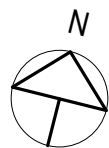


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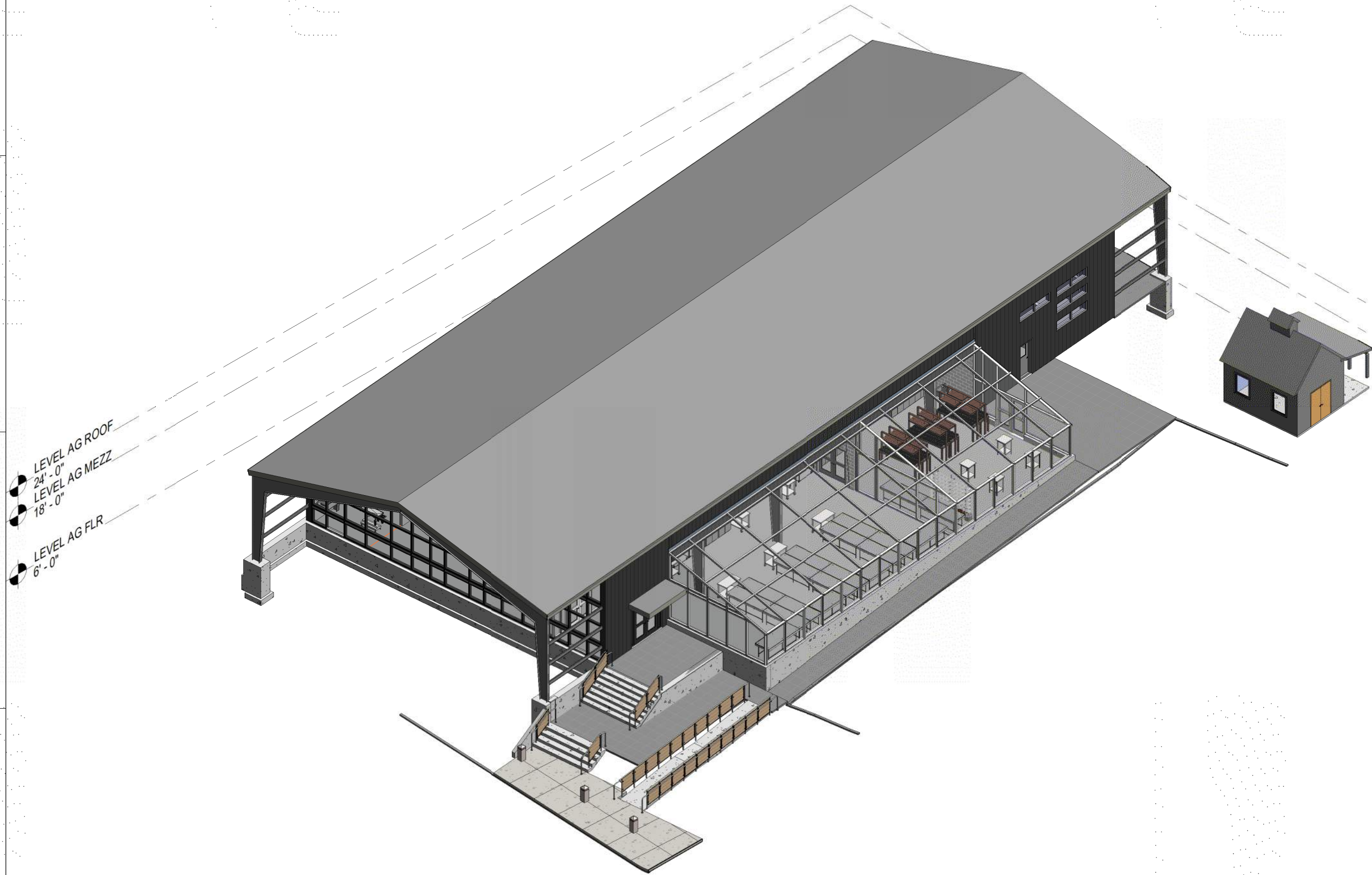
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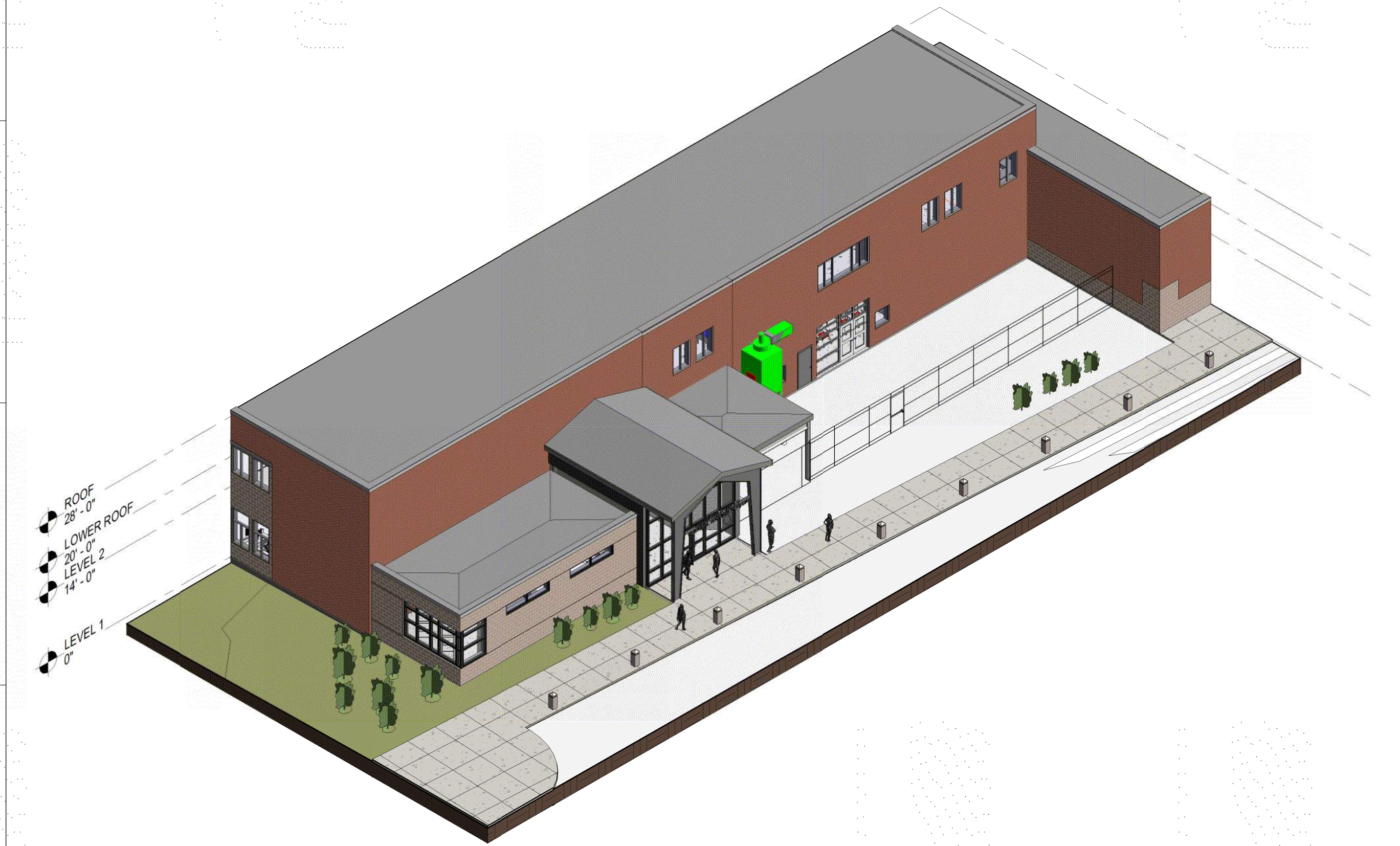
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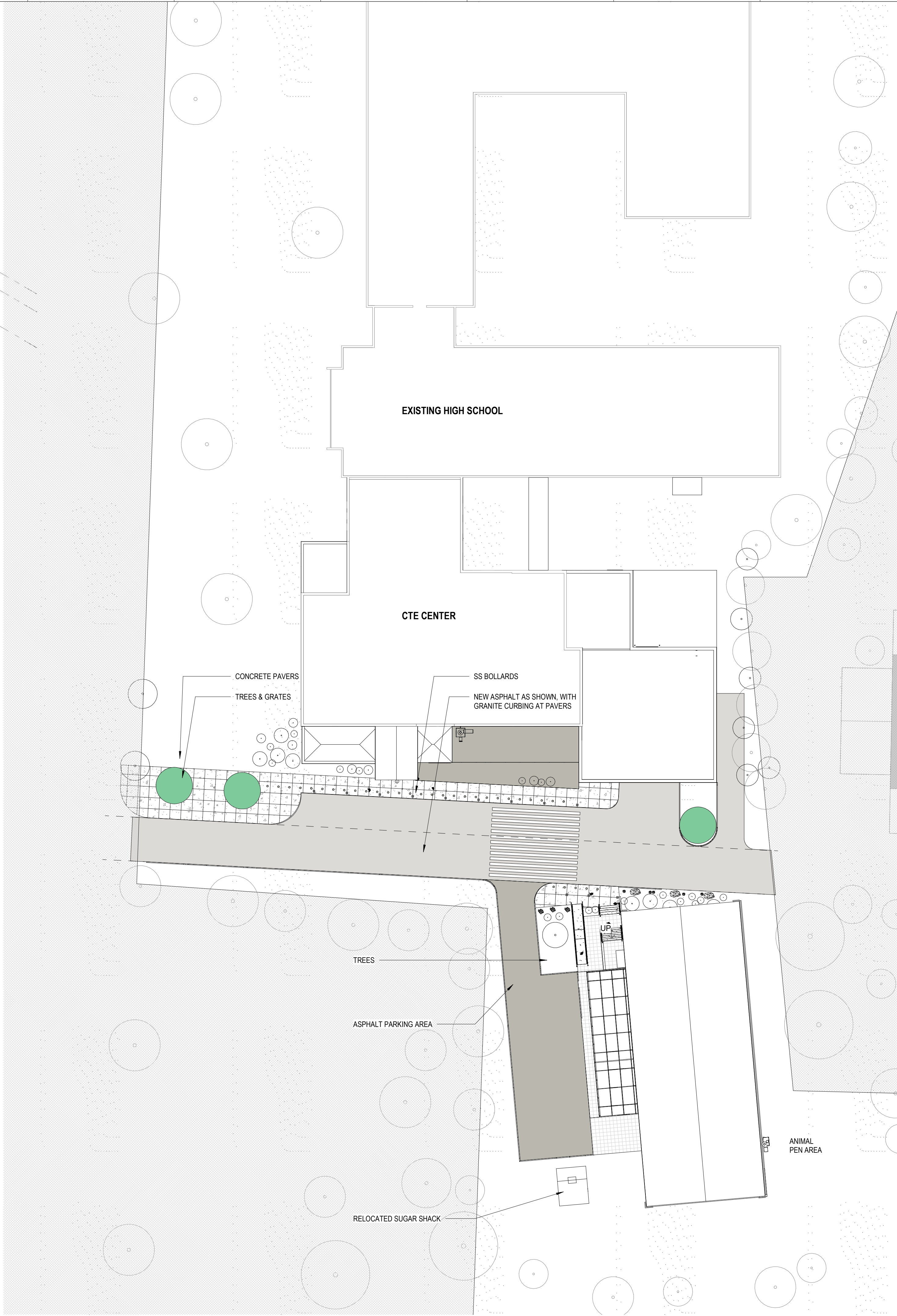
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PROJECT NO:	20-058-00
DATE:	08/27/2021
REVISED:	
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A1-0	
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3 NEW AGRICULTURE BLDG AXON  
A1-0



2 ENTRY ADDITION AXON  
A1-0



1 SITE PLAN - NEW  
A1-0 1/32" = 1'-0"



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CONTENT: First Floor - Existing & Demolition	
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DATE:	08/27/2021
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SCALE:	As indicated
A1-1	
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- ADDITION
- DEMO
- FINISHES
- MEP
- RENO 1
- RENO 2

