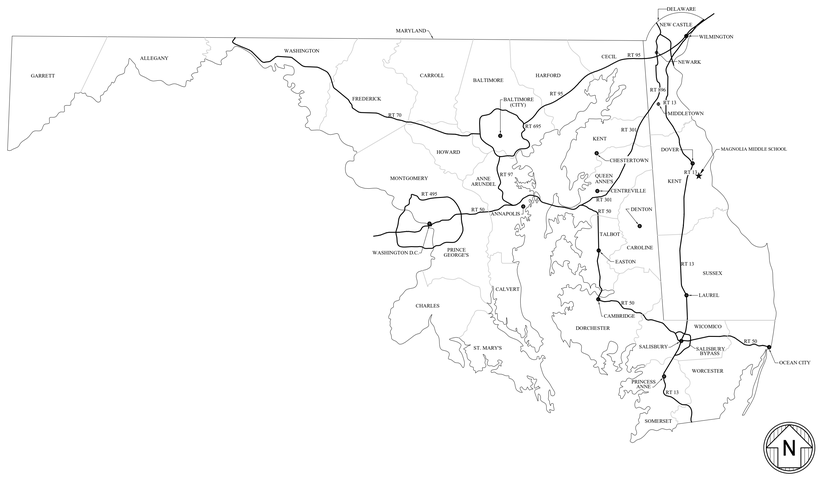
Drawings for:

MAGNOLIA MIDDLE SCHOOL

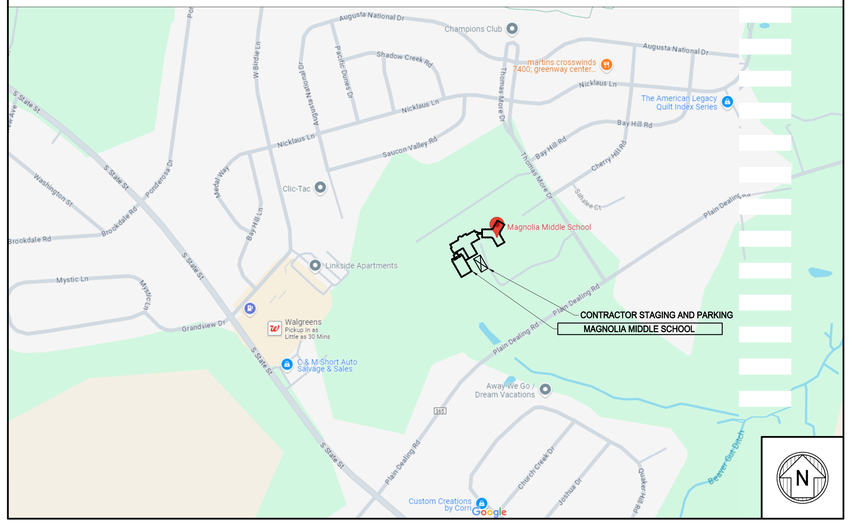
133 THOMAS MORE DR,
MAGNOLIA, DE 19962

HVAC RENOVATIONS (SRS-2503)

VICINITY MAP



LOCATION MAP



DRAWING LIST

GENERAL:

CS001	COVER SHEET
G002	CODE REVIEW PLAN
PH100	PHASING PLAN

ARCHITECTURAL:

AD101B	DEMOLITION - FLOOR PLAN - AREA B
AD102A	DEMOLITION - REFLECTED CEILING PLAN - AREA A
AD102B	DEMOLITION - REFLECTED CEILING PLAN - AREA B
AD103A	DEMOLITION - MEZZANINE PLAN - AREA A
AD103B	DEMOLITION - MEZZANINE PLAN - AREA B
AD104B	DEMOLITION - ROOF PLAN - AREA B
A101A	NEW CONSTRUCTION - FLOOR PLAN - AREA A
A101B	NEW CONSTRUCTION - FLOOR PLAN - AREA B
A102A	NEW CONSTRUCTION - REFLECTED CEILING PLAN - AREA A
A102B	NEW CONSTRUCTION - REFLECTED CEILING PLAN - AREA B
A103A	NEW CONSTRUCTION - MEZZANINE PLAN - AREA A
A103B	NEW CONSTRUCTION - MEZZANINE PLAN - AREA B
A104B	NEW CONSTRUCTION - ROOF PLAN - AREA B
A201	WALL SECTIONS & ELEVATIONS

STRUCTURAL:

S001	STRUCTURAL LEGEND & ABBREVIATIONS
S002	GENERAL NOTES
S100	OVERALL KEY PLAN
S101	PARTIAL FOUNDATION AND FRAMING PLANS
S501	TYPICAL DETAILS AND SECTIONS

MECHANICAL:

M001	LEGEND AND ABBREVIATIONS - HVAC
MD101A	PARTIAL FIRST FLOOR PLAN - AREA A - HVAC - DEMOLITION
MD101B	PARTIAL FIRST FLOOR PLAN - AREA B - HVAC - DEMOLITION
MD102A	PARTIAL SECOND FLOOR PLAN - AREA A - HVAC - DEMOLITION
MD102B	PARTIAL SECOND FLOOR PLAN - AREA B - HVAC - DEMOLITION
MD103	ROOF PLAN - HVAC - DEMOLITION
MD201	MECHANICAL ROOM PART PLANS - HVAC - DEMOLITION
MD202	MEZZANINE PART PLANS - HVAC - DEMOLITION
M101A	PARTIAL FIRST FLOOR PLAN - AREA A - HVAC - NEW WORK
M101B	PARTIAL FIRST FLOOR PLAN - AREA B - HVAC - NEW WORK
M102A	PARTIAL SECOND FLOOR PLAN - AREA A - HVAC - NEW WORK
M102B	PARTIAL SECOND FLOOR PLAN - AREA B - HVAC - NEW WORK

MECHANICAL CONTINUED:

MP101A	PARTIAL FIRST FLOOR PLAN - AREA A - MECHANICAL PIPING - NEW WORK
MP101B	PARTIAL FIRST FLOOR PLAN - AREA B - MECHANICAL PIPING - NEW WORK
M103	ROOF PLAN - HVAC - NEW WORK
M201	MECHANICAL ROOM PART PLANS - HVAC - NEW WORK
M202	MEZZANINE PART PLANS - HVAC - NEW WORK
M203	MEZZANINE PART PLANS - HVAC - NEW WORK
M301	DETAILS - HVAC
M302	DETAILS - HVAC
M303	DETAILS - HVAC
M304	DETAILS - HVAC
M305	DETAILS - HVAC
M306	DETAILS - HVAC
M307	DETAILS - HVAC
M308	DETAILS - HVAC
M401	AUTOMATIC TEMPERATURE CONTROLS - HVAC
M402	AUTOMATIC TEMPERATURE CONTROLS - HVAC
M403	AUTOMATIC TEMPERATURE CONTROLS - HVAC
M404	AUTOMATIC TEMPERATURE CONTROLS - HVAC
M405	AUTOMATIC TEMPERATURE CONTROLS - HVAC
M406	AUTOMATIC TEMPERATURE CONTROLS - HVAC
M407	AUTOMATIC TEMPERATURE CONTROLS - HVAC
M501	SCHEDULES - HVAC
M502	SCHEDULES - HVAC

PLUMBING:

FP101	FIRE SUPPRESSION PLAN
P001	LEGEND - PLUMBING
PD101A	PARTIAL FIRST FLOOR PLAN - AREA A - PLUMBING - DEMOLITION
PD101B	PARTIAL FIRST FLOOR PLAN - AREA B - PLUMBING - DEMOLITION
PD102A	PARTIAL SECOND FLOOR PLAN - AREA A - PLUMBING - DEMOLITION
PD102B	PARTIAL SECOND FLOOR PLAN - AREA B - PLUMBING - DEMOLITION
PD103	ROOF PLAN - PLUMBING - DEMOLITION
PD201	MECHANICAL ROOM PART PLANS - PLUMBING - DEMOLITION
PD202	MEZZANINE PART PLANS - PLUMBING - DEMOLITION
P101A	PARTIAL FIRST FLOOR PLAN - AREA A - PLUMBING - NEW WORK
P101B	PARTIAL FIRST FLOOR PLAN - AREA B - PLUMBING - NEW WORK
P102A	PARTIAL SECOND FLOOR PLAN - AREA A - PLUMBING - NEW WORK
P102B	PARTIAL SECOND FLOOR PLAN - AREA B - PLUMBING - NEW WORK
P103	ROOF PLAN - PLUMBING - NEW WORK
P201	MECHANICAL ROOM PART PLANS - PLUMBING - NEW WORK
P202	MEZZANINE PART PLANS - PLUMBING - NEW WORK
P301	DETAILS - PLUMBING
P401	RISER - PLUMBING
P501	SCHEDULES - PLUMBING

ELECTRICAL:

E001	ELECTRICAL LEGEND, ABBREVIATIONS AND CONVENTIONS
E002	LIGHTING FIXTURE SCHEDULE AND LIGHTING CONTROL MATRIX
E003	SITE PLAN - ELECTRICAL
ED101A	PARTIAL FIRST FLOOR PLAN - AREA A - ELECTRICAL - DEMOLITION
ED101B	PARTIAL FIRST FLOOR PLAN - AREA B - ELECTRICAL - DEMOLITION
ED102A	PARTIAL SECOND FLOOR PLAN - AREA A - ELECTRICAL - DEMOLITION
ED102B	PARTIAL SECOND FLOOR PLAN - AREA B - ELECTRICAL - DEMOLITION
ED103	PARTIAL ROOF PLAN - ELECTRICAL - DEMOLITION
ED201	MECHANICAL ROOM PART PLAN - ELECTRICAL - DEMOLITION
ED202	MEZZANINE PART PLANS - ELECTRICAL - DEMOLITION
ED203	MEZZANINE PART PLANS - ELECTRICAL - DEMOLITION
E101A	PARTIAL FIRST FLOOR PLAN - AREA A - ELECTRICAL - NEW WORK
E101B	PARTIAL FIRST FLOOR PLAN - AREA B - ELECTRICAL - NEW WORK
E102A	PARTIAL SECOND FLOOR PLAN - AREA A - ELECTRICAL - NEW WORK
E102B	PARTIAL SECOND FLOOR PLAN - AREA B - ELECTRICAL - NEW WORK
E201	MECHANICAL ROOM PART PLAN - ELECTRICAL - NEW WORK
E202	MEZZANINE PART PLANS - ELECTRICAL - NEW WORK
E203	MEZZANINE PART PLANS - ELECTRICAL - NEW WORK
E301	SCHEMATIC RISER DIAGRAMS
E401	PANEL SCHEDULES
E402	MECHANICAL EQUIPMENT CONNECTION SCHEDULE

ELECTRICAL CONTINUED:

E501	DETAILS - ELECTRICAL
E502	DETAILS - ELECTRICAL
E503	DETAILS - ELECTRICAL
E504	DETAILS - ELECTRICAL
E505	DETAILS - ELECTRICAL

BID DOCUMENTS
Date: MARCH 5, 2025

REVISIONS

no.	date	comments

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MAGNOLIA MIDDLE SCHOOL
HVAC RENOVATIONS
SRS 2503

MAGNOLIA MIDDLE SCHOOL
133 THOMAS MORE DR,
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SUBMISSION

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COVER SHEET

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

CS001

GENERAL SHEET NOTES

1. PARTITIONS:
   - SM — SMOKE BARRIER
   - 1HR — 1 HOUR PARTITION
   - 2HR — 2 HOUR PARTITION
2. EGRESS:
   - NAME ← ROOM NAME
   - [ ] ← ROOM NUMBER

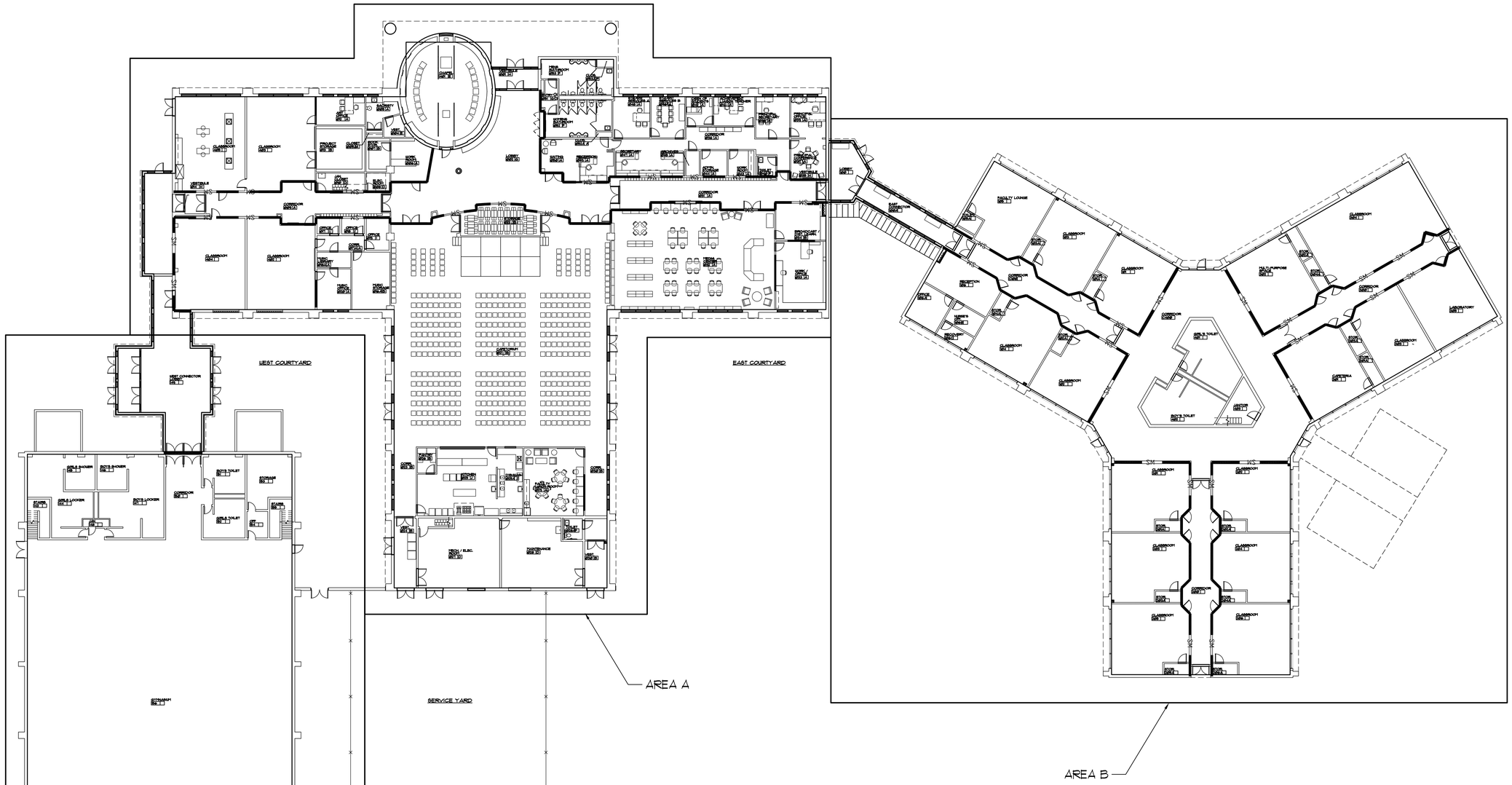
CODE REVIEW

APPLICABLE CODES:

BUILDING	2021 INTERNATIONAL BUILDING CODE (IBC)
EXISTING	2018 INTERNATIONAL EXISTING BUILDING CODE (IEBC)
LIFE SAFETY	2021 NFPA 101 LIFE SAFETY CODE
ACCESSIBILITY	2009 ICC/ANSI A117.1, ADAAG
PLUMBING	2018 INTERNATIONAL PLUMBING CODE (IPC)
MECHANICAL	2018 INTERNATIONAL MECHANICAL CODE (IMC)
ELECTRICAL	2018 INTERNATIONAL ELECTRICAL CODE (IEC)
ENERGY	2018 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)
FIRE	DELAWARE STATE FIRE PREVENTION REGULATIONS

BUILDING DATA:

AREA OF BUILDING:	64,000 SF, EXISTING
BUILDING HEIGHT:	31 FT, EXISTING
OCCUPANCY GROUP:	EDUCATION E
TYPE OF CONSTRUCTION:	TYPE IIB EXISTING
AUTOMATIC SPRINKLER SYSTEM:	EXISTING FULLY SPRINKLERED
FIRE EXTINGUISHERS:	EXISTING



11 CODE REVIEW PLAN
SCALE: 1/16" = 1'-0"

REVISIONS

no.	date	comments

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CODE REVIEW PLAN

DESIGN BY	NBB
CHECKED BY	DB
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

G002

PHASING SCHEDULE

CALENDAR

	JUN '25	JUL '25	AUG '25	SEP '25	OCT '25	NOV '25	DEC '25	JAN '26	FEB '26	MAR '26	APR '26	MAY '26	JUN '26	JUL '26	AUG '26	SEP '26	OCT '26
PHASE 1 (CHILLER AND BOILER PLANTS)																	
PHASE 2 (CAFETERIA)																	
PHASE 3 (CLASSROOM WING)																	

PHASE KEY

PHASE 1:

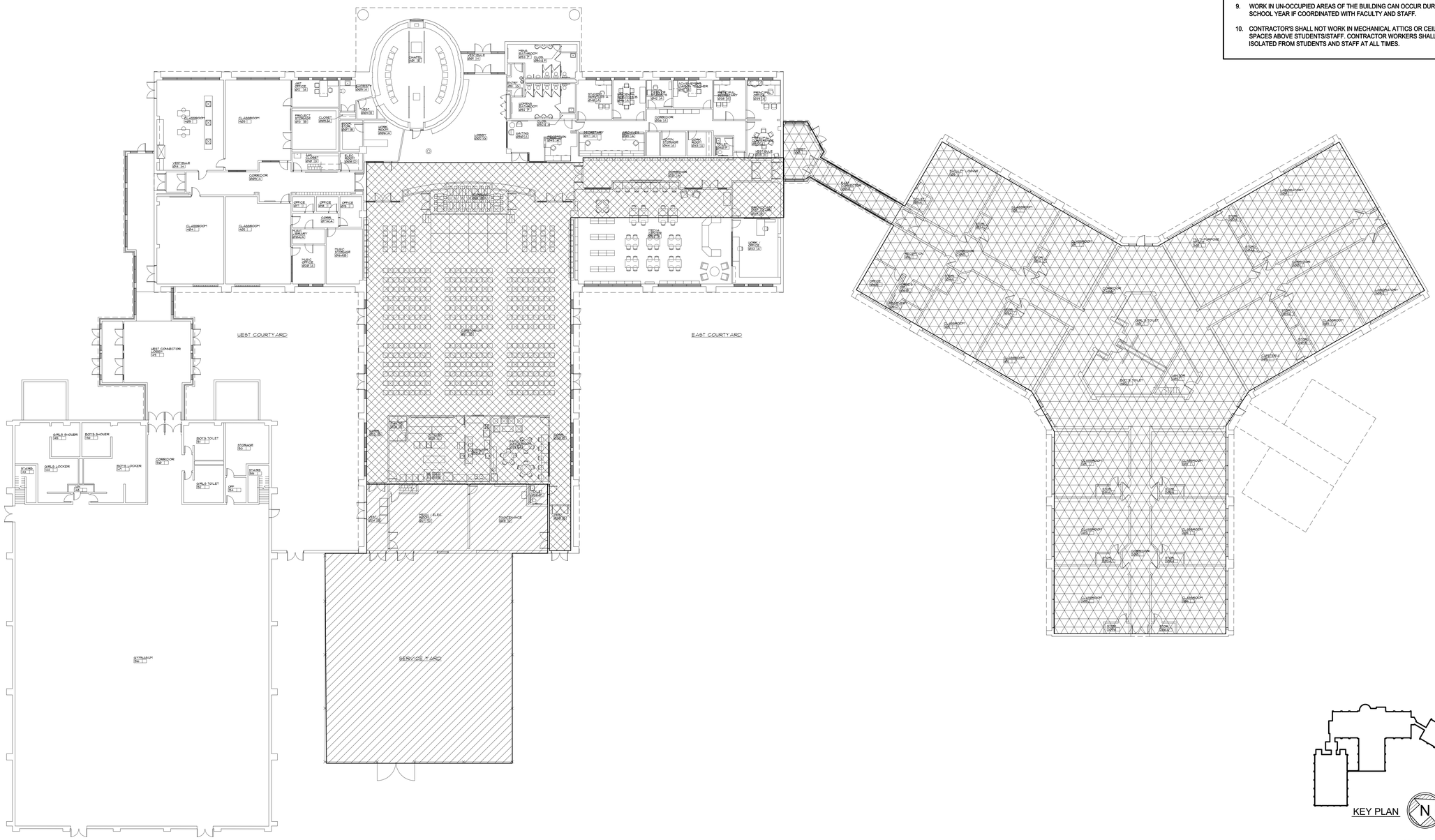
PHASE 2:

PHASE 3:

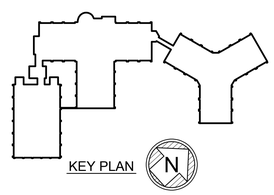
GENERAL NOTES:

(APPLY TO ALL DRAWINGS)

1. PHASING PLANS DESIGNATE TIME FRAME AND SEQUENCE OF ALL WORK TO BE COMPLETED IN THE INDICATED AREA. REFER TO DRAWINGS FOR ALL DISCIPLINES TO DETERMINE EXTENT OF WORK IN EACH AREA.
2. ALL MECHANICAL, ELECTRICAL, AND PLUMBING TO BE CAPPED, VALVED, AND OR RE-ROUTED AS INDICATED OR AS REQUIRED TO MAINTAIN OPERATION IN OCCUPIED AREAS.
3. CONTRACTOR SHALL COORDINATE ANY ACCESS REQUIRED TO OCCUPIED AREAS WITH STAFF MEMBERS AND/OR SUPERVISORS OF THE USING AGENCY PRIOR TO PERFORMING WORK.
4. THE PHASING DATES ON THIS DRAWING ARE PRELIMINARY ONLY. A FINAL CONSTRUCTION SCHEDULE SHALL BE PROVIDED BY THE CONTRACTOR AT THE START OF CONSTRUCTION. THE PHASING PLANS ARE IN NO WAY INTENDED TO LIMIT THE AMOUNT OF WORK COMPLETED IN A PHASE AS LONG AS THERE ARE NOT IMPACTS ON THE OPERATION OF THE SCHOOL.
5. DIVISION LINES BETWEEN PHASES ARE DIAGRAMMATIC ONLY. TEMPORARY PARTITION LOCATIONS WILL BE DETERMINED AT THE START OF CONSTRUCTION.
6. FOR EACH PHASE OF CONSTRUCTION, WORK SHALL BE COMPLETED IN OCCUPIED AREAS FIRST TO MINIMIZE OCCUPANT RELOCATION TIME.
7. AFTER ALL APPLICABLE REQUIREMENTS ARE MET FOR COMPLETION OF WORK IN AN AREA OF PHASING, NOTIFICATION SHALL BE GIVEN TO OWNER THAT THE AREA IS AVAILABLE FOR RE-OCCUPATION. OWNER TRAINING FOR SYSTEMS IN THAT AREA SHALL BE PROVIDED AS NECESSARY.
8. ALL WORK REQUIRED IN OCCUPIED AREAS DURING THE ACADEMIC YEAR SHALL BE COMPLETED AFTER SCHOOL HOURS OR ON WEEKENDS.
9. WORK IN UN-OCCUPIED AREAS OF THE BUILDING CAN OCCUR DURING THE SCHOOL YEAR IF COORDINATED WITH FACULTY AND STAFF.
10. CONTRACTOR'S SHALL NOT WORK IN MECHANICAL ATTICS OR CEILING SPACES ABOVE STUDENTS/STAFF. CONTRACTOR WORKERS SHALL BE ISOLATED FROM STUDENTS AND STAFF AT ALL TIMES.



PHASING PLAN



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

16 8 0 16 32

REVISIONS

no.	date	comments

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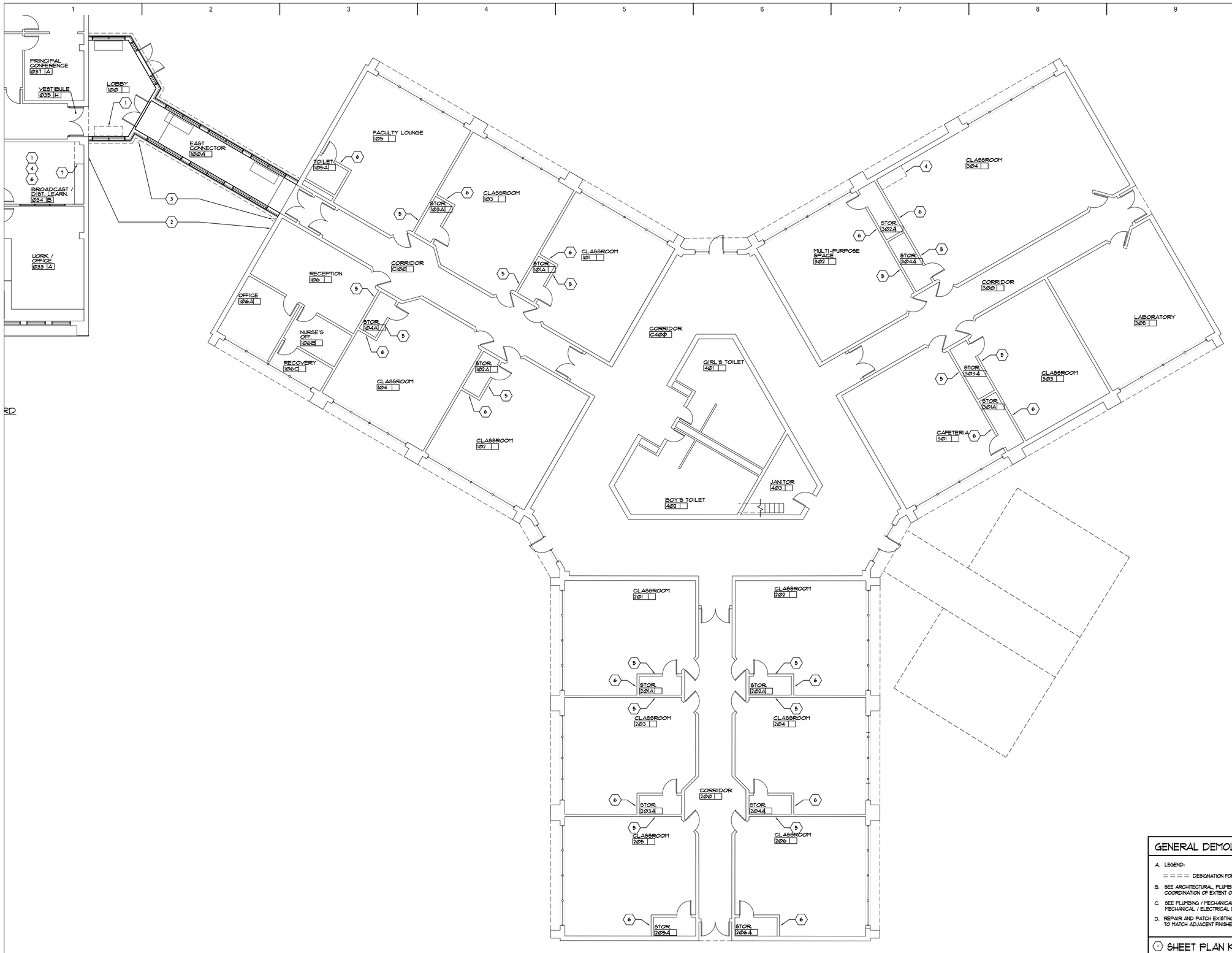
PHASING PLAN

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

PH100



GENERAL DEMOLITION NOTES :

A. LEGEND:
   = = = = DESIGNATION FOR MATERIALS TO BE REMOVED.

B. SEE ARCHITECTURAL, PLUMBING, MECHANICAL & ELECTRICAL DRAWINGS FOR COORDINATION OF EXTENT OF DEMOLITION FOR NEW CONSTRUCTION.

C. SEE PLUMBING / MECHANICAL / ELECTRICAL DRAWINGS FOR EXTENT OF PLUMBING / MECHANICAL / ELECTRICAL DEMOLITION.

D. REPAIR AND PATCH EXISTING CONSTRUCTION DISTURBED BY DEMOLITION TO MATCH ADJACENT FINISHES.

SHEET PLAN KEYNOTES :

1. REMOVE MECHANICAL UNIT (SEE MECHANICAL DRAWINGS FOR COORDINATION).
2. CORE DRILL EXTERIOR WALL (SEE MECHANICAL DRAWINGS FOR COORDINATION)
3. MODIFY DOWNSPOUTS (SEE NEW CONSTRUCTION FOR EXTENT).
4. REMOVE AND DISPOSE OF FUME HOOD (SEE MECHANICAL DRAWINGS FOR COORDINATION).
5. REMOVE AND DISPOSE OF EXISTING THERMOSTAT (SEE MECHANICAL DRAWINGS FOR COORDINATION).
6. REMOVE AND DISPOSE OF EXISTING MECHANICAL GRILLE (SEE MECHANICAL DRAWINGS FOR COORDINATION).
7. CUT COUNTERTOP BACK TO ALLOW FOR NEW CHASE.

11 DEMOLITION FLOOR PLAN - AREA B
SCALE: 1/8" = 1'-0"

REVISIONS

no.	date	comments

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DEMOLITION
- FLOOR PLAN
AREA B

DESIGN BY	NBB
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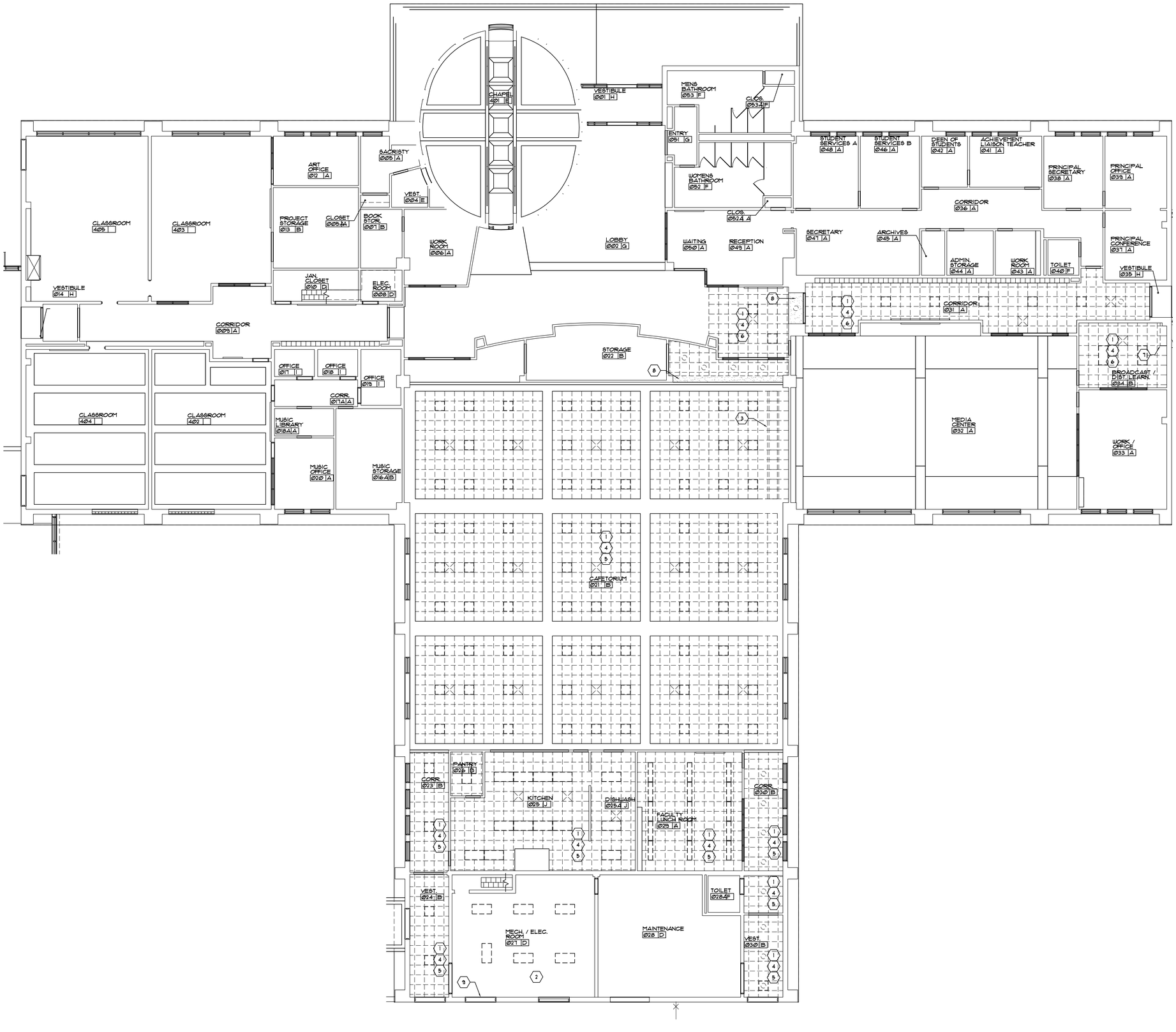
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

AD101B



11 DEMOLITION REFLECTED CEILING PLAN - AREA A
SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES :

A. LEGEND:

- EXTENTS OF 2'x2' ACOUSTICAL CEILING TILE & GRID TO BE REMOVED.
- EXTENTS OF LIGHTING ITEMS TO BE REMOVED/RELOCATED
- EXTENTS OF RECESSED LIGHTS TO BE REMOVED/RELOCATED
- EXTENTS OF MECHANICAL ITEMS TO BE REMOVED/RELOCATED

B. SEE ARCHITECTURAL, PLUMBING, MECHANICAL & ELECTRICAL DRAWINGS FOR COORDINATION OF EXTENT OF DEMOLITION FOR NEW CONSTRUCTION.

C. SEE PLUMBING / MECHANICAL / ELECTRICAL DRAWINGS FOR EXTENT OF PLUMBING / MECHANICAL / ELECTRICAL DEMOLITION.

D. REPAIR AND PATCH EXISTING CONSTRUCTION DISTURBED BY DEMOLITION TO MATCH ADJACENT FINISHES.

SHEET PLAN KEYNOTES :

1. REMOVE & DISPOSE OF ACT.
2. REMOVE & DISPOSE OF LIGHTING FIXTURES. (SEE ELECTRICAL DRAWINGS FOR COORDINATION)
3. MODIFY CEILING CLOUD TO ALIGN WITH NEW SOFFIT. (SEE NEW CONSTRUCTION FOR COORDINATION)
4. REMOVE & STORE LIGHTING FIXTURES. (SEE ELECTRICAL DRAWINGS FOR COORDINATION)
5. REMOVE & DISPOSE OF GRILLES & DIFFUSERS. (SEE MECHANICAL DRAWINGS FOR COORDINATION)
6. REMOVE & STORE GRILLES & DIFFUSERS.
7. MODIFY CEILING TO COORDINATE WITH NEW CONSTRUCTION PLAN.
8. DEMO AND DISPOSE OF GYP. BOARD NEEDED TO INSTALL PIPING.
9. CREATE WALL PENETRATION FOR NEW PIPING ABOVE DOOR (SEE MECHANICAL DRAWINGS FOR COORDINATION).

REVISIONS

no.	date	comments

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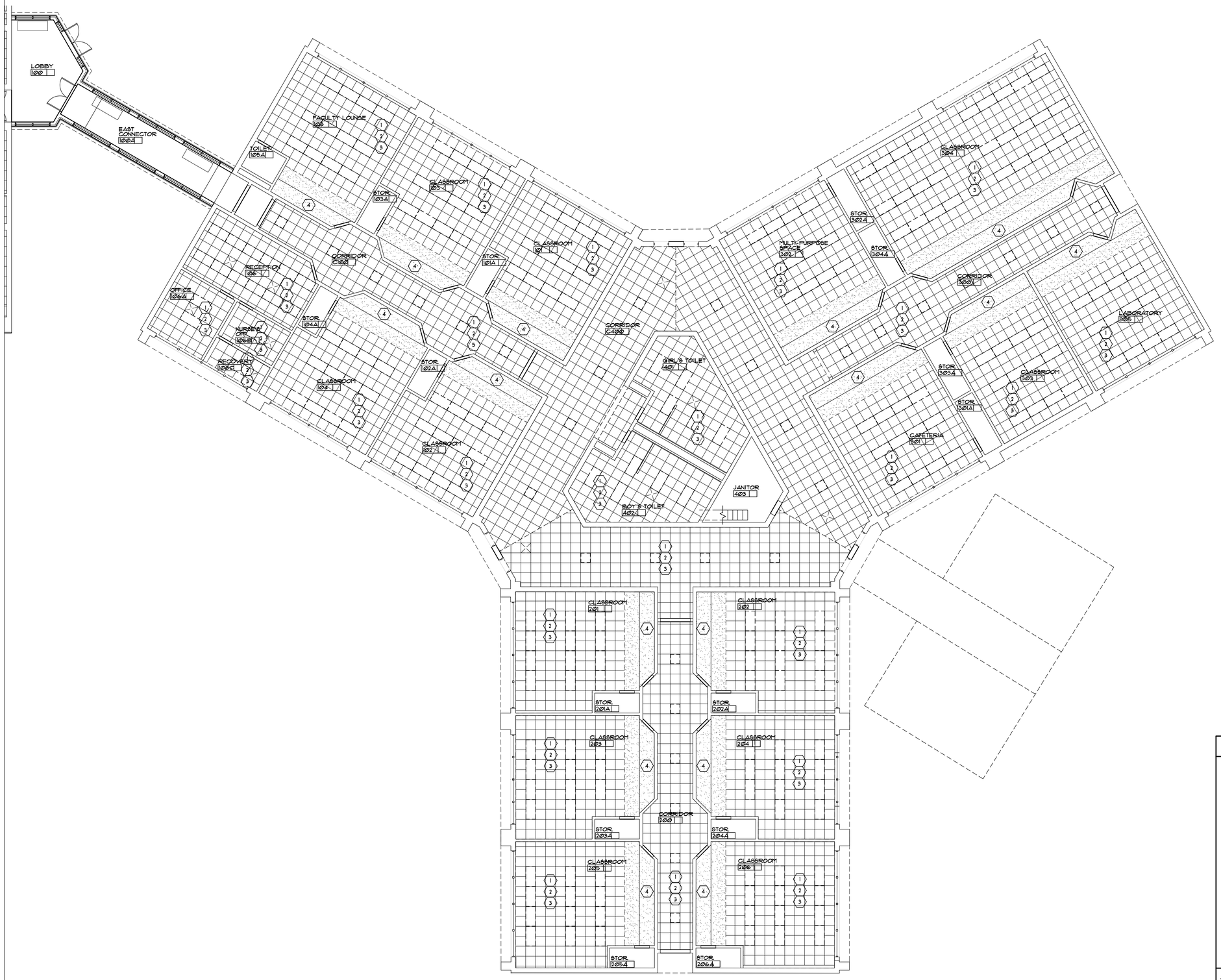
SUBMISSION

BID DOCUMENTS

DEMOLITION - REFLECTED CEILING PLAN
AREA A

DESIGN BY	NBB
CHECKED BY	DB
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

AD102A



11 DEMOLITION REFLECTED CEILING PLAN - AREA B
SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES :

A. LEGEND:

- EXTENTS OF 2'x2' ACOUSTICAL CEILING TILE & GRID TO BE REMOVED.
- EXTENTS OF LIGHTING ITEMS TO BE REMOVED/RELOCATED
- EXTENTS OF RECESSED LIGHTS TO BE REMOVED/RELOCATED
- EXTENTS OF MECHANICAL ITEMS TO BE REMOVED/RELOCATED

B. SEE ARCHITECTURAL, PLUMBING, MECHANICAL & ELECTRICAL DRAWINGS FOR COORDINATION OF EXTENT OF DEMOLITION FOR NEW CONSTRUCTION.

C. SEE PLUMBING / MECHANICAL / ELECTRICAL DRAWINGS FOR EXTENT OF PLUMBING / MECHANICAL / ELECTRICAL DEMOLITION.

D. REPAIR AND PATCH EXISTING CONSTRUCTION DISTURBED BY DEMOLITION TO MATCH ADJACENT FINISHES.

SHEET PLAN KEYNOTES :

1. REMOVE & DISPOSE OF ACT.
2. REMOVE & DISPOSE OF LIGHTING FIXTURES. (SEE ELECTRICAL DRAWINGS FOR COORDINATION)
3. REMOVE & DISPOSE OF GRILLES & DIFFUSERS. (SEE MECHANICAL DRAWINGS FOR COORDINATION)
4. MODIFY GYP. BOARD SOFFIT. COORDINATE WITH NEW CONSTRUCTION.

REVISIONS

no.	date	comments

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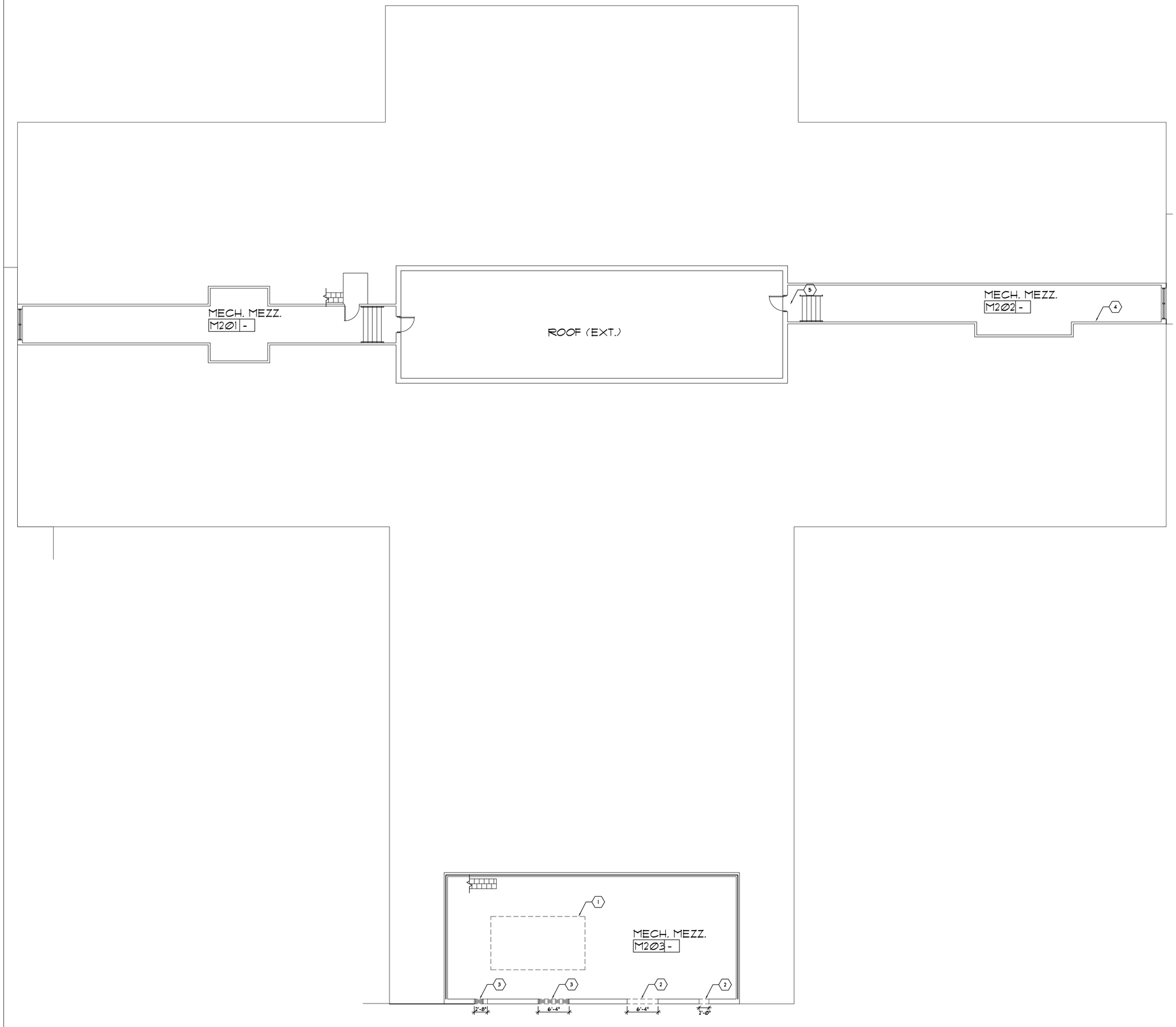
DEMOLITION - REFLECTED CEILING PLAN
AREA B

DESIGN BY	NBB
CHECKED BY	DB
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

AD102B



11 DEMOLITION MEZZANINE PLAN - AREA A
SCALE: 1/8" = 1'-Ø"

GENERAL DEMOLITION NOTES :

A. LEGEND:
= = = = DESIGNATION FOR MATERIALS TO BE REMOVED.

B. SEE ARCHITECTURAL, PLUMBING, MECHANICAL & ELECTRICAL DRAWINGS FOR COORDINATION OF EXTENT OF DEMOLITION FOR NEW CONSTRUCTION.

C. SEE PLUMBING / MECHANICAL / ELECTRICAL DRAWINGS FOR EXTENT OF PLUMBING / MECHANICAL / ELECTRICAL DEMOLITION.

D. REPAIR AND PATCH EXISTING CONSTRUCTION DISTURBED BY DEMOLITION TO MATCH ADJACENT FINISHES.

⟨-⟩ SHEET PLAN KEYNOTES :

1. REMOVE MECHANICAL UNIT. (SEE MECHANICAL DRAWINGS FOR COORDINATION).
2. OPEN EXTERIOR WALL FOR NEW LOUVER (SEE MECHANICAL DRAWINGS FOR COORDINATION).
3. REMOVE EXISTING LOUVER AND WIDEN WALL OPENING FOR NEW LOUVER. (SEE MECHANICAL DRAWINGS FOR COORDINATION).
4. CREATE WALL PENETRATION FOR NEW PIPING (SEE MECHANICAL DRAWINGS FOR COORDINATION).
5. CREATE WALL PENETRATION FOR NEW PIPING UNDERNEATH STEPS (SEE MECHANICAL DRAWINGS FOR COORDINATION).

REVISIONS

no.	date	comments

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SRS 2503

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133 THOMAS MORE DR,
MAGNOLIA, DE 19962

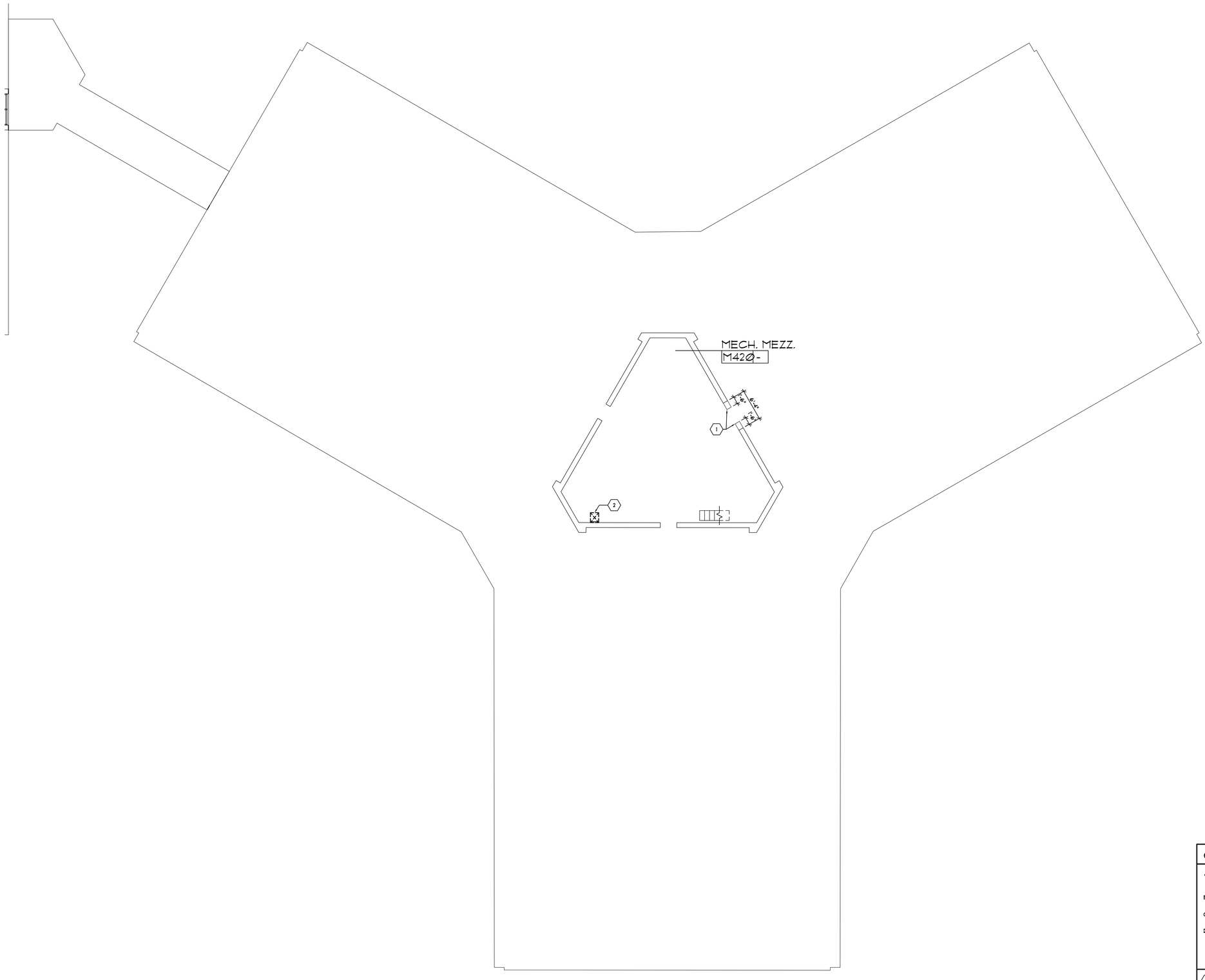
SUBMISSION

BID DOCUMENTS

DEMOLITION
- MEZZANINE PLAN
AREA A

DESIGN BY	NBB
CHECKED BY	DB
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

AD103A



11 DEMOLITION MEZZANINE PLAN - AREA B
SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES :

A. LEGEND:
= = = = DESIGNATION FOR MATERIALS TO BE REMOVED.

B. SEE ARCHITECTURAL, PLUMBING, MECHANICAL & ELECTRICAL DRAWINGS FOR COORDINATION OF EXTENT OF DEMOLITION FOR NEW CONSTRUCTION.

