTURBED BY DEMOLITION WORK, UNTIL THEY ARE RE-SUPPORTED BY NEW WORK.
17. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF EXISTING BUILDING ELEMENTS TO REMAIN THROUGHOUT SEQUENCE OF WORK. ANY DAMAGE TO EXISTING BUILDING CONDITIONS SHOWN TO REMAIN SHALL BE RESTORED TO NEW WORK CONDITION AT NO COST TO OWNER.
18. WINDOWS SCHEDULED FOR REMOVAL SHALL BE REMOVED COMPLETELY. FASTENERS MAY BE CUT FLUSH WITH HEAD, JAMBS, AND SILL IF THE NEW WINDOW UNIT WILL CONCEAL FASTENER. PROTECT EXISTING SILLS SCHEDULED TO REMAIN. ALL EXISTING WINDOW OPENINGS MUST BE FIELD MEASURED PRIOR TO SUBMITTAL OF SHOP DRAWINGS.
19. WHERE FINISHES ARE INDICATED TO BE REMOVED, REMOVAL SHALL INCLUDE ANY GROUT, ADHESIVES, FASTENERS, AND ALL OTHER ITEMS USED TO ATTACH THE FINISHES TO THE SURFACES THAT THEY COVER.
20. ANY FLOOR AREAS DAMAGED BY DEMOLITION CONTRACTOR SHALL BE PATCHED TO MATCH EXISTING.
21. WHERE CEILINGS ARE REMOVED, REMOVE ALL CEILING SYSTEMS COMPLETELY INCLUDING GRID, TRIM HANGERS, CLIPS, ETC. WHERE NEW CEILINGS ARE SPECIFIED, NO DOUBLE CEILINGS ARE PERMITTED. REMOVE ALL ORIGINAL CONCEALED CEILINGS WHERE ENCOUNTERED.
22. ALL EXISTING SURFACES TO REMAIN SHALL BE PROTECTED, PATCHED IF DAMAGED AND CLEANED PRIOR TO APPLICATION OF FINISHES.
23. CONTRACTOR TO PROTECT ALL EQUIPMENT AND OTHER ELEMENTS IN AREA OF NEW OR DEMOLITION WORK.
24. REMOVE ALL CURTAINS AND BLINDS IN AREAS OF RENOVATION OR DEMOLITION, UNLESS OTHERWISE NOTED.
25. REMOVE MECHANICAL, ELECTRICAL AND PLUMBING ITEMS AS NOTED ON MECHANICAL, ELECTRICAL AND PLUMBING PLANS. COORDINATE WITH CIVIL, STRUCTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING FOR ADDITIONAL DEMOLITION NOTES. REMOVAL WORK IS INTENDED TO INCLUDE ALL ASSOCIATED ITEMS SUCH AS ELECTRICAL OUTLETS, SWITCHES, CONDUITS, PIPING, MOUNTING BLOCKS, ETC., AS NOTED. THE CONTRACTOR SHALL REFER TO ALL CIVIL, STRUCTURAL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS AND SPECIFICATIONS FOR PROCEDURES CONCERNING RELATED TRADES IN AREAS WHICH REQUIRE DEMOLITION. REPAIR AND PATCH ANY AREAS DAMAGED DURING REMOVAL WORK.
26. WHERE EXISTING WALL FINISHES ARE INDICATED TO BE REMOVED, REMOVAL SHALL INCLUDE ANY GROUT, ADHESIVES, FASTENERS, AND ALL OTHER ITEMS USED TO ATTACH THE FINISHES TO THE SURFACES THAT THEY COVER.
27. WHERE EXISTING EXTERIOR AND INTERIOR WALLS ARE INDICATED TO REMAIN, REMOVE ALL INTERIOR FINISHES AS WELL AS ANY EXISTING FURRING ON ALL INTERIOR FACES.

DEMOLITION PLAN LEGEND



DEMOLITION KEYNOTES

- D01 PREPARE FLOOR SURFACE FOR RECEIVING SELF-LEVELING COMPOUND
- D02 ADJUST EXISTING DRAINS TO BE FLUSH WITH NEW FLOORING
- D03 CONTRACTOR TO PROVIDE COST TO DEMO AND RELOCATE DRAIN IN THIS AREA AS REQUIRED FOR NEW FOOD SERVICE EQUIPMENT



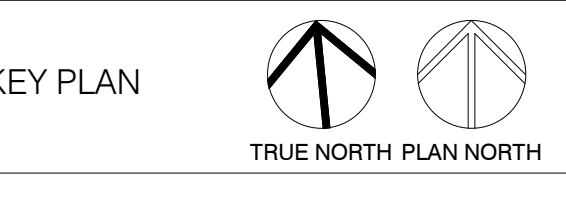
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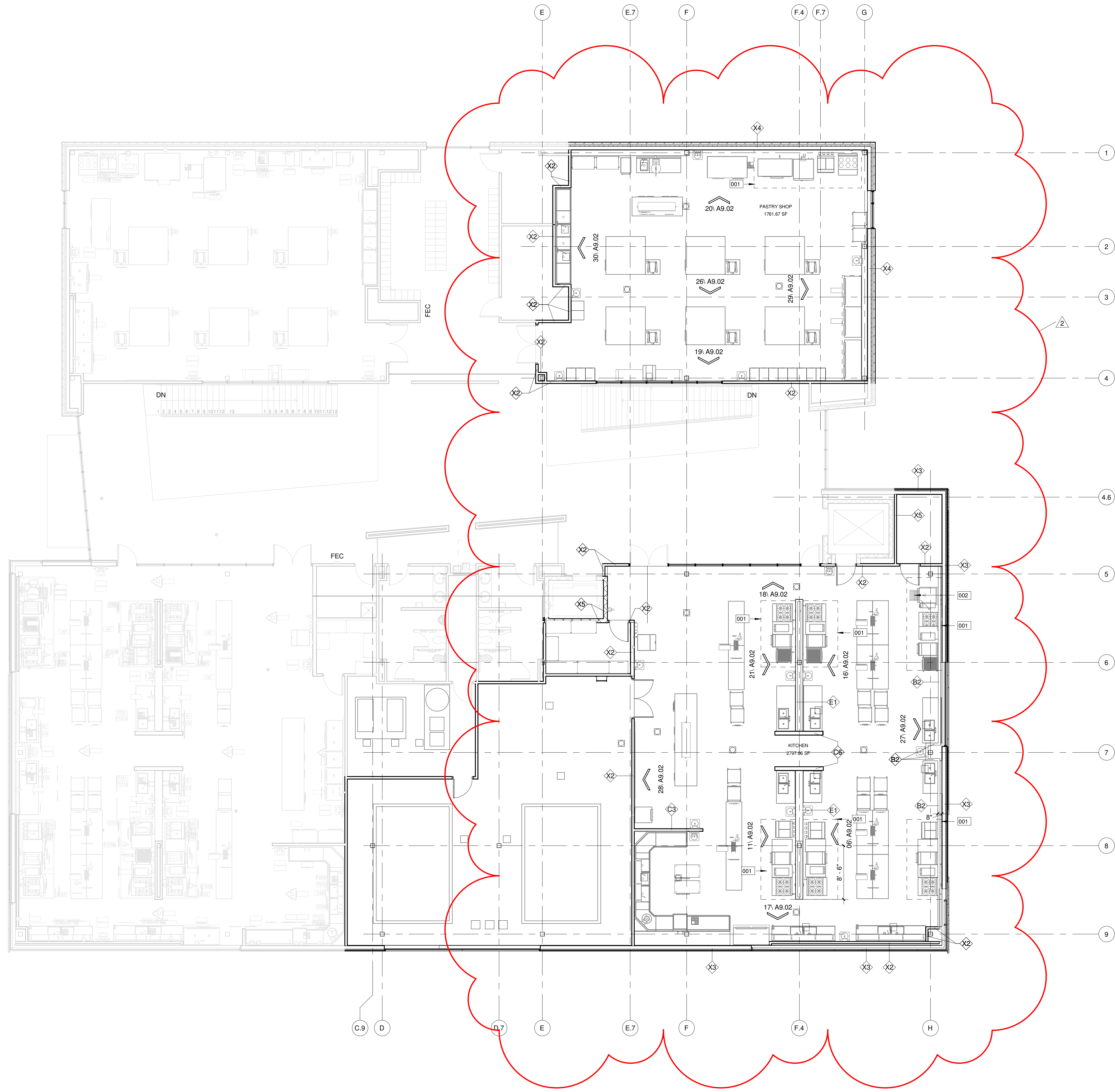
A PROJECT FOR:
CULINARY ARTS SHELL INTERIOR BUILDOUT

#	Date	ISSUED FOR
1	4/15/2020	PERMIT AND BIDDING
2	05/15/2020	ADDENDUM 1



Project Number	19012
Drawn By	Author
Checked By	Checker
Approved By	Approver
Drawing Title	DEMOLITION PLAN

Drawing Number **AD1.01**



GENERAL PLAN NOTES

1. ALL WORK TO BE PERFORMED UNDER THIS CONTRACT SHALL COMPLY WITH THE MOST RECENT EDITION OF THE CITY OF HOUSTON CODE, LABOR LAWS, RULES & REGULATIONS. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS TO CARRY OUT THE WORK DESCRIBED IN THE CONSTRUCTION DOCUMENTS.
2. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS. ANY DISCREPANCIES WITH THE DRAWINGS OR DIMENSIONS SHALL BE BROUGHT TO THE ARCHITECTS ATTENTION PRIOR TO CONSTRUCTION.
3. IF A CONFLICT EXISTS BETWEEN THE DRAWINGS (AND/OR SPECIFICATIONS), THE MORE STRINGENT AND COSTLY REQUIREMENT SHALL APPLY. ITEMS SHOWN ON THE DRAWINGS, BUT NOT SPECIFIED, SHALL APPLY AND BE FURNISHED AND INSTALLED BY THE CONTRACTOR. IF AN ITEM IS SHOWN ON THE DRAWINGS, BUT IS NOT INCLUDED IN THE SPECIFICATIONS, PROVIDE ITEM OF A QUALITY CONSISTENT WITH THE GENERAL QUALITY OF THE CONTRACT REQUIREMENTS. BRING CONFLICTS BETWEEN THE DRAWING AND SPECIFICATIONS TO THE ATTENTION OF THE ARCHITECT IMMEDIATELY.
4. WRITTEN INFORMATION TAKES PRECEDENT OVER DRAWING LINES. BRING CONFLICTS BETWEEN WRITTEN INFORMATION AND DRAWN LINE TO THE ATTENTION OF THE ARCHITECT IMMEDIATELY.
5. IF AN AREA OR SPACE IS SHOWN, BUT IS NOT CLEARLY DEFINED OR INDICATED BY NOTES, PROVIDE THE SAME MATERIALS AND FINISHES AS SCHEDULED ELSEWHERE IN THE BUILDING FOR THAT SPACE.
6. PRIOR TO SUBMITTAL OF BID, IT IS THE RESPONSIBILITY OF THE CONTRACTOR(S) TO BECOME FAMILIAR WITH ALL CONDITIONS AT THE SITE RELATIVE TO EXISTING WORK, MATERIAL HANDLING, STORAGE & DELIVERY, WORK SPACE AVAILABLE, SAFETY PRECAUTIONS REQUIRED, AND ALL OTHER CONDITIONS NECESSARY TO COMPLETE AN ACCURATE AND COMPLETE BID. NO INCREASE IN PROJECT COST WILL BE ALLOWED FOR FAILURE OF THE GENERAL CONTRACTOR TO KNOW EXISTING SITE CONDITIONS.
7. THE GENERAL CONTRACTOR GUARANTEES & WARRANTS THAT ALL WORK PERFORMED SHALL BE FREE FROM DEFECTS IN MATERIALS & WORKMANSHIP FOR A PERIOD OF ONE YEAR AFTER THE ISSUANCE OF THE CERTIFICATE OF FINAL COMPLETION. ANY DEFECTS OR DAMAGE DISCOVERED DURING SAID PERIOD SHALL BE REPAIRED OR REPLACED AS DIRECTED IN WRITING BY THE ARCHITECT WITH NO COST TO THE OWNER OR ARCHITECT.
8. THE GENERAL CONTRACT SHALL INCLUDE IN HIS/HER BID ALL COSTS ASSOCIATED WITH MATERIAL HANDLING, STORAGE AND DELIVERY.
9. THE GENERAL CONTRACTOR SHALL FURNISH & INSTALL ALL ITEMS NECESSARY FOR A COMPLETE INSTALLATION.
10. DO NOT SCALE DRAWINGS. ANY DIMENSIONS NOT INDICATED ON DRAWINGS TO BE CONFIRMED WITH ARCHITECT PRIOR TO CONSTRUCTION.
11. NO WORK SHALL BE PERFORMED OUTSIDE THE PROJECT LIMITS WITHOUT PRIOR WRITTEN APPROVAL FROM THE BUILDING OWNER AND/OR ARCHITECT.
12. THE GENERAL CONTRACTOR SHALL REMOVE ALL DEBRIS AT THE END OF EACH WORKDAY. THE GENERAL CONTRACTOR WILL FURNISH HIS/HER OWN DUMPSTER FOR TRASH & DEBRIS STORAGE UNTIL HE/SHE CAN REMOVE SUCH FROM THE PREMISES. ALL AREAS SHALL BE CLEANED/PROTECTED.
13. ALL WOOD & LUMBER SHALL BE FIRE RETARDANT TREATED AS PER THE REQUIREMENTS OF THE FORT BEND BUILDING CODE.
14. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK OF ALL TRADES AS REQUIRED FOR THE COMPLETION OF WORK.
15. MATERIALS SHALL BE NEW, OF QUALITY SPECIFIED, DELIVERED IN A TIMELY FASHION & AMPLIFIED QUANTITY TO PREVENT DELAY OF WORK. SUBSTITUTIONS REQUIRE PRIOR APPROVAL BY THE ARCHITECT.
16. INSURANCE: THE GENERAL CONTRACTOR & EACH SUB CONTRACTOR SHALL HAVE WORKERS COMPENSATION AS REQUIRED BY LAW & SUFFICIENT PROTECTION FOR CLAIMS FOR PERSONAL INJURY, INCLUDING DEATH, SHOULD THEY ARISE FROM OPERATIONS UNDER CONTRACT.
17. PRIOR TO DEMOLITION, THE GENERAL CONTRACTOR SHALL WALK THE SITE & PROVIDE A WRITTEN LIST TO THE ARCHITECT OF ANY DAMAGE TO EXISTING FINISHES, MISSING EQUIPMENT, NON-OPERATIVE EQUIPMENT, ANY WATER LEAKS, ETC.
18. IT IS THE GENERAL CONTRACTORS RESPONSIBILITY TO SECURE THE PREMISES THROUGHOUT THE DURATION OF THE PROJECT.
19. THE GENERAL CONTRACTOR SHALL TAKE THE APPROPRIATE MEASURES TO PROVIDE THE NECESSARY PROTECTION TO THE GENERAL PUBLIC FROM ACCESSING THE SITE AT ALL TIMES.
20. THE GENERAL CONTRACTOR SHALL PROVIDE A SAFE WORKING ENVIRONMENT AS WELL AS REQUIRED MEANS OF EGRESS FOR ALL PERSONNEL ON THE PROJECT SITE.
21. THE GENERAL CONTRACTOR SHALL PROVIDE THE NECESSARY PROTECTION OF ALL FINISHES THAT ARE TO REMAIN AND ALL AREAS ASSOCIATED WITH THE SCOPE OF THE PROJECT FROM DAMAGE. ANY AREAS DAMAGED DURING CONSTRUCTION SHALL BE RETURNED TO THEIR ORIGINAL FINISH.
22. THERE ARE NO SUBSTITUTIONS ALLOWED UNLESS APPROVED BY THE ARCHITECT. THE GENERAL CONTRACTOR SHALL SUBMIT IN WRITINGS ALL REQUESTS FOR SUBSTITUTIONS.
23. THE GENERAL CONTRACTOR SHALL SUBMIT SHOP DRAWINGS, PRODUCT DATA & SAMPLES TO THE ARCHITECT FOR APPROVAL PRIOR TO FABRICATION. SUBCONTRACTORS SHALL VISIT THE PROJECT SITE TO VERIFY CONDITIONS, DIMENSIONS, ETC. THE GENERAL CONTRACTOR SHALL REVIEW ALL SUBMISSIONS PRIOR TO SUBMITTING TO THE ARCHITECT FOR APPROVAL.
24. THE GENERAL CONTRACTOR SHALL INSTALL ALL MATERIALS ACCORDING TO THE MANUFACTURER'S RECOMMENDED SPECIFICATIONS. THE GENERAL CONTRACTOR SHALL SUBMIT IN WRITING TO THE ARCHITECT IF, BECAUSE OF UNFORESEEN CONDITIONS, MATERIALS CANNOT BE INSTALLED ACCORDING TO SPECIFICATIONS PRIOR TO INSTALLATION.
25. THE GENERAL CONTRACTOR SHALL ASSEMBLE ALL REQUIRED GUARANTEES, WARRANTIES & MAINTENANCE CONTRACTS EXECUTED BY EACH OF THE RESPECTIVE MANUFACTURERS, SUPPLIERS & SUBCONTRACTORS AND SUBMIT THE INFORMATION TO THE ARCHITECT.
26. THE GENERAL CONTRACTOR SHALL BRING DISCREPANCIES BETWEEN THE DRAWINGS & SPECIFICATIONS IN WRITING TO THE ATTENTION OF THE ARCHITECT.
27. ALL PLAN DETAILS & WALL SECTIONS ARE ASSUMED TO BE TYPICAL CONDITIONS UNLESS DETAILED OR NOTED OTHERWISE.
28. CLOSE WITH FIRE MATERIALS & FIRE SEAL AS REQUIRED; ALL OPENING JOINTS OR GAPS ON FIRE RATED ASSEMBLIES SUCH AS DUCTS, PIPES & CONDUIT PENETRATIONS.
29. THE GENERAL CONTRACTOR SHALL MAINTAIN ALL EXISTING FIRE RATINGS AT NEW CONSTRUCTION.
30. VERIFY OPENINGS FOR PIPES & DUCTS WITH MECHANICAL.
31. PROVIDE ACOUSTICAL CAULKING TOP, BOTTOM & BOTH SIDES OF ALL INTERIORS STUDY/GYPSUM BOARD WALLS; TYPICAL.
32. ALL HOLLOW METAL DOOR FRAMES ARE TO BE GROUT FILLED.
33. PROVIDE "TYPE X" GYPSUM AT ALL REQUIRED RATED WALLS & CEILING ASSEMBLIES.
34. PROVIDE ALL NECESSARY WOOD BLOCKING AT ALL REQUIRED LOCATIONS FOR ERECTION OF EQUIPMENT, SYSTEMS & ACCESSORIES.
35. PROVIDE WATER RESISTANT GYPSUM BOARD AT ALL WET AREAS; TYPICAL.

PLAN LEGEND

- XX PARTITION TYPES - RE: A0.02

FLOOR PLAN KEYNOTES

- 001 LOCATION OF EXHAUST HOOD ABOVE REFER TO FOOD SERVICE DRAWINGS
- 002 CONTRACTOR TO PATCH EXISTING DEMOLITIONS REQUIRED FOR DRAIN AT THIS LOCATION. COORDINATE WITH FOOD SERVICE DRAWINGS



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A PROJECT FOR:
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#	Date	ISSUED FOR
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2	05/15/2020	ADDENDUM 1



Project Number	19012
Drawn By	Author
Checked By	Checker
Approved By	Approver
Drawing Title	

SECOND FLOOR PLAN

Drawing Number **A1.01**

#	Date	ISSUED FOR
1	4/15/2020	PERMIT AND BIDDING
2	05/15/2020	ADDENDUM 1

GENERAL REFLECTED CEILING PLAN NOTES

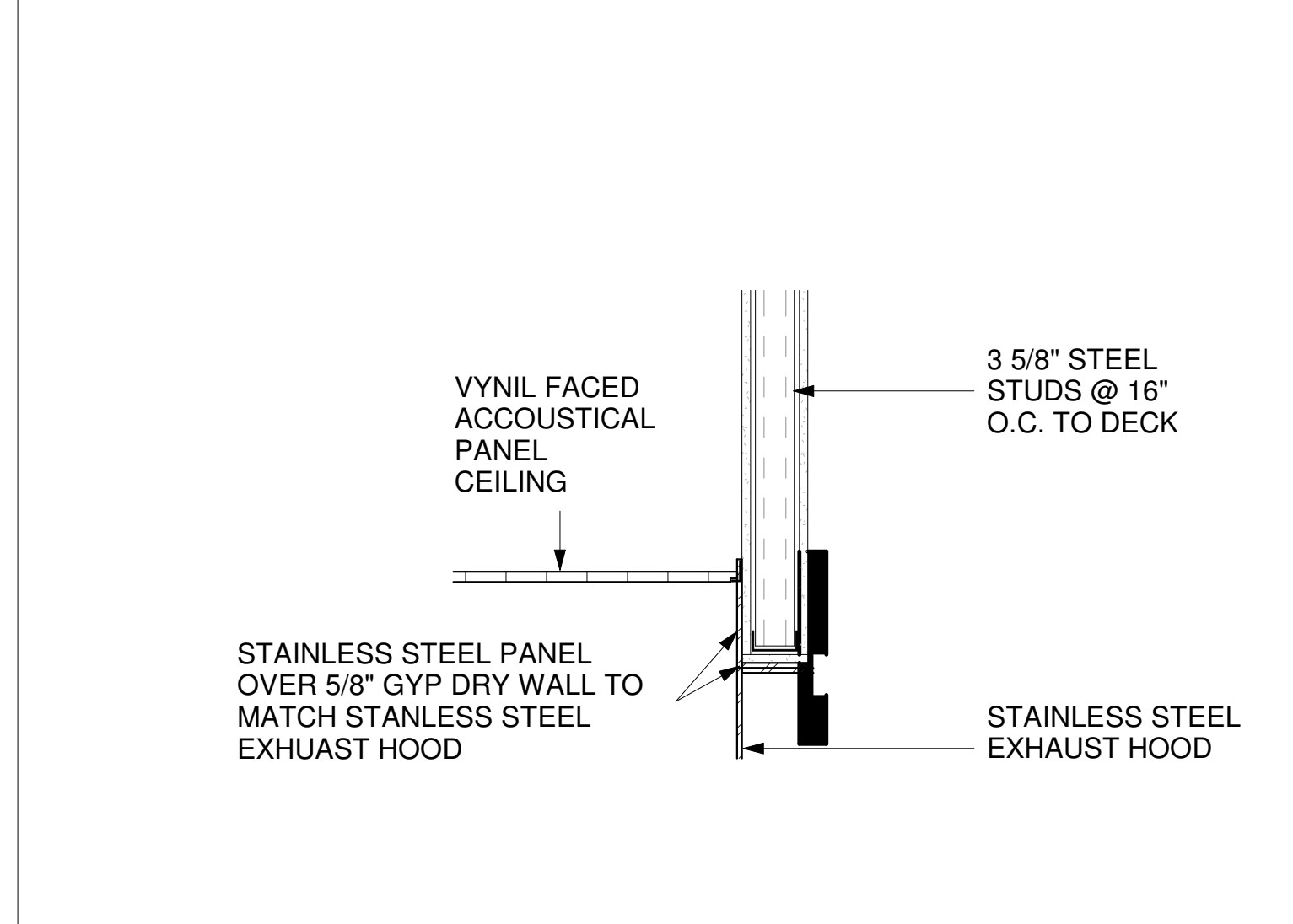
- TYPICAL CEILING HEIGHT SHALL BE 10'-0" UNLESS OTHERWISE NOTED ON REFLECTED CEILING PLANS. REFER TO TYPICAL DETAIL 11/A2.01 AT ALL STAINLESS STEEL EXHAUST HOODS.
- REFER TO ELECTRICAL DRAWINGS FOR LIGHT PATTERN AND EXIT LIGHT LOCATIONS. NOTIFY ARCHITECT OF DISCREPANCIES PRIOR TO SHOP DRAWINGS.
- REFER TO MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR ITEMS NOT SHOWN ON CEILING PLAN. GRILLES, SPEAKERS, SPRINKLERS, HEAT & SMOKE DETECTORS, SHALL BE CENTERED IN TILES UNLESS OTHERWISE NOTED.
- ALL BULKHEAD DIMENSIONS ARE FROM FINISH FACE OF WALL OR BULKHEAD TO FINISH FACE OF BULKHEAD.
- PROVIDE 1/2" REVEALS BETWEEN DISSIMILAR MATERIALS ON THE SAME PLANE AS THE CEILINGS.
- IN AREAS OF EXPOSED CEILING, PAINT EXPOSED STRUCTURE, UNDERSIDE OF DECK, SPRINKLER PIPING, CONDUIT AND ALL MISCELLANEOUS OVERHEAD ITEMS, COLORS THAT SHALL BE SELECTED BY ARCHITECT.
- ALL GRIDED CEILING SHALL BE 2X2 VINYL FACE ACOUSTICAL CEILINGS U.O.N.
- ALL GRAY AREAS ARE AREA OF NO WORK.

CEILING PLAN KEYNOTES

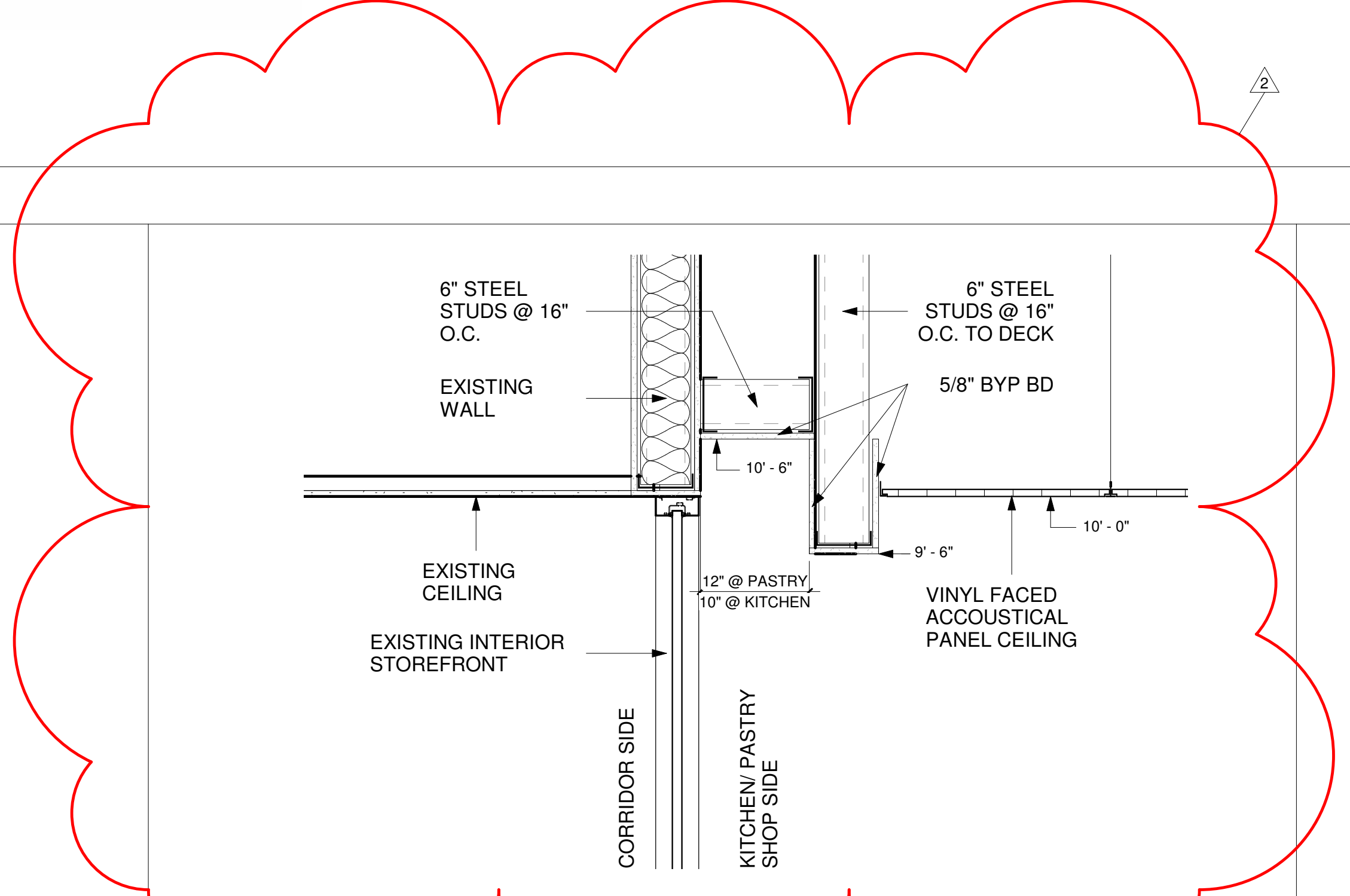
- 001 REFER TO 06/A2.01 FOR BULKHEAD THIS LOCATION
- 002 CONTRACTOR TO PROVIDE 50% SQUARE LAY-IN VINYL TILES AND 50% BEVELED REGULAR TILES IN RANDOM PATTERN FOR ACOUSTICS IN THE CEILING