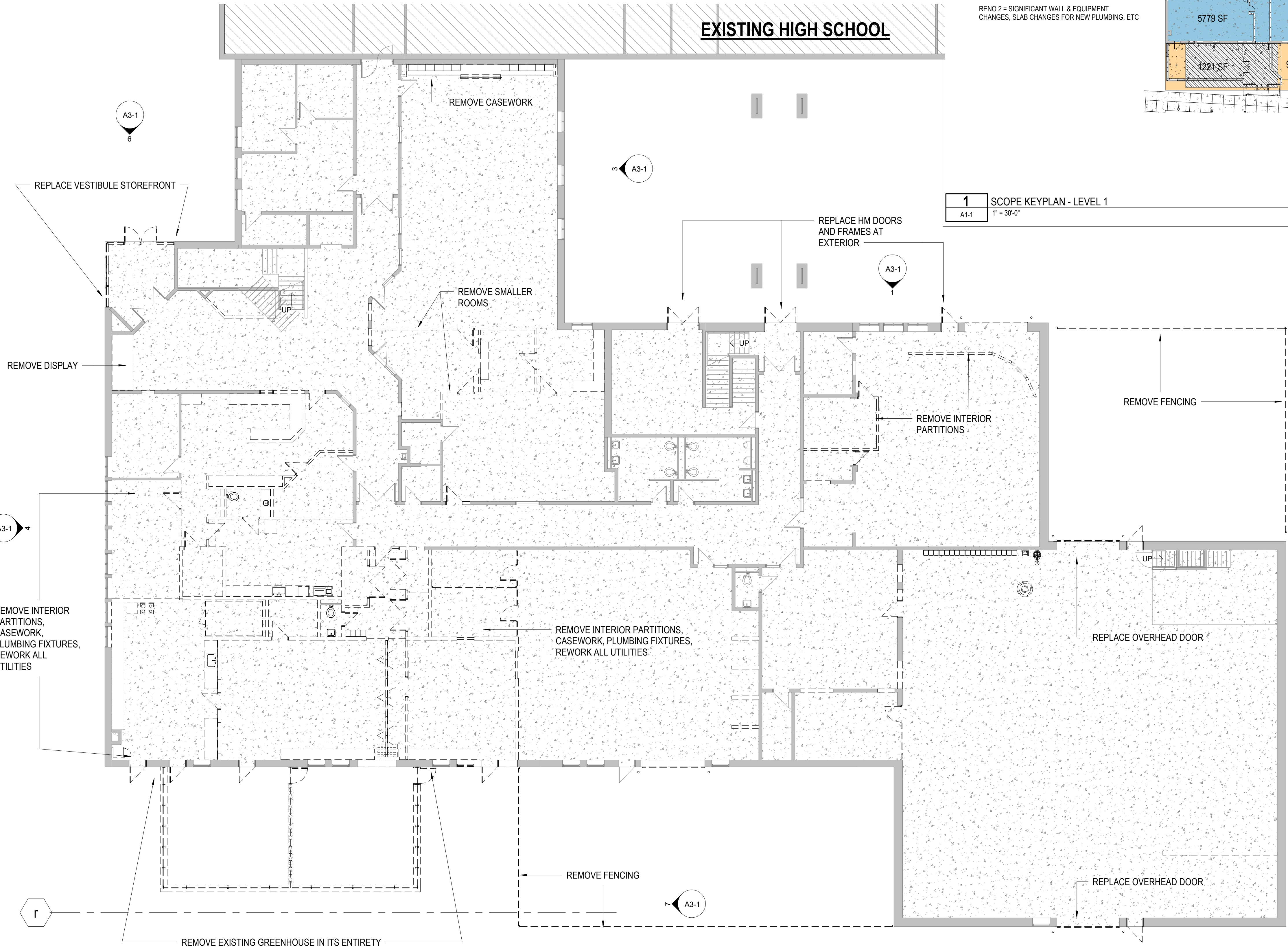
NOTES:  
DEMO AREAS REPLACED BY ADDITIONS  
FINISHES = FLOORING, CEILING REPLACEMENT, PAINT & FIXTURE REPLACEMENT  
RENO 1 = MODEST WALL & EQUIPMENT CHANGES, ALL NEW FINISHES  
RENO 2 = SIGNIFICANT WALL & EQUIPMENT CHANGES, SLAB CHANGES FOR NEW PLUMBING, ETC

NOT IN SCOPE



1 SCOPE KEYPLAN - LEVEL 1  
A1-1 1" = 30'-0"

EXISTING HIGH SCHOOL



H1 LEVEL 1-Demolition  
A1-1 3/32" = 1'-0"

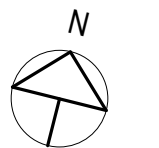


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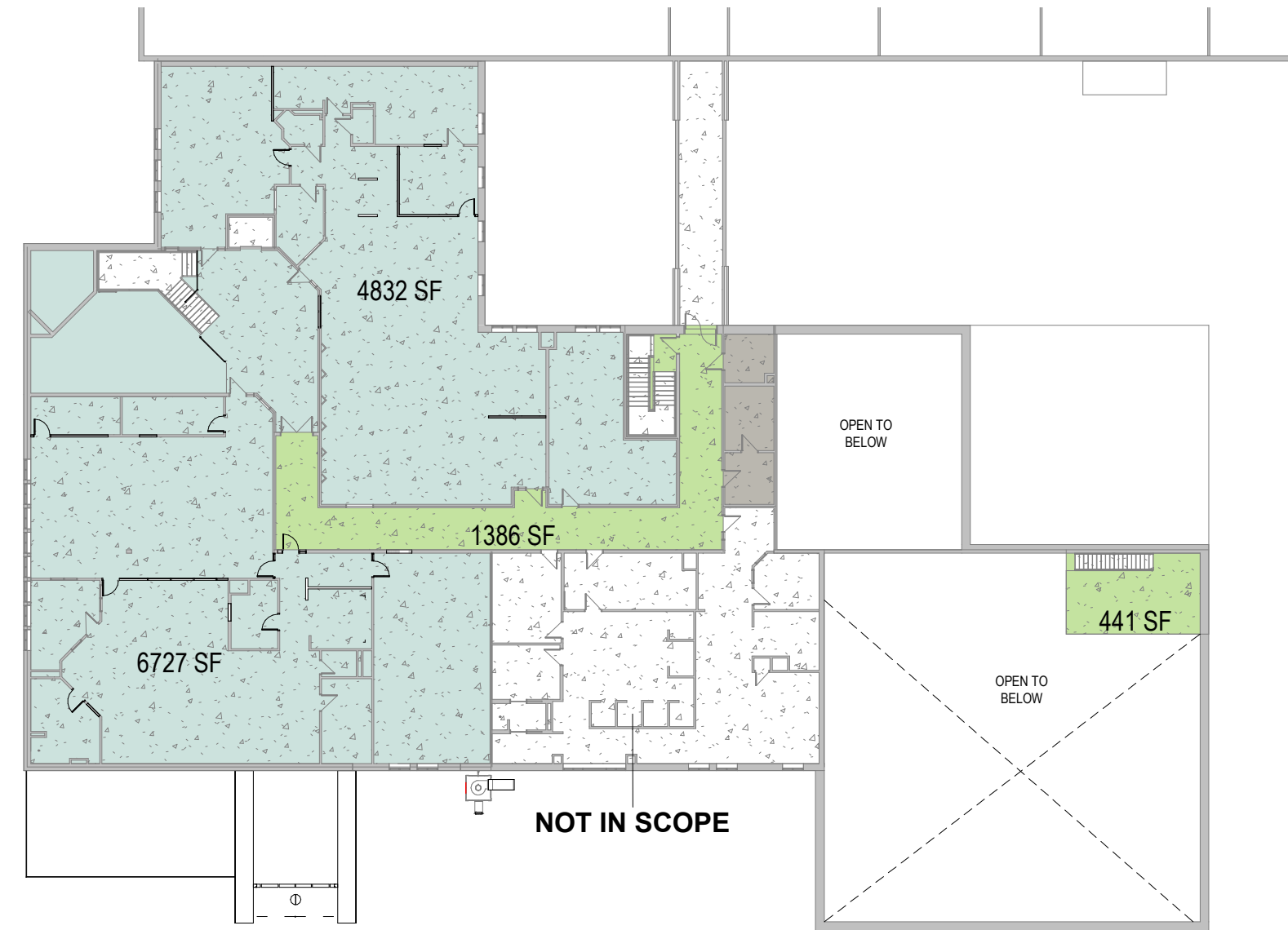
NO.	DESCRIPTION	DATE



CONTENT: Second Floor - Existing & Demolition	
DRAWN BY:	Author
PROJECT NO:	20-058-00
DATE:	08/27/2021
REVISED:	
SCALE:	As indicated
A1-2	
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- ADDITION
- DEMO
- FINISHES
- MEP
- RENO 1
- RENO 2

NOTES:  
DEMO AREAS REPLACED BY ADDITIONS  
FINISHES = FLOORING, CEILING REPLACEMENT, PAINT & FIXTURE REPLACEMENT  
RENO 1 = MODEST WALL & EQUIPMENT CHANGES, ALL NEW FINISHES  
RENO 2 = SIGNIFICANT WALL & EQUIPMENT CHANGES, SLAB CHANGES FOR NEW PLUMBING/ REMOVAL OF PLUMBING, ETC



**1** SCOPE KEYPLAN - LEVEL 2  
A1-2 1" = 30'-0"

**EXISTING HIGH SCHOOL**

REMOVE 3 SINKS

REPLACE FIXTURES, DEMO  
SINK AND TOILET ROOMS

REPLACE ELEVATOR

REMOVE WALLS, PLUMBING,  
LOCKERS, CEILINGS

REMOVE KITCHENETTE

REMOVE EXISTING  
OPERABLE  
PARTITION

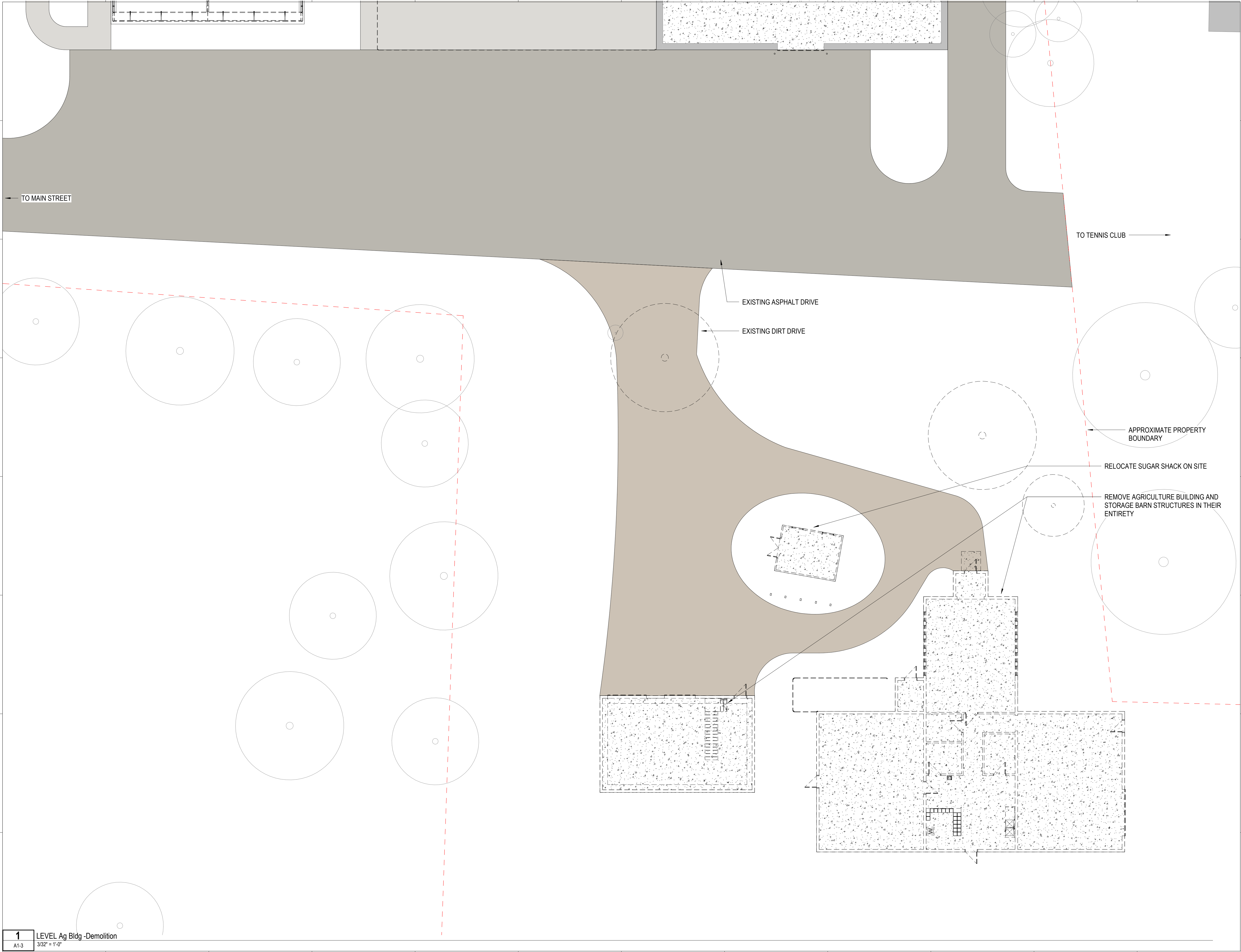
REMOVE CASEWORK

REMOVE WHIRLPOOL TUB

REMOVE  
EXISTING  
LOCKERS

**H1** LEVEL 2 -Demolition  
A1-2 3/32" = 1'-0"





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BRENSINGER**  
ARCHITECTS

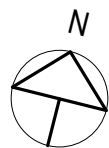
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CONTENT: Agricultural Building - Demolition	
DRAWN BY:	Author
PROJECT NO:	20-058-00
DATE:	08/27/2021
REVISED:	
SCALE:	3/32" = 1'-0"
A1-3	
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**1** LEVEL Ag Bldg -Demolition  
A1-3 3/32" = 1'-0"

1 2 3 4 5 6 7 8 9 10 11 12

H

8/27/2021 3:11:27 PM C:\Projects\20-058-00\_SRVTC Newport\_Arch Central\_V21\_JuliaSpencer.vnt



