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Moorhead Area Public Schools
Grades 5-6 Addition at Horizon Campus
Moorhead, MN

Project No. 15-024
Date: May 11, 2016

ADDENDUM NUMBER 2

BID DATE & TIME: **Tuesday, May 17, 2016 at 2:30 pm local time**
Probstfield Center for Education – Board Room
2410 – 14th Street South
Moorhead, Minnesota

The following additions, clarifications, deletions and/or changes shall be made to the SPECIFICATIONS:

Section 08 1113 – Hollow Metal Doors and Frames

1. 1.01, F – Omit and replace with the following:
   F. Accessories.
2. 1.03, E – Omit paragraph E in its entirety.
3. 2.05, A – Omit paragraph A in its entirety (glazing will be by 8E).

Section 08 1416 – Flush Wood Doors

1. 1.01, B – Omit and replace with the following:
   B. Accessories.
2. 1.03, B – Omit paragraph B in its entirety.
3. 2.05, A – Omit paragraph A in its entirety (glazing will be by 8E).

Section 08 3613 – Sectional Doors

1. 2.02, B, 2; Door shall be 2 inches (51mm) thick minimum.
2. 2.02, B, 5; Minimum R-Value shall be R17.
3. 2.02, B, E; Glazing shall be 24 x 7 x ½ minimum clear insulated units.
4. 2.03, B, 1; Omit and replace with the following:
   Door Thickness: 2 inches (51 mm) minimum thickness.
5. 2.05, C; Insulation shall be foamed-in-place polyurethane, bonded to facing or extruded polystyrene meeting the same R-Value requirements

Section 08 3323 – Overhead Coilding Doors

1. 2.02, A, 7 – Omit and replace paragraph 7 with the following:
   7. Finish: Factory powder coat painted, black both sides.
2. 2.02, A, 11 – Omit paragraph 11 (Manual push up operation).

Section 08 7100 – Door Hardware

1. 1.2, A, 2: Omit and replace with the following:
   2. Thresholds, weather-stripping, and acoustical seals.
2. 1.2, A, 3: Omit paragraph 3 (aluminum door hardware was previously bid).
3. 2.16, A: Delete the entire sentence and replace with the following:
   A. All power supplies are by this section and will be consolidated in rooms IT 559, IT 652, Mechanical 402M, Mechanical 423M, Existing Server 150 or Existing Electrical 213.

See attached Mechanical specifications revisions.

Section 26 0550 – Theatrical Lighting and Controls

1. Paragraph 2.16 Theatrical Lighting Fixtures and Accessories, add (2) Drama 7046-FS-LED 700 Series spotlight LED fixture, with 7046-RC road case accessory.

The following materials and/or equipment have been accepted as APPROVED EQUALS:

Section	Specified Product	Approved Equal
08 3613, 2.01, A – Sectional Doors	Clopay Corporation, Ideal Door Garage Doors, Overhead Door, Raynor Garage Doors, C.H.I. Overhead Doors	Midland Garage Door: www.midlandgaragedoor.com
26 5100 – Interior Lighting	AX Series by Aquarii LTG	LSR8A Series by Portfolio
26 5600 – Exterior Lighting	AX Series by Aquarii LTG	LSR8A Series by Portfolio

The following additions, deletions and/or changes shall be made to the DRAWINGS:

Sheet A3.80 – Door & Hollow Metal Frame Schedule

1. Overhead & Coiling Door Type Schedule – Note all glazing in OH-B, OH-C, and OH-D shall be 1/4" laminated frosted safety glazing.
2. Hollow Metal Door Frame Types – Frame HM-6 shall have 1/4" Laminated Safety Glazing.
3. Door 401.3 – Panel Glass shall be 1/4" FROSTED in lieu of 1/4" LAM.
4. Door 401.4 – Panel Glass shall be 1/4" FROSTED in lieu of 1/4" LAM.
5. Door 401.5 – Panel Glass shall be 1/4" FROSTED in lieu of 1/4" LAM.

See attached **Mechanical** drawing revisions.

General Electrical Items:

1. See attached drawings E2.15-R2, E2.15-R3, E2.15-R4, E2.15-R5 and E3.15-R1 for work required in the existing building cafetorium.
2. See attached drawing RBC for the antenna booster system drawing referred to in General Item #1 in Addendum #1.
3. See attached Panel Schedule LS2 for the panel schedule referred to for Sheet E6.1, Item #2 in Addendum #1.

SHEET E0.01

1. Luminaire Schedule – Add fixture Type ‘L1’. Fixture Type ‘L1’ to be the same as Type ‘L’ only 2’ x 2’ version.
2. Luminaire Schedule – For fixture Type ‘N’ provide an allowance of $3900 each, for Fixture Type ‘Q’ provide an allowance of $9665 each and for Fixture Type ‘S’ provide an allowance of $1584 each. This is distributor net pricing with freight included.

SHEET E0.03

1. Add to plan note #4 – “This work to be done under alternate #3.”

SHEET E1.01

1. Add additional demolition work as shown on attached drawings E1.01-R1 and E1.01-R2.
2. At the north end of the plan where the demolition is shown for the vestibule provide (4) Type ‘C’ fixtures and (1) Type ‘E’ fixture to be installed in a new grid ceiling and connected to the existing building corridor lighting circuits.
3. At the north end of the plan where the demolition is shown for the vestibule – Provide demolition for the room above this area. Demolition to include removal of (6) surface mounted fluorescent wraps, (2) ceiling mounted speakers, (1) fire alarm horn/strobe, (1) clock/speaker, (2) receptacles and a TV outlet. Provide (4) Type ‘C’ fixtures and (1) Type ‘E’ fixture to be installed in a new grid ceiling and connected to the existing building corridor lighting circuits.

SHEET E2.12

1. See attached drawing E2.12-R1.

SHEET E2.14

1. Rm. 428 – at the new ceiling in the link between the existing building and the new building provide (4) Type ‘B’ fixtures to be connected to the existing building corridor lighting circuit and control.

SHEET E2.15

1. Plan Notes – Add to plan note #4 “This work to be done under the base bid.”
2. Rm. 410 – Add lighting control system two button switch. Switch to be programmed to turn on/off all corridor lighting relays.
3. See attached drawing E2.15 – R1 for additional lighting requirements.

SHEET E2.24

1. Catwalk Lighting Plan – Add (4) fixtures equal to Altman Spectra Par 100 series. Fixtures to be RGB with DMX controls. Provide mounting hardware for clamping to catwalk. Fixtures to be located at the catwalk above the stage as directed by the owner. Provide connection to spare relay in the DMX relay panel.

2. At the north end of the Auditorium Lobby add (2) Type ‘D2’ fixtures in the grid ceiling shown. Fixtures are to be circuited to the same circuit and control as the other Type ‘D2’ fixtures shown in the north cloud.

3. Four of the Type ‘D2’ fixtures in the west row are to be run to a separate relay in the DMX control panel.

SHEET E3.15

1. Rm. 406 – Add 480 volt, 3-phase connection to 5 H.P. irrigation pump. Provide connection to 15/3 breaker in panel H1A.
2. Rm. 99B – In the lobby space to the west of this room provide (1) duplex receptacle mounted to masonry base below glazing. Core drill masonry base as required for circuiting. Provide Wiremold surface box.

SHEET E4.15

1. Rm. 99B – In the lobby space to the west of this room provide (1) data outlet with (2) drops mounted to masonry base below glazing. Core drill masonry base as required for cabling. Provide Wiremold surface box.

SHEET E6.1

1. At the Existing Site Buildings Electrical Riser Diagram add a note to the "Small Storage Building" existing transformer to read "Existing transformer to be transferred from the existing building main electrical room to the new small storage building location by Div. 26. Div. 26 to install the existing transformer at the new location and connect to new Panel LS2 with (4) #6 and #10 ground in 1 inch conduit.

SHEET E8.03

1. Panel H1A – Revise panel to 54 circuit panel. Provide (4) 15/3 spare breakers and revise circuits 37,39,41 and 38,40,42 to (2) 20/3 breakers.

See attached **Electrical** drawing revisions.

END OF ADDENDUM NUMBER 2

ADDENDUM – M02

Date	5/11/2016
Project #	2015226
Project Name	MAPS Grades 5-6 Addition at Horizon
Project Location	3601 12th Ave. S., Moorhead, Minnesota

NOTICE TO BIDDERS: This Addendum is prepared to supplement information presented in the Drawings and Project Manual for the above referenced project. All additions, changes, omissions and conditions listed herein shall become an integral part of the Contract Documents.

DRAWINGS

ITEM NO. 1 Sheet M1.02

A. The purpose of this sheet is to show demolition and modifications to be made to the existing water meter, irrigation meter, fire riser, and gas meter, and the proposed route through the existing building. Refer Item No. 1 in Addendum – M01 for information pertaining to the water meter and irrigation meter. Refer to Item No. 2 in Addendum – M01 for information pertaining to the Fire Protection Riser. The gas meter shall be modified/upsized as required for gas service to all new boilers, water heaters, and kitchen equipment. A new 4" gas line shall route through the existing building and in to the new addition. Refer to sheet M2.14 for the continuation of the gas piping. A 4" gas line shall route to the new boiler room 406. Refer to Item No. 8 in Addendum – M01 for information pertaining to the gas line routing to the new serving kitchen.

ITEM NO. 2 Sheet M2.01

A. The waste pipe routing up to the sink at gridlines A/15 shall be 4" diameter, and all waste lines downstream shall maintain a 4" diameter until upsizing to a 6" diameter pipe upon tying in to the first toilet grouping serving rooms 584, 585, 684, and 685. The 6" waste pipe shall not downsize until reaching the 8" building drain branch on sheet M2.02 between gridlines C12 and C18. A 4" vent shall be provided on the same sink fixture on sheet M2.01 at gridlines A/15 and route full size to a 4" vent-through-roof.
B. The 2" waste pipe between gridlines 9 and 11 and along gridline B shall be 3" in size and route up to tie in to the waste system serving the west sinks in lab classrooms 590 and 690.
C. The 2" waste pipe between gridlines 13 and 15 and between gridlines A and C shall be 3" in size and route up to tie in to the waste system serving the east sinks in lab classrooms 590 and 690. The 3" waste pipe shall maintain its size until connecting in to the 4" waste main.
D. The waste pipes serving floor drains in toilet rooms 584 and 585 shall be 2" in lieu of 3".
E. The 2" waste pipes between gridlines A and B serving sinks in lab rooms 564 and 664 shall be 3" and route full size until connecting in to the 4" waste line.
F. All applicable changes noted under Item No. 2 shall be represented in the waste and vent riser diagrams.