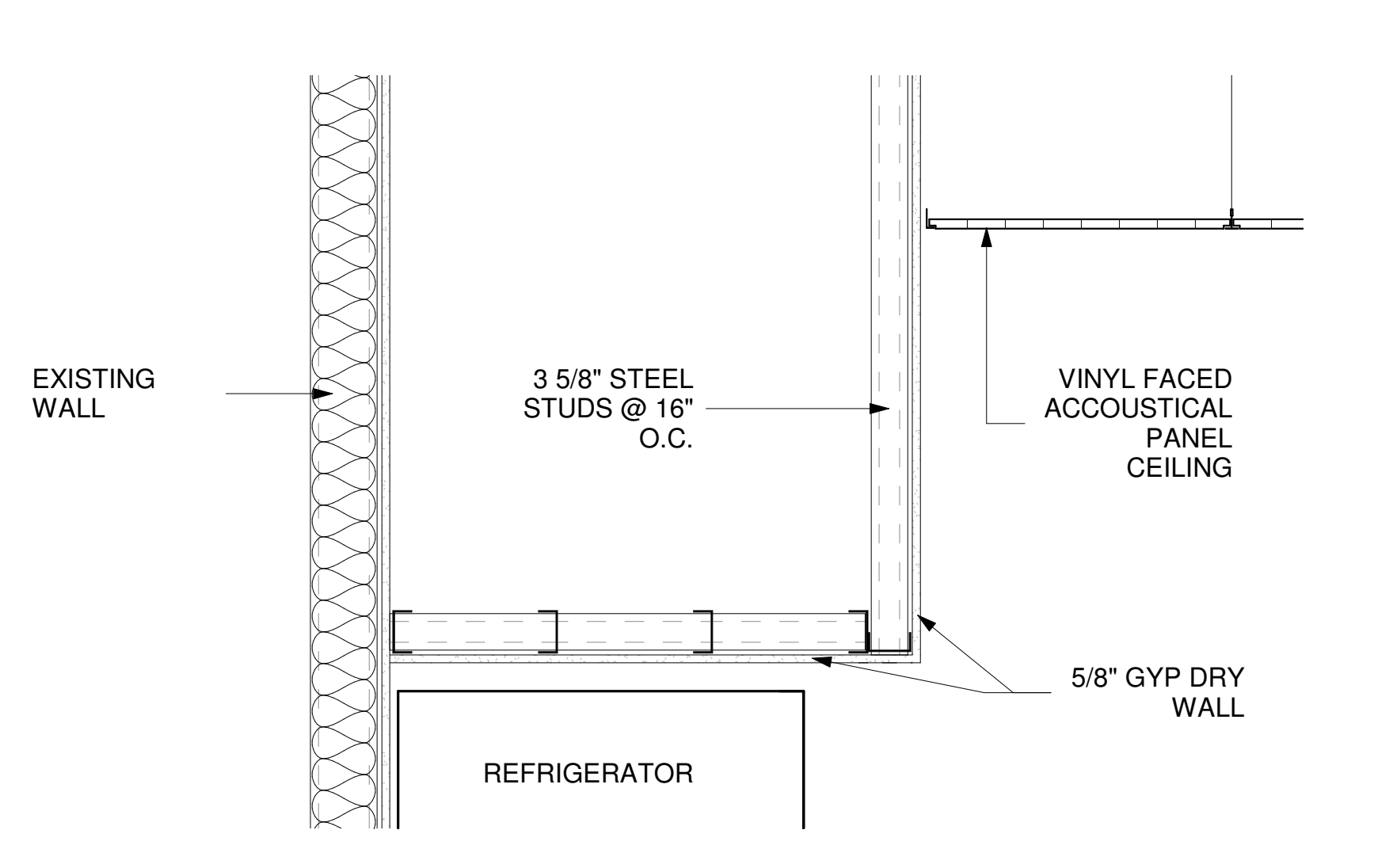
27 REFLECTED CEILING PLAN - LEVEL 2
Scale: 1/8" = 1'-0"



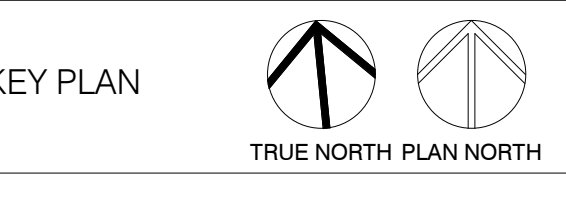
26 EXHAUST HOOD DETAIL
Scale: 1" = 1'-0"



16 BULKHEAD 2 DETAIL
Scale: 1" = 1'-0"



06 BULKHEAD DETAIL
Scale: 1" = 1'-0"




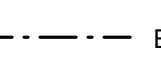
Project Number	19012
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Approved By	Approver

Drawing Title
REFLECTED CEILING PLAN

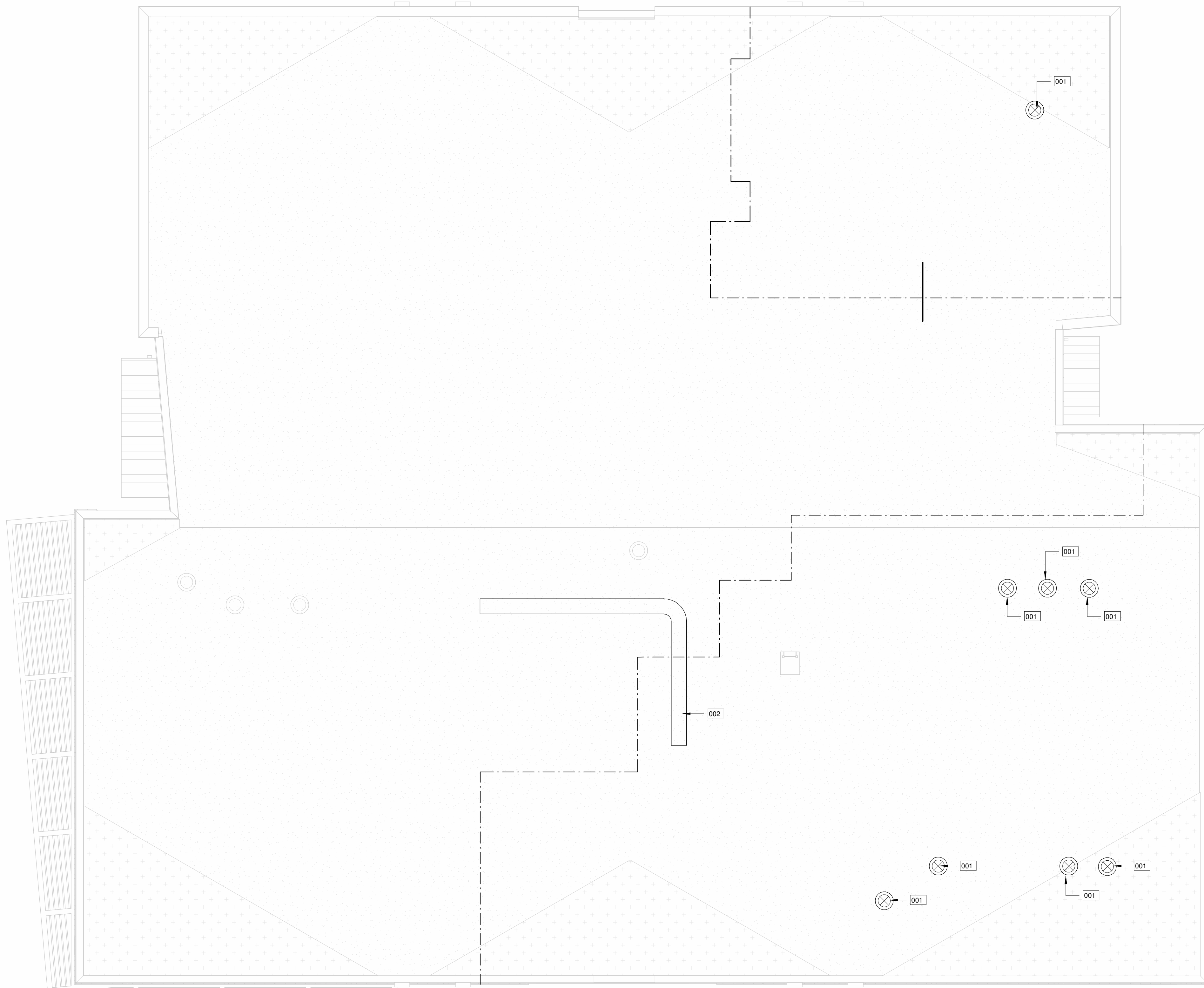
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A2.01

#	Date	ISSUED FOR
1	4/15/2020	PERMIT AND BIDDING
2	05/15/2020	ADDENDUM 1

- GENERAL ROOF PLAN NOTES**
- DETAILS INDICATED ARE TYPICAL FOR SIMILAR ROOFING CONDITIONS UNLESS OTHERWISE NOTED.
 - UNLESS OTHERWISE NOTED, MINIMUM ROOF SLOPE IS 1/4" PER FOOT. PROVIDE TAPERED INSULATION (EVEN IF NOT SHOWN ON THIS PLAN) AS REQUIRED TO MAINTAIN REQUIRED SLOPE TO ROOF DRAINS AND ELIMINATE ANY AREAS OF POTENTIAL STANDING WATER. PROVIDE TAPERED INSULATION (MINIMUM 1/4" PER FOOT SLOPE) AT ALL CRICKETS INDICATED TO DRAINS. COORDINATE HEIGHTS OF ALL FLASHINGS AND EXPANSION JOINT CAPS WITH TAPERED INSULATION TO MAINTAIN MINIMUM DIMENSIONS DETAILED.
 - ALL ROOF PENETRATIONS AND ACCESSORIES (DRAINS, VENTS, ETC.) ARE TO BE INSTALLED AND FLASHED IN COMPLIANCE WITH THE CURRENT EDITIONS OF THE N.R.C.A. (ROOFING AND WATERPROOFING MANUAL) AND S.M.A.C.N.A. (ARCHITECTURAL SHEET METAL MANUAL).
 - COORDINATE WITH MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS FOR ITEMS (INCLUDING UNIT SIZES AND LOCATIONS) NOT SHOWN OR SCHEMATICALLY SHOWN ON ROOF PLANS.
 - CURBS FOR ROOF TOP MECHANICAL EQUIPMENT ARE PROVIDED BY THE MECHANICAL CONTRACTOR. REFER TO TYPICAL CURB FLASHING DETAIL FOR BLOCKING AND FLASHING REQUIREMENTS. PROVIDE ALL BLOCKING NECESSARY TO ACHIEVE LEVEL. MECHANICAL CURBS AT ALL LOCATIONS MAINTAIN MINIMUM 8" FROM TOP OF CURB TO ADJACENT ROOF. PROVIDE TAPERED CRICKETS (MINIMUM 1/2" PER FOOT SLOPE) AROUND ALL MECHANICAL EQUIPMENT CURBS.
 - THE ROOF DRAIN AND MECHANICAL UNIT LOCATIONS SHOWN ON THE ROOF PLAN ARE APPROXIMATE. COORDINATE WITH MECHANICAL AND PLUMBING DRAWINGS FOR EXACT LOCATIONS.
 - PROVIDE WALKWAY PROTECTION WHERE INDICATED AND AT ALL SIDES OF MECHANICAL ROOF TOP UNITS REQUIRING SEVICE AND AT TOP AND BOTTOM OF ROOF STAIRS.
 - ALL ROOF TOP EQUIPMENT (EXCLUDING PREFINISHED ITEMS) SHALL BE FIELD PAINTED.
 - CONTRACTOR IS RESPONSIBLE FOR PROVIDING FRIT WOOD BLOCKING AS REQUIRED TO ACCOMMODATE ALL PROFILES OF FINISHED ROOFING INCLUDING AT CRICKETS AND TAPERED INSULATION AT WALLS, PARAPETS AND GRAVEL STOPS. GRAVEL STOPS AT GUTTER SHALL BE STAINLESS STEEL WITH SOLDERED JOINTS.
 - CONTRACTOR TO PROVIDE FRAMING DETAIL AT ALL ROOF PENETRATIONS FOR ROOF VENTS AND DUCT PENETRATION FOR NEW AHU. RE: 26/A3.01

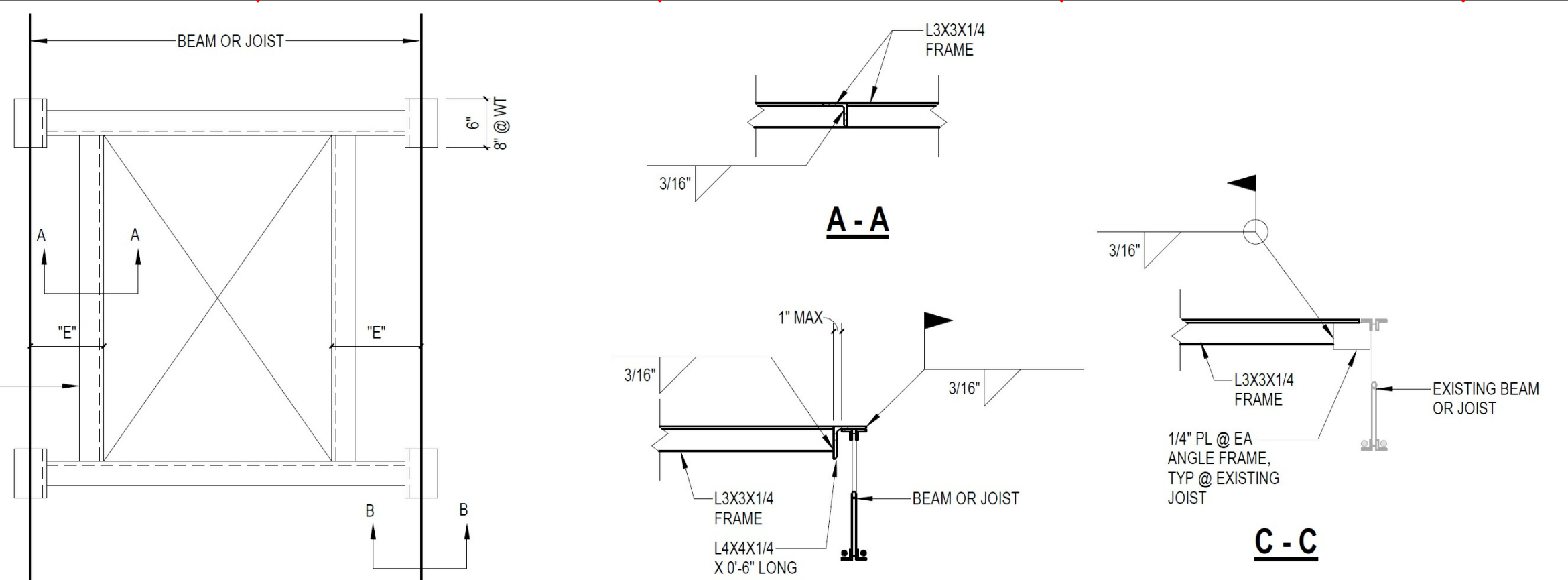
- ROOF LEGEND**
-  NEW EXHAUST EQUIPMENT (REFER TO MEP)
 -  BOUNDARY OF WORK BELOW

- ROOF PLAN KEYNOTES**
- 001 NEW EXHAUST VENT PENETRATION CONTRACTOR TO PATCH EXISTING ROOF AND PROVIDE BRACING AS REQUIRED
 - 002 NEW VENT AND DUCT FOR NEW AHU REFER TO MECHANICAL PLANS



27 ROOF LEVEL PLAN
Scale: 1/8" = 1'-0"

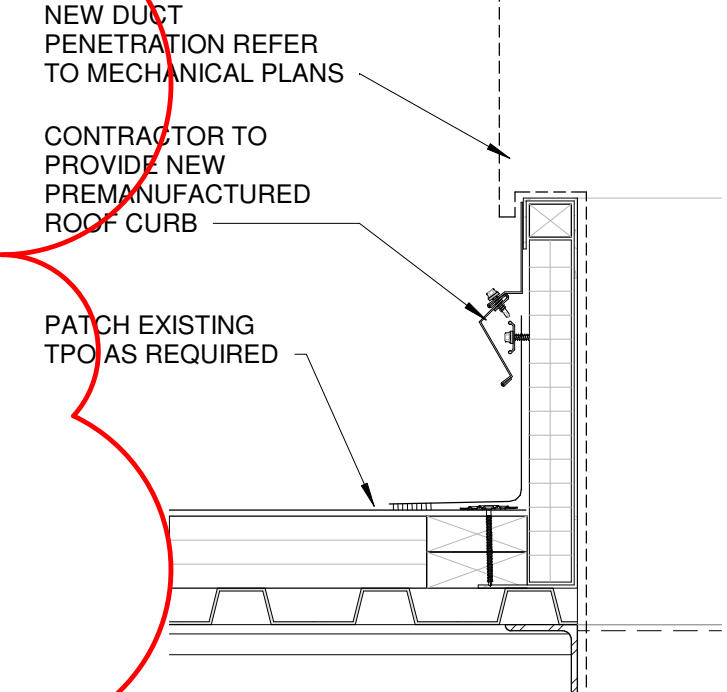
NOTE:
TYPICAL ROOF OPENING DETAIL SHOWN APPLIES TO ALL ROOF OPENINGS WHERE LEAST DIMENSION IS 12" OR LARGER. REINFORCE ROOF OPENINGS LESS THAN 12" BY WELDING 16 GAGE SHEET METAL 1/2" WIDER THAN OPENING TO METAL ROOF DECK.
WHERE DIMENSION "E" IS LESS THAN 6", ANGLE MAY BE OMITTED.
AT EXISTING CONDITIONS REFER TO DETAIL C-C FOR ANGLE CONNECTION
PROVIDE L3X3X1/4 ANGLES AS REQUIRED TO FRAME OPENING, TYP.
PROVIDE JOIST STRUT AS REQUIRED, REFER TO TYP JOIST REINFORCEMENT DETAIL.



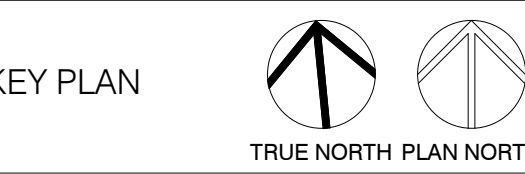
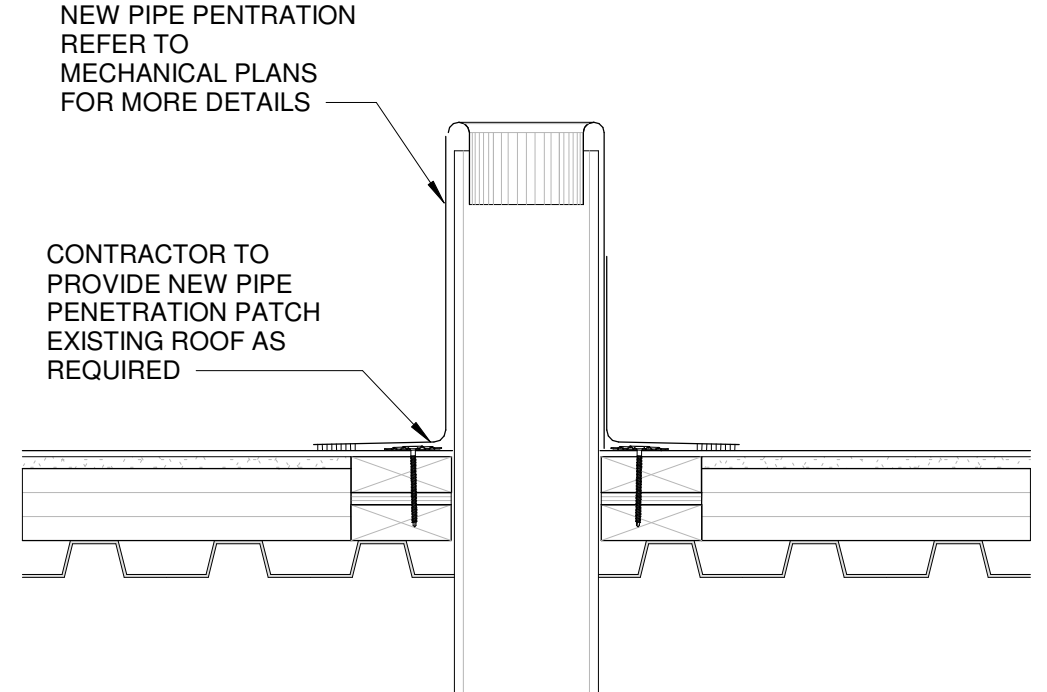
TYPICAL ROOF OPENING - PLAN VIEW

26 FRAMING DETAIL
Scale: N.T.S.

11 ROOFING DETAIL 2
Scale: 1 1/2" = 1'-0"



06 ROOF DETAIL 1
Scale: 1 1/2" = 1'-0"



Project Number	19012
Drawn By	Author
Checked By	Checker
Approved By	Approver
Drawing Title	

ROOF PLAN

Drawing Number **A3.01**

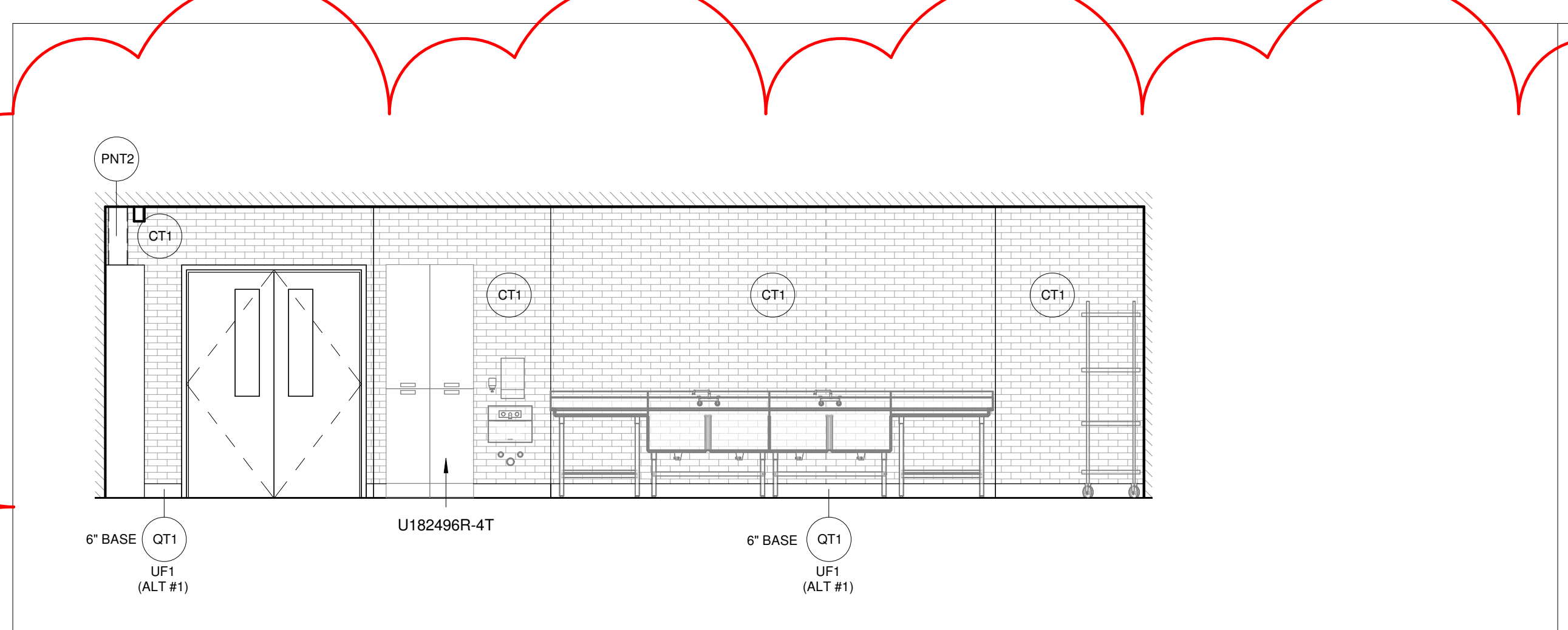
#	Date	ISSUED FOR
1	4/15/2020	PERMIT AND BIDDING
2	05/15/2020	ADDENDUM 1

GENERAL FINISH NOTES

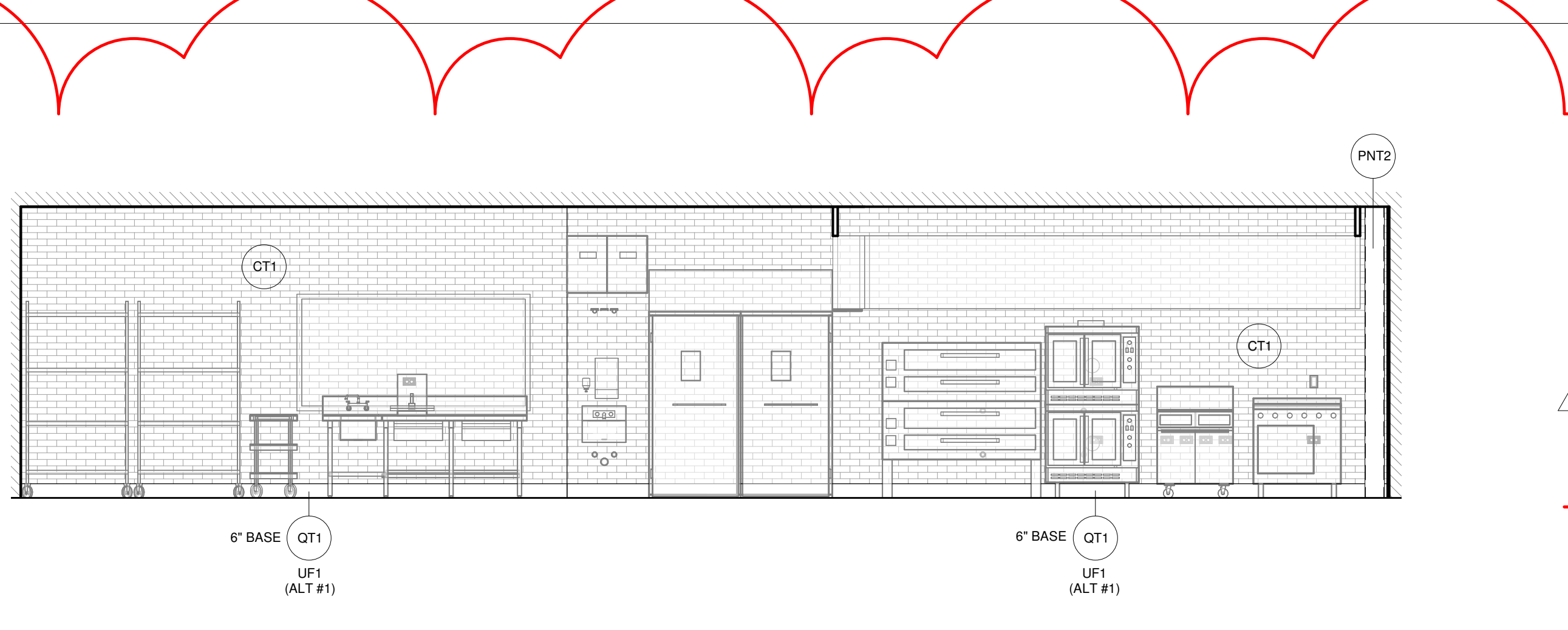
- ALL PARTIAL HEIGHT WALL SHALL HAVE STAINLESS STEEL CAP WITH 1/8" ROUNDED EDGES 1" THICK PROVIDED.
- ALL GROUTED TILES SHALL BE EPOXY.
- ALL CORNERS SHALL RECEIVE 1 1/2" x 1 1/2" x 4" STAINLESS STEEL CORNER GUARDS
- TILE EDGE PROTECTION SHALL BE USED AT ALL TILE CORNERS AND EXPOSED EDGES
- PAINT ALL EXPOSED COLUMN WHITE
- ALL COLUMNS WITHIN THE COOKING PREPARATION AREA NEXT TO GAS FLAMES SHALL RECEIVE STAINLESS STEEL COLUMN WRAP
- ALL WINDOW AREAS SHALL RECEIVE TILE SIMILAR TO WALL AT HEAD, JAMB AND SILL.
- CONTRACTOR TO PROVIDE 8 ROOM SIGNS FOR THIS PROJECT TO MATCH LAYOUT AND DESIGN OF EXISTING SIGNS. ROOM NAMES AND NUMBERS ON SIGNS TBD BY ARCH.
- ALL EXPOSED COLUMNS TO RECEIVE PAINT UNLESS OTHERWISE NOTED. COLOR TBD.