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B

C

D

E

F

G

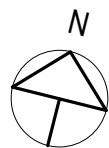
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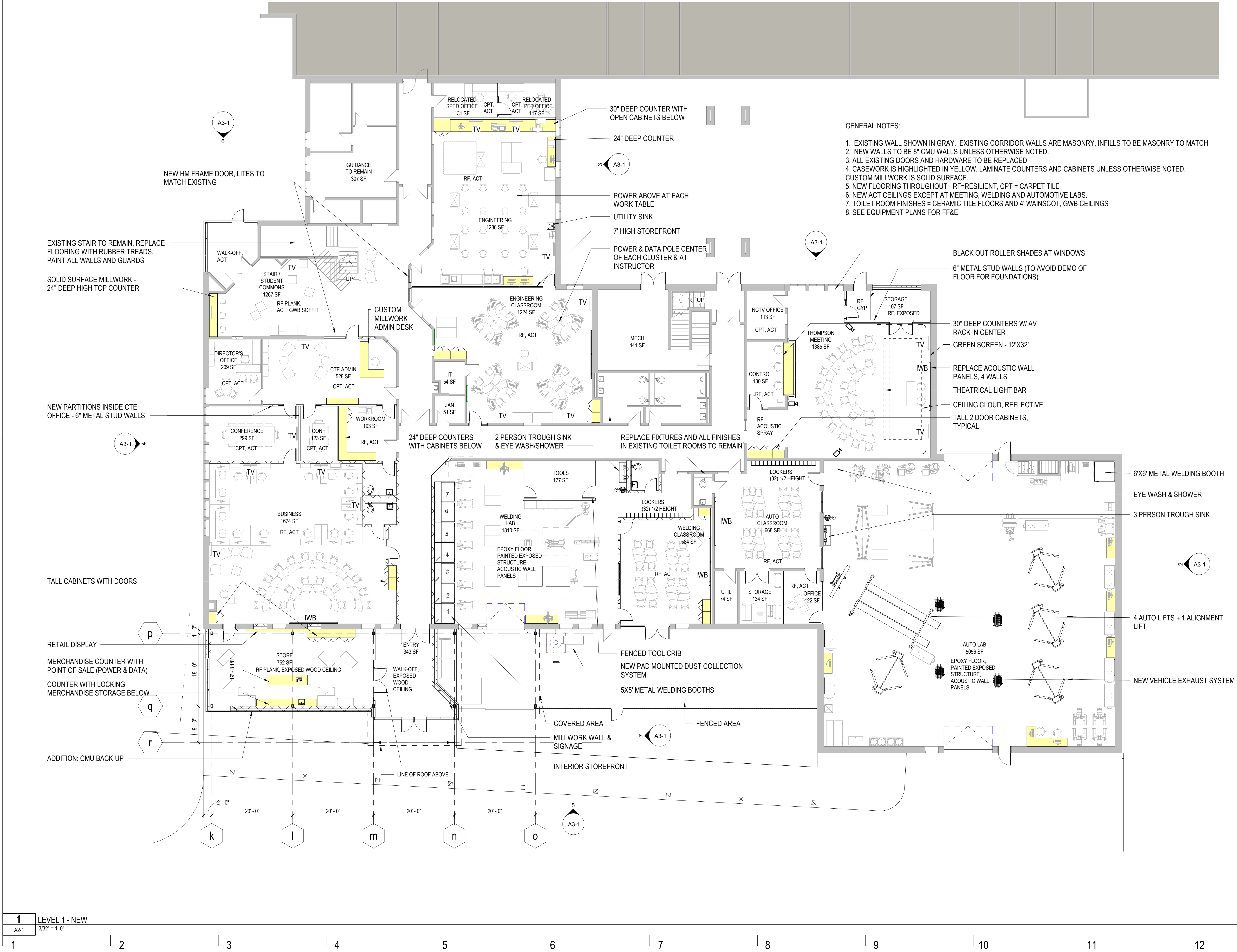
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PROJECT NO:	20-058-00
DATE:	08/27/2021
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SCALE:	3/32" = 1'-0"
<b>A2-1</b>	
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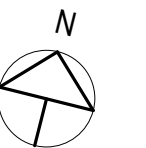
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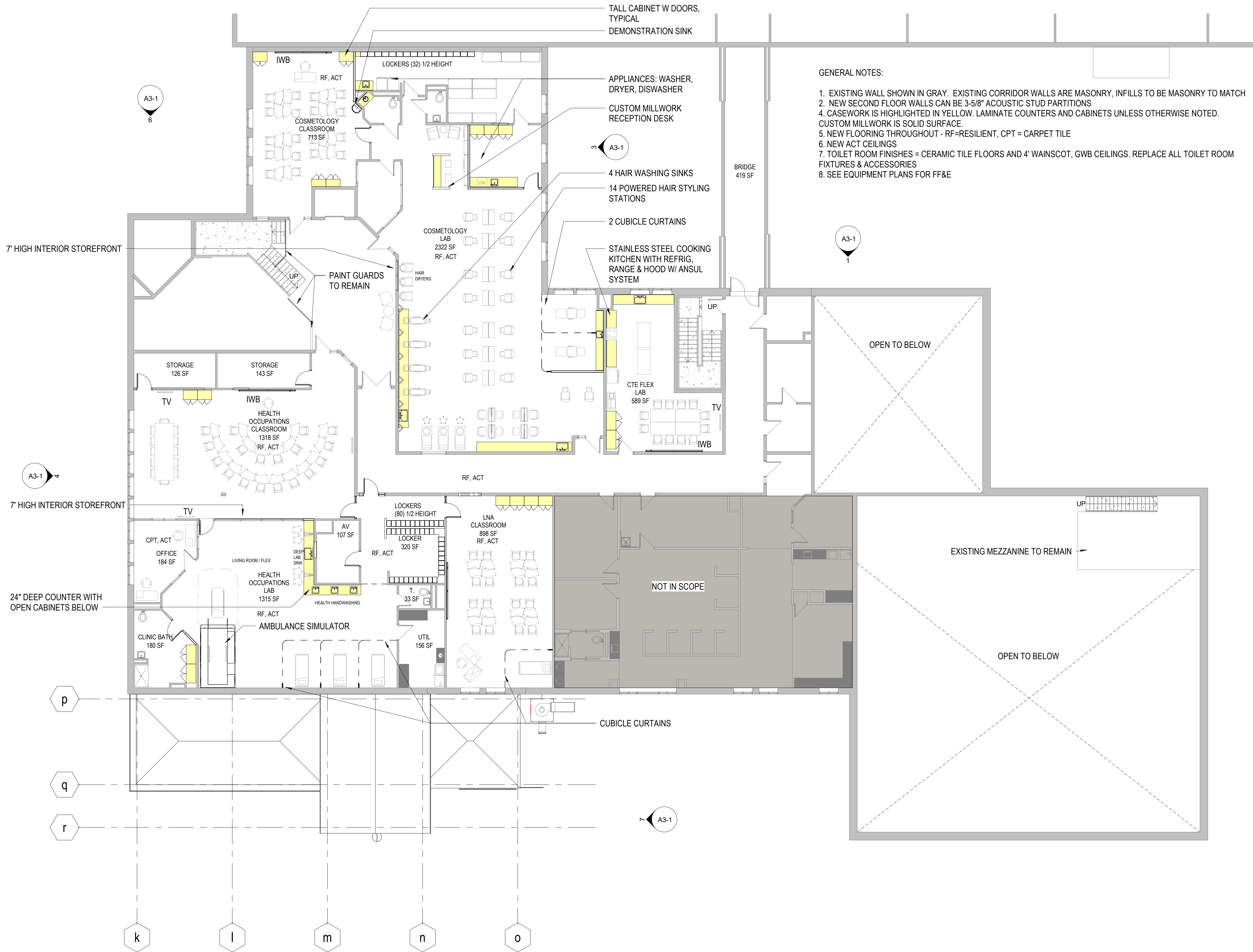
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CONTENT: Second Floor - New Construction	
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PROJECT NO:	20-058-00
DATE:	08/27/2021
REVISED:	
SCALE:	3/32" = 1'-0"
<b>A2-2</b>	
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GENERAL NOTES:

1. EXISTING WALL SHOWN IN GRAY. EXISTING CORRIDOR WALLS ARE MASONRY, INFILLS TO BE MASONRY TO MATCH
2. NEW SECOND FLOOR WALLS CAN BE 3-5/8" ACOUSTIC STUD PARTITIONS
3. CASEWORK IS HIGHLIGHTED IN YELLOW. LAMINATE COUNTERS AND CABINETS UNLESS OTHERWISE NOTED. CUSTOM MILLWORK IS SOLID SURFACE.
4. NEW FLOORING THROUGHOUT - RF=RESILIENT, CPT = CARPET TILE
5. NEW ACT CEILINGS
6. TOILET ROOM FINISHES = CERAMIC TILE FLOORS AND 4" WAINSCOT, GWB CEILINGS. REPLACE ALL TOILET ROOM FIXTURES & ACCESSORIES
7. SEE EQUIPMENT PLANS FOR FF&E

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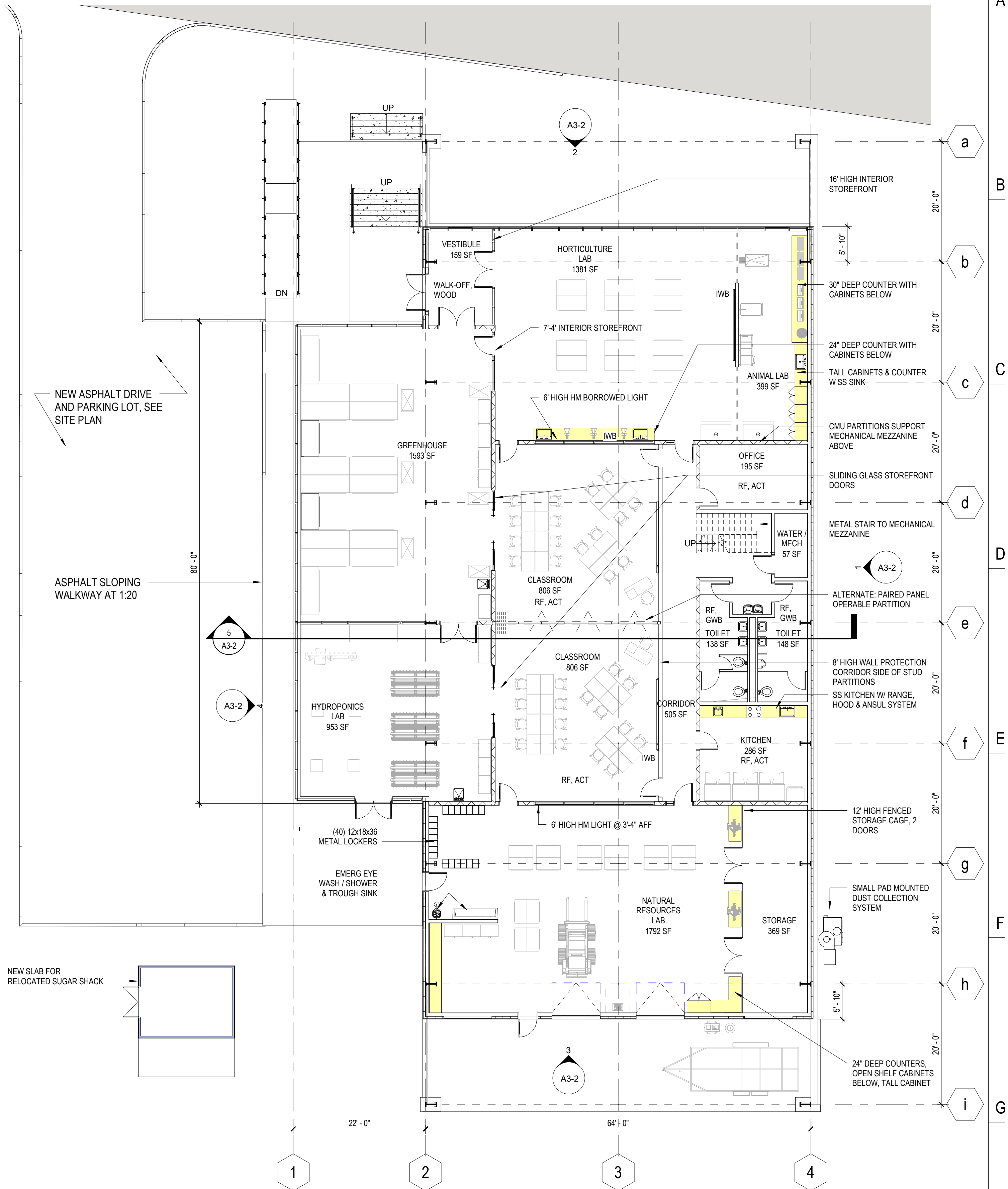
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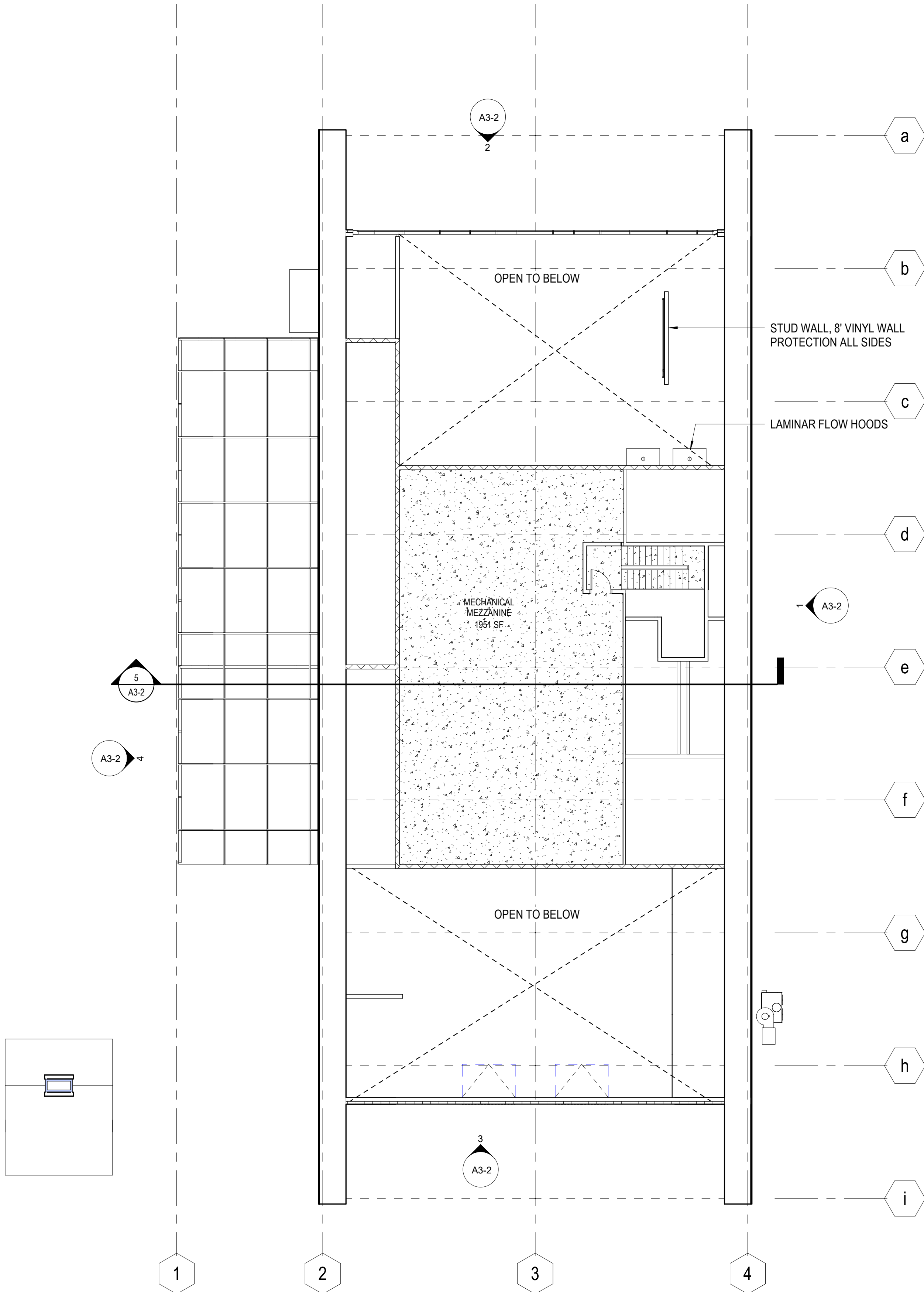
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DATE:	08/27/2021
REVISED:	
SCALE:	3/32" = 1'-0"
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GENERAL NOTES:

1. TYPICAL INTERIOR PARTITIONS TO BE GWB, 6" STUD ACOUSTIC DEMISING WALLS . 8" CMU WALLS SEPARATING GREENHOUSE AND SUPPORTING MEZZANINE FLOOR.
2. CASEWORK IS HIGHLIGHTED IN YELLOW. PHENOLIC COUNTERS AND LAMINATE CABINETS.
3. NEW FLOORING (WALK-OFF) AT VESTIBULE, RESILIENT AT CLASSROOMS, LABS AND GREENHOUSE ARE SEALED CONCRETE.
4. EXPOSED CEILINGS WITH ACOUSTIC WALL AND CEILING PANELS IN LABS, ACT IN CLASSROOMS, OFFICE & KITCHEN, GWB IN TOILETS, ACCENT WOOD CEILING IN VESTIBULE
5. TOILET ROOM FINISHES = RESILEINT SHEET AND 8' VINYL WALL PROTECTION, GWB CEILINGS
6. SEE EQUIPMENT PLANS FOR FF&E

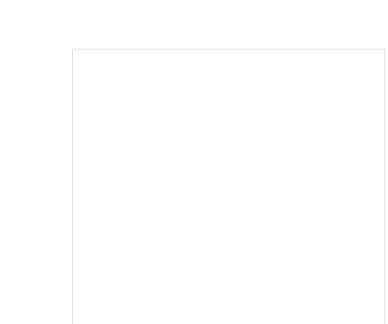
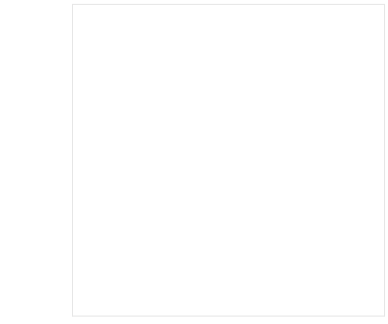


**1** LEVEL Ag Bldg -NEW  
A2-3 3/32" = 1'-0"



**2** Mezzanine - Ag Bldg - New  
A2-3 3/32" = 1'-0"



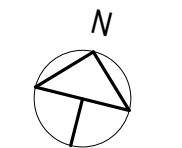


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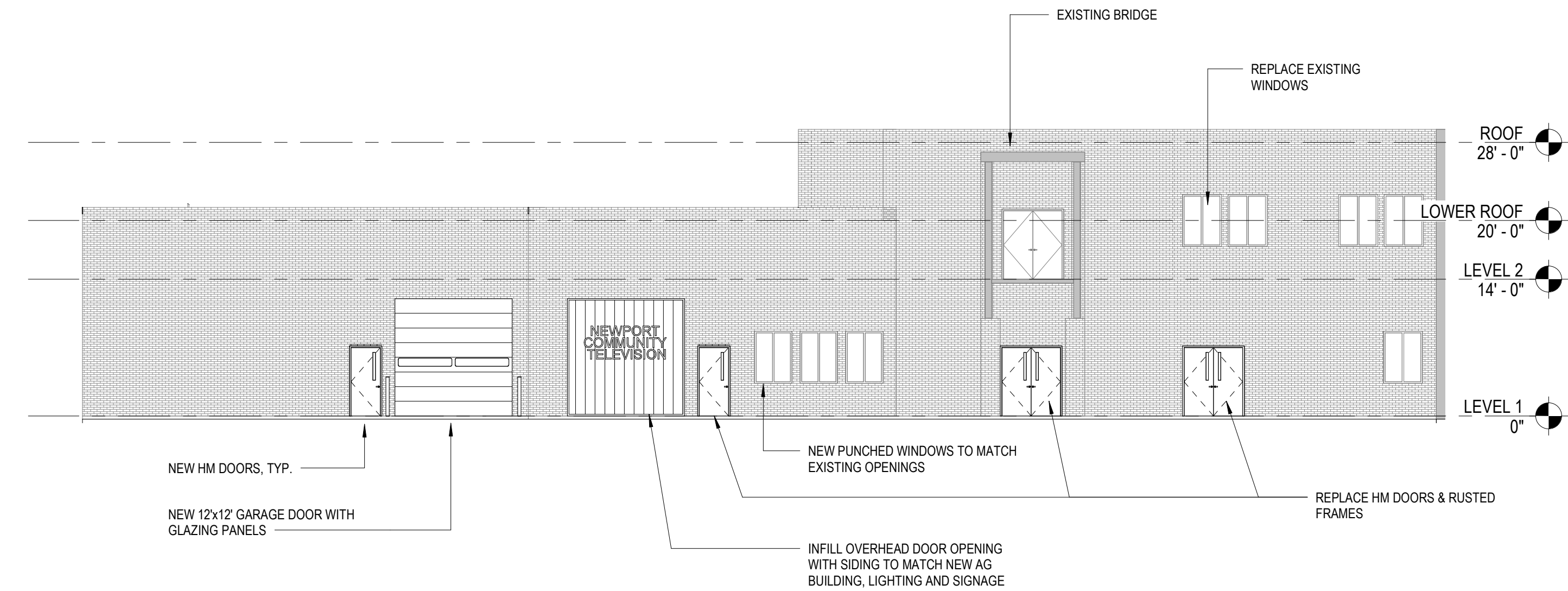
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NEWPORT, NH 03773

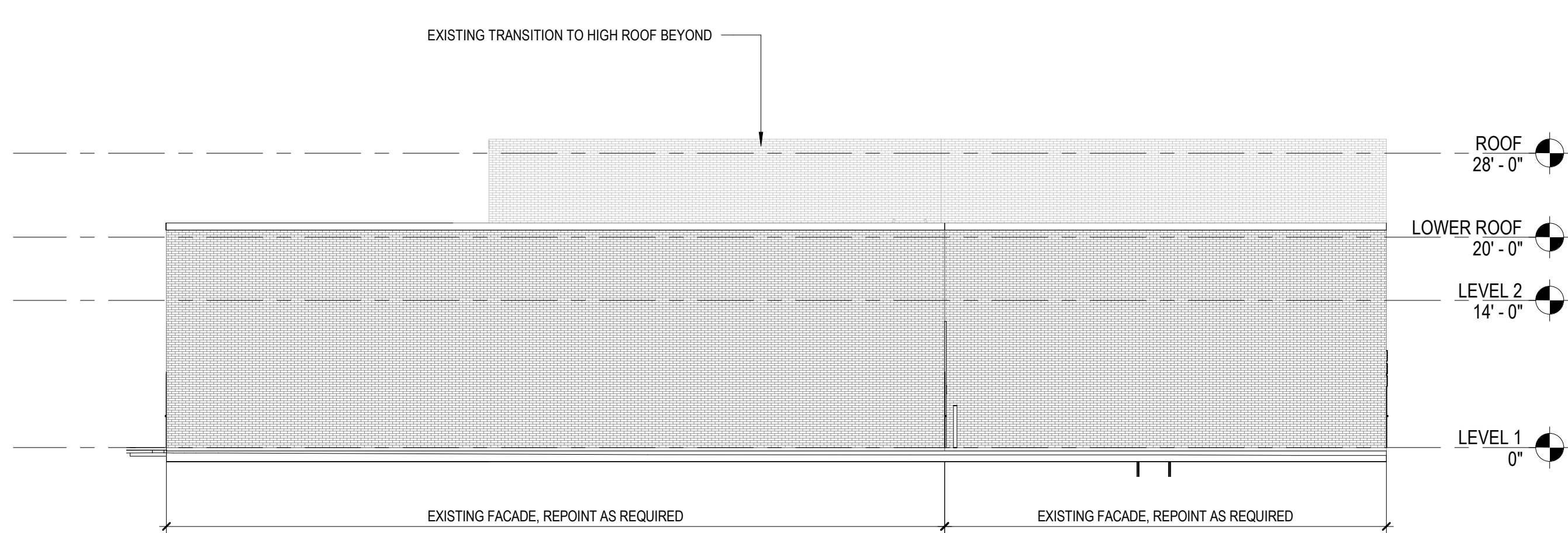
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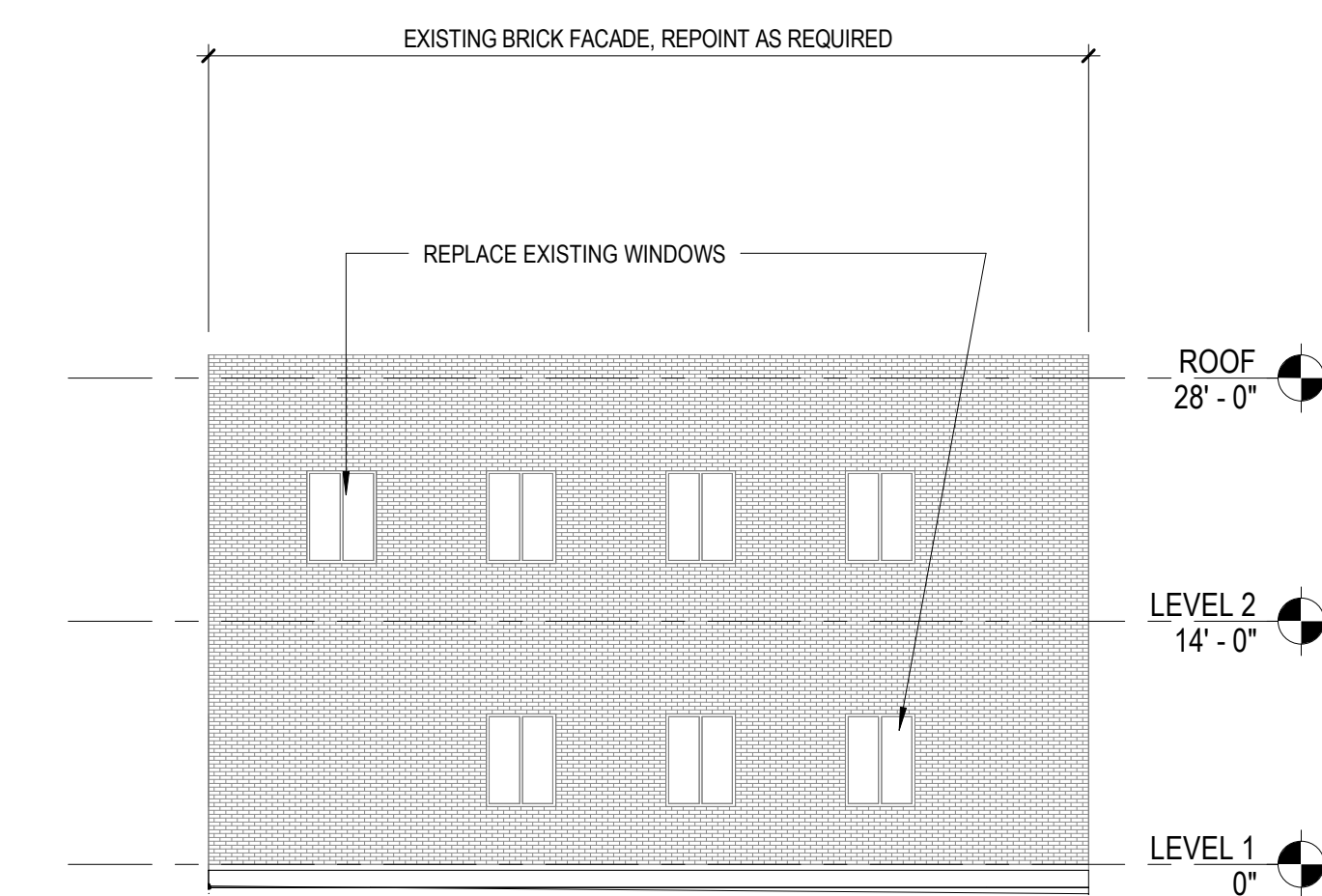
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DRAWN BY:	Author
PROJECT NO:	20-058-00
DATE:	08/27/2021
REVISED:	
SCALE:	3/32" = 1'-0"
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Project Phase CONCEPT PRICING	
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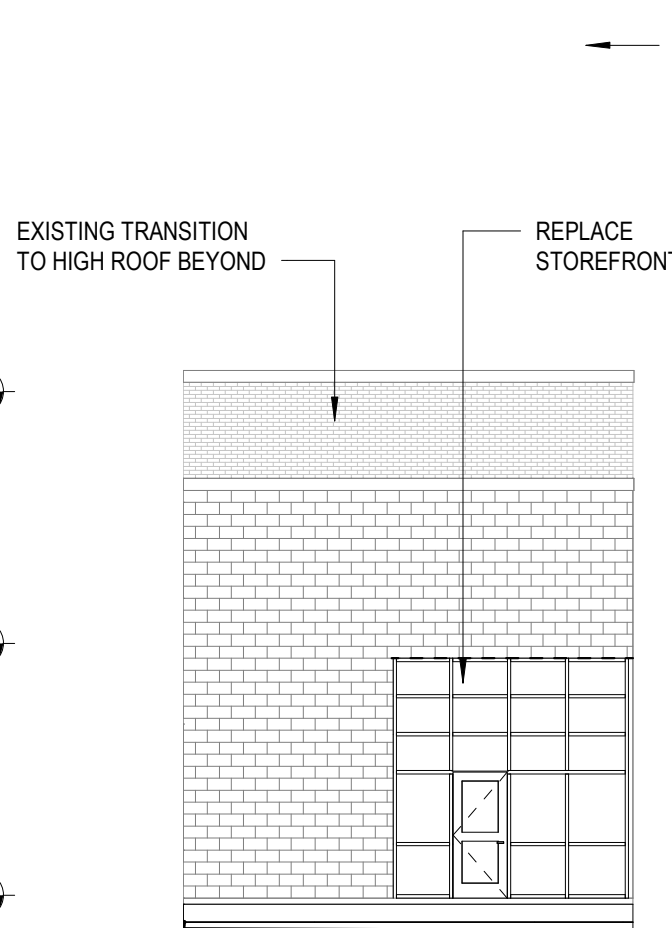
**1** Elevation North  
A3-1 3/32" = 1'-0"