C. SEE PLUMBING / MECHANICAL / ELECTRICAL DRAWINGS FOR EXTENT OF PLUMBING / MECHANICAL / ELECTRICAL DEMOLITION.

D. REPAIR AND PATCH EXISTING CONSTRUCTION DISTURBED BY DEMOLITION TO MATCH ADJACENT FINISHES.

SHEET PLAN KEYNOTES :

1. EXTEND MASONRY OPENING.
2. EXISTING ROOF HATCH TO REMAIN.

REVISIONS

no.	date	comments

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BID DOCUMENTS

DEMOLITION
- MEZZANINE PLAN
AREA B

DESIGN BY	NBB
CHECKED BY	DB
SCALE	AS NOTED
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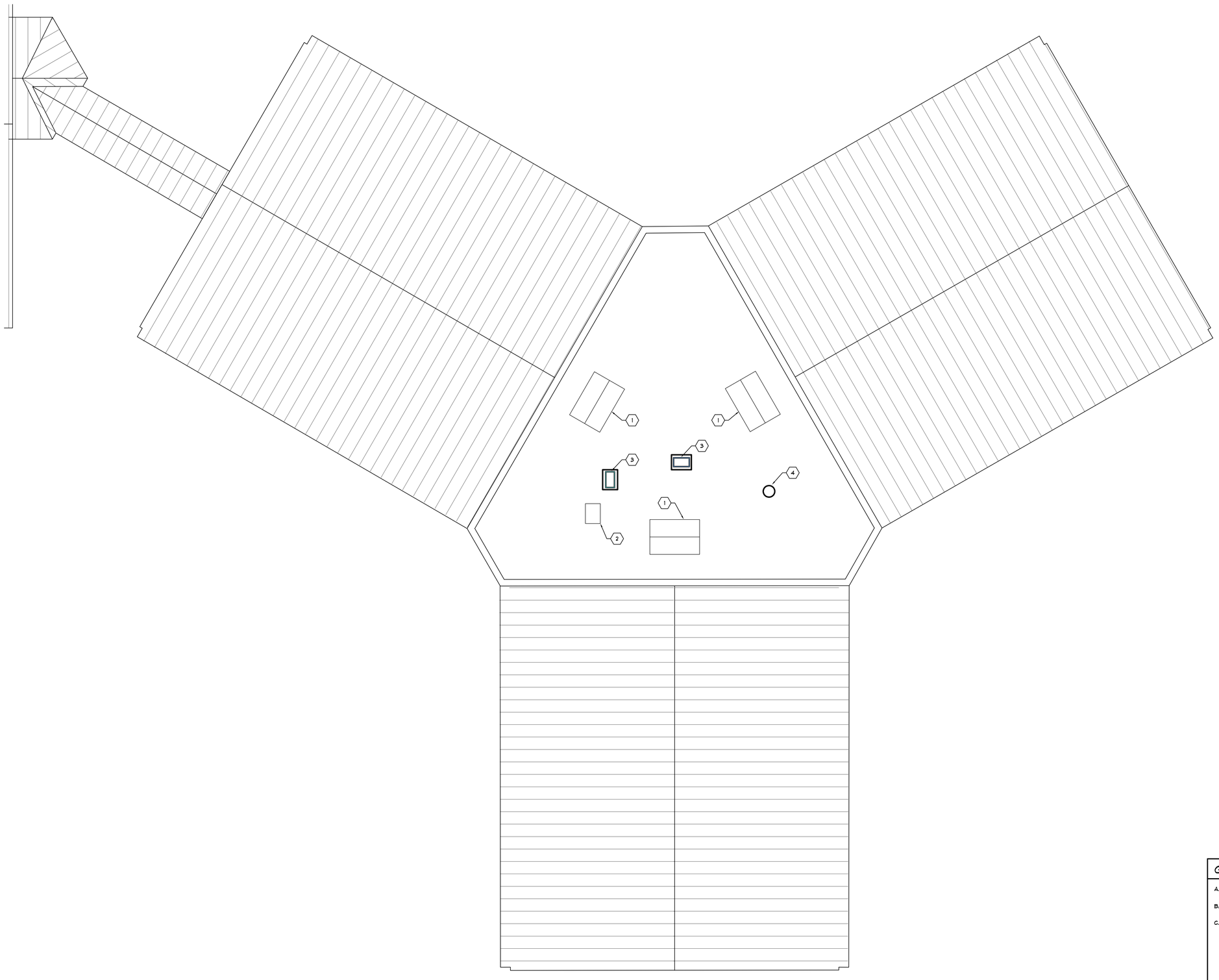
DATE	03/05/2025

AD103B



GENERAL DEMOLITION NOTES :

A. SEE ARCHITECTURAL, PLUMBING, MECHANICAL & ELECTRICAL DRAWINGS FOR COORDINATION OF EXTENT OF DEMOLITION FOR NEW CONSTRUCTION.

B. SEE PLUMBING / MECHANICAL / ELECTRICAL DRAWINGS FOR EXTENT OF PLUMBING / MECHANICAL / ELECTRICAL DEMOLITION.

C. REPAIR AND PATCH EXISTING CONSTRUCTION DISTURBED BY DEMOLITION TO MATCH ADJACENT FINISHES.

SHEET PLAN KEYNOTES :

1. REMOVE MECHANICAL UNITS. (SEE MECHANICAL DRAWINGS FOR COORDINATION)
2. EXISTING ROOF HATCH TO REMAIN.
3. MAKE ROOF PENETRATION FOR NEW VENT HOOD. (SEE MECHANICAL DRAWINGS FOR COORDINATION)
4. REMOVE EXHAUST FAN. (SEE MECHANICAL DRAWINGS FOR COORDINATION)

11 DEMOLITION ROOF PLAN - AREA B
SCALE: 1/8" = 1'-0"

REVISIONS

no.	date	comments

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DEMOLITION
- ROOF PLAN
AREA B

DESIGN BY	NBB
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SCALE	AS NOTED
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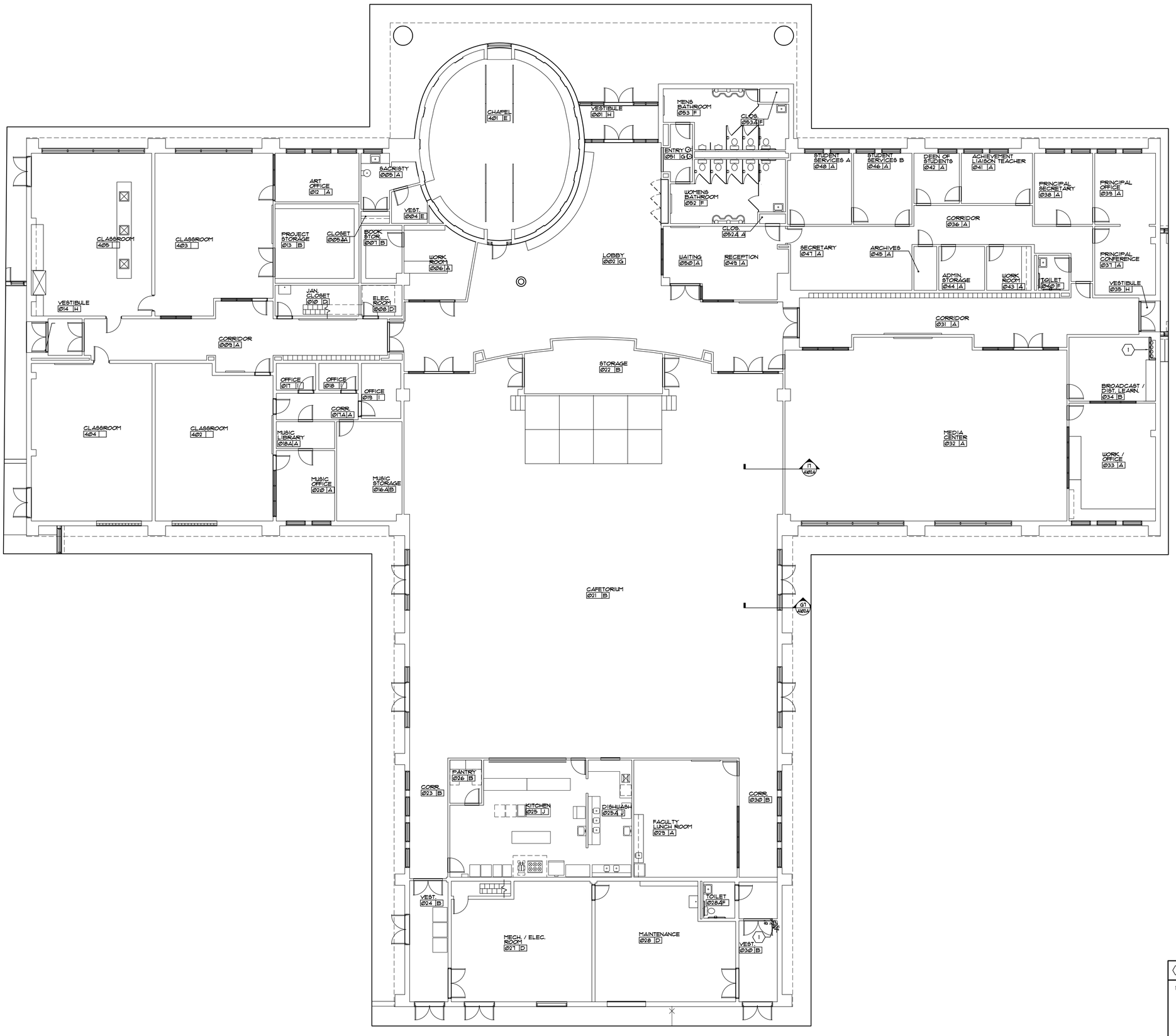
AD104B



11 NEW CONSTRUCTION FLOOR PLAN - AREA A
SCALE: 1/8" = 1'-0"

SHEET PLAN KEYNOTES :

1. NEW PIPING CHASE (SEE MECHANICAL FOR COORDINATION).

REVISIONS

no.	date	comments

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NEW CONSTRUCTION - FLOOR PLAN AREA A

DESIGN BY	NBB
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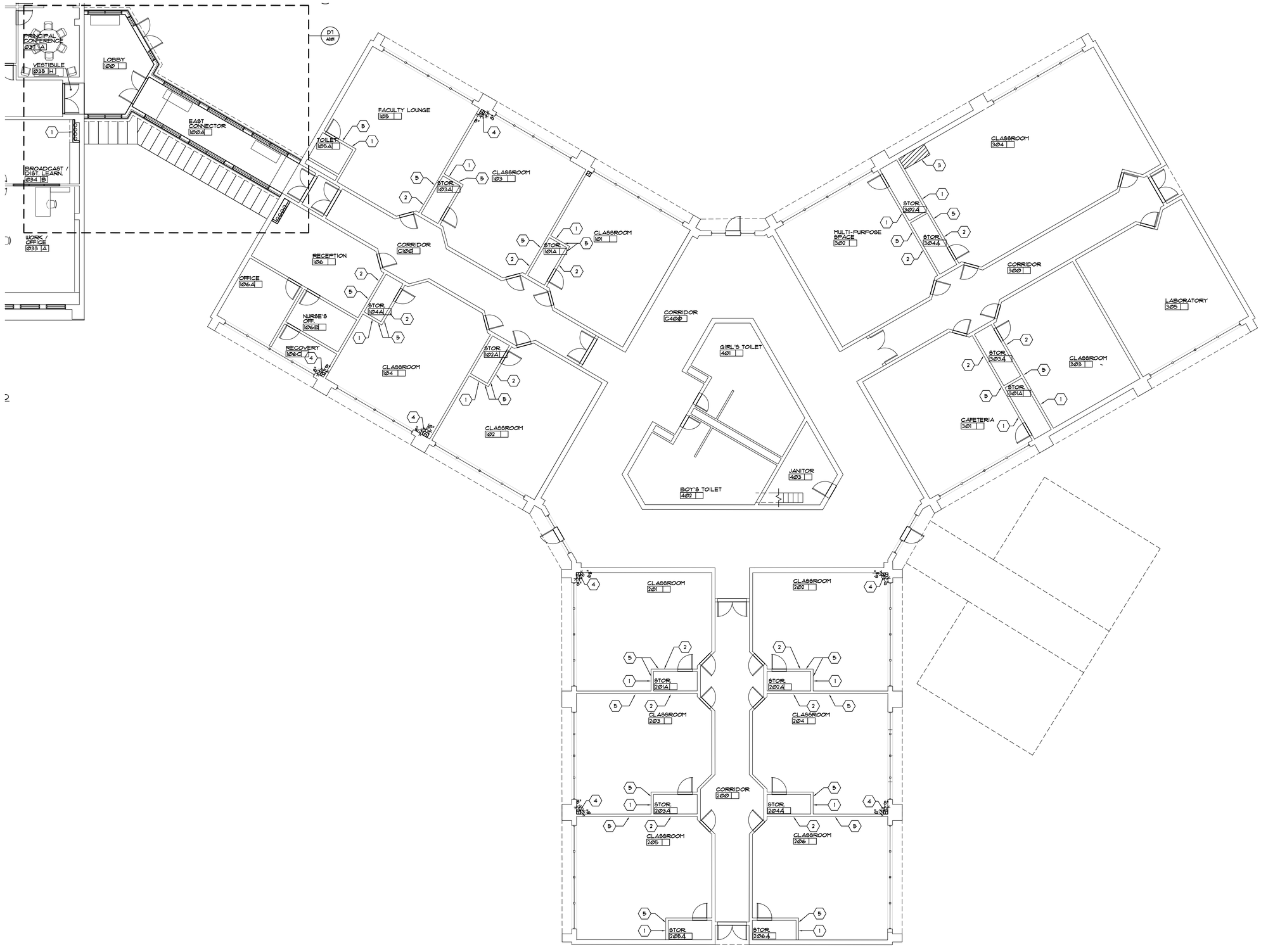
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

A101A



NEW CONSTRUCTION FLOOR PLAN - AREA B

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

SHEET PLAN KEYNOTES :

1. PATCH WALLS AT REMOVED MECHANICAL DUCT WORK PENETRATIONS.
2. PATCH WALLS AT REMOVED EXISTING THERMOSTAT.
3. PATCH FLOOR TO MATCH EXISTING.
4. NEW CONDENSATE LINE CHASE (SEE MECHANICAL FOR COORDINATION).
5. PAINT ENTIRETY OF WALL FROM CORNER TO CORNER, PAINT TO MATCH EXISTING.

REVISIONS

no.	date	comments

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NEW CONSTRUCTION - FLOOR PLAN AREA B

DESIGN BY	NBB
CHECKED BY	DB
SCALE	AS NOTED
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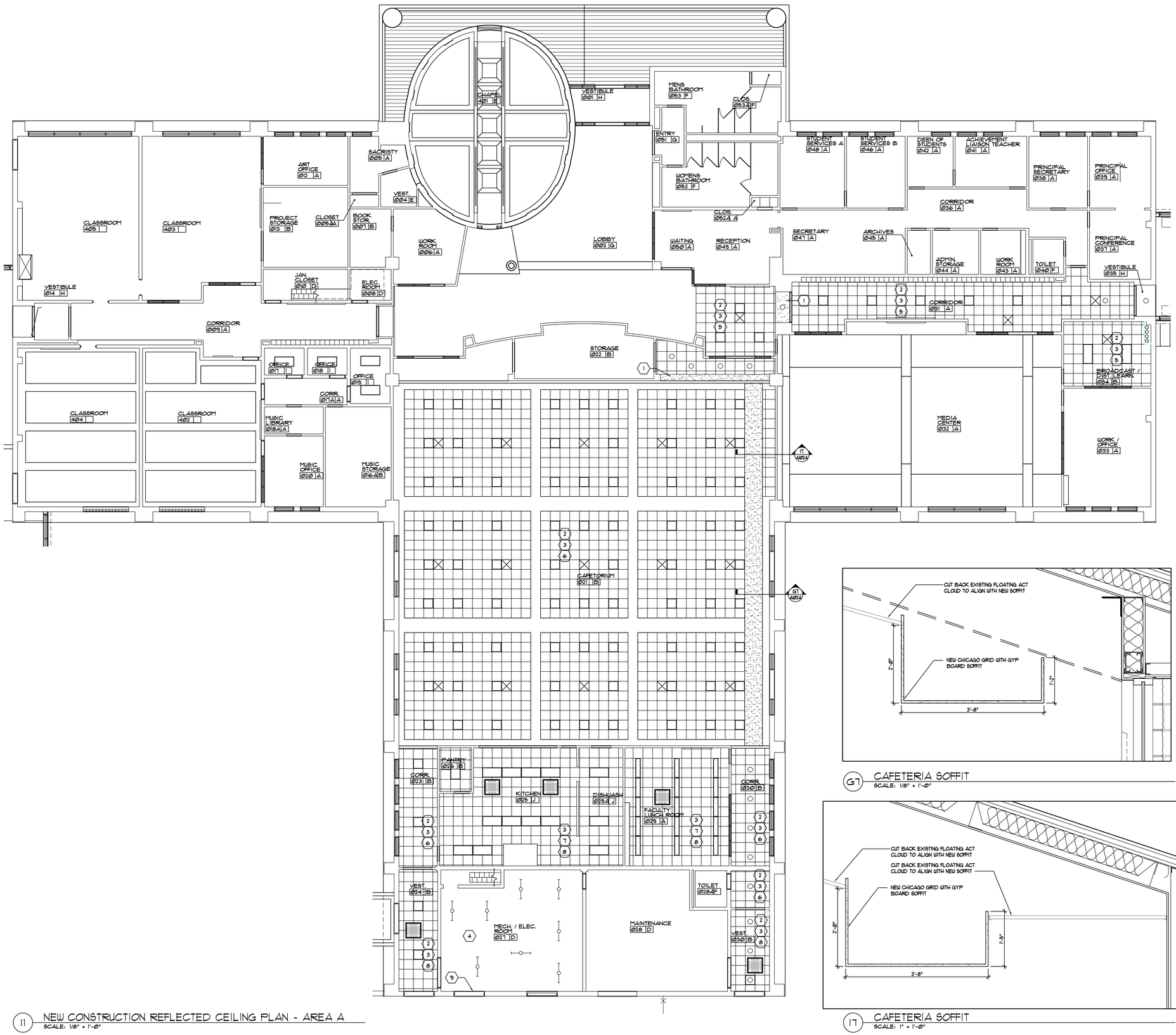
DATE	03/05/2025

A101B



11 NEW CONSTRUCTION REFLECTED CEILING PLAN - AREA A
SCALE: 1/8" = 1'-0"

G1 CAFETERIA SOFFIT
SCALE: 1/8" = 1'-0"

17 CAFETERIA SOFFIT
SCALE: 1" = 1'-0"

GENERAL REFLECTED CEILING NOTES :

A. LEGEND :

- NEW 2'x2' ACOUSTICAL CEILING TILE & GRID
- ACOUSTICAL CEILING TILE: MATCH EXISTING
- CEILING GRID: MATCH EXISTING

NOTES:
1. PROVIDE HANGARS AS REQ'D.
2. PROVIDE PERIMETER TRIM TO MATCH EXISTING.

- RECESSED DOWN LIGHT
- 2X2 RECESSED LIGHT
- 2X4 RECESSED LIGHT
- CEILING AIR DIFFUSER

B. SEE MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR SIZES AND TYPES OF LIGHT FIXTURES, DIFFUSERS, GRILLES, ETC..

C. (X'-X") DENOTES HEIGHT OF CEILING, AFF. TYPICAL CEILING IS TO MATCH EXISTING CEILING HEIGHT UNLESS OTHERWISE NOTED.

D. VERIFY ALL CONDITIONS IN THE FIELD BEFORE PROCEEDING WITH WORK.

E. ALL CONSTRUCTION SHOWN IS NEW (UNLESS OTHERWISE NOTED).

SHEET PLAN KEYNOTES :

1. REPAIR GYP. BOARD CEILING DO TO CONSTRUCTION IN THESE AREAS.
2. PROVIDE NEW ACT.
3. REINSTALL LIGHTING FIXTURES. (SEE ELECTRICAL DRAWINGS FOR COORDINATION)
4. PROVIDE NEW LIGHT FIXTURES. (SEE ELECTRICAL DRAWINGS FOR COORDINATION)
5. REINSTALL GRILLES & DIFFUSERS. (SEE MECHANICAL DRAWINGS FOR COORDINATION)
6. PROVIDE NEW GRILLES & DIFFUSERS.
7. PROVIDE NEW ACT 2.
8. PROVIDE NEW CEILING FAN COIL UNITS (SEE MECHANICAL DRAWINGS FOR COORDINATION)
9. SEAL AROUND NEW PIPE PENETRATIONS ABOVE DOOR. (SEE MECHANICAL DRAWINGS FOR COORDINATION)

REVISIONS

no.	date	comments

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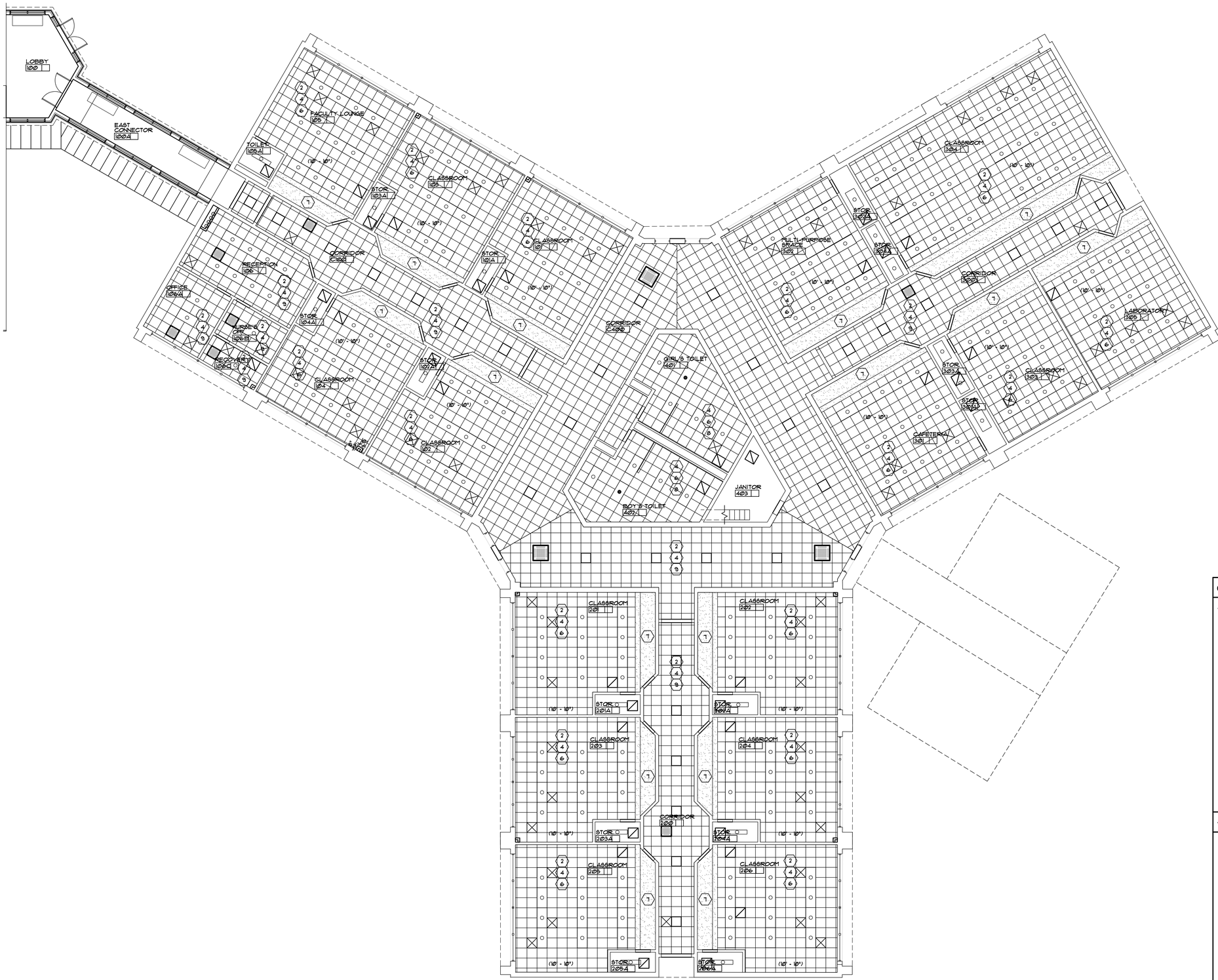
BID DOCUMENTS

NEW CONSTRUCTION-
REFLECTED CEILING PLAN
AREA A

DESIGN BY	NBB
CHECKED BY	DB
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

A102A



GENERAL REFLECTED CEILING NOTES :

A. LEGEND :

NEW 2'x2' ACOUSTICAL CEILING TILE & GRID
ACOUSTICAL CEILING TILE: ACT 1 U.O.N.
CEILING GRID: MATCH EXISTING

NOTES:
1. PROVIDE HANGARS AS REQ'D.
2. PROVIDE PERIMETER TRIM TO MATCH EXISTING.

RECESSED DOWN LIGHT
2X2 RECESSED LIGHT
2X4 RECESSED LIGHT
CEILING AIR DIFFUSER

B. SEE MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR SIZES AND TYPES OF LIGHT FIXTURES, DIFFUSERS, GRILLES, ETC..

C. (X'-X") DENOTES HEIGHT OF CEILING, AFF. TYPICAL CEILING IS TO MATCH EXISTING CEILING HEIGHT UNLESS OTHERWISE NOTED.

D. VERIFY ALL CONDITIONS IN THE FIELD BEFORE PROCEEDING WITH WORK.

E. ALL CONSTRUCTION SHOWN IS NEW (UNLESS OTHERWISE NOTED).

SHEET PLAN KEYNOTES :

1. NOT USED.
2. PROVIDE NEW ACT.
3. NOT USED.
4. PROVIDE NEW LIGHTING FIXTURES. (SEE ELECTRICAL DRAWINGS FOR COORDINATION)
5. NOT USED.
6. PROVIDE NEW GRILLES & DIFFUSERS.
7. MODIFY SOFFIT AS REQUIRED. COORDINATE WITH MEP DRAWINGS FOR PAINT.
8. PROVIDE NEW ACT 2.
9. PROVIDE NEW CEILING FAN COIL UNITS (SEE MECHANICAL DRAWINGS FOR COORDINATION)

11 NEW CONSTRUCTION REFLECTED CEILING PLAN - AREA B
SCALE: 1/8" = 1'-0"

REVISIONS

no.	date	comments

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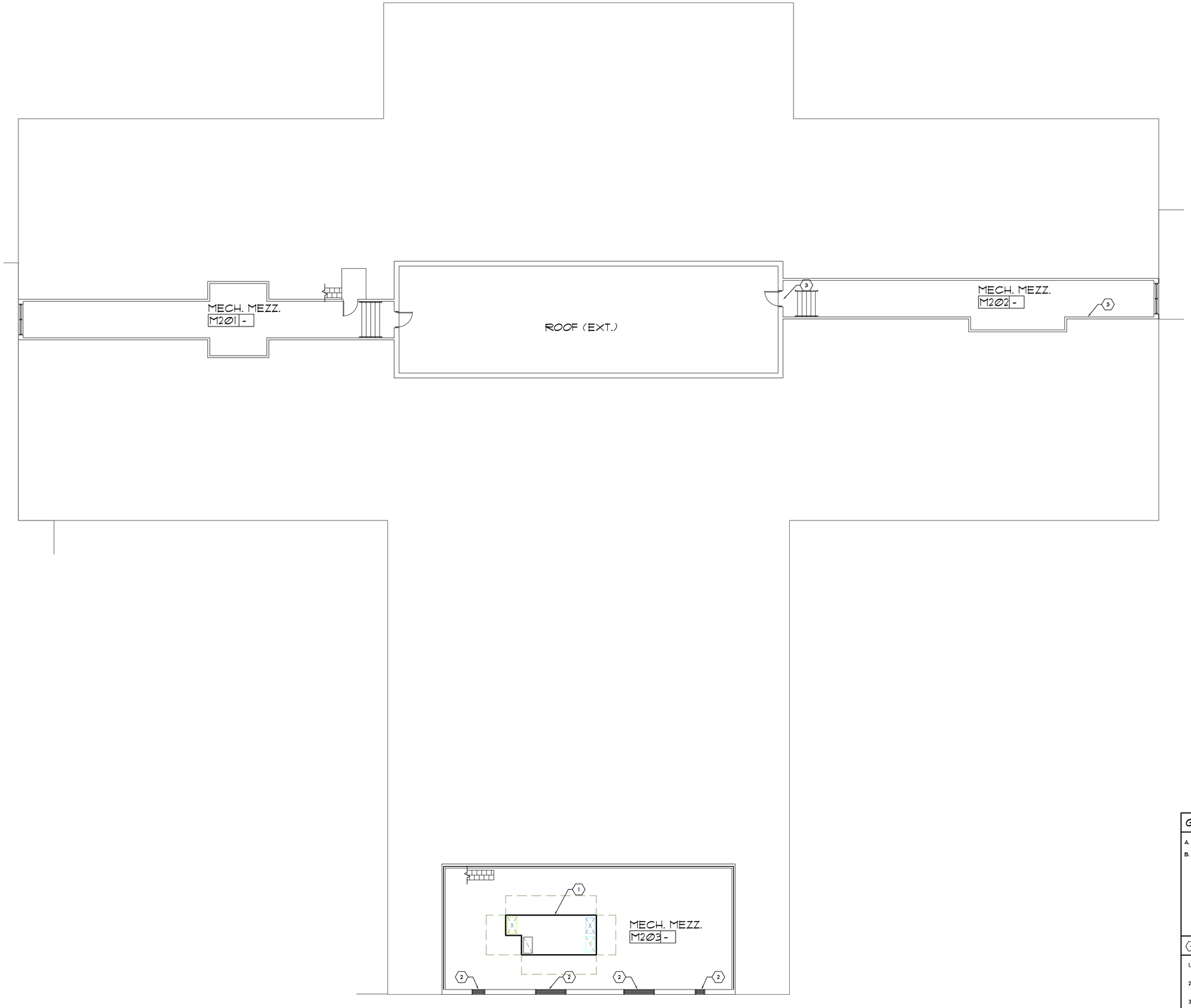
SUBMISSION

BID DOCUMENTS

NEW CONSTRUCTION-
REFLECTED CEILING PLAN
AREA B

DESIGN BY	NBB
CHECKED BY	DB
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

A102B



11 NEW CONSTRUCTION MEZZANINE PLAN - AREA A
SCALE: 1/8" = 1'-0"

GENERAL NEW CONSTRUCTION NOTES :

A. VERIFY ALL CONDITIONS IN THE FIELD BEFORE PROCEEDING WITH WORK.

B. ALL CONSTRUCTION SHOWN IS NEW (UNLESS OTHERWISE NOTED).

SHEET PLAN KEYNOTES :

1. PROVIDE NEW MECHANICAL UNIT. (SEE MECHANICAL DRAWINGS FOR COORDINATION)
2. PROVIDE NEW LOUVER. (SEE MECHANICAL DRAWINGS FOR COORDINATION)
3. SEAL AROUND NEW PIPE PENETRATIONS. (SEE MECHANICAL DRAWINGS FOR COORDINATION)

REVISIONS

no.	date	comments

ENGINEER

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NEW CONSTRUCTION - MEZZANINE PLAN AREA A

DESIGN BY	NBB
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SCALE	AS NOTED
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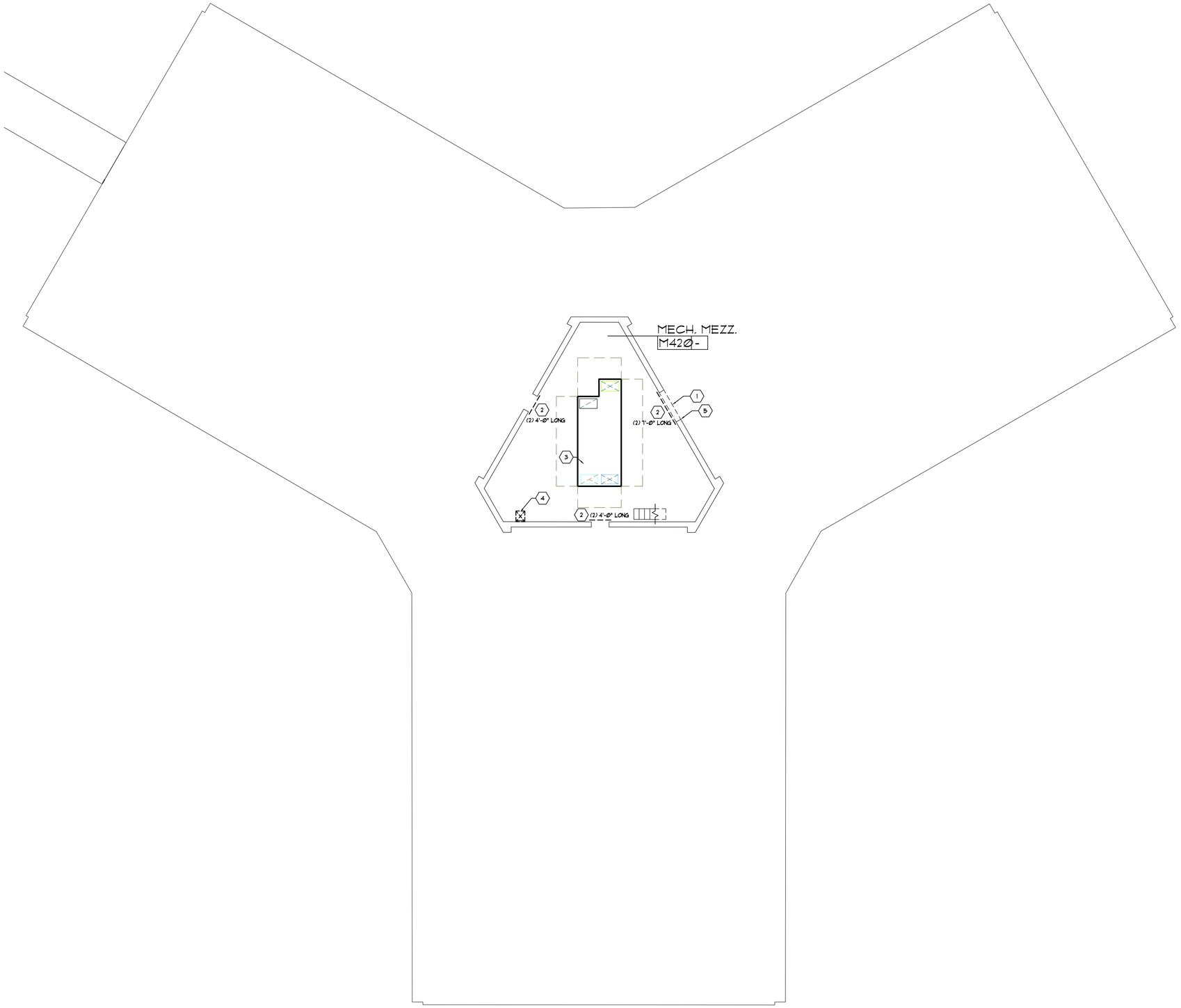
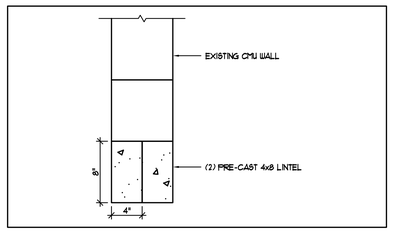
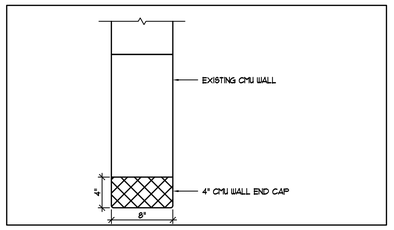
A103A



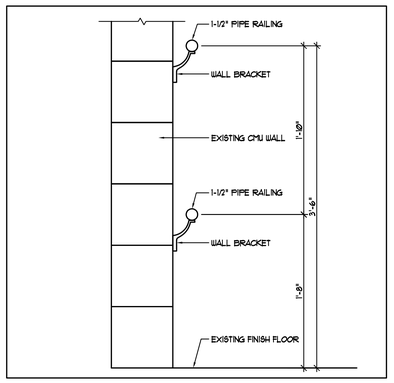
11 NEW CONSTRUCTION MEZZANINE PLAN - AREA B
SCALE: 1/8" = 1'-0"



B3 HEAD DETAIL
SCALE: 1-1/2" = 1'-0"



C3 JAMB DETAIL
SCALE: 1-1/2" = 1'-0"



E3 RAILING DETAIL
SCALE: 1-1/2" = 1'-0"

GENERAL NEW CONSTRUCTION NOTES :

A. VERIFY ALL CONDITIONS IN THE FIELD BEFORE PROCEEDING WITH WORK.
B. ALL CONSTRUCTION SHOWN IS NEW (UNLESS OTHERWISE NOTED).

SHEET PLAN KEYNOTES :

1. PROVIDE NEW LINTEL. SEE DETAIL B3/A103B.
2. PROVIDE PAINTED STEEL GUARD RAILS. SEE DETAIL E3/A103B.
3. PROVIDE NEW MECHANICAL UNIT (SEE MECHANICAL DRAWINGS FOR COORDINATION)
4. EXISTING ROOF HATCH.
5. SEE NEW JAMB DETAIL C3/A103B.

REVISIONS

no.	date	comments

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NEW CONSTRUCTION - MEZZANINE PLAN AREA B

DESIGN BY	NBB
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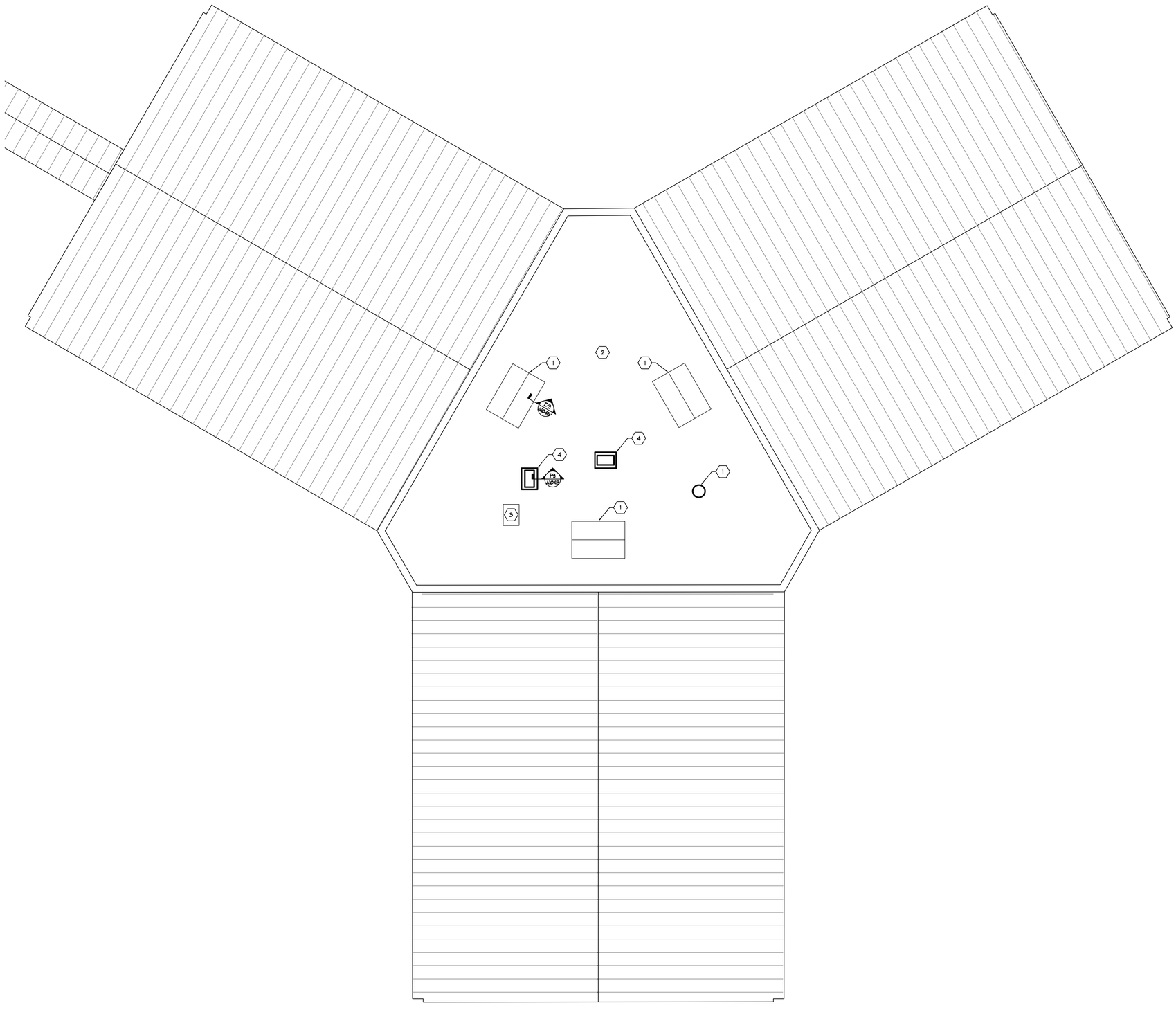
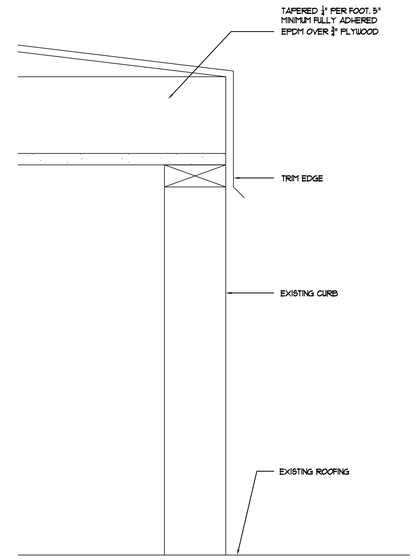
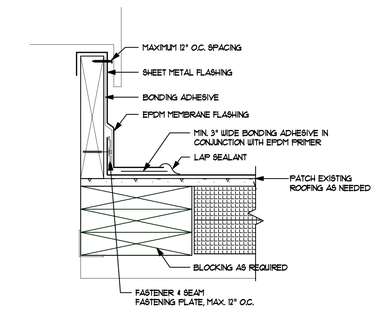


11 NEW CONSTRUCTION ROOF PLAN - AREA B
SCALE: 1/8" = 1'-0"



D9 CURB DETAIL
SCALE: 3" = 1'-0"



F9 ROOF HOOD CURB DETAIL
SCALE: 3" = 1'-0"

GENERAL NEW CONSTRUCTION NOTES :

A. VERIFY ALL CONDITIONS IN THE FIELD BEFORE PROCEEDING WITH WORK.
B. ALL CONSTRUCTION SHOWN IS NEW (UNLESS OTHERWISE NOTED).