FINISHES LEGEND

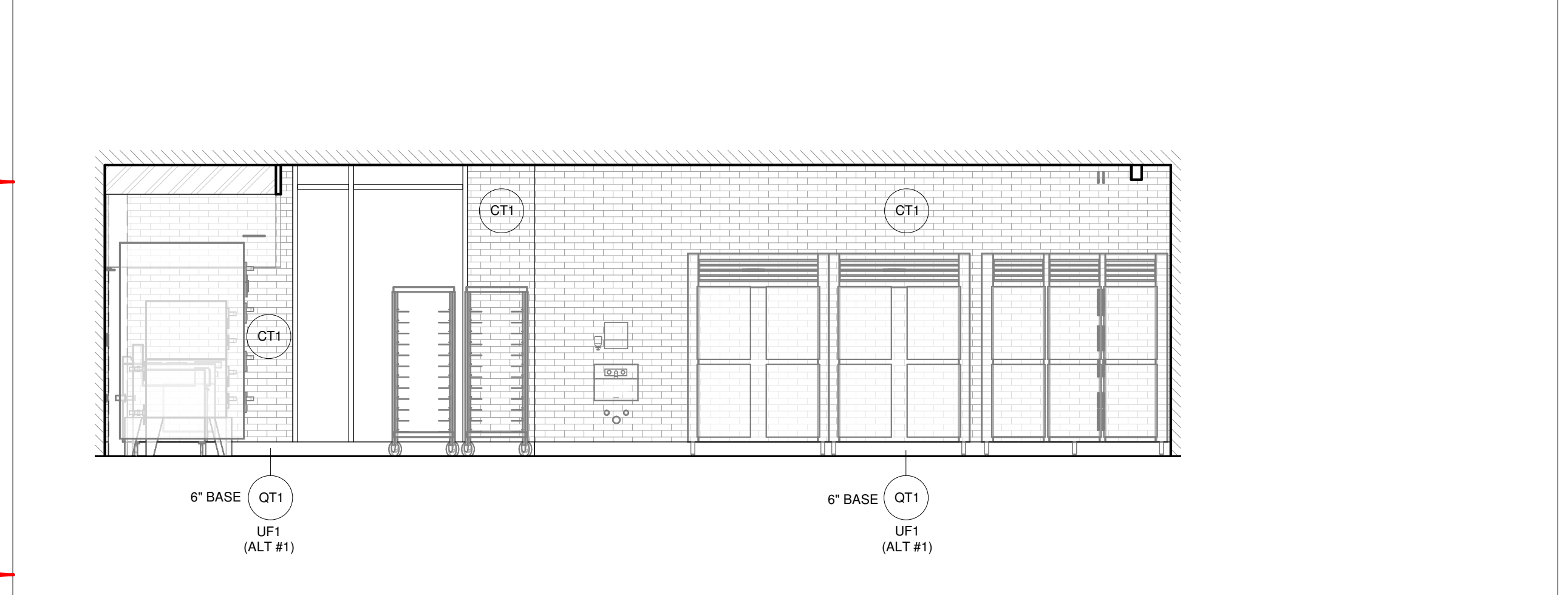
Mark	MATERIAL	COLOR	MANUF.	REMARKS
PNT1	Paint (field)	WHITE	SHERWIN WILLIAMS	-
PNT2	Paint (accent)	GREY	SHERWIN WILLIAMS	-
CT1	Subway Tile	0190 - ARCTIC WHITE 3"X6" (SUBWAY TILE)	DAL-TILE	-
FRP1	Fiberglass Panel	WHITE	MARLITE	-
SSP1	Stainless Steel Panel	STAINLESS STEEL	-	-
RB1	Rubber Base	131 - BISQUE	ROPPE	-
CB1	Ceramic Base	0190 - ARCTIC WHITE 3"X6" (SUBWAY TILE)	DAL-TILE	-
VC1	Vinyl faced Acoustical ceiling Tiles	WHITE	ARMSTRONG	-
QT1	Quarry Tile	0042 - ARRID GRAY	DAL-TILE	-
UF1	Urethane Flooring System	TBD	BASF MASTER BUILDER SOLUTIONS	-
CG	CORNER GUARD	STAINLESS STEEL	-	-
TEP	TILE EDGE PROTECTION	STAINLESS STEEL	SCHLUTER SYSTEMS	-
EGR1	EPOXY GROUT	TBD	MAPEI	-
EGR2	EPOXY GROUT	TBD	MAPEI	-



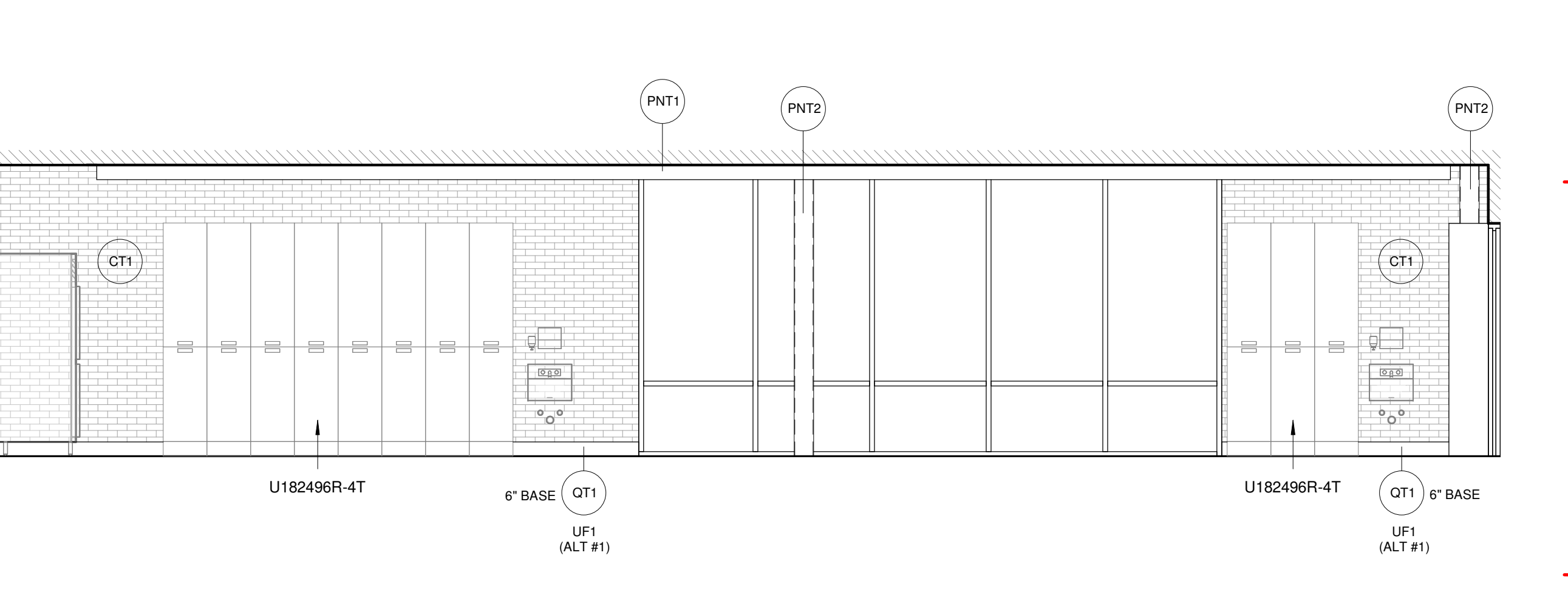
30 Elevation 1
Scale: 1/4" = 1'-0"



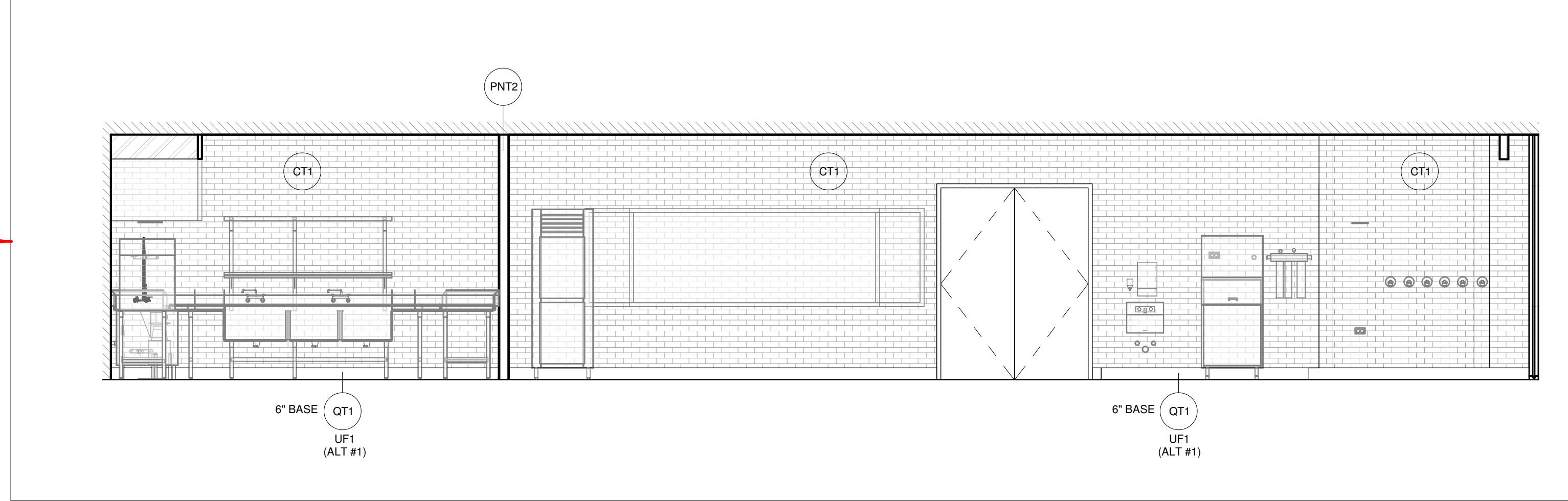
20 Elevation 2
Scale: 1/4" = 1'-0"



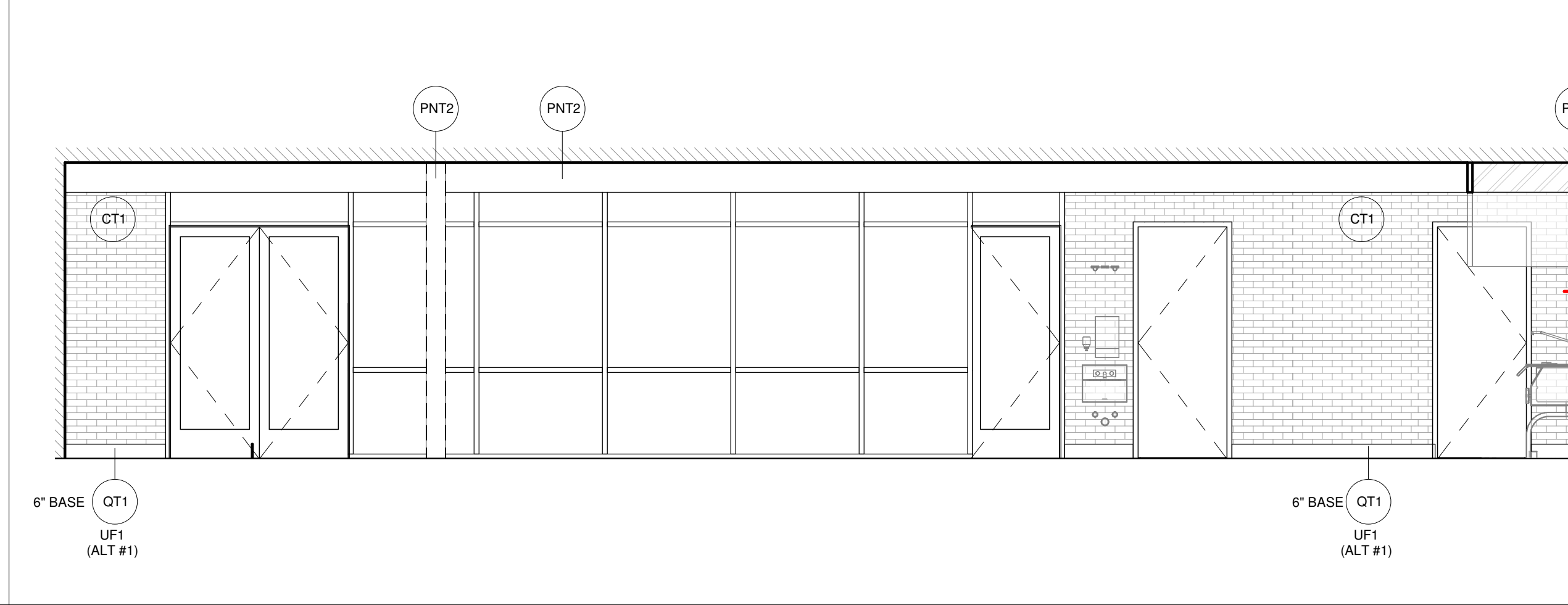
29 Elevation 3
Scale: 1/4" = 1'-0"



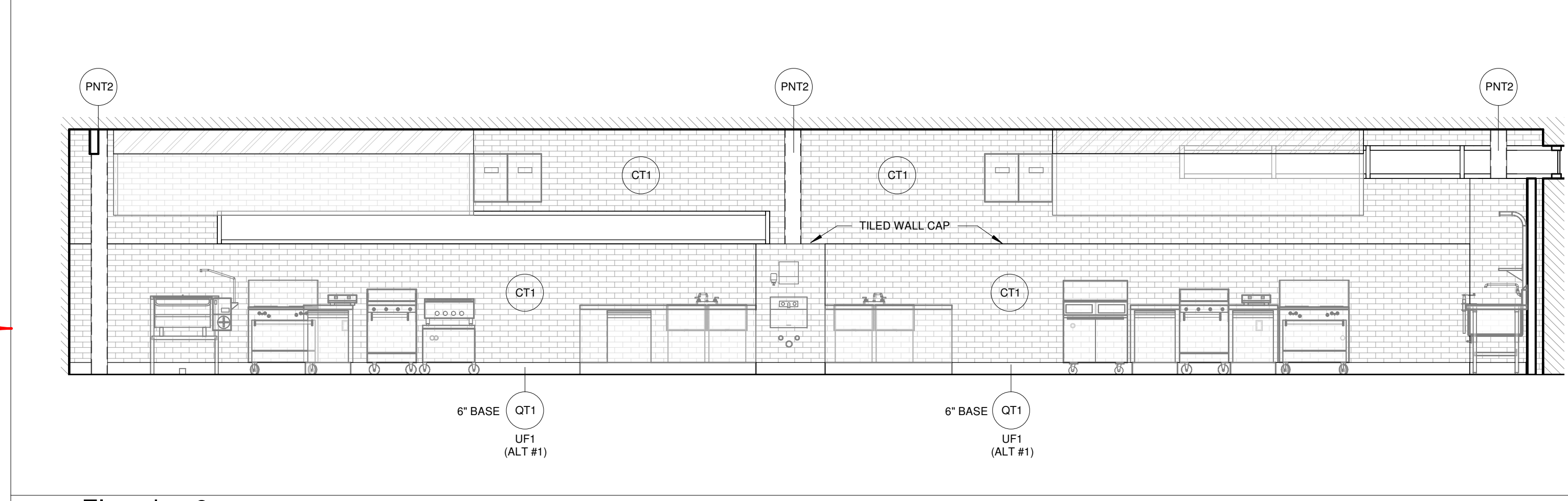
19 Elevation 4
Scale: 1/4" = 1'-0"



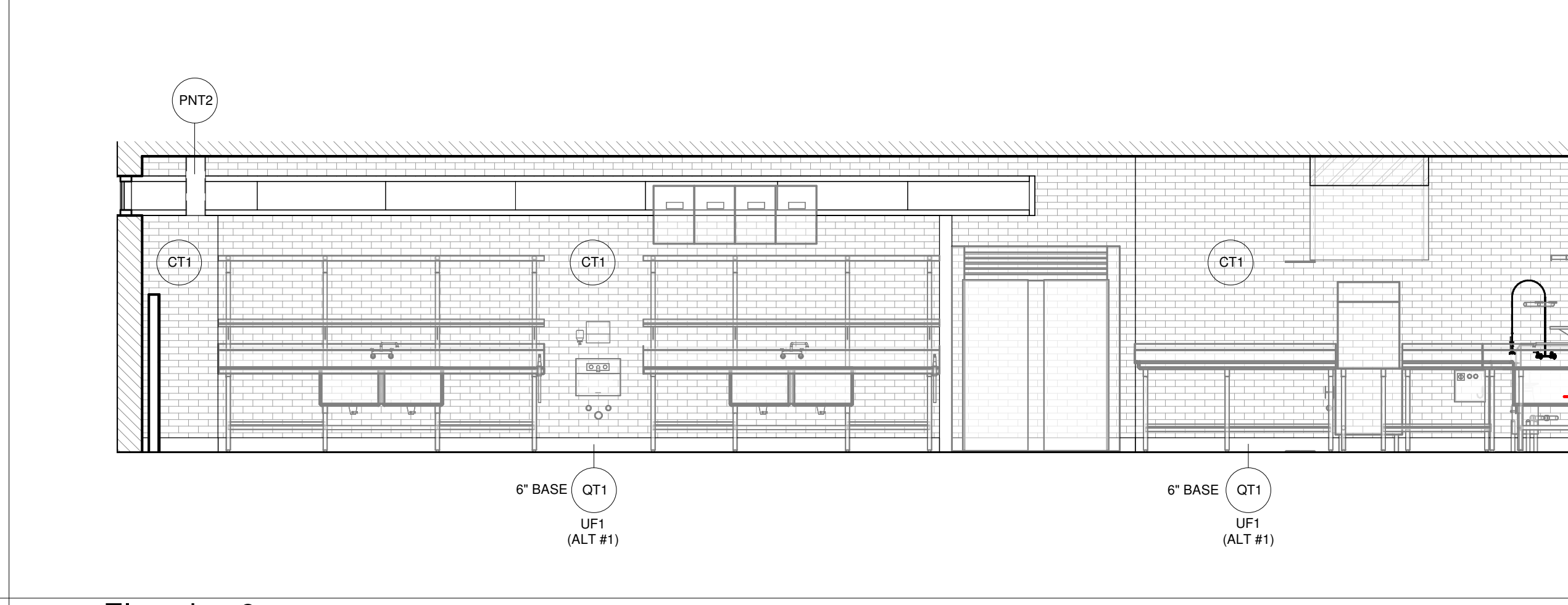
28 Elevation 5
Scale: 1/4" = 1'-0"



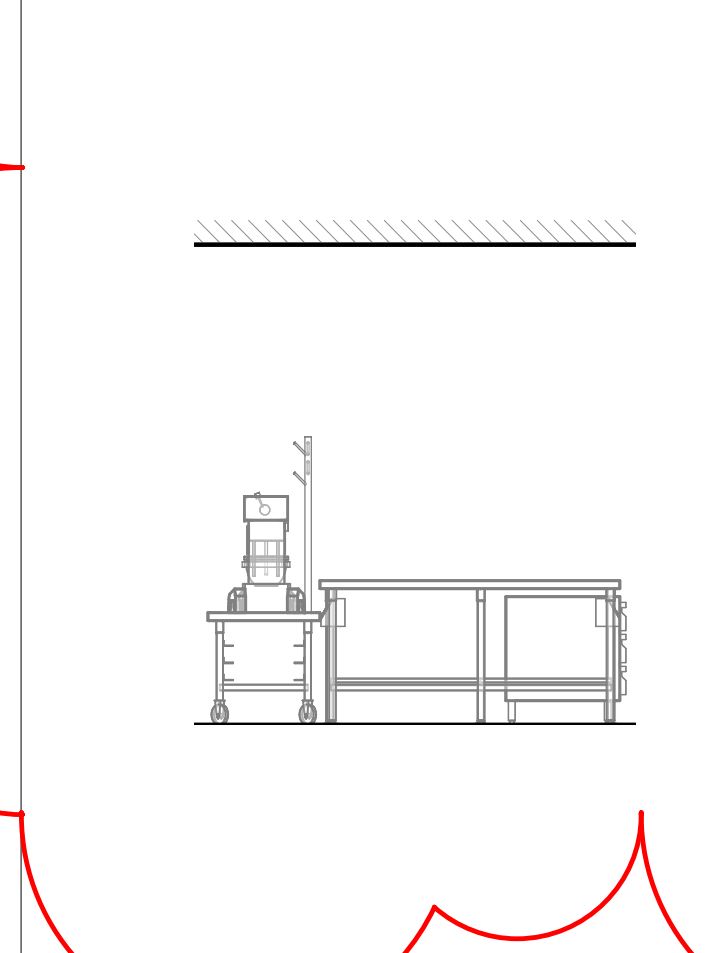
18 Elevation 6
Scale: 1/4" = 1'-0"



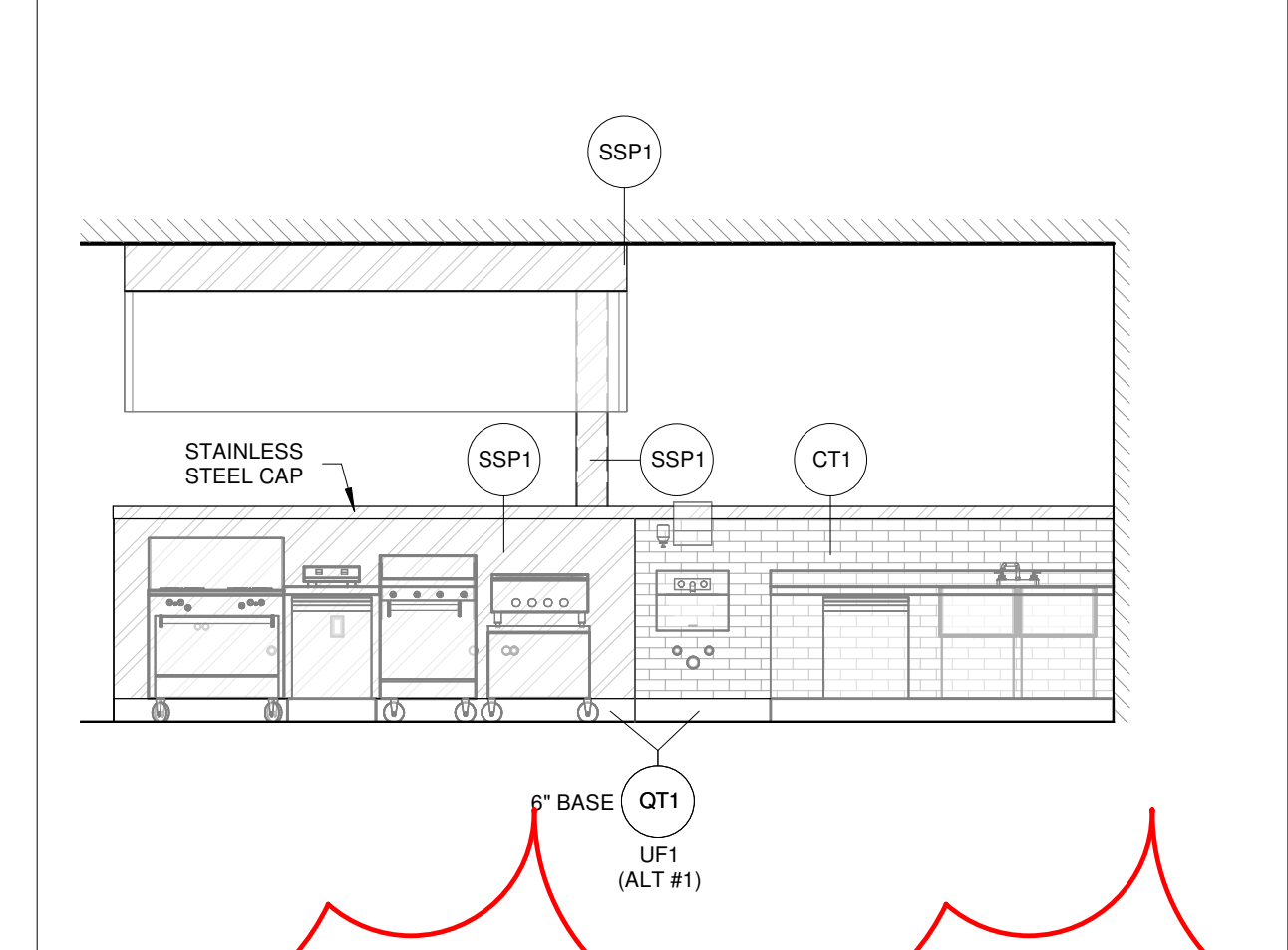
27 Elevation 7
Scale: 1/4" = 1'-0"



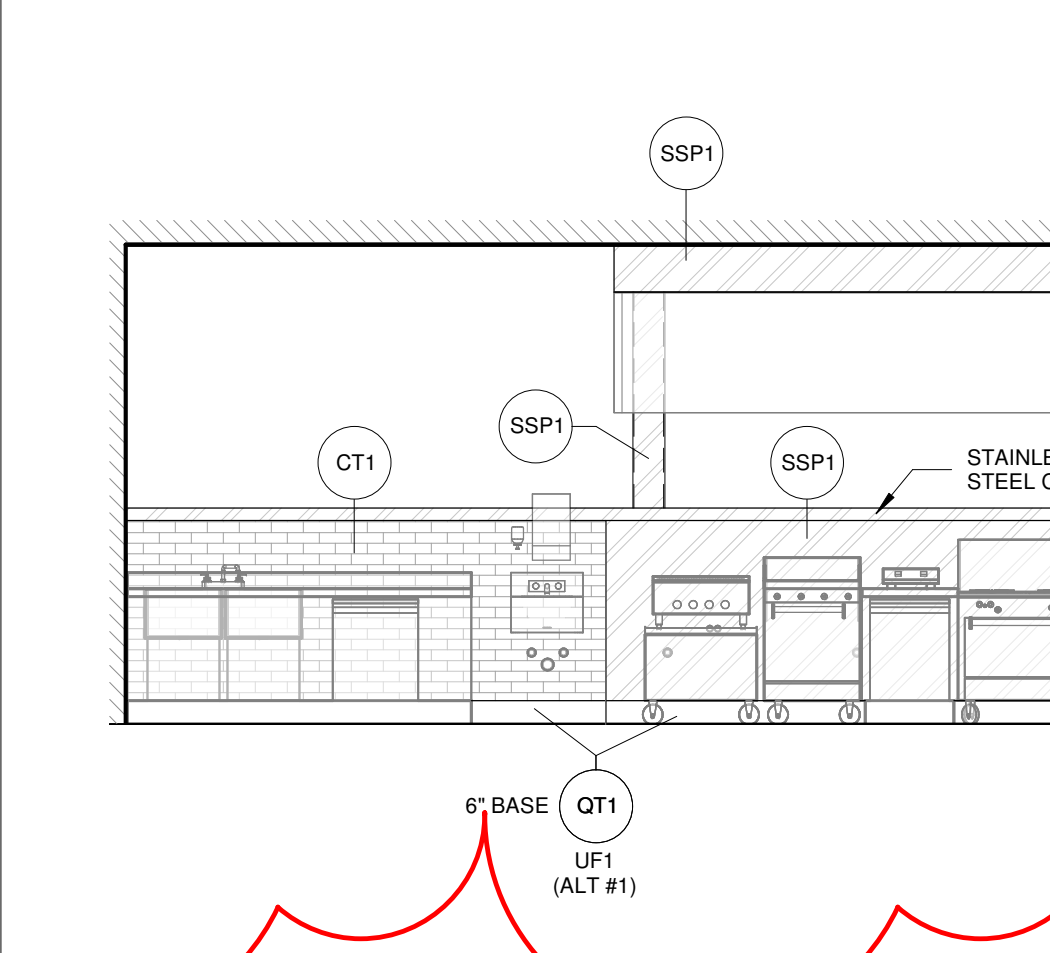
17 Elevation 8
Scale: 1/4" = 1'-0"



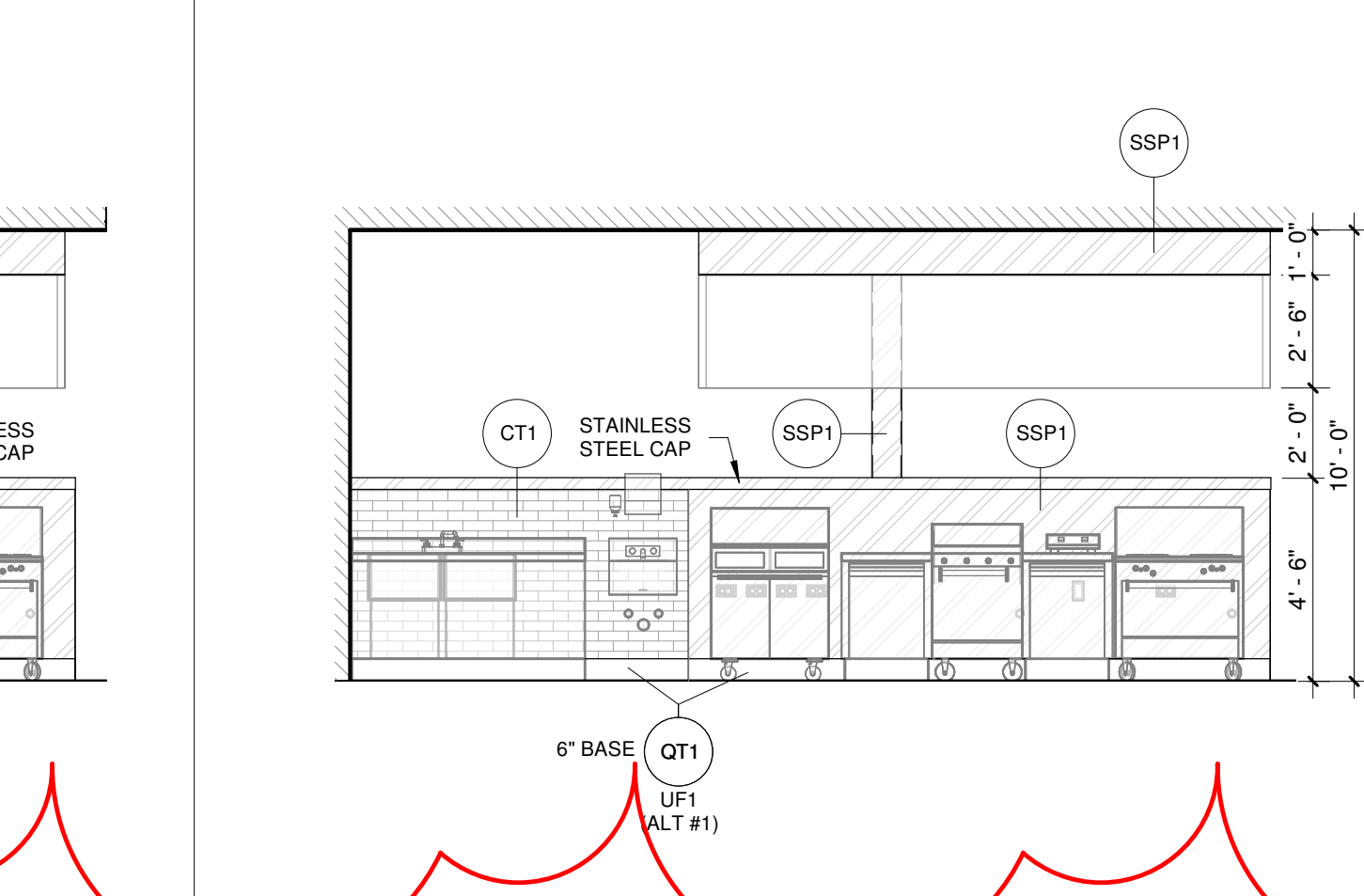
26 Elevation 9
Scale: 1/4" = 1'-0"