ITEM NO. 3 Sheet M2.02

A. The following changes shall be made to view "1/M2.02 – Foundation Plan Area C – Plumbing":
   1. The 4" waste pipe running to the east of gridline 33 shall be 6" in diameter until connecting in to the 8" building drain branch between gridlines C12 and C18. The same 6" line shall maintain its size upstream until first accepting waste from the toilet grouping serving rooms 525, 526, 625 and 626 on sheet M2.03 between gridlines 15 and 17 and running parallel to the south of gridline P.
   2. There shall be a 4" underground waste pipe serving the mop basin in custodial room 400C. The 4" waste pipe shall route to the 6" waste pipe running along the east of gridline 33.
   3. The underground GHWS/R pipes running between gridlines C18 and L shall be 1" in diameter in lieu of ¾" in diameter. The 1" GHWS/R pipes shall route up to CUH-3 in vestibule V5.1.
B. The following changes shall be made to view "2/M2.02 – Foundation Plan Area F – Plumbing":
   1. All waste piping in serving the mechanical room 406 shall be 4". All floor drains shall be 4".
   2. The label indicating a "5" W UP TO CO" shall read "4" W. UP TO CO" and indicate the 4" pipe routing up to the corridor floor clean out.
   3. The pipe routing up to mechanical room 406 in the northwest corner shall be a 6" storm drain.
   4. The below grade 8" chilled water piping indicated on view 2/M.212 shall route as shown on the attached R1 – M2.12 – Chiller and Ice Storage Plan.
C. All applicable changes noted under Item No. 3 shall be represented in the waste and vent riser diagrams.

ITEM NO. 4 Sheet M2.03

A. The 4" storm drain pipe routing up to a clean out in mechanical room 520-1 shall be replaced with a 4" diameter clean out just outside of the building. The clean out shall extend to grade.
B. The 2" waste pipes serving sink waste piping systems for lab classroom 505, 605, 531, and 631 shall be 3" diameter an maintain that size until connecting to the 4" waste main.
C. All applicable changes noted under Item No. 4 shall be represented in the waste and vent riser diagrams.

ITEM NO. 5 Sheet M2.04

A. The waste building drain branch at the point where the wye fitting combines waste from the main commons toilet rooms 400B, 400G, 400F and all subsequent waste connections, and the waste pipe from the boiler room 406 and all subsequent waste connections, shall be 6" in size. All waste piping downstream from this location shall maintain a size of 6" until exiting the building at the north wall of serving kitchen 401.
B. The 6" sanitary waste building drain shall shift to the east 2'-2" in order to match the location 35'-0" off of the east vestibule wall indicated by the civil engineer. The 6" building drain shall drop to an invert elevation of 94'-5" in order to connect in to the utility service provided by the site utility contractor. The invert elevation of the of 94'-5" is accounting for the most remote fixture on the building sanitary waste drain being sloped at greater than 1/8" per foot.
C. The building storm drain shall be indicated as 15" in lieu of 12" up until the point where the 8" storm line routing east and west in the corridor to the north of the gymnasiums tie in.

D. The inlet and outlet piping to the grease interceptor under the dishwashing room shall be 3" in lieu of 2". The 3" waste pipes shall route upstream to the point where the 2" dish drain waste pipe connects in the piping system. The 2" waste pipe serving the dish drain shall connect in to the piping system with a wye fitting in the direction of the flow. The 3" waste pipe downstream of the grease interceptor shall route full size to the 4" waste main.
E. The waste pipe running east and west accepting waste from sinks in music classrooms 412, 413, and 416 shall transition to a 3" waste pipe at the point where the sink in music classroom 412 ties in to the system.
F. The underground storm drain pipe routing north and south in the corridor to the east of the new gymnasium room 405-1 shall have cleanouts no more than 100'-0" apart.
G. The underground waste pipe routing north and south in the corridor to the east of the new gymnasium room 405-1 shall have cleanouts no more than 100'-0" apart.
H. SP-2 shall serve subsoil drain tile provided around the elevator pit. Provide a 4" drain pipe to connect in to the subsoil drain tile furnished and installed by others.
I. The elevator pit drain pipe shall be 4" in diameter.
J. All applicable changes noted under Item No. 5 shall be represented in the waste and vent riser diagrams.

ITEM NO. 6 Sheet M2.11

A. Waste piping accepting drainage from both lab classrooms 590 and 690 shall be 3" in lieu of 2".
B. Waste piping accepting drainage from both lab classrooms 564 and 664 shall be 3" in lieu of 2".
C. All changes noted under Item No.6 shall be represented in the waste and vent riser diagrams.

ITEM NO. 7 Sheet M2.12

A. The following changes shall be made to view "1/M2.12 – First Floor Plan Area C – Plumbing":
   1. For the two (2) refrigerators in Staff Lounge 500L, provide plumbing fixture IMT-1 and a ½" CW connection with ball valve shut off at branch from 4" CW main.
   2. The rain leader in DCD room 557 penetrating both the floor and ceiling shall be 8" in lieu of 4" as labeled.
B. The following changes shall be made to view "3/M2.12 – First Floor Plan Area G – Plumbing":
   1. The new plumbing fixtures in the private toilet group to the north of staff lounge 127 shall connect in to new hot water and cold water mains that run in the corridor to the north and supply water to the auditorium toilet rooms 425B and 425G. Shut off valves shall be provided on all branches off of the mains.
   2. Plumbing fixture S-3 along the west wall of staff lounge 127 shall connect in to existing cold water, hot water, waste, and vent that supplies the adjacent private toilet room.
   3. The new secure entry addition that contains rooms 99A, 99B, 99C, and 99D shall utilize a storm drain and overflow scupper for roof drainage.
C. The following changes shall be made to view "2/M2.12 – First Floor Plan Area F – Plumbing":
   1. The vent serving the water heater floor drain shall be 2" in size and route up to a 4" VTR.
   2. The vent serving the floor drain in between B-3 and B-3 shall be 4" up to a 4" VTR.
   3. The vent serving the floor drain in between B-1 and B-2 shall be 2" up to a 4" VTR.

D. All applicable changes noted under Item No. 7 shall be represented in the waste and vent riser diagrams.

ITEM NO. 8 Sheet M2.13

A. The mop basin in custodial room 620-1 shall be served from the hot and cold water piping mains shown on the main level plan. Shut off valves shall be provided at branches off of main. Waste and vent shall tie in to the nearest waste and vent systems. Sizes are as indicated in the plumbing fixture rough in connection schedule.
B. Waste piping accepting drainage from both lab classrooms 531 and 631 shall be 3" in lieu of 2".
C. Waste piping accepting drainage from both lab classrooms 505 and 605 shall be 3" in lieu of 2".
D. All changes noted under Item No. 8 shall be represented in the waste and vent riser diagrams.

ITEM NO. 9 Sheet M2.14

A. The 140 deg hot water and recirculating hot water lines shown on this sheet shall be routed to all kitchen equipment/fixture rough-ins in lieu of the standard hot water connection. Shut off valves off of the main shall be provided for each rough-in.
B. The kitchen EW-1 shall be served by 1" hot and cold water lines that are on separate branch lines and shut-off valves from toilet room 401D and adjacent fixtures in 401C.
C. The hot water and cold water piping branches that serve toilet room 401D and adjacent fixture in 401C shall be 1" and 2-1/2" respectively.
D. The 4" hard cold water line that enters the page from the east and comes from the existing mechanical room 021 (addressed in addendum 1) shall route directly to the domestic booster pump in mechanical room 406. The hard cold water line shall then route to the water softener after the booster pump. A 2" hard cold water line shall branch off of the 4" pressure-boosted hard cold water main prior to being softened and be routed to all wall hydrants that are provided as part of this project. The pressure boosted (soft) cold water shall route to all other fixtures.
E. Provide soft cold water and condensate drain piping to each humidifier (H-1, H-2, H-3) in rooms 411, 414, and 415. Installation of humidifier and associated piping and components shall be in accordance with specification section 230800-2.4 and manufacturer's written instructions.
F. All applicable changes noted under Item No. 9 shall be represented in the waste and vent riser diagrams.

ITEM NO. 10 Sheet M2.15

A. The washer/dryer outlet box located in auditorium storage room 418 shall be moved to dressing/class room 114. All hot water, cold water, waste and vent connections shall be tied in to the nearest piping mains to the new washer/dryer location.

ITEM NO. 11 Sheet M2.22

A. The hard cold water piping shown on this sheet shall be 2" in lieu of 4" in diameter. The hard cold water pipe routes to the east over the commons space, and routes down in the chase it is currently shown in to the main level at which point it routes to all wall hydrants.

ITEM NO. 12 Sheet M2.23

A. The sinks in classrooms 629 and 630 shall be installed with 1-1/2" vent piping up to the ceiling space. Sinks in classrooms 529 and 530 also tie in to the venting system. The venting for the two sets of stacked sinks shall tie together, at with point a 2" vent up to 4" vent-through-roof shall be installed.
B. The sinks in classrooms 632, 633, and 634 shall be installed with 1-1/2" vent piping up to the ceiling space. Sinks in classrooms 532, 533, and 534 also tie in to the venting system. The venting for the three sets of stacked sinks shall tie together, at with point a 2" vent up to 4" vent-through-roof shall be installed.
C. The sinks in classrooms 635 and 637 shall be installed with 1-1/2" vent piping up to the ceiling space. Sinks in classrooms 529 and 530 also tie in to the venting system. The venting for the three sets of stacked sinks shall tie together, at with point a 2" vent up to 4" vent-through-roof shall be installed.

ITEM NO. 13 Sheet 2.31

A. The 140 degree hot water line shown on this sheet shall be routed to all kitchen equipment/fixture rough-ins in lieu of the standard hot water piping connections. Shut off valves off of the main shall be provided for each rough-in. The 140 degree recirculating hot water line shall connect to the 140 degree hot water line after the last kitchen fixture to complete the 140 degree hot water loop.
B. All kitchen fixtures rough-ins requiring hot water, cold water, waste and vent piping connections shall be represented in a domestic water riser diagram and waste and vent riser diagram.
C. As specified in the food service equipment plumbing rough-in plan, all floor drains FD-2 shall be 4" with a 4" funnel and furnished and installed by the plumbing contractor.
D. The kitchen equipment plumbing connection schedule for P72A shall indicate a 140 degree hot water from building supply. The 140 degree hot water line connects in to the built in dishwashing booster heater provided by FSEC.
E. Refer to Item No. 8 in Addendum – M01 for information pertaining to the gas line routing to the new serving kitchen.