SHEET PLAN KEYNOTES :

1. PROVIDE CURB CAP.
2. EXISTING ROOF TO REMAIN.
3. EXISTING ROOF HATCH TO REMAIN.
4. PROVIDE NEW VENT HOOD. (SEE MECHANICAL AND STRUCTURAL DRAWINGS FOR COORDINATION)

REVISIONS

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NEW CONSTRUCTION - ROOF PLAN AREA B

DESIGN BY	NBB
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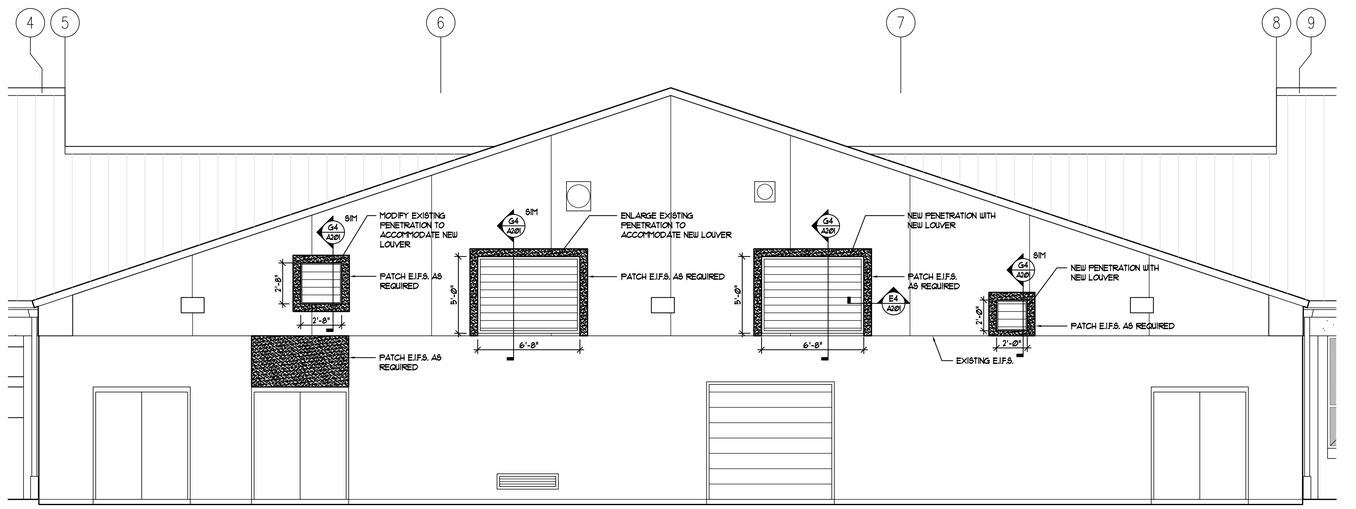
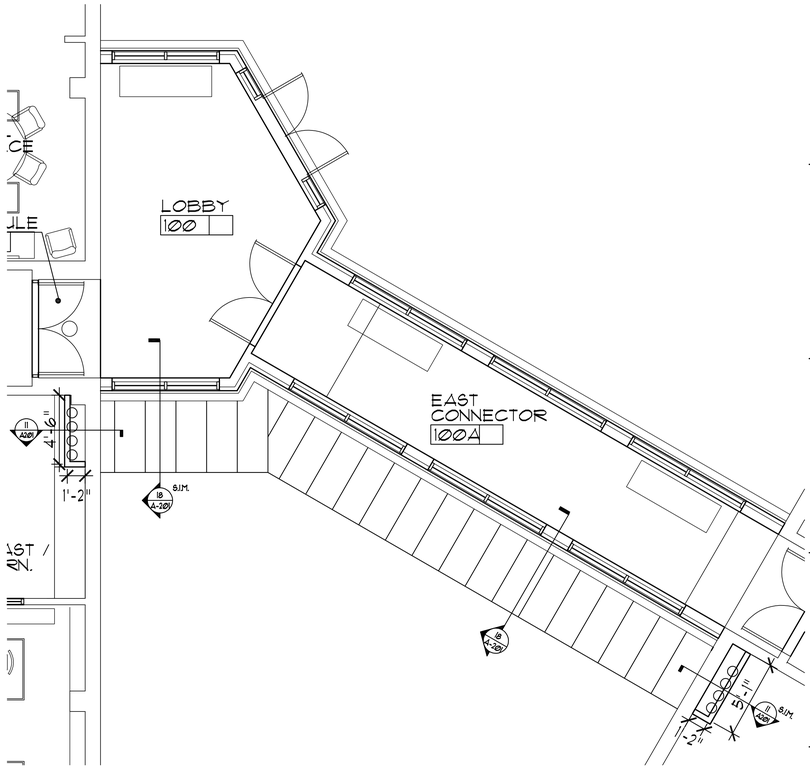
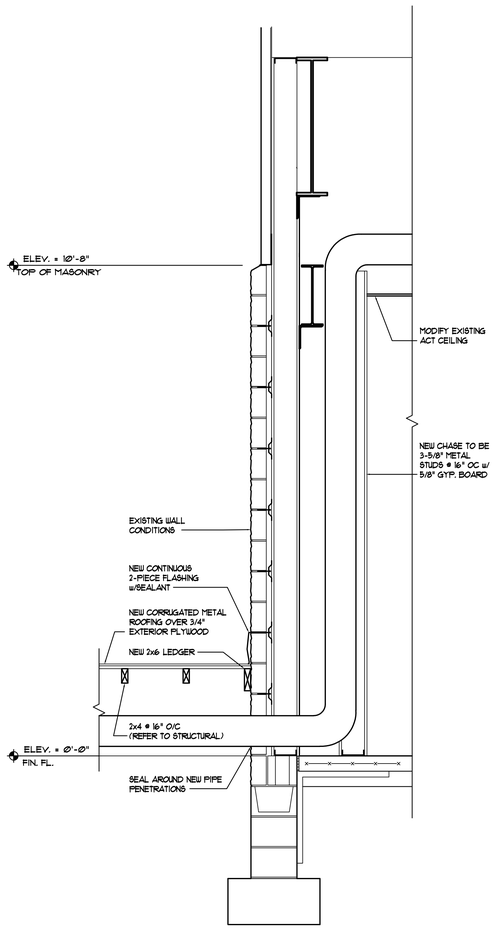
A104B



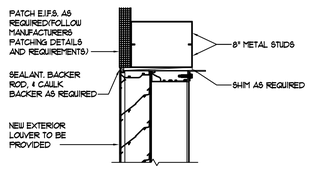
C1 SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



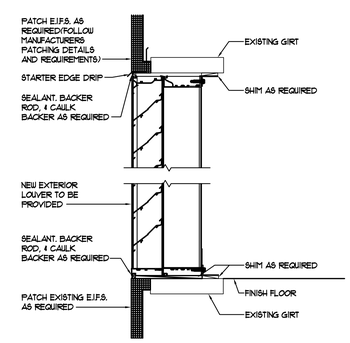
D1 ENLARGED FLOOR PLAN
SCALE: 1/4" = 1'-0"



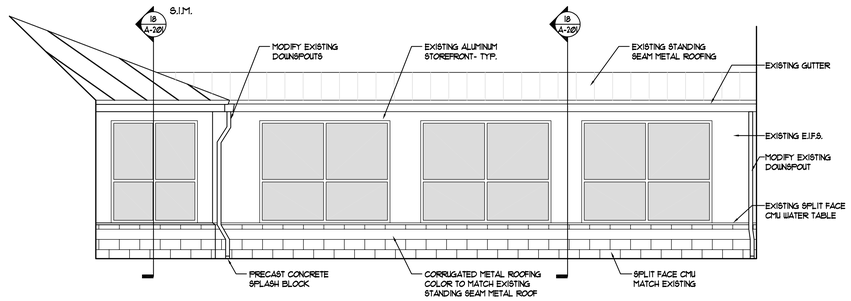
11 WALL SECTION
SCALE: 3/4" = 1'-0"



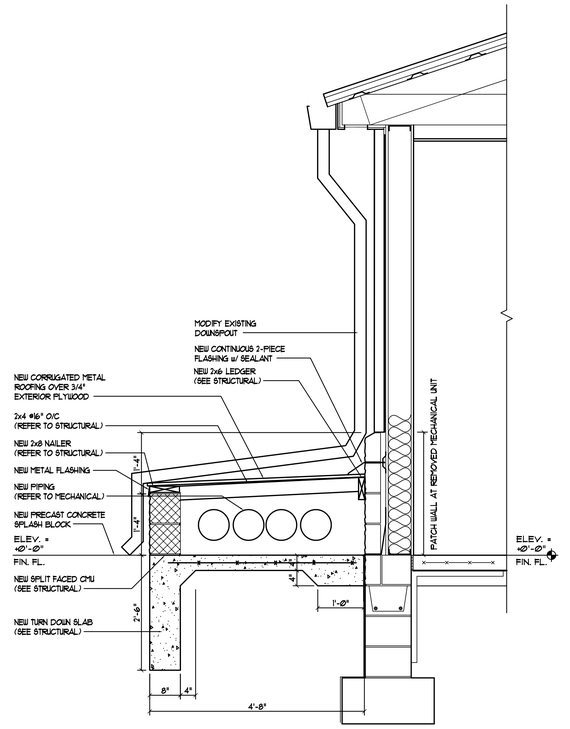
E4 LOUVER DETAIL
SCALE: 1-1/2" = 1'-0"



G4 LOUVER DETAIL
SCALE: 1-1/2" = 1'-0"



14 ELEVATION
SCALE: 1/4" = 1'-0"



18 WALL SECTION
SCALE: 3/4" = 1'-0"

REVISIONS

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BID DOCUMENTS

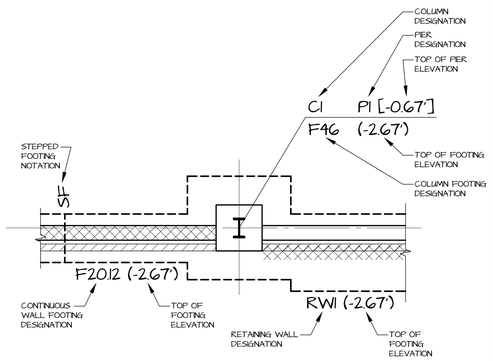
WALL SECTIONS & ELEVATIONS

DESIGN BY	NBB
CHECKED BY	DB
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

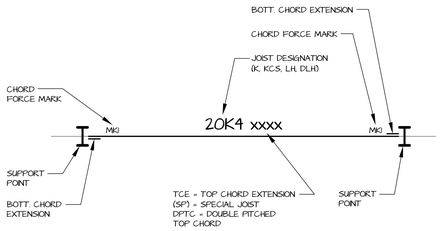
A201

STRUCTURAL LEGEND & ABBREVIATIONS

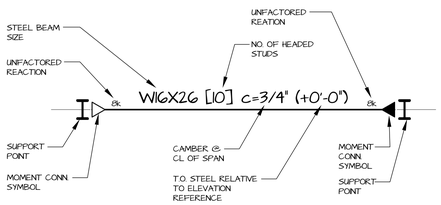
FOUNDATION NOTATION



JOIST NOTATION



STEEL BEAM NOTATION



DRAWING ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	LW	LIGHT WEIGHT CONCRETE
ADD'L	ADDITIONAL	LL	LIVE LOAD
ADJ	ADJACENT	LG	LONG
ALT	ALTERNATE	LLH	LONG LEG HORIZONTAL
APPROX	APPROXIMATE	LLV	LONG LEG VERTICAL
ARCH	ARCHITECTURAL	LP	LOW POINT
BM	BEAM	MFR, MANUF	MANUFACTURER
BRG	BEARING	MAX	MAXIMUM
BP	BEARING PLATE	MECH	MECHANICAL
BS	BOTH SIDES	MEP	MECHANICAL, ELECTRICAL, PLUMBING
BOTT	BOTTOM	MIN	MINIMUM
B.O	BOTTOM OF	MISC	MISCELLANEOUS
BLDG	BUILDING		
		NS	NEAR SIDE
CANT	CANTILEVER	NOM	NOMINAL
CANT LE	CANTILEVER LEFT END	NBL	NON-BEARING LINTEL
CANT RE	CANTILEVER RIGHT END	NBMH	NON-BEARING METAL HEADER
CIP	CAST IN PLACE	NBWH	NON-BEARING WOOD HEADER
CL	CENTER LINE	NW	NORMAL WEIGHT CONCRETE
CLR	CLEAR	N/A	NOT AVAILABLE
COL	COLUMN	NIC	NOT IN CONTRACT
CONC	CONCRETE	NTS	NOT TO SCALE
CC	CONCRETE COLUMN		
CMU	CONCRETE MASONRY UNIT	O/C	ON CENTER
CONN	CONNECTION	OPNG	OPENING
CJ	CONTROL JOINT/ CONSTRUCTION JOINT	OPP	OPPOSITE
CONT	CONTINUOUS	OD	OUTSIDE DIAMTER
COORD	COORDINATE		
		PL	PLATE
DL	DEAD LOAD	PCF	POUNDS PER CUBIC FOOT
DIA, Ø	DIAMETER	PSF	POUNDS PER SQUARE FOOT
DIM	DIMENSION	PSI	POUNDS PER SQUARE INCH
DBL	DOUBLE	P/C	PRECAST CONCRETE
DWLS	DOWELS	PREFAB	PREFABRICATED
DN	DOWN	PT	PRESSURE TREATED
DWG	DRAWING		
		RAD	RADIUS
EF	EACH FACE	REF	REFER OR REFERENCE
EW	EACH WAY	REINF	REINFORCING
EWEF	EACH WAY EACH FACE	REBAR	REINFORCING BAR
EOS	EDGE OF SLAB	REQ'D	REQUIRED
EL	ELEVATION	RW	RETAINING WALL
ELEV	ELEVATOR	RD	ROOF DRAIN
EQ	EQUAL	RE	ROOF RAFTER
EQUIP	EQUIPMENT		
EXIST/ (E)	EXISTING	SIM	SIMILAR
EJ	EXPANSION JOINT	SOG	SLAB ON GRADE
EXT	EXTERIOR	SPEC	SPECIFICATION
EIFS	EXTERIOR INSULATION FINISH SYSTEM	SQ	SQUARE
		SS	STAINLESS STEEL
FIN	FINISH	STD	STANDARD
FF	FINISH FLOOR	STL	STEEL
FLR	FLOOR	SF	STEPPED FOOTING
FD	FLOOR DRAIN	STIFF	STIFFENER
FT	FOOT		
FDN	FOUNDATION	THK	THICK, THICKNESS
FRM	FRAMING	TS	THICKENED SLAB
		TSF	THICKENED SLAB, FOOTING
GALV	GALVANIZED	T&B	TOP & BOTTOM
GA	GAUGE	T.O.	TOP OF
GT	GIRDER TRUSS	T.O.B.	TOP OF BEAM
GB	GRADE BEAM	T.O.C.	TOP OF CONCRETE
		T.O.F.	TOP OF FOOTING
HS	HAUNCHED SLAB	T.O.P.	TOP OF PARAPET
HP	HIGH POINT	T.O.S.	TOP OF SLAB
HB	HOIST BEAM	T.O.STL.	TOP OF STEEL
HK	HOOK	T.O.W.	TOP OF WALL
HORIZ	HORIZONTAL	TDS	TURNED DOWN SLAB
HEF	HORIZONTAL EACH FACE	TYP	TYPICAL
HIF	HORIZONTAL INSIDE FACE		
HOF	HORIZONTAL OUTSIDE FACE	UNO	UNLESS NOTED OTHERWISE
IBC	INTERNATIONAL BUILDING CODE	VERT	VERTICAL
		WWF	WELDED WIRE FABRIC
K	KIPS (1000#s)	WF	WIDE FLANGE
KSF	KIPS PER SQUARE FOOT	W	WIDTH, WIDE
		w/	WITH
L	ANGLE	w/o	WITHOUT
LBS	POUNDS	WD	WOOD

DRAWING SYMBOLS

	MOMENT CONNECTION - BEAM TO BEAM OR BEAM TO COLUMN - SEE PLAN FOR REQUIRED CONNECTION MOMENT CAPACITY, IF NO LOAD SHOWN, PROVIDE FULL CAPACITY OF BEAM IN ADDITION TO FULL DEPTH SHEAR CONNECTION
	FLEXIBLE MOMENT CONNECTION (FMC) - BEAM TO COLUMN CONNECTION SEE PLAN FOR REQUIRED CONNECTION MOMENT IF NO LOAD SHOWN, SEE TYPICAL DETAILS.
	SLIDING CONNECTION @ EXPANSION JOINT
	CRIPPLE POINT IN STEEL MEMBER - SEE TYPICAL DETAIL FOR ADDITIONAL INFORMATION
	CHANGE IN SLAB ELEVATION
[.]	SPOT ELEVATION LOCATION
S/ D_	SLAB/ DECK CONSTRUCTION TAG - SEE SCHEDULE FOR ADDITIONAL INFORMATION
	UTILITY LINE - COORDINATE SIZE & INVERT w/ UTILITY DRAWINGS
	SLAB CONTROL/ CONSTRUCTION JOINT - SEE TYPICAL DETAILS FOR ADDITIONAL INFORMATION
FD	FLOOR DRAIN - COORDINATE SIZE & LOCATION w/ ARCHITECTURAL & PLUMBING DRAWINGS
TD	TRENCH DRAIN - COORDINATE SIZE & LOCATION w/ ARCHITECTURAL & PLUMBING DRAWINGS
SL	SLOPE OF FLOOR/ ROOF/ SLAB
S-XXX	SECTION MARK
S200	BUILDING ELEVATION
A101	DETAIL/ ENLARGED PLAN CALLOUT
RTU 1	MECHANICAL UNIT ID & WEIGHT
A	WALL TAG
T.O. WHAT EL. (SEE PLAN)	LEVEL DESIGNATION
#	STRUCTURAL GRID DESIGNATION
#	EXISTING STRUCTURAL GRID DESIGNATION

DRAWING MATERIALS

CONCRETE/ PRECAST CONCRETE	SHEAR WALLS
COMPACTED EARTH / SITEWORK	RIGID INSULATION
CRUSHED STONE	GROUT
CONCRETE MASONRY UNIT	MANY CONCRETE MASONRY UNIT
AREA OF OVERFRAMING	MECHANICAL UNIT
BRICK VENEER	WOOD
STONE VENEER	STEEL
PLYWOOD SHEATHING/ DECKING	METAL DECKING

DRAWING LIST

SHEET NUMBER	SHEET NAME
S001	STRUCTURAL LEGEND & ABBREVIATIONS
S002	GENERAL NOTES
S100	OVERALL KEY PLAN
S101	PARTIAL FOUNDATION AND FRAMING PLANS
S501	TYPICAL DETAILS AND SECTIONS

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no.	date	comments

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STRUCTURAL LEGEND & ABBREVIATIONS

DESIGN BY	FMY
CHECKED BY	JRB
SCALE	AS NOTED
JOB NO.	240088
DATE	03/05/2025

S001

PROJECT SPECIFICATIONS AND GENERAL NOTES

GENERAL

1. COMPLETE ALL WORK PER THE DRAWINGS AND SPECIFICATIONS CONTAINED HEREIN.
2. MEANS AND METHODS INCLUDING ALL WORK RELATED TO THE STAGING, CONSTRUCTION PRACTICES, AND SAFETY OF THE PROJECTS WORKERS AND PROPERTY SHALL BE COMPLETED BY THE CONTRACTOR IN ACCORDANCE WITH STANDARD INDUSTRY PRACTICE AND ALL CODES AND STANDARDS. ENGINEER SITE VISITS ARE FOR THE REVIEW OF THE STRUCTURAL WORK FOR GENERAL CONFORMANCE WITH THE DRAWINGS AND SPECIFICATIONS AND ARE NOT FOR THE REVIEW OF CONTRACTOR RESPONSIBILITIES, INCLUDING BUT NOT LIMITED TO PROJECT SAFETY AND MEANS AND METHODS OF CONSTRUCTION.
3. ALL DRAWINGS HAVE BEEN PREPARED IN ACCORDANCE WITH THE
   a. 2021 INTERNATIONAL BUILDING CODE.
4. THE CONTRACTOR IS RESPONSIBLE FOR THE EVALUATION AND COMPLIANCE WITH LOADING RESTRICTIONS FOR MEANS AND METHODS OF CONSTRUCTION AS WELL AS STAGING FOR OTHER TRADES.
5. SPECIAL INSPECTIONS SHALL BE IN ACCORDANCE WITH CHAPTER 17 OF THE REFERENCED INTERNATIONAL BUILDING CODE. SUBMIT ALL REPORTS TO THE ENGINEER OF RECORD FOR REVIEW. AT THE COMPLETION OF THE PROJECT, THE SPECIAL INSPECTION REPORT SHALL BE COMPLETED AND SUBMITTED TO THE ENGINEER OF RECORD.
6. CONTRACTOR SHALL NOT SCALE DRAWINGS TO DETERMINE DIMENSIONS OF ELEMENTS.
7. STRUCTURAL DRAWINGS SHALL NOT BE REPRODUCED TO CREATE SHOP DRAWINGS OR SHORING DOCUMENTATION WITHOUT THE EXPRESS WRITTEN CONSENT OF PILOTTOWN ENGINEERING.
8. DIMENSIONS NOT SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE COORDINATED WITH THE OTHER DISCIPLINE DRAWINGS. THE HORIZONTAL AND VERTICAL DIMENSIONS CONTAINED ON THE STRUCTURAL DRAWINGS WERE DEVELOPED BY OTHER DISCIPLINES FOR THE PURPOSE OF THIS PROJECT.
9. THE STRUCTURAL DOCUMENTS ARE TO BE USED IN COORDINATION WITH ALL OTHER DISCIPLINES INCLUDING THE ARCHITECTURAL, MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS. ANY DISCREPANCIES SHOULD BE BROUGHT TO THE ATTENTION OF THE DESIGN TEAM PRIOR TO THE COMMENCEMENT OF WORK.
10. UNLESS SPECIFICALLY APPROVED, ALL REQUESTED CHANGES IN WORK BY THE CONTRACTOR ARE CONSIDERED TO BE COMPLETED AT NO ADDITIONAL COST AND ARE SUBJECT TO THE APPROVAL OF THE DESIGN TEAM AND OWNER.
11. REFER TO THE ARCHITECTURAL DOCUMENTS FOR ALL WATERPROOFING AND FIREPROOFING LOCATIONS AND DETAILS.

SHOP DRAWING REQUIREMENTS

1. SHOP DRAWINGS SHALL BE SUBMITTED FOR REVIEW BY PILOTTOWN ENGINEERING AND THE DESIGN TEAM FOR THE FOLLOWING ITEMS FOR THIS THE PROJECT:
   a. CONCRETE MIX DESIGNS INCLUDING ALL LABORATORY TESTING, MATERIALS, ETC.
   b. REINFORCING SHOP DRAWINGS
   c. ANCHOR BOLT AND CONCRETE EMBEDDED ASSEMBLIES
   d. STEEL FRAMING
   e. COLD FORMED METAL FRAMING
   f. MASONRY PRODUCTS
   g. ALL ADMIXTURES, SEALANTS, HARDENERS, AND COATINGS
   h. OTHER
2. CONTRACTORS TO ALLOW FOR A 10 BUSINESS DAY REVIEW PERIOD BY THE DESIGN TEAM FOR ALL SHOP DRAWINGS NOTED ABOVE. CONTRACTOR RESPONSIBLE TO SUBMITTED SHOP DRAWINGS IN A TIMELY MANNER AND ALL SUBMITTED DRAWINGS SHALL BE REVIEWED BY THE CONSTRUCTION MANAGER PRIOR TO SUBMISSION.
3. DELEGATED DESIGN SUBMITTALS REQUIRE THE REVIEW AND APPROVAL FROM A PROFESSIONAL ENGINEER AND SHALL BE SUBMITTED WITH CALCULATIONS AND SIGNED AND SEALED DRAWINGS PRIOR TO REVIEW.

EXISTING CONSTRUCTION

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, COORDINATION, AND INSTALLATION OF SHORING AND STABILIZATION OF EXISTING CONSTRUCTION AS REQUIRED TO PERFORM THE WORK CONTAINED IN THE DRAWINGS AND SPECIFICATIONS.
2. DIMENSIONS SHOWN REFERRING TO EXISTING STRUCTURES ARE FOR REFERENCE ONLY. ALL DIMENSIONS RELATED TO EXISTING BUILDINGS AND FRAMING SHOULD BE VERIFIED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORK.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY INFORMATION RELATING TO THE EXISTING STRUCTURE THAT HAS BEEN UNCOVERED DUE TO DEMOLITION AND REMOVAL OF FINISHES.

FOUNDATIONS

1. BOTTOM OF FOOTINGS SHALL BEAR ON UNDISTURBED VIRGIN SOIL OR CONTROLLED COMPACTED FILL CAPABLE OF SAFELY SUPPORTING 2,000 PSF.
2. ALL SOILS SUPPORTING FOOTINGS AND SLABS SHOULD BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY OR AS DETERMINED BY A REGISTERED GEOTECHNICAL ENGINEER.
3. BOTTOM OF FOOTING SUBGRADE MUST BE INSPECTED AND APPROVED BY A REGISTERED GEOTECHNICAL ENGINEER PRIOR TO PLACING ANY CONCRETE FOUNDATIONS. APPROVAL IN WRITING MUST INDICATE THE SOIL IS ADEQUATE TO SAFELY SUSTAIN THE SPECIFIED BEARING PRESSURE AND ALL REPORTS TO BE SUBMITTED TO THE ENGINEER OR RECORD.
4. BOTTOM OF ALL FOOTINGS SUBJECTED TO FREEZE THAW CONDITIONS SHALL BE A MINIMUM 2'-6" FEET BELOW FINISHED GRADE.

CONCRETE

1. ALL CONCRETE SHALL BE READY-MIX AND PROPORTIONED ON THE BASIS OF LABORATORY TRIAL MIXTURE OR FIELD TEST DATA OR BOTH ACCORDING TO ACI 301 AND ACI 318. DESIGN MIXTURES SHALL MEET THE REQUIREMENTS BELOW BASED ON CONCRETE PLACEMENT LOCATIONS:
   a. INTERIOR SLABS ON GRADE:
      i. MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS
      ii. EXPOSURE CATEGORY: F0
   b. EXTERIOR SLABS ON GRADE:
      i. MINIMUM COMPRESSIVE STRENGTH OF 4500 PSI AT 28 DAYS
      ii. EXPOSURE CATEGORY: F2
      iii. 6% AIR-ENTRAINMENT (+/- 1.5%)
   c. FOOTINGS AND FOUNDATION WALLS
      i. MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS
      ii. EXPOSURE CATEGORY: F0
2. CONTRACTOR IS RESPONSIBLE FOR THE PREPARATION OF DESIGN MIXTURES FOR EACH APPLICATION/LOCATION USED IN CONSTRUCTION AS NOTED ABOVE AND ON THE DRAWINGS.
3. ALL CONCRETE WORK SHALL COMPLY WITH THE REQUIREMENTS OF THE FOLLOWING:
   a. ACI BUILDING CODE (ACI 318).
   b. ACI DETAILING MANUAL (ANL. 66).
   c. SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS (ACI 301).
4. ALL REINFORCING STEEL SHALL BE MANUFACTURED AND CONFORM TO ASTM DESIGNATION A615 GRADE 60. ALL BARS TO BE LAPPED A MINIMUM 48 BAR DIAMETERS UNLESS OTHERWISE NOTED.
5. ALL WWF SHALL BE MANUFACTURED FROM HIGH STRENGTH STEEL CONFORMING TO ASTM A1064/A1064M. ALL WWF SHALL LAP A MINIMUM OF 6 INCHES.
6. CONCRETE SLAB ON GRADE SHALL BE FINISHED TO TOLERANCE FOR FLOOR FLATNESS (FF) OF 25 AND FLOOR LEVELNESS (FL) OF 20 UNLESS OTHERWISE MANDATED BY ARCHITECTURAL FINISH REQUIREMENTS.
7. ALL CONCRETE SLAB ON GRADE SHALL BE TESTED FOR FLOOR FLATNESS AND LEVELNESS WITHIN 48 HOURS OF THE SLAB ON GRADE PLACEMENT. CONTRACTOR SHALL SUBMIT REPORTS TO THE ENGINEER AND ARCHITECT OF RECORD AND ALL SPECIALTY FLOORING SUB-CONTRACTORS FOR REVIEW.
8. PLACE TRANSVERSE REINFORCING (SWB) IN BOTTOM LAYER OF CONTINUOUS FOOTINGS. PROVIDE CORNER BARS IN FOOTINGS TO MATCH CONTINUOUS REINFORCEMENT. EXTEND WALL FOOTING REINFORCING INTO COLUMN FOOTINGS A MINIMUM OF 2 FEET.
9. PROVIDE KEYS IN CONCRETE WALLS, PIERS, GRADE BEAMS, AND FOOTINGS AT INTERSECTIONS UNLESS NOTED OTHERWISE. PROVIDE CORNER BARS TO MATCH HORIZONTAL REINFORCEMENT AT WALL CORNERS AND TEE INTERSECTIONS.
10. CONCRETE SHALL ACHIEVE A MINIMUM OF 70% OF THE DESIGN STRENGTH PRIOR TO STEEL ERECTION. WRITTEN CONFIRMATION OF THIS STRENGTH SHOULD BE SUBMITTED TO THE ENGINEER OF RECORD PRIOR TO THE COMMENCEMENT OF STEEL ERECTION.

STEEL

1. ALL STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST AISC CODE. ALL STRUCTURAL STEEL SHAPES AND GRADES SHALL BE AS FOLLOWS (UNLESS NOTED OTHERWISE):
   a. WIDE FLANGE (W) SHAPES, ASTM A992/A992M GRADE 50
   b. S, M, AND HP SHAPES, ASTM A572 GRADE 50
   c. HSS STRUCTURAL SECTIONS, ASTM A500 GRADE B, FY = 46 KSI
   d. HSS ROUND SECTIONS, ASTM A500 GRADE C, FY = 46 KSI
   e. STEEL PIPE SECTIONS, ASTM A53, GRADE B, FY = 35 KSI
   f. ALL OTHER STRUCTURAL STEEL SHALL BE ASTM A36 UNLESS OTHERWISE NOTED.
   g. ANCHOR BOLTS, ASTM F1554
2. CLEAN ALL STEEL IN ACCORDANCE WITH SSPC-SP3 AND PROVIDE A SHOP COAT OF RUST INHIBITIVE PAINT. STEEL CONTRACTOR TO COORDINATE PRIMER LOCATION WITH SLIP CRITICAL BOLTED CONNECTION LOCATIONS AS REQUIRED.
3. STEEL TO RECEIVE SPRAYED-ON FIREPROOFING OR CONCRETE ENCASEMENT SHALL REMAIN CLEANED AND UNPAINTED.
4. ALL LINTELS SHALL BE HOT DIP GALVANIZED.
5. ALL EXPOSED STEEL TO THE WEATHER ELEMENTS (DUNNAGE FRAMING, SCREEN WALL FRAMING, CANOPY FRAMING, ETC.) SHALL BE HOT DIP GALVANIZED.
6. ANY POINTS OF WELDING ON GALVANIZED MEMBERS SHALL BE TOUCHED UP IN THE FIELD WITH A ZINC-RICH PAINT AS REQUIRED BY THE STEEL ERECTOR.
7. ORIENT ALL BEAMS MILL CAMBER UPWARD DURING FABRICATION AND ERECTION.
8. ALL SHOP AND FIELD WELDING SHALL BE PERFORMED BY WELDERS CERTIFIED, AS DESCRIBED IN "LATEST EDITION OF THE AMERICAN WELDING SOCIETY'S STANDARD QUALIFICATION PROCEDURE", AWS D1, TO PERFORM THE TYPE OF WORK REQUIRED.
9. SEPARATE ALL ALUMINUM AND STEEL MEMBERS AS REQUIRED TO PREVENT GALVANIC AND CORROSIVE EFFECTS.
10. ALL STEEL WELDING RODS SHALL BE AS FOLLOWS:
   a. E70XX FOR STEEL CONNECTIONS
   b. E80XX FOR BRACE CONNECTIONS
   c. E60XX FOR STEEL TO METAL STUD CONNECTIONS
11. CONTRACTOR TO SUBMIT ALL STEEL SHOP DRAWINGS FOR REVIEW PRIOR TO ANY FABRICATION.
12. STEEL FABRICATOR IS SOLELY RESPONSIBLE FOR COORDINATING WITH THE GENERAL CONTRACTOR FOR THE PURPOSE OF SURVEYING AND VERIFICATION OF EXISTING CONDITIONS INCLUDING BUT NOT LIMITED TO THE LOCATION, ELEVATION, AND DIMENSIONS OF WALLS AND FRAMING THAT EXIST AT THE TIME OF THE STEEL ERECTION.

MASONRY

1. ALL MASONRY UNITS SHALL BE NORMAL WEIGHT MASONRY UNITS MEETING ASTM C90 WITH MINIMUM COMPRESSIVE STRENGTH OF 2,000 PSI (F'M) (AVERAGE OF 3 TESTS).
2. ALL MASONRY UNITS TO BE GROUTED SOLID BELOW GRADE, AT ALL VERTICAL REINFORCING LOCATIONS, AND WHERE INDICATED IN DRAWINGS.
3. ALL CMU SHALL BE LAID IN A FULL BED OF MORTAR.
4. THE FOLLOWING BLOCK STRENGTHS ARE REQUIRED UNLESS ASSEMBLY STRENGTH IS JUSTIFIED VIA THE PRISM TEST:
   a. 2,800 PSI ON GROSS AREA FOR SOLID INDIVIDUAL UNITS.
   b. 1,900 PSI ON NET AREA OF HOLLOW INDIVIDUAL UNITS.
   c. 3,750 PSI ON NET AREA OF INDIVIDUAL IVANY UNITS.
5. ALL MASONRY MORTAR SHALL BE ASTM C270 TYPE S WITH A MINIMUM COMPRESSIVE STRENGTH OF 1,800 PSI AT 28 DAYS.
6. ALL MORTAR SHALL BE FIELD-TESTED PER ASTM C780.
7. COMPRESSIVE STRENGTH VALUES DETERMINED THROUGH ASTM C780 IN THE FIELD ARE NOT EXPECTED TO ACHIEVE THE COMPRESSIVE STRENGTHS OF LABORATORY TESTED ASTM C270 SPECIFICATION MORTARS.
8. GROUT SHALL BE A HIGH SLUMP MIX, PROPORTIONED IN ACCORDANCE WITH ASTM C476, THAT ACHIEVES THE COMPRESSIVE STRENGTH OF THE MASONRY (F'M), NOT LESS THAN 2,000 PSI AT 28 DAYS.
9. ALL GROUT SHALL BE TESTED USING FIELD OBTAINED CYLINDERS IN ACCORDANCE WITH ASTM C109.
10. ALL CONCRETE MASONRY SHALL BE CONSTRUCTED IN ACCORDANCE WITH "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES ACI 530/ASCE 5/TMS 402" AND THE "SPECIFICATION FOR MASONRY STRUCTURES ACI 530/ASCE 6/TMS 602".
11. PROVIDE HOT-DIPPED GALVANIZED TRUSS TYPE HORIZONTAL JOINT REINFORCEMENT, MIN. 9 GA. AT 16" ON CENTER VERTICAL IN ALL MASONRY WALLS. SPACE HORIZONTAL JOINT REINFORCEMENT AT 8 INCHES ON CENTER IN ALL PARAPETS. USE SHOP FABRICATED SPECIAL PIECES AT ALL CORNERS AND TEES.

TIMBER

1. ALL STRUCTURAL TIMBER FRAMING, WALLS, BLOCKING, ETC. SHALL BE HEM FIR #2 MINIMUM, STRESS GRADE LUMBER OR APPROVED EQUAL. THE MINIMUM ALLOWABLE PROPERTIES ARE AS FOLLOWS: F'B = 850 PSI, F'V = 150 PSI, E = 1,300,000 PSI.
2. ALL STRUCTURAL TIMBER MUST BE STAMPED IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION'S "CONSTRUCTION MANUAL."
3. ALL TIMBER AND TIMBER CONSTRUCTION SHALL COMPLY WITH THE FOLLOWING STANDARDS:
   a. AMERICAN INSTITUTE OF TIMBER CONSTRUCTION TIMBER CONSTRUCTION MANUAL.
   b. AMERICAN WOOD COUNCIL, NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION (NDS).
   c. AMERICAN PLYWOOD ASSOCIATION PLYWOOD DESIGN SPECIFICATION.
   d. AMERICAN WOOD-PRESERVERS ASSOCIATION STANDARDS.
4. ALL TIMBER CONNECTIONS SHALL BE MADE USING PREFABRICATED CONNECTORS. TOE-NAILING IS NOT PERMITTED AS THE FINAL CONNECTION UNLESS OTHERWISE APPROVED BY THE ENGINEER. SUBMIT MANUFACTURER'S DATA FOR REVIEW. FASTENERS SHALL BE AS MANUFACTURED BY SIMPSON STRONGTIE OR APPROVED EQUAL.
5. PROVIDE 2X BLOCKING BETWEEN WALL STUDS AT 2'-0" O/C FOR ALL INTERIOR BEARING WALLS.
6. PROVIDE MINIMUM CONTINUOUS SOLID BLOCKING OR CROSS-BRIDGING LINES AT 8'-0" O/C MAX SPACING FOR ALL WOOD JOISTS AND WOOD RAFTERS.
7. PROVIDE A MINIMUM OF ONE LINE OF BLOCKING OR CROSS BRIDGING FOR ALL SPANS.
8. TREATED LUMBER SHALL BE PROVIDED AT ALL LOCATIONS WHERE LUMBER IS IN CONTACT WITH CONCRETE AND MASONRY FOUNDATION WALLS OR AT THE EXTERIOR OF THE BUILDING.
9. SHEATHING FOR EXTERIOR WALLS SHALL BE MIN 1/2" THICK (NOMINAL), 32/16 SPAN RATING, APA STRUCTURAL RATED SHEATHING, EXPOSURE 1. ALL SHEATHING SHALL BE PLACED HORIZONTALLY AND SECURED IN ACCORDANCE WITH THE WALL SCHEDULE SHOWN ON THE STRUCTURAL DRAWINGS. ALL JOINTS IN SHEATHING SHALL BE STAGGERED.
10. SHEATHING FOR ROOFS SHALL BE 5/8" THICK (NOMINAL), 32/16 SPAN RATING, APA STRUCTURAL RATED SHEATHING, EXPOSURE 1. ALL JOINTS IN SHEATHING SHALL BE STAGGERED. USE PANEL CLIPS, TONGUE & GROOVE, OR LUMBER BLOCKED EDGE SUPPORTS AS RECOMMENDED BY APA. NAILING SHALL COMPLY WITH APA REQUIREMENTS FOR PLYWOOD FLOOR/ROOF DIAPHRAGMS.

REVISIONS

no.	date	comments

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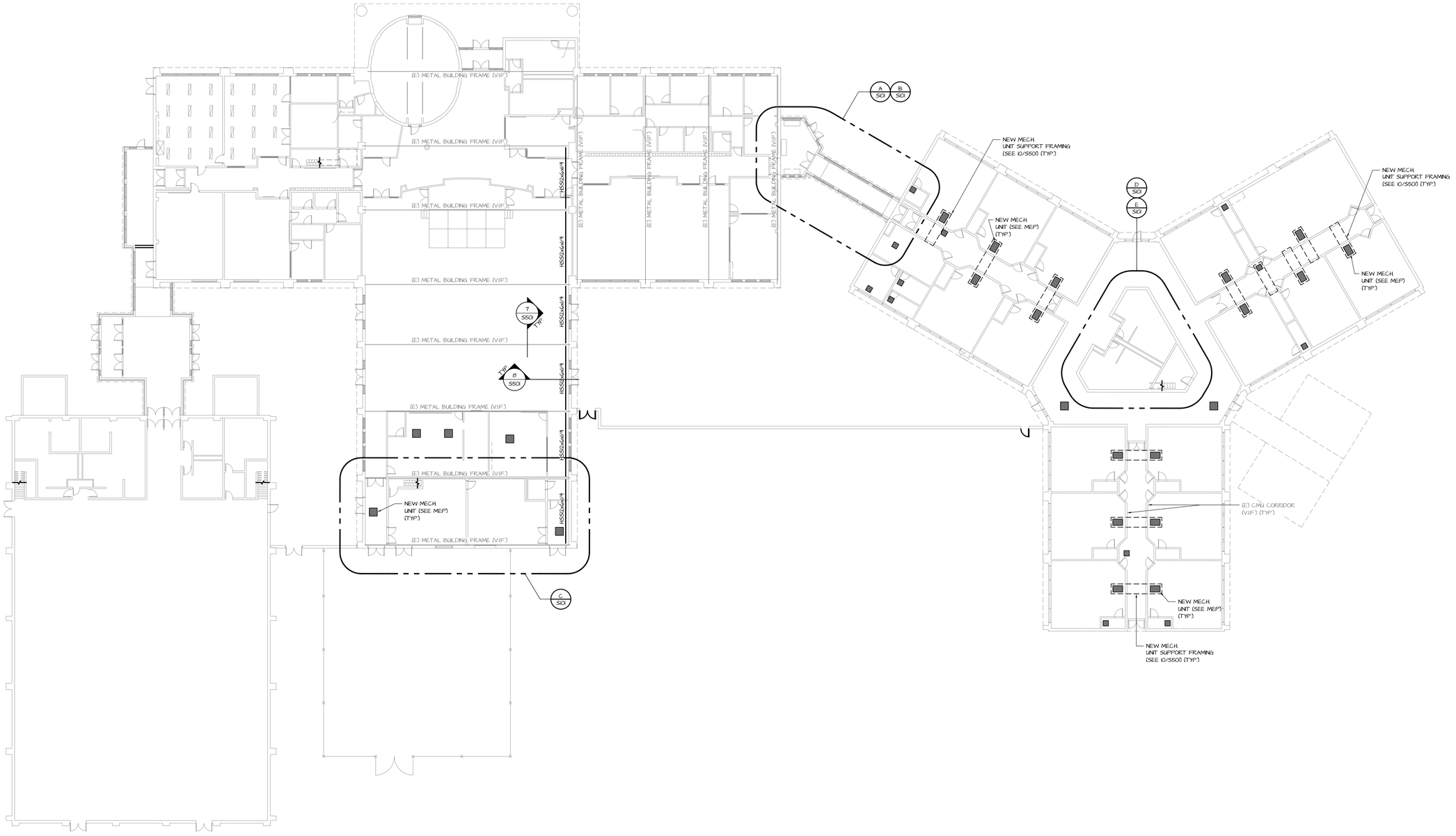
SUBMISSION

BID DOCUMENTS

GENERAL NOTES

DESIGN BY	FMY
CHECKED BY	JRB
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

S002



1 S100 OVERALL KEY PLAN

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

REVISIONS

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OVERALL KEY PLAN

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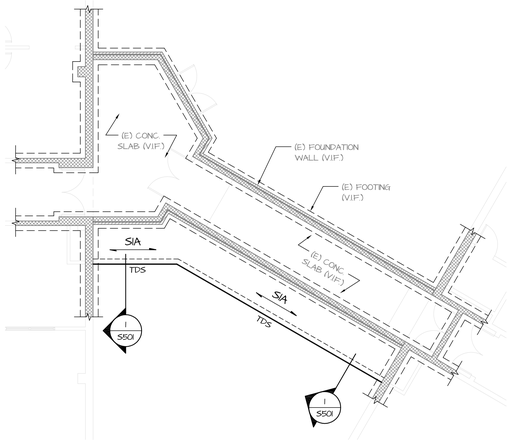
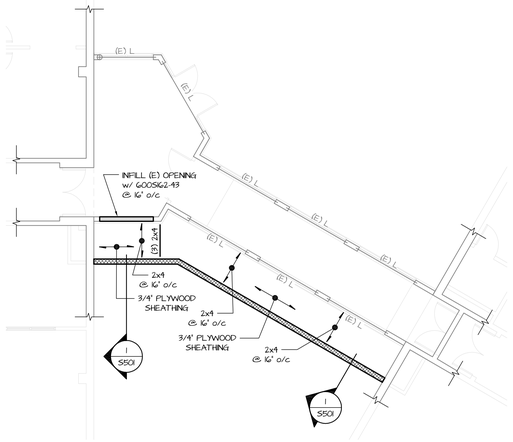
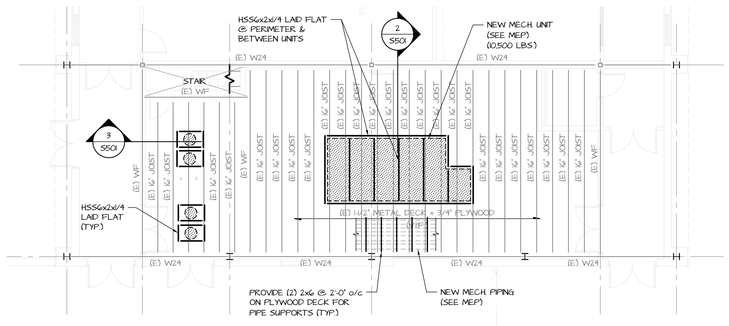
S100



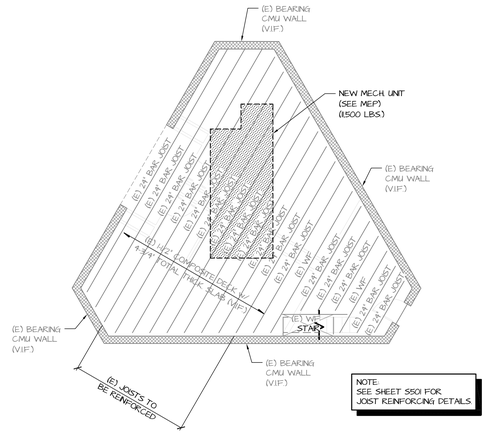
A S101 PARTIAL FOUNDATION PLAN SCALE: 1/8" = 1'-0"



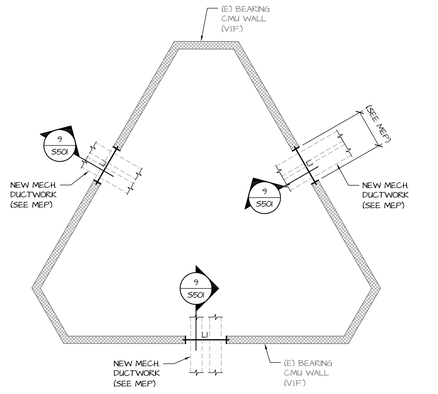
B S101 PARTIAL FRAMING PLAN SCALE: 1/8" = 1'-0"



C S101 PARTIAL MEZZANINE FRAMING PLAN SCALE: 1/8" = 1'-0"



D S101 PARTIAL MEZZANINE FRAMING PLAN SCALE: 1/8" = 1'-0"



E S101 NEW WALL OPENING PLAN SCALE: 1/8" = 1'-0"

NOTES:
1. LI INDICATES (2) L6x4x5/16 (LLV) w/ 3/8"ϕ x 7" PLATE SEE 9/S501 FOR ADDITIONAL INFORMATION
2. COORDINATE WALL PENETRATIONS FOR NEW DUCTWORK w/ MECHANICAL DRAWINGS.

REVISIONS

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PARTIAL FOUNDATION AND FRAMING PLANS

DESIGN BY	FMY
CHECKED BY	JRB
SCALE	AS NOTED
JOB NO.	24008B
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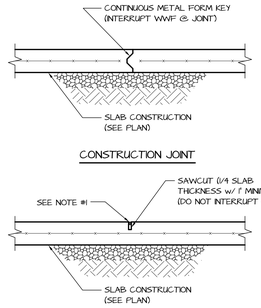
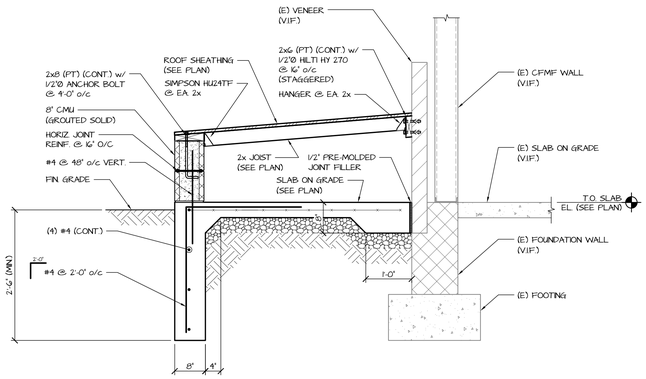
S101

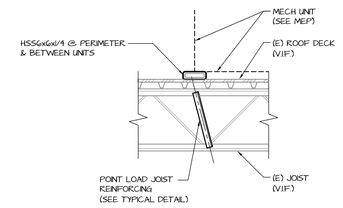


TYPICAL SLAB ON GRADE JOINT DETAILS

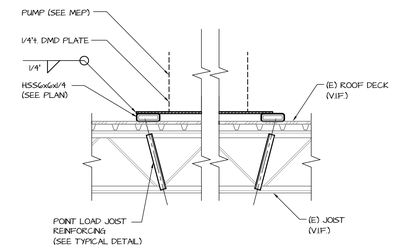
NOTES:
1. PROVIDE SEMIRIGID FILLER @ HIGH VEHICLE TRAFFIC AREAS.
2. CONSTRUCTION JOINTS & CONTROL JOINTS SHALL CREATE PANELS OF 225sqFt (MAX.) LENGTH TO WIDTH RATIO NOT TO EXCEED 1½ : 1
3. SAWCUT INTERIOR SLABS WITHIN 24 HOURS OF CONCRETE POUR. SAWCUT EXTERIOR SLABS WITHIN 12 HOURS OF CONCRETE POUR OR COVER TO PREVENT EXCESSIVE MOISTURE EVAPORATION



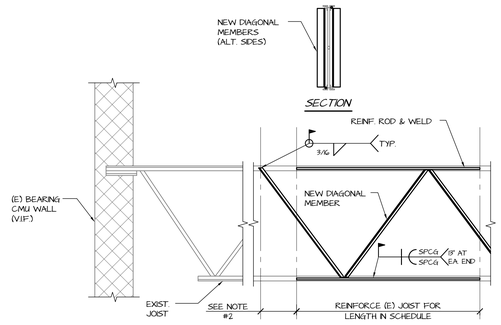
SECTION 1 / S501



DETAIL 2 / S501



DETAIL 3 / S501



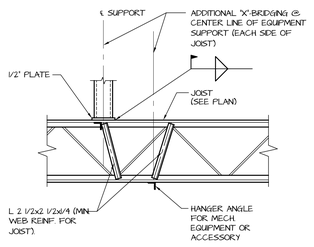
TYPICAL JOIST REINFORCEMENT SCHEDULE

MARK	REINFORCING STEEL			WELD	SPACING	DIAGONAL MEMBER	
	SIZE	LENGTH*	LOCATION**			SIZE	LENGTH
1	5/8"Ø	FULL	T. & B., NS-1	-	2" @ 8"	L2x2x1/4	FULL

* INDICATES PORTION OF JOIST SPAN WHICH REQUIRES REINFORCING MEMBERS. SEE PLAN FOR (0'-0")
** INDICATES T-TOP, B- BOTTOM, NS-1 SIDE, BS-2 SIDES

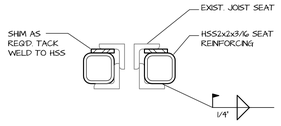
NOTES:
1. STROKE EXISTING JOISTS DURING REINFORCING PROCESS.
2. CONTINUE DIAGONAL REINF. TO NEXT PANEL POINT PAST REINF. LENGTH.

DETAIL 4 / S501



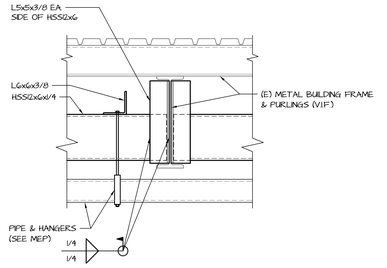
TYPICAL JOIST REINFORCING DETAIL
@ CONCENTRATED LOAD

DETAIL 5 / S501

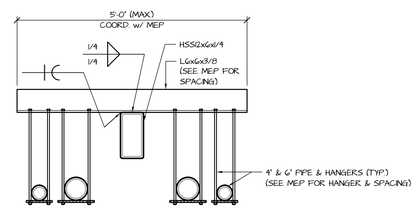


JOIST SEAT REINFORCING DETAIL

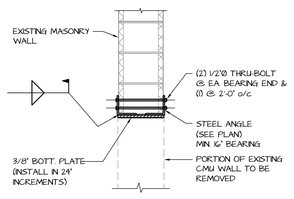
DETAIL 6 / S501



SECTION 7 / S501



SECTION 8 / S501

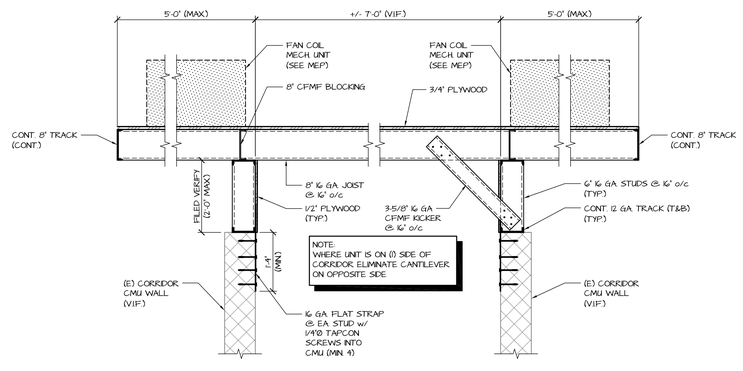


ERECTION SEQUENCE:

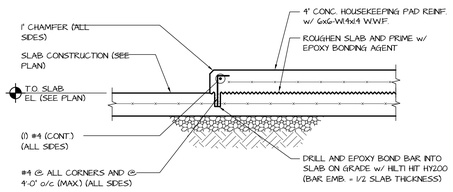
1. SAWCUT 4" SLOT ON ONE SIDE.
2. INSTALL ANGLE ON ONE SIDE.
3. REPEAT STEPS 1 & 2 ON OTHER SIDE.
4. INSTALL THRU-BOLTS.
5. INSTALL & WELD 3/8" PLATE TO UNDERSIDE OF ANGLES IN 2'-0" INCREMENTS AS WALL IS REMOVED.

INSTALLATION OF NEW LINTEL
IN EXISTING WALL DETAIL

SECTION 9 / S501



SECTION 10 / S501



TYPICAL HOUSEKEEPING PAD DETAIL

NOTE:
1. COORDINATE PAD SIZE AND LOCATION w/ MECHANICAL DRAWINGS.