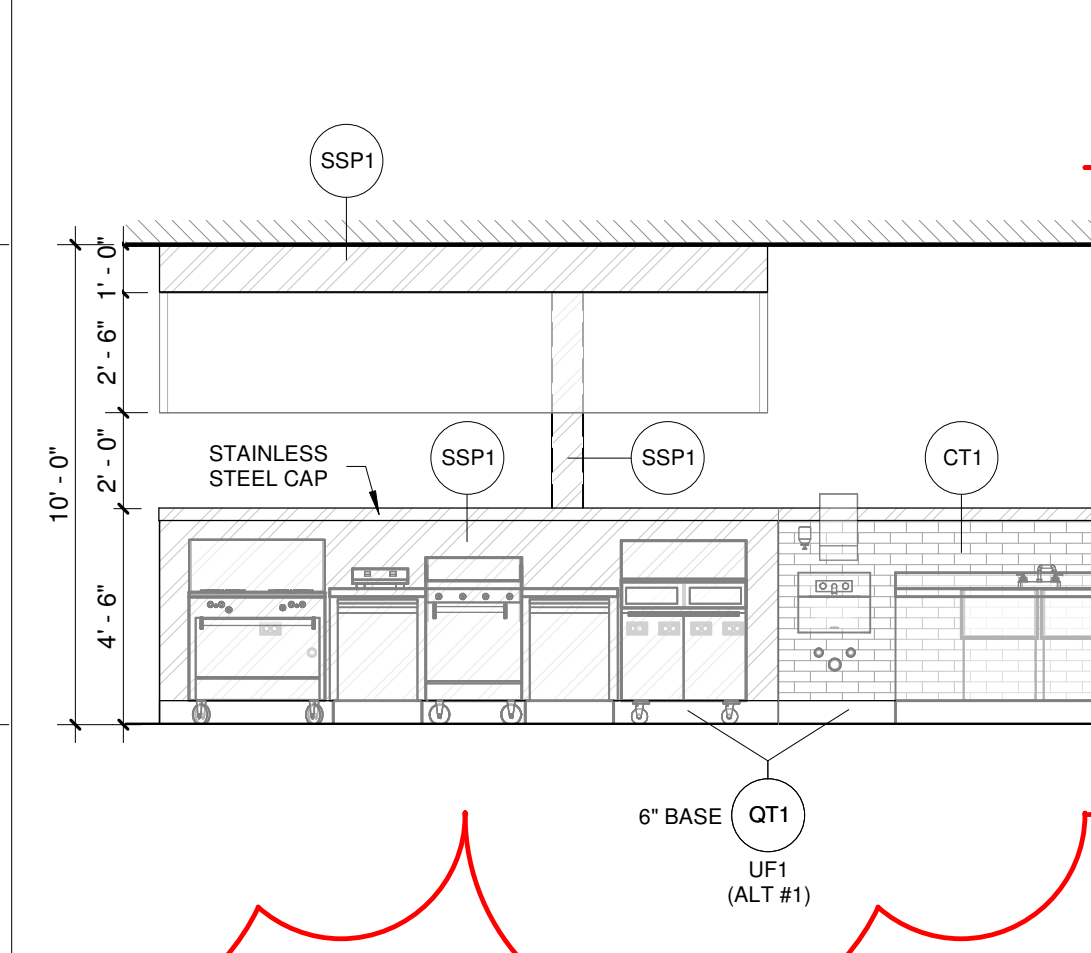
21 Elevation 10
Scale: 1/4" = 1'-0"



16 Elevation 11
Scale: 1/4" = 1'-0"

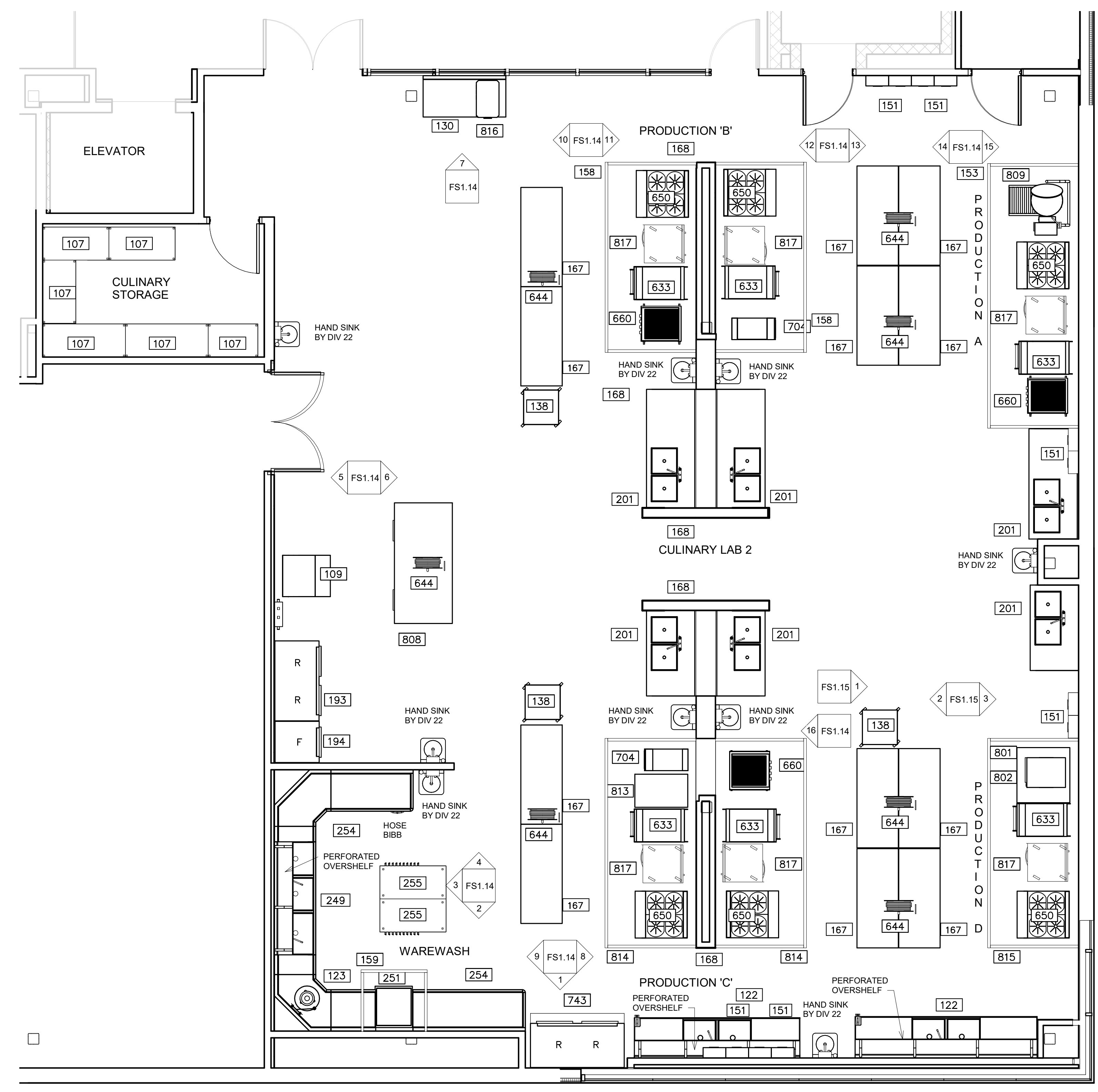


11 Elevation 12
Scale: 1/4" = 1'-0"



06 Elevation 13
Scale: 1/4" = 1'-0"

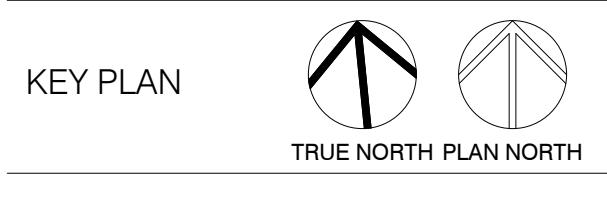
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	03-23-2020	90% CD
	03-26-2020	95% CD
	04-15-2020	ISSUED FOR PERMIT AND BIDDING
	05-15-2020	ADDENDUM #1



FS1 FOODSERVICE CULINARY EQUIPMENT PLAN
1/4" = 1'-0"

FOODSERVICE EQUIPMENT SCHEDULE						
FDP ITEM	QTY	FDP DESCRIPTION	FDP REMARKS	MFR	MODEL	PROVIDED BY
107	6	DRY STORAGE SHELVING		METRO	METRO MAX 'Q'	
109	1	ICE MACHINE W/ BIN		MANITOWOC	IY-0454A	
122	2	TWO COMPARTMENT SINK		CUSTOM FABRICATED		OF/CI
123	1	DISPOSER - 3HP		MASTER DISPOSER	C-3-LBC-18-CCRMS-PF	
130	1	WORKTABLE		CUSTOM FABRICATED		
138	3	PAN RACK				
151	6	FIRE PROTECTION SYSTEM		ANSUL	R102	
153	1	EXHAUST HOOD				
158	2	EXHAUST HOOD				
159	1	CONDENSATE HOOD		ACCUREX	XD1	
167	12	MOBILE WORKTABLE		CUSTOM FABRICATED		
168	5	S/S WALL CAP		CUSTOM FABRICATED		
193	1	REACH-IN REFRIGERATOR - 2DR		TRAUlsen	RHT 132WUT HHS	
194	1	REACH-IN FREEZER - 1DR		TRAUlsen	RLT 132WUT HHS	
201	6	WORK STATION		CUSTOM FABRICATED		
249	1	THREE COMPARTMENT SINK W/DISPOSER		CUSTOM FABRICATED		
251	1	DISHMACHINE - AM15T		HOBART	AM15T	
254	2	SOILED & CLEAN DISHTABLE		CUSTOM FABRICATED		
255	2	MOBILE UTENSIL SHELF		METRO	METROMAX 'Q'	
633	6	GRIDDLE W/ CABINET BASE		GARLAND	C24836-1-1	
644	7	QUAD ELECTRIC CORD REEL	PROVIDED BY DIV. 26; COORDINATE CORD LENGTH WITH OWNERS			
650	6	FOUR BURNER RANGE		GARLAND	M44RC-E	
660	3	CHARBROILER		GARLAND	MST24BE	
704	2	SINGLE FRYER		VULCAN	1GR45A w/Casters no Basket Lift	
743	1	ROLL-IN REFRIGERATED CABINET-2DR		TRAUlsen	RRI 232HUT FHS	
801	1	SPREADER CABINET		CUSTOM FABRICATED		
802	1	STEAMER	COUNTER TOP	CLEVELAND	22CET3.1	
808	1	DEMO COUNTER		CUSTOM FABRICATED		OF/CI
809	1	40 GAL KETTLE		GROEN	DH-40	
813	1	SPREADER CABINET		CUSTOM FABRICATED		
814	2	EXHAUST HOOD		ACCUREX		
815	1	EXHAUST HOOD		ACCUREX	XXDW	
816	1	ICE CREAM FREEZER	EXISTING	EXISTING	RELOCATE	OF/OI
817	6	WORKTOP REFRIGERATOR	TRUE TWT-27-HC	TRUE	TWT-27-HC	

NOTE:
OF/CI - OWNER FURNISHED/CONTRACTOR INSTALLED
OF/OI - OWNER FURNISHED/OWNER INSTALLED



Project Number	19012
Drawn By	GBM
Checked By	MM
Approved By	MM

Drawing Title
FS CULINARY EQUIPMENT PLAN

Drawing Number
FS1.01

CONSULTANTS:

MEP ENGINEERS
Infrastructure Associates
(713) 622-0120

STRUCTURAL ENGINEERS
Dally + Associates
(713) 337-8881

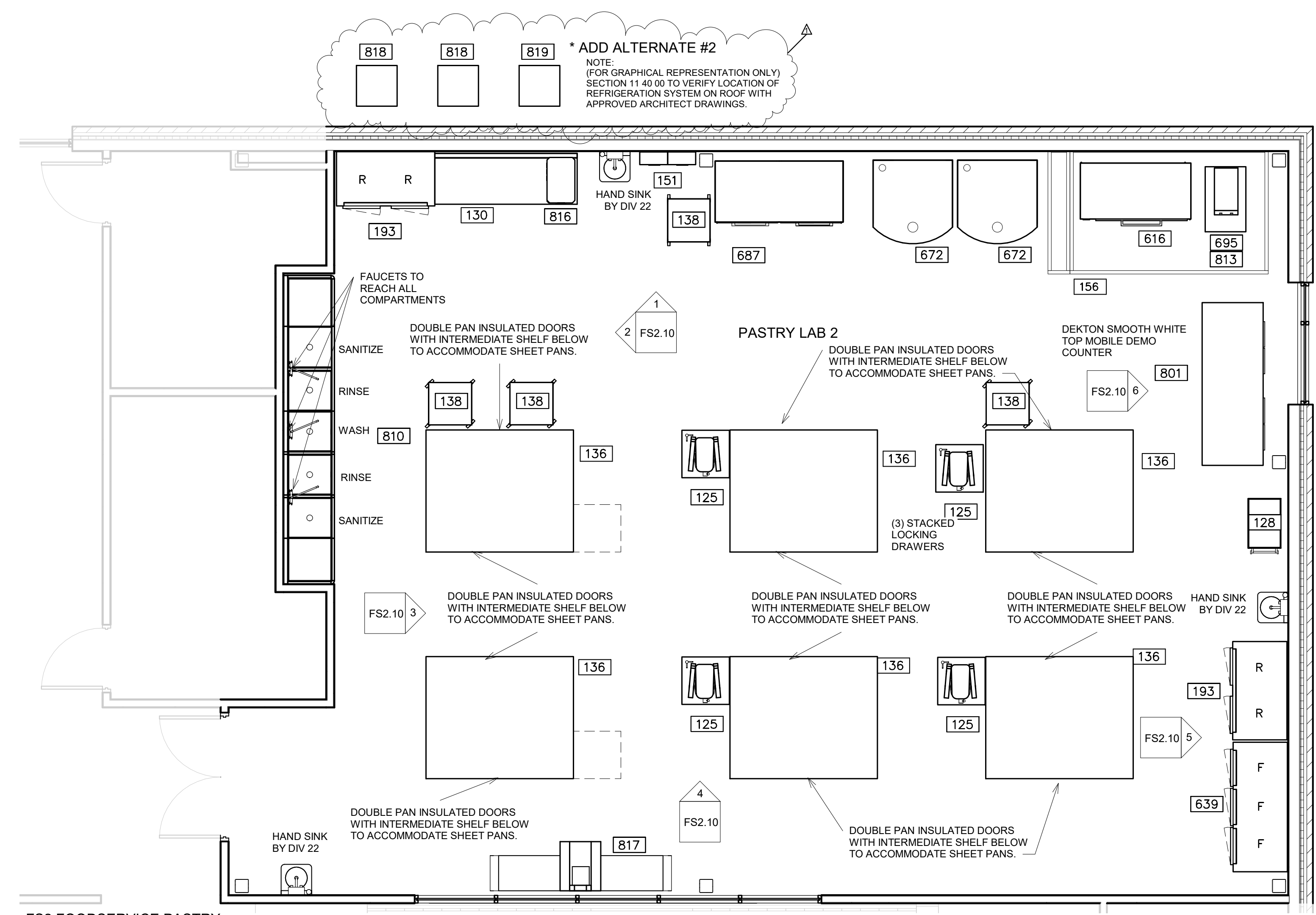
FOOD SERVICE
Foodservice Design Professionals
(281) 350-2323

PROFESSIONAL SEAL:

A PROJECT FOR:

CULINARY
ARTS SHELL
INTERIOR
BUILDOUT

#	Date	ISSUED FOR
	02-25-2020	
	03-23-2020	90% CD
	03-26-2020	95% CD
	04-15-2020	ISSUED FOR PERMIT AND BIDDING
	05-15-2020	ADDENDUM #1



FS2 FOODSERVICE PASTRY
EQUIPMENT PLAN
1/4" = 1'-0"

FOODSERVICE EQUIPMENT SCHEDULE						
FDP ITEM	QTY	FDP DESCRIPTION	FDP REMARKS	MFR	MODEL	PROVIDED BY
125	4	20 QT. MIXER W/STAND		HOBART	HL200	
128	1	UTILITY CART		LAKESIDE	743	
130	1	WORKTABLE		CUSTOM FABRICATED	---	
136	6	BAKER'S TABLE		CUSTOM FABRICATED	---	
138	4	PAN RACK		CRES COR	207-UA-12AC	
151	1	FIRE PROTECTION SYSTEM		ANSUL	R102	
156	1	EXHAUST HOOD		ACCUREX		
193	2	REACH-IN REFRIGERATOR - 2DR		TRAUlsen	RHT 2-32-WUT-HHS	OF/CI
616	1	FOUR DECK OVEN		REVENT	US 4 DECK 3 PAN	OF/CI
639	1	REACH-IN FREEZER - NARROW		TRAUlsen	RLT 332NUT-HHS	OF/CI
672	2	ROTATING RACK OVEN		REVENT	ONE 39/G/S W/S'	OF/CI
687	1	PROOFER		REVENT	P7121	
695	1	INDUCTION RANGE		EXISTING/RELOCATE	---	
801	1	DEMO COUNTER		CUSTOM FABRICATED	---	OF/CI
810	1	FIVE COMPARTMENT SINK	(5) 24" X 26" 15" DEEP WITH ROUNDED INTERNAL EDGES	CUSTOM FABRICATED	---	OF/CI
813	1	SPREADER CABINET		CUSTOM FABRICATED	---	
816	1	ICE CREAM FREEZER	EXISTING	EXISTING/RELOCATE	---	
817	1	SHEETER	EXISTING	EXISTING/RELOCATE	---	OF/OI
818	2	REMOTE REFRIGERATION UNIT	(2) DR. REFRIGERATOR	TRAUlsen	REMOTE	
819	1	REMOTE REFRIGERATION UNIT	(3) DR. FREEZER	TRAUlsen	REMOTE	

* ADD ALTERNATE #2

NOTE:
OF/CI - OWNER FURNISHED/CONTRACTOR INSTALLED
OF/OI - OWNER FURNISHED/OWNER INSTALLED



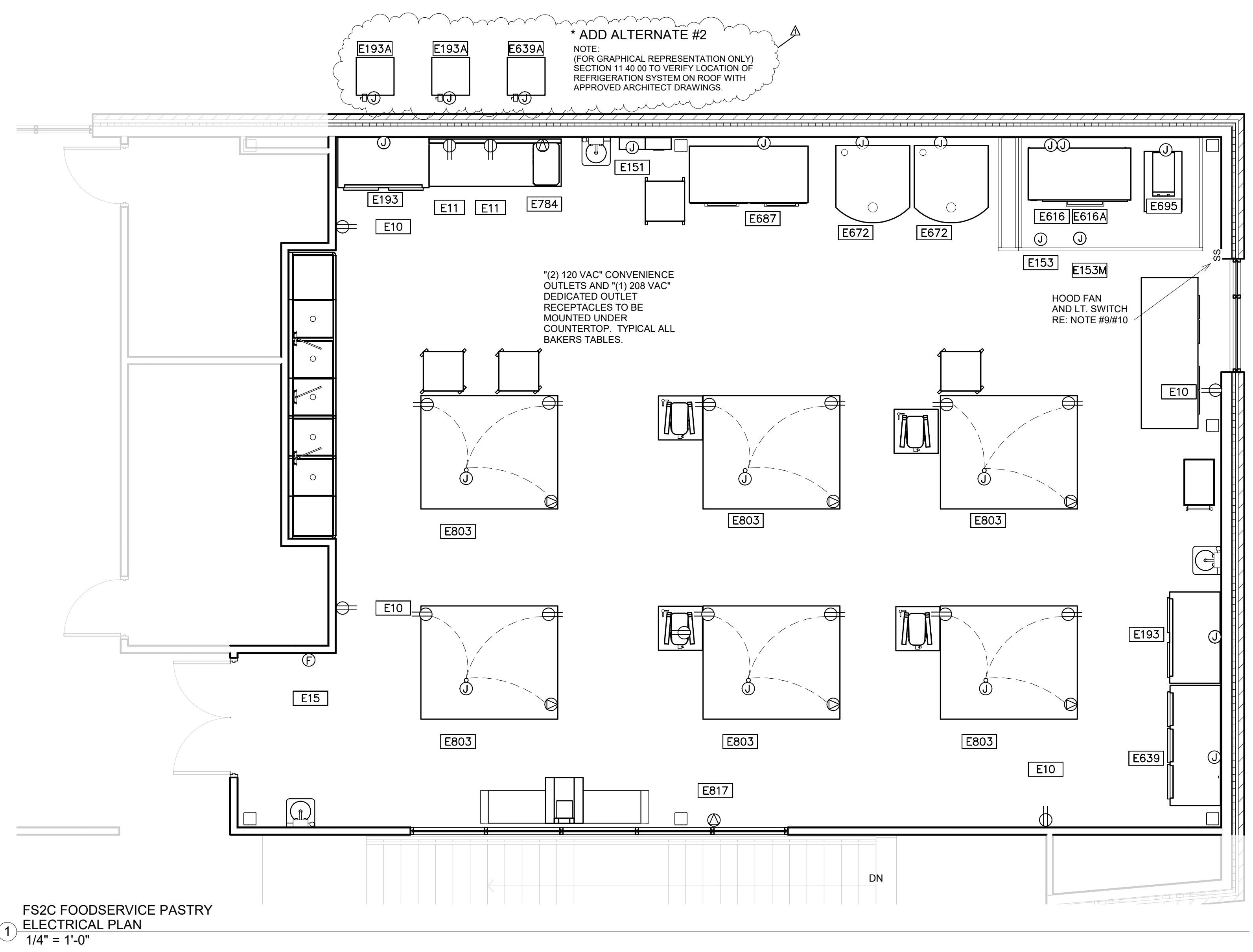
Project Number	19012
Drawn By	GBM
Checked By	MM
Approved By	Approver

FS PASTRY
EQUIPMENT PLAN

Drawing Number
FS2.01



#	Date	ISSUED FOR
02-25-2020		
03-23-2020		90% CD
03-26-2020		95% CD
04-15-2020		ISSUED FOR PERMIT AND BIDDING
05-15-2020		ADDENDUM #1



1 FS2C FOODSERVICE PASTRY ELECTRICAL PLAN
1/4" = 1'-0"

FOODSERVICE ELECTRICAL SCHEDULE								
FDP ENO	FDP ECONN	FDP ELOAD	FDP EVOLT	FDP EPH	FDP ESERVICE TO	FDP ELOC	FDP EAFF	FDP EREMARKS
E10	DR	16.0A	120	1	CONVENIENCE OUTLET	WALL	24"	---
E11	DR	16.0A	120	1	CONVENIENCE	WALL	47"	MOUNT HORIZONTAL
E15	JB	---	---	---	REMOTE FIRE PULL	WALL	48"	RE: NOTE #11 - RECESSED JB - EXTEND TO FIRE SYSTEM FOR HOOD
E151	JB	1.0A	120	1	FIRE PROT. SYSTEM	CLG	DFA	BTC; RE: NOTE #4, #6, #9 & #11
E153	JB	10.0A	120	1	HOOD LIGHTS	CLG	DFA	BTC; RE: NOTE #4, #6, #9 & #10
E153M	JB	1.0A	120	1	TEMPERATURE SENSOR	CLG	DFA	BTC; RE: NOTE #4, #6 & #9
E193	JB	8.2A	120	1	REFRIGERATOR	WALL	90"	---
E193A	JB/DS	5.4A	120	1	EQUIPMENT	VERIFY	VERIFY	BTC; RE: NOTE #4 & #5
E616	JB	33.3KW	208	3	DECK OVEN	WALL	36"	BTC; RE: NOTE #4
E616A	JB	11.0KW	208	3	DECK OVEN	WALL	36"	BTC; RE: NOTE #4
E639	JB	16.0A	208	1	FREEZER	WALL	90"	COORDINATE NEMA PLUG
E639A	JB/DS	5.4A	120	1	EQUIPMENT	VERIFY	VERIFY	BTC; RE: NOTE #4 & #5
E672	JB	15.0A	208	3	ROTATING RACK OVEN	WALL	24"	BTC; RE: NOTE #4 - SHUNT TRIP BREAKER
E687	JB	15.0A	208	3	PROOFER	WALL	85"	---
E695	JB	22.0A	200V-240V	1	EQUIPMENT	WALL	24"	SHUNT TRIP BREAKER BTC; RE: NOTE #4
E784	SR	15.0A	208	1	ICE CREAM FREEZER	WALL	47"	MOUNT HORIZONTAL
E803	JB	30.0A	208	1	TABLE RECEPTACLES	FLOOR	4"	---
E817	DR	16.0A	480	3	DOUGH SHEETER	WALL	24"	CONFIRM NEMA CONFIGURATION W/DIV. 26

ADD ALTERNATE #2

- DO NOT ROUGH-IN FROM THIS DRAWING. REFER TO THE CONTRACTOR'S DIMENSIONED DRAWINGS.
- VERIFY ALL ELECTRICAL CHARACTERISTICS WITH ENGINEERING DRAWINGS.
- DIMENSIONS INDICATED ARE TO BE VERIFIED BY CONTRACTOR AND ADJUSTED AS REQUIRED BY FOODSERVICE EQUIPMENT AND/OR FIELD CONDITIONS.
- ACCESSORIES AND FITTINGS PROVIDED LOOSE WITH FOODSERVICE EQUIPMENT BY SECTION 11 40 00. FIELD INSTALLED BY DIVISION 26.
- STAINLESS STEEL DISCONNECT SWITCH PROVIDED AND INSTALLED BY DIVISION 26.
- ALL ELECTRICAL CONNECTIONS BENEATH EXHAUST HOOD TO EXTEND TO SHUNT TRIP BREAKERS WITHIN ELECTRICAL PANEL BOX FOR SHUT-DOWN DURING FIRE MODE - BY DIVISION 26.
- DOOR HEATER(S), LIGHT(S), COIL(S) AND PRESSURE RELIEF PORT(S) PRE-WIRED TO JUNCTION BOX AT TOP OF COLD STORAGE ASSEMBLY BY SECTION 14 00 00. FINAL CONNECTION BY DIVISION 26.
- N/A
- INTERCONNECT TO EXHAUST HOOD FAN(S) AND SWITCH BY DIVISION 26.
- INTERCONNECT TO EXHAUST HOOD LIGHT(S) AND SWITCH BY DIVISION 26.
- INTERCONNECT FIRE PROTECTION SYSTEM TO PANEL BOX SHUNT TRIP(S) AND BUILDING ALARM - BY DIVISION 26.
- RECEPTACLE(S) TO BE PRE-WIRED TO JUNCTION BOX OR LOAD CENTER FOR FINAL CONNECTION BY DIVISION 26.
- SECTION 11 40 00 TO VERIFY UTILITY REQUIREMENTS OF EXISTING EQUIPMENT.
- EMPTY CONDUIT RUN FROM CASHIER STATION TO MANAGERS OFFICE FOR POS SYSTEM BY DIVISION 26. LOCATION OF MANAGER'S OFFICE TO BE VERIFIED.

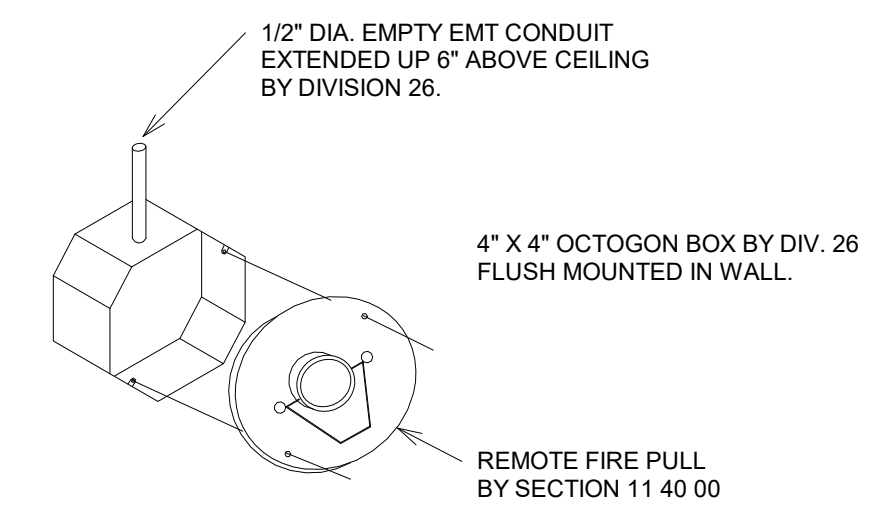
2 ELECTRICAL GENERAL NOTES 1 NONE

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
SCR	CONDUIT STUB BTC ON RECEPTACLES FURNISH WITH EQUIPMENT	CC	CONDUIT FOR COMPUTER CABLES
CS	CONDUIT STUB UP/OUT FOR DIRECT CONNECTION	BTC	BRANCH TO CONNECTION ON EQUIPMENT
DR	20 AMP DUPLEX RECEPTACLE (MOUNT HORIZONTAL)	WPR	20 AMP WEATHERPROOF RECEPTACLE (SPRINGS COVER)
SR	SINGLE PURPOSE RECEPTACLE	FPB	FIRE PROTECTION BUZZER
SR	SINGLE PURPOSE RECEPTACLE 208V 1PH	BSC	BEVERAGE SYSTEM CONDUIT
FR	FLUSH FLOOR RECEPTACLE	DFA	DROP FROM ABOVE
PMR	PEDESTAL MOUNTED RECEPTACLE	AFF	ABOVE FINISH FLOOR
DCR	DROP CORD RECEPTACLE	CS/JB	JUNCTION BOX ON PEDSTAL
JB	JUNCTION BOX ON CEILING	DS	DISCONNECT SWITCH
JB/DS	JUNCTION BOX WITH DISCONNECT BY DIV. 26	JB/DS	CONDUIT STUB-UP WITH DISCONNECT BY DIV. 26

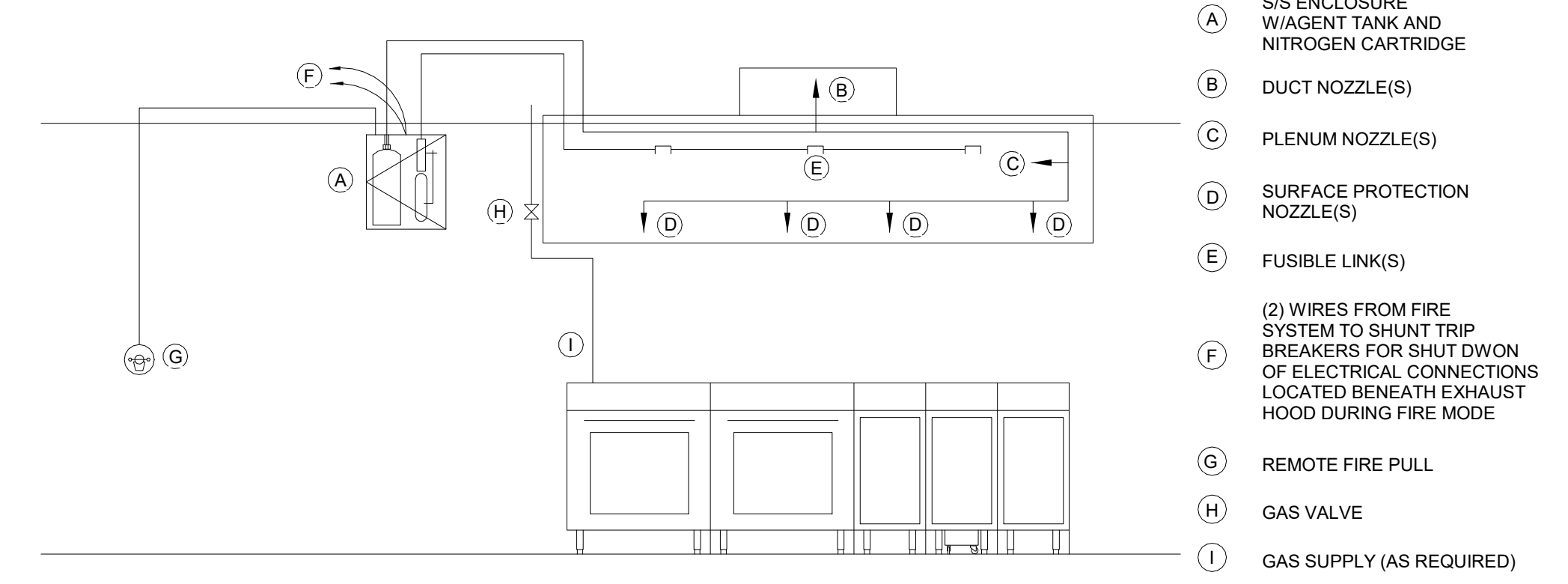
4 ELECTRICAL SYMBOLS 1 NONE

NOTE: ELECTRICAL CONNECTIONS INDICATED ARE THOSE REQUIRED FOR THE FOODSERVICE EQUIPMENT AND THOSE REQUIRED FOR SUPPORT EQUIPMENT FURNISHED BY DIVISION 26. FOR ADDITIONAL REQUIREMENTS REFER TO ELECTRICAL ENGINEERS DRAWINGS.