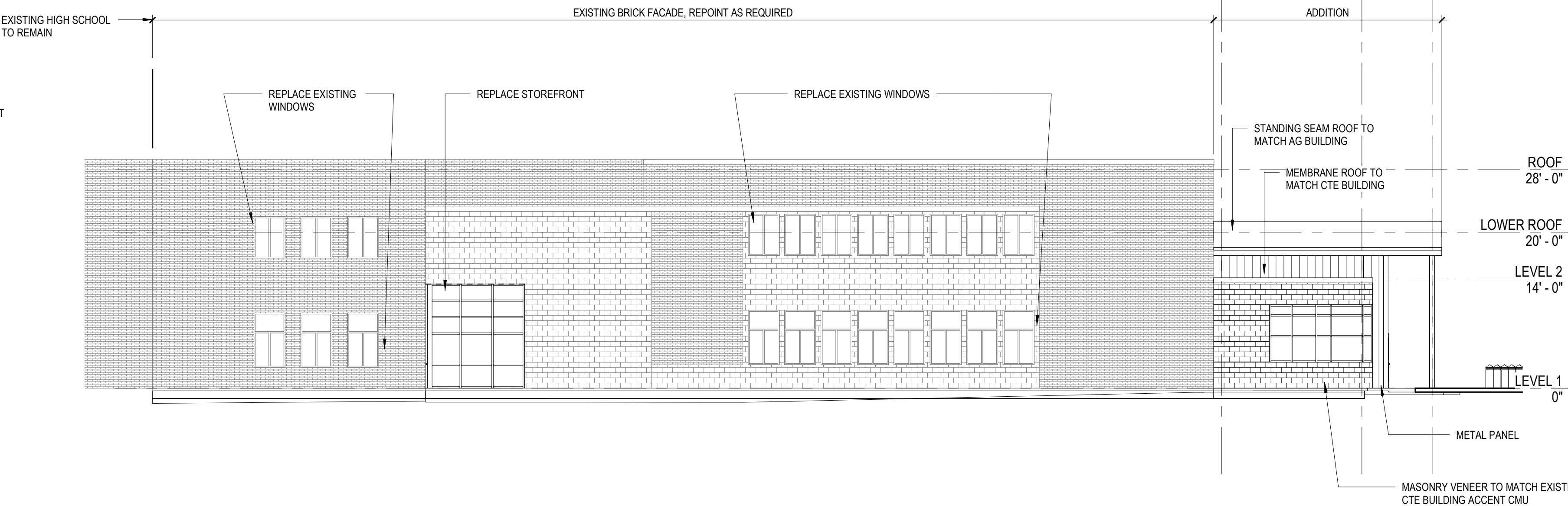
**2** Elevation East 1  
A3-1 3/32" = 1'-0"



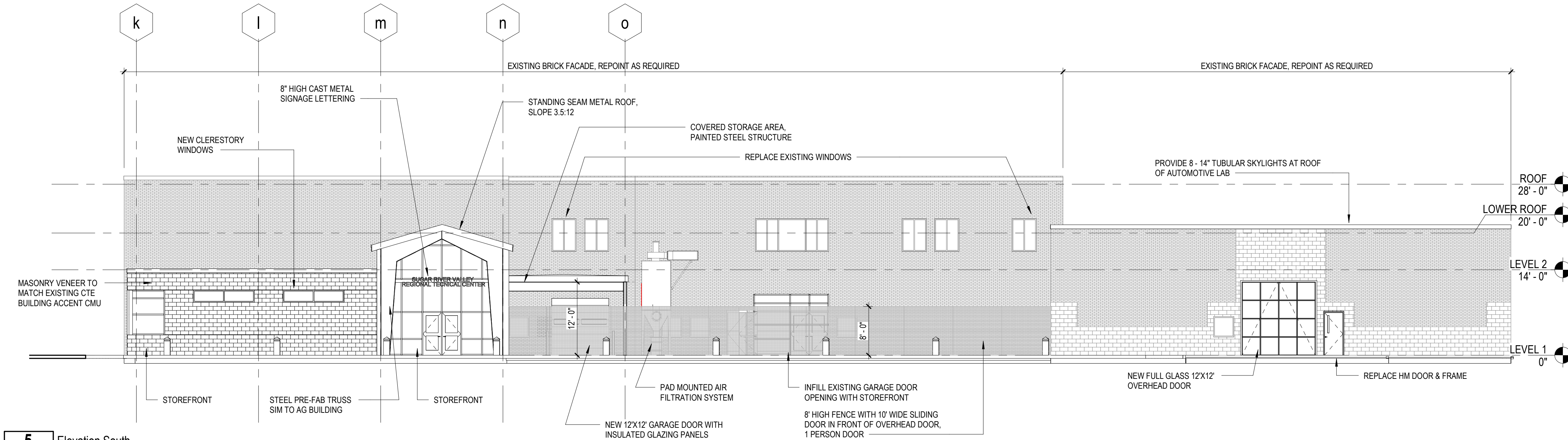
**3** Elevation East 2  
A3-1 3/32" = 1'-0"



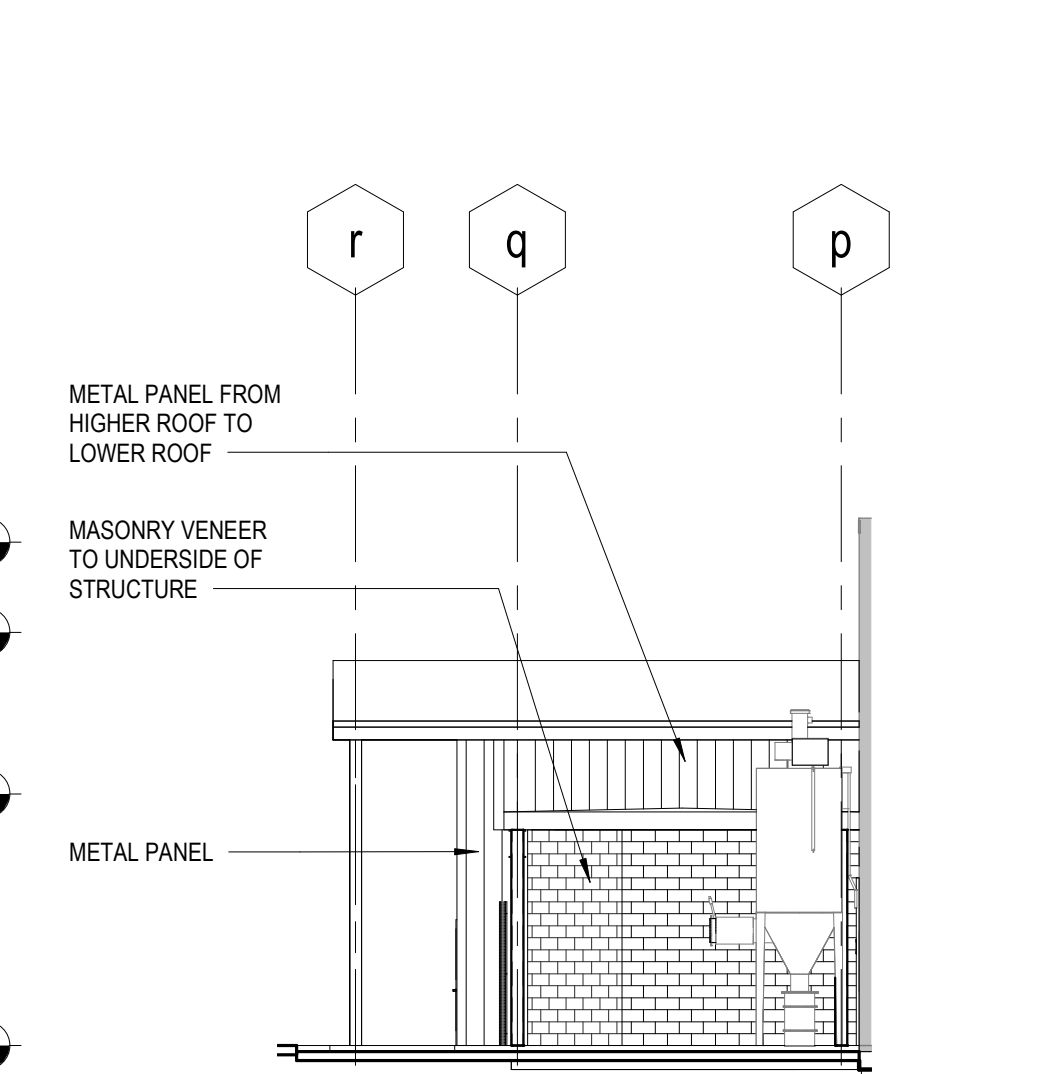
**6** Elevation North 2  
A3-1 3/32" = 1'-0"