DETAIL 11 / S501

REVISIONS

no.	date	comments

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BID DOCUMENTS

TYPICAL DETAILS
AND SECTONS

DESIGN BY	FMY
CHECKED BY	JRB
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

S501

CODE REVIEW

APPLICABLE CODES FOR PROJECT:

BUILDING	2021 INTERNATIONAL BUILDING CODE (IBC)
EXISTING	2018 INTERNATIONAL EXISTING BUILDING CODE (IEBC)
LIFE SAFETY	2021 NFPA 101 LIFE SAFETY CODE
ACCESSIBILITY	2009 ICC/ANSI A117.1, ADAAG
PLUMBING	2018 INTERNATIONAL PLUMBING CODE (IPC)
MECHANICAL	2018 INTERNATIONAL MECHANICAL CODE (IMC)
ELECTRICAL	2018 INTERNATIONAL ELECTRICAL CODE (IEC)
ENERGY	2018 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)
FIRE	DELAWARE STATE FIRE PREVENTION REGULATIONS

MECHANICAL ABBREVIATIONS

ABBREV.	DEFINITION	ABBREV.	DEFINITION
AFF	ABOVE FINISHED FLOOR	L	LOUVER
AFG	ABOVE FINISHED GRADE	LAT	LEAVING AIR TEMPERATURE
AHU	AIR HANDLING UNIT	LBS	POUNDS
APD	AIR PRESSURE DROP	LF	LINEAR FOOT
APPROX	APPROXIMATELY	LFT	LEAVING FLUID TEMPERATURE
ARCH	ARCHITECTURAL	LWT	LEAVING WATER TEMPERATURE
BFP	BACKFLOW PREVENTER	MAX	MAXIMUM
BLHP	BOILER HORSEPOWER	MAU	MAKE-UP AIR UNIT
BHP	BRAKE HORSEPOWER	MBH	BTU PER HOUR (THOUSAND)
BTU	BRITISH THERMAL UNIT	MECH	MECHANICAL
BTUH	BRITISH THERMAL UNITS/HOUR	MIN	MINIMUM
C	CLOSED	MOCP	MAX. OVERCURRENT PROTECTION
CAP	CAPACITY	MOD	MOTORIZED DAMPER
CCMS	CENTRAL CONTROL MONITORING STATION	NC	NORMALLY CLOSED
CCW	COUNTER CLOCKWISE	NO	NORMALLY OPEN
CFM	CUBIC FEET PER MINUTE	NC	NOISE CRITERIA
CONT	CONTINUATION	NO./#	NUMBER
COP	COEFFICIENT OF PERFORMANCE	OA	OUTSIDE AIR
CU	CONDENSING UNIT	OAF	OUTSIDE AIR FAN
CUH	CABINET UNIT HEATER	OAT	OUTSIDE AIR TEMPERATURE
CUR	CURTAIN	OED	OPEN END DUCT
CW	CLOCKWISE	PD	PRESSURE DROP
CHWR	CHILLED WATER RETURN	PG	PROPYLENE GLYCOL
CHWS	CHILLED WATER SUPPLY	PSI	POUNDS PER SQUARE INCH
DB	DRY BULB	PRV	POWER ROOF VENTILATOR
DC	DUCT HEATING COIL (HYDRONIC)	RAF	RETURN AIR FAN
DD	DUCT DETECTOR	RE-CIRC	RECIRCULATING
DEPT	DEPARTMENT	REG	REGISTER
DIFF	DIFFUSER	REQ'D	REQUIRED
DN	DOWN	RH	RELIEF HOOD
DWG	DRAWING	RH	RELATIVE HUMIDITY
DWM	DOMESTIC WATER METER	RLF	RELIEF AIR FAN
EAT	ENTERING AIR TEMPERATURE	RM	ROOM
ECON	ECONOMIZER	RPM	REVOLUTIONS PER MINUTE
EDC	ELECTRIC DUCT COIL	RTU	ROOFTOP UNIT
EER	ENERGY EFFICIENCY RATIO	SB	STAND-BY
EF	EXHAUST FAN	SECT	SECTION
EFF	EFFICIENCY	SENS	SENSIBLE
ELEC CHAR	ELECTRICAL CHARACTERISTICS	SF	SUPPLY AIR FAN
EQUIP	EQUIPMENT	SL	SOUND LINING
ERHP	ELECTRIC RADIANT HEAT PANEL	SP	STATIC PRESSURE
ERV	ENERGY RECOVERY VENTILATOR	SPC	STATIC PRESSURE CONTROLLER
ESP	EXTERNAL STATIC PRESSURE	SPLY	SUPPLY
EX	EXISTING	SQ	SQUARE
EXH	EXHAUST	SS	STAINLESS STEEL
EXP	EXPANSION JOINT	STD	STANDARD
EFT	ENTERING FLUID TEMPERATURE	STOR	STORAGE
EWT	ENTERING WATER TEMPERATURE	SWT	SUPPLY WATER TEMPERATURE
°F	DEGREES FAHRENHEIT	TEMP	TEMPERATURE
FCU	FAN COIL UNIT	THD	TOP HORIZONTAL DISCHARGE
FLA	FULL LOAD AMPS	T-OA	OUTSIDE TEMPERATURE SENSOR
FMF	FLOW METER FITTING	TONS	TONS OF REFRIGERATION
FPM	FEET PER MINUTE	TYP	TYPICAL
FPP	FREEZE PROTECTION PUMP	UH	UNIT HEATER
FT H2O	FEET WATER GAUGE	V	VOLTS
FZ	FREEZE STAT	VAV	VARIABLE AIR VOLUME
GPM	GALLONS PER MINUTE	VEL	VELOCITY
HC	HANDICAPPED	VF	VENTILATION FAN
HP	HEAT PUMP	VSD	VARIABLE SPEED DRIVE
HP	HORSEPOWER	VTR	VENT THROUGH ROOF
HPI	HEAT PUMP (INDOOR)	W/	WITH
HPO	HEAT PUMP (OUTDOOR)	WB	WET BULB
HWR	HEATING WATER RETURN	WG	WATER GAUGE
HWS	HEATING WATER SUPPLY	WPD	WATER PRESSURE DROP
HT	HEIGHT	WTR	WATER
HZ	HERTZ	%	PERCENT
IH	INTAKE HOOD	ø	PHASE
IN H2O	INCHES WATER GAUGE	DELTA P	PRESSURE DIFFERENCE
IW	INDIRECT WASTE	DELTA T	TEMPERATURE DIFFERENCE
KW	KILOWATT		

MECHANICAL LEGEND

SYMBOL	ABBREV.	DEFINITION
	SA	SUPPLY AIR DUCT UP,DOWN
	RA	RETURN AIR DUCT UP,DOWN
	EA	EXHAUST AIR DUCT UP,DOWN
	OA	OUTSIDE AIR DUCT UP,DOWN
		RECT. TO ROUND TRANSITION
		DUCT TRANSITION
		FLEXIBLE CONNECTION (DUCTWORK)
		FLEXIBLE DUCT
	AMS	AIR MONITORING STATION
		SOUND ATTENUATOR
	SL	SOUND LINING
		ELBOW W/ TURNING VANES
		RADIUS ELBOW
	VD	MANUAL VOLUME DAMPER
	FD	FIRE DAMPER
	MOD	MOTOR OPERATED DAMPER
	DD	DUCT SMOKE DETECTOR
DPC	DPC	DIFFERENTIAL PRESSURE CONTROLLER
DPS	DPS	DIFFERENTIAL PRESSURE SENSOR
SPC	SPC	STATIC PRESSURE CONTROLLER
SPS	SPS	STATIC PRESSURE SENSOR
T	T'STAT	TEMPERATURE SENSOR WITH GUARD
H	HUMIDISTAT	RELATIVE HUMIDITY SENSOR WITH GUARD
CO	CO	CARBON MONOXIDE SENSOR
CO_2	CO_2	CARBON DIOXIDE SENSOR WITH GUARD
AS		AQUASTAT
S		SWITCH
ATC	ATC	AUTOMATIC TEMPERATURE CONTROL PANEL
	UH	UNIT HEATER
	C.O.	BREECHING CLEANOUT
		BLIND FLANGE
		FLEXIBLE HOSE
RS	RS	REFRIGERANT SUCTION
RL	RL	REFRIGERANT LIQUID
HWS	HWS	HEATING WATER SUPPLY
HWR	HWR	HEATING WATER RETURN
CHWS	CHWS	CHILLED WATER SUPPLY
CHWR	CHWR	CHILLED WATER RETURN
CD	CD	A/C CONDENSATE DRAIN
NG	NG	NATURAL GAS PIPING
#		DRAWING NOTE - DEMOLITION
#		DRAWING NOTE - NEW WORK
		SHUT-OFF VALVE
		GLOBE VALVE
		BALANCING VALVE
		VENTURI FLOW METER FITTING
		MULTI-PURPOSE VALVE
		CHECK VALVE
		3-WAY MODULATING VALVE (ATC)
		2-WAY MODULATING VALVE (ATC)
		PRESSURE REDUCING VALVE
		NEEDLE VALVE
		PRESSURE RELIEF OR SAFETY VALVE

SYMBOL	ABBREV.	DEFINITION
		STRAINER W/HOSE END DRAIN VALVE AND CAP
		HOSE END DRAIN VALVE
		MANUAL AIR VENT
		PRESSURE GAUGE W/NEEDLE VALVE AND SNUBBER
		COMB. SHUT-OFF/BALANCE VALVE WITH MEMORY (CIRCUIT SETTER)
		THERMOMETER
		UNION
		FLANGE
		CONCENTRIC REDUCER
		ECCENTRIC REDUCER
		FLEXIBLE CONNECTION (PIPING)
		AUTOMATIC AIR VENT
		FLO-CONTROL VALVE
		BACKFLOW PREVENTER MAKE-UP WATER SYSTEM
		AUTOMATIC FLOW CONTROL VALVE
		PIPE ALIGNMENT GUIDE
		PIPE ANCHOR
		EXPANSION LOOP
		PIPE - TURN DOWN
		PIPE - TURN UP
		PIPE - BOTTOM TAKE OFF
		PIPE - TOP TAKE OFF
		SOLENOID VALVE (GAS)
		END CAP
		DIRECTION OF FLOW
	FS	FLOW SWITCH
		GAUGE VALVE
	CW	COLD WATER
	HW	DOMESTIC HOT WATER
	HWR	DOMESTIC HOT WATER RECIRCULATING
	CX	CONNECT TO EXISTING
	RX	REMOVE EXISTING (ENDS HERE)
	PC	PUMPED CONDENSATE
X / XXX		PART PLAN NO. / DRAWING NO. — PART PLAN DESIGNATION
#		KITCHEN EQUIPMENT TAG
TYPE / CFM / SDS1 / CFM / 12X12 / 24X24 / MODULE SIZE / NECK SIZE		SUPPLY AIR DEVICE TAG
TYPE / CFM / RDS1 / CFM / 12"Ø / NECK SIZE		ROUND SUPPLY AIR DEVICE TAG
TYPE / CFM / SDS1 / CFM / 12X12 / NECK SIZE / 8'-0" A.F.F. / ELEV. CENTER OF FACE		SIDEWALL AIR DEVICE TAG
TYPE / CFM / RDS1 / CFM / 12X12 / 24X24 / MODULE SIZE / NECK SIZE		RETURN AIR DEVICE TAG
TYPE / CFM / RDS1 / CFM / 12X12 / 24X24 / MODULE SIZE / NECK SIZE		EXHAUST AIR DEVICE TAG

NOTE:
1. NOT ALL ITEMS WITHIN LEGEND MAY BE UTILIZED ON THIS PROJECT.

REVISIONS

no.	date	comments

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HVAC RENOVATIONS
SRS 2503

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133 THOMAS MORE DR,
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SUBMISSION

BID DOCUMENTS

LEGEND AND ABBREVIATIONS HVAC

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

M001

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. SEE PART PLAN #1 ON MD202 FOR CONTINUATION.
2. REMOVE DUCT TO POINT INDICATED AND PERMANENTLY CAP.
3. REMOVE THERMOSTAT, CONTROL WIRING AND/OR TUBING.
4. REMOVE PTAC AND ALL ASSOCIATED PIPING, CONTROLS, LOUVER AND SUPPORTS. PATCH, PAINT AND REPAIR WALL AS NEEDED.
5. REMOVE ELECTRIC HEATER AND ALL ASSOCIATED WIRING AND CONTROLS.
6. REMOVE DUCT TO POINT INDICATED AND TEMPORARILY CAP FOR FUTURE CONNECTION UNDER NEW WORK.
7. REMOVE DUCT AND ALL ASSOCIATED SUPPORTS, DAMPERS, INSULATION AND AIR DEVICES.
8. REMOVE CONDENSATE PIPING AND ALL ASSOCIATED SUPPORTS.

CHAPEL 401 E
VESTIBULE 001 H
MENS BATHROOM 053 F
CLOS. 053A F
ENTRY 051 G
WOMENS BATHROOM 052 F
CLOS. 052A F
LOBBY 002 G
WAITING 050 A
RECEPTION 049 A
STUDENT SERVICES A 048 A
STUDENT SERVICES B 046 A
DEAN OF STUDENTS 042 A
ACHIEVEMENT LIAISON TEACHER 041 A
PRINCIPAL SECRETARY 038 A
PRINCIPAL OFFICE 039 A
SECRETARY 047 A
ARCHIVES 045 A
CORRIDOR 036 A
ADMIN. STORAGE 044 A
WORK ROOM 043 A
TOILET 040 F
PRINCIPAL CONFERENCE 037 A
VESTIBULE 035 H
CORRIDOR 031 A
MEDIA CENTER 032 A
BROADCAST / DIST. LEARN. 034 B
WORK / OFFICE 033 A
ART OFFICE 012 A
SACRISTY 005 A
VEST. 004 E
PROJECT STORAGE 013 B
CLOSET 005A A
BOOK STOR. 007 B
WORK ROOM 006 A
JAN. CLOSET 010 D
ELEC. ROOM 008 D
CLASSROOM 405
CLASSROOM 403
VESTIBULE 014 H
CORRIDOR 009 A
CLASSROOM 404
CLASSROOM 402
OFFICE 017 I
OFFICE 018 I
OFFICE 019 I
CORR. 017A A
MUSIC LIBRARY 084 A
MUSIC STORAGE 084B
MUSIC OFFICE 020 A
STORAGE 022 B
CAFETORIUM 021 B
KITCHEN 025 J
DISHWASH 025A J
PANTRY 026 B
CORR. 023 B
FACULTY LUNCH ROOM 029 A
CORR. 030 B
TOILET 084F
MECH. / ELEC. 027 D
MAINTENANCE 028 D
VEST. 024 B
VEST. 030 B
PTAC
LOBBY 001
MATCHLINE - SEE MD101B
EAST COURTYARD
NOT IN SCOPE
30X22 REGISTER
ELECTRIC UNIT HEATER
EXISTING CO PIPE DISCHARGED TO PAVEMENT
WALL CAP
36X12 OUTSIDE AIR INTAKE LOUVER (11" A.F.F.)

PARTIAL FIRST FLOOR PLAN - AREA A - HVAC - DEMOLITION

KEY PLAN

SCALE: 1/8" = 1'-0"
8 0 8 16

REVISIONS

no.	date	comments

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SUBMISSION

BID DOCUMENTS

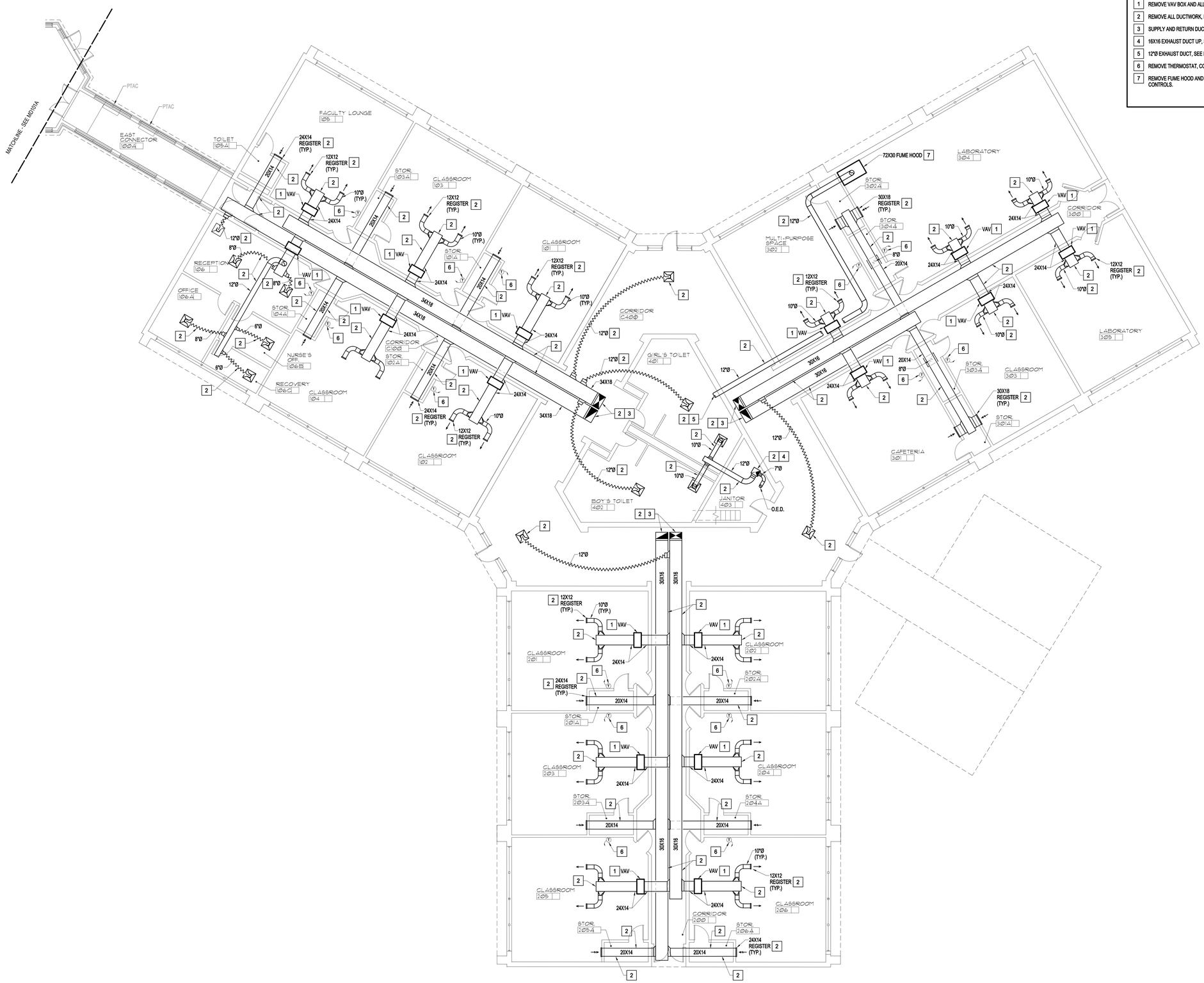
PARTIAL FIRST FLOOR PLAN AREA A HVAC DEMOLITION

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

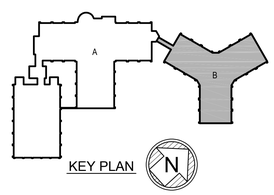
MD101A

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. REMOVE VAV BOX AND ALL ASSOCIATED DUCT, CONTROLS, INSULATION AND SUPPORTS.
2. REMOVE ALL DUCTWORK, INSULATION, DAMPERS, SUPPORTS AND AIR DEVICES.
3. SUPPLY AND RETURN DUCT UP, SEE PART PLAN #2 ON MD202 FOR CONTINUATION.
4. 16X16 EXHAUST DUCT UP, SEE PART PLAN #2 ON MD202 FOR CONTINUATION.
5. 12"Ø EXHAUST DUCT, SEE PART PLAN #2 ON MD202 FOR CONTINUATION.
6. REMOVE THERMOSTAT, CONTROL WIRING AND/OR TUBING.
7. REMOVE FUME HOOD AND ALL ASSOCIATED DUCTWORK, PIPING, SUPPORTS, INSULATION AND CONTROLS.



PARTIAL FIRST FLOOR PLAN - AREA B - HVAC - DEMOLITION



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

8 0 8 16

REVISIONS

no.	date	comments

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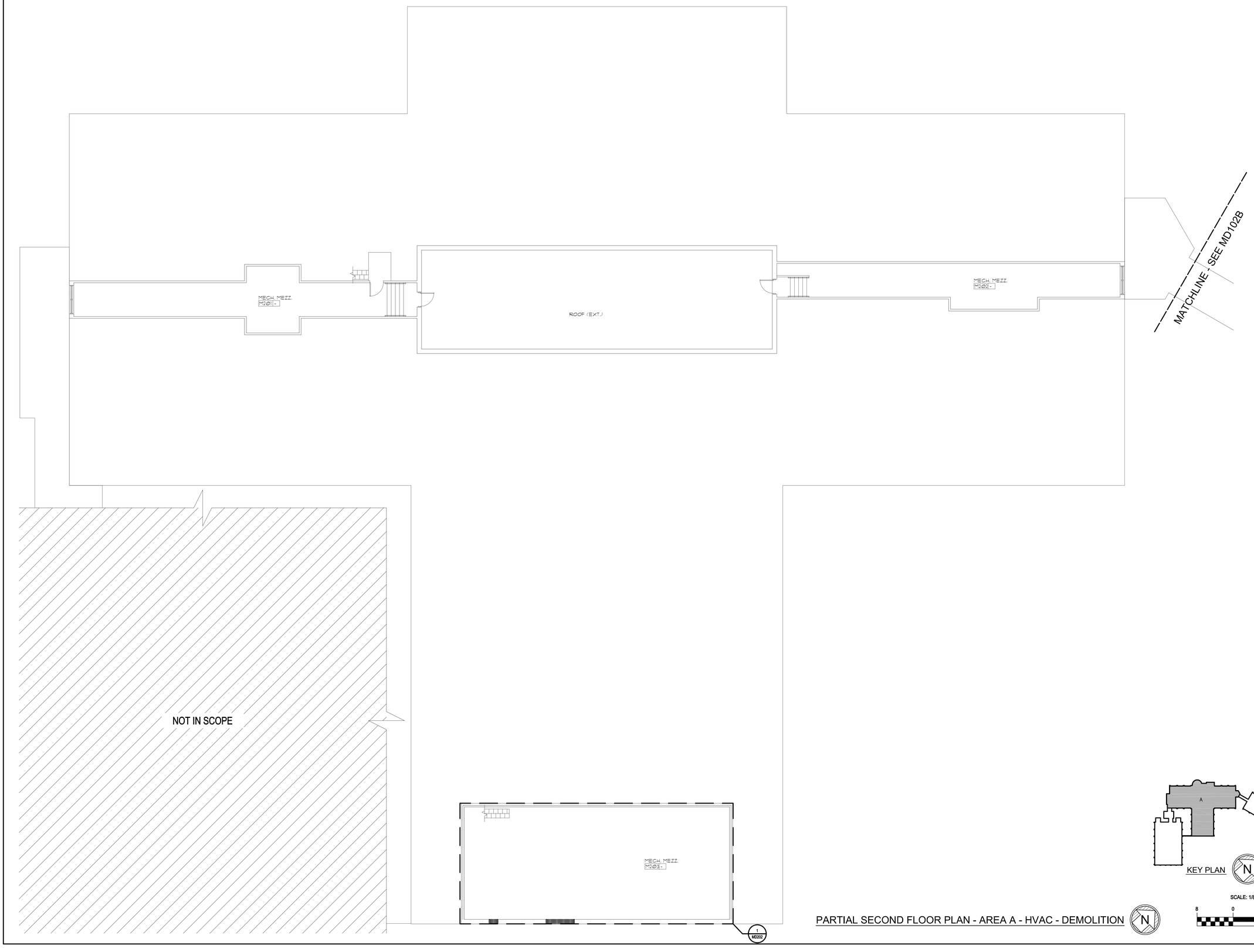
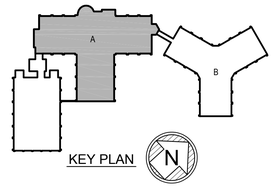
PARTIAL FIRST FLOOR PLAN AREA B HVAC DEMOLITION

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

MD101B



PARTIAL SECOND FLOOR PLAN - AREA A - HVAC - DEMOLITION



KEY PLAN

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

8 0 8 16

REVISIONS

no.	date	comments

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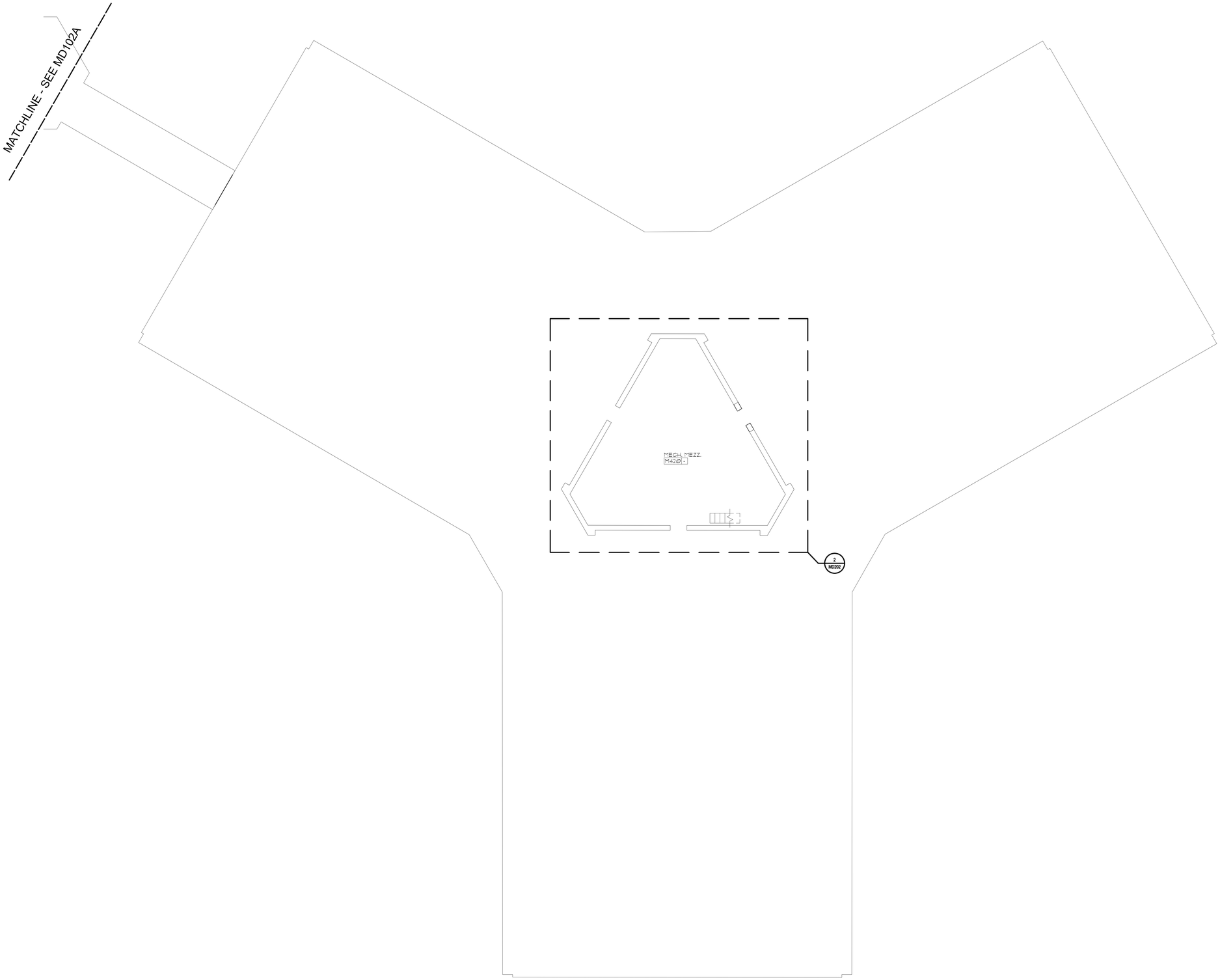
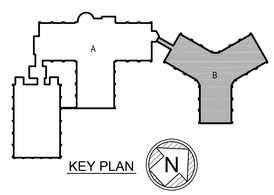
PARTIAL SECOND FLOOR PLAN
AREA A
HVAC
DEMOLITION

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

MD102A



PARTIAL SECOND FLOOR PLAN - AREA B - HVAC - DEMOLITION



KEY PLAN

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

8 0 8 16

REVISIONS

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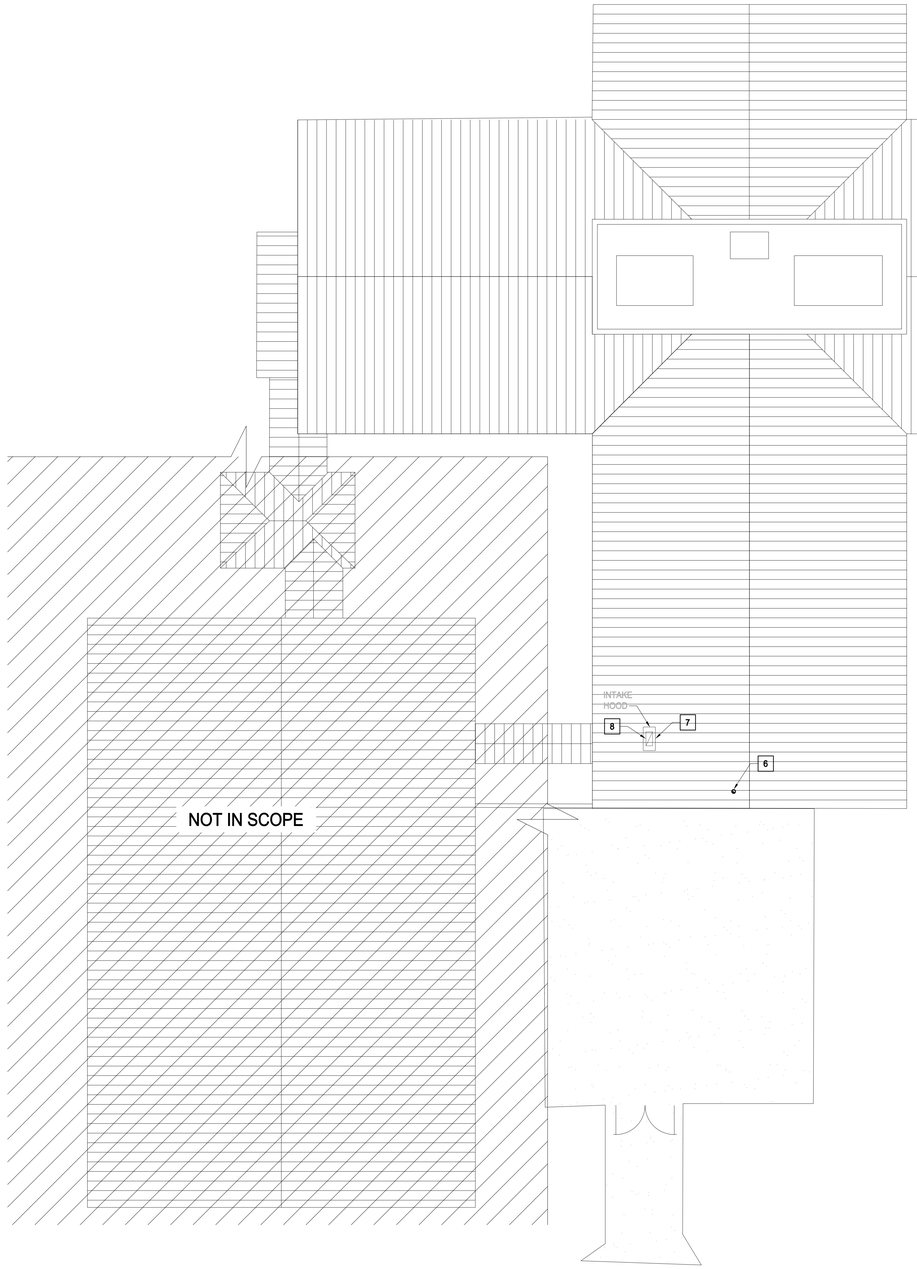
PARTIAL SECOND FLOOR PLAN
AREA B
HVAC
DEMOLITION

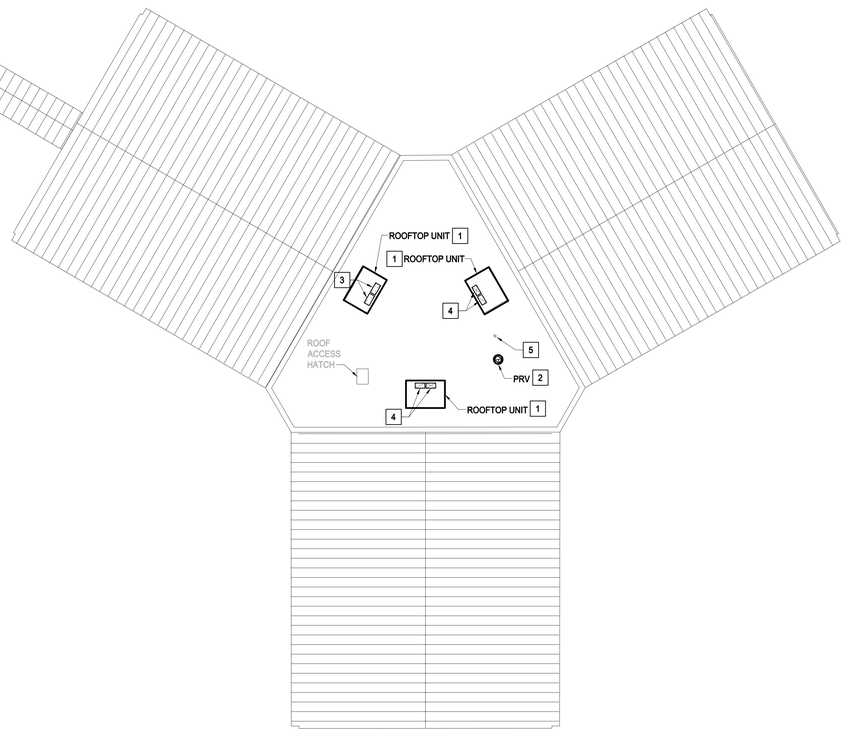
DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

MD102B

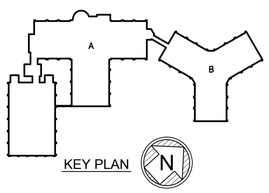
DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. REMOVE ROOF TOP AIR HANDLING UNIT AND ALL ASSOCIATED DUCT, PIPING, CONTROLS, INSULATION AND SUPPORTS. CAP ROOF CURB UNDER NEW WORK.
2. REMOVE EXHAUST FAN AND ALL ASSOCIATED DUCT, DAMPERS SUPPORTS, CONTROLS AND LOUVERS, CAP ROOF CURB UNDER NEW WORK.
3. 34X18 SUPPLY AND RETURN DUCT DOWN, SEE PART PLAN #2 ON MD202 FOR CONTINUATION.
4. 30X16 SUPPLY AND RETURN DUCT DOWN, SEE PART PLAN #2 ON MD202 FOR CONTINUATION.
5. EXISTING 4"Ø WATER HEATER FLUE TERMINATION, SEE PART PLAN #2 ON MD202 FOR CONTINUATION DOWN.
6. REMOVE 12" GAS FURNACE FLUE DUCT AND PATCH/REPAIR ROOF PENETRATION, SEE PART PLAN #1 ON MD202 FOR CONTINUATION DOWN.
7. EXISTING OUTSIDE AIR INTAKE HOOD TO REMAIN FOR USE UNDER NEW WORK.
8. 44X21 O.A. DUCT DOWN, SEE PART PLAN #1 ON MD202 FOR CONTINUATION.





ROOF PLAN - AREA A & B - HVAC - DEMOLITION



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

16 8 0 16 32

REVISIONS

no.	date	comments

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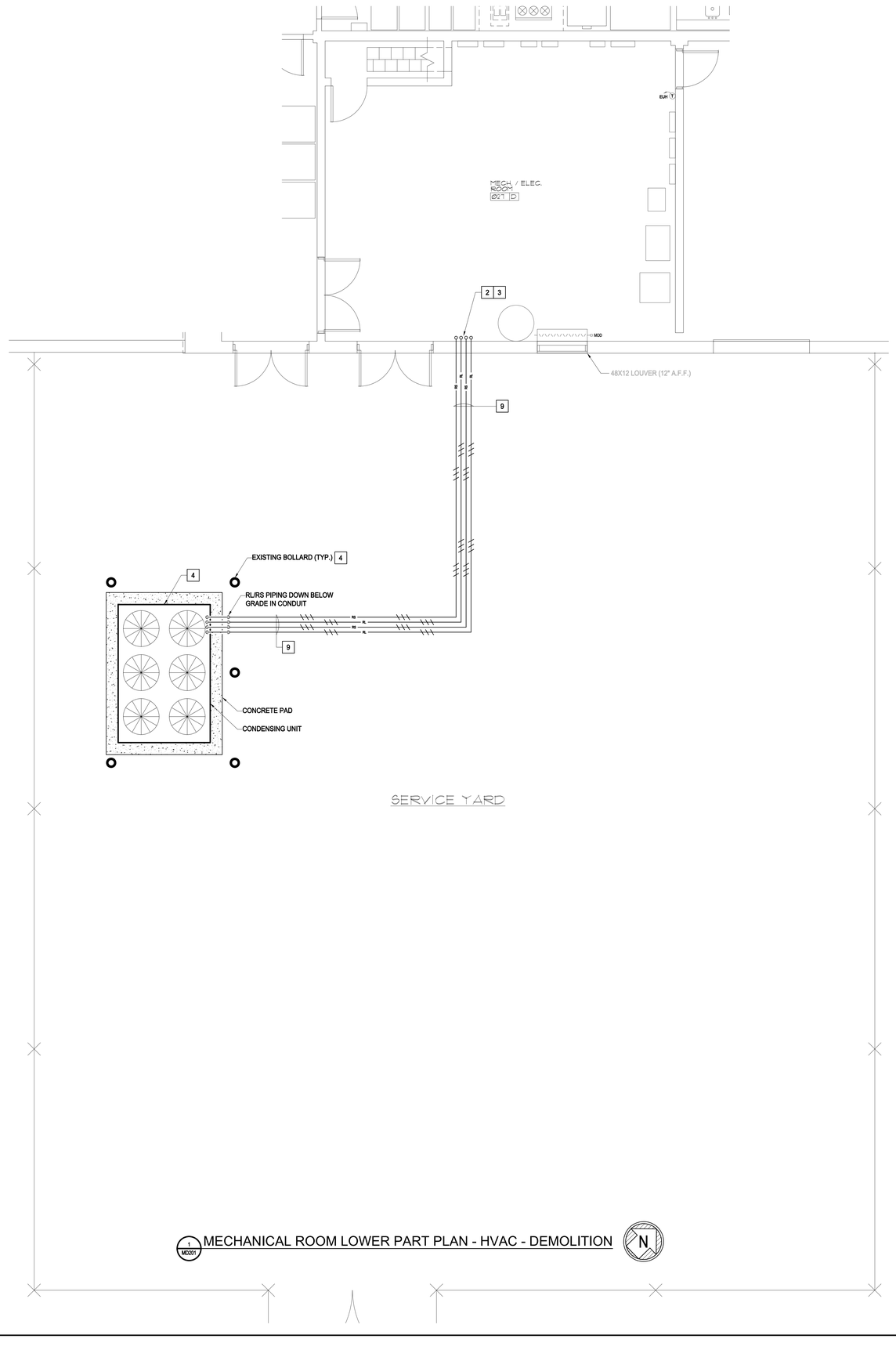
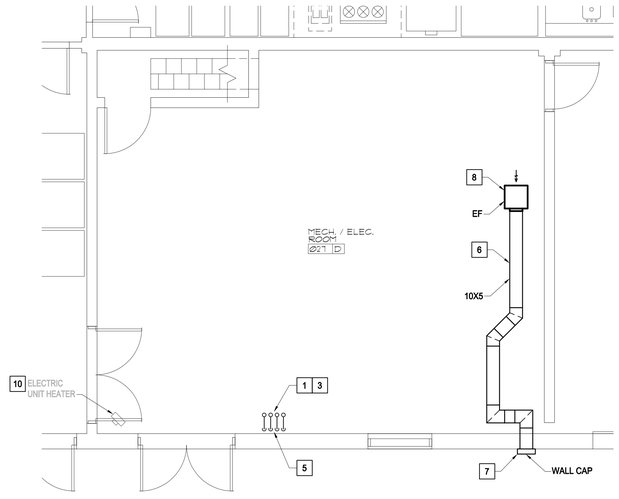
ROOF PLAN
HVAC
DEMOLITION

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

MD103



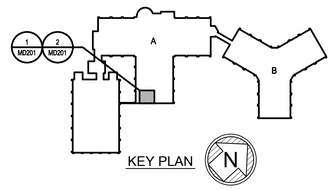
1 MD201 MECHANICAL ROOM LOWER PART PLAN - HVAC - DEMOLITION



2 MD201 MECHANICAL ROOM UPPER PART PLAN - HVAC - DEMOLITION

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. RL/RS PIPING UP, SEE PART PLAN #1 ON MD202 FOR CONTINUATION.
2. RL/RS PIPING UP AND DOWN DOWN BELOW GRADE, SEE UPPER PART PLAN ON THIS SHEET FOR CONTINUATION UP.
3. REMOVE ALL PIPING AND ASSOCIATED SUPPORTS, INSULATION AND VALVING.
4. REMOVE CONDENSING UNIT AND ALL ASSOCIATED PIPING, SUPPORTS, VALVES, WIRING, CONTROLS, INSULATION, CONCRETE PAD, BOLLARDS, AND CONTROLS.
5. RL/RS PIPING DOWN, SEE LOWER PART PLAN THIS SHEET FOR CONTINUATION.
6. REMOVE ALL DUCT AND ASSOCIATED SUPPORTS AND INSULATION.
7. REMOVE WALL CAP AND ALL ASSOCIATED DUCT, PATCH AND PAINT WALL TO MATCH EXISTING.
8. REMOVE EXHAUST FAN AND ALL ASSOCIATED DUCT, DAMPERS, SUPPORTS AND CONTROLS.
9. REMOVE BELOW GRADE PIPING AND CONDUIT. CAP CONDUIT AT BUILDING FOUNDATION. PATCH AND REPAIR ASPHALT TO MATCH EXISTING ADJACENT CONSTRUCTION.
10. REMOVE, SALVAGE AND REINSTALL ELECTRIC UNIT HEATER IN NEW LOCATION, SEE NEW WORK PLANS.



KEY PLAN

SCALE: 1/4" = 1'-0"

4 0 4 8

REVISIONS

no.	date	comments

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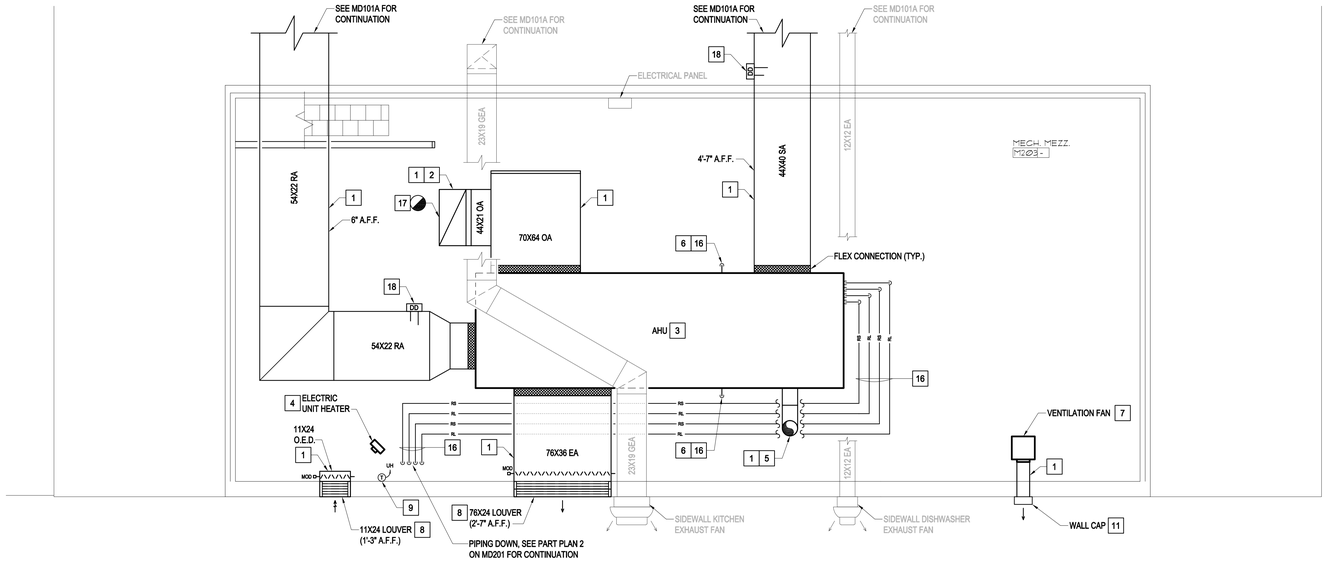
BID DOCUMENTS

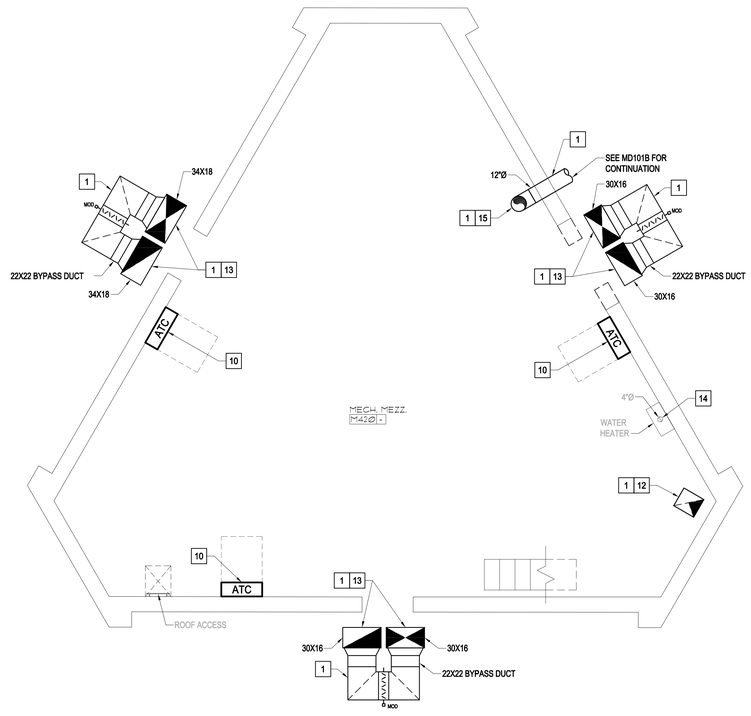
MECHANICAL ROOM
PART PLANS
HVAC
DEMOLITION

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

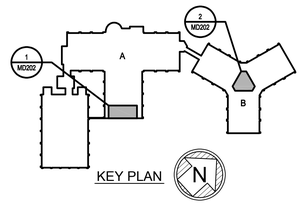
MD201



1 MD202 MEZZANINE PART PLAN - HVAC - DEMOLITION



2 MD202 MEZZANINE PART PLAN - HVAC - DEMOLITION



SCALE: 1/4" = 1'-0"

4 0 4 8

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. REMOVE DUCT AND ALL ASSOCIATED SUPPORTS, DAMPERS AND INSULATION.
2. 44X21 DUCT UP TO ROOF HOOD ON ROOF, SEE MD103 FOR CONTINUATION.
3. REMOVE AIR HANDLING UNIT AND ALL ASSOCIATED DUCT, PIPING, CONTROLS, INSULATION AND SUPPORTS.
4. REMOVE ELECTRIC HEATER AND ALL ASSOCIATED SUPPORTS, WIRING AND CONTROLS.
5. 12"Ø GAS FURNACE FLUE UP THROUGH ROOF TO TERMINATION, SEE MD103 FOR CONTINUATION.
6. 1" CONDENSATE DOWN, SEE MD101A FOR CONTINUATION.
7. REMOVE VENTILATION FAN AND ALL ASSOCIATED DUCT, DAMPERS, SUPPORTS, CONTROLS AND LOUVERS.
8. REMOVE LOUVER AND ALL ASSOCIATED DUCT.
9. REMOVE THERMOSTAT, CONTROL WIRING AND/OR TUBING.
10. REMOVE ATC PANEL AND ASSOCIATED CONTROLS, WIRING AND SUPPORTS.
11. REMOVE WALL CAP AND ALL ASSOCIATED DUCT, PATCH AND PAINT WALL TO MATCH EXISTING.
12. 16X16 EXHAUST DUCT UP THROUGH ROOF TO EXHAUST FAN AND DOWN TO FIRST FIRST FLOOR. SEE MD103 FOR CONTINUATION UP, SEE MD101B FOR CONTINUATION DOWN.
13. SUPPLY AND RETURN DUCT UP THROUGH ROOF TO AHU AND DOWN TO FIRST FLOOR. SEE MD103 FOR CONTINUATION UP, SEE MD101B FOR CONTINUATION DOWN.
14. 4"Ø WATER HEATER FLUE UP THROUGH ROOF TO TERMINATION, SEE MD103D FOR CONTINUATION.
15. 12"Ø FUME HOOD EXHAUST UP TO UNDERSIDE OF ROOF AND CAPPED. FUME HOOD FAN HAS BEEN REMOVED.
16. REMOVE ALL PIPING AND ASSOCIATED SUPPORTS, INSULATION AND VALVING.
17. REMOVE DUCT UP TO UNDERSIDE OF ROOF INTAKE HOOD AND TEMPORARILY CAP FOR FUTURE USE UNDER NEW WORK.
18. REMOVE DUCT SMOKE DETECTOR AND ALL ASSOCIATED WIRING AND CONTROLS.

REVISIONS

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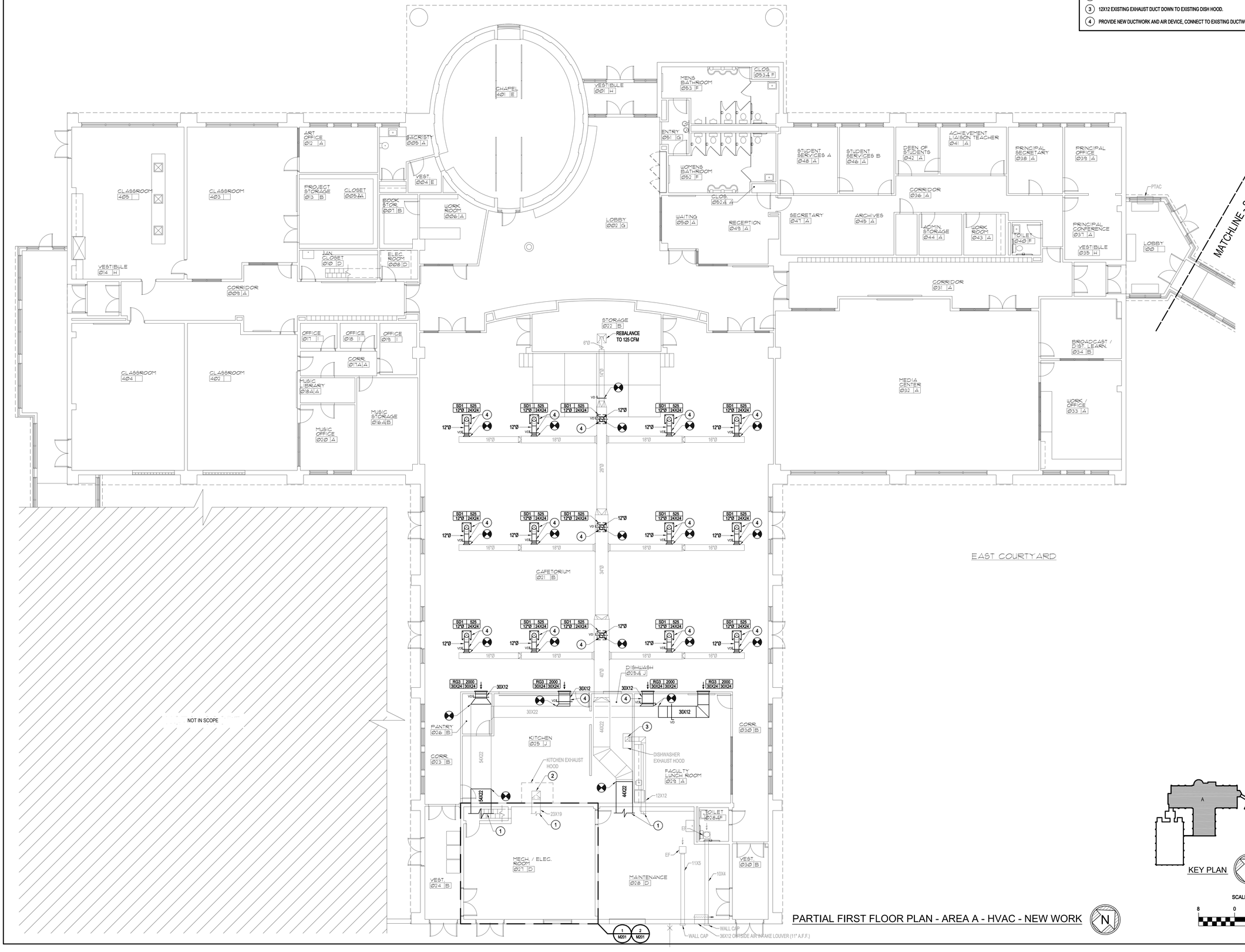
MEZZANINE PART PLANS
HVAC
DEMOLITION

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

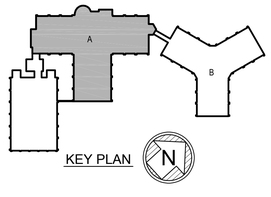
MD202

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. SEE PART PLAN #1 ON M202 FOR CONTINUATION.
2. 23X19 EXISTING GREASE EXHAUST DUCT DOWN TO EXISTING KITCHEN HOOD.
3. 12X12 EXISTING EXHAUST DUCT DOWN TO EXISTING DISH HOOD.
4. PROVIDE NEW DUCTWORK AND AIR DEVICE, CONNECT TO EXISTING DUCTWORK AS INDICATED.