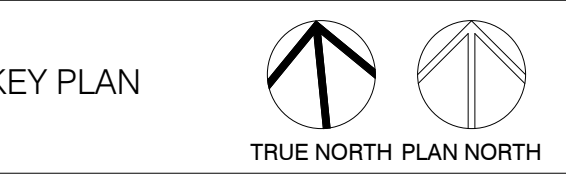
3 ELECTRICAL COORDINATION NOTES 1 NTS



5 RECESSED FIRE PULL DETAIL 1 N.T.S.



6 FIRE SUPPRESSION TYPICAL DETAIL 1 N.T.S.



KEY PLAN

Project Number	19012
Drawn By	GBM
Checked By	MM
Approved By	Approver

Drawing Title
**FS PASTRY
ELECTRICAL PLAN**

Drawing Number
FS2.07



UNIT NO.	LOCATION	SERVING	TYPE	MAX DIMENSIONS			SUPPLY AIR FAN												CHILLED WATER COIL												HOT WATER COIL												ELECTRICAL		NOTES
				LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	SUPPLY AIRFLOW RATE (CFM)	OUTSIDE AIRFLOW RATE (CFM)	DISCHARGE CONFIGURATION	FAN TYPE	E.S.P. (IN. WG)	MIN ROWS	MAX FINS PER INCH	CAPACITY		ENTERING AIR TEMPERATURE		LEAVING AIR TEMPERATURE		WATER FLOW (GPM)	EWT (°F)	LWT (°F)	MAX. P. D.		MIN ROWS	MAX FINS PER INCH	CAPACITY	MAX. FACE VELOCITY (FPM)	ENTERING AIR TEMPERATURE		LEAVING AIR TEMPERATURE		WATER FLOW (GPM)	EWT (°F)	LWT (°F)	MAX. P. D.		FAN MOTOR SIZE (HP)	V/PH/Hz						
														TOTAL (BTUH)	SENSIBLE (BTUH)	DB (°F)	WB (°F)	DB (°F)	WB (°F)				IN.	FT.					DB (°F)	WB (°F)	DB (°F)	WB (°F)				IN.	FT.			FAN MOTOR SIZE (HP)	V/PH/Hz				
AHU-2-3	MECH ROOM	LEVEL-2	HORI. DRAW THRU	137	102	90	20,000	20,000	TOP REAR	AIRFOIL	3.15	8.0	12.0	1937000	975000	450	96.0	80.0	53.0	52.9	240.1	45	61	1.3	15	1.0	9.0	696000	450	20.0	50.0	47.4	150	120	0.1	10	25.0	460/3/60	ALL						

NOTES:
 1. UNITS SHALL BE EQUIPPED WITH VARIABLE FREQUENCY DRIVE CAPABLE OF REDUCING FAN SPEED TO 30% OF THE DESIGN SPEED FOR ALL UNITS.
 2. FAN MOTORS SHALL BE INVERTER DUTY RATED SUITABLE FOR WORKING WITH VFD.
 3. PROVIDE FLAT 2" MERV-11 FILTER FOR ALL UNITS.
 4. PROVIDE STAINLESS STEEL DRAIN PAN.
 5. MOTORS SHALL BE PREMIUM EFFICIENCY TYPE (PER LATEST IEC CODE).
 6. PROVIDE UNIT WITH 2" SPRING FAN ISOLATION AND BASE 4" RAILS.
 7. PROVIDE SMOKE DETECTOR IN SUPPLY AIR DUCT TO TURN OFF UNIT IF SMOKE IS DETECTED.
 8. EXTERNAL STATIC PRESSURE DOES NOT INCLUDE FILTER LOSSES.
 9. PROVIDE UNIT WITH FREEZE PROTECTION PUMP. SIZE PUMP FOR 50 GPM. 25 FT HEAD AND 1/2 HP MOTOR POWERED AT 115V / 1 PH / 60HZ.
 10. PROVIDE UNIT WITH MIXING BOX, MOTORIZED RETURN AIR AND OUTSIDE AIR DAMPERS.
 11. PROVIDE OUTSIDE AIR DAMPER SIZED FOR 100% OUTSIDE AIR ECONOMIZER.

HOT WATER COIL SCHEDULE														
PLAN MARK	SERVING	AIR VOLUME (CFM)	WIDTH (IN)	HEIGHT (IN)	EAT (°F)	LAT (°F)	CAPACITY (MBH)	EWT (°F)	LWT (°F)	GPM	MAX ROWS	MAX WATER PRESSURE DROP (FT)	MAX AIR PRESSURE DROP (IN H2O)	NOTES
HWC-2-8	PASTRY LAB	3000	26	16	50	75	81.0	150	150	8.1	2	10	0.35	ALL
HWC-2-9	SPECIALTY LAB	3750	32	16	50	75	101.2	150	150	10.1	2	10	0.35	ALL
HWC-2-10	SPECIALTY LAB	3750	32	16	50	75	101.2	150	150	10.1	2	10	0.35	ALL
HWC-2-11	SPECIALTY LAB	3750	32	16	50	75	101.2	150	150	10.1	2	10	0.35	ALL
HWC-2-12	SPECIALTY LAB	4350	36	16	50	75	117.4	150	150	11.8	2	10	0.35	ALL
HWC-2-13	SPECIALTY LAB	3150	26	16	50	75	85.0	150	150	8.5	2	10	0.35	ALL
HWC-2-14	SPECIALTY LAB	3150	28	16	50	75	85.0	150	150	8.5	2	10	0.35	ALL

NOTES:

FAN SCHEDULE													
PLAN MARK	SERVING	AIR VOLUME (CFM)	FAN TYPE	DRIVE TYPE	E.S.P. IN WG	MOTOR			MANUFACTURER & MODEL	LOCATION	REMARKS		
						HP	V/PH/Hz	RPM					
KEF-16	DISH WASHER	250	UP-BLAST	DIRECT	0.5	1/10	120/1/60	1725	ACCUREX XRUD	ROOF	1, 2, 3, 4		
KEF-17	CULINARY LAB	3750	UP-BLAST	DIRECT	1.25	2	460/3/60	1725	ACCUREX XRUD	ROOF	ALL		
KEF-18	CULINARY LAB	3750	UP-BLAST	DIRECT	1.25	2	460/3/60	1725	ACCUREX XRUD	ROOF	ALL		
KEF-19	CULINARY LAB	3750	UP-BLAST	DIRECT	1.25	2	460/3/60	1725	ACCUREX XRUD	ROOF	ALL		
KEF-20	CULINARY LAB	4350	UP-BLAST	DIRECT	1.25	2	460/3/60	1725	ACCUREX XRUD	ROOF	ALL		
KEF-21	CULINARY LAB	3150	UP-BLAST	DIRECT	1.25	2	460/3/60	1725	ACCUREX XRUD	ROOF	ALL		
KEF-22	CULINARY LAB	3150	UP-BLAST	DIRECT	1.25	2	460/3/60	1725	ACCUREX XRUD	ROOF	ALL		
KEF-23	PASTRY LAB	3000	UP-BLAST	DIRECT	1.25	2	460/3/60	1725	ACCUREX XRUD	ROOF	ALL		
KEF-24	PASTRY LAB	350	UP-BLAST	DIRECT	0.75	1/10	120/1/60	1725	ACCUREX XRUD	ROOF	1, 2, 3, 4		
KEF-25	PASTRY LAB	350	UP-BLAST	DIRECT	0.75	1/10	120/1/60	1725	ACCUREX XRUD	ROOF	1, 2, 3, 4		

NOTES:
 1. FAN SHALL BE SUITABLE FOR OUTDOOR INSTALLATION AND OPERATION.
 2. PROVIDE MANUFACTURER'S SUPPLIED 1/4" HIGH ROOF CURB AND INSECT SCREEN. REFER SPECIFICATIONS FOR WIND SPEED REQUIREMENTS.
 3. PROVIDE MOTORIZED DAMPER FOR UNIT WITH 300+ CFM. PROVIDE BACK-DRAFT DAMPER ON UNITS WITH LESS THAN 300 CFM. MOTORIZED DAMPER SHALL CLOSE WHEN ASSOCIATED FAN IS DE-ENERGIZED.
 4. PROVIDE UNIT WITH SINGLE POINT ELECTRICAL CONNECTION AND DISCONNECT SWITCH.
 5. VFD TO BE PROVIDED ALONG WITH KITCHEN HOOD. FAN SPEED TO BE CONTROLLED BY KITCHEN VENTILATION CONTROLS SYSTEM.

GRAVITY VENTILATOR SCHEDULE									
PLAN MARK	SERVING	MAX AIR FLOW (CFM)	DIMENSIONS				MAKE AND MODEL	REMARKS	
			THROAT	CURB CAB	WEATHERHOOD	HEIGHT BASE			
GV-1	AHU-2-3	20,000	60"X96"	68"X104"	74"X110"	42-1/2"	GREENHECK - WIH	ALL	

NOTES:
 1. PROVIDE UNIT WITH MANUFACTURER FURNISHED CUSTOM ROOF CURB.
 2. PROVIDE UNIT WITH BIRD-SCREEN.
 3. COORDINATE FINISH WITH ARCHITECT.

AIRFLOW MEASURING STATION SCHEDULE									
PLAN MARK	SERVED BY	LOCATION	MAX CFM	MIN CFM	SIZE (IN)		MAKE AND MODEL	NOTES	
					WIDTH (IN)	HEIGHT (IN)			
AFMS-2-8	AHU-1	PASTRY LAB	3000	0	26	16	EBTRON - GTC116PC	ALL	
AFMS-2-9	AHU-2-1, 2-2	SPECIALTY LAB	3750	0	32	16	EBTRON - GTC116PC	ALL	
AFMS-2-10	AHU-2-1, 2-2	SPECIALTY LAB	3750	0	32	16	EBTRON - GTC116PC	ALL	
AFMS-2-11	AHU-2-1, 2-2	SPECIALTY LAB	3750	0	32	16	EBTRON - GTC116PC	ALL	
AFMS-2-12	AHU-2-1, 2-2	SPECIALTY LAB	4350	0	36	16	EBTRON - GTC116PC	ALL	
AFMS-2-13	AHU-2-1, 2-2	SPECIALTY LAB	3150	0	26	16	EBTRON - GTC116PC	ALL	
AFMS-2-14	AHU-2-1, 2-2	SPECIALTY LAB	3150	0	28	16	EBTRON - GTC116PC	ALL	

NOTES:

DIFFUSER NECK-DUCT SIZE SCHEDULE	
SUPPLY AIR (CFM)	DIFFUSER NECK AND BRANCH DUCT SIZE
0 - 100	6"
101 - 200	8"
201 - 300	10"
301 - 400	12"
401 - 800	14"

AIR DEVICE SCHEDULE								
MARK	MAKE	TYPE	MODEL	FACE SIZE (INCH)	NECK SIZE	MATERIAL	MOUNTING	REMARKS
(A)	PRICE	SUPPLY	ASPD	24"X24"	SEE NECK SCHEDULE	ALUMINUM	CEILING	1,2,3,4

NOTES:
 1. PROVIDE ROUND NECK ADAPTER FOR ALL SUPPLY AIR DIFFUSERS WHERE NECESSARY.
 2. REFER TO PLANS FOR AIR FLOW RATE.
 3. COORDINATE CEILING TYPE WITH FINAL ARCHITECTURAL PLANS.
 4. PROVIDE DIFFUSERS WITH INSULATED PLENUM.

AIR BALANCE CALCULATION				
LAB	EQUIPMENT TAG	EXHAUST (CFM)	MAKE-UP (CFM)	
CULINARY LAB	KEF-16	250		
	KEF-17	3750		
	KEF-18	3750		
	KEF-19	3750		
	KEF-20	4350		
	KEF-21	3150		
	KEF-22	3150		
AHU-2-1, 2-2			9,550	
AHU-2-3			16,300	
TOTAL EXHAUST (CFM)		25,850		
TOTAL MAKE-UP AIR (CFM)			25,850	
PASTRY LAB	KEF-23	3000		
	KEF-24	350		
	KEF-25	350		
	AHU-2-3		3,700	
TOTAL EXHAUST (CFM)		3,700		
TOTAL MAKE-UP AIR (CFM)			3,700	

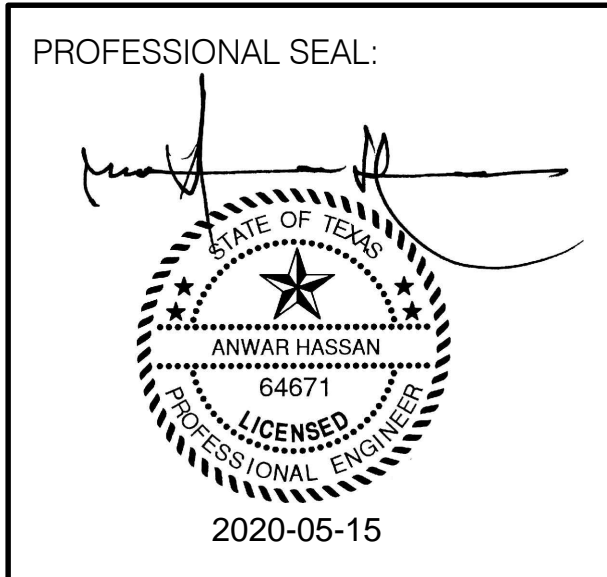
OUTSIDE AIR CALCULATION					
SPACE	ROOM AREA (SQ. FT.)	NUMBER OF PEOPLE (N)	REQUIRED OUTDOOR AIR PER PERSON (CFM/PERSON)	REQUIRED OUTDOOR AIR PER AREA (CFM/SF)	OUTSIDE AIR REQUIRED (CFM)
SPECIALTY LAB	3653	20	10	0.18	857
PASTRY LAB	2285	10	10	0.18	511
TOTAL OUTSIDE AIR REQUIRED (CFM)					1,368
TOTAL OUTSIDE AIR PROVIDED BY AHU-2-3 (CFM)					1,400

NOTES:
 1. AMOUNT OF OUTDOOR AIR COMPLIES WITH REQUIREMENTS OF 2012 UMC.



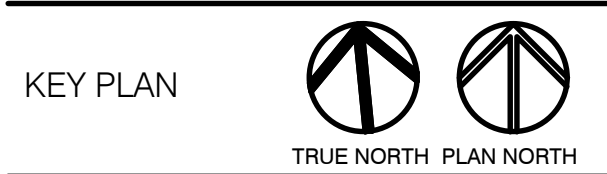
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A PROJECT FOR:
CULINARY ARTS SHELL INTERIOR BUILDOUT

#	Date	ISSUED FOR
	2020/04/15	PERMIT AND BIDDING
Δ	2020/05/15	ADDENDUM #1



Project Number	
Drawn By	
Checked By	
Approved By	
Drawing Title	SCHEDULES

Drawing Number **M1.02**

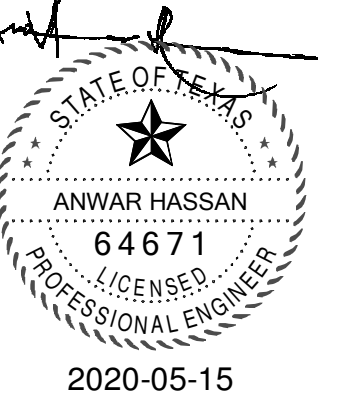
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PROFESSIONAL SEAL:



A PROJECT FOR:

**CULINARY ARTS SHELL
INTERIOR
BUILDOUT**

#	Date	ISSUED FOR
	2020/04/15	PERMIT AND BIDDING
1	2020/05/15	ADDENDUM #1



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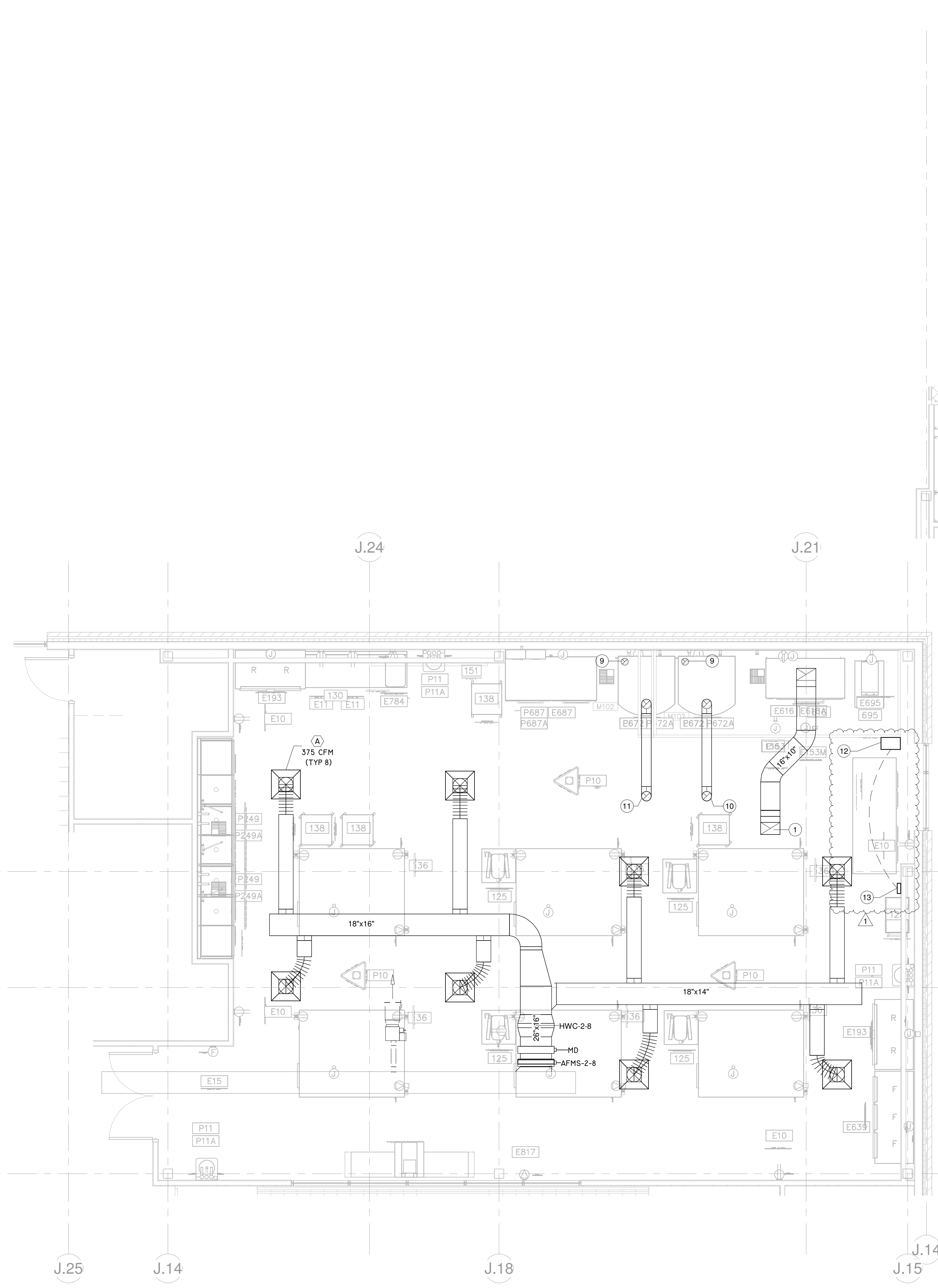


Project Number	17024
Drawn By	Author
Checked By	Checker
Approved By	Approver

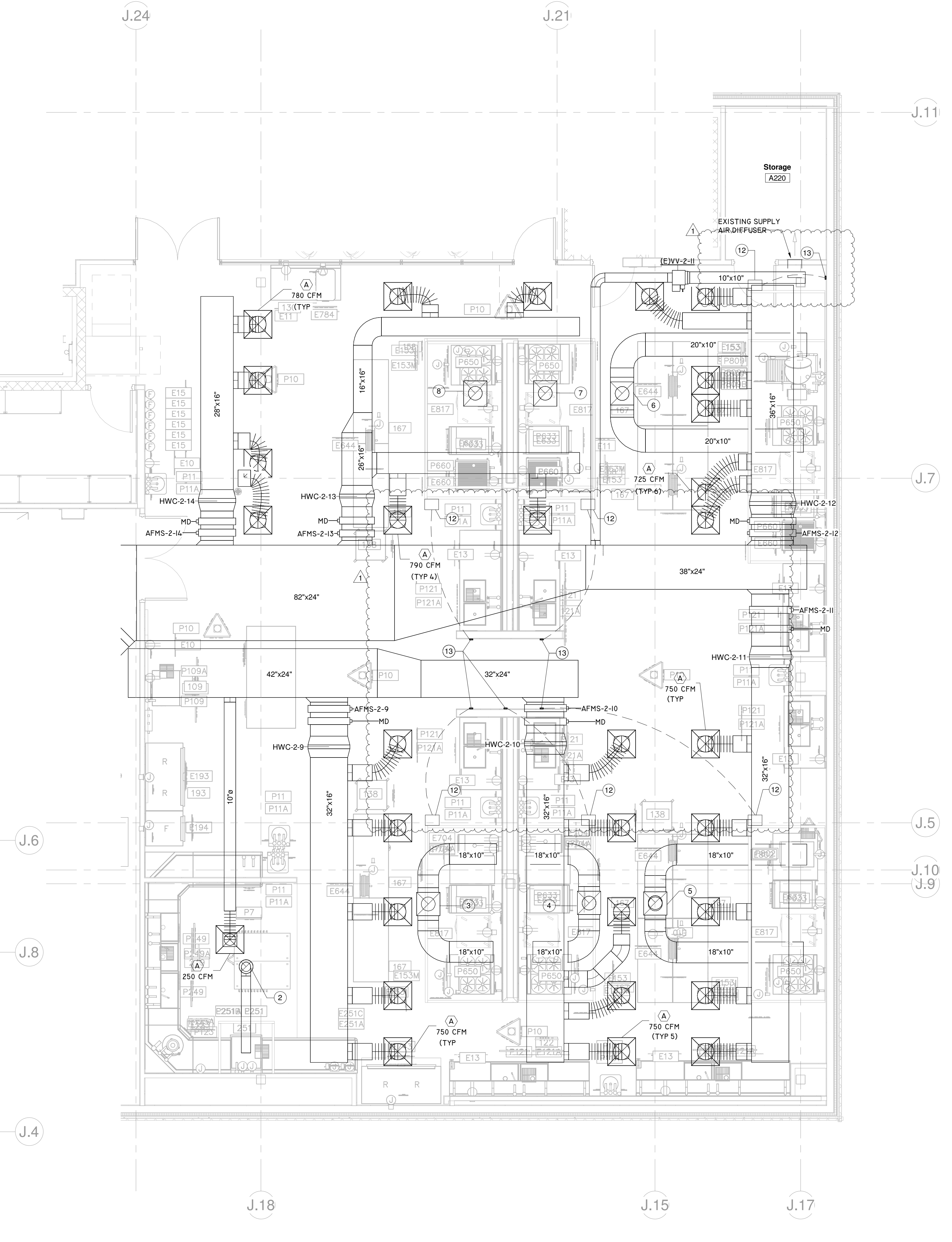
Drawing Title
**ENLARGED PLANS -
HVAC**

Drawing Number
M2.02

KEYNOTE LEGEND	
1	22X20 EXHAUST DUCT UP TO KEF-23 ON ROOF.
2	8" EXHAUST DUCT UP TO KEF-16 ON ROOF.
3	20X20 EXHAUST DUCT UP TO KEF-17 ON ROOF.
4	20X20 EXHAUST DUCT UP TO KEF-18 ON ROOF.
5	20X20 EXHAUST DUCT UP TO KEF-19 ON ROOF.
6	20X20 EXHAUST DUCT UP TO KEF-20 ON ROOF.
7	22X20 EXHAUST DUCT UP TO KEF-21 ON ROOF.
8	22X20 EXHAUST DUCT UP TO KEF-22 ON ROOF.
9	6" FLUE EXHAUST DUCT UP TO ROOF.
10	8" EXHAUST DUCT UP TO KEF-24 ON ROOF.
11	8" EXHAUST DUCT UP TO KEF-25 ON ROOF.
12	MOUNT VFD INSIDE STAINLESS STEEL CONTROL PANEL PROVIDED WITH KITCHEN HOOD. COORDINATE WITH DIV 26 FOR POWER.
13	TOUCH SCREEN INTERFACE TO BE PROVIDED WITH KITCHEN HOOD. COORDINATE WITH ARCHITECT FOR MOUNTING LOCATION.



2 ENLARGED PLAN - PASTERY LAB 2 - HVAC
Scale: 1/4" = 1'-0"



1 ENLARGED PLAN - CULINARY LAB 2 - HVAC
Scale: 1/4" = 1'-0"

ELECTRICAL KEYNOTES

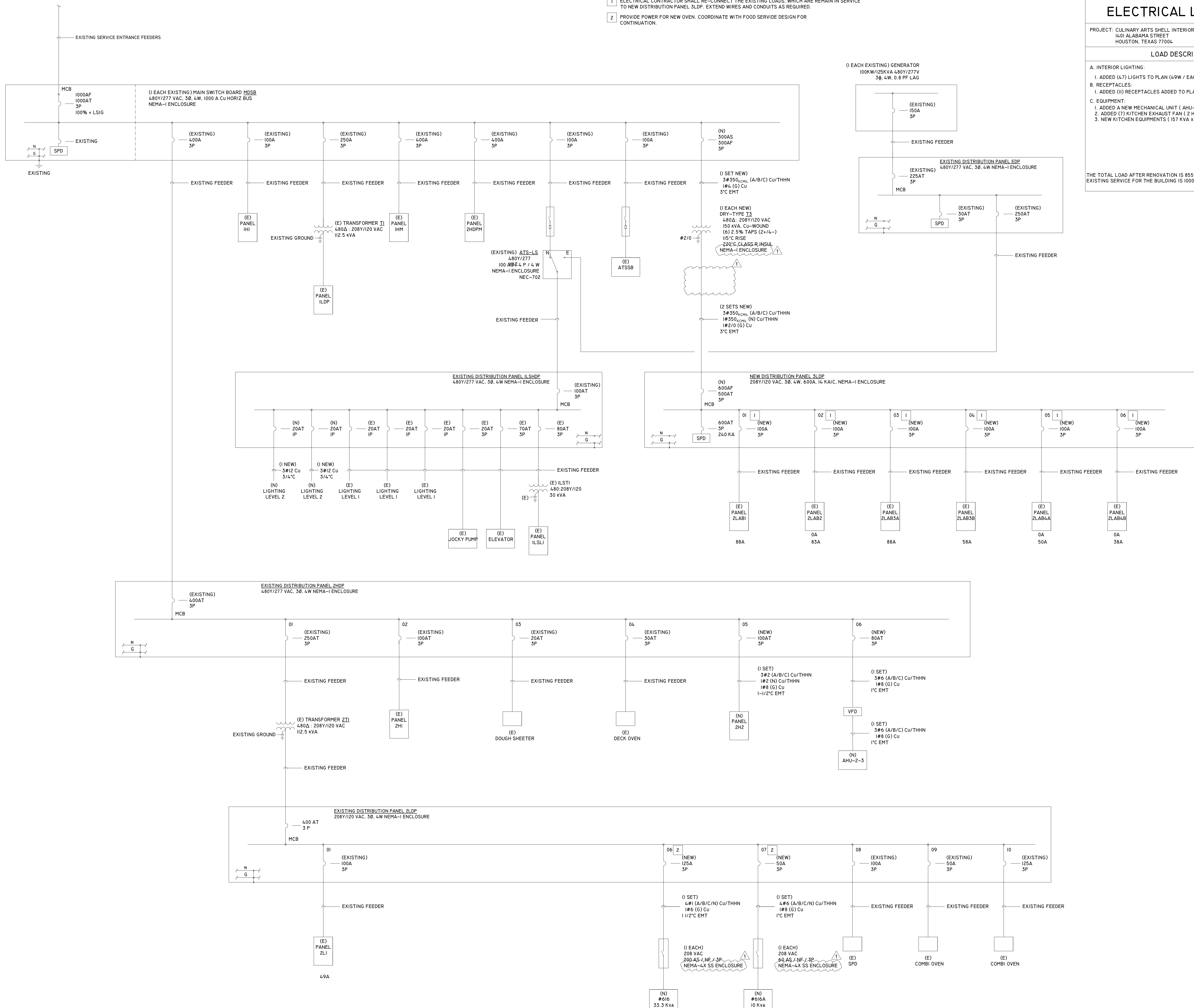
- 1 ELECTRICAL CONTRACTOR SHALL RE-CONNECT THE EXISTING LOADS, WHICH ARE REMAIN IN SERVICE TO NEW DISTRIBUTION PANEL 3LDP. EXTEND WIRES AND CONDUITS AS REQUIRED.
- 2 PROVIDE POWER FOR NEW OVEN. COORDINATE WITH FOOD SERVICE DESIGN FOR CONTINUATION.