ITEM NO. 14 Sheet 3.12

A. The following changes to be made to view "3/M3.12 – First Floor Plan Area C – Fire Protection":
   1. The hatched area covering the secure entry addition room 99A-D shall be tied in to and served from existing adjacent fire protection zone. All new fire protection service and modifications shall be made in accordance with all NFPA regulations.
   2. All existing spaces that are renovated yet remain unhatched for fire protection services shall maintain the existing fire protection piping mains. Sprinkler heads in renovated rooms shall be moved or modified as required so the space maintains compliance with all NFPA regulations.

ITEM NO. 15 Sheet M4.12

A. Refer to "R1 – M2.12 – Chiller and Ice Storage Plan" attached to this addendum for the chiller and ice storage plant layout. Specifications for the ice storage tank system can be found below.

SPECIFICATIONS

ITEM NO. 16 230650 – Refrigeration - Add in the following section: **2.4 Ice Storage Tank System:**

A. The energy storage cooling system shall be supplied from one single source with complete system responsibility. The energy storage cooling system using ice shall be modular in design so that its capacity can be increased in minimum increments as small as 82 usable latent ton-hours and maximum increments of no more than 500 latent ton-hours with no one tank being more than 25 percent of the usable stored capacity. It shall be a closed circuit single source system including; packaged glycol chiller unit(s) with factory installed ice making controls, separate modular ice storage tanks, DDC control system, and heat transfer fluid providing twenty-four hour system performance as indicated in the plans and specifications. This organization shall have factory trained service technicians who will be responsible for the start-up and first year parts and labor warranty of the system including warranties listed elsewhere in the bid documents. All storage vessels shall be of one module size to facilitate balancing and shall be filled with water as a freezing fluid, such that the ice tank heat exchanger is totally submerged. The ice tank heat exchanger, in all thermal storage tank modules, shall be piped in parallel and a chilled solution ethylene glycol shall be circulated through the tubes. In the charging mode of operation, sub cooled ethylene glycol solution shall cause ice to form and build on the tube surfaces. In the load mode of operation, the melting ice from around the tube surfaces shall cool the glycol solution. Internal melt comes from the load mode of operation of the ice melting from the tube surface, inside the ice, out. CALMAC Manufacturing is basis of design. Encapsulated and ice builder systems are not acceptable.
B. Daily performance of the energy storage cooling system shall be as scheduled on the twenty-four hour load profile in the specifications and/or on the drawings. Suppliers shall provide information in accordance with the current ARI Guideline for Specifying the Thermal Performance of Cool Storage 2002 that proposed equipment will meet minimum performance specified. Each ICE tank shall have FACTORY RATED AND PUBLISHED charge and discharge performance curves that clearly indicate net usable ton-hours of storage at the system design temperatures shown in the plans and specifications. Net usable ton-hours shall be shown on these curves and shall be provided with the submittal package. Average charging ethylene glycol temperature (average over ice making hours) and final charging temperature must meet minimum scheduled performance as listed.
C. The modular ice storage tank design shall incorporate structure and storage fluid containment in a one-piece (sides and bottom) seamless tank designed for a minimum 25-year service life and shall be constructed solely of corrosion-resistant materials.
D. The ice tanks and tank covers shall be suitable for installation above or below ground with a maximum 12 inch deep covering, and shall produce a floor loading of no more than 391 pounds per square foot.
E. The ice tank farm shall be modular and have a maximum single tank capacity of no more than 400 usable ton-hours each, capable of being individually isolated so that each 400 ton-hour tank

may be serviced without interrupting the operation of the total system for system reliability. The tanks shall have opposite or same end connections as shown on plans. Isolation valves for tanks shall be supplied, installed and insulated as shown on the plans.

F. The ice tank shall consist of a seamless one-piece design manufactured with rotationally molded corrosion resistant polyethylene. Totally buried tanks shall be one-third thicker, installed a maximum of one foot below grade, and installed in accordance with manufacturers recommended procedures. The tank shall include a factory assembled thermally isolated expansion chamber to help prevent expansion water from forming capacity reducing ice caps. If the non-basis of design ice tank does not contain phase change expansion chamber, manufacturer must provide and guarantee insulated expansion tank with quote.
G. Stainless steel vessels will also be considered provided all stainless steel parts (heat exchanger, all sides of tanks and all supports) are coated with a cross linked epoxy-phenolic cured coating with an alkaline curing agent such as Plasite 7122HAR to eliminate long term corrosion due to sweating and/or outdoor weather. Galvanized steel is not acceptable. All stainless steel surfaces shall be cleaned and properly etched with a standard solution such as Galvaprep® or a phosphating solution. After the surface is etched it shall be thoroughly rinsed with water and dried prior to applying protective coating. Coated steel tanks shall be reinforced with full width structural angles underneath on all FOUR sides, and all seams are welded to ensure watertight construction.
H. Manufacturer of metal tanks must also provide an extra containment pool liner for installation after 10 years of operation.
I. The fluid containment barriers shall be polyethylene or equivalent with an average thickness of 3/8 inch and a minimum ultimate strength of 2600 psi as per ASTM D 638-08. According to ASTM-1004A zinc rich compound shall be applied to all exposed edges and welds on non-polyethylene constructed tanks. Ice tank and fluid containment shall be warranted as designated under warranty section.
J. The phase change water containment integrity shall be totally repairable without removing the internal ice tank heat exchanger. If removal of tank heat exchanger is required, tank manufacturer shall provide to owner at their option money or labor for heat exchanger removal, repair, and replacement during containment warranty period. Indoor installations shall require no more than three foot of overhead clearance for heat exchanger repair. Galvanized steel tanks shall include enough room for rigging apparatus for a side or overhead removal of heat exchanger for tube repair.
K. If required by installation manual, manufacturers of thermal storage tank vessels shall provide, install, and warrant tank safety switches and temperature thermisters. Manufacturer shall notify control contractor of the quantity of safety BAS points required for the tank farm. Float switches and thermisters shall be included in the ice tank warranty.
L. All thermal storage tanks must be designed and able to withstand, without damage or distortion, repeated cycles of total freezing of ALL water within it due to control malfunctions or ambient temperatures. Damages caused by a total freeze shall be covered under ice tank vessel warranty defined in this specification.
M. All thermal storage vessels must be capable of being re-deployed for use at other sites with remaining specified original warranty in force.
N. Manufacturer's of thermal storage tank vessels shall provide, install and warrant all heat tracing tape if required for inventory meters, site glasses, and connections.

O. The ice tank shall contain a spiral-wound, mat type heat exchanger, constructed entirely of polyethylene headers and 5/8 inch O.D. polyethylene tubing arranged in multiple parallel circuits with OPPOSITE direction of flow in adjoining tubes for even ice making and melting. Every connection in the heat exchanger shall be fusion welded.
P. Manufacturer's of thermal energy storage heat exchangers using tubes less than 5/8 inch inside diameter must provide tubes connected to internal headers with all fusion welded construction. If all fusion welded construction is not provided, the manufacturer must provide annual inspections of mechanical connections for seven years.
Q. Additionally, manufacturers using tubes less than 5/8 inch O.D. must install and warrant a self cleaning 5 micron glycol fluid filter and strainer system to filter glycol entering tank farm to eliminate tube blockages at in heat exchanger tubes.
R. Steel heat exchanger tubes (1.05" O.D.) may be used provided steel framework is hot dip galvanized after fabrication and coated as directed above. All ice tank heat exchangers shall be warranted as specified elsewhere.
S. The heat exchanger shall be capable of operating up to a 90 psi (620 kPa) maximum pressure and shall have a minimum burst pressure rated for 4 times the maximum operating pressure.
T. Each ice tank heat exchanger and its associated piping shall be factory hydrostatically-pressure tested to a minimum of 250 psi (1724 kPa) after tank insertion, not prior.
U. To avoid capacity reducing ice caps, heat exchanger tubes shall be totally submerged in the freezing liquid, and shall be kept evenly spaced by plastic spacer strips.
V. Heat transfer fluid temperature drops across the heat exchanger in the charging mode must be large enough to permit full fluid flow through the ice making ethylene glycol chiller. Bypass of fluid around the ice making ethylene glycol chiller in the charging mode is not acceptable.
W. Multiple modular thermal storage tank systems shall be piped parallel in reverse return for self-balancing. At design conditions the ice tank flow shall not change greater than 3% by varying the pressure across the tank farm by one foot (.043psi). Manufacturers unable to meet this criterion must provide install and warrant circuit setters for each tank in the farm. Manufacturer must provide pressure drop curves of ice tank with submittal package.
X. The heat exchanger must be repairable without removal from tank.
Y. Pressure relief valves between the tank and system must be provided and warranted by non basis of design ice tank manufacturer's if required by ice tank manufacturer.
Z. Covers shall be provided for all ice modules and/or tanks. Covers for buried vessels shall be designed to support architectural landscaping wood chips, or other similar material, having a maximum depth of twelve inches. Covers shall also support the weight of an average adult person (200 pounds) at any point on the tank farm.
AA. Covers shall be in modular sections that can be readily lifted, removed, and replaced by two men. Each section shall weigh no more than 250 pounds, and shall have smoothed edges or handles for easy and safe gripping.
BB. Each vessel shall have at least one inspection port in the cover, which can be used for visual inspection, determining liquid level, and for filling the vessel with water, without removing the cover(s). Each buried tank's inspection port shall have a Schedule 80 PVC pipe extending to six inches above grade, with a casketed and easily removable cap.
CC. Covers for steel vessels shall be a minimum of 16 gauge stainless or 14 gauge for hot dipped galvanized steel tanks of same type used on sides and bottom.

DD. The bottom, sides and cover(s) of each vessel shall be factory insulated. Insulation on the interior of the structural containment vessel is unacceptable.

EE. Manufacturer must provide adequate insulation to limit standby losses not to exceed ONE PERCENT of the total stored capacity when in an 85 degree F. environment for a period of twenty-four hours.