PARTIAL FIRST FLOOR PLAN - AREA A - HVAC - NEW WORK



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

8 0 8 16

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MAGNOLIA, DE 19962

SUBMISSION

BID DOCUMENTS

PARTIAL FIRST FLOOR PLAN
AREA A
HVAC
NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

M101A

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. SEE PART PLAN #2 ON M202 FOR CONTINUATION.
2. UNIT FULL SIZE RETURN AIR CONNECTION PLENUM, MINIMUM 24 INCHES DEEP.

PARTIAL FIRST FLOOR PLAN - AREA B - HVAC - NEW WORK

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

8 0 8 16

REVISIONS

no.	date	comments

ENGINEER

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WO# 24008B

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Project No. 118.048

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MAGNOLIA MIDDLE SCHOOL
HVAC RENOVATIONS
SRS 2503

MAGNOLIA MIDDLE SCHOOL
133 THOMAS MORE DR,
MAGNOLIA, DE 19962

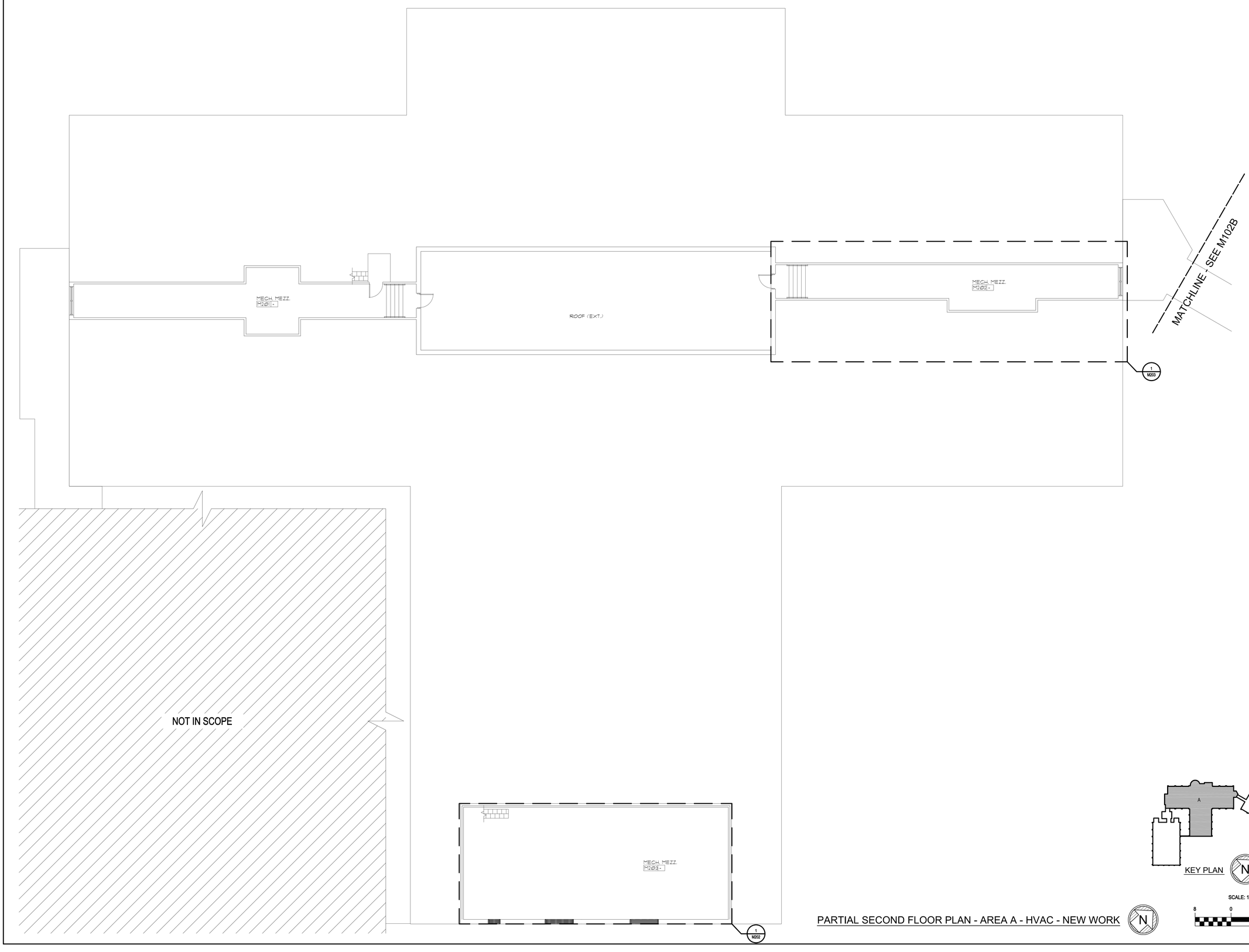
SUBMISSION

BID DOCUMENTS

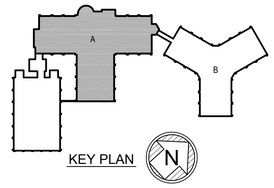
PARTIAL FIRST FLOOR PLAN
AREA B
HVAC
NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

M101B



PARTIAL SECOND FLOOR PLAN - AREA A - HVAC - NEW WORK



KEY PLAN

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

8 0 8 16

REVISIONS

no.	date	comments

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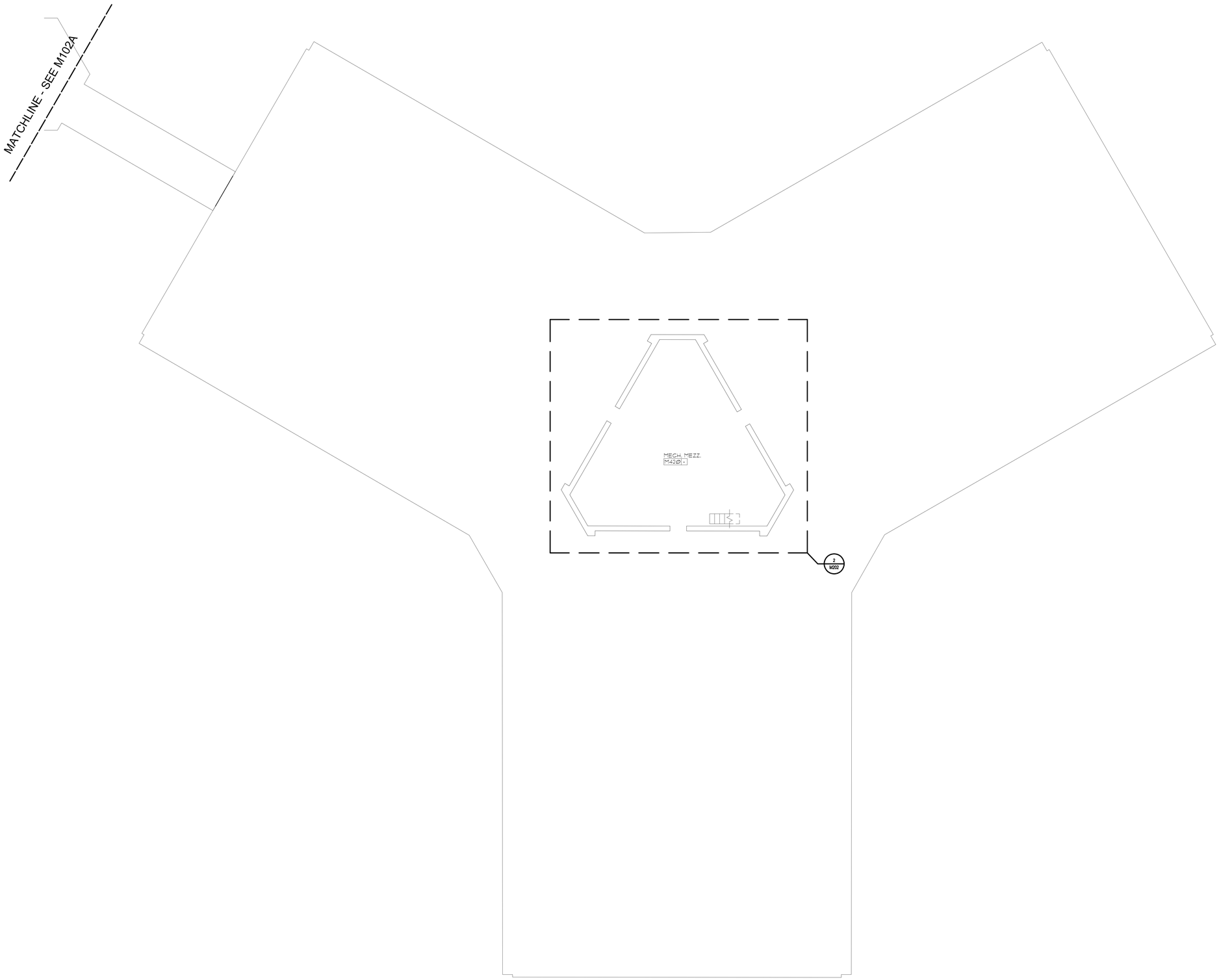
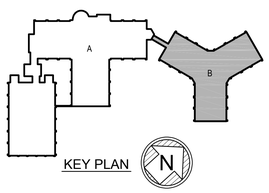
PARTIAL SECOND FLOOR PLAN
AREA A
HVAC
NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

M102A



PARTIAL SECOND FLOOR PLAN - AREA B - HVAC - NEW WORK



KEY PLAN

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

8 0 8 16

REVISIONS

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PARTIAL SECOND FLOOR PLAN
AREA B
HVAC
NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

M102B

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. CHWS, CHWR, HWS, HWR & CD TO MECHANICAL MEZZANINE, SEE PART PLAN 1 ON M202 FOR CONTINUATION.
2. CHWS, CHWR, HWS & HWR TO MECHANICAL MEZZANINE, SEE M203 FOR CONTINUATION.
3. PIPING DOWN WALL IN CHASE.
4. PIPING ROUTED IN LOW ARCHITECTURAL ENCLOSURE, REFER TO ARCHITECT'S DETAIL, HEAT TRACING PROVIDED FOR ALL PIPING.
5. 2" CONDENSATE DOWN TO CONCRETE SPLASH BLOCK (TYP.).
6. 4" CHWS/CHWR PIPING VALVED AND CAPPED FOR FUTURE EXTENSION, (BALANCE TO 230 GPM) CLOSE AFTER BALANCING.
7. 3"HWS/HWR PIPING VALVED AND CAPPED FOR FUTURE EXTENSION, (BALANCE TO 100 GPM) CLOSE AFTER BALANCING.
8. PROVIDE HEAVY DUTY STAINLESS STEEL METAL GUARDS ON ALL SENSORS.
9. INTERLOCK STATIC PRESSURE SENSOR WITH RELIEF AIR M.O.D. SHOWN IN PART PLAN #1 ON M202.
10. CLOSE FLAPS ON FAN COILS IN KITCHEN SO THAT THEY ONLY BLOW AIR AWAY FROM EXISTING KITCHEN HOOD.
11. HYDRONIC ZONE SHUT-OFF VALVE ASSEMBLY, REFER TO DETAIL.
12. PIPING INSTALLED IN NEW ARCHITECTURAL BULKHEAD, REFER TO ARCHITECTURAL PLANS.

CHAPEL 401 E
VESTIBULE 001 H
MENS BATHROOM 053 F
CLOS. 053A F
ENTRY 051 G
WOMENS BATHROOM 052 F
CLOS. 052A F
LOBBY 002 G
SACRISTY 005 A
VEST. 004 E
ART OFFICE 012 A
CLASSROOM 405
CLASSROOM 403
CLOSET 005M
PROJECT STORAGE 013 B
BOOK STOR. 007 B
WORK ROOM 006 A
JAN. CLOSET 009 D
ELEC. ROOM 008 D
VESTIBULE 014 H
CORRIDOR 003 A
OFFICE 016
OFFICE 017
OFFICE 019
CORR. 001A A
CLASSROOM 404
CLASSROOM 402
MUSIC LIBRARY 018A A
MUSIC STORAGE 016AB
MUSIC OFFICE 020 A
STORAGE 022 B
WAITING 050 A
RECEPTION 049 A
STUDENT SERVICES A 048 A
STUDENT SERVICES B 046 A
DEAN OF STUDENTS 042 A
ACHIEVEMENT LIAISON TEACHER 041 A
PRINCIPAL SECRETARY 038 A
PRINCIPAL OFFICE 039 A
SECRETARY 047 A
ARCHIVES 045 A
CORRIDOR 036 A
ADMIN. STORAGE 044 A
WORK ROOM 043 A
TOILET 040 F
PRINCIPAL CONFERENCE 037 A
VESTIBULE 035 H
LOBBY 00
PTAC
CORRIDOR 031 A
MEDIA CENTER 032 A
BROADCAST / DIST. LEARN. 034 B
WORK / OFFICE 033 A
MATCHLINE - SEE MP101B
FMF-18
FMF-17
SZVAV-01
PIPE ANCHOR (TYP.)
PIPE ALIGNMENT GUIDES (TYP.)
CAFETORIUM 021 B
EXP-3
EXP-4
EXP-1
EXP-2
EAST COURTYARD
NOT IN SCOPE
PANTRY 026 B
CORR. 023 B
KITCHEN 025 J
DISHWASH 025A J
FACULTY LUNCH ROOM 029 A
CORR. 030 B
FCU-01
FCU-02
FCU-03
FCU-04
FCU-05
TOILET 028AF
MECH. / ELEC. ROOM 027 D
MAINTENANCE 028 D
VEST. 024 B
VEST. 032 B
CD PIPING DOWN IN CHASE

PARTIAL FIRST FLOOR PLAN - AREA A - MECHANICAL PIPING - NEW WORK

KEY PLAN

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

8 0 8 16

REVISIONS

no.	date	comments

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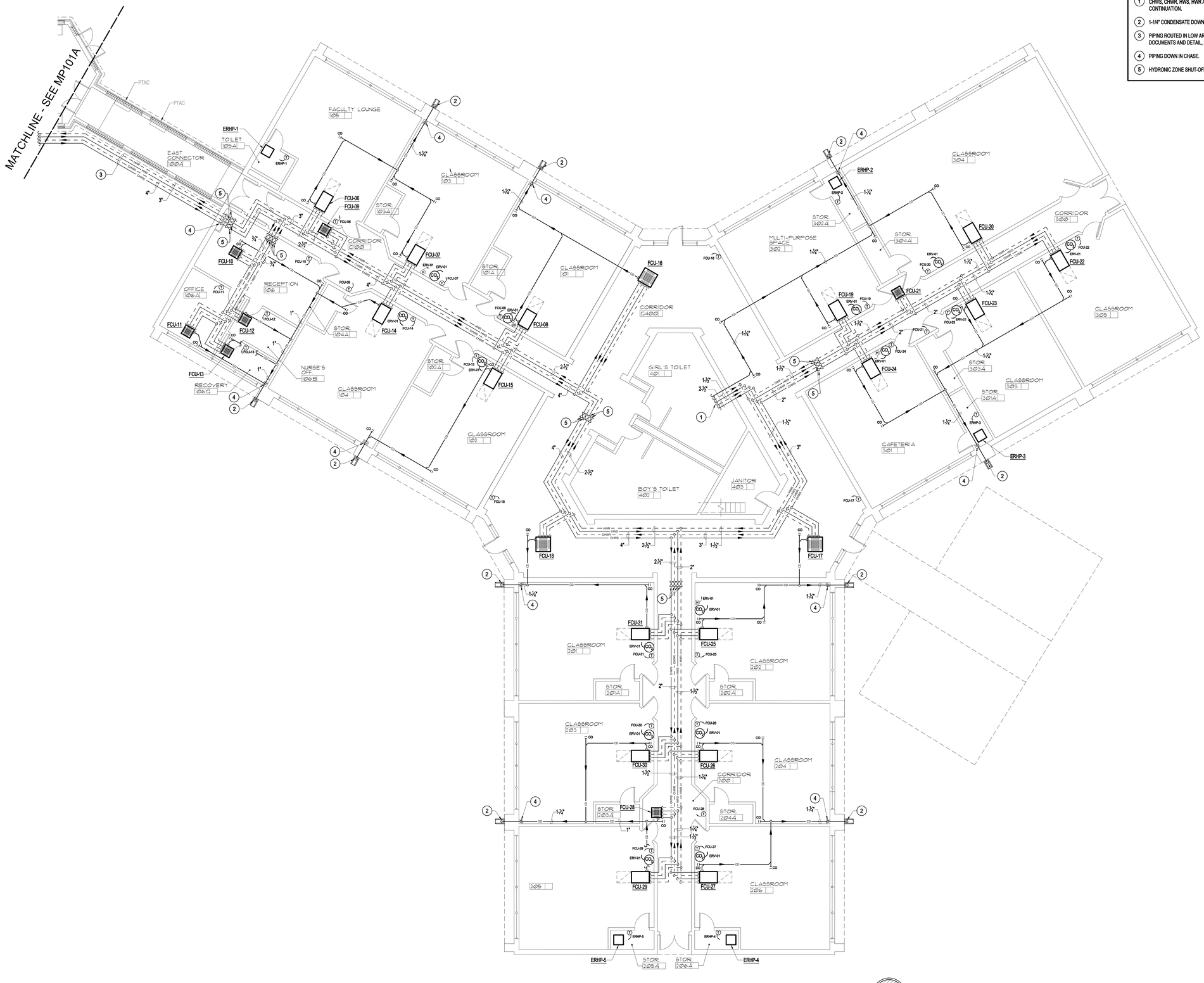
BID DOCUMENTS

PARTIAL FIRST FLOOR PLAN AREA A MECHANICAL PIPING NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

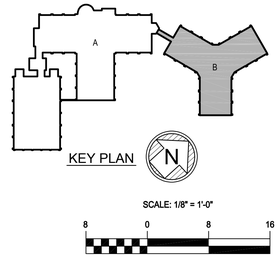
MP101A



PARTIAL FIRST FLOOR PLAN - AREA B - MECHANICAL PIPING - NEW WORK

DRAWING NOTES:

1. CHWS, CHWR, HWS, HWR AND CD TO MECHANICAL MEZZANINE, SEE PART PLAN 2 ON M202 FOR CONTINUATION.
2. 1-1/4" CONDENSATE DOWN TO CONCRETE SPLASH BLOCK (TYP.).
3. PIPING ROUTED IN LOW ARCHITECTURAL ENCLOSURE, REFER TO ARCHITECT'S CONTRACT DOCUMENTS AND DETAIL, HEAT TRACING PROVIDED FOR ALL PIPING.
4. PIPING DOWN IN CHASE.
5. HYDRONIC ZONE SHUT-OFF VALVE ASSEMBLY, REFER TO DETAIL.



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

8 0 8 16

REVISIONS

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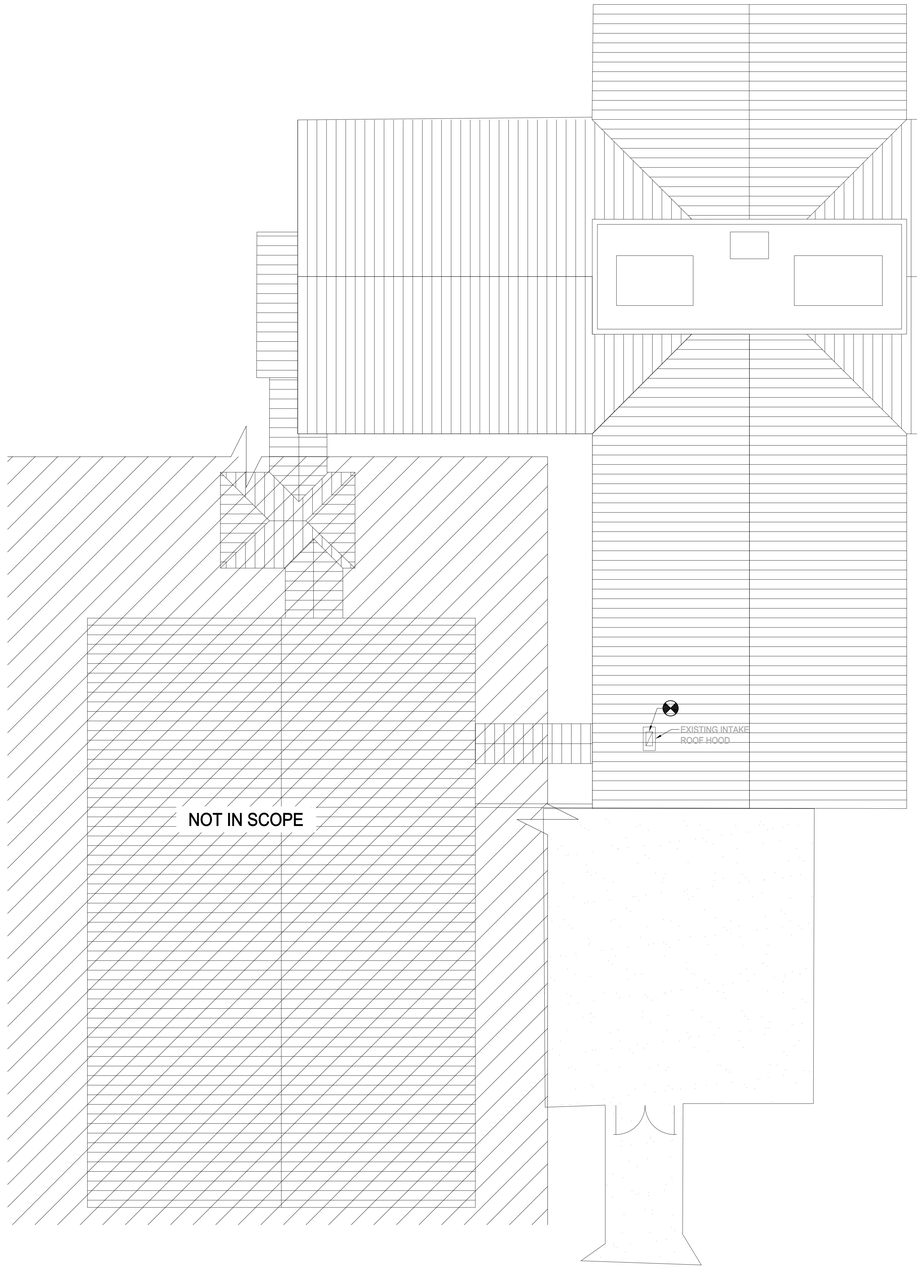
PARTIAL FIRST FLOOR PLAN AREA B MECHANICAL PIPING NEW WORK

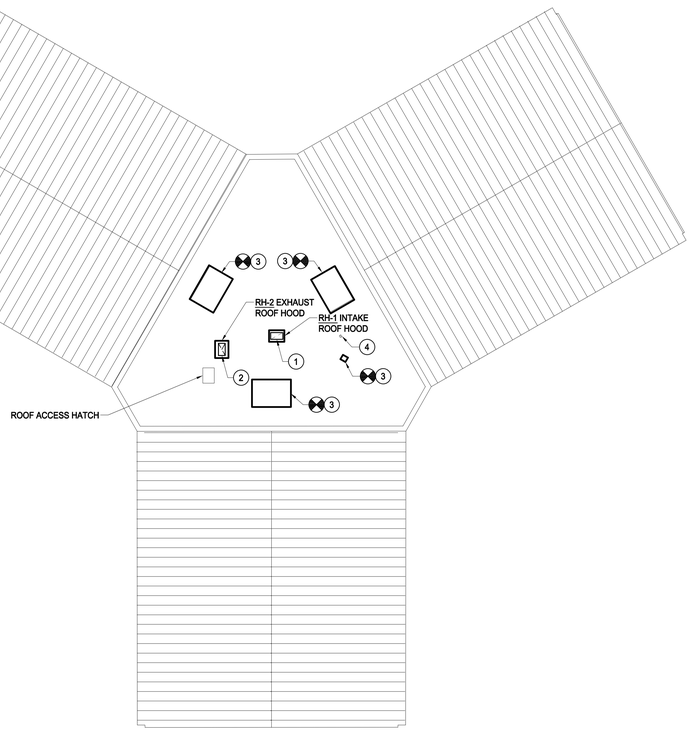
DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

MP101B

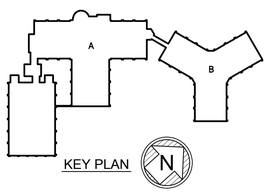
DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. 38X22 O.A. DUCT DOWN THROUGH ROOF, SEE PART PLAN #2 ON M202 FOR CONTINUATION.
2. 38X22 E.A DUCT DOWN THROUGH ROOF, SEE PART PLAN #2 ON M202 FOR CONTINUATION.
3. INSULATED METAL ROOF CAP OVER EXISTING ROOF CURB, REFER TO DETAIL.
4. EXISTING 4"Ø WATER FLUE TERMINATION, SEE PART PLAN #2 ON M202 FOR CONTINUATION DOWN.





ROOF PLAN - AREA A & B - HVAC - NEW WORK



KEY PLAN

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

16 8 0 16 32

REVISIONS

no.	date	comments

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SUBMISSION

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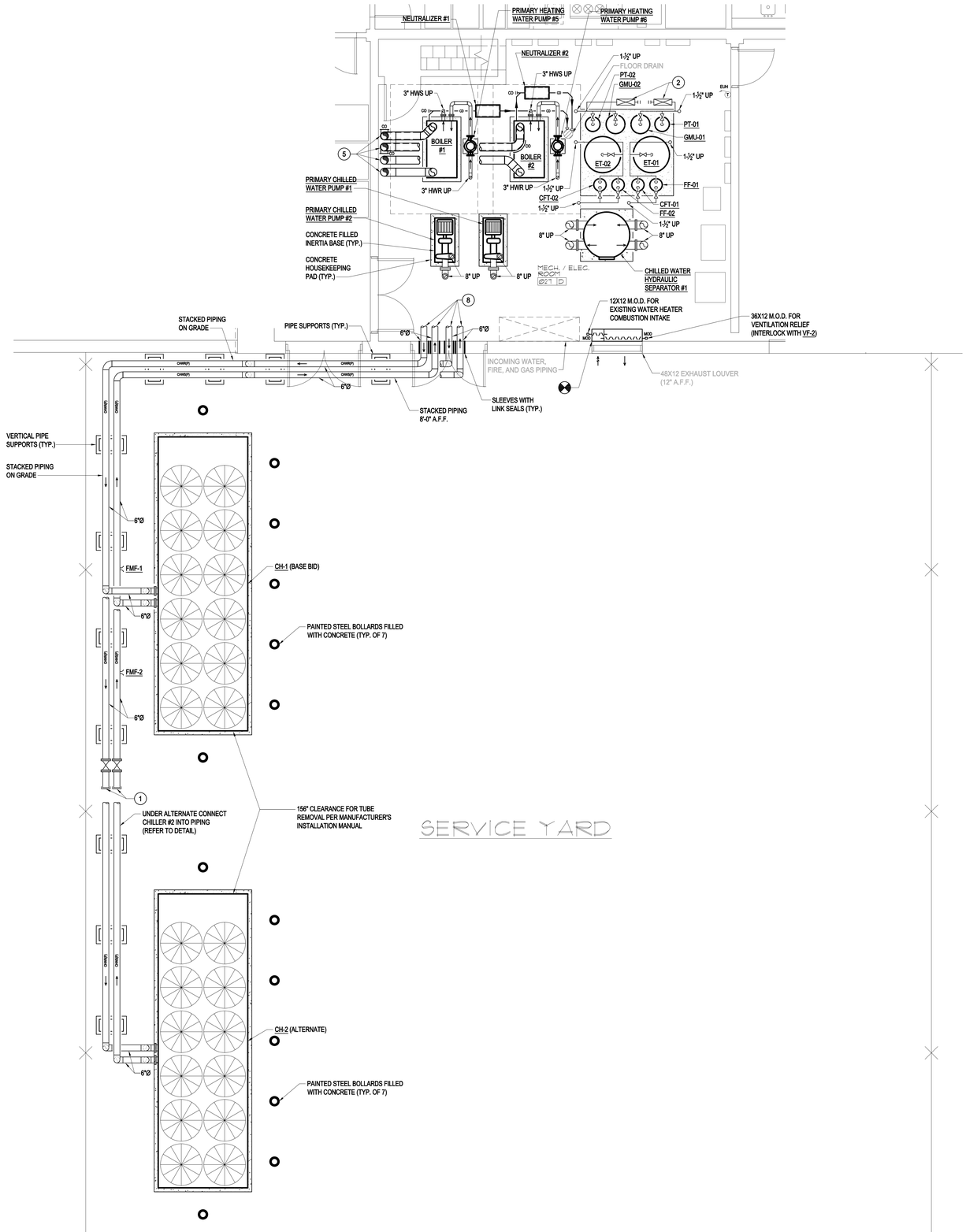
ROOF PLAN
HVAC
NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

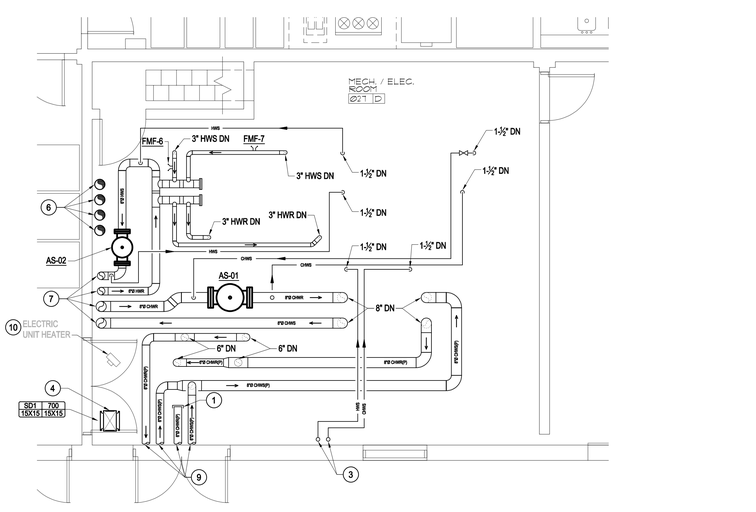
M103



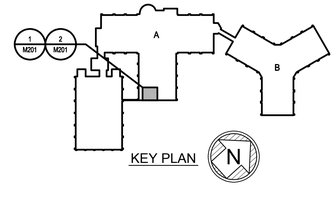
1 M001 MECHANICAL ROOM AND SERVICE YARD LOWER PART PLAN - HVAC - NEW WORK

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. CHWS/CHWR PIPING CAPPED FOR FUTURE USE UNDER BASE BID. EXTEND TO SECOND CHILLER UNDER ADD ALTERNATE (REFER TO DETAIL).
2. MAKE-UP WATER VALVE TRAIN CONNECTION, SEE PLUMBING DRAWINGS FOR CONTINUATION (REFER TO DETAIL).
3. 1-1/2" CHWS & HWS PIPING DOWN, SEE PART PLAN #1 ON M202 FOR CONTINUATION.
4. 16X10 O.A. DUCT UP, SEE PART PLAN #1 ON M202 FOR CONTINUATION.
5. 8"Ø DOUBLE WALL BOILER FLUE AND 8"Ø COMBUSTION AIR INTAKE UP, SEE PART PLAN #2 ON THIS SHEET FOR CONTINUATION.
6. 8"Ø DOUBLE WALL BOILER FLUE AND 8"Ø COMBUSTION AIR INTAKE UP AND DOWN, SEE PART PLAN #1 ON M202 FOR CONTINUATION UP, SEE PART PLAN #1 ON THIS SHEET FOR CONTINUATION DOWN.
7. 8"Ø CHWS/CHWR AND 6"Ø HWS/HWR PIPING UP, SEE PART PLAN #1 ON M202 FOR CONTINUATION.
8. CHWS/CHWR PIPING, FOR CONTINUATION SEE UPPER PART PLAN ON THIS SHEET.
9. CHWS/CHWR PIPING, FOR CONTINUATION SEE LOWER PART PLAN ON THIS SHEET.
10. REINSTALL EXISTING ELECTRIC UNIT HEATER AND CONNECT TO RECONNECT TO EXISTING CONTROLS.



2 M201 MECHANICAL ROOM UPPER PART PLAN - HVAC - NEW WORK



SCALE: 1/4" = 1'-0"

4 0 4 8

REVISIONS

no.	date	comments

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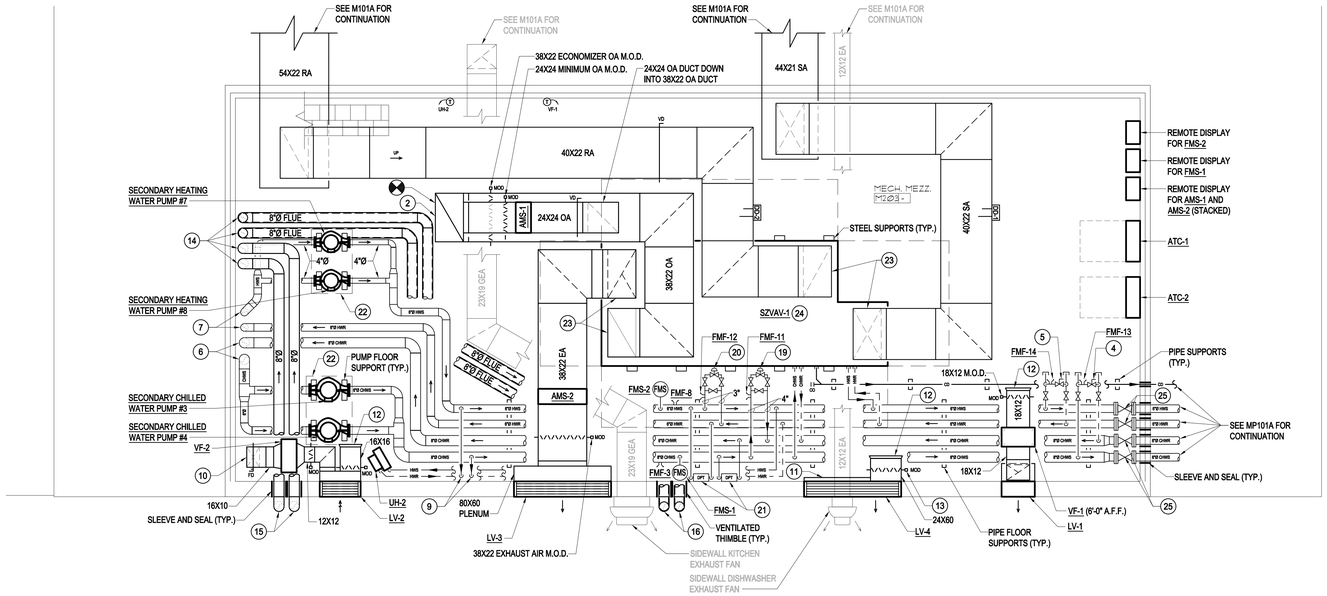
BID DOCUMENTS

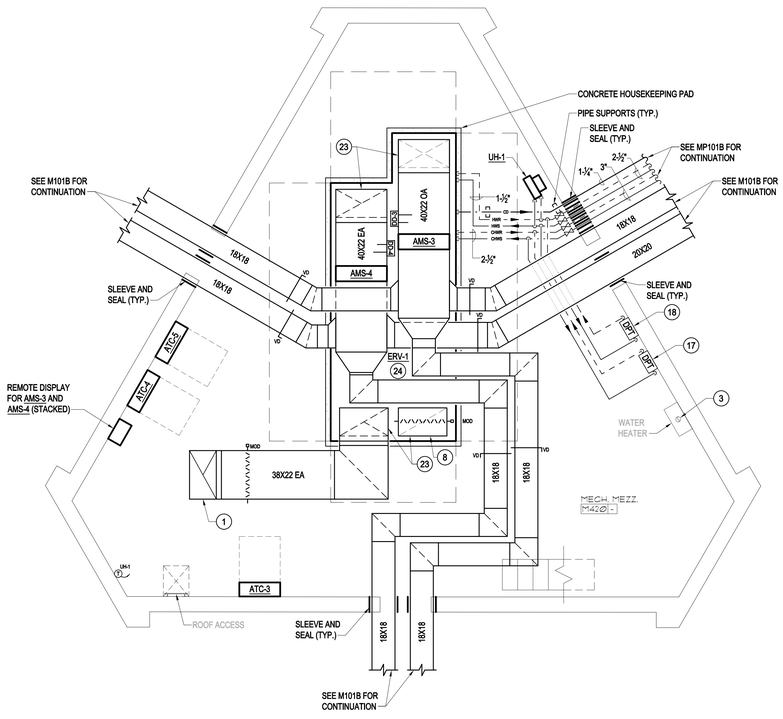
MECHANICAL ROOM PART PLANS HVAC NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

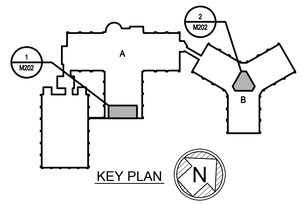
M201



1 M202 MEZZANINE PART PLAN - HVAC - NEW WORK



2 M202 MEZZANINE PART PLAN - HVAC - NEW WORK



DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. 38X21 E.A. DUCT UP TO HOOD ON ROOF, SEE M103 FOR CONTINUATION.
2. 38X21 O.A. DUCT UP TO EXISTING HOOD ON ROOF, SEE M103 FOR CONTINUATION.
3. EXISTING 4"Ø WATER HEATER FLUE UP THROUGH ROOF TO TERMINATION, SEE M103 FOR CONTINUATION.
4. 4" CHWS/CHWR PIPING VALVED AND CAPPED FOR FUTURE ADDITION, (BALANCE TO 143 GPM) CLOSE AFTER BALANCING.
5. 3" HWS/HWR PIPING VALVED AND CAPPED FOR FUTURE ADDITION, (BALANCE TO 70.5 GPM) CLOSE AFTER BALANCING.
6. 8" CHWS/CHWR PIPING DOWN, SEE PART PLAN #2 ON M201 FOR CONTINUATION.
7. 6" HWS/HWR PIPING DOWN, SEE PART PLAN #2 ON M201 FOR CONTINUATION.
8. 38x22 O.A. DUCT UP TO HOOD ON ROOF, SEE M103 FOR CONTINUATION.
9. 1-1/2" CHWS & HWS PIPING DOWN, SEE PART PLAN #2 ON M201 FOR CONTINUATION.
10. 16X10 O.A. DUCT DOWN, SEE PART PLAN #1 ON M201 FOR CONTINUATION.
11. BLANK OFF UNUSED PORTION OF LOUVER.
12. OPEN ENDED DUCT.
13. INTERLOCK RELIEF AIR M.O.D. WITH SZVAV-1 STATIC PRESSURE SENSOR IN CAFETERIA.
14. 8"Ø DOUBLE WALL BOILER FLUE AND 8"Ø COMBUSTION AIR INTAKE DOWN, SEE PART PLAN #2 ON M201 FOR CONTINUATION.
15. 8"Ø COMBUSTION AIR INTAKE WALL TERMINATION, REFER TO DETAIL.
16. 8"Ø DOUBLE WALL BOILER FLUE WALL TERMINATION, REFER TO DETAIL.
17. CHILLED WATER DIFFERENTIAL PRESSURE TRANSMITTER (INTERLOCK WITH CHILLED WATER PUMP VFD'S).
18. HEATING WATER DIFFERENTIAL PRESSURE TRANSMITTER (INTERLOCK WITH HEATING WATER PUMP VFD'S).
19. 2-WAY CHILLED WATER MINIMUM FLOWRATE BYPASS CONTROL VALVE.
20. 2-WAY HEATING WATER MINIMUM FLOWRATE BYPASS CONTROL VALVE.
21. MINIMUM FLOW BYPASS DIFFERENTIAL PRESSURE TRANSMITTER.
22. AUXILIARY DRAIN PAN BELOW PUMPS.
23. TRANSITION TO UNIT FULL SIZE CONNECTION AND INSTALL FLEXIBLE DUCT CONNECTION.
24. PROVIDE UNIT IN MODULES. FIELD ASSEMBLE UNIT IN MEZZANINE.
25. HYDRONIC ZONE SHUT-OFF VALVE ASSEMBLY, REFER TO DETAIL.

REVISIONS

no.	date	comments

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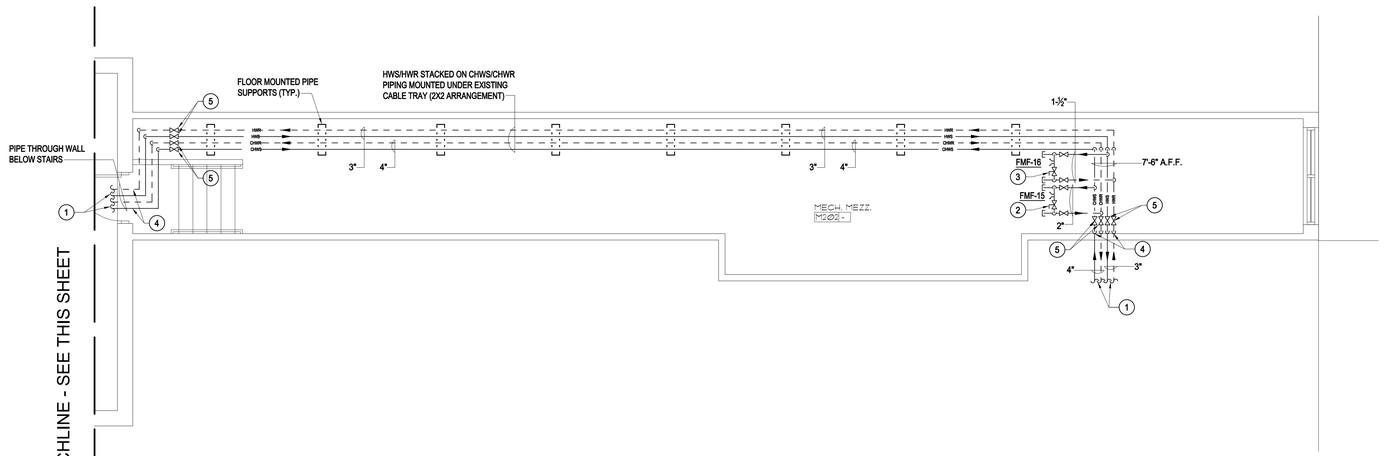
MEZZANINE PART PLANS
HVAC
NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

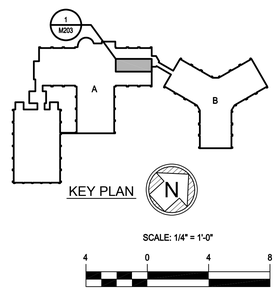
M202

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. CHWS, CHWR, HWS & HWR PIPE THROUGH WALL, SEE MP101A FOR CONTINUATION.
2. 2" CHWS/CHWR PIPING VALVED AND CAPPED FOR FUTURE EXTENSION, (BALANCE TO 22 GPM) CLOSE AFTER BALANCING.
3. 1-1/2" HWS/HWR PIPING VALVED AND CAPPED FOR FUTURE EXTENSION, (BALANCE TO 16 GPM) CLOSE AFTER BALANCING.
4. SEAL PIPE WALL PENETRATION PER DETAIL.
5. HYDRONIC ZONE SHUT-OFF VALVE ASSEMBLY, REFER TO DETAIL.



1 M203 MEZZANINE PART PLAN - HVAC - NEW WORK



REVISIONS

no.	date	comments

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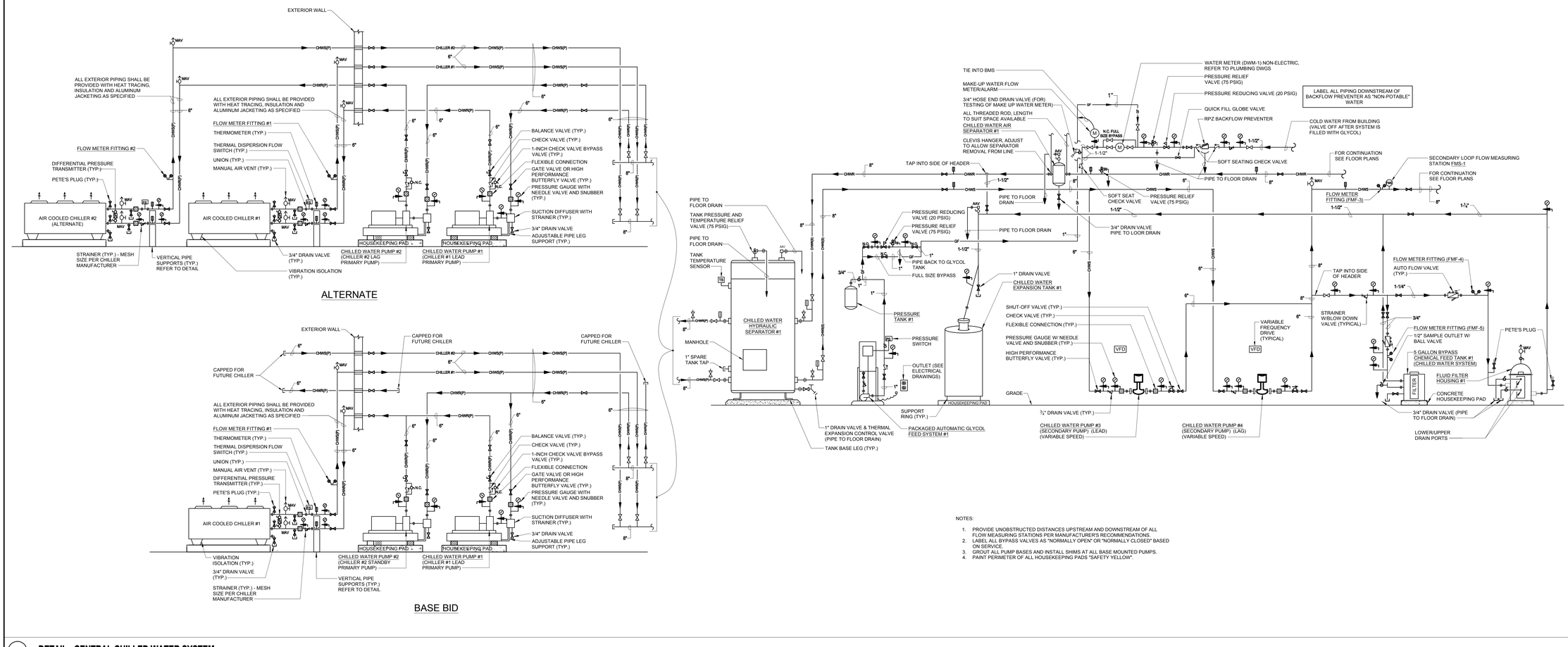
BID DOCUMENTS

MEZZANINE PART PLANS
HVAC
NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

M203

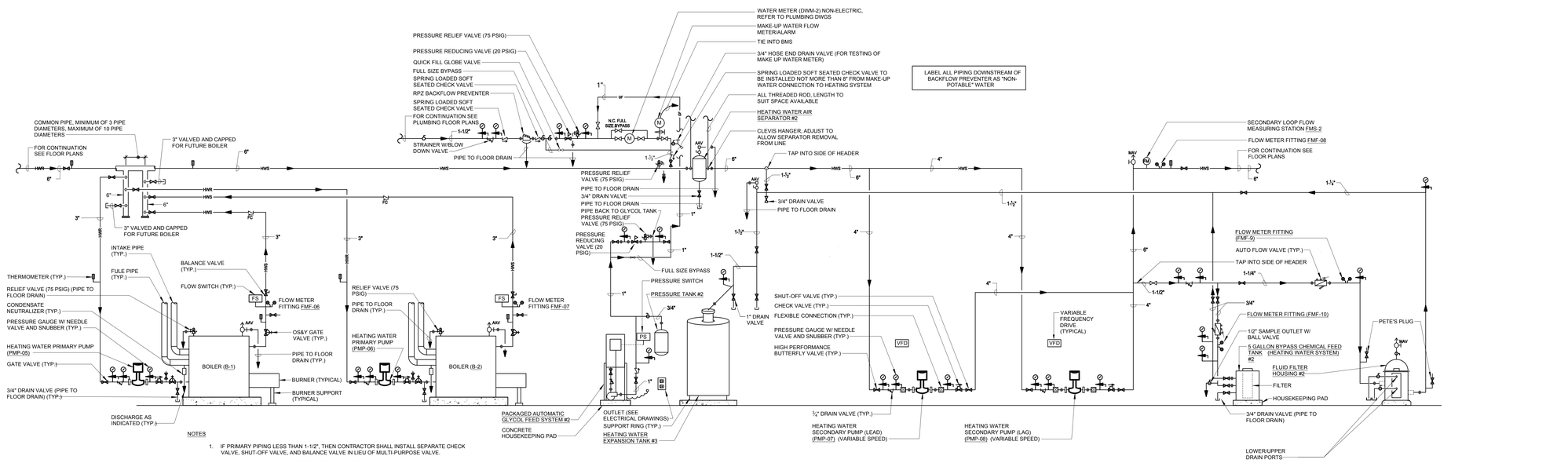


NOTES:

1. PROVIDE UNOBSTRUCTED DISTANCES UPSTREAM AND DOWNSTREAM OF ALL FLOW MEASURING STATIONS PER MANUFACTURERS RECOMMENDATIONS.
2. LABEL ALL BYPASS VALVES AS "NORMALLY OPEN" OR "NORMALLY CLOSED" BASED ON SERVICE.
3. GROUT ALL PUMP BASES AND INSTALL SHIMS AT ALL BASE MOUNTED PUMPS.
4. PAINT PERIMETER OF ALL HOUSEKEEPING PADS "SAFETY YELLOW".