ELECTRICAL LOAD ANALYSIS

PROJECT: CULINARY ARTS SHELL INTERIOR BUILDOUT
140 ALABAMA STREET
HOUSTON, TEXAS 77004

LOAD DESCRIPTION	KVA ADDED
A. INTERIOR LIGHTING: 1. ADDED (47) LIGHTS TO PLAN (49W / EACH)	+2.3 KVA
B. RECEPTACLES: 1. ADDED (11) RECEPTACLES ADDED TO PLAN 180 W / EACH	+2 KVA
C. EQUIPMENT: 1. ADDED A NEW MECHANICAL UNIT (AHU-2-3 - 25 HP) 2. ADDED (7) KITCHEN EXHAUST FAN (2 HP / EACH) 3. NEW KITCHEN EQUIPMENTS (157 KVA x 0.65)	+30 KVA +20 KVA +102 KVA
TOTAL LOAD ADDED (KVA) TOTAL AMP ADDED (AMP)	+156 KVA +188 AMP
EXISTING LOAD (AMP)	667 AMP

THE TOTAL LOAD AFTER RENOVATION IS 855 AMP.
EXISTING SERVICE FOR THE BUILDING IS 1000 AMP @ 480Y/277 VAC 3Φ 4W.



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PROFESSIONAL SEAL:
SEVAK KALANTARIANS
97498
2020-05-15

A PROJECT FOR:
CULINARY ARTS SHELL INTERIOR BUILDOUT

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	2020/04/15	PERMIT AND BIDDING
1	2020/05/15	ADDENDUM #1

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KEY PLAN
TRUE NORTH PLAN NORTH

Project Number	17024
Drawn By	Author
Checked By	Checker
Approved By	Approver

Drawing Title
PROPOSED ONE LINE DIAGRAM

Drawing Number
E1.03

#	Date	ISSUED FOR
	2020/04/15	PERMIT AND BIDDING
1	2020/05/15	ADDENDUM #1

Project Number	17024
Drawn By	Author
Checked By	Checker
Approved By	Approver
Drawing Title	

PANEL SCHEDULES

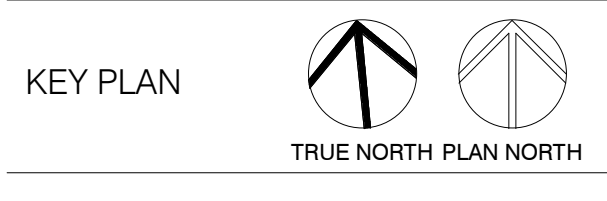
PANEL: 2H1																					
LOCATION: ELEC ROOM				FED FROM:																	
MTG:		SURFACE FLUSH STRUT		BUS:		100% NEUTRAL SYS GND ISO GND		OPT:		INT SPD FTL FUSIBLE		ENCL:		NEMA TYPE 1 STEEL		MAIN:		100 A CU/SN 100 A MLO		3 0 4 WIRE KA/C VOLTS	
WIRE SIZE	LOAD DESCRIPTION	LOAD TYPE	TRIP RATE / P	PKT NO	A (kVA)	B (kVA)	C (kVA)	PKT NO	P / TRIP RATE	LOAD TYPE	LOAD DESCRIPTION	WIRE SIZE									
3-#12, 1-#12, 1-#12, 3/4"	(E) DISHWASHER	Q	20 / 3	1	3.0	1.0		2	1 / 20	L	(E) LIGHTING	1-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	5		3.0	1.0	6	1 / 20	L	(E) LIGHTING	1-#12, 1-#12, 1-#12, 3/4"									
3-#12, 1-#12, 1-#12, 3/4"	(E) BOOSTER HEATER E251&B&C RM A218	Q	20 / 3	7	3.0	1.0		8	1 / 20	L	(E) LIGHTING	1-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	9		3.0	1.0	10	1 / 20	L	(E) LIGHTING	1-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	11				12	1 / 20	L	(E) LIGHTING	1-#12, 1-#12, 1-#12, 3/4"									
3-#12, 1-#12, 1-#12, 3/4"	(E) DOUGH SHEETER	Q	20 / 3	13	4.4	0.0		14	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	17		4.4	0.6	16	1 / 20	L	(N) LIGHTING - PASTRY LAB 2	1-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	17				18	1 / 20	L	(N) LIGHTING - CULINARY LAB 2	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	30 -- 3	19	0.0	4.3		20	3 / 20	Q	(N) BOOSTER HEATER - LAB 2	3-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	21		0.0	4.3	22	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	23				24	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
3-#12, 1-#12, 1-#12, 3/4"	(N) DISHWASHER - LAB 2	Q	20 / 3	25	3.0	4.4		26	3 / 20	K	(N) DOUGH SHEETER	3-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	27		3.0	4.4	28	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	29				30	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	31	0.0	0.0		32	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	33		0.0	0.0	34	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	35		0.0	0.0	36	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	37	0.0	0.0		38	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	39		0.0	0.0	40	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	41		0.0	0.0	42	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
					24 kVA	25 kVA	25 kVA														
					87 A	89 A	91 A														

PANEL: 2H2																					
LOCATION: ELEC ROOM				FED FROM:																	
MTG:		SURFACE FLUSH STRUT		BUS:		100% NEUTRAL SYS GND ISO GND		OPT:		INT SPD FTL FUSIBLE		ENCL:		NEMA TYPE 1 STEEL		MAIN:		100 A CU/SN 100 A MCB		3 0 4 WIRE KA/C VOLTS	
WIRE SIZE	LOAD DESCRIPTION	LOAD TYPE	TRIP RATE / P	PKT NO	A (kVA)	B (kVA)	C (kVA)	PKT NO	P / TRIP RATE	LOAD TYPE	LOAD DESCRIPTION	WIRE SIZE									
3-#12, 1-#12, 1-#12, 3/4"	(N) KEF-17	M	15 / 3	1	0.9	0.9		2	3 / 15	M	(N) KEF-18	3-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	5		0.9	0.9	4	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
3-#12, 1-#12, 1-#12, 3/4"	(N) KEF-19	M	15 / 3	7	0.9	0.9		8	3 / 15	M	(N) KEF-20	3-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	9		0.9	0.9	10	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	11				12	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
3-#12, 1-#12, 1-#12, 3/4"	(N) KEF-21	M	15 / 3	13	0.9	0.9		14	3 / 15	M	(N) KEF-22	3-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	15		0.9	0.9	16	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	17				18	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
3-#12, 1-#12, 1-#12, 3/4"	(N) KEF-23	M	15 / 3	19	0.8			20	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	21		0.8		22	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
--	--	--	--	23				24	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
					6 kVA	6 kVA	6 kVA														
					23 A	23 A	23 A														

PANEL: 2LAB4B																					
LOCATION: CULINARY LAB 2				FED FROM:																	
MTG:		SURFACE FLUSH STRUT		BUS:		100% NEUTRAL SYS GND ISO GND		OPT:		INT SPD FTL FUSIBLE		ENCL:		NEMA TYPE 1 STEEL		MAIN:		100 A CU/SN 100 A MLO		3 0 4 WIRE KA/C VOLTS	
WIRE SIZE	LOAD DESCRIPTION	LOAD TYPE	TRIP RATE / P	PKT NO	A (kVA)	B (kVA)	C (kVA)	PKT NO	P / TRIP RATE	LOAD TYPE	LOAD DESCRIPTION	WIRE SIZE									
1-#12, 1-#12, 1-#12, 3/4"	RANGE - E650	Q	20 / 1	1	0.8	1.3		2	1 / 20	Q,K	HOOD LIGHTS AND TEMP SENSOR	1-#12, 1-#12, 1-#12, 3/4"									
--	SHUNT TRIP BREAKER	--	--	3		0.0	0.4	4	1 / 20	R	CONVENIENCE OUTLET - E13	1-#12, 1-#12, 1-#12, 3/4"									
1-#12, 1-#12, 1-#12, 3/4"	WORKTOP REFRIGERATOR - 817	Q	20 / 1	5				6	1 / 20	Q	WORKTOP REFRIGERATOR - 817	1-#12, 1-#12, 1-#12, 3/4"									
--	SHUNT TRIP BREAKER	--	--	7	0.0	0.0		8	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
1-#12, 1-#12, 1-#12, 3/4"	WORKTOP REFRIGERATOR - 817	Q	20 / 1	9				10	1 / 20	Q	ELECTRONIC IGNITION - E633	1-#12, 1-#12, 1-#12, 3/4"									
--	SHUNT TRIP BREAKER	--	--	11		0.4	0.1	12	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
1-#12, 1-#12, 1-#12, 3/4"	HOOD LIGHTS AND TEMP SENSOR	Q,K	20 / 1	13	1.3	0.2		14	1 / 20	Q	ELECTRONIC IGNITION - E633	1-#12, 1-#12, 1-#12, 3/4"									
1-#12, 1-#12, 1-#12, 3/4"	HOOD LIGHTS AND TEMP SENSOR	Q,K	20 / 1	15		1.3	0.0	16	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
1-#12, 1-#12, 1-#12, 3/4"	RECEPT - FRYER - E704	K	20 / 1	17				18	1 / 20	K	RECEPT - FRYER - E704	1-#12, 1-#12, 1-#12, 3/4"									
--	SHUNT TRIP BREAKER	--	--	19	0.0	0.0		20	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
1-#12, 1-#12, 1-#12, 3/4"	RECEPT - FILTER - E704	K	20 / 1	21		1.0	1.0	22	1 / 20	K	RECEPT - FILTER - E704	1-#12, 1-#12, 1-#12, 3/4"									
--	SHUNT TRIP BREAKER	--	--	23				24	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
1-#12, 1-#12, 1-#12, 3/4"	REFRIGERATOR - E743	K	20 / 1	25	1.4	0.4		26	1 / 20	Q	RANGE - E650	1-#12, 1-#12, 1-#12, 3/4"									
1-#12, 1-#12, 1-#12, 3/4"	CONVENIENCE OUTLET - E13	R	20 / 1	27		0.4	0.0	28	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
1-#12, 1-#12, 1-#12, 3/4"	ELECTRIC CORD REEL - E644	R	20 / 1	29		1.9	0.2	30	3 / 40	Q	STEAMER - COUNTER TOP	3-#8, 1-#8, 1-#10, 3/4"									
1-#12, 1-#12, 1-#12, 3/4"	ELECTRIC CORD REEL - E644	R	20 / 1	31	1.9	0.2		32	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
1-#12, 1-#12, 1-#12, 3/4"	ELECTRIC CORD REEL - E644	R	20 / 1	33	0.0%			34	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
1-#12, 1-#12, 1-#12, 3/4"	ELECTRIC CORD REEL - E644	R	20 / 1	35		1.9	0.2	36	--	--	--	1-#12, 1-#12, 1-#12, 3/4"									
1-#12, 1-#12, 1-#12, 3/4"	FREEZER PROTECTION PUMP	Q	20 / 1	37	0.5	0.0		38	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	39		0.0	0.0	40	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	41		0.0	0.0	42	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	43	0.0	0.0		44	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	45		0.0	0.0	46	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	47		0.0	0.0	48	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	49	0.0	0.0		50	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	51		0.0	0.0	52	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	53		0.0	0.0	54	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	55	0.0	0.0		56	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	57		0.0	0.0	58	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
--	SPARE	--	20 -- 1	59		0.0	0.0	60	1 -- 20	--	SPARE	1-#12, 1-#12, 1-#12, 3/4"									
					8 kVA	7 kVA	7 kVA														
					67 A	54 A	56 A														

LOAD TYPE		CONNECTED	FACTOR	LOAD ANALYSIS		TOTALS	
LIGHTING	L	0 VA	0.00%	0 VA	0 VA		
RECEPTACLE	R	8400 VA	100.00%	8400 VA	8400 VA	CONNECTED LOAD (kVA) 21 kVA	
EQUIPMENT	Q	4000 VA	100.00%	4000 VA	4000 VA	DEMAND LOAD (kVA) 18 kVA	
COOLING	C	0 VA	0.00%	0 VA	0 VA	CONNECTED CURRENT (A) 59 A	
HEATING	H	0 VA	0.00%	0 VA	0 VA	DEMAND CURRENT (A) 50 A	
MOTOR	M	0 VA	0.00%	0 VA	0 VA		

#	Date	ISSUED FOR
1	2020/04/15	PERMIT AND BIDDING
1	2020/05/15	ADDENDUM #1



Project Number	17024
Drawn By	Author
Checked By	Checker
Approved By	Approver
Drawing Title	ENLARGED PLANS - POWER

Drawing Number	E2.01
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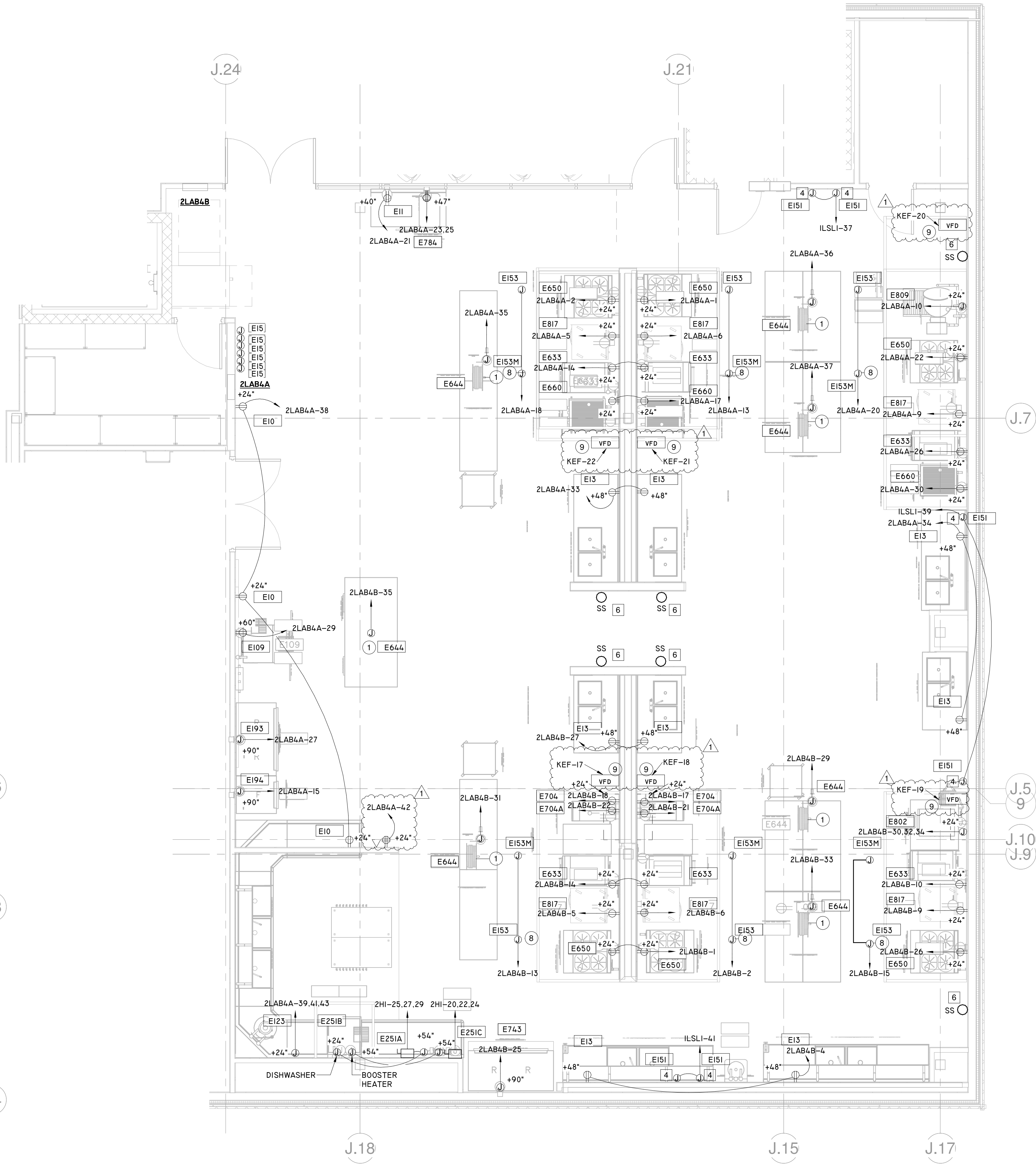
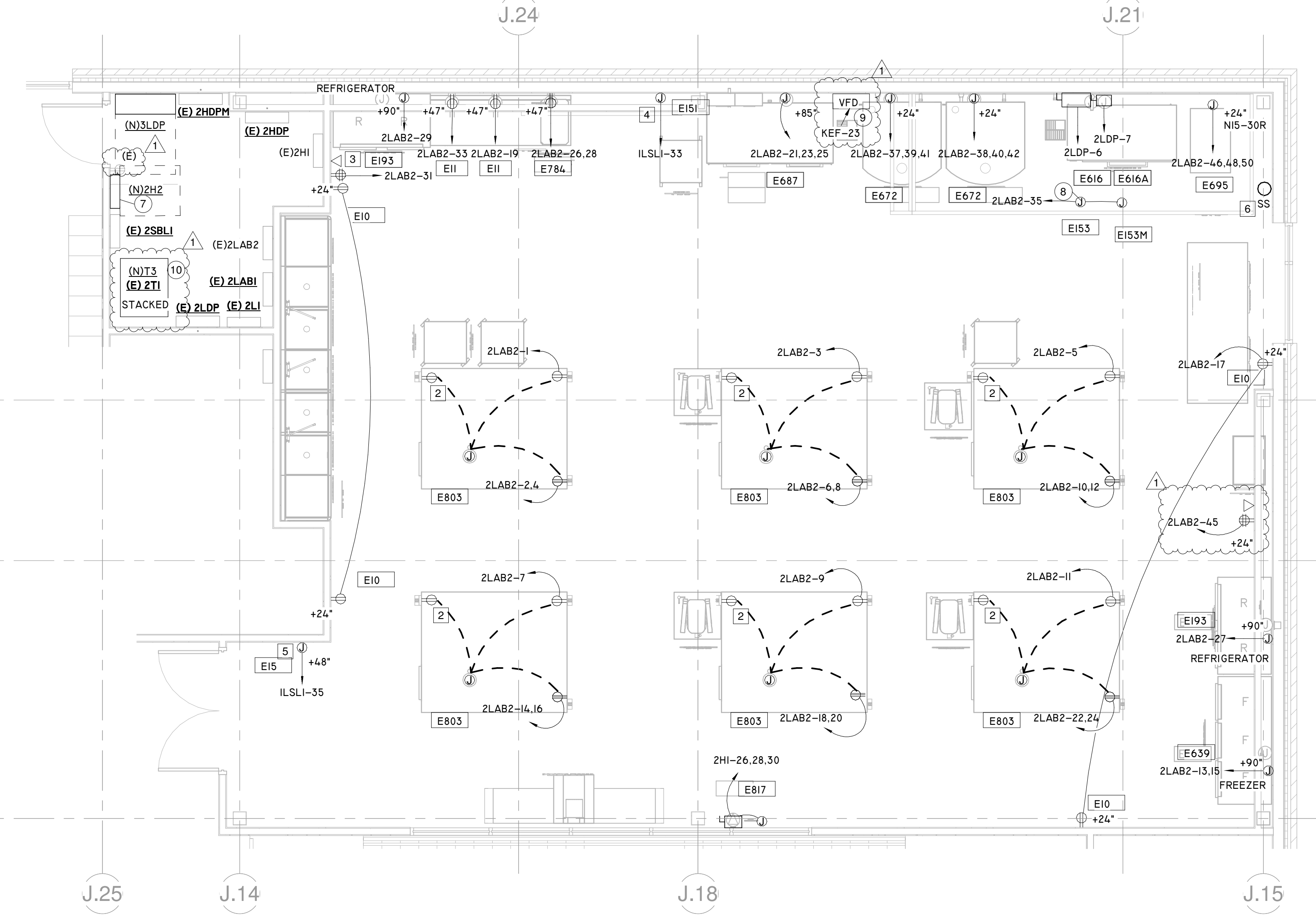
FOODSERVICE ELECTRICAL SCHEDULE									
FDP ENO	FDP ECNN	FDP ELOAD	FDP EVOLT	FDP EPH	FDP ESERVICE TO	FDP ELOC	FDP EAFF	FDP EREMARKS	
E10	DR	16.0A	120	1	CONVENIENCE OUTLET	WALL	24"	---	
E11	DR	16.0A	120	1	CONVENIENCE	WALL	40"	---	MOUNT HORIZONTAL
E13	WFR	16.0A	120	1	CONVENIENCE OUTLET	WALL	48"	---	RE: NOTE #11 - RECESSED JB - EXTEND TO FIRE SYSTEM FOR HOOD
E15	JB	---	---	---	REMOTE FIRE PULL	WALL	48"	---	RE: NOTE #11 - RECESSED JB - EXTEND TO FIRE SYSTEM FOR HOOD
E109	DR	16.0A	120	1	ICE MACHINE	WALL	60"	---	IO FIRE SYSTEM FOR HOOD
E123	JB	3.0HP	208	3	DISPOSER	WALL	24"	---	BTC; RE: NOTE #4 - CONNECT THRU C.P. TO DISPOSER
E151	JB	1.0A	120	1	FIRE PROT. SYSTEM	CLG	DFA	---	BTC; RE: NOTE #4, #6, #9 & #11
E153	JB	10.0A	120	1	HOOD LIGHTS	CLG	DFA	---	BTC; RE: NOTE #4, #6, #9 & #10
E153M	JB	1.0A	120	1	TEMPERATURE SENSOR	CLG	DFA	---	BTC; RE: NOTE #4, #6 & #9
E193	JB	11.0A	120	1	REFRIGERATOR	WALL	90"	---	
E194	JB	11.5A	120	1	FREEZER	WALL	90"	---	
E251	JB	---	---	---	DISHMACHINE	WALL	24"	---	BTC; RE: NOTE #4 - INTERCONNECT TO E251A
E251A	JB/DS	11.6A	480	3	DISHMACHINE	WALL	54"	---	BTC; RE: NOTE #4 & #5 - INTERCONNECT TO E251
E251B	JB	---	---	---	BOOSTER HEATER	WALL	24"	---	BTC; RE: NOTE #4 - INTERCONNECT TO E251C
E251C	JB/DS	13.0KW	480	3	BOOSTER HEATER	WALL	54"	---	BTC; RE: NOTE #4 & #5 - INTERCONNECT TO E251B
E633	DR	1.0A	120	1	ELECTRONIC IGNITION	WALL	24"	---	SHUNT TRIP BREAKER
E644	JB	16.0A	120	1	EQUIPMENT	CLG	VERIFY	---	BTC; PROVIDED AND INSTALLED BY DIV. 26
E660	DR	3.4A	120	1	RANGE	WALL	24"	---	SHUNT TRIP BREAKER
E660	DR	1.0A	120	1	CHARBROILER	WALL	24"	---	SHUNT TRIP BREAKER
E704	DR	1.0A	120	1	FRYER	WALL	24"	---	SHUNT TRIP BREAKER PROVIDED AND INSTALLED BY DIVISION 26
E704A	DR	8.0A	120	1	FILTER	WALL	24"	---	SHUNT TRIP BREAKER PROVIDED AND INSTALLED BY DIVISION 26
E743	JB	11.4A	120	1	REFRIGERATOR	WALL	90"	---	
E784	SR	15.0A	208	1	ICE CREAM FREEZER	WALL	47"	---	MOUNT HORIZONTAL
E802	JB	34.4A	240	3	STEAMER - COUNTER TOP	WALL	24"	---	BTC; RE: NOTE #4 - SHUNT TRIP BREAKER
E809	JB	5.0A	120	1	KETTLE	WALL	24"	---	SHUNT TRIP BREAKER
E817	DR	3.0A	120	1	WORKTOP REFRIGERATOR	WALL	24"	---	

FOODSERVICE ELECTRICAL SCHEDULE									
FDP ENO	FDP ECNN	FDP ELOAD	FDP EVOLT	FDP EPH	FDP ESERVICE TO	FDP ELOC	FDP EAFF	FDP EREMARKS	
E10	DR	16.0A	120	1	CONVENIENCE OUTLET	WALL	24"	---	
E11	DR	16.0A	120	1	CONVENIENCE	WALL	47"	---	MOUNT HORIZONTAL
E15	JB	---	---	---	REMOTE FIRE PULL	WALL	48"	---	RE: NOTE #11 - RECESSED JB - EXTEND TO FIRE SYSTEM FOR HOOD
E151	JB	1.0A	120	1	FIRE PROT. SYSTEM	CLG	DFA	---	BTC; RE: NOTE #4, #6, #9 & #11
E153	JB	10.0A	120	1	HOOD LIGHTS	CLG	DFA	---	BTC; RE: NOTE #4, #6, #9 & #10
E153M	JB	1.0A	120	1	TEMPERATURE SENSOR	CLG	DFA	---	BTC; RE: NOTE #4, #6 & #9
E193	JB	8.2A	120	1	REFRIGERATOR	WALL	90"	---	
E616	JB	33.3KW	208	3	PIZZA DECK OVEN	WALL	36"	---	BTC; RE: NOTE #4
E616A	JB	11.0KW	208	3	PIZZA DECK OVEN	WALL	36"	---	BTC; RE: NOTE #4
E639	JB	16.0A	208	1	FREEZER	WALL	90"	---	COORDINATE NEMA PLUG
E672	JB	15.0A	208	3	ROTATING RACK OVEN	WALL	24"	---	BTC; RE: NOTE #4 - SHUNT TRIP BREAKER
E687	JB	15.0A	208	3	PROOFER	WALL	85"	---	
E695	JB	22.0A	200V-240V	1	EQUIPMENT	WALL	24"	---	SHUNT TRIP BREAKER BTC; RE: NOTE #4
E784	SR	15.0A	208	1	ICE CREAM FREEZER	WALL	47"	---	MOUNT HORIZONTAL
E803	JB	30.0A	208	1	TABLE RECEPTACLES	FLOOR	4"	---	
E817	DR	16.0A	480	3	DOUGH SHEETER	WALL	24"	---	CONFIRM NEMA CONFIGURATION W/DIV. 26

- FOODSERVICE ELECTRICAL GENERAL NOTES**
- DO NOT ROUGH-IN FROM THIS DRAWING. REFER TO THE CONTRACTOR'S DIMENSIONED DRAWINGS.
 - VERIFY ALL ELECTRICAL CHARACTERISTICS WITH ENGINEERING DRAWINGS.
 - DIMENSIONS INDICATED ARE TO BE VERIFIED BY CONTRACTOR AND ADJUSTED AS REQUIRED BY FOODSERVICE EQUIPMENT AND/OR FIELD CONDITIONS.
 - ACCESSORIES AND FITTINGS PROVIDED LOOSE WITH FOODSERVICE EQUIPMENT BY SECTION II 40 00. FIELD INSTALLED BY DIVISION 26.
 - STAINLESS STEEL DISCONNECT SWITCH PROVIDED AND INSTALLED BY DIVISION 26.
 - ALL ELECTRICAL CONNECTIONS BENEATH EXHAUST HOOD TO EXTEND TO SHUNT TRIP BREAKERS WITHIN ELECTRICAL PANEL BOX FOR SHUT-DOWN DURING FIRE MODE - BY DIVISION 26.
 - DOOR HEATER(S), LIGHT(S), COIL(S) AND PRESSURE RELIEF PORT(S) PRE-WIRED TO JUNCTION BOX AT TOP OF COLD STORAGE ASSEMBLY BY SECTION II 40 00. FINAL CONNECTION BY DIVISION 26.
 - N/A
 - INTERCONNECT TO EXHAUST HOOD FANS(S) AND SWITCH BY DIVISION 26.
 - INTERCONNECT TO EXHAUST HOOD LIGHT(S) AND SWITCH BY DIVISION 26.
 - INTERCONNECT FIRE PROTECTION SYSTEM TO PANEL BOX SHUNT TRIP(S) AND BUILDING ALARM - BY DIVISION 26.
 - RECEPTACLE(S) TO BE PRE-WIRED TO JUNCTION BOX OR LOAD CENTER FOR FINAL CONNECTION BY DIVISION 26.
 - SECTION II 40 00 TO VERIFY UTILITY REQUIREMENTS OF EXISTING EQUIPMENT.
 - EMPTY CONDUIT RUN FROM CASHIER STATION TO MANAGERS OFFICE FOR POS SYSTEM BY DIVISION 26. LOCATION OF MANAGER'S OFFICE TO BE VERIFIED.

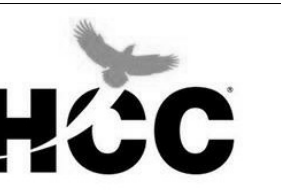
KEYNOTE LEGEND

1	PROVIDE STAINLESS STEEL CORD REELS SIMILAR TO HUBBEL #HBL554123 WITH HBL5369C.
2	SEE RECEPTACLE DETAILS ON 7 ON SHEET E5.01.
3	RECEPTACLE FOR TEACHER STATION. COORDINATE WITH ARCHITECTURAL ELEVATION AND A/V FOR ADDITION REQUIREMENT.
4	PROVIDE POWER FOR FIRE PROTECTION SYSTEM FROM EMERGENCY PANEL ILSLI. REFER TO FOODSERVICE DRAWINGS FOR CONTINUATION.
5	PROVIDE POWER FOR GAS SHUT VALVE EPO FROM EMERGENCY PANEL ILSLI. ELECTRICAL CONTRACTOR SHALL VERIFY LOCATION OF PANEL ILSLI.
6	HOOD FAN AND LIGHT SWITCH. REFER TO FOODSERVICE DRAWING FOR CONTINUATION.
7	ELECTRICAL CONTRACTOR SHALL RELOCATE THE LIGHTING SWITCH IN ELECTRICAL ROOM TO MAKE SPACE FOR PANEL 2H2.
8	PROVIDE POWER FOR HOOD LIGHT AND TEMPERATURE SENSOR. COORDINATE WITH FOODSERVICE DESIGN FOR CONTINUATION.
9	KITCHEN EXHAUST FAN (KEF) LOCATION ON ROOF PLAN. COORDINATE FINAL LOCATION WITH DIV 25.
10	NEW TRANSFORMER T3 TO STACK ON EXISTING TRANSFORMER T1. REFER TO DETAIL 10/E5.01 FOR MORE DETAILS.