FF. For plastic vessels that freeze solid the bottom and the sides of the tank shall be insulated externally with a minimum of two inches of extruded polystyrene or polyurethane applied in overlapping layers having a minimum R- factor of nine (9). Insulation of sides shall be covered with a .032-inch thick aluminum jacket for protection and reflectance.

GG. The tops of all vessel types shall have a minimum of three inches of insulation applied to the interior cavity of the cover and have an R- factor of 24. Insulation with direct access or contact with the storage fluid or ambient air is not acceptable.

HH. For stainless steel or galvanized steel vessels that do not freeze solid, insulation meeting the standby loss criteria shall be applied between the exterior of the containment wall or pool type liner and the interior of the structural support system. Insulation of sides and bottom of vessel shall be covered with a minimum 30 mil thick PVC or EPDM impermeable liner, with all seams and joints double lapped and solvent welded. All fastening materials used to hold the liner in place shall be non-corrosive plastic, or stainless steel.

II. Hydrostatically flush clean and field pressure test all piping EXTERNAL to thermal storage tanks as specified elsewhere to remove welding slag, flux, and dirt. If hydrostatic test is with water the ice tanks must not be a part of this test and shall be valved off to eliminate filling the ice tanks with water, which cannot be easily replaced with the pre-mixed ethylene glycol. After successful completion of the test, drain the system and add premixed ethylene glycol to the system as described in another part of the specification. Upon completion of the filling and removal of air, pressure test the ice tanks in accordance with manufacturer's recommendations.

JJ. A lug type, full flow shut off valve shall be included for field installation and insulation in the supply and return lines of each tank on the system side of the removable flexible connector (if required).

KK. Liquid level and/or pressure switches in the expansion tank shall provide glycol system leak protection.

LL. Tank bottoms shall be level and supported over the entire area and insulated from their supporting surface with insulation supplied by the tank manufacturer.

MM. The thermal storage farm system shall be provided with one ice inventory-measuring device, which will indicate the amount of ice available at any time within an accuracy of +/- 5 percent. This inventory-measuring device shall also be equipped with an electric transducer capable of producing a 4 - 20 ma. signal which can interface with the building automation system. This device is for indication only, NOT FOR CONTROL OF ICE SYSTEM.

NN. The ice tank manufacturer shall supply ten years of water treatment chemicals required for treatment of the phase change water against biological growth AND tank corrosion. The treatment must eliminate algae, bacteria, and metal corrosion (if metal tanks supplied). The submittal documents must contain the name(s), and quantities required for the ten-year chemical treatment. Rules for handling, storing, amount of room required for storing, and rules for application must also be provided. Manufacturer of ice tank must provide factory-trained personnel annual inspection for heat exchanger and tank corrosion during warranty period shown below.

OO. Manufacturer of ice tanks to provide parts warranty for phase change fluid containment, float switches, heat tracing tape, tank pressure relief valves if required, sight glass, insulation, corrosion, and structure of tank for TWENTY YEARS from date of shipment to jobsite.

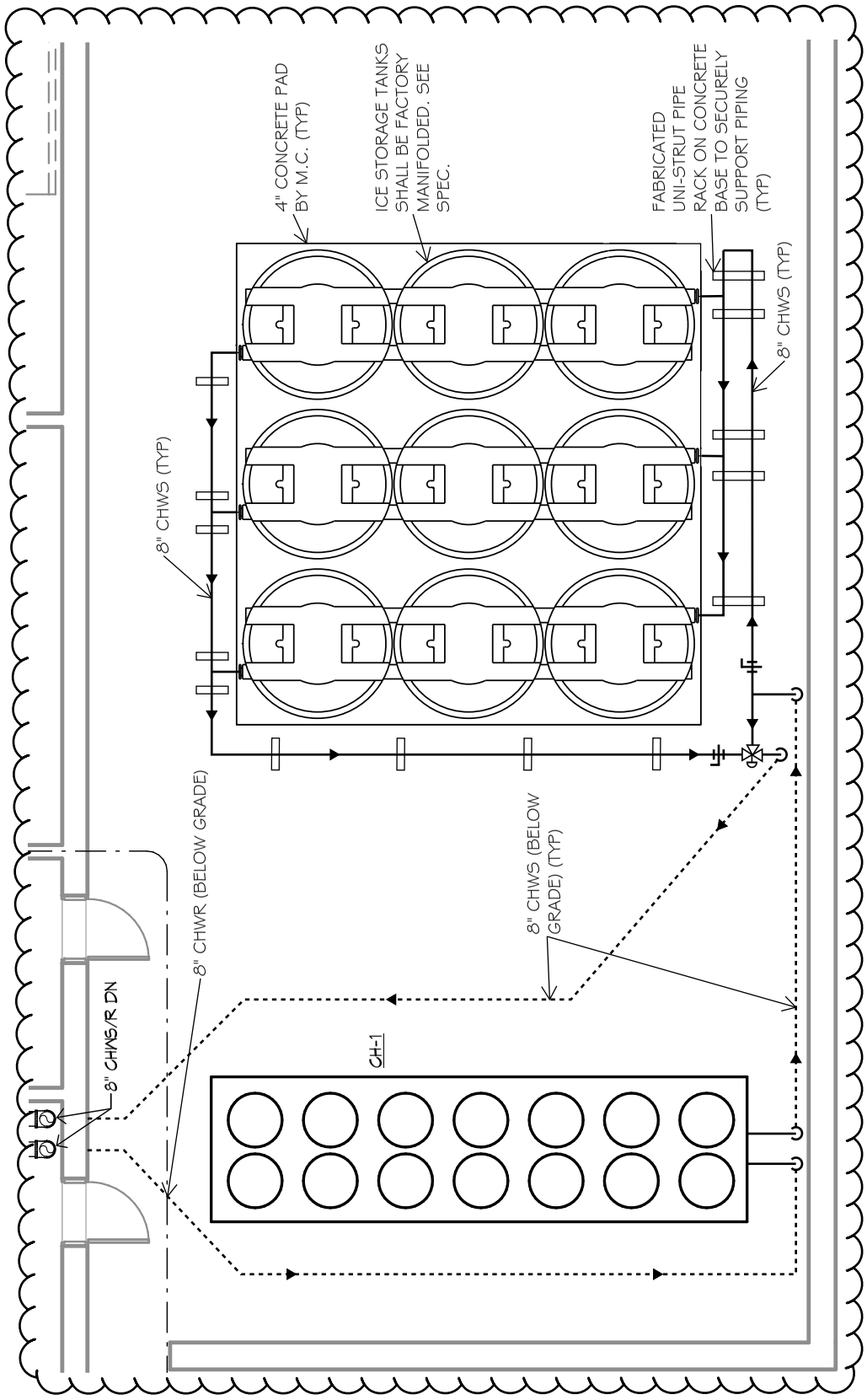
PP. Manufacturer of ice tanks must provide complete parts and labor warranty for ice tank heat exchanger integrity and ice inventory meter and/or ice thickness meter for FIVE YEARS from date of shipment to job site.

QQ. The Ice Storage Tank System Manufacturer shall be on site for a minimum of 4 hours for direct coordination with the temperature controls contractor. This is to be scheduled with the awarded controls contractor during construction.

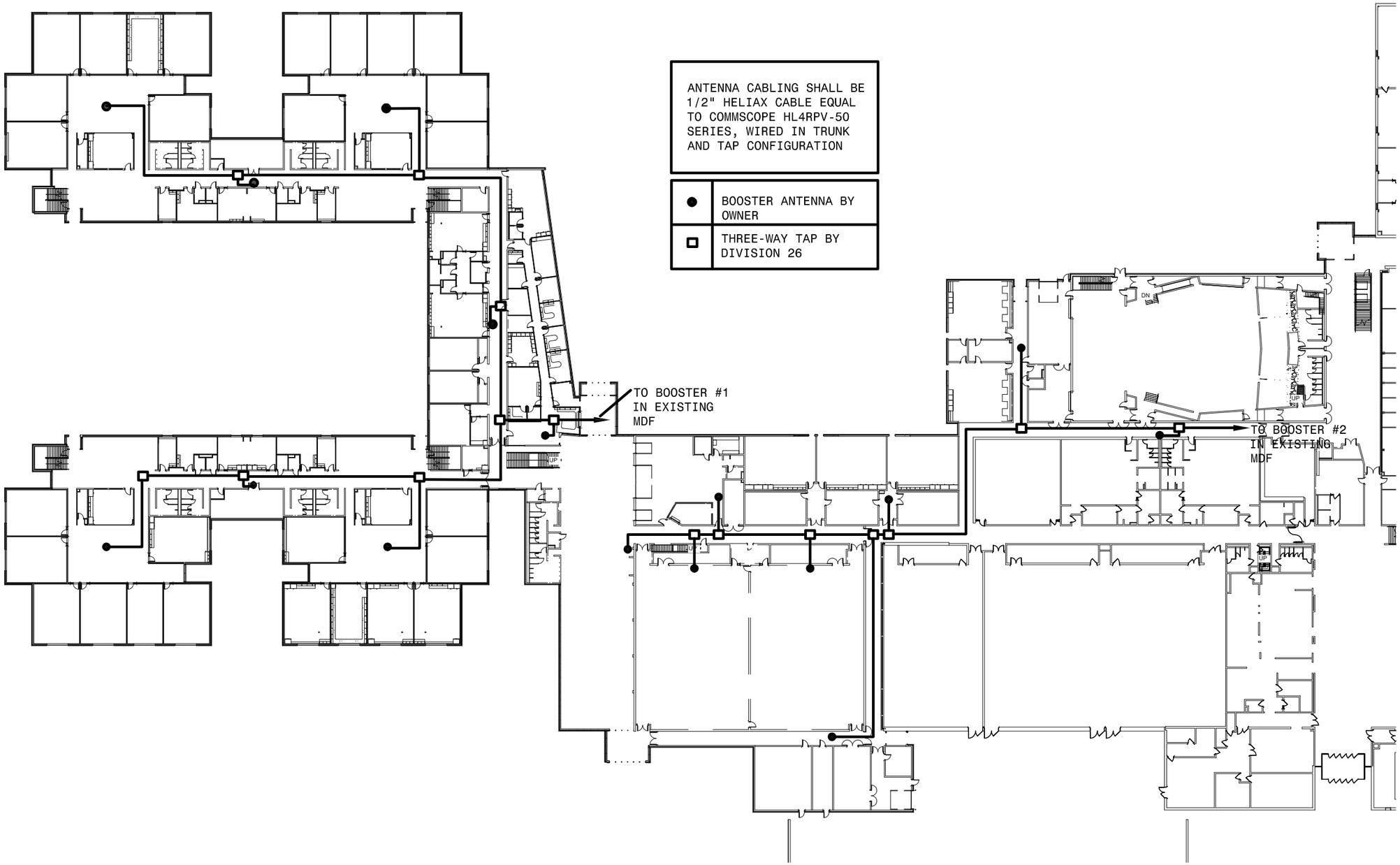
Ice Tank Model	Qty	Glycol Entering Fluid Temp (°F)	Glycol Leaving Fluid Temp (°F)	Discharging Flow per tank (gpm)	Discharge Pressure Drop (psi)	Storage Discharge Time (hours)	Total ton hour	Average Ice Making Temp (°F)	Ice Making Temp at end of Charge (°F)	Maximum Charge time (hours)	Charging Flow per tank (gpm)	Charging Pressure Drop (psi)	Glycol volume per tank (gallons) Total
1500C	3 (9 total tanks)	50	42	140	6.5	8	1458	23	28	8	230	14	157 X 9= 1413