**4** Elevation West  
A3-1 3/32" = 1'-0"



**5** Elevation South  
A3-1 3/32" = 1'-0"



**7** EAST ELEVATION  
A3-1 3/32" = 1'-0"



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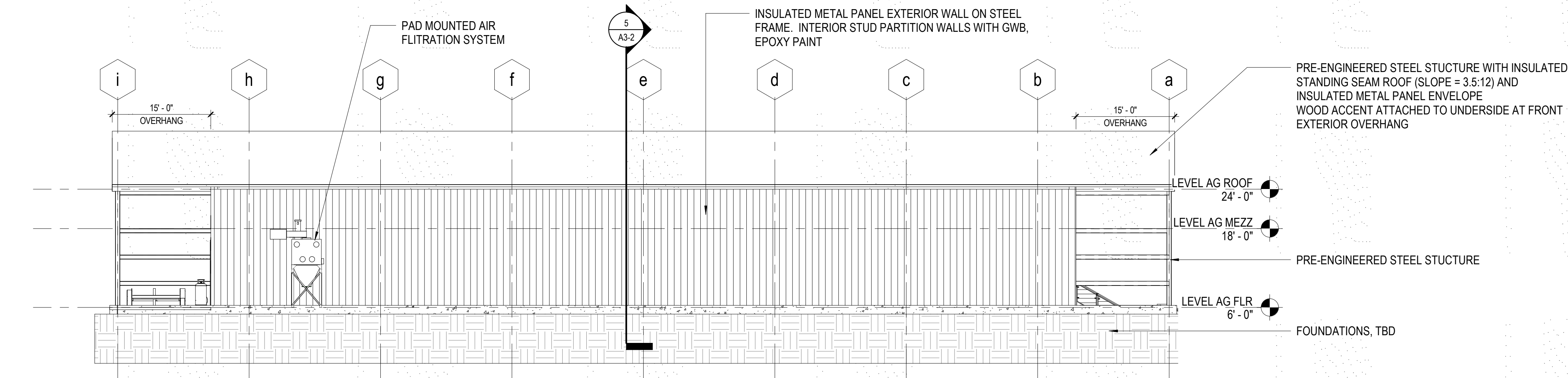
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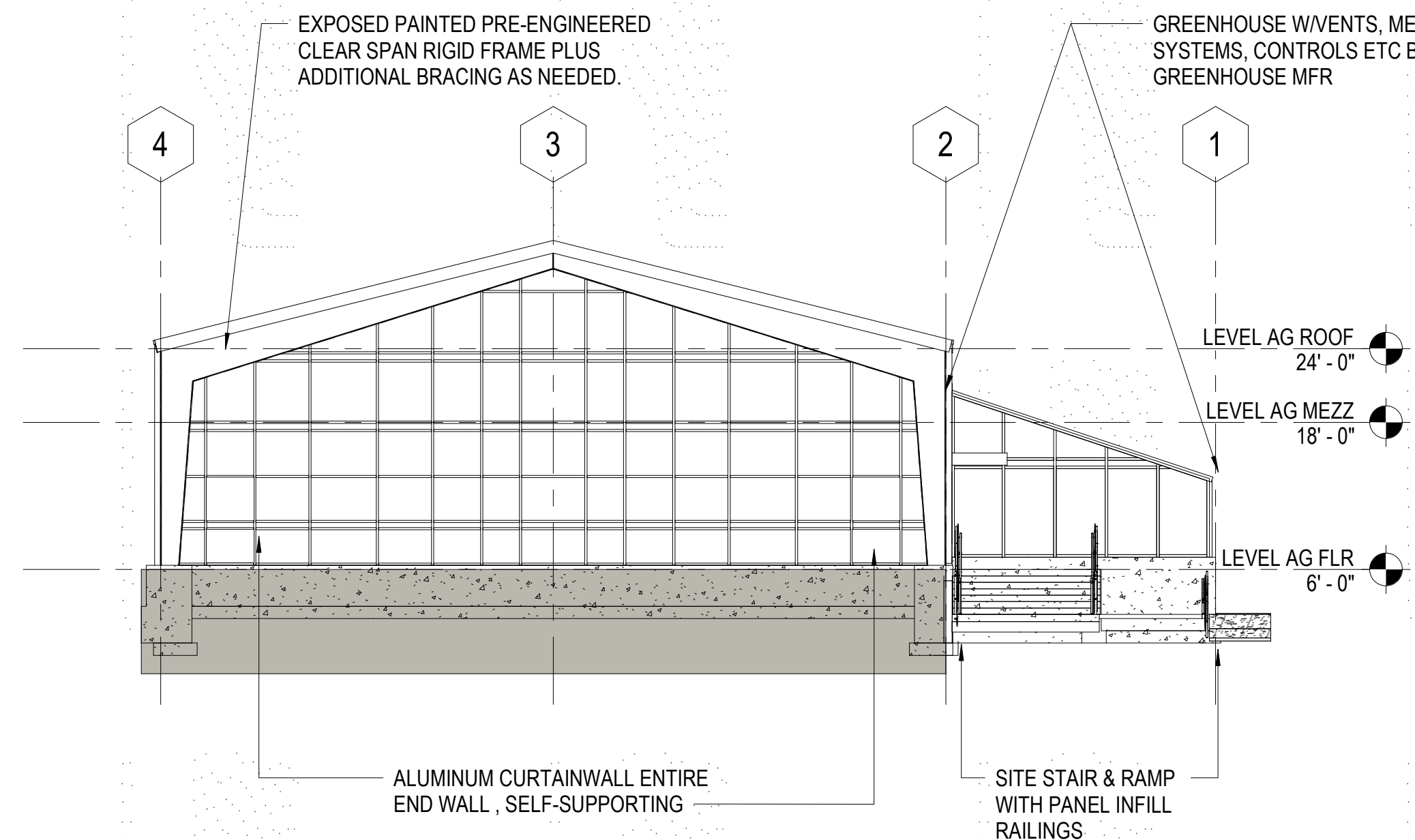
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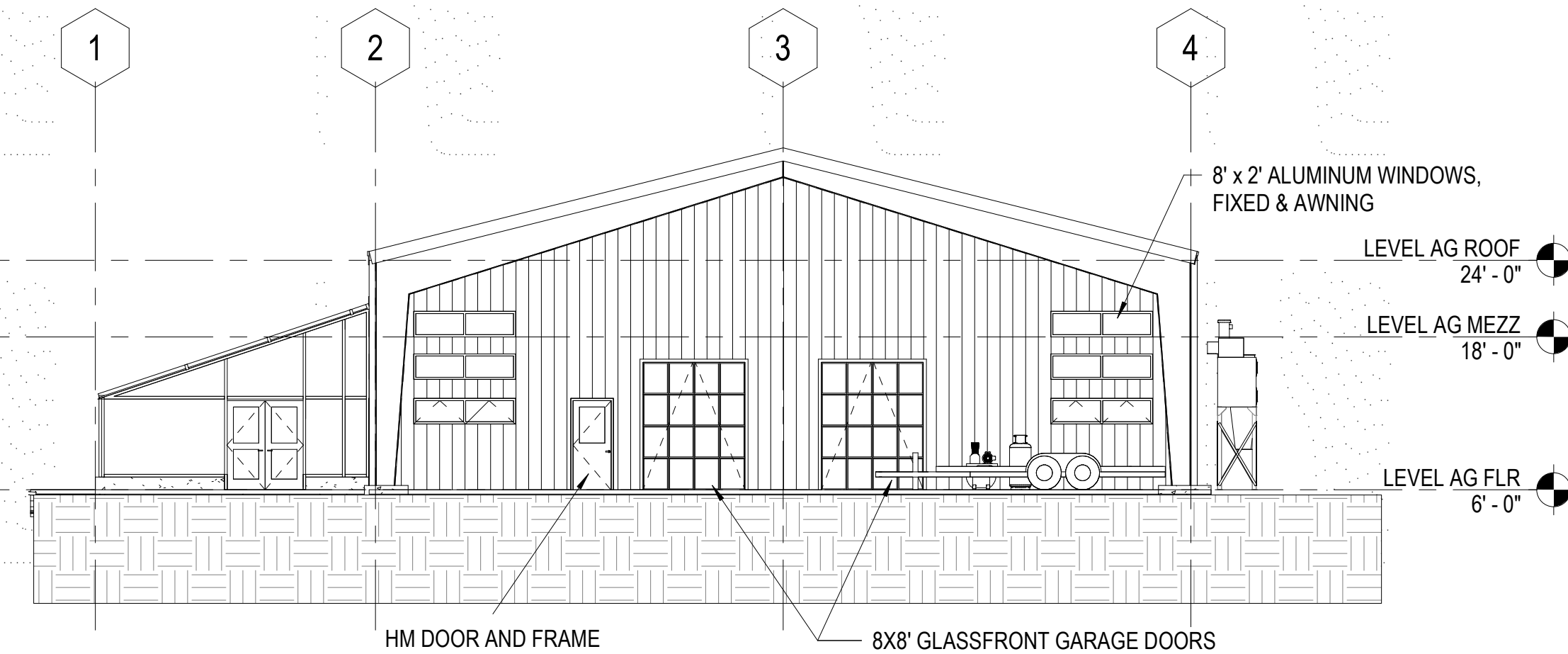
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DRAWN BY:	Author
PROJECT NO:	20-058-00
DATE:	08/27/2021
REVISED:	
SCALE:	3/32" = 1'-0"
A3-2	
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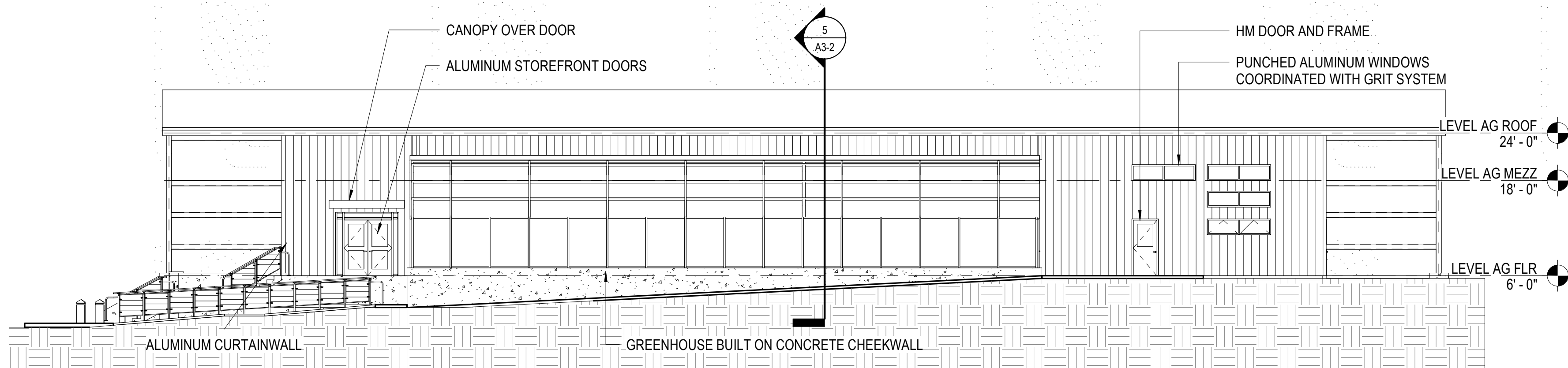
**1** Elevation AG EAST  
A3-2 3/32" = 1'-0"



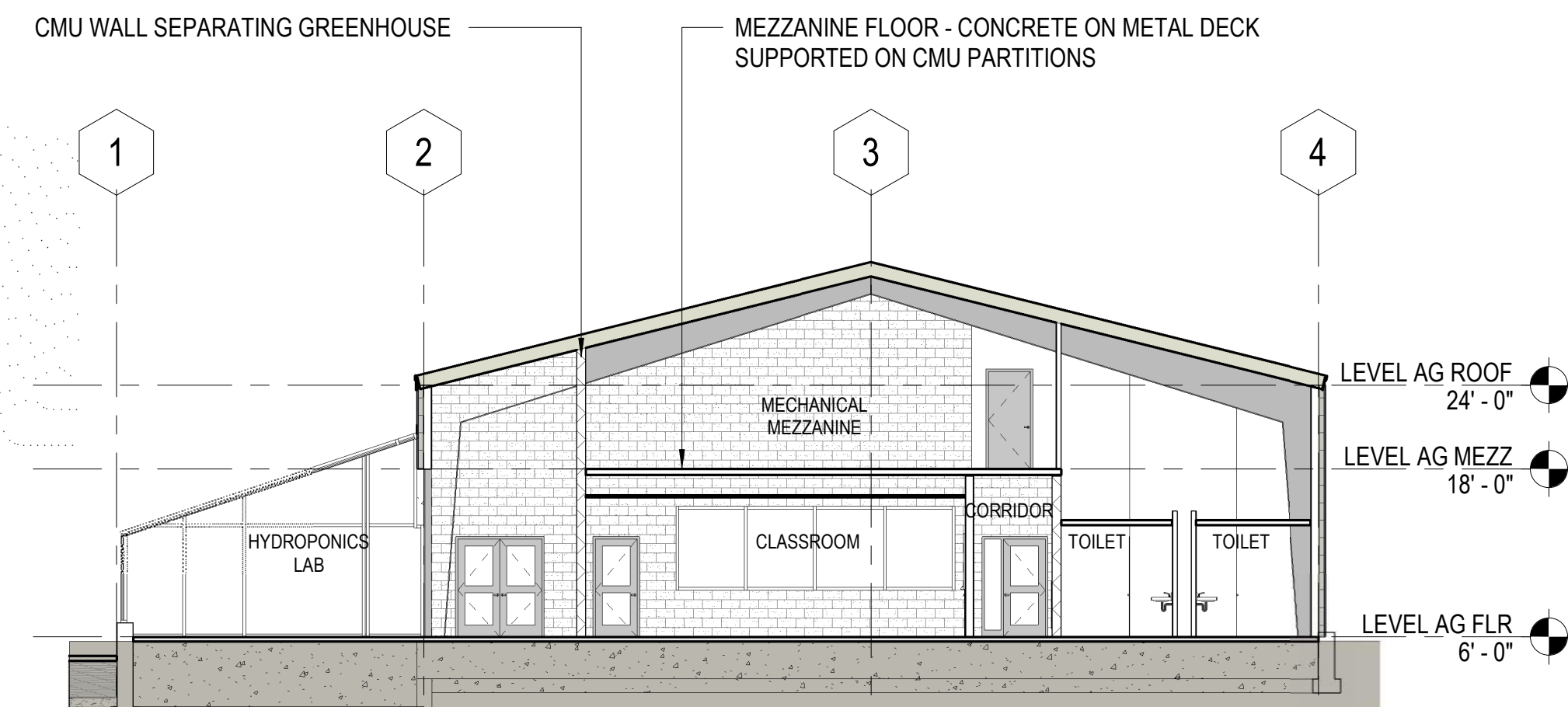
**2** Elevation AG NORTH  
A3-2 3/32" = 1'-0"