1 DETAIL - CENTRAL CHILLED WATER SYSTEM

NO SCALE



NOTES

1. IF PRIMARY PIPING LESS THAN 1-1/2", THEN CONTRACTOR SHALL INSTALL SEPARATE CHECK VALVE, SHUT-OFF VALVE, AND BALANCE VALVE IN LIEU OF MULTI-PURPOSE VALVE.
2. LABEL ALL BYPASS VALVES AS "NORMALLY CLOSED".
3. PROVIDE UNOBSTRUCTED DISTANCES UPSTREAM AND DOWNSTREAM OF ALL FLOW MEASURING STATIONS PER MANUFACTURER'S RECOMMENDATIONS.
4. BOILER GAS SHUT OFF VALVE SHALL BE INSTALLED BETWEEN 24 INCHES AND 60 INCHES ABOVE FINISHED FLOOR.
5. PAINT PERIMETER OF ALL HOUSEKEEPING PADS "SAFETY YELLOW".

2 DETAIL - CENTRAL HOT WATER SYSTEM

NO SCALE

REVISIONS

no.	date	comments

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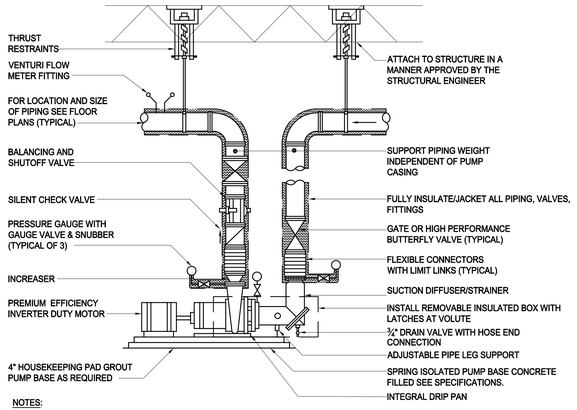
DETAILS
HVAC

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

M301

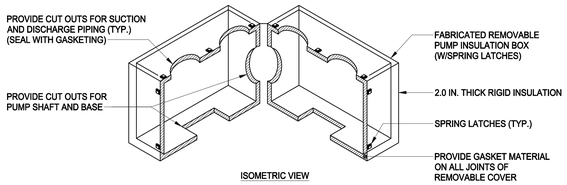


NOTES:

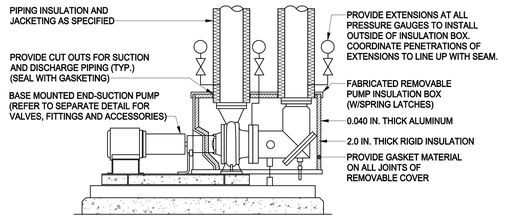
1. MAINTAIN 4 TO 10 PIPE DIAMETERS OF STRAIGHT RUN PIPING BETWEEN PUMP SUCTION CONNECTION AND ELBOW.
2. A TRIPLE DUTY VALVE MAY BE UTILIZED ON PUMP DISCHARGE IN LIEU OF SEPARATE CHECK VALVE, SHUT-OFF VALVE, AND BALANCE VALVE. HOWEVER, AN ADDITIONAL SHUT-OFF VALVE IS REQUIRED TO ALLOW SERVICING OF CHECK VALVE FEATURE IF A MULTI-PURPOSE VALVE IS UTILIZED.
3. PIPES, VALVES AND FITTINGS SHALL BE LINE SIZE, NOT PUMP FLANGE SIZE.

1 DETAIL - TYPICAL CONSTANT SPEED BASE MOUNTED PUMP

NO SCALE



ISOMETRIC VIEW



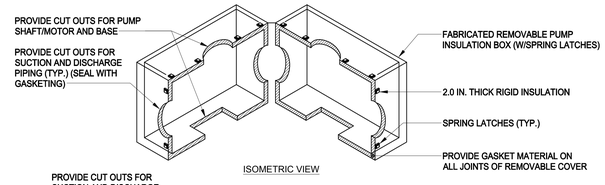
SECTION VIEW

NOTE:

1. FOR BELOW AMBIENT APPLICATIONS APPLY VAPOR BARRIER MASTIC AT ALL PENETRATIONS AND SEAMS TO PREVENT CONDENSATION.

2 DETAIL - TYPICAL BASE MOUNTED PUMP INSULATION BOX

NO SCALE



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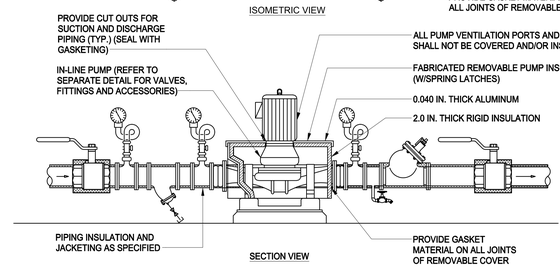


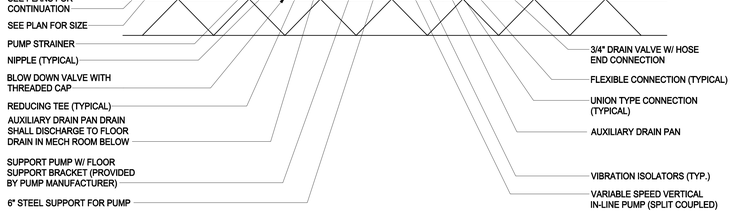
SECTION VIEW

NOTE:

1. FOR BELOW AMBIENT APPLICATIONS APPLY VAPOR BARRIER MASTIC AT ALL PENETRATIONS AND SEAMS TO PREVENT CONDENSATION.

3 DETAIL - TYPICAL IN-LINE PUMP INSULATION BOX

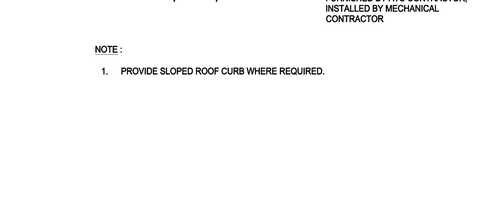
NO SCALE



NOTES :

1. MAINTAIN 4 TO 10 PIPE DIAMETERS OF STRAIGHT RUN PIPING BETWEEN PUMP SUCTION CONNECTION AND PUMP STRAINER.
2. PIPES, VALVES AND FITTINGS SHALL BE LINE SIZE, NOT PUMP FLANGE SIZE.

4 DETAIL - VARIABLE SPEED VERTICAL IN-LINE PUMP (SPLIT COUPLED)

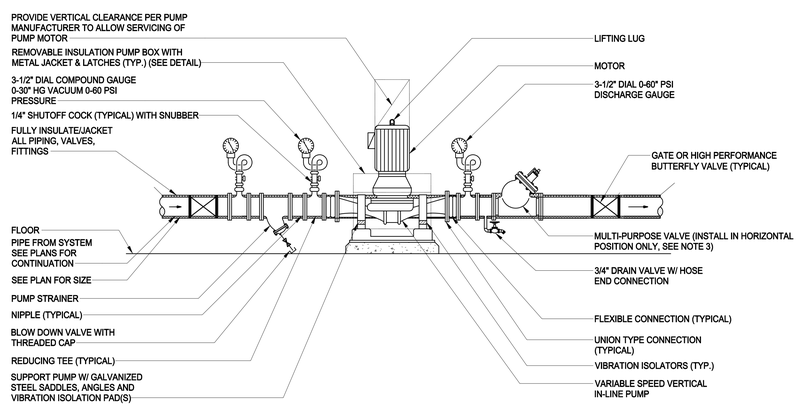


NOTE :

1. PROVIDE SLOPED ROOF CURB WHERE REQUIRED.

5 DETAIL - TYPICAL INTAKE/RELIEF AIR HOOD(DUCT MOUNTED MOTOR OPERATED DAMPERS)

NO SCALE

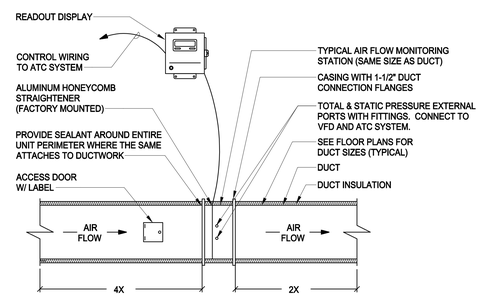


NOTES:

1. MAINTAIN 4 TO 10 PIPE DIAMETERS OF STRAIGHT RUN PIPING BETWEEN PUMP SUCTION CONNECTION AND PUMP STRAINER.
2. INSTALL MULTI-PURPOSE VALVE SUFFICIENT DISTANCE DOWNSTREAM OF PUMP TO PROVIDE ACCURATE FLOW MEASUREMENT PER VALVE MANUFACTURER'S. RECOMMENDATIONS.
3. IF PRIMARY PIPING LESS THAN 1-1/2", THEN CONTRACTOR SHALL 2 INSTALL SEPARATE CHECK VALVE, SHUT-OFF VALVE, AND BALANCE VALVE IN LIEU OF MULTI-PURPOSE VALVE.
4. PIPES, VALVES AND FITTINGS SHALL BE LINE SIZE, NOT PUMP FLANGE SIZE.

6 DETAIL - CONSTANT SPEED VERTICAL IN-LINE PUMP (CLOSE COUPLED)

NO SCALE



X = ONE DIAMETER FOR ROUND DUCTS

X = ONE DUCT DIMENSION FOR SQUARE DUCTS

X = DUCT WIDTH + DUCT HEIGHT FOR RECTANGULAR DUCTS / 2

NOTES:

1. PROVIDE MINIMUM STRAIGHT RUN UPSTREAM & DOWNSTREAM OF UNIT AS INDICATED PRIOR TO ANY OBSTRUCTION, OFFSET, ELBOWS, EQUIPMENT TAKE-OFFS, ETC.
2. PROVIDE ADDITIONAL DUCT ACCESS DOOR ON OPPOSITE SIDE OF DUCT.
3. THERMAL DISPERSION TYPE DO NOT REQUIRE STRAIGHTENER.

7 DETAIL - TYPICAL AIR FLOW MONITORING STATION

NO SCALE

REVISIONS

no.	date	comments

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HVAC

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SCALE	AS NOTED
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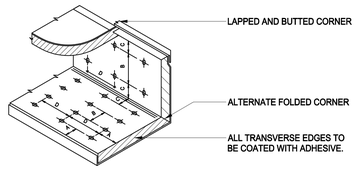
M302



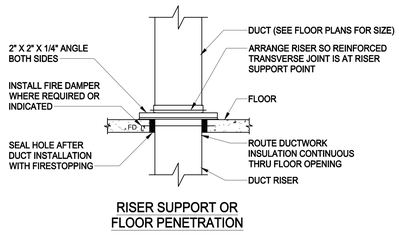
VELOCITY	MAX SPACING FOR FASTENERS			
	A	B	C	D
LOW - 2 INCH S.P. AND LESS	3"	12"	4"	18"
MED.- 3 INCH S.P. & GREATER	3"	6"	4"	16"

NOTES:

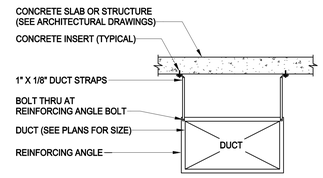
1. LINER ADHERED TO THE DUCT WITH 90% MINIMUM AREA COVERAGE OF ADHESIVE.
2. THE VELOCITY RATED SIDE OF THE LINER MUST FACE THE AIR FLOW.
3. PROVIDE GALVANIZED PERFORATED LINER ON ON TOP OF SOUND LINING WHERE SPECIFIED.

1 DETAIL - TYPICAL FLEXIBLE DUCT LINER INSTALLATION

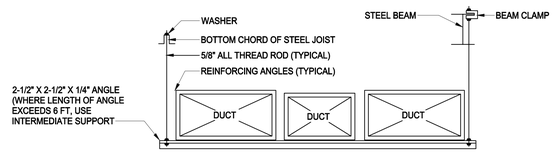
NO SCALE



RISER SUPPORT OR FLOOR PENETRATION



SINGLE RECTANGULAR DUCT



* USE THIS METHOD WHENEVER DUCTS CAN BE GROUPED TOGETHER

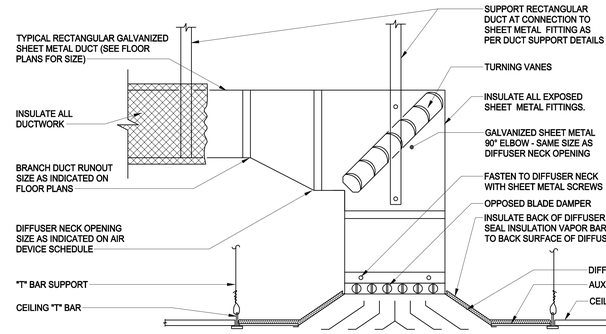
MULTIPLE DUCT RUNS ON TRAPEZE HANGERS

NOTE:

1. DUCTS SHALL BE SUPPORTED PER SMACNA STANDARDS

2 DETAIL - TYPICAL INSTALLATION OF HANGERS AND SUPPORTS FOR DUCTWORK

NO SCALE

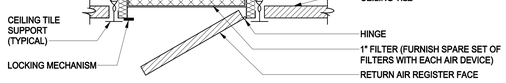


NOTES:

1. "T" BAR SUPPORT WIRES SHOULD BE INSTALLED AT EACH CORNER OF THE DIFFUSER
2. SUPPORT SHOULD BE INSTALLED TO ISOLATE DUCT TENSION FROM DIFFUSER.
3. PAINT DUCTWORK BEHIND AIR DEVICE WITH 2 COATS OF FLAT BLACK PAINT.

3 DETAIL - TYPICAL CEILING MOUNTED DIFFUSER

NO SCALE

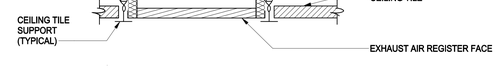


NOTES:

1. "T" BAR SUPPORT WIRES SHOULD BE INSTALLED AT EACH CORNER OF THE REGISTER.
2. SUPPORT SHOULD BE INSTALLED TO ISOLATE DUCT TENSION FROM REGISTER.
3. PAINT DUCTWORK BEHIND AIR DEVICE WITH 2 COATS OF FLAT BLACK PAINT.

4 DETAIL - TYPICAL CEILING FILTER RETURN AIR REGISTER

NO SCALE

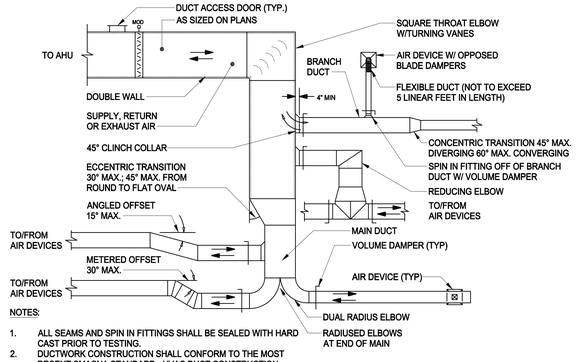


NOTES:

1. "T" BAR SUPPORT WIRES SHOULD BE INSTALLED AT EACH CORNER OF THE REGISTER.
2. SUPPORT SHOULD BE INSTALLED TO ISOLATE DUCT TENSION FROM REGISTER.
3. PAINT DUCTWORK BEHIND AIR DEVICE WITH 2 COATS OF FLAT BLACK PAINT.

5 DETAIL - TYPICAL CEILING EXHAUST AIR REGISTER

NO SCALE

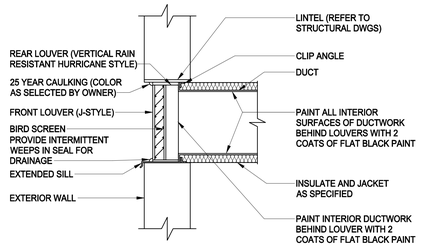


NOTES:

1. ALL SEAMS AND SPIN IN FITTINGS SHALL BE SEALED WITH HARD CAST PRIOR TO TESTING.
2. DUCTWORK CONSTRUCTION SHALL CONFORM TO THE MOST RECENT SMACNA STANDARD - HVAC DUCT CONSTRUCTION STANDARDS.
3. PROVIDE INSULATED STAND-OFFS AT VOLUME DAMPERS INSTALLED IN INSULATED DUCT SYSTEMS.
4. FURNISH AND INSTALL ADEQUATELY SIZED DUCT ACCESS DOORS AT ALL FIRE DAMPERS, AIR MEASURING DEVICES, MOTOR-OPERATED DAMPERS, DUCT SMOKE DETECTORS, AND OTHER LOCATIONS WHERE INDICATED AND REQUIRED FOR DUCT ACCESS.
5. INSTALL PINK RIBBON AT ALL VOLUME DAMPERS LOCATED ABOVE CEILINGS.
6. LABEL ALL DUCT ACCESS DOORS.
7. PAINT BEHIND ALL AIR DEVICES WITH 2 COATS OF FLAT BLACK PAINT.

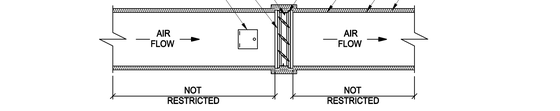
6 DETAIL - TYPICAL SUPPLY, EXHAUST, OR RETURN DUCT OFFSET, TRANSITION AND DUCT ACCESS DOORS

NO SCALE

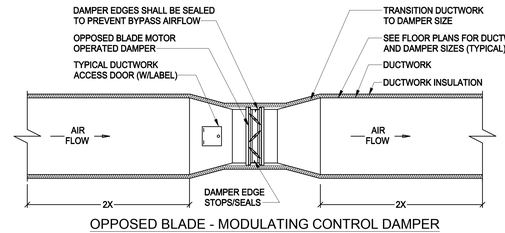


7 DETAIL - EXTERIOR MECHANICAL LOUVER - HURRICANE RATED

NO SCALE



PARALLEL BLADE - 2-POSITION CONTROL DAMPER



OPPOSED BLADE - MODULATING CONTROL DAMPER

X = ONE DIAMETER FOR ROUND DUCTS
X = ONE DUCT DIMENSION FOR SQUARE DUCTS
X = DUCT WIDTH + DUCT HEIGHT FOR RECTANGULAR DUCTS / 2

NOTES:

1. PROVIDE MINIMUM STRAIGHT RUN UPSTREAM & DOWNSTREAM OF DAMPER AS INDICATED PRIOR TO ANY OBSTRUCTION, OFFSET, ELBOWS, EQUIPMENT TAKE-OFFS, ETC. WHERE ABOVE STRAIGHT RUN OF DUCTWORK IS NOT FEASIBLE PROVIDE MAXIMUM STRAIGHT RUN AVAILABLE.
2. MOUNT DAMPER ACTUATOR IN ACCESSIBLE LOCATION ON SIDE OF DUCTWORK.
3. MARK SHAFTS OF ALL DAMPERS SO THAT THE DAMPER POSITION CAN BE DETERMINED BY VIEWING THE SHAFT.

8 DETAIL - TYPICAL DUCTWORK MOUNTED CONTROL DAMPER

NO SCALE

REVISIONS

no.	date	comments

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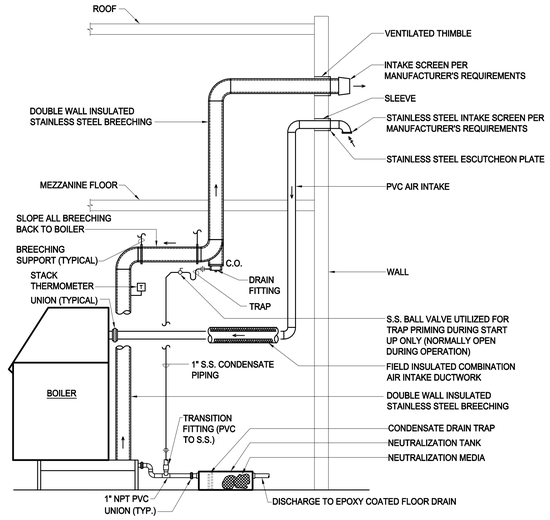
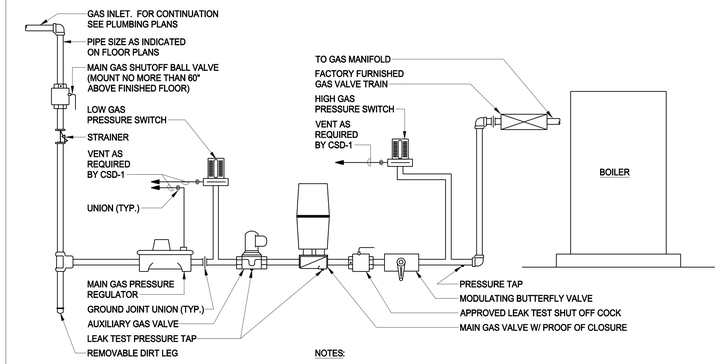
M303



1 DETAIL - TYPICAL CONDENSING BOILER VERTICAL STACK WITH DIRECT VENT COMBUSTION AIR (FROM SIDEWALL)

NO SCALE

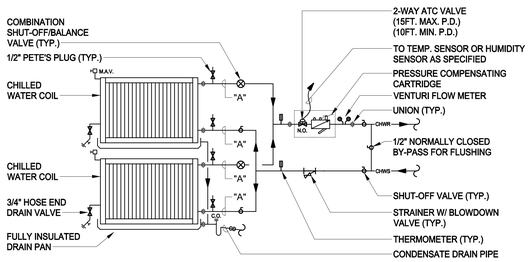


NOTES:

1. GAS PRESSURE REGULATOR SHALL BE A MINIMUM OF 10 FEET AWAY FROM CONNECTION TO BOILER OR AS REQUIRED BY BOILER MANUFACTURER.
2. MAIN GAS SHUT-OFF VALVE SHALL BE INSTALLED NO MORE THAN 60 INCHES ABOVE THE FINISHED FLOOR.

2 DETAIL - TYPICAL U.L./FM GAS TRAIN AT BOILERS

NO SCALE



NOTES :

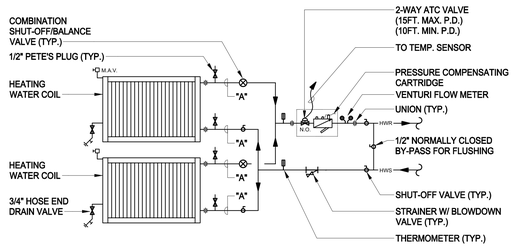
1. CHILLED WATER SUPPLY CONNECTIONS SHALL BE ARRANGED FOR COUNTER FLOW HEAT TRANSFER BETWEEN AIR AND FLUID.
2. ALL PIPE, VALVES, & FITTINGS SHALL BE ARRANGED SO AS NOT TO INTERFERE WITH COIL ACCESS OR REMOVAL.
3. ATC VALVE SHALL BE PRESSURE INDEPENDENT TYPE WITH INTEGRAL VENTURI FLOW METER. FOR FLOW RATES EXCEEDING 85 GPM, INSTALL FLOW METER STATION ON RETURN PIPE WITH SHUT-OFF VALVE.
4. PROVIDE INTERMEDIATE DRAIN PAN FOR MULTIPLE (STACKED) COOLING COILS. PIPE INTERMEDIATE DRAIN PAN TO BOTTOM OF DRAIN PAN.
5. IF COILS ARE NOT PROVIDED FROM THE EQUIPMENT MANUFACTURER WITH DRAIN CONNECTIONS THEN CONTRACTOR SHALL INSTALL 3/4" HOSE END DRAIN VALVE IN PIPING AT EACH COIL.

INDIVIDUAL PIPE SIZE SCHEDULE		
UNIT NO.	PIPE SIZE "A"	FLOW RATE GPM
SZVAV-1	2-1/2"	35
ERV-1	2"	24

NOTES:
1. SEE UNIT SCHEDULE FOR MAIN PIPE SIZES.

3 PIPING DETAIL - STACKED CHILLED WATER COIL W/2-WAY PRESSURE INDEPENDENT CONTROL VALVE (SZVAV-1 & ERV-1)

NO SCALE



NOTES:

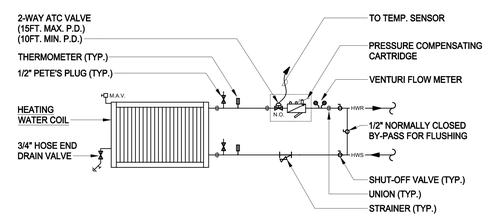
1. HEATING WATER SUPPLY CONNECTIONS SHALL BE ARRANGED FOR COUNTER FLOW HEAT TRANSFER BETWEEN AIR AND FLUID.
2. ALL PIPE, VALVES, & FITTINGS SHALL BE ARRANGED SO AS NOT TO INTERFERE WITH COIL ACCESS OR REMOVAL.
3. ATC VALVE SHALL BE PRESSURE INDEPENDENT TYPE WITH INTEGRAL VENTURI FLOW METER. FOR FLOW RATES EXCEEDING 85 GPM, INSTALL FLOW METER STATION ON RETURN PIPE WITH SHUT-OFF VALVE.
4. IF COILS ARE NOT PROVIDED FROM THE EQUIPMENT MANUFACTURER WITH DRAIN CONNECTIONS THEN CONTRACTOR SHALL INSTALL 3/4" HOSE END DRAIN VALVE IN PIPING AT EACH COIL.

INDIVIDUAL PIPE SIZE SCHEDULE		
UNIT NO.	PIPE SIZE "A"	FLOW RATE GPM
SZVAV-1	1-1/2"	17
ERV-1	1"	6

NOTES:
1. SEE UNIT SCHEDULE FOR MAIN PIPE SIZES.

4 PIPING DETAIL - STACKED HEATING WATER COIL W/2-WAY PRESSURE INDEPENDENT CONTROL VALVE (SZVAV-1 & ERV-1)

NO SCALE

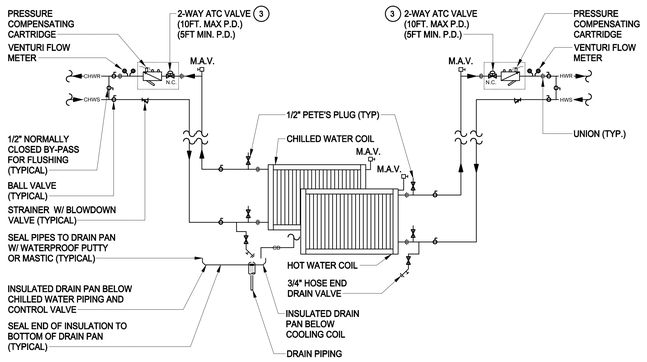


NOTES:

1. HEATING WATER SUPPLY CONNECTIONS SHALL BE ARRANGED FOR COUNTER FLOW HEAT TRANSFER BETWEEN AIR AND FLUID.
2. ALL PIPE, VALVES, & FITTINGS SHALL BE ARRANGED SO AS NOT TO INTERFERE WITH COIL ACCESS OR REMOVAL.
3. ATC VALVE SHALL BE PRESSURE INDEPENDENT TYPE WITH INTEGRAL VENTURI FLOW METER. FOR FLOW RATES EXCEEDING 85 GPM, INSTALL FLOW METER STATION ON RETURN PIPE WITH SHUT-OFF VALVE.

5 PIPING DETAIL - HEATING WATER COIL W/2-WAY PRESSURE INDEPENDENT CONTROL VALVE

NO SCALE

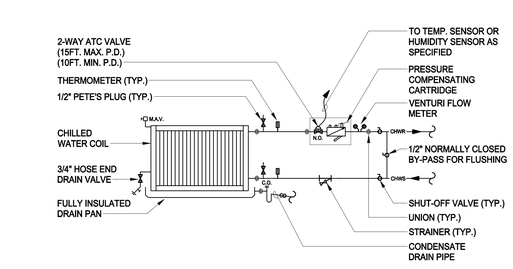


NOTES:

1. PIPING CONNECTIONS FOR HEATING COIL AND COOLING COIL SHALL BE AS INDICATED ON DRAWINGS.
2. INSULATE ALL PIPING
3. ATC VALVES SHALL BE PRESSURE INDEPENDENT TYPE WITH INTEGRAL VENTURI FLOW METER.

6 PIPING DETAIL - TYPICAL FOUR PIPE FAN COIL UNIT WITH 2-WAY CONTROL VALVES (VALVES ABOVE CEILING)

NO SCALE

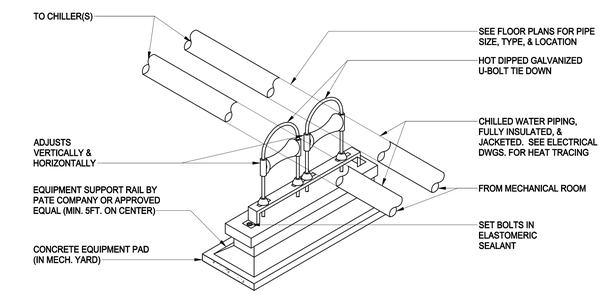


NOTES :

1. CHILLED WATER SUPPLY CONNECTIONS SHALL BE ARRANGED FOR COUNTER FLOW HEAT TRANSFER BETWEEN AIR AND FLUID.
2. ALL PIPE, VALVES, & FITTINGS SHALL BE ARRANGED SO AS NOT TO INTERFERE WITH COIL ACCESS OR REMOVAL.
3. ATC VALVE SHALL BE PRESSURE INDEPENDENT TYPE WITH INTEGRAL VENTURI FLOW METER. FOR FLOW RATES EXCEEDING 85 GPM, INSTALL FLOW METER STATION ON RETURN PIPE WITH SHUT-OFF VALVE.
4. PROVIDE INTERMEDIATE DRAIN PAN FOR MULTIPLE (STACKED) COOLING COILS. PIPE INTERMEDIATE DRAIN PAN TO BOTTOM OF DRAIN PAN.

7 PIPING DETAIL - CHILLED WATER COIL W/2-WAY PRESSURE INDEPENDENT CONTROL VALVE

NO SCALE



NOTES :

1. ALL HARDWARE SHALL BE HOT DIPPED GALVANIZED OR STAINLESS STEEL.
2. PIPING SHALL BE MINIMUM 18" ABOVE GRADE.

8 DETAIL - EXTERIOR CHILLED WATER PIPING SUPPORT (LOW)

NO SCALE

REVISIONS

no.	date	comments

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SCALE	AS NOTED
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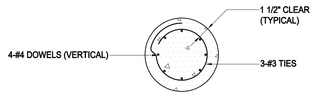
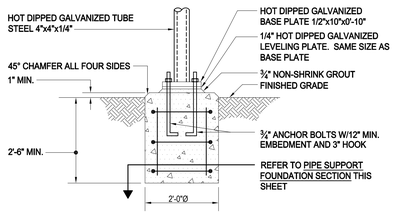
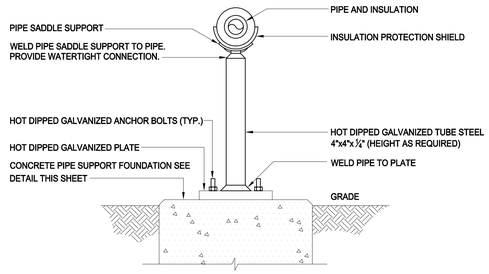
M304



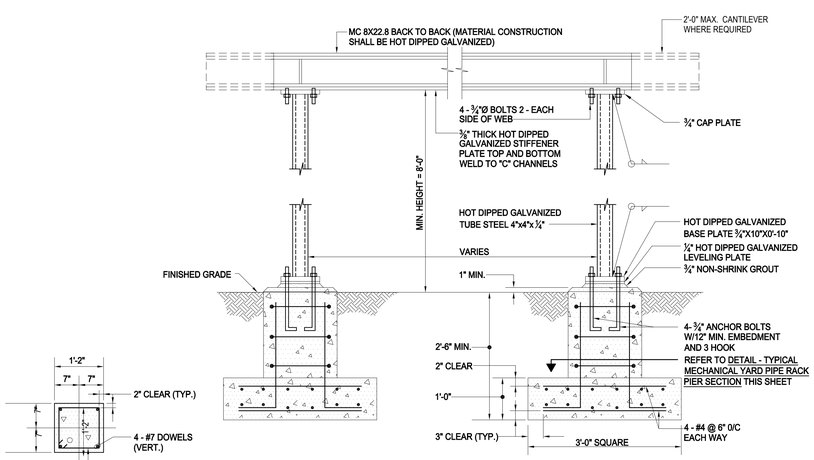
PIPE SUPPORT FOUNDATION SECTION



DETAIL - PIPE SUPPORT FOUNDATION

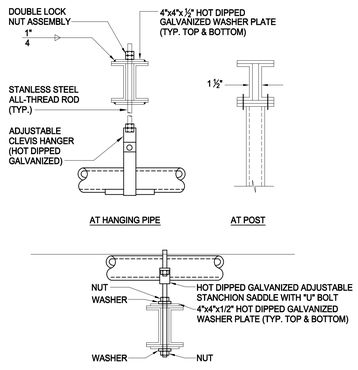


DETAIL - TYPICAL EXTERIOR PIPING SUPPORT



DETAIL - TYPICAL MECHANICAL YARD
PIPE RACK PIER SECTION

DETAIL - TYPICAL PIER AND FOOTING



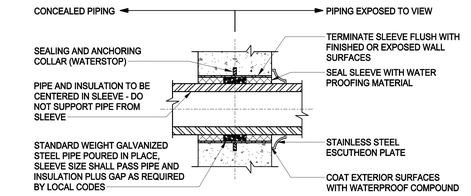
DETAIL - TYPICAL END ELEVATIONS
CHANNEL ASSEMBLY

NOTE:

1. ALL EXTERIOR HARDWARE SHALL BE STAINLESS STEEL

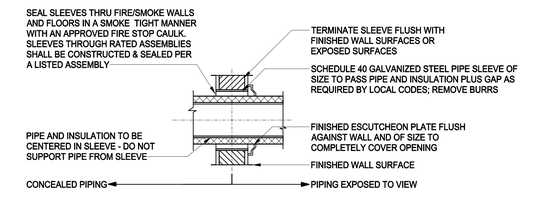
1 DETAIL - TYPICAL MECHANICAL YARD PIPE RACKS/SUPPORTS/FOUNDATIONS (HIGH RACKED PIPING)

NO SCALE



2 DETAIL - TYPICAL PIPE SLEEVE THRU EXTERIOR WALL

NO SCALE

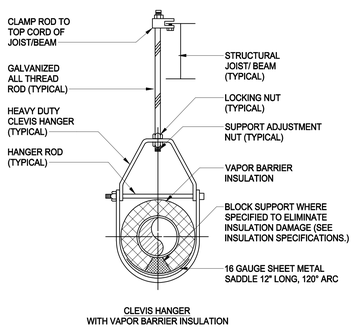


NOTE:

1. FOR INTERIOR FRAME PARTITIONS - PIPE SLEEVES MAY BE FABRICATED FROM GALVANIZED SHEET METAL; ROUND TUBE CLOSED WITH SNAPLOCK JOINT, WELDED SPIRAL SEAMS, OR WELDED LONGITUDINAL JOINT. FABRICATE FROM THE FOLLOWING GAUGES: 3" AND SMALLER, 20 GAUGE; 4" TO 6", 16 GAUGE; OVER 6", 14 GAUGE.

3 DETAIL - TYPICAL PIPE SLEEVE THRU INTERIOR WALL

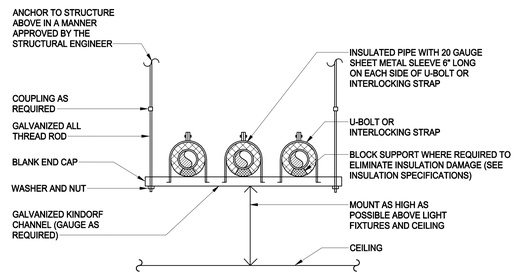
NO SCALE



CLEVIS HANGER
WITH VAPOR BARRIER INSULATION

4 DETAIL - TYPICAL INDIVIDUAL PIPE SUPPORT

NO SCALE

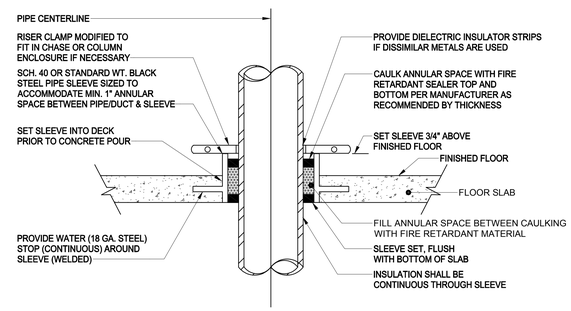


NOTES:

1. ALL PIPING SUPPORT SYSTEM COMPONENTS SHALL HAVE A NON-CORROSIVE METAL FINISH, GALVANIZED OR EQUAL.
2. COORDINATE CROSS PIPING WITH MECHANICAL PIPING ROUTED IN CORRIDORS & SPRINKLER PIPING MAINS CROSSING IN CORRIDORS.

5 DETAIL - TYPICAL TRAPEZE PIPING SUPPORT

NO SCALE



6 DETAIL - TYPICAL PIPE SLEEVE THRU INTERIOR FLOOR

NO SCALE

REVISIONS

no.	date	comments

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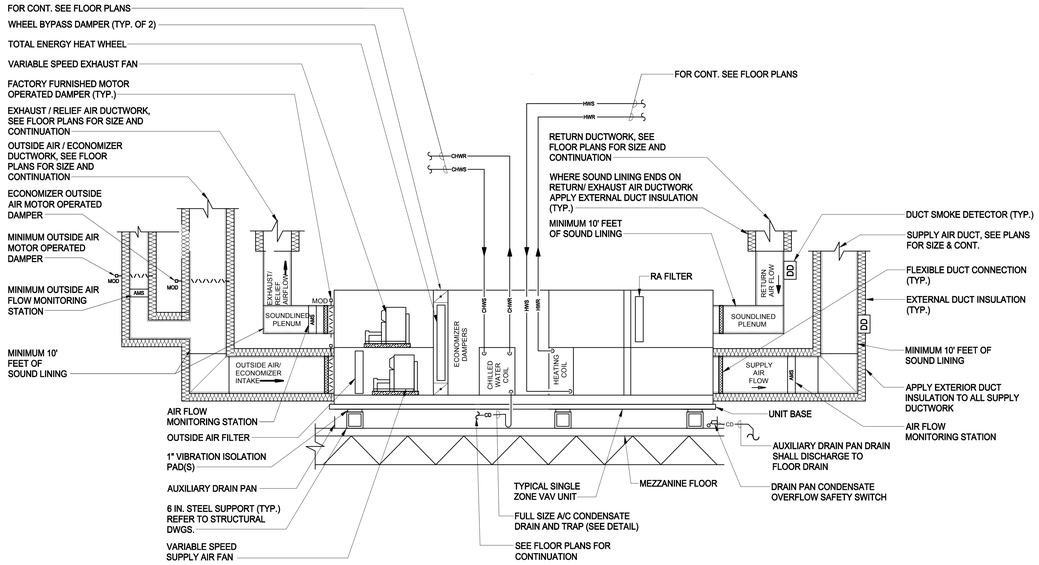
M305

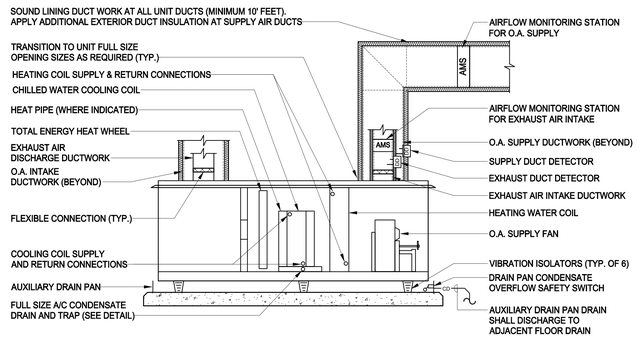


NOTES:

1. PROVIDE DUCT SMOKE DETECTORS ON SUPPLY AND RETURN DUCTS, SEE PLANS FOR LOCATION.
2. PROVIDE A MINIMUM OF 10 FEET OF SOUND LINING FOR SUPPLY, INTAKE, EXHAUST/RELIEF AND RETURN AIR DUCTS FROM UNIT.
3. COODINATE EXACT LOCATIONS FOR DUCT CONNECTIONS WITH FLOOR PLANS AND EQUIPMENT MANUFACTURER.
4. REFER TO FLOOR PLANS FOR EXACT LOCATION OF AIRFLOW MONITORING STATIONS.

4 DETAIL - INDOOR SINGLE ZONE VAV UNITS

NO SCALE

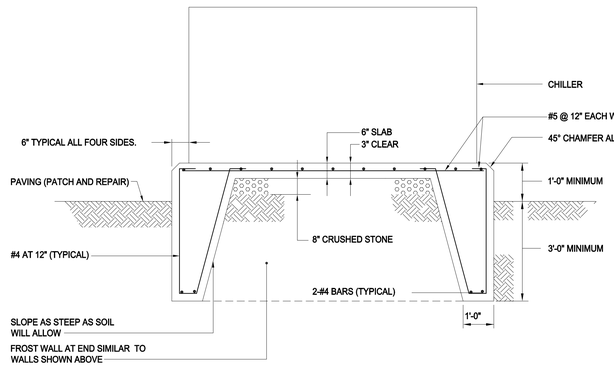


NOTES:

1. REFER TO DRAWINGS FOR LOCATION OF DUCTWORK CONNECTIONS TO UNIT.
2. SEE COIL PIPING DETAILS FOR CONTROL VALVE AND FREEZE PROTECTION PIPING.
3. FURNISH AND INSTALL MULTIPLE AIR FLOW MONITORING STATIONS WHERE INDICATED.

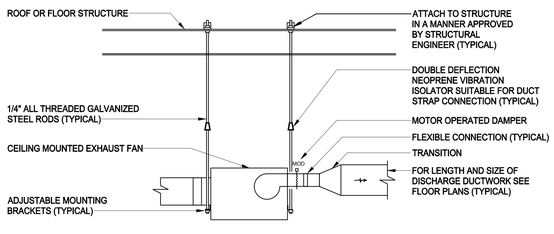
2 DETAIL - TYPICAL INDOOR FLOOR MOUNTED ENERGY RECOVERY VENTILATOR WITH DUCT MOUNTED AIR FLOW MONITORING STATIONS

NO SCALE



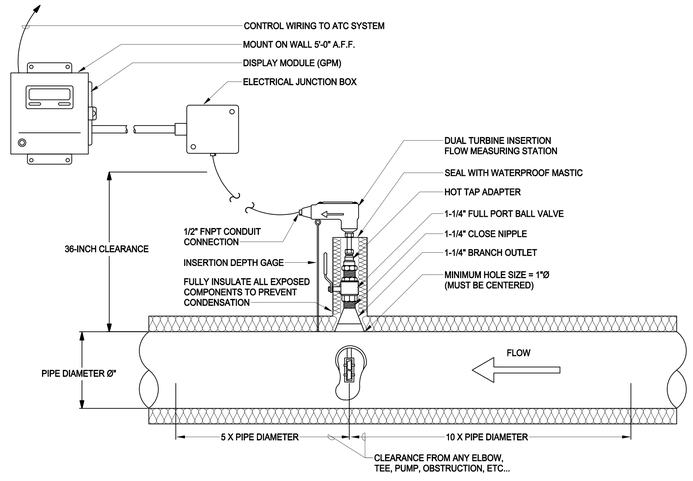
3 DETAIL - TYPICAL EXTERIOR EQUIPMENT PAD FOR CHILLER

NO SCALE



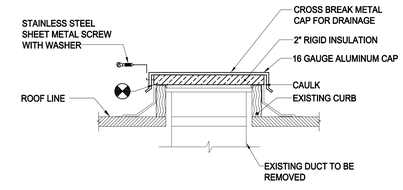
4 DETAIL - TYPICAL INLINE CABINET EXHAUST FAN

NO SCALE



5 DETAIL - FLOW MEASURING STATION

NO SCALE



6 DETAIL - TYPICAL ROOF CURB CAP FOR EXISTING ROOF CURB

NO SCALE

REVISIONS

no.	date	comments

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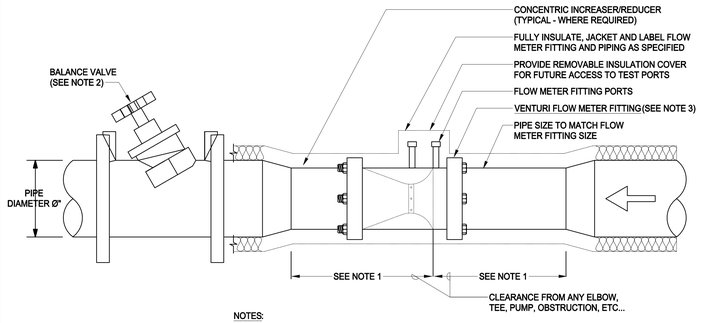
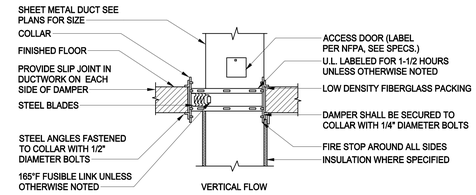


NOTES:

1. PROVIDE MINIMUM RECOMMENDED UPSTREAM AND DOWNSTREAM CLEARANCES PER MANUFACTURER'S REQUIREMENTS.
2. FOR CONSTANT SPEED PUMPS, WHERE A FLOW METER FITTING IS INDICATED ON PUMP DISCHARGE, ALSO INSTALL A BALANCE VALVE. OMIT BALANCE VALVE FOR VARIABLE SPEED DRIVEN PUMPS.
3. REFER TO SCHEDULE ON THIS DETAIL FOR SIZING AND SELECTION OF ALL FLOW METER FITTINGS.

1 DETAIL - FLOW METER FITTING (VENTURI TYPE)

NO SCALE

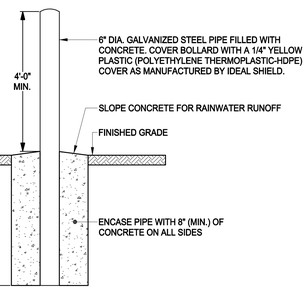


NOTE:

1. INSTALLATION SHALL COMPLY WITH U.L. REQUIREMENTS

2 DETAIL - TYPICAL VERTICAL DYNAMIC TYPE FIRE DAMPER

NO SCALE

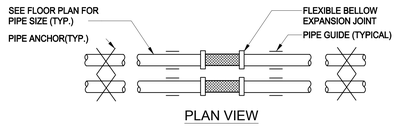


NOTES:

1. FIELD-COORDINATE EXACT LOCATION(S) OF BOLLARD(S) WITH EQUIPMENT BEING PROTECTED BY THE SAME TO ENSURE THAT BOLLARD(S) DO NOT OBSTRUCT ACCESS TO EQUIPMENT.

3 DETAIL - PROTECTIVE BOLLARD

NO SCALE

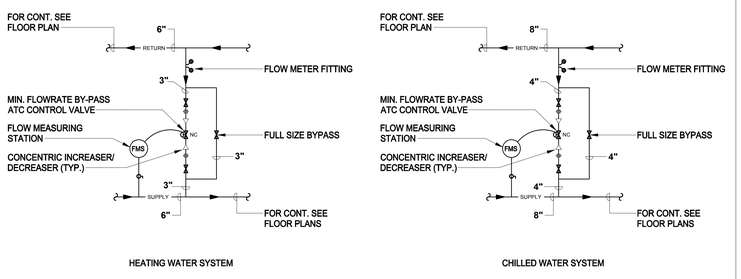


NOTE:

1. BELLOW TO BE INSTALLED HORIZONTALLY AND WITHIN FOUR PIPE DIAMETERS OF A PIPE GUIDE

4 DETAIL - TYPICAL FLEXIBLE EXPANSION BELLOWS

NO SCALE

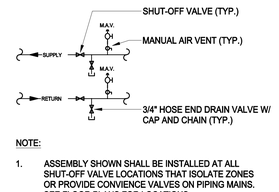


NOTES:

1. INSTALL ON HYDRONIC WATER MAINS AND INTERLOCK WITH ATC SYSTEM.
2. CONTROL VALVE SHALL BE SIZED BASED ON FLOW RATE, NOT PIPE SIZE.

5 DETAIL - MINIMUM FLOWRATE BYPASS PIPING

NO SCALE

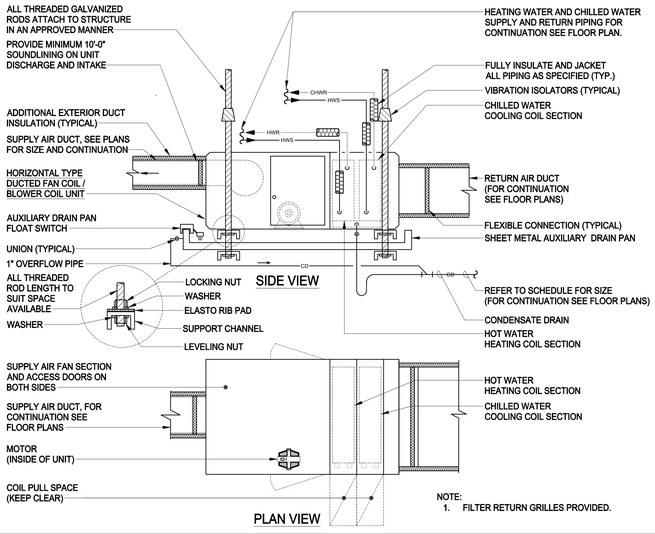


NOTE:

1. ASSEMBLY SHOWN SHALL BE INSTALLED AT ALL SHUT-OFF VALVE LOCATIONS THAT ISOLATE ZONES OR PROVIDE CONVIENCE VALVES ON PIPING MAINS. SEE FLOOR PLANS FOR LOCATIONS.
2. INSTALL ADDITIONAL MANUAL AIR VENTS AT ALL HIGH POINTS OF THE PIPING SYSTEMS.

6 DETAIL - TYPICAL HYDRONIC ZONE SHUT-OFF VALVE ASSEMBLY

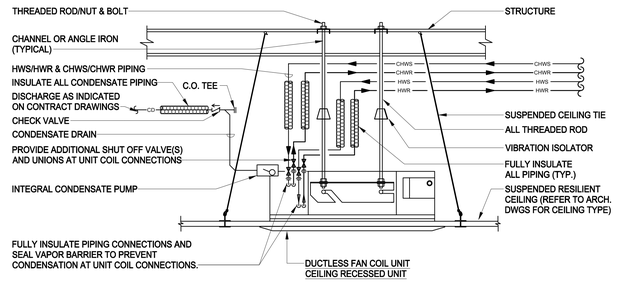
NO SCALE



NOTE:
1. FILTER RETURN GRILLES PROVIDED.