2 ENLARGED PLAN - PASTRY LAB 2 - POWER
Scale: 1/4" = 1'-0"

1 ENLARGED PLAN - CULINARY LAB 2 - POWER
Scale: 1/4" = 1'-0"



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PROFESSIONAL SEAL:



2020-05-15

A PROJECT FOR:

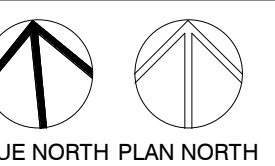
**CULINARY
ARTS SHELL
INTERIOR
BUILDOUT**

#	Date	ISSUED FOR
	2020/04/15	PERMIT AND BIDDING
1	2020/05/15	ADDENDUM #1



INFRASTRUCTURE ASSOCIATES, INC.
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KEY PLAN

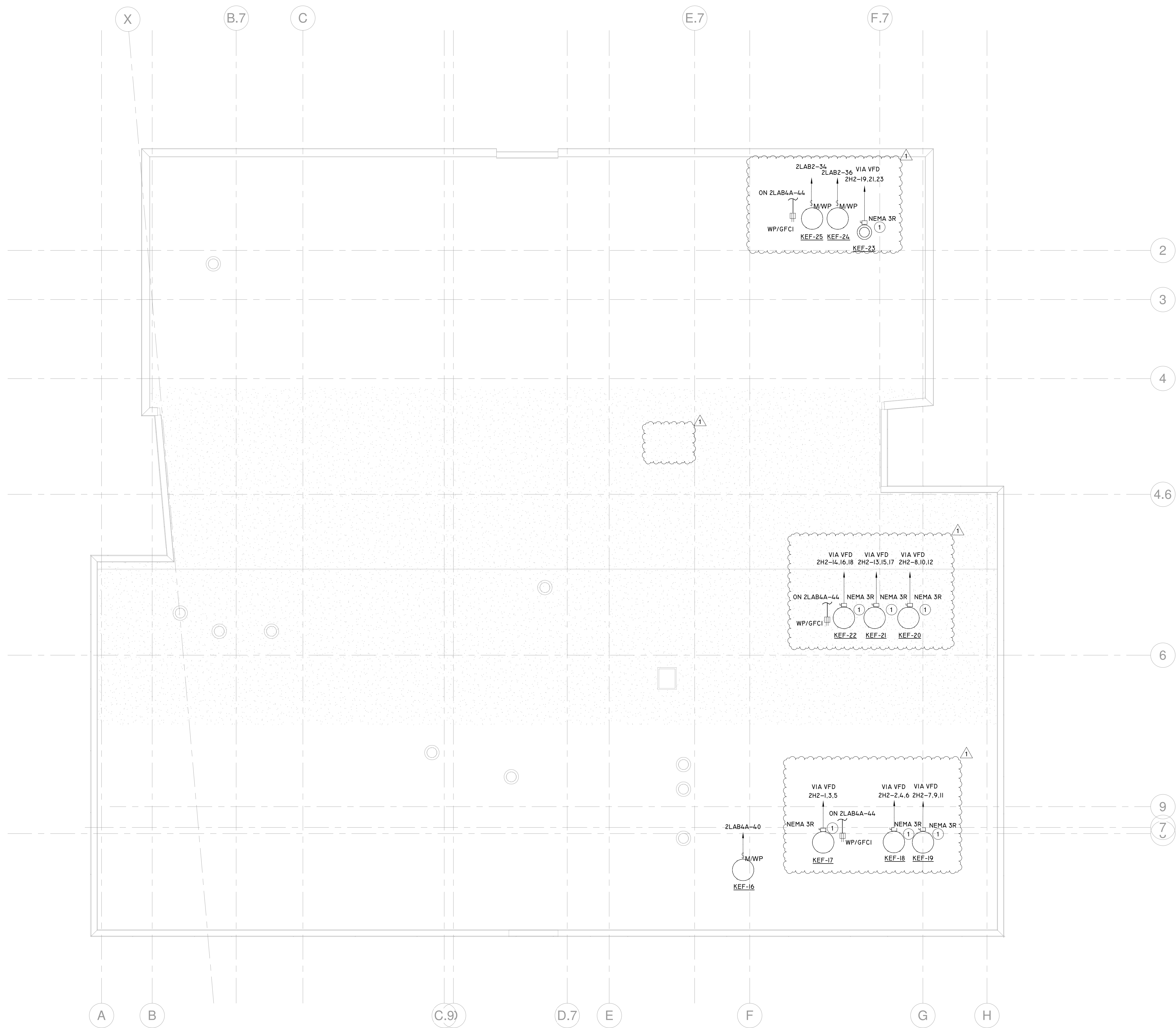


Project Number	17024
Drawn By	Author
Checked By	Checker
Approved By	Approver
Drawing Title	

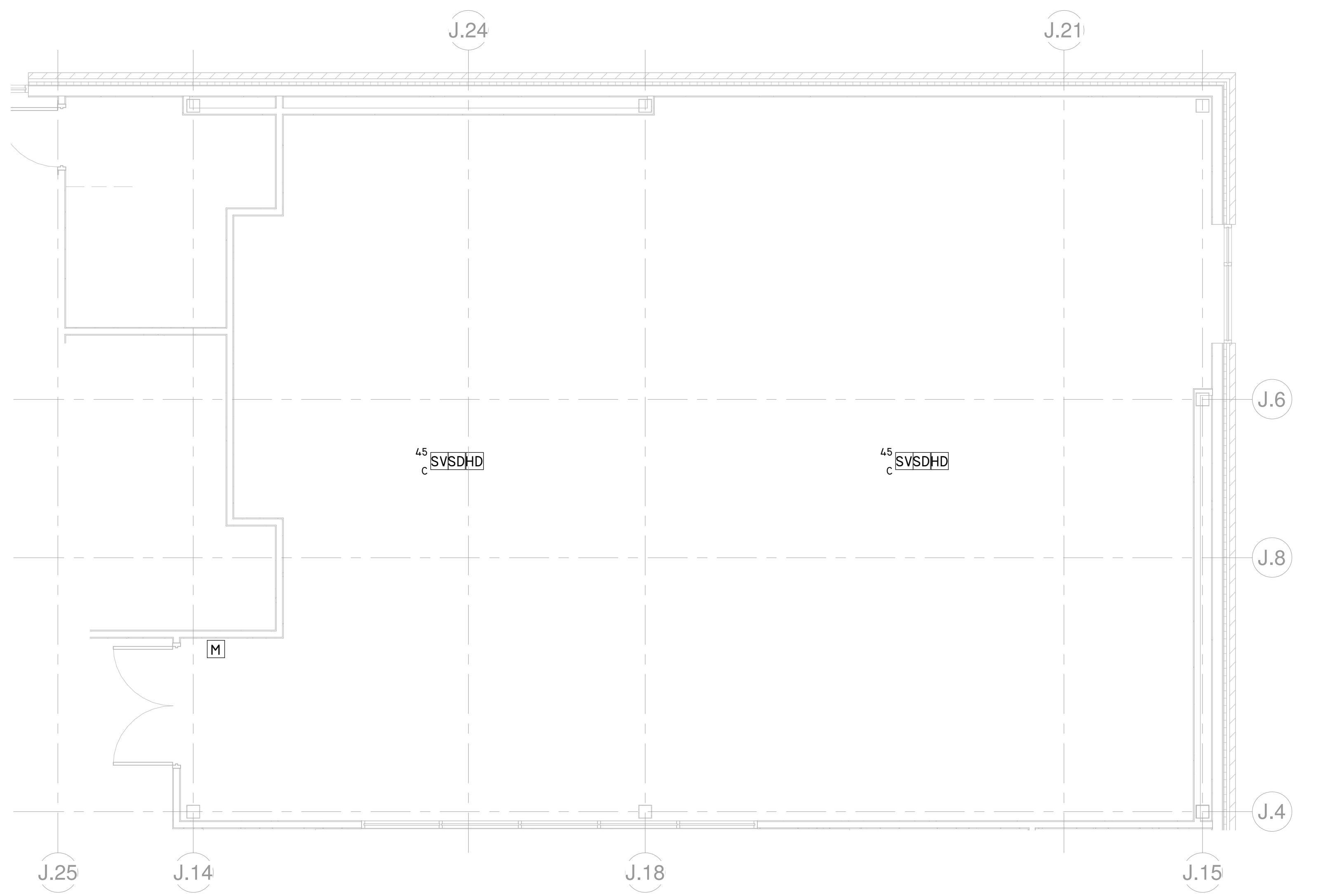
ROOF PLAN - POWER

Drawing Number **E2.02**

KEYNOTE LEGEND
1 VIA VFD. REFER TO E2.01 FOR LOCATION OF VFD AND COORDINATE FINAL LOCATION WITH DIV 23.

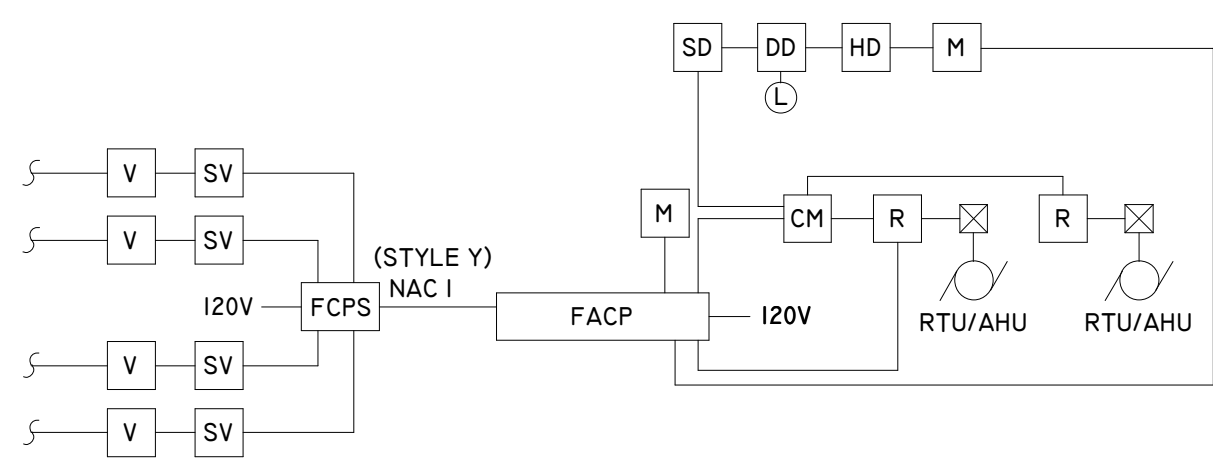


1 ROOF PLAN - POWER
Scale: 1/8" = 1'-0"



2 ENLARGED PLAN - PASTERY LAB 2 - FIRE ALARM
Scale: 1/4" = 1'-0"

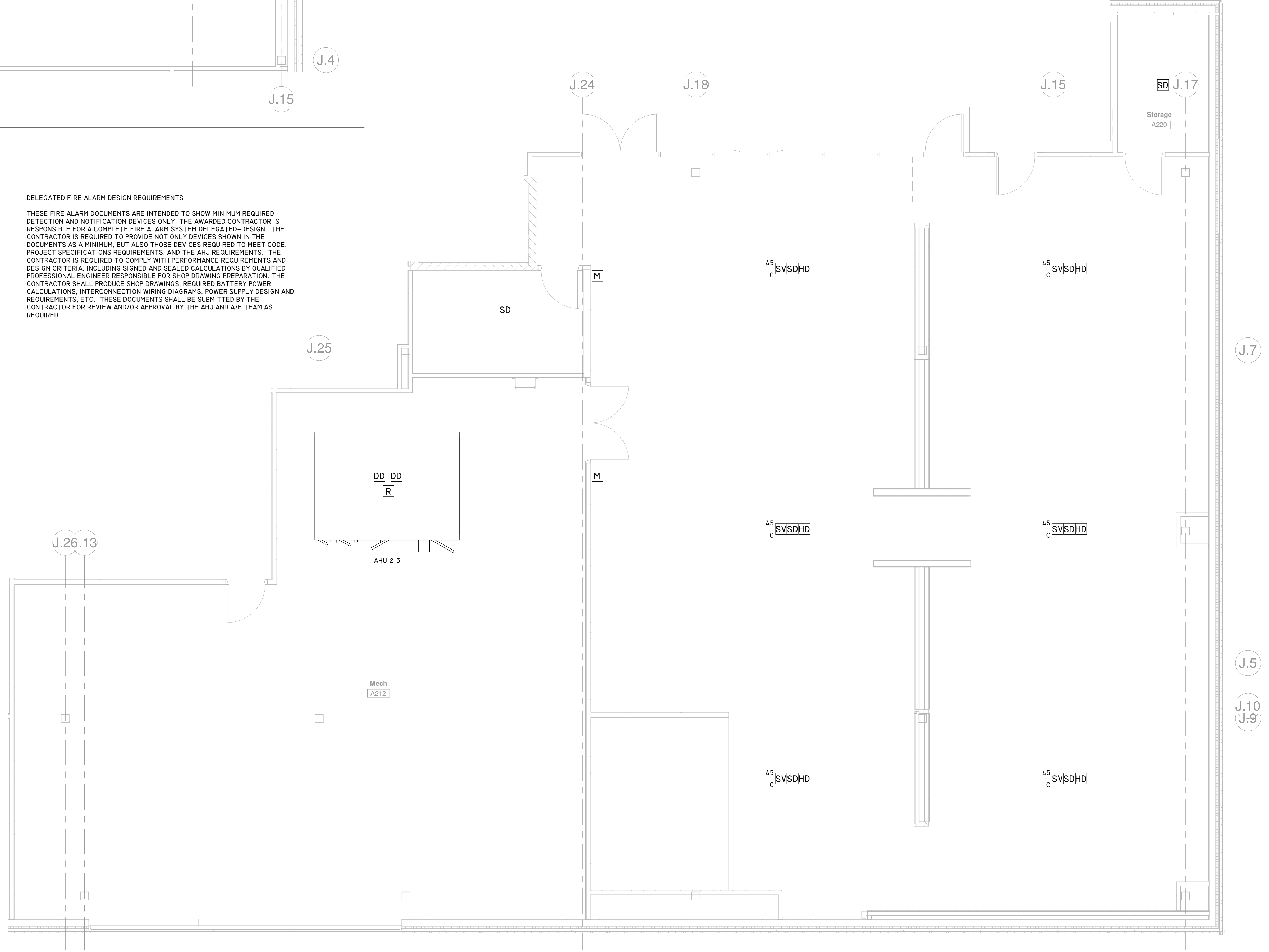
FIRE ALARM SYMBOLS LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	FIRE ALARM VISUAL ALARM, TYPICALLY 80" A.F.F. TO TOP. XX = CANDELA LEVEL, P = PROTECTIVE COVER, C = CEILING MOUNT		FIRE ALARM HEAT DETECTOR
	FIRE ALARM MANUAL PULL STATION, 48" A.F.F. PD = PEDESTAL MOUNT, P = PROTECTIVE COVER		FIRE ALARM DOOR HOLDER
	FIRE ALARM SPRINKLER FLOW SWITCH		CONTROL MODULE
	FIRE ALARM SPRINKLER VALVE TAMPER SWITCH		MONITOR MODULE
	FIRE ALARM SPEAKER/VISUAL ALARM TYP 80" A.F.F. TO TOP, XX = CANDELA LEVEL, P = PROTECTIVE COVER, C = CEILING MOUNT		FIRE ALARM SMOKE FIRE DAMPER BY DIV. 15, PROVIDE 120V CIRCUIT BY DIV 15
	FIRE ALARM DUCT SMOKE DETECTOR WITH REMOTE LED		REMOTE FIRE ALARM SYSTEM POWER SUPPLY
	FIRE ALARM SHUTDOWN RELAY FOR HVAC EQUIPMENT		DIGITAL ALARM COMMUNICATOR TRANSMITTER
	FIRE ALARM SMOKE DETECTOR, PHOTOELECTRIC		FIRE ALARM CONTROL PANEL
	FIRE ALARM SINGLE STATION SMOKE DETECTOR, 120V WITH BATTERY		FIRE ALARM ANNUNCIATOR PANEL
	BEAM DETECTOR		CARBON MONOXIDE AND SMOKE COMBINATION DETECTOR



SYMBOLS ARE INDICATIVE OF TYPES OF DEVICES IN SYSTEM. REFER TO PLANS FOR EXACT QUANTITIES.

FIRE ALARM NOTE:
1. CONTRACTOR WILL TEST ALL EXISTING FIRE ALARM DEVICES TO ENSURE THEY ARE IN PROPER WORKING CONDITION AND RE-CERTIFY THE FIRE ALARM SYSTEM. REPLACE DEVICES AS NECESSARY.
2. EXISTING FIRE ALARM SYSTEM TO REMAIN WITH DEVICES AND WIRING. PROVIDE INTERFACE CONNECTION BETWEEN EXISTING FIRETRON INSTALLED FIRE ALARM SYSTEM (AND REQUIRED NEW FIRE ALARM DEVICES. CONTRACTOR SHALL HIRE SERVICES OF FIRETRON TO COMMISSION AND TEST THE SYSTEM AFTER INSTALLATION.

DELEGATED FIRE ALARM DESIGN REQUIREMENTS
THESE FIRE ALARM DOCUMENTS ARE INTENDED TO SHOW MINIMUM REQUIRED DETECTION AND NOTIFICATION DEVICES ONLY. THE AWARDED CONTRACTOR IS RESPONSIBLE FOR A COMPLETE FIRE ALARM SYSTEM DELEGATED-DESIGN. THE CONTRACTOR IS REQUIRED TO PROVIDE NOT ONLY DEVICES SHOWN IN THE DOCUMENTS AS A MINIMUM, BUT ALSO THOSE DEVICES REQUIRED TO MEET CODE, PROJECT SPECIFICATIONS REQUIREMENTS, AND THE AHJ REQUIREMENTS. THE CONTRACTOR IS REQUIRED TO COMPLY WITH PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA, INCLUDING SIGNED AND SEALED CALCULATIONS BY QUALIFIED PROFESSIONAL ENGINEER RESPONSIBLE FOR SHOP DRAWING PREPARATION. THE CONTRACTOR SHALL PRODUCE SHOP DRAWINGS, REQUIRED BATTERY POWER CALCULATIONS, INTER-CONNECTION WIRING DIAGRAMS, POWER SUPPLY DESIGN AND REQUIREMENTS, ETC. THESE DOCUMENTS SHALL BE SUBMITTED BY THE CONTRACTOR FOR REVIEW AND/OR APPROVAL BY THE AHJ AND A/E TEAM AS REQUIRED.



1 ENLARGED PLAN - CULINARY LAB 2 - FIRE ALARM
Scale: 1/4" = 1'-0"

FIRE ALARM SEQUENCE OF OPERATION

- A. DETECTION & ALARM**
WHEN A FIRE ALARM CONDITION IS DETECTED BY ANY ALARM INITIATING DEVICE (SMOKE DETECTOR, DUCT DETECTOR, PULL STATION, OR SPRINKLER FLOW SWITCH), THE FOLLOWING FUNCTIONS WILL OCCUR:
- (A) THE FIRE ALARM CONTROL PANEL COMMON ALARM INDICATOR WILL FLASH AND THE AUDIBLE DEVICE WILL SOUND. ACKNOWLEDGING THE ALARM CONDITION WILL SILENCE THE AUDIBLE DEVICE AND CAUSE THE COMMON ALARM INDICATOR TO ILLUMINATE STEADILY.
 - (B) THE DISPLAY WILL INDICATE ALL APPLICABLE INFORMATION ASSOCIATED WITH THE ALARM CONDITION INCLUDING ZONE, DEVICE TYPE, DEVICE LOCATION, AND TIME OF ALARM. LOCATION AND ZONING MESSAGES WILL BE CUSTOM FIELD-PROGRAMMED TO MATCH THE RESPECTIVE PREMISES. LOCAL ANNUNCIATOR LED'S ASSOCIATED WITH THE ALARM POINT WILL FLASH UNTIL PANEL IS SILENCED.
 - (C) DISPLAY SYSTEM STATUS CHANGES ON ANY REMOTE ANNUNCIATOR(S) VIA AN ALPHANUMERIC MESSAGE ON THE DISPLAY.
 - (D) ACTIVATE AN ALARM CONTACT CLOSURE TO ACTIVATE A DIGITAL ALARM COMMUNICATOR TRANSMITTER (DACT) FOR SIGNALING TO A UL-APPROVED CENTRAL MONITORING STATION VIA TELEPHONE LINES FURNISHED BY OWNER.
 - (E) ACTIVATE ALL AUDIO/VISUAL SIGNALS THROUGHOUT THE ENTIRE FACILITY.
 - (F) ACTIVATE ALL VISUAL SIGNALS. VISUAL SIGNALS WILL BE HIGH INTENSITY STROBES (75 CD MINIMUM) TO MEET THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA) & TEXAS ACCESSIBILITY STANDARDS (TAS). ACTIVATE THROUGHOUT THE ENTIRE FACILITY. STROBES SHALL BE XENON TYPE AND WHITE OR CLEAR IN COLOR. THE MAX PULSE DURATION WILL BE 0.2 SECONDS WITH A MAXIMUM DUTY CYCLE OF 40%. THE FLASH RATE WILL BETWEEN 1-HZ AND 3-HZ.
 - (G) DEACTIVATE ALL FANS RATED OVER 2,000 CFM.
 - (H) ALARM VERIFICATION WILL BE FIELD-PROGRAMMABLE FOR EACH SMOKE DETECTOR. THE VERIFICATION SEQUENCE IS ACTIVATED AFTER A "CHECK" PROCEDURE AND THE PANEL WILL WAIT FOR A TIME THEN RESAMPLE THE DETECTOR FOR CONTINUED PRESENCE OF SMOKE. IF THE ALARM CONDITION CONTINUES OR A NON-VERIFIED DEVICE IS ACTIVATED DURING THIS VERIFICATION PERIOD, THE PANEL WILL INITIATE ALL ALARM SEQUENCES. THIS ENTIRE SEQUENCE WILL OCCUR WITHIN 60 SEC. THE SYSTEM WILL LOG INTO MEMORY THE NUMBER OF VERIFICATION EVENTS.
 - (I) CLOSE ALL SMOKE FIRE DAMPERS ASSOCIATED WITH THE HVAC UNITS(S).
 - (J) ALL NON-SILENCEABLE AUXILIARY CONTROL FUNCTIONS (FANS, CENTRAL STATION INTERFERENCE, ELEVATOR RECALL INTERFACE, ETC) WILL REMAIN IN OPERATION, EVEN WHEN A/V DEVICES ARE SILENCED, UNTIL THE PANEL IS CLEARED AND RESET.
 - (K) IF GAS WATER HEATERS OR BOILERS (DOMESTIC OR HYDRONIC) ARE PROVIDED FOR THE PROJECT PROVIDE A MANUAL RESET CARBON MONOXIDE (CO) DETECTOR ADJACENT TO THE WATER HEATER(S). INTERLOCK THE CO DETECTOR TO DISABLE THE WATER HEATER BURNERS UPON DETECTION OF 100 PPM OR HIGHER CO CONCENTRATION AND UPON LOSS OF POWER TO THE CO DETECTOR. SUBMIT PRODUCT DATA FOR CO DETECTOR AND CERTIFICATE OF CALIBRATION.
- B. SYSTEM TROUBLE DETECTION**
WHEN A TROUBLE CONDITION IS DETECTED BY THE FIRE ALARM CONTROL PANEL, THE FOLLOWING FUNCTIONS SHALL OCCUR:
- (A) THE FIRE ALARM CONTROL PANEL TROUBLE INDICATOR WILL FLASH AND THE INTERNAL AUDIBLE DEVICE WILL SOUND. ACKNOWLEDGMENT OF THE AUDIBLE DEVICE WILL SILENCE THE AUDIBLE DEVICE AND CAUSE ALL TROUBLE INDICATORS TO ILLUMINATE STEADY.
 - (B) THE DISPLAY WILL DISPLAY ALL APPLICABLE INFORMATION ASSOCIATED WITH THE RESPECTIVE TROUBLE CONDITIONS. LOCAL ANNUNCIATOR LED'S ASSOCIATED WITH THE ALARM POINT WILL ILLUMINATE.
 - (C) ACTIVATE A TROUBLE CONTACT CLOSURE TO ACTIVATE A DACT FOR SIGNALING TO A UL-APPROVED CENTRAL MONITORING STATION VIA PHONE LINES FURNISHED BY OWNER.
 - (D) DISPLAY THE SYSTEM STATUS CHANGES ON THE REMOTE ANNUNCIATOR(S) VIA AN ALPHANUMERIC MESSAGE ON THAT DISPLAY.
- C. SYSTEM SUPERVISORY ALARM DETECTION**
WHEN A SUPERVISORY ALARM CONDITION IS DETECTED DUE TO A FIRE SPRINKLER VALVE BEING PLACED IN AN "OFF-NORMAL" POSITION, THE FOLLOWING FUNCTIONS WILL OCCUR:
- (A) THE FIRE ALARM CONTROL PANEL SUPERVISORY INDICATOR WILL FLASH AND THE INTERNAL AUDIBLE DEVICE WILL SOUND. ACKNOWLEDGMENT OF THE SUPERVISORY CONDITION WILL ILLUMINATE THE AUDIBLE DEVICE.
 - (B) THE DISPLAY WILL DISPLAY ALL APPLICABLE INFORMATION ASSOCIATED WITH THE RESPECTIVE SUPERVISORY CONDITION. LOCAL ANNUNCIATOR LED'S WILL ILLUMINATE FOR THE ALARM POINT.
 - (C) DISPLAY THE SYSTEM STATUS CHANGE ON THE REMOTE ANNUNCIATOR(S) VIA AN ALPHANUMERIC MESSAGE ON THAT DISPLAY.
 - (D) ACTIVATE A SUPERVISORY ALARM CONTACT CLOSURE TO ACTIVATE THE DACT FOR SIGNALING TO A UL-APPROVED CENTRAL MONITORING STATION VIA PHONE LINES FURNISHED BY OWNER.
- D. FIRE ALARM PANEL**
FIRE ALARM PANEL SHALL BE INTELLIGENT DIGITAL PROTOCOL ANALOG ADDRESSABLE FIRE ALARM SYSTEM. THIS SYSTEM SHALL INCLUDE, BUT NOT BE LIMITED TO SYSTEM CABINET, POWER SUPPLY, BUILT SIGNALING LINE CIRCUIT (S.L.C.), 80 CHARACTER LCD ANNUNCIATOR, SIX PROGRAMMABLE "FLEXPUT" CIRCUITS, BUILT IN DUAL LINE DIGITAL COMMUNICATOR ASSOCIATED PERIPHERAL DEVICES, BATTERIES, WIRING, CONDUIT AND OTHER RELEVANT COMPONENTS AND ACCESSORIES REQUIRED TO FURNISH A COMPLETE AND OPERATIONAL LIFE SAFETY SYSTEM. THE SYSTEM SHALL BE TESTED AFTER COMPLETION OF INSTALLATION IN ACCORDANCE WITH MANUFACTURE RECOMMENDED TESTING PROCEDURE AND GOVERNING LIFE SAFETY CODES.