Notes: CALMAC is basis of design. Net usable storage capacity, average ice making temperature, pressure drops, and ice making temp at end of charge is the minimum performance accepted. No one tank shall represent more than 12 % of total cool storage capacity. Contractor to connect flanged tanks in groups of three and insulate connections as shown on plans. Provide and insulate lug type shut-off valves as indicated.

END OF ADDENDUM



R1 - M4.12 - CHILLER AND ICE STORAGE PLAN (1/8" = 1'-0")



ANTENNA CABLING SHALL BE 1/2" HELIAX CABLE EQUAL TO COMMSCOPE HL4RPV-50 SERIES, WIRED IN TRUNK AND TAP CONFIGURATION

●	BOOSTER ANTENNA BY OWNER
□	THREE-WAY TAP BY DIVISION 26

1 PARTIAL OVERALL FLOORPLAN - RADIO BOOSTER CABLING

0' 30' 60' 120'

NORTH

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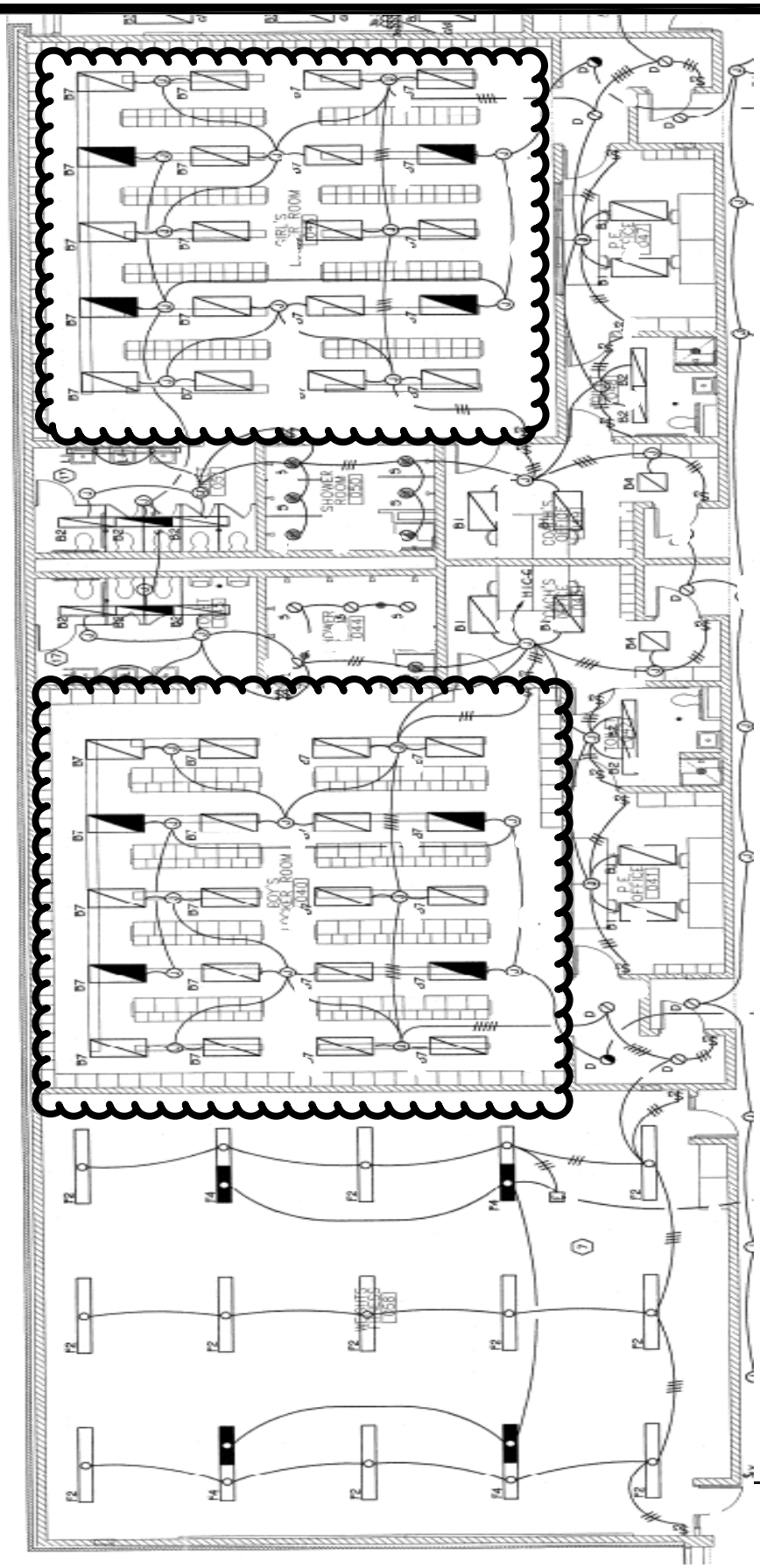
HORIZON MIDDLE SCHOOL ADDITION

MOORHEAD, MN

MBN JOB #: 15-214 DATE: 5-09-16

RBC



NOTE: DISCONNECT, REMOVE AND REINSTALL EXISTING LIGHT FIXTURES IN THE CLOUDED EXISTING ROOMS AS REQUIRED FOR STRUCTURAL WORK ABOVE THE CEILING

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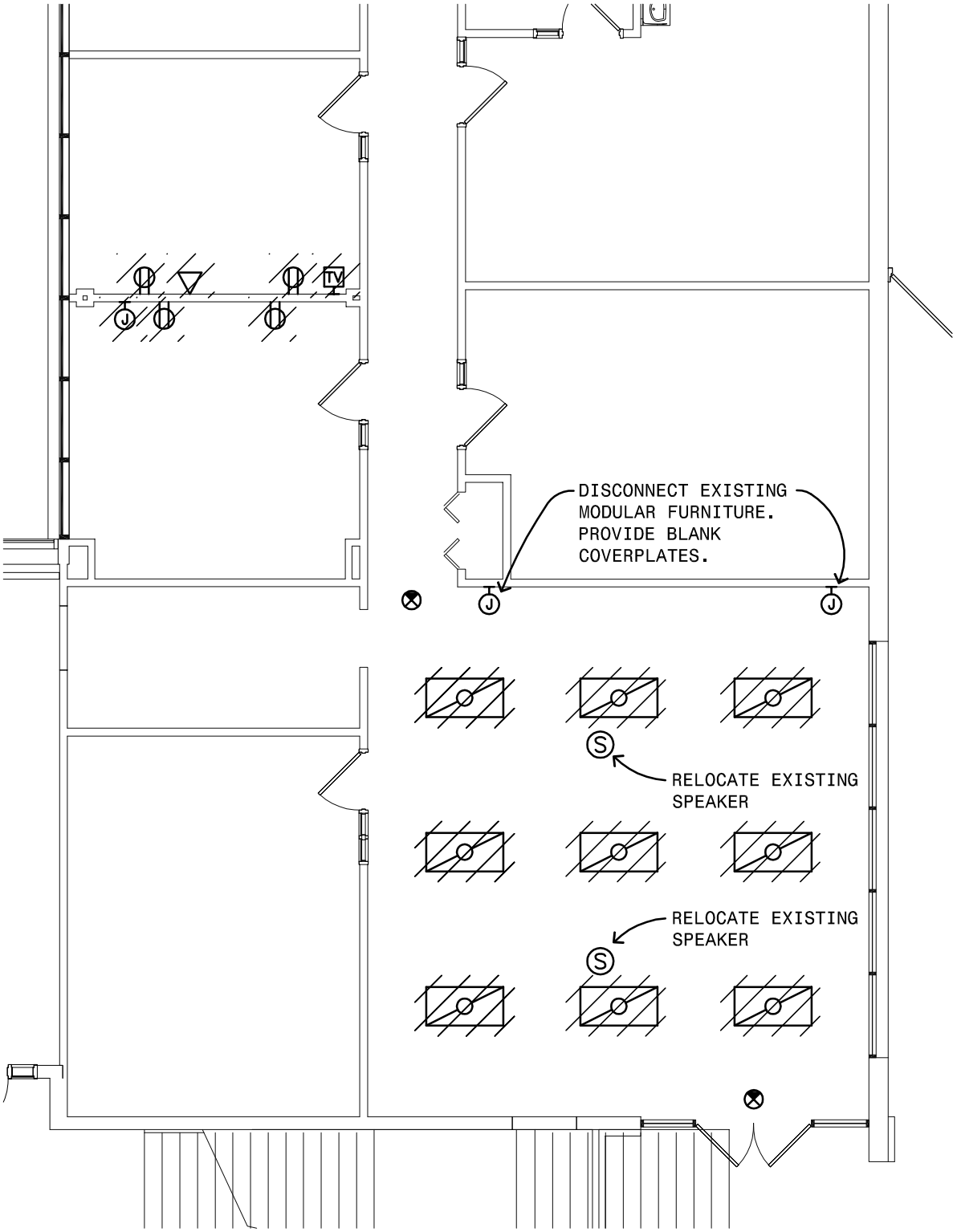
MAPS GRADES 5-6
ADDITION AT HORIZON CAMPUS
MOORHEAD, MINNESOTA