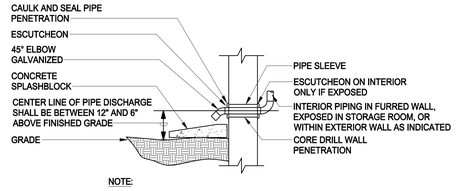
7 DETAIL - HORIZONTAL FAN COIL / BLOWER COIL UNIT (DUAL WALL)

NO SCALE



8 DETAIL - DUCTLESS FAN COIL CEILING MOUNTED UNIT

NO SCALE



NOTE:

1. PAINT EXTERIOR GALVANIZED 45° ELBOW TO MATCH BUILDING EXTERIOR WALL COLOR.

9 DETAIL - A/C CONDENSATE DRAIN DISCHARGE DETAIL

NO SCALE

REVISIONS

no.	date	comments

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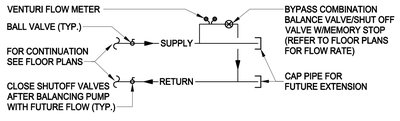
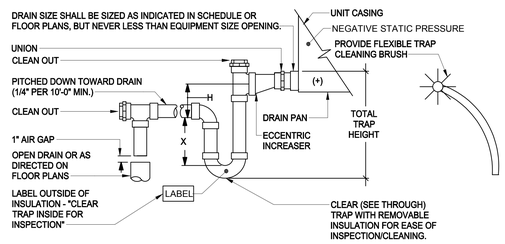


NOTE:
1. REFER TO FLOOR PLANS FOR LOCATION AND QUANTITY.

1 DETAIL - TYPICAL FUTURE ADDITION HYDRONIC PIPING FLOW BYPASS

NO SCALE

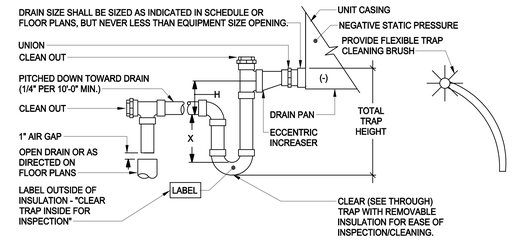
TRAP SIZING
"X" MUST EQUAL 1 INCH PLUS CASING STATIC PRESSURE
"H" MUST EQUAL AT LEAST 1 INCH
TOTAL TRAP HEIGHT = "X" + "H" + (1.5 x PIPE DIAMETER) + INSULATION THICKNESS



2 DETAIL - TYPICAL BLOW-THRU OR POSITIVE PRESSURE A/C CONDENSATE DRAIN TRAP ASSEMBLY

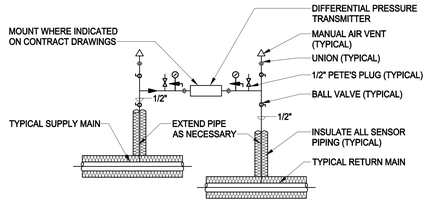
NO SCALE

TRAP SIZING
"H" MUST EQUAL 1 INCH PLUS CASING STATIC PRESSURE
"X" = 1/2 "H"
TOTAL TRAP HEIGHT = "X" + "H" + (1.5 x PIPE DIAMETER) + INSULATION THICKNESS



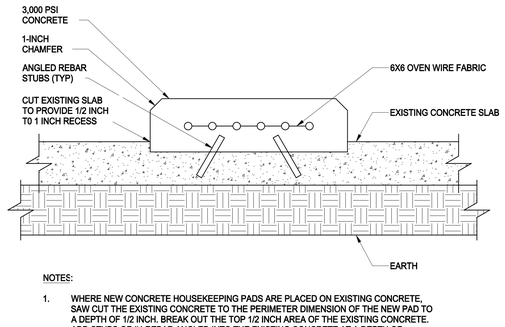
3 DETAIL - TYPICAL DRAW-THRU OR NEGATIVE PRESSURE A/C CONDENSATE DRAIN TRAP ASSEMBLY

NO SCALE



4 DETAIL - TYPICAL DIFFERENTIAL PRESSURE TRANSMITTER

NO SCALE

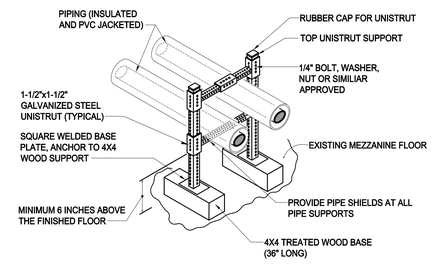


NOTES:

1. WHERE NEW CONCRETE HOUSEKEEPING PADS ARE PLACED ON EXISTING CONCRETE, SAW CUT THE EXISTING CONCRETE TO THE PERIMETER DIMENSION OF THE NEW PAD TO A DEPTH OF 1/2 INCH. BREAK OUT THE TOP 1/2 INCH AREA OF THE EXISTING CONCRETE. ADD STUBS OF #4 REBAR ANGLED INTO THE EXISTING CONCRETE AT A DEPTH OF APPROXIMATELY 50 PERCENT OF THE EXISTING SLAB THICKNESS. THE TOP PORTION OF THE REBAR STUB SHALL EXTEND INTO THE NEW PAD BY APPROXIMATELY 50 PERCENT OF ITS THICKNESS. FURNISH ONE REBAR STUB PER EVERY TWO SQUARE FEET OF THE NEW PAD. CHEMICALLY BOND THE NEW CONCRETE TO THE EXISTING CONCRETE.
2. EXTEND CONCRETE 4-6 INCHES BEYOND EQUIPMENT.
3. PAINT EDGES OF SLAB SAFETY YELLOW.

5 DETAIL - CONCRETE HOUSE KEEPING PAD EXISTING SLAB

NO SCALE

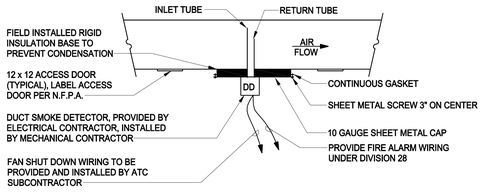


NOTES:

1. ALL UNISTRUT, SUPPORTS & HARDWARE SHALL BE GALVANIZED STEEL.
2. PROVIDE SUPPORTS FOR ADDITIONAL VERTICAL STACKED PIPING WHERE INDICATED.

6 DETAIL - INTERIOR PIPE FLOOR SUPPORT

NO SCALE



7 DETAIL - TYPICAL DUCT SMOKE DETECTOR

NO SCALE

8 NOT USED

9 NOT USED

REVISIONS

no.	date	comments

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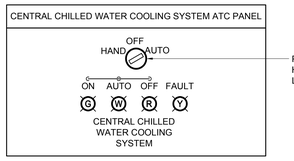
BID DOCUMENTS

DETAILS
HVAC

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

M308



AUTOMATIC TEMPERATURE CONTROL POINT LIST

EQUIPMENT OR SYSTEM	DISCRETE & ANALOG CONTROL						DISCRETE & STATUS ALARM	DISCRETE ALARM			ANALOG VALVE INDICATION & ALARM													PROGRAMS				
	START & STOP	CHILLED WATER VALVE (FULLY MODULATING - PRESSURE INDEPENDENT)	MINIMUM FLOW BYPASS VALVE (FULLY MODULATING PRESSURE INDEPENDENT)	CHILLER FREEZE PROTECTION PUMP ENERGIZE MODE	VSD DRIVE	LEAD / STANDBY	LEAD / LAG	EQUIPMENT STATUS	HIGH TEMP. ALARM	DOMESTIC MAKE UP WATER FLOW METER ALARM	LOW TEMP. ALARM	FLOW SWITCH	CHILLED WATER RE-SET	DIFFERENTIAL PRESSURE TRANSMITTERS (TYP.)	TEMP. CHWR (PRIMARY & SECONDARY)	TEMP. CHWS (PRIMARY & SECONDARY)	CHILLED WATER HYDRAULIC SEPARATOR TEMPERATURE	VFD SPEED, AMPERAGE AND ALARMS	AUTOMATIC GLYCOL FEEDER (LOW FLUID ALARM)	TEMP. OA GLOBAL	CHILLER SUPPLY TEMPERATURE	CHILLER RETURN TEMPERATURE	CHILLER BACNET POINTS	FLOW MEASURING STATION (SECONDARY)	TOTAL RUN TIME	DEMAND LIMIT	OPT START & STOP	TIME PROGRAM	GRAPHIC DISPLAY
CHILLER (TYP. OF 1)	●							●	●	●	●	●	●	●	●	●	●			●	●	●	●		●	●	●	●	●
PRIMARY CHILLED WATER PUMPS (TYP. OF 2)	●			●		●		●																	●	●	●	●	●
SECONDARY CHILLED WATER PUMPS (TYP. OF 2)	●	●	●		●		●	●						●				●						●	●	●	●	●	●
AUTOMATIC GLYCOL FEEDER								●											●										●
ELECTRIC HEATING CABLES								●																	●				●

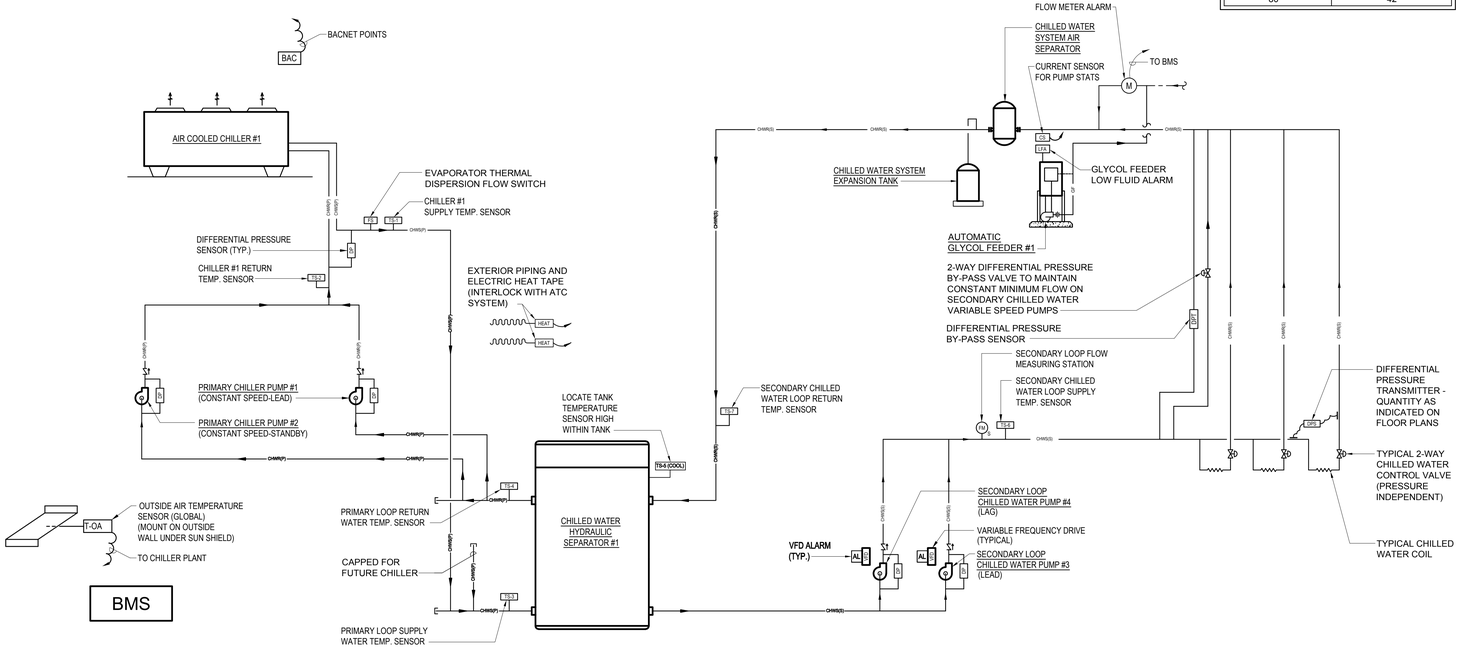
NOTES:
1. PROVIDE ADDITIONAL DIGITAL POINTS AS NECESSARY TO ACCOMPLISH THE SPECIFIED SEQUENCE OF OPERATION DESCRIBED IN THE SPECIFICATIONS.
2. ALL ITEMS IN THE POINTS LIST SHALL BE VIEWABLE FROM THE OPERATOR'S TERMINAL.

SECONDARY CHILLED WATER PUMP - PARALLEL PUMP OPERATION (EXAMPLE)

1.	SINGLE LEAD CHILLED WATER SECONDARY PUMP MIN. AND MAX. FLOW RATE:	110 GPM TO 352 GPM (MAX. GPM IS 110% OF PEAK DESIGN FLOWRATE)
2.	PARALLEL LAG CHILLED WATER SECONDARY PUMP ENERGIZE FLOW RATE (AS MEASURED BY SECONDARY FLOW MEASURING STATION):	352.1 GPM (>110% OF SINGLE SECONDARY CHILLED WATER PUMP MAX. FLOW RATE)
3.	PARALLEL LAG CHILLED WATER SECONDARY PUMP DE-ENERGIZE FLOW RATE (AS MEASURED BY SECONDARY FLOW MEASURING STATION):	220 GPM (<66% OF SINGLE SECONDARY CHILLED WATER PUMP MAX. FLOW RATE - ALSO MIN. FLOW RATE FOR SECONDARY PUMPS (110 GPM X 2 PUMPS))
4.	PARALLEL LEAD/LAG CHILLED WATER SECONDARY PUMP(S) MIN. AND MAX. FLOW RATE:	352.1 GPM TO 640 GPM (MAX. GPM IS COMBINED FLOW RATE FOR LEAD / LAG SECONDARY CHILLED WATER PUMPS)

CHILLED WATER RESET SCHEDULE

T-OA OUTSIDE AIR TEMP (°F)	CHILLED WATER HYDRAULIC SEPARATOR TEMP (°F) (TS-7)
55	48
80	42



ATC CONTROL SEQUENCE

CENTRAL CHILLED WATER SYSTEM

1. THE CHILLED WATER SYSTEM SHALL BE STARTED AND STOPPED BY A SIGNAL FROM THE BMS. PROVIDE A PANEL MOUNTED HAND-OFF-AUTO (H-O-A) SWITCH THAT OVERRIDES THE BMS TO MANUALLY START OR STOP THE CHILLED WATER SYSTEM. THE BMS SHALL HAVE CONTROL OF THE CHILLED WATER SYSTEM OPERATION WHEN THE PANEL MOUNTED H-O-A SWITCH IS IN THE "AUTO" POSITION ONLY. TO MANUALLY ENERGIZE HEATING SYSTEM FOR AQUACULTURE OPERATIONS (TO SERVE HEAT EXCHANGERS) SWITCH PANEL MOUNTED H-O-A SWITCH TO "HAND" POSITION.
2. PROVIDE AN OUTSIDE TEMPERATURE SENSOR THAT SHALL AUTOMATICALLY ENERGIZE THE CHILLED WATER SYSTEM WHEN THE AMBIENT TEMPERATURE IS 55 DEGREES F (ADJUSTABLE) OR ABOVE. OUTSIDE TEMPERATURE SENSOR SHALL BE A GLOBAL UNIT MOUNTED OUTSIDE UNDER SUN SHIELD.
3. PROVIDE AUTOMATIC ALTERNATOR FOR LEAD/LAG PUMP CONTROL OF THE SECONDARY PUMPS. ONLY ONE SECONDARY PUMP SHALL RUN AT ONE TIME. IF THE LEAD PUMP FAILS AS SENSED BY DIFFERENTIAL PRESSURE SENSOR, THE LAG PUMP SHALL ENERGIZE AFTER A 15 SECOND TIME DELAY AND AN AUDIBLE AND VISUAL ALARM WITH SILENCE SWITCH SHALL SOUND "ON" THE EMS. THE SYSTEM SHALL AUTOMATICALLY ROTATE LEAD/LAG ASSIGNMENT EVERY WEEK, ADJUSTABLE THROUGH SOFTWARE.
4. IN ADDITION TO AUTOMATIC ALTERNATOR PROVIDE A PANEL MOUNTED PUMP SELECTOR SWITCH THAT SHALL ALLOW MANUAL OVERRIDE OF THE PRIMARY (LEAD) AND LAG STATUS OF EACH PUMP AND INTERLOCKS TO THE SELECTED PUMPS. PROVIDE A POLE ON THE H-O-A SWITCH FOR THE EXCLUSIVE USE OF THE BMS FOR REMOTE MONITORING OF THE SWITCH POSITION. ALL INPUT AND OUTPUT POINTS LISTED ON THE BMS POINT SCHEDULE THAT ARE CONNECTED THROUGH A CONTROL PANEL PROVIDED BY THE ATC SUBCONTRACTOR, SHALL BE WIRED THROUGH DEDICATED TERMINAL STRIPS. DIGITAL OUTPUT (DO) CONTROL POINTS SHALL BE A 24 VAC MAX SIGNAL PROVIDED BY THE BMS TO THE ATC CONTROL PANEL TO DRIVE A PILOT RELAY. THE PILOT RELAY, THE H-O-A SWITCH, AND ALL CONTROL PANEL AND EQUIPMENT INTERLOCK WIRING SHALL BE PROVIDED BY THE ATC SUBCONTRACTOR. THE 24 VAC SIGNAL AND ALL WIRING BETWEEN THE ATC CONTROL PANEL AND THE BMS SHALL BE PROVIDED BY THE ATC SUBCONTRACTOR.
5. CHILLER WHEN ENABLED SHALL OPERATE UNDER IT'S PACKAGED CONTROLS TO MAINTAIN A CONSTANT LEAVING WATER TEMPERATURE OF 42 DEGREES F (ADJUSTABLE). WHENEVER A CHILLER IS ENABLED THE LEAD (CONSTANT SPEED) PRIMARY PUMP SHALL ENERGIZE AND RUN CONTINUOUSLY.
6. PROVIDE AUTOMATIC ALTERNATOR FOR LEAD/STANDBY PUMP CONTROL OF THE PRIMARY PUMPS. ONLY ONE PRIMARY PUMP SHALL RUN AT ONE TIME. IF THE LEAD PUMP FAILS AS SENSED BY DIFFERENTIAL PRESSURE SENSOR, THE STANDBY PUMP SHALL ENERGIZE AFTER A 15 SECOND TIME DELAY AND AN AUDIBLE AND VISUAL ALARM WITH SILENCE SWITCH SHALL SOUND "ON" THE BMS. THE SYSTEM SHALL AUTOMATICALLY ROTATE LEAD/STANDBY ASSIGNMENT EVERY WEEK, ADJUSTABLE THROUGH SOFTWARE.
7. THE DIFFERENTIAL PRESSURE SENSOR SET POINT FOR THE VARIABLE FREQUENCY DRIVEN PUMPS SHALL BE FIELD DETERMINED. SET POINT SHALL BE BASED ON MAINTAINING MINIMUM PRESSURE TO OVERCOME RESISTANCE OF ANY COILS, CONTROL VALVE, AND RUNOUT PIPE/FITTINGS. THE FINAL DIFFERENTIAL PRESSURE SENSOR SET POINT VALUE SHALL BE DOCUMENTED ON THE AS-BUILT ATC DRAWINGS.
8. FURNISH AND INSTALL HIGH TEMPERATURE AND LOW TEMPERATURE ALARM PROGRAM ON THE SECONDARY LOOP SUPPLY TEMPERATURE SENSOR. SHOULD THE SECONDARY LOOP TEMPERATURE EXCEED 60 DEGREES F (ADJUSTABLE) OR DROP BELOW 38 DEGREES F (ADJUSTABLE) DURING NORMAL SYSTEM OPERATION AND ALARM SHOULD ANNUNCIATE ON THE ATC SYSTEM AN AUDIBLE AND VISUAL ALARM WITH SILENCE SWITCH SHALL ANNUNCIATE UPON ACTIVATION OF THE ALARM CONDITION.
9. WHEN THE CHILLED WATER SYSTEM IS STARTED (MANUALLY OR AUTOMATICALLY), EITHER LOCALLY OR REMOTELY THROUGH THE BMS, THE ATC SYSTEM SHALL START THE LEAD PRIMARY (CONSTANT SPEED) CHILLED WATER PUMP AND CHILLER. THE LEAD PRIMARY CHILLED WATER PUMP SHALL THEN RUN CONTINUOUSLY. UPON PROOF OF FLOW VIA DISCHARGE FLOW SWITCH, (FS), THE CHILLER SHALL BE ENERGIZED. THE CHILLER SYSTEM PACKAGED CONTROLS SHALL MAINTAIN A LEAVING WATER TEMPERATURE OF 42 DEGREES F (ADJUSTABLE) AS SENSED BY CHILLED WATER SUPPLY TEMPERATURE SENSOR, TS-1. A CHILLER RETURN TEMPERATURE SENSOR, TS-2, SHALL BE PROVIDED TO MONITOR CHILLER RETURN TEMPERATURE. THE CHILLER AND ITS ASSOCIATED PUMP SHALL MAINTAIN CHILLED WATER HYDRAULIC SEPARATOR TEMPERATURE BY LOADING/UNLOADING COMPRESSORS AS REQUIRED.
10. THE SECONDARY LOOP FLOW MEASURING STATION, FM(S) SHALL ENABLE THE LAG CHILLED WATER SECONDARY PUMP WHENEVER THE FLOW RATE MEASURED AT THE SECONDARY LOOP FLOW MEASURING STATION, FM(S) REACHES 110 PERCENT (ADJUSTABLE) OF THE FLOW RATE OF A SINGLE SECONDARY CHILLED WATER PUMP MEASURED AT THE SECONDARY LOOP FLOW MEASURING STATION, FM(S). PROVIDE TIME DELAY OF 15 MINUTES (ADJUSTABLE) TO AVOID CYCLING ON/OFF OF LAG SECONDARY CHILLED WATER PUMP. THE LAG CHILLED WATER SECONDARY PUMP AND SHALL THEN OPERATE IN PARALLEL WITH THE LEAD SECONDARY PUMP UNTIL THE SECONDARY LOOP FLOW RATE MEASURED AT FM(S) DROPS TO 66 PERCENT OF THE DESIGN FLOW RATE OF A SINGLE SECONDARY CHILLED WATER PUMP. PROVIDE TIME DELAY OF 15 MINUTES (ADJUSTABLE) TO AVOID CYCLING ON/OFF OF LAG SECONDARY CHILLED WATER PUMP.
11. CHILLER AND ASSOCIATED PRIMARY PUMP(S) SHALL BE SEQUENCED TO MAINTAIN HYDRAULIC SEPARATOR VARIABLE TEMPERATURE PER RESET SCHEDULE (ADJUSTABLE) AS SENSED BY HYDRAULIC SEPARATOR TEMPERATURE SENSOR TS-5. IF THE CHILLER OR PRIMARY CHILLER PUMP FAIL THEN AN AUDIBLE AND VISUAL ALARM WITH SILENCE SWITCH SHALL SEND AN ALARM ON THE ATC/EMS SYSTEM PANEL. PROVIDE ALL INTERLOCK WIRING REQUIRED BY THE CHILLER MANUFACTURER, INCLUDING STARTER INTERLOCKS, FLOW SWITCH, AND PUMP STARTER AUXILIARY CONTACT WIRING TO INSURE A COMPLETE AND AUTOMATED SYSTEM.
12. TANK TEMPERATURE SENSOR (TS-5) SHALL ENERGIZE AIR COOLED CHILLER COMPRESSORS AS REQUIRED TO MAINTAIN TANK TEMPERATURE SET POINT 42 DEGREES F (ADJUSTABLE).
13. THE FACTORY FURNISHED CHILLER CONTROLS SHALL BE ARRANGED TO PREVENT SHORT CYCLING OF COMPRESSORS DUE TO RAPID CHANGES IN CHILLER RETURN TEMPERATURE. THE CHILLER COMPRESSORS SHALL BE BROUGHT ON AND DE-ENERGIZED IN SUFFICIENT NUMBER OF STAGES TO PREVENT SHORT CYCLING.
14. THROUGH INTERLOCK WIRING THE LEAD SECONDARY CHILLED WATER PUMP SHALL BE ENERGIZED WHENEVER A PRIMARY CHILLED WATER PUMP AND CHILLER IS ENERGIZED. THE LEAD SECONDARY CHILLED WATER PUMP SYSTEM SHALL VARY SYSTEM FLOW THROUGH PUMP VARIABLE SPEED DRIVE TO MAINTAIN DIFFERENTIAL PRESSURE CONTROLLER SET POINT. DIFFERENTIAL PRESSURE SENSOR/TRANSMITTER SHALL BE COMMERCIAL GRADE QUALITY, INTELLIGENT TYPE, OR APPROVED EQUAL. DIFFERENTIAL PRESSURE SET POINT SHALL BE ADJUSTABLE THROUGH THE ENERGY MANAGEMENT SYSTEM. THE DIFFERENTIAL PRESSURE SENSOR/TRANSMITTER SHALL BE LOCATED AS SHOWN ON THE DRAWINGS. THE LEAD SECONDARY CHILLED WATER PUMP SHALL ONLY ENERGIZE WHEN PRIMARY SYSTEM IS ON.
15. WHEN THE CHILLED WATER SYSTEM IS STOPPED, EITHER MANUALLY OR AUTOMATICALLY, THE ATC CONTRACTOR SHALL PROVIDE A "TIME DELAY OFF" FUNCTION TO KEEP BOTH THE SECONDARY LEAD CHILLED WATER PUMP AND THE PRIMARY LEAD CHILLED WATER PUMP RUNNING FOR AN ADDITIONAL 2 MINUTES (ADJUSTABLE) AFTER THE CHILLER HAS BEEN DE-ENERGIZED TO ENSURE THAT RESIDUAL REFRIGERANT WILL PASS OUT OF THE EVAPORATOR.
16. PROVIDE A DIFFERENTIAL PRESSURE SENSOR TO DETERMINE STATUS OF CHILLER. THE BMS SYSTEM AND LOCAL ATC PANEL SHALL BE ALARMED FOR CHILLER FAILURE.
17. THE PRIMARY CHILLED WATER PLANT LOOP SHALL BE PROVIDED WITH CHILLER SUPPLY TEMPERATURE SENSORS (TS-1) CHILLER RETURN TEMPERATURE SENSORS (TS-2), PRIMARY LOOP SUPPLY TEMPERATURE SENSOR, TS-3, AND PRIMARY LOOP RETURN TEMPERATURE SENSOR, TS-4. ALL CONTROL DEVICES SHALL BE MONITORED AND FULLY ADJUSTABLE.
18. THE SECONDARY CHILLED WATER PLANT LOOP SHALL BE PROVIDED WITH SECONDARY LOOP SUPPLY WATER TEMPERATURE SENSOR, TS-6, SECONDARY LOOP RETURN WATER TEMPERATURE SENSOR TS-7, SECONDARY LOOP FLOW MEASURING STATION FMS AND DIFFERENTIAL PRESSURE TRANSMITTERS. ALL CONTROL DEVICES SHALL BE MONITORED AND FULLY ADJUSTABLE.
19. ATC SYSTEM SHALL INCLUDE ALL ALGORITHMS AND DEVICES REQUIRED FOR CHILLER SEQUENCING (IN FUTURE WHEN SECOND CHILLER IS ADDED), PUMP SEQUENCING, BTU MEASUREMENT, AND CHILLED WATER RESET.
20. PROVIDE A MAKE-UP WATER FLOW METER/ALARM THAT SHALL, UPON DETECTION OF FLOW (FIELD DETERMINED) SEND AN ALARM TO THE CENTRAL STATION MONITORING SYSTEM NOTIFYING THE OWNER THAT FLOW IS BEING PRODUCED THROUGH THE METER. UPON MANUAL RESET AT THE FLOW METER THE ALARM SHALL CEASE AND THE SYSTEM RETURN TO NORMAL STATUS. THE BMS SHALL KEEP RECORD OF TOTAL NUMBER OF GALLONS THAT HAVE PASSED THROUGH THE MAKE-UP WATER FLOW METER/ALARM.
21. PROVIDE ALL INTERLOCK AND CONTROL WIRING FOR AUTOMATIC GLYCOL FEEDER. INTERLOCK STATUS AND LOW FLUID ALARM ON GLYCOL FEEDER WITH ATC SYSTEM.
22. THE SECONDARY CHILLED WATER LOOPS SHALL BE PROVIDED WITH FLOW MEASURING STATION (FMS). THE FLOW MEASURING STATIONS SHALL MONITOR THE SECONDARY CHILLED WATER FLOW RATES IN GALLONS PER MINUTE AND SHALL DISPLAY THE VALUE ON THE ATC SYSTEM COMPUTER.
23. FURNISH AND INSTALL A FLOW SWITCH (FS) IN DISCHARGE PIPE OF THE CHILLER. CHILLER COMPRESSORS SHALL NOT BE ENABLED TO ENERGIZE UNTIL FLOW SWITCH PROVES FLOW. INTERLOCK FLOW SWITCHES TO ATC SYSTEM.
24. MINIMUM FLOWRATE BYPASS VALVE: PROVIDE A MINIMUM SECONDARY FLOW RATE BYPASS VALVE, DIFFERENTIAL PRESSURE TRANSMITTER AND INTERLOCK WITH SECONDARY FLOW MEASURING STATION TO MAINTAIN MINIMUM SECONDARY CHILLED WATER FLOW RATE REGARDLESS OF TERMINAL EQUIPMENT TWO-WAY VALVE POSITION(S). THE MINIMUM SECONDARY FLOW RATE BYPASS VALVE SHALL MODULATE TO MAINTAIN MINIMUM SCHEDULED FLOW RATE ON THE CHILLED WATER SECONDARY PUMPS AS SCHEDULED. THE DIFFERENTIAL PRESSURE AT THE MINIMUM FLOW BYPASS SHALL ALSO BE MONITORED ON THE ATC SYSTEM.
25. THE DIFFERENTIAL PRESSURE SET POINT SHALL BE DETERMINED BASED ON FIELD MEASUREMENTS OF DIFFERENTIAL PRESSURE ACROSS THE MAINS AND FIELD MEASUREMENT OF THE CHILLED WATER SECONDARY PUMP FLOW RATES TO VERIFY A MINIMUM FLOW AS SCHEDULED ON THE CHILLED WATER SECONDARY PUMP SCHEDULE. MINIMUM DIFFERENTIAL PRESSURE SHALL BE INDICATED IN ATC GRAPHIC AS SECONDARY INDICATOR OF MINIMUM FLOW AS MEASURED AT THE FLOW MEASURING STATION.
26. HARD WIRE INTERLOCK CHILLER PRIMARY PUMPS WITH CHILLER.
27. MAP OVER CHILLER BACNET POINTS DESIRED BY OWNER TO BMS.
28. INTERLOCK AND MONITOR STATUS OF ELECTRIC HEAT TAPE FOR ALL EXTERIOR PIPING. REFER TO ELECTRICAL DRAWINGS FOR LOCATION.
29. EACH CHILLER'S PRIMARY CHILLED WATER PUMP SHALL BE HARDWIRED INTERLOCKED WITH ITS ASSOCIATED CHILLER. CHILLER CONTROL PANEL SHALL AUTOMATICALLY ENERGIZE PRIMARY CHILLED WATER PUMP FOR FREEZE PROTECTION PER MANUFACTURER'S REQUIREMENTS. UPON A SIGNAL FROM THE AIR COOLED CHILLER FREEZE PROTECTION PUMP CONTROL OUTPUT FOR FREEZE PROTECTION PUMP OPERATION THE LEAD PRIMARY CHILLED WATER PUMP SHALL ENERGIZE AND RUN CONTINUOUSLY. FREEZE PROTECTION MODE SHALL ONLY BE ENABLED WHEN THE CHILLED WATER SYSTEM IS "OFF" DUE TO AMBIENT CONDITIONS AND THE AMBIENT TEMPERATURE IS BELOW 37°F (ADJUSTABLE).

1 CONTROLS - CENTRAL CHILLED WATER SYSTEM (BASE BID)

NO SCALE

REVISIONS

no.	date	comments

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SUBMISSION
BID DOCUMENTS

AUTOMATIC TEMPERATURE CONTROLS HVAC

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
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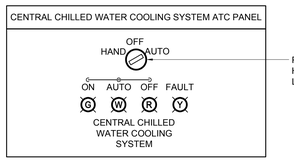
M401



AUTOMATIC TEMPERATURE CONTROL POINT LIST

EQUIPMENT OR SYSTEM	DISCRETE & ANALOG CONTROL: START & STOP	CHILLED WATER VALVE (FULLY MODULATING - 2-WAY) OR (3-WAY)	MINIMUM FLOW BYPASS VALVE (FULLY MODULATING PRESSURE INDEPENDENT)	CHILLER FREEZE PROTECTION PUMP ENERGIZE MODE	VSD DRIVE	LEAD / LAG	DISCRETE & STATUS ALARM: EQUIPMENT STATUS	DISCRETE ALARM: HIGH TEMP. ALARM	DOMESTIC MAKE UP WATER FLOW METER ALARM	LOW TEMP. ALARM	ANALOG VALVE INDICATION & ALARM: FLOW SWITCHES (TYP.)	CHILLED WATER RESET	DIFFERENTIAL PRESSURE TRANSMITTERS (TYP.)	TEMP CHWR (PRIMARY & SECONDARY)	TEMP CHWS (PRIMARY & SECONDARY)	CHILLED WATER HYDRAULIC SEPARATOR TEMPERATURE	VFD SPEED, AMPERAGE AND ALARMS	AUTOMATIC GLYCOL FEEDER (LOW FLUID ALARM)	TEMP OA GLOBAL	CHILLER SUPPLY TEMPERATURE	CHILLER RETURN TEMPERATURE	CHILLER BACNET POINTS	FLOW MEASURING STATION (SECONDARY)	PROGRAMS: TOTAL RUN TIME	DEMAND LIMIT	OPT START & STOP	TIME PROGRAM	GRAPHIC DISPLAY
CHILLER (TYP. OF 2)	●					●	●	●	●	●	●	●	●	●	●	●			●	●	●	●		●	●	●	●	●
PRIMARY CHILLED WATER PUMPS (TYP. OF 2)	●			●		●	●												●	●			●	●	●	●	●	●
SECONDARY CHILLED WATER PUMPS (TYP. OF 2)	●	●	●		●	●	●							●				●		●			●	●	●	●	●	●
AUTOMATIC GLYCOL FEEDER							●												●					●				●
ELECTRIC HEAT TAPE							●																	●				●

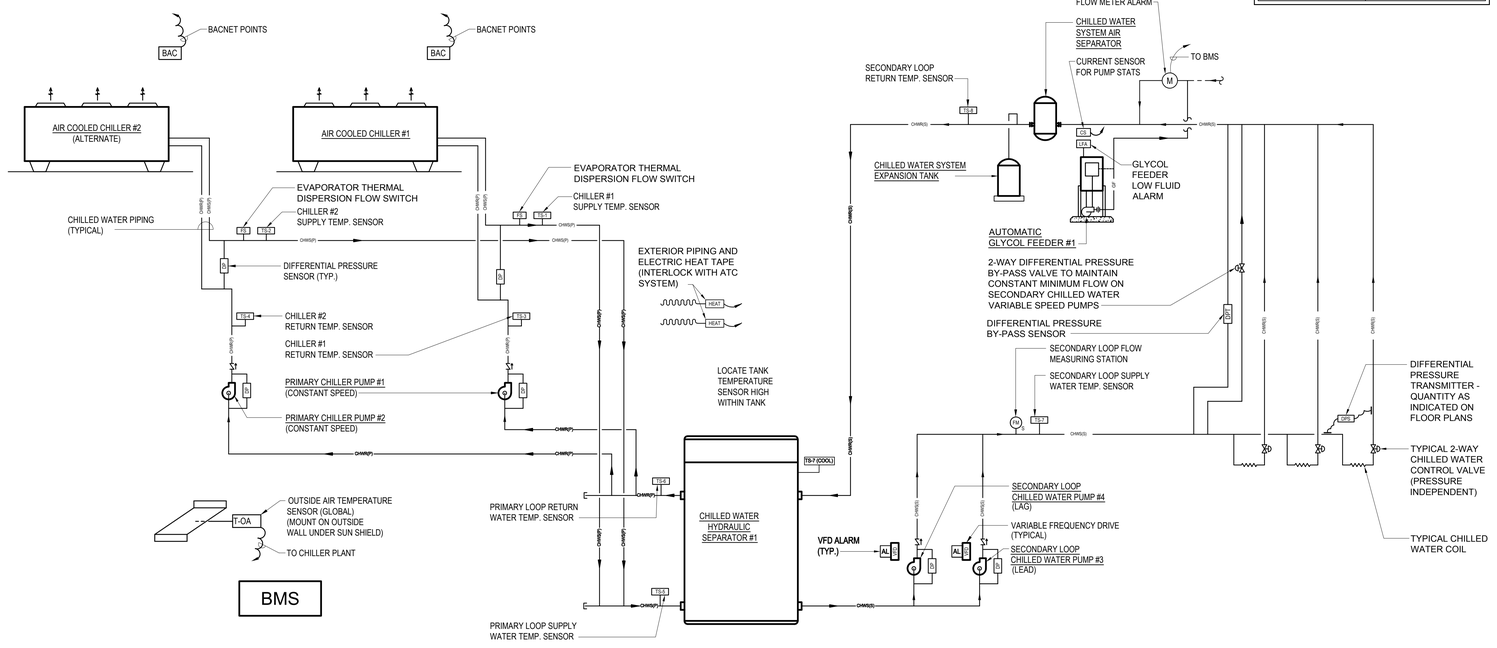
NOTES:
1. PROVIDE ADDITIONAL DIGITAL POINTS AS NECESSARY TO ACCOMPLISH THE SPECIFIED SEQUENCE OF OPERATION DESCRIBED IN THE SPECIFICATIONS.
2. ALL ITEMS IN THE POINTS LIST SHALL BE VIEWABLE FROM THE OPERATOR'S TERMINAL.

SECONDARY CHILLED WATER PUMP - PARALLEL PUMP OPERATION (EXAMPLE)

1.	SINGLE LEAD CHILLED WATER SECONDARY PUMP MIN. AND MAX. FLOW RATE:	110 GPM TO 352 GPM (MAX. GPM IS 110% OF PEAK DESIGN FLOWRATE)
2.	PARALLEL LAG CHILLED WATER SECONDARY PUMP ENERGIZE FLOW RATE (AS MEASURED BY SECONDARY FLOW MEASURING STATION):	352.1 GPM (>110% OF SINGLE SECONDARY CHILLED WATER PUMP MAX. FLOW RATE)
3.	PARALLEL LAG CHILLED WATER SECONDARY PUMP DE-ENERGIZE FLOW RATE (AS MEASURED BY SECONDARY FLOW MEASURING STATION):	220 GPM (<66% OF SINGLE SECONDARY CHILLED WATER PUMP MAX. FLOW RATE - ALSO MIN. FLOW RATE FOR SECONDARY PUMPS (110 GPM X 2 PUMPS))
4.	PARALLEL LEAD/LAG CHILLED WATER SECONDARY PUMP(S) MIN. AND MAX. FLOW RATE:	352.1 GPM TO 640 GPM (MAX. GPM IS COMBINED FLOW RATE FOR LEAD / LAG SECONDARY CHILLED WATER PUMPS)

CHILLED WATER RESET SCHEDULE

T-OA OUTSIDE AIR TEMP (°F)	CHILLED WATER HYDRAULIC SEPARATOR TEMP (°F) (TS-7)
55	48
80	42



1 **CONTROLS - CENTRAL CHILLED WATER SYSTEM (ALTERNATE)**

NO SCALE

ATC CONTROL SEQUENCE

CENTRAL CHILLED WATER SYSTEM

1. THE CHILLED WATER SYSTEM SHALL BE STARTED AND STOPPED BY A SIGNAL FROM THE CCMS. PROVIDE A PANEL MOUNTED HAND-OFF-AUTO (H-O-A) SWITCH THAT OVERRIDES THE CCMS TO MANUALLY START OR STOP THE CHILLED WATER SYSTEM. THE CCMS SHALL HAVE CONTROL OF THE CHILLED WATER SYSTEM OPERATION WHEN THE PANEL MOUNTED H-O-A SWITCH IS IN THE "AUTO" POSITION ONLY. TO MANUALLY ENERGIZE HEATING SYSTEM FOR AQUACULTURE OPERATIONS (TO SERVE HEAT EXCHANGERS) SWITCH PANEL MOUNTED H-O-A SWITCH TO "HAND" POSITION.
2. PROVIDE AN OUTSIDE TEMPERATURE SENSOR THAT SHALL AUTOMATICALLY ENERGIZE THE CHILLED WATER SYSTEM WHEN THE AMBIENT TEMPERATURE IS 50 DEGREES F (ADJUSTABLE) OR ABOVE. OUTSIDE TEMPERATURE SENSOR SHALL BE GLOBAL UNIT MOUNTED OUTSIDE UNDER SUN SHIELD.
3. PROVIDE AUTOMATIC ALTERNATOR FOR LEAD/LAG PUMP CONTROL OF THE SECONDARY PUMPS. ONLY ONE SECONDARY PUMP SHALL RUN AT ONE TIME. IF THE LEAD PUMP FAILS AS SENSED BY DIFFERENTIAL PRESSURE SENSOR, THE LAG PUMP SHALL ENERGIZE AFTER A 15 SECOND TIME DELAY AND AN AUDIBLE AND VISUAL ALARM WITH SILENCE SWITCH SHALL SOUND "ON" THE EMS. THE SYSTEM SHALL AUTOMATICALLY ROTATE LEAD/LAG ASSIGNMENT EVERY WEEK, ADJUSTABLE THROUGH SOFTWARE.
4. IN ADDITION TO AUTOMATIC ALTERNATOR PROVIDE A PANEL MOUNTED PUMP SELECTOR SWITCH THAT SHALL ALLOW MANUAL OVERRIDE OF THE PRIMARY (LEAD) AND LAG STATUS OF EACH PUMP AND INTERLOCKS TO THE SELECTED PUMPS. PROVIDE A POLE ON THE H-O-A SWITCH FOR THE EXCLUSIVE USE OF THE CCMS FOR REMOTE MONITORING OF THE SWITCH POSITION. ALL INPUT AND OUTPUT POINTS LISTED ON THE CCMS POINT SCHEDULE THAT ARE CONNECTED THROUGH A CONTROL PANEL PROVIDED BY THE ATC SUBCONTRACTOR, SHALL BE WIRED THROUGH DEDICATED TERMINAL STRIPS. DIGITAL OUTPUT (DO) CONTROL POINTS SHALL BE A 24 VAC MAX SIGNAL PROVIDED BY THE CCMS TO THE ATC CONTROL PANEL TO DRIVE A PILOT RELAY. THE PILOT RELAY, THE H-O-A SWITCH, AND ALL CONTROL PANEL AND EQUIPMENT INTERLOCK WIRING SHALL BE PROVIDED BY THE ATC SUBCONTRACTOR. THE 24 VAC SIGNAL AND ALL WIRING BETWEEN THE ATC CONTROL PANEL AND THE CCMS SHALL BE PROVIDED BY THE ATC SUBCONTRACTOR.
5. CHILLERS SHALL BE OPERATED THROUGH THE BMS SYSTEM TO ACHIEVE ROTATIONAL SEQUENCING TO FACILITATE EVEN RUN TIMES, AS WELL AS LEAD/LAG ENABLE AND DISABLE. EACH CHILLER WHEN ENABLED SHALL OPERATE UNDER IT'S PACKAGED CONTROLS TO MAINTAIN A CONSTANT LEAVING WATER TEMPERATURE OF 42 DEGREES F (ADJUSTABLE). WHENEVER A CHILLER IS ENABLED IT'S DEDICATED (CONSTANT SPEED) PRIMARY PUMP SHALL ENERGIZE AND RUN CONTINUOUSLY. LEAD CHILLER SHALL BE ALTERNATED EVERY SEVEN (7) DAYS OR BASED ON RUN TIME HOURS (ADJUSTABLE).
6. PROVIDE AUTOMATIC ALTERNATOR FOR LEAD/LAG PUMP CONTROL OF THE SECONDARY PUMPS. ONLY ONE SECONDARY PUMP SHALL RUN AT ONE TIME. IF THE LEAD PUMP FAILS AS SENSED BY DIFFERENTIAL PRESSURE SENSOR, THE LAG PUMP SHALL ENERGIZE AFTER A 15 SECOND TIME DELAY AND AN AUDIBLE AND VISUAL ALARM WITH SILENCE SWITCH SHALL SOUND "ON" THE EMS. THE SYSTEM SHALL AUTOMATICALLY ROTATE LEAD/STANDBY ASSIGNMENT EVERY WEEK, ADJUSTABLE THROUGH SOFTWARE.
7. THE DIFFERENTIAL PRESSURE SENSOR SET POINT FOR THE VARIABLE SPEED DRIVEN PUMPS SHALL BE FIELD DETERMINED. SET POINT SHALL BE BASED ON MAINTAINING MINIMUM PRESSURE TO OVERCOME RESISTANCE OF ANY COILS, CONTROL VALVE, AND RUNOUT PIPE/FITTINGS. THE FINAL DIFFERENTIAL PRESSURE SENSOR SET POINT VALUE SHALL BE DOCUMENTED ON THE AS-BUILT ATC DRAWINGS.
8. FURNISH AND INSTALL HIGH TEMPERATURE AND LOW TEMPERATURE ALARM PROGRAM ON THE SECONDARY LOOP SUPPLY TEMPERATURE SENSOR. SHOULD THE SECONDARY LOOP TEMPERATURE EXCEED 60 DEGREES F (ADJUSTABLE) OR DROP BELOW 38 DEGREES F (ADJUSTABLE) DURING NORMAL SYSTEM OPERATION AND ALARM SHOULD ANNUNCIATE ON THE ATC SYSTEM AN AUDIBLE AND VISUAL ALARM WITH SILENCE SWITCH SHALL ANNUNCIATE UPON ACTIVATION OF THE ALARM CONDITION.
9. WHEN THE CHILLED WATER SYSTEM IS STARTED (MANUALLY OR AUTOMATICALLY), EITHER LOCALLY OR REMOTELY THROUGH THE CCMS, THE ATC SYSTEM SHALL START THE LEAD PRIMARY (CONSTANT SPEED) CHILLED WATER PUMP AND LEAD CHILLER THROUGH THE ATC PANEL MOUNTED PUMP SELECTOR SWITCH. THE LEAD PRIMARY CHILLED WATER PUMP SHALL THEN RUN CONTINUOUSLY. UPON PROOF OF FLOW VIA DISCHARGE FLOW SWITCH, (FS), THE LEAD CHILLER SHALL BE ENERGIZED. THE LEAD CHILLER SYSTEM PACKAGED CONTROLS SHALL MAINTAIN A LEAVING WATER TEMPERATURE OF 42 DEGREESF (ADJUSTABLE) AS SENSED BY CHILLED WATER SUPPLY TEMPERATURE SENSOR, TS-1. A CHILLER RETURN TEMPERATURE SENSORS, TS-3 & TS-4, SHALL BE PROVIDED TO MONITOR CHILLER RETURN TEMPERATURE. THE LEAD CHILLER AND ITS ASSOCIATED PUMP SHALL MAINTAIN CHILLED WATER BUFFER TANK TEMPERATURE BY LOADING/UNLOADING COMPRESSORS AS REQUIRED.
10. THE SECONDARY LOOP FLOW MEASURING STATION, FM(S) SHALL ENABLE THE LAG CHILLED WATER SECONDARY PUMP WHENEVER THE FLOW RATE MEASURED AT THE SECONDARY LOOP FLOW MEASURING STATION, FM(S) REACHES 110 PERCENT (ADJUSTABLE) OF THE FLOW RATE OF A SINGLE SECONDARY CHILLED WATER PUMP MEASURED AT THE SECONDARY LOOP FLOW MEASURING STATION, FM(P). PROVIDE TIME DELAY OF 15 MINUTES (ADJUSTABLE) TO AVOID CYCLING ON/OFF OF LAG SECONDARY CHILLED WATER PUMP. THE LAG CHILLED WATER SECONDARY PUMP AND SHALL THEN OPERATE IN PARALLEL WITH THE LEAD SECONDARY PUMP UNTIL THE SECONDARY LOOP FLOW RATE MEASURED AT FM(S) DROPS TO 66 PERCENT OF THE DESIGN FLOW RATE OF A SINGLE SECONDARY CHILLED WATER PUMP. PROVIDE TIME DELAY OF 15 MINUTES (ADJUSTABLE) TO AVOID CYCLING ON/OFF OF LAG SECONDARY CHILLED WATER PUMP.
11. CHILLER(S) AND ASSOCIATED PRIMARY PUMP(S) SHALL BE SEQUENCED TO MAINTAIN HYDRAULIC SEPARATOR VARIABLE TEMPERATURE (ADJUSTABLE) AS SENSED BY HYDRAULIC SEPARATOR TEMPERATURE SENSOR TS-7. WHEN THE BUILDING LOAD CAN BE DELIVERED BY A SINGLE CHILLER (AS DETERMINED BY HYDRAULIC SEPARATOR TEMPERATURE SENSOR) THEN THE LAG CHILLER AND ITS ASSOCIATED PRIMARY PUMP SHALL BE DE-ENERGIZED. SHOULD THE LEAD PRIMARY CHILLER PUMP OR IT'S ASSOCIATED CHILLER FAIL, THEN THE LAG PRIMARY CHILLER PUMP AND ITS ASSOCIATED CHILLER SHALL BE ENERGIZED. IF THE LEAD PRIMARY CHILLER OR PRIMARY CHILLER PUMP FAIL THEN AN AUDIBLE AND VISUAL ALARM WITH SILENCE SWITCH SHALL SEND AN ALARM ON THE ATC/EMS SYSTEM PANEL. PROVIDE ALL INTERLOCK WIRING REQUIRED BY THE CHILLER MANUFACTURER, INCLUDING STARTER INTERLOCKS, FLOW SWITCHES, AND PUMP STARTER AUXILIARY CONTACT WIRING TO INSURE A COMPLETE AND AUTOMATED SYSTEM.
12. TANK TEMPERATURE SENSOR (TS-7) SHALL ENERGIZE AIR COOLED CHILLERS IN SEQUENCE AS REQUIRED TO MAINTAIN TANK TEMPERATURE SET POINT 42 DEGREES F (ADJUSTABLE).
13. THE FACTORY FURNISHED CHILLER CONTROLS SHALL BE ARRANGED TO PREVENT SHORT CYCLING OF COMPRESSORS DUE TO RAPID CHANGES IN CHILLER RETURN TEMPERATURE. THE CHILLER COMPRESSORS SHALL BE BROUGHT ON AND DE-ENERGIZED IN SUFFICIENT NUMBER OF STAGES TO PREVENT SHORT CYCLING.
14. THROUGH INTERLOCK WIRING THE LEAD SECONDARY CHILLED WATER PUMP SHALL BE ENERGIZED WHENEVER A PRIMARY CHILLED WATER PUMP AND CHILLER IS ENERGIZED. THE LEAD SECONDARY CHILLED WATER PUMP SYSTEM SHALL VARY SYSTEM FLOW THROUGH PUMP VARIABLE SPEED DRIVE TO MAINTAIN DIFFERENTIAL PRESSURE CONTROLLER SET POINT. DIFFERENTIAL PRESSURE SENSOR/TRANSMITTER SHALL BE COMMERCIAL GRADE QUALITY, INTELLIGENT TYPE, ROSEMOUNT MODEL 1151 DP, FOXBORO, OR APPROVED EQUAL. DIFFERENTIAL PRESSURE SET POINT SHALL BE ADJUSTABLE THROUGH THE ENERGY MANAGEMENT SYSTEM. THE DIFFERENTIAL PRESSURE SENSOR/TRANSMITTER SHALL BE LOCATED AS SHOWN ON THE DRAWINGS. THE LEAD SECONDARY CHILLED WATER PUMP SHALL ONLY ENERGIZE WHEN PRIMARY SYSTEM IS ON.
15. WHEN THE CHILLED WATER SYSTEM IS STOPPED, EITHER MANUALLY OR AUTOMATICALLY, THE ATC CONTRACTOR SHALL PROVIDE A "TIME DELAY OFF" FUNCTION TO KEEP BOTH THE SECONDARY LEAD CHILLED WATER PUMP AND THE PRIMARY LEAD CHILLED WATER PUMP RUNNING FOR AN ADDITIONAL 2 MINUTES (ADJUSTABLE) AFTER THE CHILLER HAS BEEN DE-ENERGIZED TO ENSURE THAT RESIDUAL REFRIGERANT WILL PASS OUT OF THE EVAPORATOR.
16. PROVIDE A DIFFERENTIAL PRESSURE SENSOR TO DETERMINE STATUS OF EACH CHILLER. THE DDC SYSTEM AND LOCAL ATC PANEL SHALL BE ALARMED FOR CHILLER FAILURE.
17. THE PRIMARY CHILLED WATER PLANT LOOP SHALL BE PROVIDED WITH CHILLER SUPPLY TEMPERATURE SENSORS (TS-1) CHILLER RETURN TEMPERATURE SENSORS (TS-3, TS-4), PRIMARY LOOP SUPPLY TEMPERATURE SENSOR, TS-5, PRIMARY LOOP RETURN TEMPERATURE SENSOR, TS-6 AND A PRIMARY LOOP FLOW MEASURING STATION FMP. ALL CONTROL DEVICES SHALL BE MONITORED AND FULLY ADJUSTABLE.
18. THE SECONDARY CHILLED WATER PLANT LOOP SHALL BE PROVIDED WITH SECONDARY LOOP SUPPLY WATER TEMPERATURE SENSOR, TS-7, SECONDARY LOOP RETURN WATER TEMPERATURE SENSOR TS-8, SECONDARY LOOP FLOW MEASURING STATION FMS AND DIFFERENTIAL PRESSURE TRANSMITTERS. ALL CONTROL DEVICES SHALL BE MONITORED AND FULLY ADJUSTABLE.
19. ATC SYSTEM SHALL INCLUDE ALL ALGORITHMS AND DEVICES REQUIRED FOR CHILLER SEQUENCING, PUMP SEQUENCING, BTU MEASUREMENT, AND CHILLED WATER RESET.
20. PROVIDE A MAKE-UP WATER FLOW METER/ALARM THAT SHALL, UPON DETECTION OF FLOW (FIELD DETERMINED) SEND AN ALARM TO THE CENTRAL STATION MONITORING SYSTEM NOTIFYING THE OWNER THAT FLOW IS BEING PRODUCED THROUGH THE METER. UPON MANUAL RESET AT THE FLOW METER THE ALARM SHALL CEASE AND THE SYSTEM RETURN TO NORMAL STATUS. THE CCMS SHALL KEEP RECORD OF TOTAL NUMBER OF GALLONS THAT HAVE PASSED THROUGH THE MAKE-UP WATER FLOW METER/ALARM.
21. PROVIDE ALL INTERLOCK AND CONTROL WIRING FOR AUTOMATIC GLYCOL FEEDER. INTERLOCK STATUS AND LOW FLUID ALARM ON GLYCOL FEEDER WITH ATC SYSTEM.
22. THE PRIMARY AND SECONDARY CHILLED WATER LOOPS SHALL BE PROVIDED WITH FLOW MEASURING STATION (FMS). THE FLOW MEASURING STATIONS SHALL MONITOR THE SECONDARY CHILLED WATER FLOW RATES IN GALLONS PER MINUTE AND SHALL DISPLAY THE VALUE ON THE ATC SYSTEM COMPUTER.
23. FURNISH AND INSTALL A FLOW SWITCH (FS) IN DISCHARGE PIPE OF EACH CHILLER. CHILLERS SHALL NOT BE ENABLED TO ENERGIZE UNTIL FLOW SWITCH PROVES FLOW. INTERLOCK FLOW SWITCHES TO ATC SYSTEM.
24. MINIMUM FLOWRATE BYPASS VALVE: PROVIDE A MINIMUM SECONDRY FLOW RATE BYPASS VALVE, DIFFERENTIAL PRESSURE TRANSMITTER AND INTERLOCK WITH SECONDARY FLOW MEASURING STATION TO MAINTAIN MINIMUM SECONDARY CHILLED WATER FLOW RATE REGARDLESS OF TERMINAL EQUIPMENT TWO-WAY VALVE POSITION(S). THE MINIMUM SECONDARY FLOW RATE BYPASS VALVE SHALL MODULATE TO MAINTAIN MINIMUM SCHEDULED FLOW RATE ON THE CHILLED WATER SECONDARY PUMPS AS SCHEDULED. THE DIFFERENTIAL PRESSURE AT THE MINIMUM FLOW BYPASS SHALL ALSO BE MONITORED ON THE ATC SYSTEM.
25. THE DIFFERENTIAL PRESSURE SET POINT SHALL BE DETERMINED BASED ON FIELD MEASUREMENTS OF DIFFERENTIAL PRESSURE ACROSS THE MAINS AND FIELD MEASUREMENT OF THE CHILLED WATER SECONDARY PUMP FLOW RATES TO VERIFY A MINIMUM FLOW AS SCHEDULED ON THE CHILLED WATER SECONDARY PUMP SCHEDULE. MINIMUM DIFFERENTIAL PRESSURE SHALL BE INDICATED IN ATC GRAPHIC AS SECONDARY INDICATOR OF MINIMUM FLOW AS MEASURED AT THE FLOW MEASURING STATION.
26. HARDWIRE INTERLOCK EACH CHILLER PRIMARY PUMP WITH IT'S ASSOCIATED CHILLER.
27. MAP OVER BOTH CHILLERS BACNET POINTS DESIRED BY OWNER TO THE BMS.
28. INTERLOCK AND MONITOR STATUS OF ELECTRIC HEAT TAPE FOR ALL EXTERIOR PIPING. REFER TO ELECTRICAL DRAWINGS FOR LOCATION.
29. EACH CHILLER'S PRIMARY CHILLED WATER PUMP SHALL BE HARDWIRED INTERLOCKED WITH ITS ASSOCIATED CHILLER. CHILLER CONTROL PANEL SHALL AUTOMATICALLY ENERGIZE PRIMARY CHILLED WATER PUMP FOR FREEZE PROTECTION PER MANUFACTURER'S REQUIREMENTS. UPON A SIGNAL FROM THE AIR COOLED CHILLER FREEZE PROTECTION PUMP CONTROL OUTPUT FOR FREEZE PROTECTION PUMP OPERATION THE LEAD PRIMARY CHILLED WATER PUMP SHALL ENERGIZE AND RUN CONTINUOUSLY. FREEZE PROTECTION MODE SHALL ONLY BE ENABLED WHEN THE CHILLED WATER SYSTEM IS "OFF" DUE TO AMBIENT CONDITIONS AND THE AMBIENT TEMPERATURE IS BELOW 37°F (ADJUSTABLE).