**3** Elevation AG SOUTH  
A3-2 3/32" = 1'-0"



**4** Elevation AG WEST  
A3-2 3/32" = 1'-0"



**5** SECTION AT NEW AGRICULTURAL BUILDING  
A3-2 3/32" = 1'-0"



## PROPOSED NEW WORK

### APPLICABLE CODES

All construction elements and systems will conform to the following:

- The New Hampshire State Building Code
- NH State Fire Code Saf-C 6000
- IBC 2015 (International Building Code) with NH amendments
- IECC 2015 (International Energy Conservation Code) with NH amendments
- IMC 2015 (International Mechanical Code)
- IPC 2015 (International Plumbing Code)
- NFPA 70 2017 (National Electrical Code) with NH amendments
- NFPA 72 2013
- NFPA 1 2015
- NFPA 101 2015 (Life Safety Code)
- NFPA 13, 2013
- ASHRAE 188-2015 Legionellosis: Risk Management for Building Water Systems
- Local Authorities Having Jurisdiction (AHJ)
- Newport Fire Department Regulations
- All Other Applicable Codes and Standards

### FIRE PROTECTION SYSTEMS DESCRIPTION

Provide and install a combination wet/dry NFPA 13 compliant automatic sprinkler system to protect the entire facility, including attic spaces. A new 4" water/sprinkler service shall be installed by the site contractor to serve the facility. Dry sprinkler coverage shall be provided in areas subject to freezing. The system shall be designed in accordance with NFPA 13 and AHJ requirements.

**Water supply shall be an extension of the existing 6" line serving the CTE building, located in the main driveway. A flow test at the driveway/Dartmouth College Highway corner is recommended to establish current flow and pressure data.**

New sprinkler system standards include:

- Sprinkler piping materials shall be in keeping with NFPA-13 requirements.
- Schedule 10 and 40 steel piping is to be used. Mechanical (Victaulic) fittings are acceptable for new piping.
- New heads shall be concealed type in all finish ceiling areas.
- UL listed flexible sprinkler heads is allowed.
- Protective guards will be installed over all sprinkler heads susceptible to accidental striking and abuse.
- New sprinkler heads shall be centered within ceiling tiles in all public spaces.

### NEW PLUMBING SYSTEMS DESCRIPTION

**Domestic Water System Description:** Provide new 2" entrance with 1-1/2" backflow preventer and meter assembly. A booster pump is not anticipated.

**Sub-Metering: Provide a sub meter on the incoming domestic water system. Meter shall be capable of communicating with the Building EMS and reporting cubic feet of consumption to the area display system.**

#### **Domestic Hot Water System Description:**

**OPTION 1:** Provide (1) new 199 MBH LP gas fired water heater with 200 Gallon storage each. Heater will serve all areas of the building. Provide mixing valve, recirc. pump and tie-in to new building management system.

- Domestic hot water system shall be installed in accordance with prevailing codes.
- Domestic hot water piping shall be Type L copper with lead-free soldered joints and fittings.
- The domestic hot water recirculation system shall be provided as part of the contract.
- Domestic hot water service shall fee all applicable plumbing fixtures noted hereinafter.
- Lead free isolation valves shall be installed for fixture isolation and as required per prevailing plumbing codes.

**OPTION 2:** Provide (1) new 120 Gallon storage tank by AO Smith or equal. Tank to be furnished with 4500W electric element for backup heating. Primary tank heat generated by a drain-back solar hot water system.

**Provide five (5) 4'x8' Caleffi Starmax V solar collectors on the roof of the Agricultural building. Two (2) 1/2HP pumps in series will circulate water from the tank through the panels to heat domestic water. As a freeze protective measure, piping arrangement shall all the panels to "drain back", or empty when water is not flowing through them.**

**Domestic Water Distribution:** Water to be distributed through Type L copper piping, using soldered and pro-press fittings. All domestic hot, cold and recirc. piping to be insulated with 1" insulation. Protect all exposed piping with PVC jacketing.

As a line item alternate, insulated PEX tubing may be installed for domestic services. All piping in mechanical room and within 10 feet of water heaters must remain copper.

**Sanitary & Vent Piping:** Provide new cast iron sanitary and venting to all fixtures. Below slab piping to be service weight cast iron, hub & spigot. Above grade to be service weight with no hub connections. As a line item alternative, schedule 40 PVC may be considered where permissible by local AHJ.

**A new 6" sanitary exit shall be extended from the facility to the existing 8" line located in the south driveway of the CTE. No ejector pump is anticipated.**

**Roof Drainage:** None anticipated.

**Plumbing Fixtures:** Provide new toilets, lavatories, showers and accessories.



New toilets to be vitreous china, wall mounted with chair carrier and elongated bowl equal to Zurn. Provide ADA fixtures where noted by the Architect. All new toilets to be manual flush valve by Sloan with 1.6 Gallon per flush capacity.

New urinals to be vitreous china equal to or Zurn. Provide ADA fixtures where noted by the Architect. All new urinals to have manual flush valve by Sloan, 1/8 GPF.

New lavatories to be wall mounted in single bathrooms with fixture equal to Koehler with carrier. Provide ADA fixtures where noted by the Architect. All new lavatories to have battery operated sensor faucet equal to Sloan Optima with Leonard mixing valve at fixture.

Water fountains to be furnished with integral chiller, dual level (ADA) fountains and a bottle filler.

Provide counter mounted eyewash stations in all labs with tempering valve. One per lab.

Note: Provide hot water recirculation to within 2 feet of all public lavatories in keeping with IECC 2015 regulations.

**Gas Piping:** Provide schedule 40 steel gas piping with welded, threaded or MegaPressG fittings to new boiler room and water heater. Piping within the building to be run at 11" w.c. Provide shutoffs at all fixtures.

**Provide (2) below grade, 1,000 gallon LP storage tanks. Tank location to be determined. Below grade flexible gas pipe will deliver high pressure gas to a regulator, with low pressure LP distribution to boilers and hot water heaters.**

**Sub-Metering: Provide a sub meter on the incoming LP Gas line. Meter shall be capable of communicating with the Building EMS and reporting CFH of consumption to the area display system.**

**\*Note that under Option 2, no LP gas is required.**

#### **Sanitary Drainage, Venting and Storm Drain Notes**

- Floor cleanouts and wall cleanouts will be installed to allow inspection and rodding of piping.
- Vents through roof will be minimum of 4"Ø to prevent frosting.

#### **Rainwater Harvesting:**

- **Rainwater harvesting is desired for irrigation purposes in the greenhouse. Rainwater collected off the pitched roof shall be piped to a 2,000 Gallon (approximately) below grade cistern.**
- **The harvested rainwater shall be filtered and pumped into the building to serve toilets, urinals and hose bibbs in the Greenhouse.**
- **All piping and fixtures associated with the rainwater system shall be clearly labeled to avoid confusion with the potable water system.**

- **Sub-Metering: Provide a sub meter on the main food from the rainwater harvesting system. Meter shall be capable of communicating with the Building EMS and reporting cubic feet of consumption to the area display system.**

#### **Piping Standards**

All piping shall be installed to meet the following:

- Domestic hot and cold water piping shall be Type L hard copper, with lead free solder fittings.
  - As an alternate, PEX tubing may be considered as a line item.
- Insulation on all domestic cold, hot and hot water recirculation piping shall be 1", or as required by IECC 2015, commercial provisions, whichever is more stringent.
- Sanitary waste, vent piping and roof leaders located above grade shall be no hub cast iron, ASTM 888.
- Sanitary waste and roof leader piping below grade shall be hub and spigot cast iron, ASTM 888.
- Horizontal runs of roof drain shall be wrapped with 1 1/2" heavy density fiberglass.

#### **MECHANICAL SYSTEMS DESCRIPTION**

##### **Heating, Ventilating & Air Conditioning (HVAC) Systems Description:**

**OPTION 1:** Building shall be ventilated by energy recovery units. Heating to be accomplished by a boiler plant circulating hot water to heating terminals. Air conditioning to be provided as an add alternate to select areas by Mitsubishi ductless split heat pumps.

Provide (2) 300 MBH input high efficiency condensing boilers by Lochinvar or equal. Boilers shall circulate 160F water to heating terminals by two inline variable speed pumps. Boilers to be wall mounted in storage room. Furnish with ASME rated expansion tank, air separator and all accessories required for complete and proper performance. Vent boilers through exterior wall using combination combustion air/exhaust vent termination kits. Venting materials to be CPVC.

Provide (1) 1,500 CFM static core energy recovery unit by Renewaire. Unit to serve classrooms, horticulture, and animal labs. Unit to be installed high in space and ducted to supply diffusers in each space.

Provide (1) horizontal exposed unit ventilator to serve the Natural Resources lab. Unit furnished with hot water heating coil, face and bypass damper and outdoor air connection to exterior wall louver.

Provide (3) 2-ton Mitsubishi P-Series heat pumps with heating and cooling capability. Each heat pump paired with (1) 2-ton ceiling cassette and wall mounted thermostat. Classrooms to be cooled include Horticulture, Classroom 1, and Classroom 2.

**OPTION 2:** Building shall be ventilated by energy recovery units. Heating and cooling to be accomplished by an air source heat pump system generating both heating and cooling for the facility. A refrigerant to water heat exchanger shall act as the "boiler" and transfer heat from the heat pump to forced water for radiant floors and perimeter heating. The outdoor heat pump shall also feed fan coils for summer cooling.



**Provide (1) 20-Ton air-source heat pump equal to Mitsubishi R2-H2I with low ambient Hyper Heating technology. Heat Pump must be able to heat when outdoor air temperatures fall below 0 deg. F. Provide (1) 10-port branch controller box.**

**Provide five (5) ducted fan coils equal to Mitsubishi PEFY. Three (2-Ton) units and two (3-Ton) units are anticipated for 12-tons of fan coil total. Can coils shall be fully ducted and will provide cooling, ventilation and supplemental heating.**

**Provide three (3) Mitsubishi Heat Exchangers model PWFY-P-72 for heating not water generation. Two (2) 25 GPM inline pumps shall pump water through the heat exchangers to radiant floors and perimeter heaters.**

Provide hot water unit heaters in storage spaces with wall mounted thermostats.

Provide hydronic fin-tube radiation in Toilet Rooms.

Provide floor mounted hydronic cabinet heaters in entryway vestibules.

Provide hot water radiant slab heat in the **entire facility. Five (5) radiant zones are anticipated, covering approximately 9,500 SF of floor area.** Each space to be controlled by a radiant manifold with dedicated mixing valve and injection pump. Radiant Pex tubing to be run 12" o.c. through the entirety of each classroom from the respective manifold. In-slab temperature sensors shall modulate the slab to ensure rooms do not overheat. Exposed unit ventilators in each space shall be used as supplemental heaters to the radiant slab in each space.

Provide wall prop exhaust fans in greenhouse and hydroponics labs. Intake louvers with insulated outside air dampers shall be installed for pressure relief.

**Bathroom Exhaust:** Ceiling exhaust fans with wall louver.

**IT & Electrical Closets:** Ceiling exhaust fans with wall louver.

#### **Ductwork Standards:**

All low and medium pressure ductwork installed within the building shall be built to meet the latest SMACNA standards and ASHRAE recommendations, including the following:

- Duct shall be made of the best grade galvanized iron. Duct shall be installed and stored on site per SMACNA "Intermediate Level" cleanliness guidelines.
- Ductwork shall be insulated to meet or exceed the requirements of IECC 2015, commercial provisions. All air conditioning supply ductwork shall be insulated with a minimum of R-6.0 fiberglass insulation.
- Volume dampers shall be provided at all runouts to individual air terminals.
- Combination smoke/fire dampers shall be provided at each shaft penetration by a duct.
- Fire dampers shall be provided wherever a 2-hour wall is penetrated by a duct, or a duct penetrates a floor not protected by a shaft.
- Smoke dampers will be required at smoke barrier penetrations by a duct.

#### **Piping Standards:**

All hot water heating and chilled water piping shall be steel or hard copper, and shall be installed to meet the following:

- Copper tubing shall be Type L, with lead free solder fittings.
- Steel tubing shall be screwed or welded schedule 40, with 150# fittings.
- Insulation shall be as required by IECC 2015, Commercial Provisions.
- Pro-Press and other mechanical fittings are permissible at the option of the contractor. Victaulic fittings are not permissible on heating pipes.
- All refrigerant piping shall be ACR hard copper with brazed fittings. Pre-insulated line sets for dedicated ductless split systems is acceptable.