MBN JOB #: 15-214
REVISION DATE: 5-10-16

R1
E1.01



1 EXISTING ADMINISTRATION AREA DEMOLITION

SCALE: 1/8" = 1'-0"

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MOORHEAD, MINNESOTA

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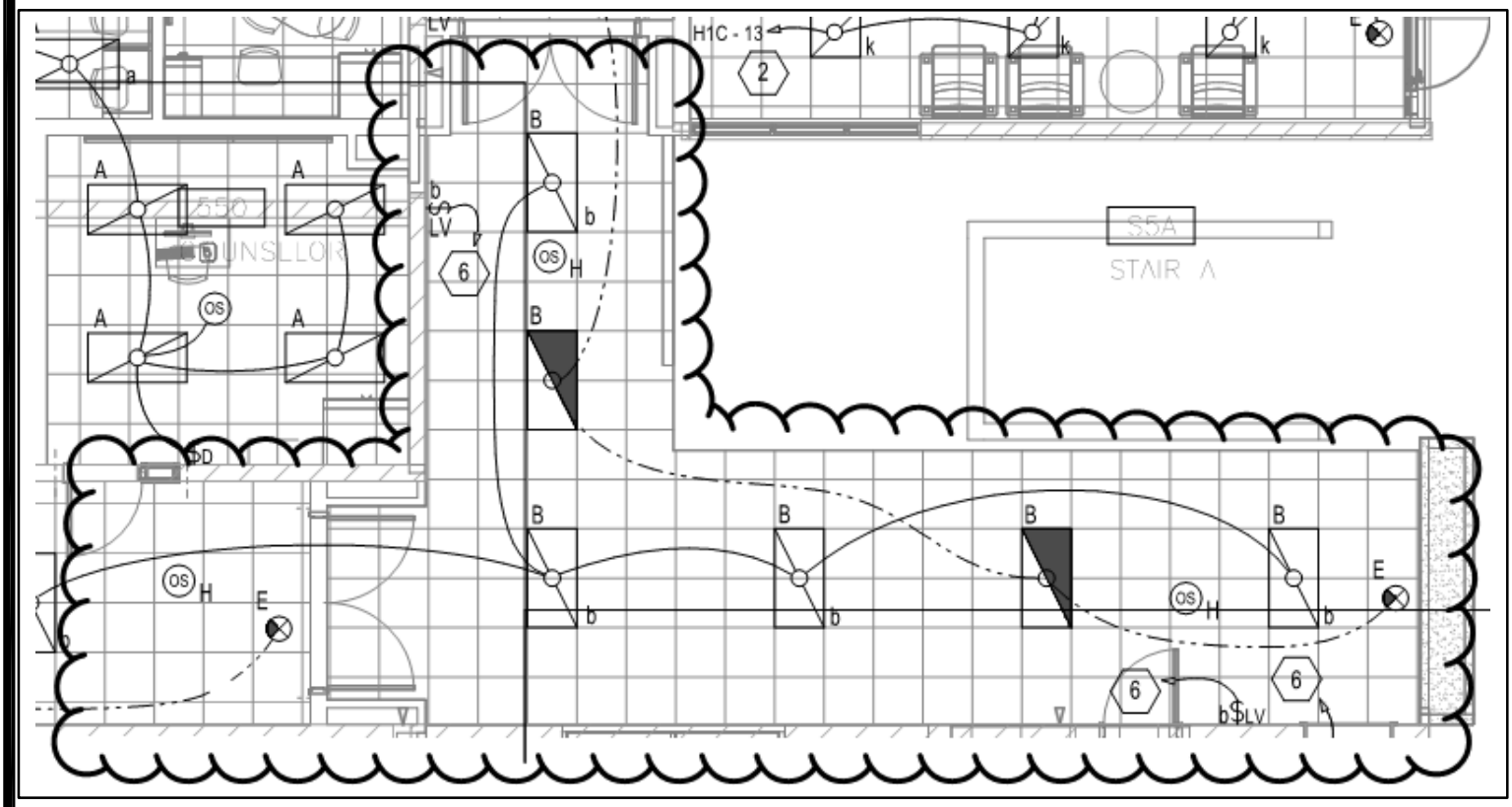
R2
E1.01



1 PARTIAL AREA 'C' LIGHTING

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ADDITION AT HORIZON CAMPUS
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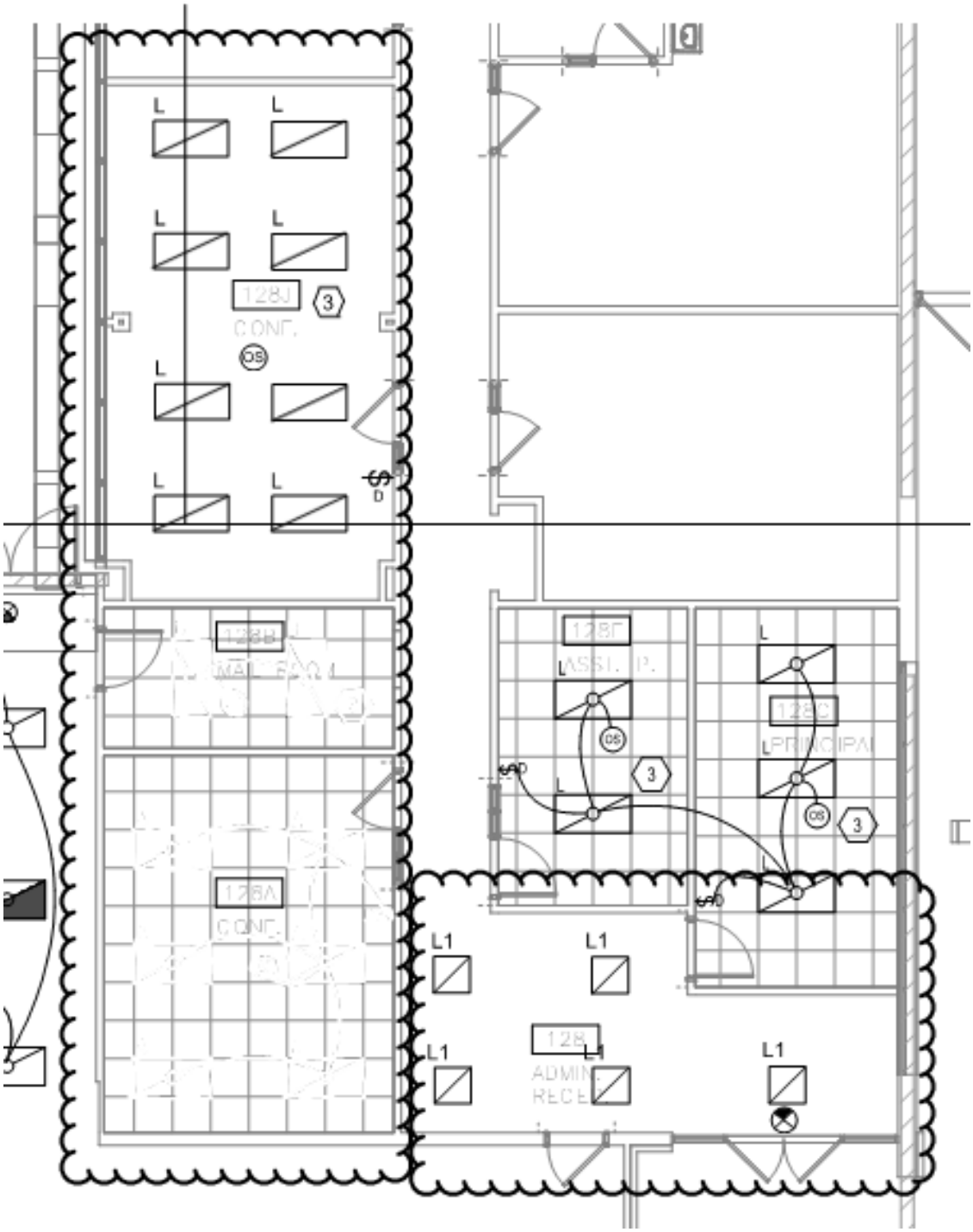
R1
E2.12



1 EXISTING ADMINISTRATION AREA LIGHTING

SCALE: 1/8" = 1'-0"

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ADDITION AT HORIZON CAMPUS

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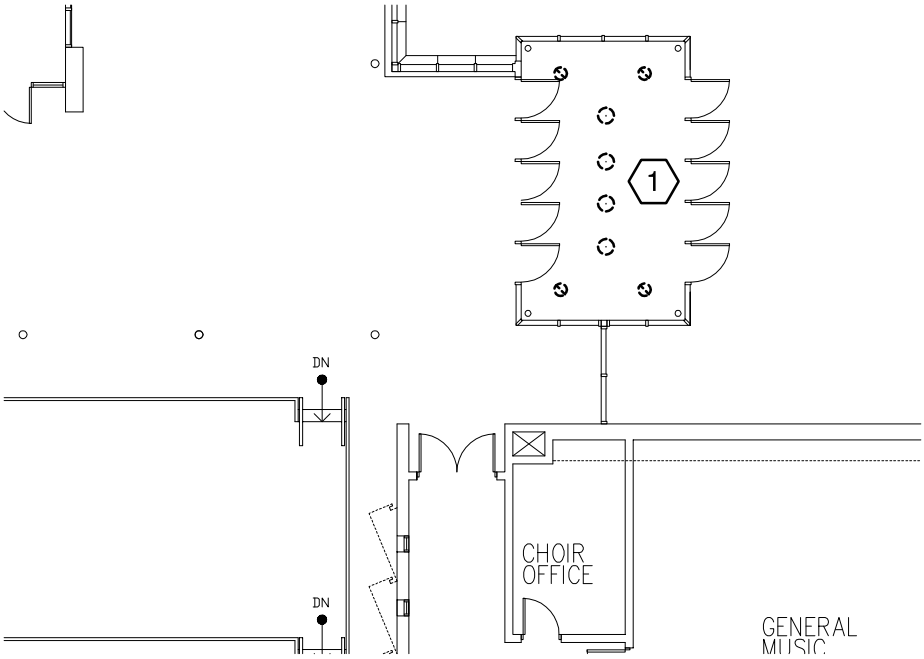
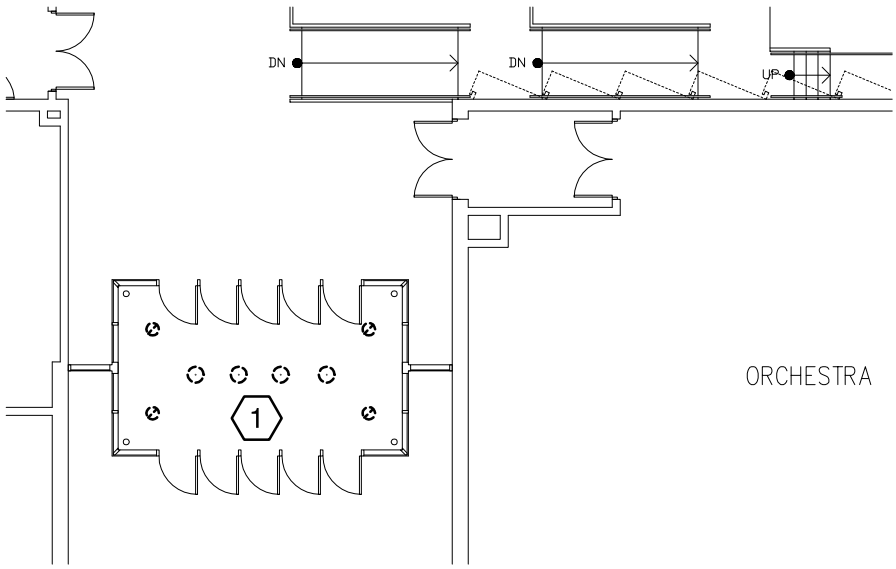
R1