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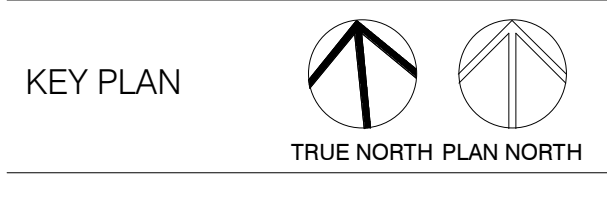
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A PROJECT FOR:
CULINARY ARTS SHELL INTERIOR BUILDOUT

#	Date	ISSUED FOR
	2020/04/15	PERMIT AND BIDDING
1	2020/05/15	ADDENDUM #1

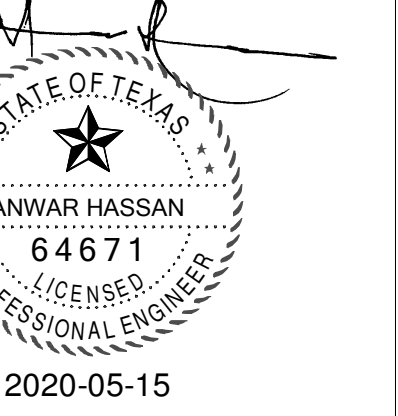
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Project Number	17024
Drawn By	Author
Checked By	Checker
Approved By	Approver

Drawing Title
ENLARGED PLANS - FIRE ALARM

Drawing Number
E4.01



**CULINARY ARTS SHELL
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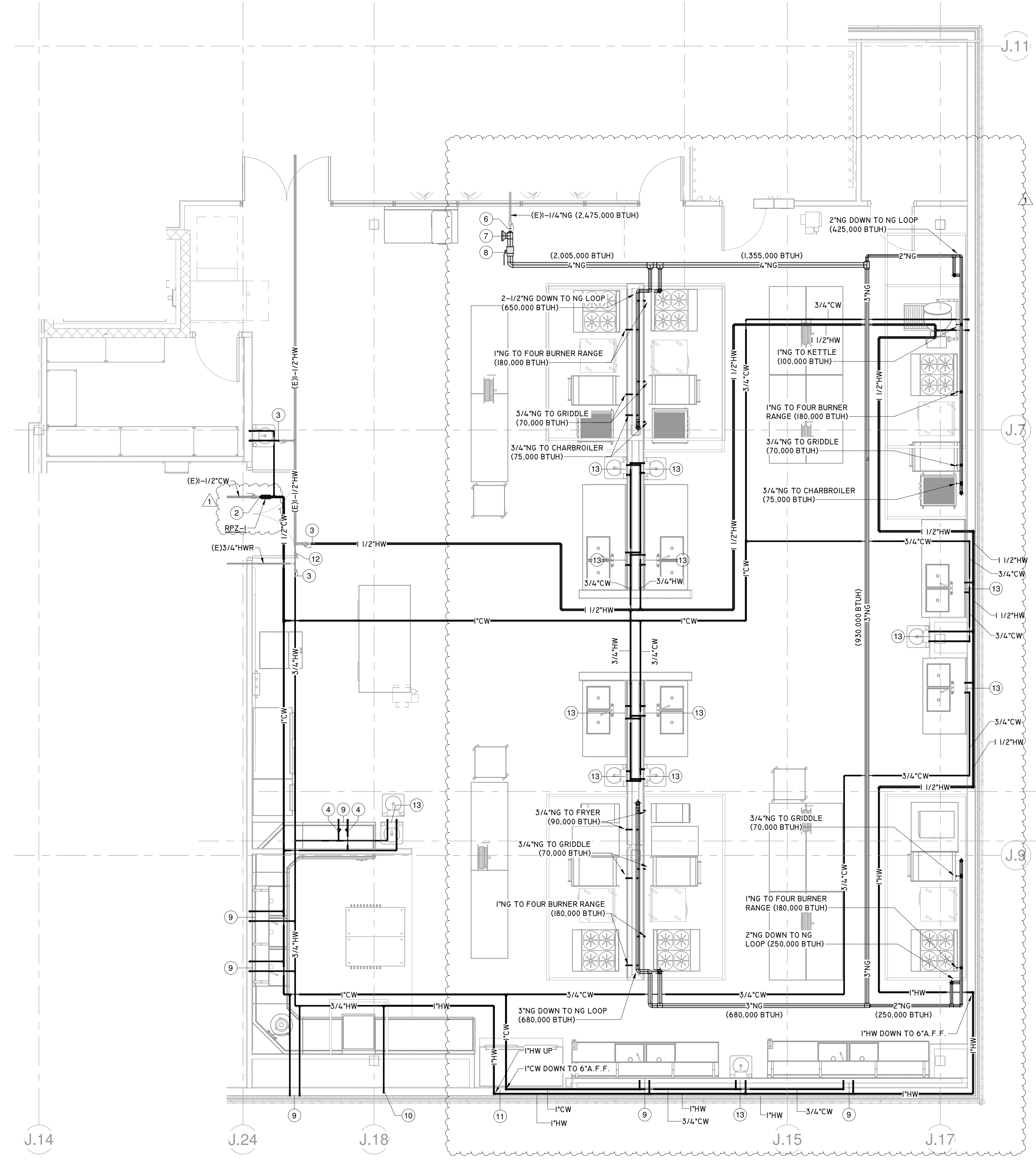


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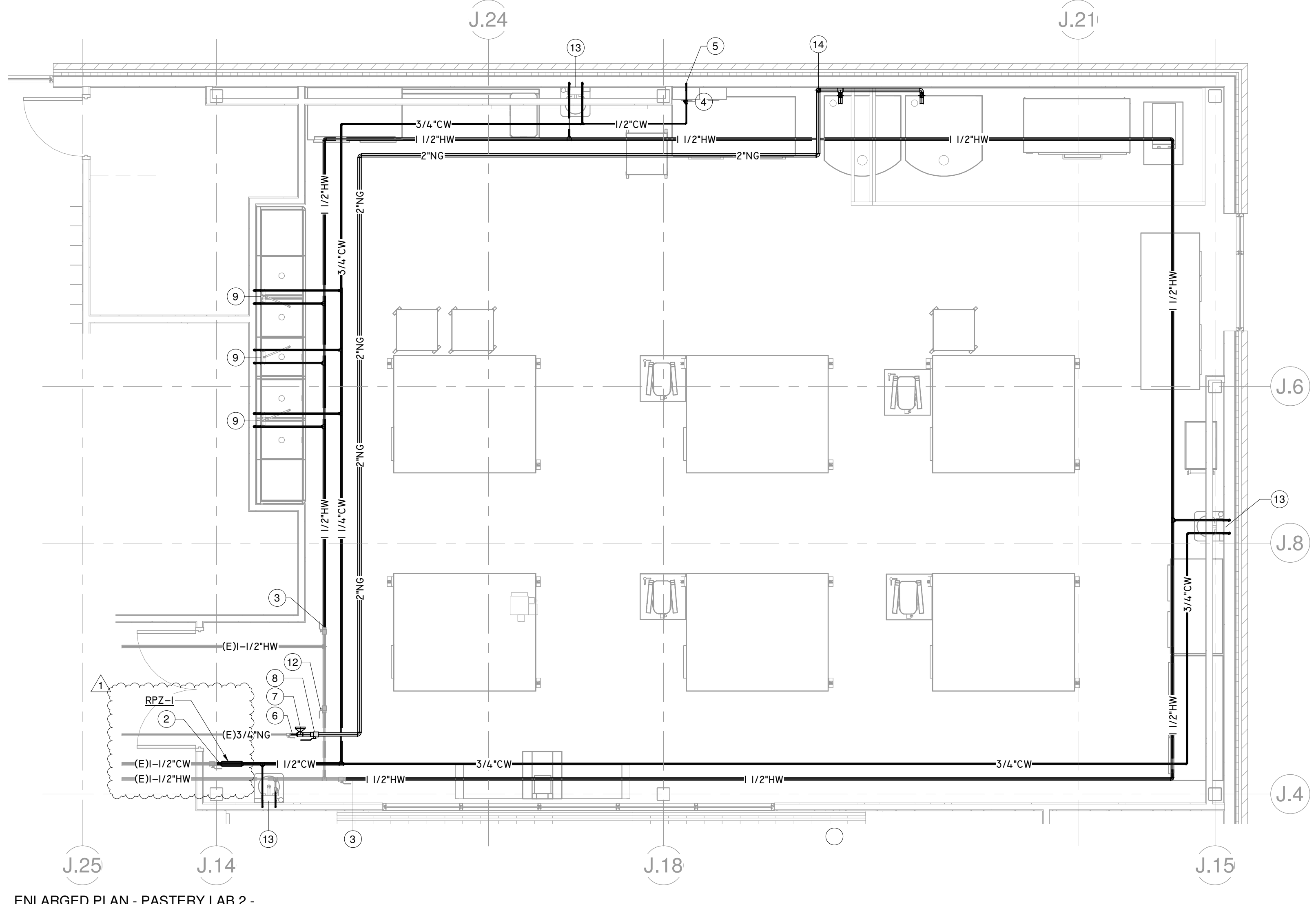
Drawing Title
**SECOND FLOOR -
ENLARGED PLANS**

Drawing Number
P3.01

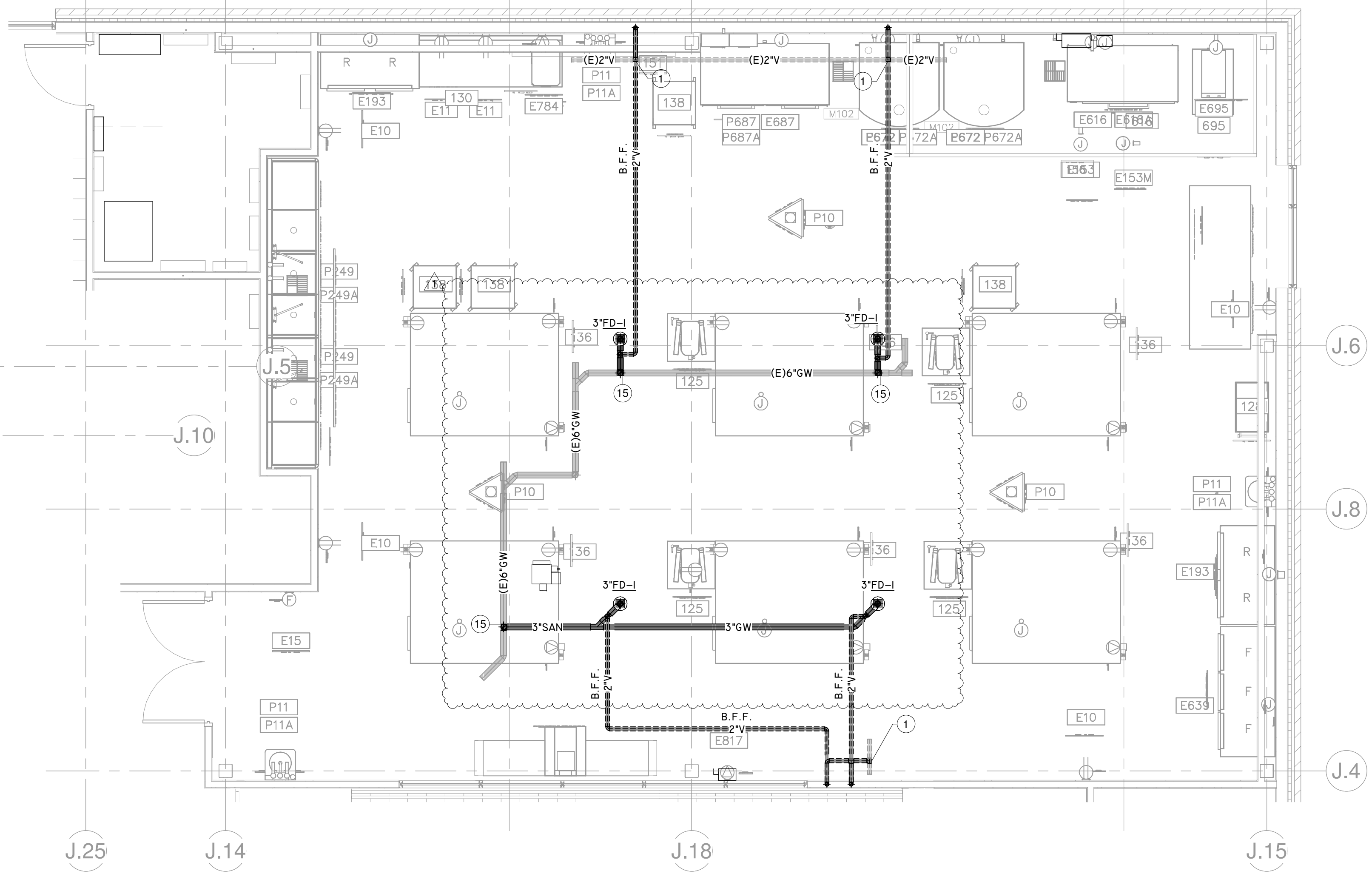
KEYNOTE LEGEND	
1	ROUTE V LINE TO EXISTING VENT LINE APPROXIMATELY THIS POINT. FIELD VERIFY EXACT LOCATION AND SIZE OF EXISTING PIPE.
2	ROUTE CW LINE TO EXISTING COLD WATER LINE APPROXIMATELY THIS POINT. FIELD VERIFY EXACT LOCATION AND SIZE OF EXISTING PIPE.
3	ROUTE HW LINE TO EXISTING COLD WATER LINE APPROXIMATELY THIS POINT. FIELD VERIFY EXACT LOCATION AND SIZE OF EXISTING PIPE.
4	BACKFLOW PREVENTER
5	1/2" CW DOWN TO ROOFER.
6	ROUTE NG LINE TO EXISTING NATURAL GAS LINE APPROXIMATELY THIS POINT. FIELD VERIFY EXACT LOCATION AND SIZE OF EXISTING PIPE.
7	PRESSURE REGULATOR (FROM 5PSI DOWN TO 1/4" OF WC)
8	AUTOMATIC GAS SHUT-OFF VALVE CONNECTED TO FIRE ALARM SYSTEM IN DIVISION 26.
9	3/4" CW AND 3/4" HW DOWN TO FOOD SERVICE EQUIPMENT.
10	3/4" HW TO DISHWASHER.
11	ROUTE 1" CW DOWN & 1" HW UP IN WALL AND RUN LATERAL TO FIXTURES.
12	EXISTING HW BYPASS VALVE, SET TO NORMALLY CLOSED.
13	3/4" CW AND 3/4" HW DOWN TO FIXTURE.
14	2" NG DOWN TO SERVE GAS LOAD UNDER HOOD.
15	ROUTE GREASE WASTE LINE TO EXISTING GREASE WASTE LINE APPROXIMATELY THIS POINT. FIELD VERIFY EXACT LOCATION, SIZE, DIRECTION OF FLOW AND DEPTH OF BURY OF EXISTING PIPE.



ENLARGED PLAN - CULINARY LAB 2 - DOMESTIC
1/4" = 1'-0"



ENLARGED PLAN - PASTERY LAB 2 - DOMESTIC
1/4" = 1'-0"



ENLARGED PLAN - PASTERY LAB 2 - SANITARY
1/4" = 1'-0"

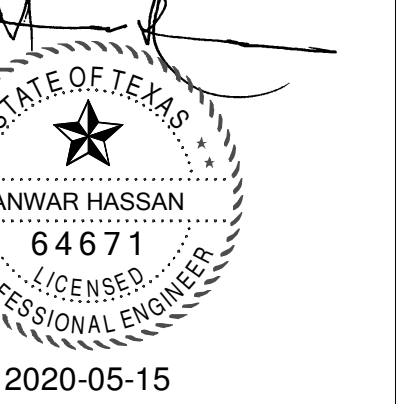
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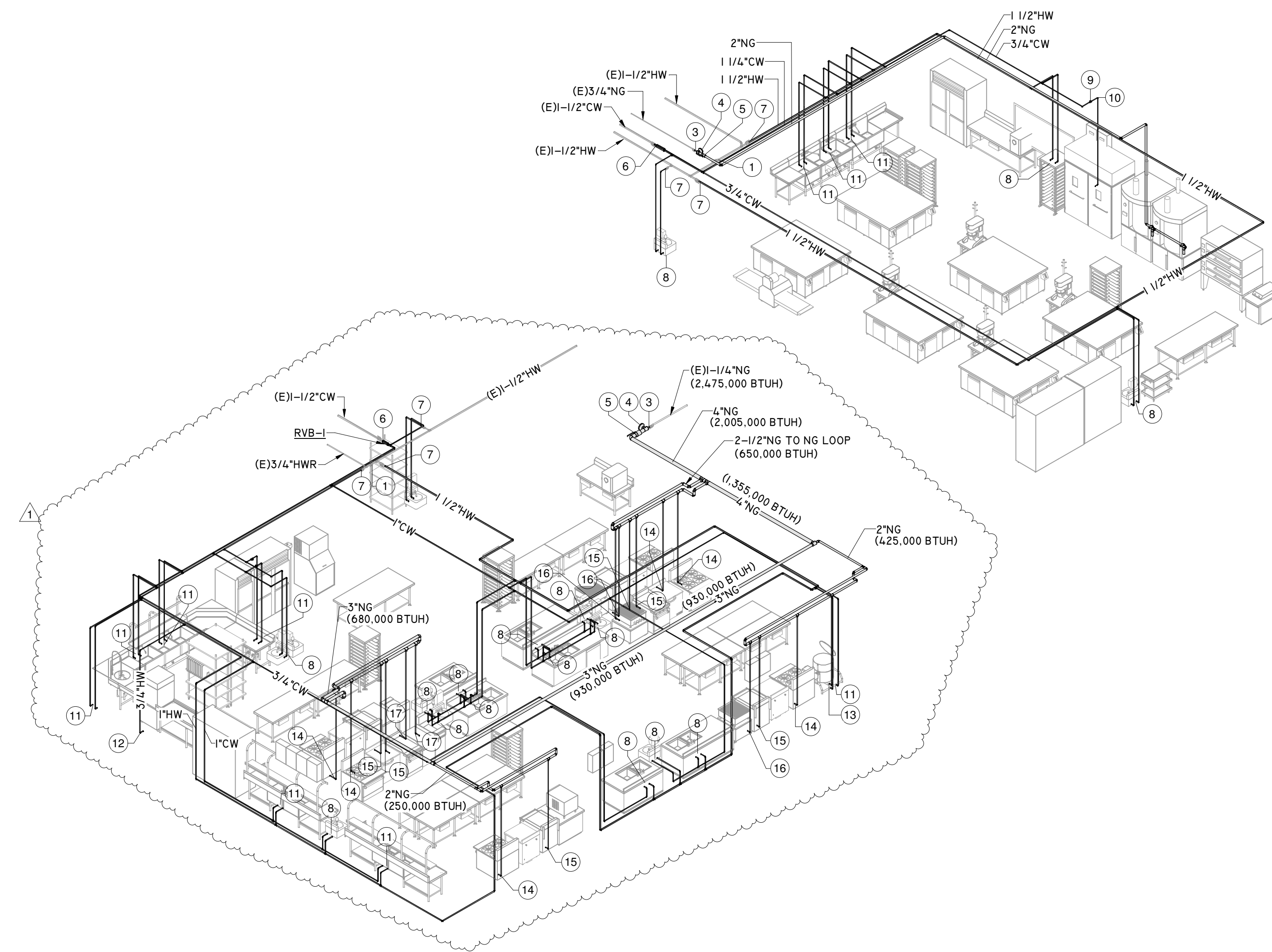
PROFESSIONAL SEAL:



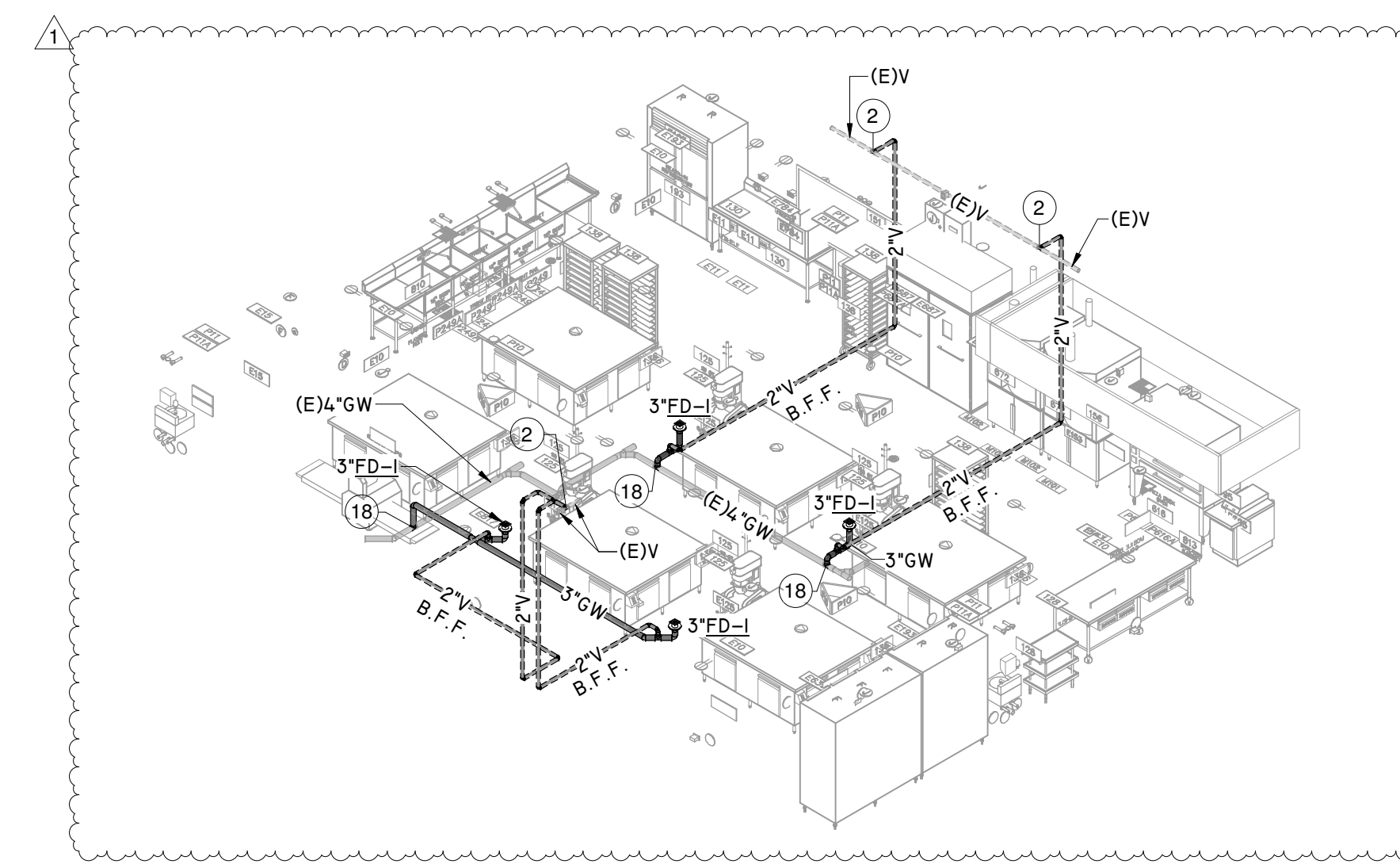
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BUILDOUT

KEYNOTE LEGEND	
1	EXISTING HW BYPASS VALVE. SET TO NORMALLY CLOSED
2	ROUTE V LINE TO EXISTING VENT LINE APPROXIMATELY THIS POINT. FIELD VERIFY EXACT LOCATION AND SIZE OF EXISTING PIPE.
3	ROUTE NG LINE TO EXISTING NATURAL GAS LINE APPROXIMATELY THIS POINT. FIELD VERIFY EXACT LOCATION AND SIZE OF EXISTING PIPE.
4	PRESSURE REGULATOR (FROM 5PSI DOWN TO 1/4" OF WC)
5	AUTOMATIC GAS SHUT-OFF VALVE CONNECTED TO FIRE ALARM SYSTEM IN DIVISION 26.
6	ROUTE CW LINE TO EXISTING COLD WATER LINE APPROXIMATELY THIS POINT. FIELD VERIFY EXACT LOCATION AND SIZE OF EXISTING PIPE.
7	ROUTE HW LINE TO EXISTING COLD WATER LINE APPROXIMATELY THIS POINT. FIELD VERIFY EXACT LOCATION AND SIZE OF EXISTING PIPE.
8	3/4"CW AND 3/4"HW DOWN TO FIXTURE.
9	BACKFLOW PREVENTER.
10	1/2"CW DOWN TO PROOFER.
11	3/4"CW AND 3/4"HW DOWN TO FOOD SERVICE EQUIPMENT.
12	3/4"HW TO DISHWASHER.
13	1"NG TO KETTLE (100,000 BTUH)
14	1"NG TO FOUR BURNER RANGE (180,000 BTUH)
15	3/4"NG TO GRIDDLE (70,000 BTUH)
16	3/4"NG TO CHARBROILER (75,000 BTUH)
17	3/4"NG TO FRYER (90,000 BTUH)
18	ROUTE GREASE WASTE LINE TO EXISTING GREASE WASTE LINE APPROXIMATELY THIS POINT. FIELD VERIFY EXACT LOCATION, SIZE, DIRECTION OF FLOW AND DEPTH OF BURY OF EXISTING PIPE.



2 DOMESTIC RISER DIAGRAM



1 SANITARY RISER DIAGRAM



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KEY PLAN



Project Number	17024
Drawn By	Author
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Approved By	Approver
Drawing Title	

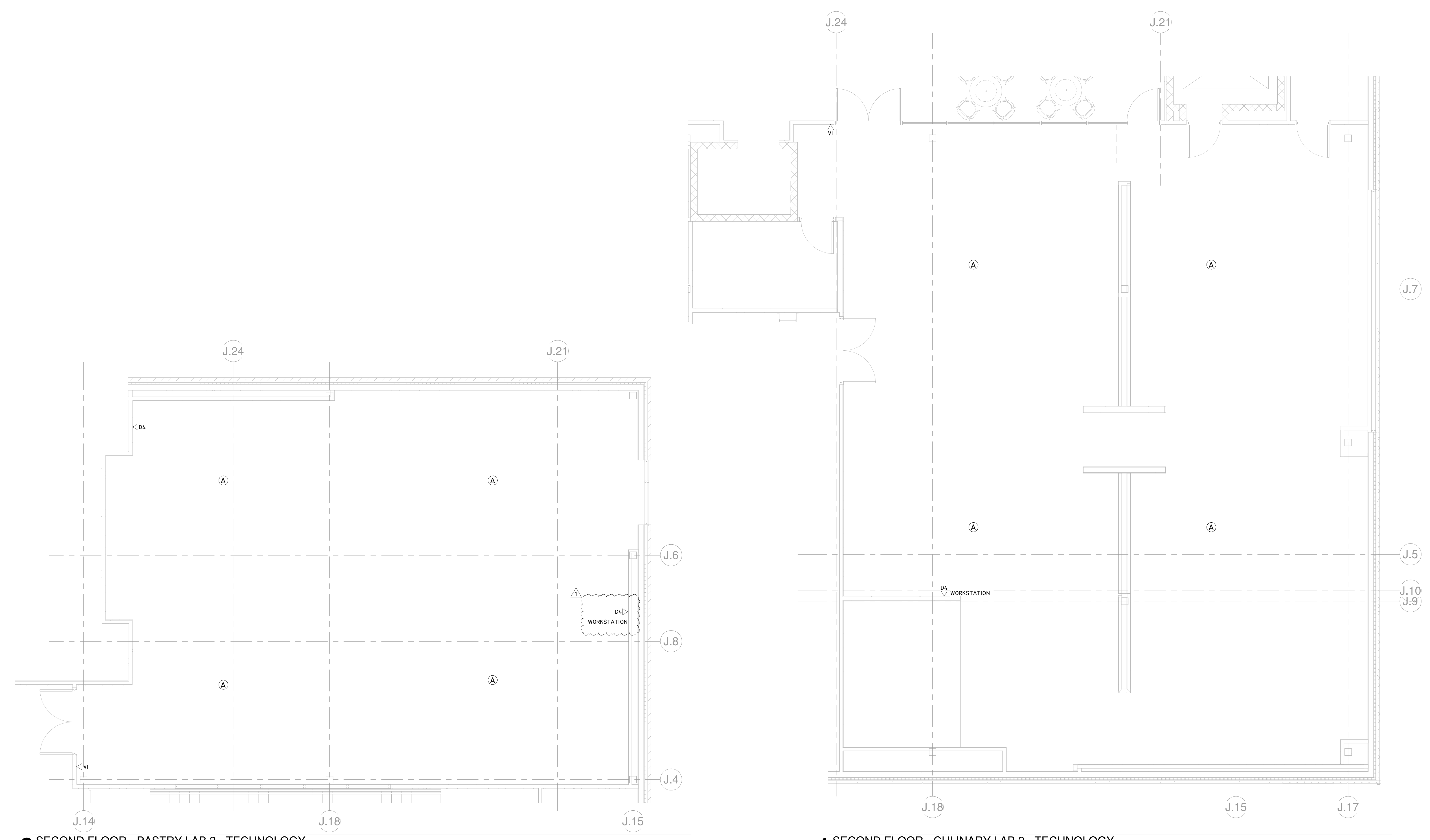
RISER DIAGRAMS

Drawing Number P4.01

#	Date	ISSUED FOR
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1	2020/05/15	ADDENDUM #1

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TECHNOLOGY PLAN IS SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL PROVIDE PATHWAYS FOR ALL DEVICES SHOWN. COORDINATE WITH HCC IT FOR FINAL LOCATIONS.



2 SECOND FLOOR - PASTRY LAB 2 - TECHNOLOGY
Scale: 1/4" = 1'-0"

1 SECOND FLOOR - CULINARY LAB 2 - TECHNOLOGY
Scale: 1/4" = 1'-0"



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PROFESSIONAL SEAL:



2020-05-15

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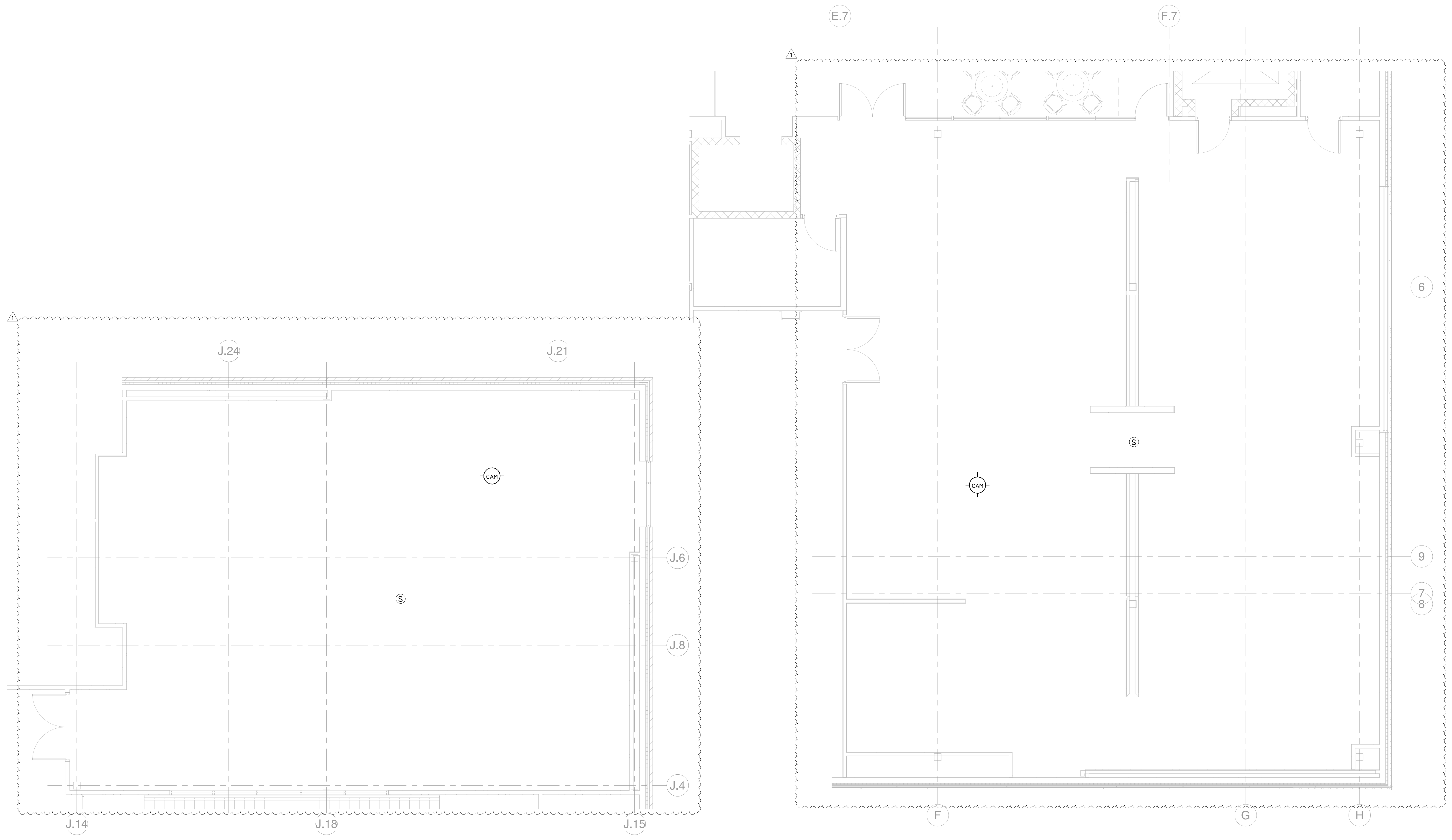


Project Number	17024
Drawn By	Author
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Drawing Title
AUDIO VISUAL - ENLARGED PLAN

Drawing Number
T1.04

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2 SECOND FLOOR - PASTRY LAB 2 - AUDIO VISUAL
Scale: 1/4" = 1'-0"

1 SECOND FLOOR - CULINARY LAB 2 - AUDIO VISUAL
Scale: 1/4" = 1'-0"

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