**Building Automation:** Install a new building automation system to address the new facility:

- Furnish and install an integrated Direct Digital Control (DDC), web-based browser, Building Automation System (BAS) to address all HVAC equipment associated with this contract. Basis of design is Johnson Controls Metasys.
- Protocol shall be BACnet/IP.
- The BAS shall include all required operating software, licenses, networked controllers, graphics, self-commissioning, training, post installation support and service.
- An IP address shall be established with the owner's IT department for system connectivity.



**Electrical Demolition Description:** Refer to the Architectural Demolition Drawings for scope of demolition. Existing Sugar Shack, Storage Barn, and Agricultural Building is being demolished. Disconnect and remove all existing electrical panelboards, devices, and equipment complete to facilitate demolition of existing buildings.

PROPOSED NEW WORK

**Electrical Service/Power Distribution:** A new underground electrical branch feeder (400A, 208/120, 3PH, 4W) shall be provided from the existing CTE Building main switchboard ‘MSB’ to serve the new Agricultural Building. The branch feeder wiring (parallel sets of 4-250KCMIL, 1#3G-4”C) shall terminate at a 400A disconnect in the Agricultural Building main electric room and properly labeled with location of power source. Provide minimum 2-4”C spare conduits with pull rope in duct bank. A new 400A/3P branch circuit breaker compatible with existing ‘MSB’ shall be provided in available space to feed the new Agricultural Building.

Provide a fully rated 400A, 208/120V/3PH panel within a main electric room. Provide additional sub-panels in the main electric room as needed serve HVAC, lighting, and general plug loads. Large HVAC and/or equipment loads shall be fed from the main panel.

**Emergency Power System/Generator:** An Optional Standby Power System (NEC 702) shall be provided for the building to completely support the electrical requirements of the building and program, during electric utility outages. A diesel fueled standby generator in Level 2 sound-attenuated enclosure with critical grade silencer and sub-base fuel storage (72-hour storage) will be provided, sized as a 150kW, 208/120V, 3PH, 4W power plant, with a unit mounted output circuit breaker (400A). Provide terminations and overcurrent protection to connect portable load bank equipment for periodic testing.

Standby power shall be connected to an indoor 400 ampere rated automatic transfer switch with the normal side 400A branch feeder from the Agricultural Building, 400A standby feeder from generator, and load side 400A feeder to main distribution panel ‘MDP’. Transfer switch shall be rated for 65,000 AIC, at 208/120 volts three phase, four wire.

**Emergency Egress Lighting:** Provide emergency lighting as stand-alone, self-contained emergency battery units either wall or ceiling mounted along emergency pass of egress with a maximum spacing of 50’ on center. Provide LED/thermoplastic style exit signs with battery backup along egress paths and doors. All common areas including lobbies/corridors, public restrooms, meeting rooms, utility rooms, and workshops/labs shall have emergency lighting.

**Lighting and Controls:** All interior lighting shall be LED type. Provide occupancy sensor controls in offices, classrooms, storage rooms, restrooms, meeting rooms and daylight responsive controls in areas within daylight zones. All occupancy and daylight sensors shall be connected as part of a digital, networked lighting control system. There shall be local override multi-level digital wall stations in each individual space such as offices, classrooms, and labs. The common areas including corridors shall be controlled by the lighting control system as time-of-day/programmed schedule with local occupancy sensor control for off-hours. Strategically placed override wall stations will be provided at suitable common area locations such as entries and lobby areas. A small relay-based lighting control panel will control site lighting as time-of-day/programmed schedule and integral fixture photocells.

The basis of design for this product will be Acuity nLight Product. The exterior building mounted lighting shall be LED type full cutoff fixtures with integral photocells. Fixtures located near emergency egress doors shall have integral battery backup to provide emergency egress lighting.

Ambient light levels shall be maintained in keeping with IESNA guidelines.

Interior lighting shall be LED products maintaining the following minimum lighting levels:

- 30-50 foot-candle for classrooms, offices and meeting rooms.
- 10-20 foot-candle for corridors and storage rooms.
- 10-30 foot-candle for restrooms and lobby areas.
- 50-75 foot-candle for workshop areas.

Exterior lighting shall be LED products maintaining the following minimum lighting levels:

- 0.5-2 foot-candle for building exterior.
- 10-15 foot-candle for building entries.

Based on the Lighting Power Density listed for 2015 IECC, a school shall meet the requirement of a maximum of .87watts/sf.

Typical Classroom/Lab:

Lights in classroom shall be combination of recessed 2x4 or 2x2 LED volumetric fixtures, parallel rows of continuous pendant direct/indirect, and at directional/wall wash at the teaching wall. Vacancy sensors shall be integral to the fixture as well as daylight sensors along the window wall. One set of two zone on/off raise/lower switches located at the door with another set located at the teaching wall.

Typical Office/Meeting Room:

Lights in the offices/meeting rooms to be 2x2 or 2x4 recessed volumetric LED to be located 6’ on center with ceiling or wall occupancy/daylight sensors depending on size of room.

Typical Corridor:

Lights in the corridors to be 2x2 or 2x4 recessed volumetric LED to be located 12’ on center, occupancy/daylight sensors to be located 40’ on center allowing high/low dimming based on daylight zones during operational hours and on/off during closed hours.

Typical Entry/Commons:

Lights in the entry/common area to be a combination of 2x2 or 2x4 recessed volumetric LED to be located 12’ on center, decorative pendant fixtures, and recessed wall washers or track spot/accent lights for wall displays, occupancy/daylight sensors to be located 40’ on center allowing high/low dimming based on daylight zones during operational hours and on/off during closed hours.

**Telecommunications:** A full and complete Telecommunications and Data system shall be provided for the proposed program layouts. Wiring shall consist of but not limited to: Jacks, faceplates, patch panels, termination blocks, CAT 6 copper horizontal cables, exterior/interior multimode 50-micron fiber links, and associated equipment required to



support the installation, including racks, cable/ladder tray, conduits, and pathways. Provide network interconnection (12-strand multi-mode OM4 in 2" conduit or as required) between the new Agricultural Building IT/Server room and the existing main building MDF room.

Classrooms and offices shall have a minimum (4) tele/data outlets, each on a different wall or as directed by the owner. The labs spaces shall have a minimum (12) tele/data outlets, 3-each on a different wall and a data outlet (2-CAT6 drops) for each computer/workstation or as directed by the owner. Each tele/data outlet location shall be provided with two dedicated CAT6 cable drops for data/VoIP. Wireless access points shall be provided as required throughout, at a minimum (1) for each space excluding private offices, restrooms, and storage areas with (2) CAT6 drops per wireless access point.

There shall be a dedicated tele/data closet for the main server network switches and head-end equipment by others. The electrical contractor shall provide all passive equipment (data/fiber patch panels), devices/jacks, cable & cable terminations, certified testing for a complete and operational system. Provide mounting backboards, dedicated quad receptacles, ladder tray and ground bus bar/bonding per TIA-607-B standards. The IT/Data closet shall be located so that data cable lengths are limited to 290-ft maximum. Provide minimum 2-gang back box, 1" pathways with pull string to above accessible ceiling/space for all device locations. Provide cable hangers/trays to tele/data closets only above accessible ceilings, otherwise, provide entirely conduit. Cabling shall be riser rated Category 6.

Provide a fully installed wireless clock system for the proposed with headend unit at the IT/Server room. System will utilize wireless/Bluetooth technology to synchronized clocks as required.

Provide a fully installed school intercom/PA system by Valcom and ceiling tile speakers within all classrooms/labs, offices/meeting rooms and throughout common areas/corridors. The phone system will be used for paging. Classrooms/labs shall be provided with handsets and desk stations.

**Fire Alarm System:** A fully addressable fire alarm system with voice evacuation shall be provided for the building. The Agricultural Building fire alarm control panel shall be interconnected (fiber link or fire alarm cable in 2" conduit as required) with the main building system to report as a supervisory but not evacuate the main building. Provide fire alarm wiring, devices and equipment associated with the installation of a Voice Evacuation Fire Alarm System. Wiring will include audible & visual notification devices, initiation devices and sensors as required. Local transmission of building alarm will be digital communication over leased telephone lines, cellular transmitter or as directed by the Local Fire Department.

Provide smoke detector coverage 30' on center in corridors, entry lobby, and electric/IT rooms. Provide manual pull stations within 5 feet of each exit door. Duct smoke detectors will be provided along with associated remote alarm indicators and test switches for air-handling units rated over 2000 CFM on both supply and return ducts/plenums. Provide wiring and connections for all fire protection alarm switch monitoring and alarm bell. Provide 120VAC wiring for alarm bell. Provide interconnect wiring and monitor modules for sprinkler fire alarm switches. Provide interconnections with building management and security systems as required. Carbon monoxide detection shall be provided in areas with fossil-fuel burning equipment including the mechanical room. Fire alarm wiring shall be type MC fire alarm rated cable where completely concealed or conduit and wire if exposed.

**Devices & Wiring:** Power receptacles shall be provided to comply with National Electrical Code NEC 210.8 (Ground-Fault Protection) including restrooms, kitchens, classroom/lab area countertops with sinks. Receptacles shall be provided to comply with NEC 210.63 within 25-ft of all HVAC equipment and shall be weatherproof ground-fault receptacles when located on exterior. Provide dedicated receptacles in tele/data closets for general power and telecommunication equipment. Provide dedicated circuits for classroom specialty equipment, countertops, etc. as required. Provide general-purpose receptacles in corridors every 50-ft maximum for general maintenance use. Provide general purpose/convenience receptacles in classrooms and offices based on residential guidelines (12' on center). Provide minimum (2) quad receptacles at the teaching wall on a dedicated circuit. Classroom/lab countertops shall have metallic surface raceway (dual channel) for power and data with power receptacles spaced 3' on center. There shall be a quad receptacle for each computer/workstation with up to (4) workstation quad receptacles per circuit. Provide all power connections, disconnects and starters as required for HVAC equipment. Provide infrastructure (back boxes, pathways, 120VAC) for door access control and power assist automatic door operators. Provide power and connections for the labs including pumps, ovens, heaters, refrigerators, filtration systems, and other specialty equipment. Wiring shall be conduit and wire where subject to physical damage and above inaccessible ceiling and type MC cable where concealed. Refer to the new construction architectural plans for program space layouts.

**Security-Intrusion-Surveillance:** Provide electrical infrastructure only for door access control/intercom, intrusion alarm, and video surveillance systems. The electrical contractor E.C. shall provide power/support wiring, empty back boxes, and pathways for card access control/intercom, intrusion alarm and IP cameras/NVR. Devices, cabling, and headend equipment shall be provided by security/AV vendor. Coordinate locations with owner and security/AV vendor.

**Photovoltaic Solar Panels (ADD ALTERNATE):**

Provide a complete photovoltaic 'PV' system consisting of photovoltaic modules and associated system components including but not limited to inverters, AC combiner boxes/panels, PV disconnects, rapid shutdown devices, utility interconnection/disconnects, monitoring/metering, surge protective devices, grounding, roof-mounted support system as necessary for connection to facility electrical system. PV array shall be mounted on the existing CTE Building roof and be suitable with existing roof structure.

The PV system shall be interconnected with the utility (grid-tied system) with net metering. Point of interconnection shall be a line side tap on the CTE switchboard main service disconnect. The existing switchboard busbar size is inadequate to provide PV back-fed breaker in the distribution section. Existing utility meter shall be replaced with new utility smart (Net) meter with bypass for utility metering of the electrical power system.

The estimated PV array (117 kW) was sized to offset the estimated daily electric usage (kWH) of the new Agricultural Building. The daily electric usage was based on calculated demanded loads with estimated hours of operation for loads such as lighting (6 hrs.), receptacles (4 hrs.), HVAC (6 hrs.), and miscellaneous equipment (6 hrs.). The minimum expected annual energy production using (117 kW) is 144,771 kWH/year, as calculated by the National Renewable Energy Laboratory's PV Watts calculator. The total nominal rated power output of array shall be equal to or greater than the rated output of the basis of design array. The nominal rated output of the individual PV modules shall be equal to or greater than the rated output of the basis of design module (Heliene 390 Black Mono Solar Panel @390 Watts DC).



Provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, sensors/data loggers, system programming, etc. as necessary for a complete operating system.

*Demand Sub-Metering (ADD ALTERNATE):*

Provide sub-metering/smart meters with energy-monitoring system/dashboard for graphical display of real-time and historical energy usage data of the new Agricultural Building. Provide advanced energy metering for each electric panel with separate monitoring of different load types including (lighting, receptacle, HVAC) any large loads 10% or more of the total annual consumption of the building, and the photovoltaic system production. The electrical sub-metering basis of design shall be manufactured by E-MonD-Mon.

The sub-meters shall have properly sized voltage/amperage with current sensors and multiple meter unit enclosures for loads being monitored. Provide all required data recorders and energy monitoring software to monitor cumulative kWh, real-time kW, and peak kW. Meters shall have capability to interface with the building’s energy management system and use compatible communication protocol (BACnet) to display data log information via energy management system platform.

Provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, sensors/data loggers, system programming, etc. as necessary for a complete operating system.