E2.15



1 EXISTING CAFETORIUM EAST VESTIBULE

SCALE: 1/16" = 1'-0"



2 EXISTING CAFETORIUM SOUTH VESTIBULE

SCALE: 1/16" = 1'-0"

(1) DISCONNECT AND REMOVE EXISTING SUSPENDED AND RECESSED LIGHT FIXTURES. REPLACE THE DOWNLIGHTS WITH (4) TYPE 'D2' FIXTURES AND REPLACE THE (4) SUSPENDED FIXTURES WITH (4) FIXTURES EQUAL TO DELRAY AL2277 SERIES, SILVER FINISH, WHITE GLASS SHADE, 3500K, 3780 LUMENS, 8 FOOT PENDANT LENGTH TO BE FIELD ADJUSTED TO MATCH EXISTING VARYING PENDANT LENGTHS. RECONNECT TO EXISTING CIRCUITING. THIS WORK TO BE DONE UNDER ALTERNATE #4.

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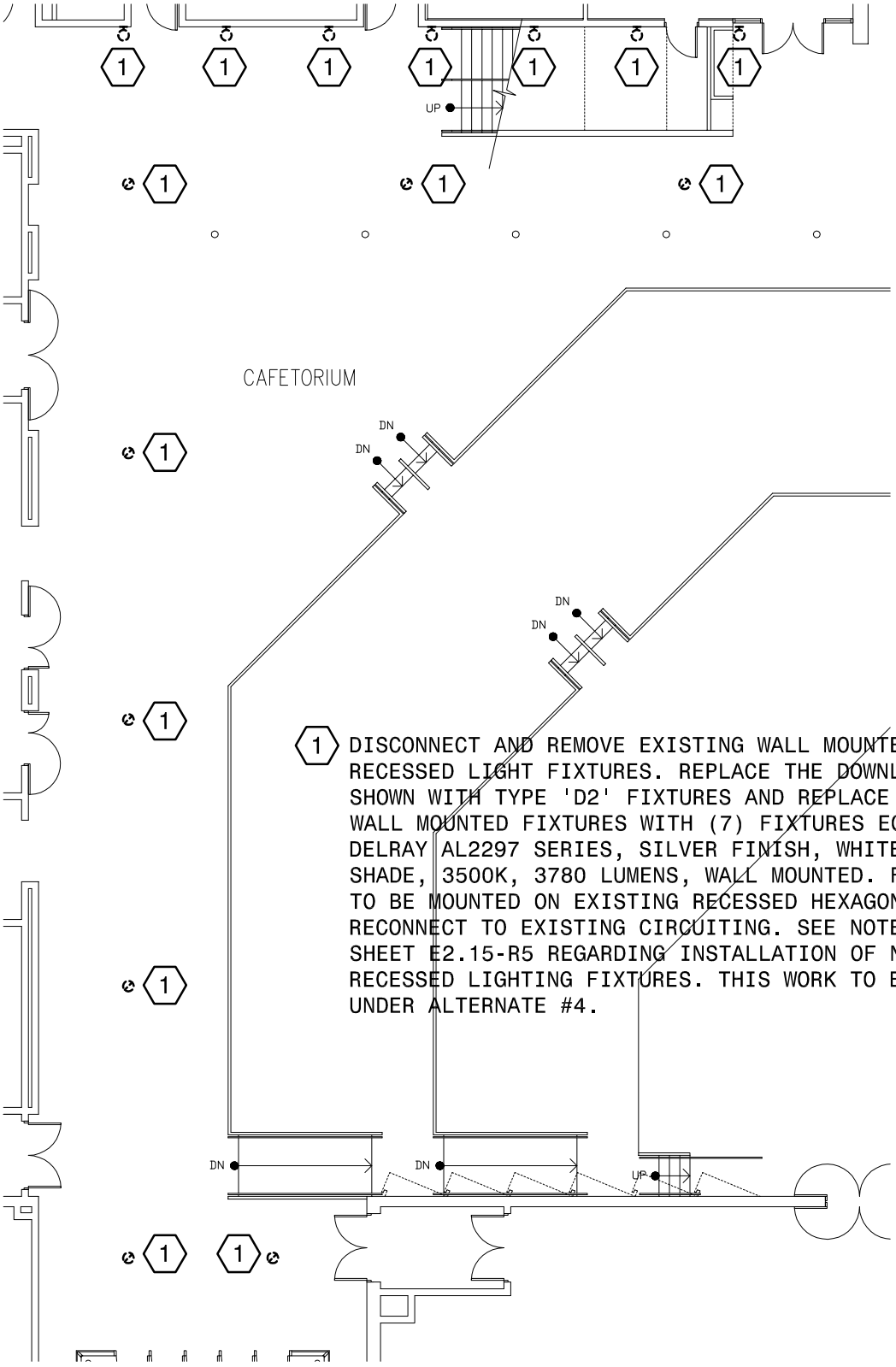
R1
E2.15



1 DISCONNECT AND REMOVE EXISTING WALL MOUNTED AND RECESSED LIGHT FIXTURES. REPLACE THE DOWNLIGHTS SHOWN WITH TYPE 'D2' FIXTURES AND REPLACE THE (7) WALL MOUNTED FIXTURES WITH (7) FIXTURES EQUAL TO DELRAY AL2297 SERIES, SILVER FINISH, WHITE GLASS SHADE, 3500K, 3780 LUMENS, WALL MOUNTED. FIXTURE TO BE MOUNTED ON EXISTING RECESSED HEXAGONAL BOX. RECONNECT TO EXISTING CIRCUITING. SEE NOTES ON SHEET E2.15-R5 REGARDING INSTALLATION OF NEW RECESSED LIGHTING FIXTURES. THIS WORK TO BE DONE UNDER ALTERNATE #4.

1 EXISTING LIGHTING REPLACEMENT

SCALE: 1/16" = 1'-0"

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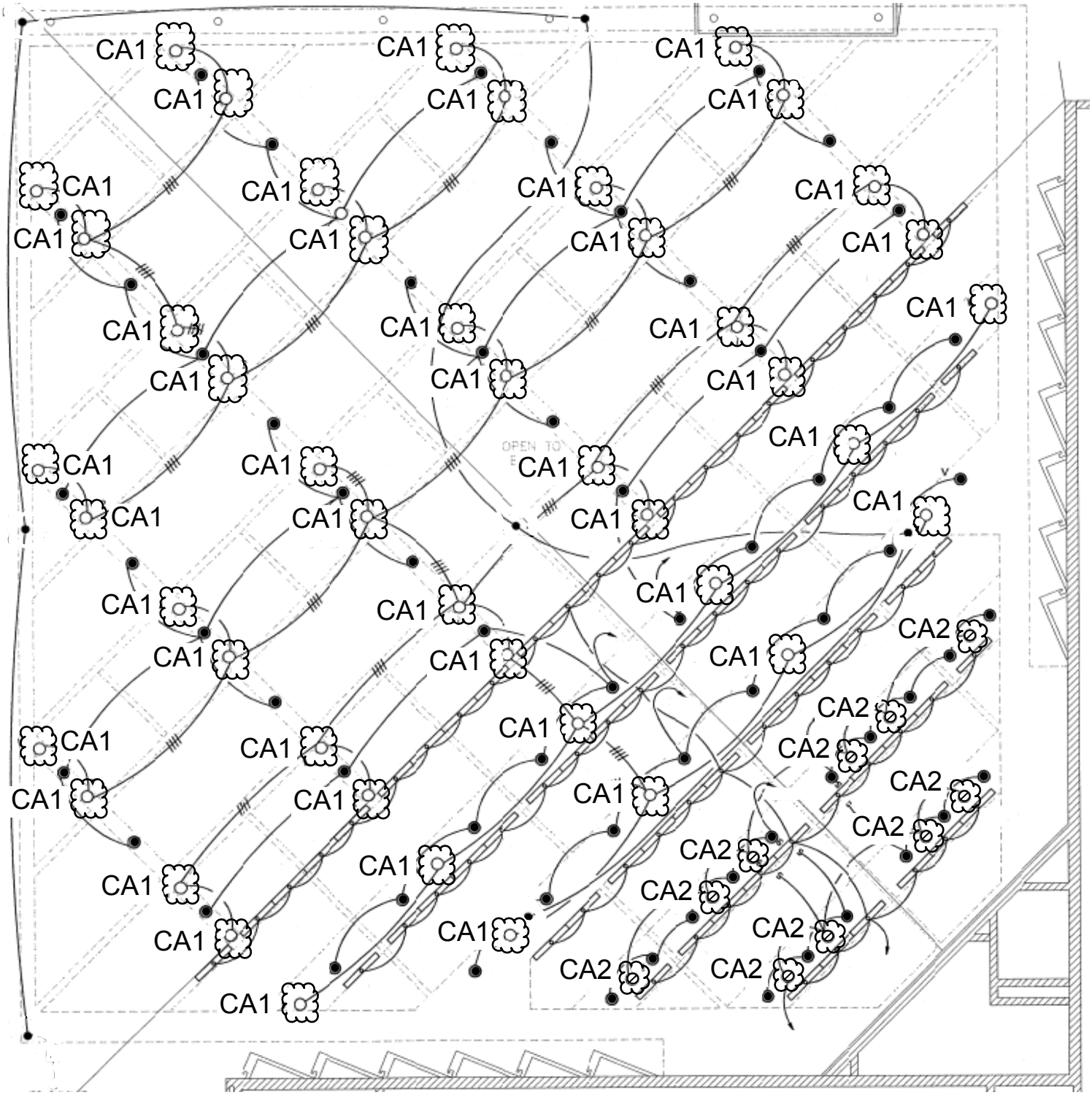
R3
E2.15



NOTE: SEE SHEET E2.15-R5 FOR NOTES FOR WORK REQUIRED IN THIS AREA.

1 LED ACCENT LIGHTING DETAIL

SCALE: 1/8" = 1'-0"

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R4

E2.15

EXISTING CAFETORIUM LIGHTING REPLACEMENT NOTES

DISCONNECT AND REMOVE THE EXISTING PENDANT MOUNTED CYLINDER 'CA1' FIXTURES SHOWN CLOUDED ON SHEET E2.15-R4 AND REPLACE WITH FIXTURES EQUAL TO PORTFOLIO LSR8A SERIES - 8 INCH 55 DEGREE CUTOFF CYLINDER WITH MEDIUM DISTRIBUTION AND SEMI-SPECULAR TRIM, CYLINDER FINISH IS TO BE BLACK. DISCONNECT AND REMOVE THE EXISTING RECESSED DOWNLIGHTS 'CA2'FIXTURES SHOWN CLOUDED ON SHEET E2.15-R4 AND REPLACE WITH FIXTURES EQUAL TO PORTFOLIO LD8S SERIES - 8 INCH DOWNLIGHT, 55 DEGREE CUTOFF WITH MEDIUM DISTRIBUTION AND SEMI-SPECULAR TRIM, 3500K, 6000 LUMENS. THE EXISTING LIGHTING IN THIS SPACE IS SUSPENDED CYLINDERS AND RECESSED METAL HALIDE FIXTURE FOR DAILY USE AND SUSPENDED CYLINDERS AND RECESSED QUARTZ FIXTURES FOR PERFORMANCE LIGHTING. THE PURPOSE OF THIS WORK IS TO REMOVE THE METAL HALIDE FIXTURES IN THEIR ENTIRETY AND REPLACE THEM WITH LED FIXTURES. THE PENDANT FIXTURES ARE TO BE MOUNTED SO THE BOTTOM OF THE FIXTURES MATCHES THE EXISTING INSTALLATION. THE CONTRACTOR IS TO VERIFY THE OPENING SIZE IN THE EXISTING GYPBOARD CEILING PRIOR TO ORDERING THE NEW RECESSED FIXTURES. THE NEW FIXTURES ARE TO EITHER FIT IN THE EXISTING OPENING OR BE LARGER IN WHICH CASE THE CONTRACTOR IS TO MODIFY THE OPENING AS REQUIRED FOR INSTALLATION OF THE NEW FIXTURES. CUTTING OF THE EXISTING CEILING IS TO BE DONE TO MINIMIZE THE DAMAGE TO THE EXISTING CEILING FINISH AND TO HAVE THE NEW RECESSED FIXTURE COMPLETELY COVER THE CEILING OPENING. ALL NEW FIXTURES ARE TO BE RECONNECTED TO EXISTING LIGHTING CIRCUITING. THIS WORK IS TO BE DONE UNDER ALTERNATE #4.

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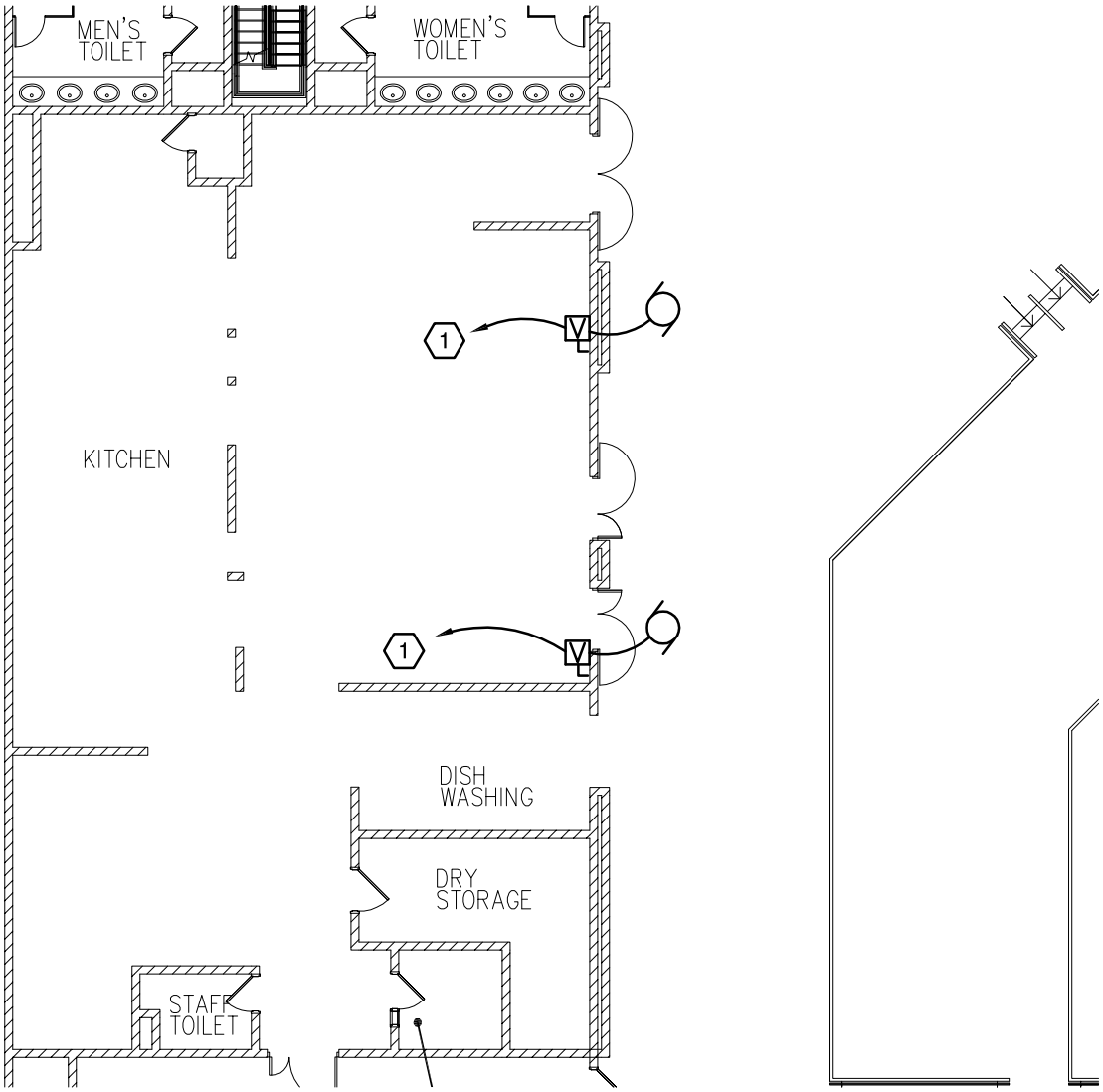
R5
E2.15



1 RELIEF FAN ELECTRICAL CONNECTION

SCALE: 1/16" = 1'-0"

1. PROVIDE 480 VOLT, 3-PHASE CONNECTION TO NEW 5 H.P. BUILDING RELIEF FAN. PROVIDE HOMERUN TO EXISTING PANEL H1D. EXISTING PANEL H1D IS LOCATED NEXT TO EXISTING PANEL HLS AS SHOWN ON SHEET E0.03. REPLACE (6) EXISTING 20/1 BREAKERS IN EXISTING SIEMENS PANEL H1D WITH (2) NEW 15/3 BREAKERS. VFDS WILL BE PROVIDED BY DIVISION 23 AND INSTALLED BY DIVISION 26. THE VFDS ARE TO BE LOCATED IN THE MECHANICAL ROOM LOCATED ABOVE THIS LOCATION.

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R1
E3.15

PANELBOARD LOAD SCHEDULE

PANEL: LS2 **MAIN:** MCB 60A **ENCLOSURE:** NEMA 1 **LOCATION:** SMALL STORAGE

VOLTS: 208Y/120, 3 PH., 4W.

RATING: 100 AMP **AIC RATING:** 10,000 **MOUNTING:** SURFACE **FED FROM:** XFMR

CKT #	TRIP AMPS	POLE	LOAD IN VOLT-AMPERES					LOAD DESCRIPTION	PH	LOAD DESCRIPTION	LOAD IN VOLT-AMPERES					TRIP AMPS	POLE	CKT #
			LIGHTING	RECPT	MTRS&EQUIP	KITCHEN	HEAT/AC				HEAT/AC	KITCHEN	MTRS&EQUIP	RECPT	LIGHTING			
1	20	1						EXIST	A	EXIST						20	1	2
3	20	1						EXIST	B	EXIST						20	1	4
5	20	1						EXIST	C	EXIST						20	1	6
7	20	1						EXIST	A	EXIST						20	1	8
9	20	1						EXIST	B	EXIST						15	1	10
11	20	1						EXIST	C	SPARE						20	1	12
13	20	1						EXIST	A	SPARE						20	1	14
15	20	1						EXIST	B	SPARE						15	1	16
17	20	1						SPARE	C	SPARE						20	1	18

LOAD CALCULATIONS

LOAD TYPE	VA / PHASE			TOTAL VA	DEMAND FACTOR	DIVERSIFIED LOAD
	A	B	C			
LIGHTING					1.00	0
RECEPTACLES					0.50	0
MOTORS & EQUIP					0.90	0
KITCHEN EQUIP.					0.65	0
HEAT / AC					0.90	0
LARGEST MOTOR					0.25	0
TOTAL AMPS:	0			TOTAL VA:		0

NOTES:

* PROVIDE GFCI BREAKER

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E6.1