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no.	date	comments

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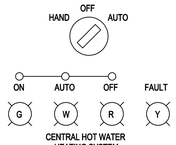
SUBMISSION
BID DOCUMENTS

AUTOMATIC TEMPERATURE CONTROLS HVAC

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

M402

CENTRAL HOT WATER HEATING SYSTEM ATC PANEL



AUTOMATIC TEMPERATURE CONTROL POINT LIST

EQUIPMENT OR SYSTEM	AUTOMATIC GLYCOL FEEDER LOW FLUID ALARM	BOILER GENERAL ALARM (BACNET POINTS)	CONDENSATE BLOCK SWITCH	EQUIPMENT STATUS	FLOW MEASURING STATION (SECONDARY LOOP)	FLOW SWITCH	FLAME FAILURE ALARM	GAS SYSTEMS	GLOBAL - OA TEMP	GRAPHIC DISPLAY	HAND-OFF-AUTO SWITCH (H-O-A)	HOT WATER RE-SET	LEAD / LAG	LOW TEMPERATURE ALARM	LOW WATER CUT-OFF ALARM	MAKE-UP WATER ALARM	MAKE-UP WATER CONSUMPTION (GPM & GALLONS PER DAY)	MINIMUM FLOW PROVISION	MINIMUM FLOW RATE BYPASS DIFFERENTIAL PRESSURE TRANSMITTER	MINIMUM FLOW RATE BYPASS VALVE (2-WAY MODULATING, PRESSURE INDEPENDENT)	PRIMARY PUMP "EXERCISING MODE"	START & STOP	START & STOP - OPTIMIZATION	TEMP - BOILER RETURN	TEMP - BOILER SUPPLY	TEMP - SECONDARY HWR	TEMP - SECONDARY HWS	TIME PROGRAM	TOTAL RUN TIME	VFD AMPERAGE, SPEED AND ALARMS	VFD DRIVE
BOILERS (TYP. OF 2)		●	●	●		●	●	●	●	●	●	●	●	●	●	●	●					●	●	●	●			●	●		
PRIMARY HEATING PUMPS (TYP. OF 2)				●						●	●		●								●	●	●					●	●		
SECONDARY HEATING PUMPS (TYP. OF 2)				●	●					●	●		●						●	●	●		●	●		●	●	●	●	●	●
AUTOMATIC GLYCOL FEEDER	●			●						●																			●		
ELECTRIC HEAT TAPE				●						●																			●		

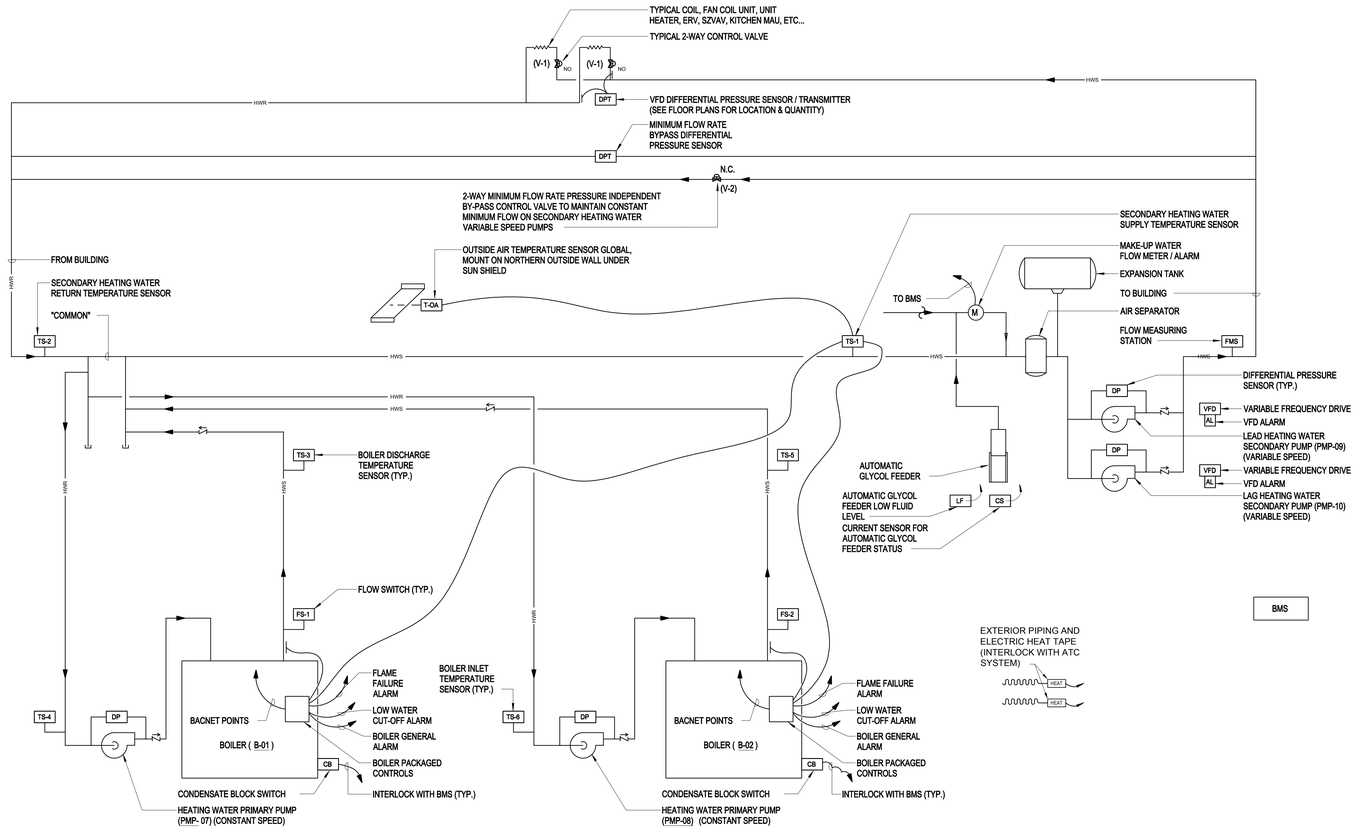
NOTES
1. PROVIDE ADDITIONAL DIGITAL POINTS AS NECESSARY TO ACCOMPLISH THE SPECIFIED SEQUENCE OF OPERATION DESCRIBED IN THE SPECIFICATIONS.
2. ALL ITEMS IN THE POINTS LIST MUST BE VIEWABLE FROM THE OPERATOR'S TERMINAL.

HEATING WATER RE-SET SCHEDULE

OUTSIDE AIR TEMPERATURE (T-OA)	HEATING WATER SUPPLY TEMPERATURE (TS-1)
45°F	110°F
15°F	150°F

SECONDARY HEATING WATER PUMP - PARALLEL PUMP OPERATION

1.	SINGLE LEAD HEATING WATER SECONDARY PUMP MIN. AND MAX. FLOW RATE:	60 GPM TO 220 GPM (MAX. GPM IS 110% OF PEAK DESIGN FLOW RATE)
2.	PARALLEL LAG HEATING WATER SECONDARY PUMP ENERGIZE FLOW RATE (AS MEASURED BY SECONDARY FLOW MEASURING STATION):	220.1 GPM (>110% SINGLE SECONDARY HEATING WATER PUMP MAX. FLOW RATE)
3.	PARALLEL LAG HEATING WATER SECONDARY PUMP DE-ENERGIZE FLOW RATE (AS MEASURED BY SECONDARY FLOW MEASURING STATION):	120 GPM (<60% OF SINGLE SECONDARY HEATING WATER PUMP MAX. FLOW RATE - ALSO MIN. FLOW RATE FOR SECONDARY PUMPS (60 GPM X 2 PUMPS))
4.	PARALLEL LEAD/LAG HEATING WATER SECONDARY PUMP(S) MIN. AND MAX. FLOW RATE:	220.1 GPM TO 400 GPM (MAX. GPM IS COMBINED FLOW RATE FOR LEAD/LAG SECONDARY HEATING WATER PUMPS)



ATC CONTROL SEQUENCE

A. GENERAL:

1. THE FOLLOWING HOT WATER HEATING SYSTEM CONTROL SEQUENCES SHALL BE PROVIDED FOR A HOT WATER CENTRAL PLANT AS SPECIFIED. THE BOILERS SHALL BE INTERLOCKED AND COORDINATED WITH HOT WATER CENTRAL PLANT. PROVIDE TEMPERATURE CONTROLS AND PIPING AS REQUIRED TO ACCOMPLISH THE SEQUENCE OF OPERATION.WHERE FACTORY PROVIDED SENSORS ARE UTILIZED, MAP OVER THE SAME TO THE BUILDING MANAGEMENT SYSTEM SO THAT ALL POINTS CAN BE MONITORED AND CONTROLLED FROM THE OPERATOR'S TERMINAL.

2. PROVIDE AN OUTSIDE AIR TEMPERATURE SENSOR THAT SHALL AUTOMATICALLY ENERGIZE HEATING SYSTEM WHEN THE AMBIENT TEMPERATURE IS 55 DEGREES FAHRENHEIT (ADJUSTABLE) OR BELOW. HEATING SYSTEM SHALL ALSO ENERGIZE ANYTIME THERE IS A CALL FOR HEAT OR ACTIVE DE-HUMIDIFICATION.

3. PROVIDE A PANEL MOUNTED HAND-OFF-AUTOMATIC (H-O-A) SYSTEM CONTROL SWITCH IN THE ATC PANEL LOCATED IN THE BOILER ROOM. WHEN THE SYSTEM SWITCH IS INDEXED TO THE "HAND" POSITION, THE SYSTEM SHALL BE ENERGIZED AND OPERATED AUTOMATICALLY UNDER THE BOILER PACKAGED CONTROLS TO MAINTAIN THE SEQUENCE OF OPERATION. WHEN THE SYSTEM SWITCH IS INDEXED TO THE OFF POSITION, THE SYSTEM SHALL (DE-ENERGIZE IF ON) REMAIN OFF. WHEN THE SYSTEM IS INDEXED TO "AUTO", THE SYSTEM SHALL OPERATE AUTOMATICALLY UNDER CONTROL OF THE ATC SYSTEM AND DETERMINE OCCUPIED/UNOCCUPIED MODE OF OPERATION.

4. WHEN THE SYSTEM IS DE-ENERGIZED THE FOLLOWING SHALL OCCUR:

   a. ALL PUMPS SHALL BE DE-ENERGIZED.
   b. BOILER BURNERS SHALL BE DE-ENERGIZED.

5. PROVIDE OUTSIDE/GLOBAL AIR TEMPERATURE SENSORS THAT SHALL RESET THE BUILDING HEATING WATER SUPPLY WATER TEMPERATURE (TS-1) SET POINT DURING THE HEATING MODE AS SCHEDULED ON THIS DRAWING.

6. THE HOT WATER SYSTEM SHALL BE STARTED AND STOPPED BY A SIGNAL FROM THE BMS (BUILDING MANAGMENT SYSTEM). PROVIDE A PANEL MOUNTED HAND-OFF-AUTO (H-O-A) SWITCH THAT OVERRIDES THE BMS TO MANUALLY START OR STOP THE HOT WATER SYSTEM. THE BMS SHALL HAVE CONTROL OF THE HOT WATER SYSTEM OPERATION WHEN THE PANEL MOUNTED H-O-A SWITCH IS IN THE "AUTO" POSITION ONLY.

7. PROVIDE AUTOMATIC ALTERNATOR FOR LEAD/LAG PUMP CONTROL OF THE SECONDARY PUMPS. IF THE LEAD PUMP FAILS AS SENSED BY DIFFERENTIAL PRESSURE SENSOR, THE LAG PUMP SHALL ENERGIZE AFTER A 15 SECOND TIME DELAY AND AN AUDIBLE AND VISUAL ALARM WITH SILENCE SWITCH SHALL SOUND "ON" THE BMS. THE SYSTEM SHALL AUTOMATICALLY ROTATE LEAD/LAG ASSIGNMENT EVERY WEEK OR PER RUN TIME HOURS, ADJUSTABLE THROUGH SOFTWARE. IF THE LEAD PUMP FAILS THEN THE LAG PUMP SHALL ENERGIZE.

8. IN ADDITION TO THE AUTOMATIC ALTERNATOR PROVIDE A PANEL MOUNTED PUMP SELECTOR SWITCH THAT SHALL ALLOW MANUAL OVERRIDE OF THE PRIMARY (LEAD) AND LAG STATUS OF EACH PUMP AND INTERLOCKS TO THE SELECTED PUMPS. PROVIDE A POLE ON THE H-O-A SWITCH FOR THE EXCLUSIVE USE OF THE BMS FOR REMOTE MONITORING OF THE SWITCH POSITION. ALL INPUT AND OUTPUT POINTS LISTED ON THE BMS POINT SCHEDULE THAT ARE CONNECTED THROUGH A CONTROL PANEL PROVIDED BY THE ATC SUBCONTRACTOR, SHALL BE WIRED THROUGH DEDICATED TERMINAL STRIPS. DIGITAL OUTPUT (DO) CONTROL POINTS SHALL BE A 24 VAC MAX SIGNAL PROVIDED BY THE BMS TO THE ATC CONTROL PANEL TO DRIVE A PILOT RELAY. THE PILOT RELAY, THE H-O-A SWITCH, AND ALL CONTROL PANEL AND EQUIPMENT INTERLOCK WIRING SHALL BE PROVIDED BY THE ATC SUBCONTRACTOR. THE 24 VAC SIGNAL AND ALL WIRING BETWEEN THE ATC CONTROL PANEL AND THE BMS SHALL BE PROVIDED BY THE ATC SUBCONTRACTOR.

9. PROVIDE HOT WATER SECONDARY SUPPLY AND SECONDARY RETURN TEMPERATURE SENSORS TS-1 AND TS-2 TO MONITOR MAIN SUPPLY AND MAIN RETURN TEMPERATURES.

10. PROVIDE BOILER SUPPLY/RETURN TEMPERATURE SENSORS, TS-3, TS-4, TS-5, AND TS-6, TO MONITOR EACH BOILERS SUPPLY AND RETURN TEMPERATURE.

11. LOW TEMPERATURE ALARM SHALL BE SET TO ALARM SHOULD THE SECONDARY HEATING WATER SUPPLY TEMPERATURE FALL BELOW 100°F (ADJUSTABLE) DURING NORMAL OPERATION. AFTER APPROPRIATE TIME DELAYS TO OBTAIN STABILIZE OPERATION.

12. MAP OVER ALL BOILER AND VFD GENERAL ALARMS AND INDICATE SPECIFICALLY WHAT EACH ALARM IS ON THE BMS. COORDINATE DESIRED BACNET ALARMS TO BE MAPPED OVER WITH OWNER.

13. HARDWIRE INTERLOCK THE BOILER PRIMARY PUMPS WITH THEIR ASSOCIATED BOILER.

B. CENTRAL HEATING BOILERS (HEATING MODE)

1. THE LEAD BOILER WHEN ENABLED SHALL OPERATE UNDER ITS PACKAGED CONTROLS TO MAINTAIN A VARIABLE LEAVING WATER TEMPERATURE AS REQUIRED TO MAINTAIN SECONDARY HEATING WATER SUPPLY TEMPERATURE. WHENEVER A BOILER IS ENABLED IT'S DEDICATED (CONSTANT SPEED) PRIMARY PUMP SHALL RUN CONTINUOUSLY.

2. BOILERS SHALL BE ENABLED ON A CALL FOR HEATING OR FOR DEHUMIDICATION RE-HEAT.

3. THE VARIABLE HEATING WATER SUPPLY TEMPERATURE SET POINT SHALL BE MAINTAINED BY RE-SETTING OF BOILER DISCHARGE WATER TEMPERATURE SETPOINT.

4. WHEN THE HEATING WATER SYSTEM IS STARTED (MANUALLY OR AUTOMATICALLY) EITHER LOCALLY OR REMOTELY THROUGH THE BMS, THE ATC SYSTEM SHALL START THE SELECTED (LEAD) HEATING WATER SECONDARY PUMP. THE LEAD HEATING WATER SECONDARY PUMP SHALL THEN RUN CONTINUOUSLY. SIMULTANEOUSLY, THE BOILER SHALL ENERGIZE ALONG WITH ITS ASSOCIATED PRIMARY PUMP. THE BOILER SHALL OPERATE UNDER ITS PACKAGED CONTROLS TO MAINTAIN A VARIABLE LEAVING WATER TEMPERATURE AS REQUIRED TO MAINTAIN SECONDARY HEATING WATER SUPPLY TEMPERATURE. THE LEAD BOILER'S PRIMARY PUMP SHALL ALSO RUN CONTINUOUSLY.

5. DURING NORMAL OPERATION THE OUTDOOR AIR TEMPERATURE SENSOR (T-OA) SHALL RESET THE SECONDARY LOOP SUPPLY TEMPERATURE AS SENSED BY TS-1. THE VARIABLE HEATING WATER SUPPLY TEMPERATURE SET POINT SHALL BE MAINTAINED BY RE-SETTING BOILER DISCHARGE TEMPERATURE. THE RESET SCHEDULE SHALL BE AS INDICATED ON THE CONTRACT DOCUMENTS AND SHALL BE FULLY ADJUSTABLE.

6. BOILERS SHALL BE OPERATED THROUGH THE BMS SYSTEM TO ACHIEVE ROTATIONAL SEQUENCING TO FACILITATE EVEN RUN TIMES, AS WELL AS LEAD/LAG ENABLE AND DISABLE. EACH BOILER WHEN ENABLED SHALL OPERATE UNDER ITS PACKAGED CONTROLS TO MAINTAIN A VARIABLE LEAVING WATER TEMPERATURE AS REQUIRED TO MAINTAIN SECONDARY HEATING WATER SUPPLY TEMPERATURE. WHENEVER A BOILER IS ENABLED IT'S DEDICATED (CONSTANT SPEED) PRIMARY PUMP SHALL RUN CONTINUOUSLY. LEAD BOILER SHALL BE ALTERNATED EVERY 14 DAYS.

7. PROVIDE GLOBAL OUTSIDE AIR TEMPERATURE SENSOR THAT WILL ENERGIZE/DE-ENERGIZE LAG BOILERS. THE SELECTED LAG BOILERS SHALL BE ENABLED TO OPERATE UNDER THEIR OWN PACKAGED CONTROLS, WHENEVER THE OUTSIDE AIR TEMPERATURE IS BELOW 40 DEGREES F (ADJUSTABLE) AND DISABLED WHEN OUTDOOR AIR IS ABOVE 45 DEGREES F (ADJUSTABLE). WHENEVER SELECTED LAG BOILER IS ENABLED, THE DEDICATED LAG BOILER PRIMARY PUMP SHALL RUN CONTINUOUSLY. THE LAG BOILER SHALL ONLY BE ENABLED IF LEAD BOILER CANNOT MAINTAIN SETPOINT.

8. IF THE LEAD BOILER IS ENABLED, AND MORE THAN 45 MINUTES (ADJUSTABLE) HAS ELAPSED WITH BOILER AT 100% CAPACITY WITHOUT ACHIEVING ITS SET POINT, THEN LAG BOILER AND ITS PRIMARY PUMP SHALL BE AUTOMATICALLY ENERGIZED TO MAINTAIN SECONDARY HEATING WATER SUPPLY TEMPERATURE SET POINT (TS-1). THE VARIABLE SECONDARY HEATING WATER SUPPLY TEMPERATURE SET POINT SHALL BE MAINTAINED BY MODULATION OF TWO(2) BOILERS INDEPENDENTLY. BOILERS SHALL FIRE INDEPENDENTLY UNDER PACKAGED CONTROLS TO MAINTAIN VARIABLE SECONDARY HEATING WATER SUPPLY TEMPERATURE AS DETERMINED BY THE RESET SCHEDULE. BOILER STAGING UP AND DOWN SHALL INCLUDE TIME DELAYS (ADJUSTABLE) TO AVOID SHORT CYCLING OF BOILERS.

9. IF THE LEAD BOILER FAILS AS DESCRIBED ABOVE, AN AUDIBLE AND VISUAL ALARM WITH SILENCE SWITCH SHALL SOUND AN ALARM ON THE BMS SYSTEM. THE AUDIBLE AND VISUAL ALARM SHALL NOT BE ENERGIZED WHEN LAG BOILER IS AUTOMATICALLY ENERGIZED BY OUTSIDE AIR TEMPERATURE SENSOR.

10. WHENEVER OUTSIDE AIR TEMPERATURE IS 40 DEGREES F OR BELOW, ALL BOILERS SHALL BE ENABLED TO MAINTAIN SECONDARY LOOP HEATING WATER SUPPLY TEMPERATURE SET POINT (TS-1). THE VARIABLE HEATING WATER SUPPLY TEMPERATURE SET POINT SHALL BE MAINTAINED BY MODULATION OF BOILERS INDEPENDENTLY. BOILERS SHALL FIRE INDEPENDENTLY UNDER PACKAGED CONTROLS TO MAINTAIN VARIABLE LEAVING WATER TEMPERATURE OF 160 DEGREES F (ADJUSTABLE) AT PEAK LOAD AND 110 DEGREES F AT MINIMUM LOAD. WHEN OUTSIDE AIR TEMPERATURE RISES TO 45 DEGREES F (ADJUSTABLE) THE LAG BOILERS SHALL BE DISABLED AND LEAD BOILER SHALL CONTINUE TO OPERATE. ABOVE 45 DEGREES F OUTDOOR AIR TEMPERATURE, THE LAG BOILERS SHALL ONLY BE ENABLED IF LEAD BOILER CANNOT MAINTAIN SET POINT.

11. ALL SET POINTS SHALL BE FULLY ADJUSTABLE.

12. PROVIDE A MAKE-UP WATER FLOW METER/ALARM THAT SHALL, UPON DETECTION OF FLOW (FIELD DETERMINED) SEND AN ALARM TO THE BUILDING MANAGEMENT SYSTEM NOTIFYING THE OWNER THAT FLOW IS BEING PRODUCED THROUGH THE METER. UPON MANUAL RESET AT THE FLOW METER THE ALARM SHALL CEASE AND THE SYSTEM RETURN TO NORMAL STATUS. THE BMS SHALL KEEP RECORD OF TOTAL NUMBER OF GALLONS THAT HAVE PASSED THROUGH THE MAKE-UP WATER FLOW METER/ALARM.

13. THE SECONDARY HEATING WATER WATER PUMP SHALL VARY SYSTEM FLOW THROUGH PUMP VARIABLE FREQUENCY DRIVE TO MAINTAIN DIFFERENTIAL PRESSURE CONTROLLER SET POINT. SET POINT SHALL BE BASED ON MAINTAINING MINIMUM PRESSURE TO OVERCOME RESISTANCE OF ANY COILS, CONTROL VALVES AND RUN-OUT PIPE/FITTINGS. THE FINAL DIFFERENTIAL PRESSURE SET POINT SHALL BE DOCUMENTED ON THE AS-BUILT ATC DRAWINGS. DIFFERENTIAL PRESSURE SENSOR/TRANSMITTER SHALL BE COMMERCIAL GRADE QUALITY, INTELLIGENT TYPE, OR APPROVED EQUAL. THE DIFFERENTIAL PRESSURE SENSOR/TRANSMITTER SHALL BE LOCATED AS SHOWN ON THE DRAWINGS. THE SECONDARY HEATING WATER PUMP SHALL ONLY ENERGIZE WHEN PRIMARY SYSTEM IS ON. WHERE MULTIPLE DIFFERENTIAL PRESSURE SENSORS ARE INDICATED, THE DEVICE FURTHEST FROM SET POINT DIFFERENTIAL PRESSURE SHALL GOVERN SECONDARY PUMP SPEED.

14. THE SECONDARY LOOP FLOW MEASURING STATION, FMS SHALL ENABLE THE LAG HEATING WATER SECONDARY PUMP WHENEVER THE FLOW RATE MEASURED AT THE SECONDARY LOOP FLOW MEASURING STATION, FM(S) REACHES 110 PERCENT (ADJUSTABLE) OF THE FLOW RATE OF A SINGLE SECONDARY HEATING WATER PUMP MEASURED AT THE SECONDARY LOOP FLOW MEASURING STATION, FMS. PROVIDE TIME DELAY OF 15 MINUTES (ADJUSTABLE) TO AVOID CYCLING ON/OFF OF LAG SECONDARY HEATING WATER PUMP. THE LAG HEATING WATER SECONDARY PUMP SHALL THEN OPERATE IN PARALLEL WITH THE LEAD SECONDARY PUMP UNTIL THE SECONDARY LOOP FLOW RATE MEASURED AT FM(S) DROPS TO 60 PERCENT OF THE DESIGN FLOW RATE OF A SINGLE SECONDARY HEATING WATER PUMP. PROVIDE TIME DELAY OF 15 MINUTES (ADJUSTABLE) TO AVOID CYCLING ON/OFF OF LAG SECONDARY HEATING WATER PUMP.

15. FURNISH AND INSTALL FLOW SWITCH FS-1, AND FS-2 IN EACH BOILERS DISCHARGE PIPING. BOILERS SHALL NOT ENERGIZE UNTIL FLOW IS PROVEN VIA INDIVIDUAL FLOW SWITCHES. INTERLOCK FLOW SWITCHES WITH BMS SYSTEM.

16. WHEN THE HEATING WATER SYSTEM OR ANY BOILER IS STOPPED EITHER MANUALLY OR AUTOMATICALLY, THE ATC CONTRACTOR SHALL PROVIDE A "TIME DELAY OFF" FUNCTION TO KEEP THE OPERATING PRIMARY BOILER PUMP(S) RUNNING FOR AN ADDITIONAL 2 MINUTES (ADJUSTABLE) AFTER BOILER(S) HAVE BEEN DE-ENERGIZED TO REMOVE EXCESS RESIDUAL HEAT FROM EACH BOILER.

17. EACH BOILER BURNER'S NORMALLY OPEN FLAME FAILURE CIRCUIT AND LOW WATER CUT-OFF SHALL BE INTERLOCKED INTO WITH THE BMS TO ALARM WHENEVER BURNER SENSES FLAME FAILURE OR LOW WATER CONDITIONS. COORDINATE REQUIREMENTS WITH THE BOILER BURNER MANUFACTURER. AN AUDIBLE AND VISUAL ALARM WITH SILENCE SWITCH SHALL BE PROVIDED ON THE BMS SYSTEM

18. THE HEATING WATER SYSTEM SECONDARY LOOP SHALL BE PROVIDED WITH A FLOW MEASURING STATION (FMS). THE FLOW MEASURING STATION SHALL MONITOR THE HEATING WATER SYSTEM SECONDARY FLOW RATE IN GALLONS PER MINUTE AND SHALL DISPLAY THE VALUE ON THE OPERATOR'S TERMINAL.

19. INTERLOCK EACH BOILERS CONDENSATE BLOCK SWITCH TO SHUT DOWN THE BOILER SHOULD A BLOCKAGE IN THE CONDENSATE DISCHARGE BE DETECTED. ALARM CONDENSATE BLOCK SWITCHES ALSO ON BMS SYSTEM.

20. MINIMUM FLOWRATE BYPASS VALVE: PROVIDE A MINIMUM HEATING WATER SECONDARY FLOW RATE BYPASS VALVE AND DIFFERENTIAL PRESSURE TRANSMITTER AND INTERLOCK WITH HEATING WATER SECONDARY FLOW MEASURING STATION TO MAINTAIN MINIMUM SECONDARY HEATING WATER FLOW RATE REGARDLESS OF TERMINAL EQUIPMENT TWO-WAY VALVE POSITION(S). THE MINIMUM SECONDARY FLOW RATE BYPASS VALVE SHALL MODULATE AS NEEDED TO MAINTAIN MINIMUM SCHEDULED FLOW RATE ON THE HEATING WATER SECONDARY PUMPS AS SCHEDULED. THE DIFFERENTIAL PRESSURE AT THE MINIMUM FLOW BYPASS SHALL ALSO BE MONITORED ON THE ATC SYSTEM. MINIMUM FLOW RATE SETPOINT SHALL HAVE TWO DIFFERENT SETPOINTS. ONE SETPOINT FOR SINGLE PUMP OPERATION AND ONE SETPOINT FOR PARALLEL PUMP OPERATION.

21. FREEZE PROTECTION: DURING UNOCCUPIED PERIODS LEAD SECONDARY PUMPS SHALL BE ENERGIZED AND MODULATE BASED ON SYSTEM DP SENSOR WHEN AMBIENT TEMPERATURES ARE BELOW 35 DEGREES F. LEAD BOILER AND ASSOCIATED PRIMARY PUMP SHALL ENERGIZED WHEN OAT IS 55 DEGREES F OR BELOW.

22. REGARDLESS OF OUTSIDE AIR TEMPERATURE, PROVIDE A SCHEDULE THAT WILL PERIODICALLY EXERCISE BOILER PRIMARY PUMPS FOR 5 MINUTES EVERY TWO WEEKS (ADJUSTABLE) TO PREVENT PUMPS FROM SEIZING UP. THIS MODE OF ACTION SHOULD OCCUR AT NIGHT AND THE ATC SYSTEM SHOULD INDICATE "PRIMARY PUMP EXERCISING" WHEN THIS MODE IS ACTIVATED.

23. MAP OVER EACH BOILERS BACNET POINTS DESIRED BY OWNER TO THE BMS.

28. INTERLOCK AND MONITOR STATUS OF ELECTRIC HEAT TAPE FOR ALL EXTERIOR PIPING. REFER TO ELECTRICAL DRAWINGS FOR LOCATION.

1 **CONTROLS - CENTRAL HEATING WATER SYSTEM**

NO SCALE

REVISIONS

no.	date	comments

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SUBMISSION

BID DOCUMENTS

AUTOMATIC TEMPERATURE CONTROLS HVAC

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

M403

ATC POINTS LIST

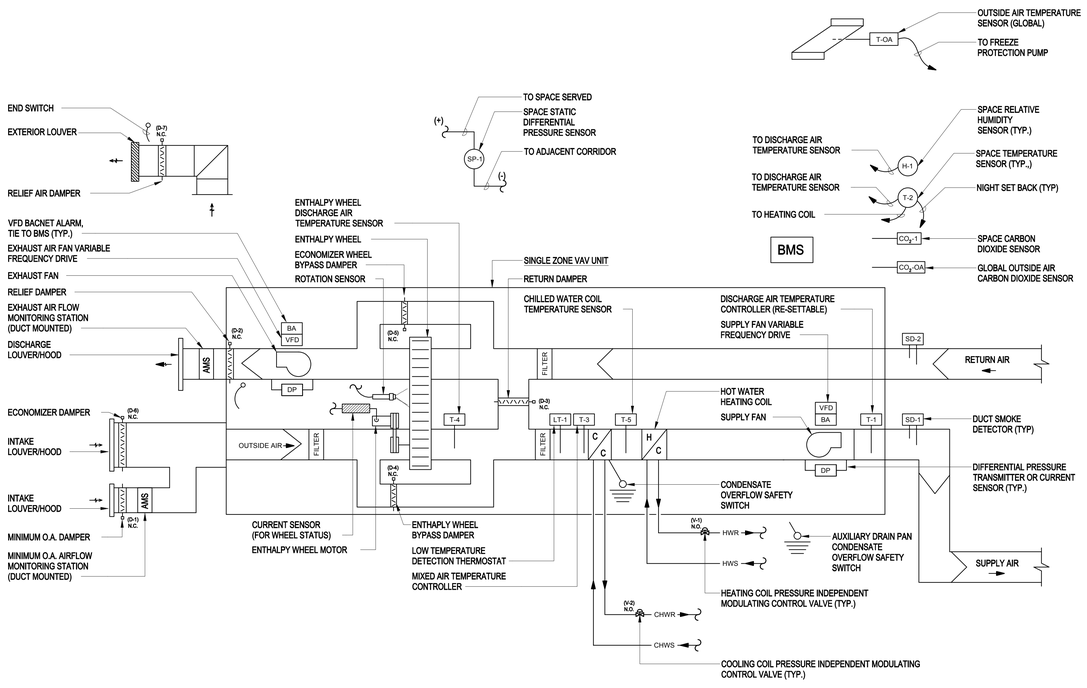
EQUIPMENT OR SYSTEM	AIRFLOW MEASURING STATIONS	PRIMARY DRAIN PAN CONDENSATE OVERFLOW SAFETY SWITCH	AUXILIARY DRAIN PAN CONDENSATE OVERFLOW SAFETY SWITCH	CONTROL VALVE (CHILLED WATER) (2-WAY MODULATING PRESSURE INDEPENDENT)	CONTROL VALVE (HOT WATER) (2-WAY MODULATING PRESSURE INDEPENDENT)	DAMPER - FULLY MODULATING (O.A., ECONOMIZER, RELIEF AIR, RETURN AIR)	DAMPER - TWO POSITION (EXH. AIR, WHEEL BYPASS)	DEMAND CONTROLLED VENTILATION	DUCT SMOKE DETECTORS	ENTHALPY WHEEL MOTOR STATUS	ENTHALPY WHEEL ROTATION	EQUIPMENT STATUS	GLOBAL OA CO_2	GLOBAL OA TEMP	GRAPHIC DISPLAY	LOW TEMPERATURE DETECTION THERMOSTAT	MODE OF OPERATION (HEAT / COOL / VENTILATION, ECONOMIZER, DEHUMIDIFICATION)	PANDEMIC MODE	SPACE CO_2	SPACE RELATIVE HUMIDITY	SPACE DIFFERENTIAL STATIC PRESSURE	SPACE TEMPERATURE	START & STOP	TEMP - COIL DISCHARGE AIR (CHILLED WATER COIL)	TEMP - COIL DISCHARGE AIR (HEATING WATER COIL)	TEMP - ENTHALPY WHEEL DISCHARGE	TEMP - MIXED AIR	TEMP - SPACE	TEMP - SUPPLY AIR	TIME PROGRAM	TOTAL RUN TIME	VFD AMPERAGE, SPEED AND BACNET ALARM	VFD DRIVES
SINGLE ZONE VAV UNIT	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
RELIEF AIR DAMPER(S)						●						●			●						●								●					

NOTES:
1. PROVIDE ADDITIONAL DIGITAL POINTS AS NECESSARY TO ACCOMPLISH THE SPECIFIED SEQUENCE OF OPERATION DESCRIBED IN THE SPECIFICATIONS.
2. ALL ITEMS IN THE POINTS LIST MUST BE VIEWABLE FROM THE OPERATOR'S TERMINAL.

SZVAV UNIT BMS INTERLOCK SCHEDULE

SZVAV NO.	RELIEF
SZVAV-1	RELIEF DAMPER IN MECHANICAL MEZZANINE M203

NOTES:
1. ANYTIME SINGLE ZONE VAV UNIT OPERATES IN OCCUPIED MODE, ALL INTERLOCKED RELIEF DAMPERS SHALL OPERATE, WHEN REQUIRED, BY ECONOMIZER MODE OF OPERATION.



1 **CONTROLS - SINGLE ZONE VAV UNIT**

NO SCALE

ATC CONTROL SEQUENCE

SINGLE ZONE VAV UNIT

A. GENERAL

1. THE SINGLE ZONE VAV UNITS SHALL BE PROVIDED WITH ALL FIELD INSTALLED CONTROLS/DEVICES AS INDICATED IN DIVISION 23 SECTION, *HEATING, VENTILATING, AND AIR CONDITIONING EQUIPMENT*. ALL CONTROLS/DEVICES SHALL BE INTEGRATED, COORDINATED, AND INSTALLED TO PROVIDE A COMPLETE AND FUNCTIONAL SYSTEM. A FACTORY FURNISHED AND LABELED TERMINAL STRIP LOCATED WITHIN UNIT FOR FIELD INSTALLED DDC CONTROLS SHALL BE PROVIDED BY MANUFACTURER.
2. SINGLE ZONE VAV UNIT SHALL BE STARTED AND STOPPED THROUGH THE CCMS BY WAY OF OPTIMUM START-STOP PROGRAM (WITH MANUAL OVERRIDE).
3. DUCT MOUNTED SMOKE DETECTORS SD-1 AND SD-2 (PROVIDED UNDER DIVISION 28) SHALL BE MOUNTED IN THE SUPPLY DUCT AND RETURN DUCT. UPON DETECTION OF PRODUCTS OF COMBUSTION, THE SUPPLY AIR FAN, AND INTERLOCKED EXHAUST AIR FAN SHALL SHUT DOWN AND A SIGNAL SHALL BE SENT TO THE FIRE ALARM SYSTEM AND ATC SYSTEM.
4. ATC SUBCONTRACTOR SHALL INSTALL INTERLOCK WIRING, THERMOSTATS, RELATIVE HUMIDITY SENSORS, CO2 SENSORS, AIR FLOW MONITORING STATIONS, HOT WATER COIL CONTROL VALVE, CHILLED WATER COIL CONTROL VALVE, LOW TEMPERATURE DETECTION THERMOSTATS, CONTROLLERS, RELAYS, CONTROL WIRING ...ETC. FOR A COMPLETE AND OPERATIONAL SYSTEM.
5. FOR UNITS WITH MULTIPLE FANS ALL REQUIREMENTS APPLY TO ALL FANS.
6. THE ATC SUBCONTRACTOR SHALL INSTALL AND INTERLOCK A/C CONDENSATE OVERFLOW SAFETY SWITCHES TO RESPECTIVE THEIR SINGLE ZONE VAV UNIT. THE CONDENSATE OVERFLOW SAFETY SWITCHES SHALL BE WIRED TO DE-ENERGIZE THE SINGLE ZONE VAV UNIT IN THE CASE OF HIGH LEVEL WATER CONDITION. A LOCAL ALARM SHALL BE ANNUNCIATED UPON ACTIVATION OF PUMP SAFETY SWITCH AND ON ATC SYSTEM. FIELD INSTALL THE A/C CONDENSATE OVERFLOW SAFETY SWITCHES IN THE COOLING COIL DRAIN PAN.
7. PROVIDE DIFFERENTIAL PRESSURE SENSORS TO DETERMINE THE STATUS OF ALL FANS ASSOCIATED WITH THE SINGLE ZONE VAV UNITS. AT CONTRACTOR'S OPTION CURRENT SENSORS MAY BE PROVIDED IN LIEU OF PRESSURE SENSOR TO DETERMINE STATUS.
8. THE SINGLE ZONE VAV UNIT SUPPLY FAN SPEED/AMPERAGE/BACNET ALARMS AND EXHAUST FAN SPEED/AMPERAGE/BACNET ALARMS SHALL BE MONITORED VIA VFD'S AND SHALL REPORT THE SAME ON THE AUTOMATIC TEMPERATURE CONTROL SYSTEM.
9. THE SINGLE ZONE VAV UNIT SPACE CARBON DIOXIDE LEVEL SHALL BE MONITORED/TRENDED ON THE ATC SYSTEM. FURNISH AND INSTALL SPACE CO2 AND OUTSIDE AIR CO2 SENSOR AND INTERLOCK WITH UNIT AND ATC SYSTEM.
10. PROVIDE AND INSTALL MODULATING HEATING WATER CONTROL VALVE (V-1) AND INTERLOCK TO SINGLE ZONE VAV FIELD INSTALLED UNIT CONTROLLER FOR PROVIDING HEAT VIA HOT WATER COIL.
11. PROVIDE AND INSTALL MODULATING CHILLED WATER CENTRAL VALVE (V-2) AND INTERLOCK TO SINGLE ZONE FIELD INSTALLED UNIT CONTROLLER FOR PROVIDING COOLING VIA CHILLED WATER COIL.
12. WHEN THE SINGLE ZONE VAV IS DE-ENERGIZED, THE OUTSIDE AIR DAMPER (D-1), ECONOMIZER DAMPER (D-6), AND EXHAUST AIR DAMPER (D-2), SHALL CLOSE, THE RETURN AIR DAMPER (D-3) SHALL OPEN, THE ENERGY RECOVERY WHEEL SHALL STOP ROTATING, THE HEATING WATER COIL CONTROL VALVE (V-1) SHALL FAIL OPEN AND THE CHILLED WATER CONTROL VALVE (V-2) SHALL CLOSE. BOTH THE SUPPLY AIR FAN AND EXHAUST AIR FAN SHALL DE-ENERGIZE.
13. LOW LIMIT THERMOSTATS: LOW TEMPERATION DETECTION THERMOSTAT (LT-1) SHALL HAVE A MINIMUM 20 FOOT (AVERAGING SENSING ELEMENT) CAPILLARY TUBE SIZED TO THE BASIS OF ONE LINEAR FOOT OF CAPILLARY TUBE FOR EACH SQUARE FOOT OF COIL SURFACE. THERMOSTAT SENSITIVITY SHALL BE ADJUSTABLE. LOW TEMPERATURE DETECTION THERMOSTATS SHALL STOP SUPPLY AND EXHAUST AIR FANS, OPEN RETURN AIR DAMPER (D-3), CLOSE ERV WHEEL BYPASS DAMPERS (D-4 AND D-5) AND CLOSE BOTH THE MAIN (D-1) AND ECONOMIZER (D-6) OUTSIDE AIR DAMPERS IF MIXED AIR TEMPERATURE DROPS BELOW 35 DEGREES F AND OPEN HOT WATER HEATING VALVES. INTERLOCK LOW TEMPERATURE DETECTION THERMOSTAT TO ALARM ON ATC SYSTEM.
14. INTERLOCK ALL AIR FLOW MONITORING STATIONS WITH THE ATC SYSTEM.
15. CREATE GRAPHIC ON ATC SYSTEM AND RECORD/DISPLAY ALL INFORMATION INCLUDING AIR FLOW RATE IN CUBIC FEET PER MINUTE.
16. SENSIBLE TEMPERATURE AUTOMATIC ECONOMIZER SHALL BE PROVIDED. ALL CONTROLS, DAMPERS, WIRING NECESSARY FOR ECONOMIZER OPERATION SHALL INCLUDING A MIXED AIR LOW TEMPERATURE CONTROLLER (T-3). THE ECONOMIZER CONTROL SYSTEM SHALL PREVENT THE MIXED AIR TEMPERATURE FROM DROPPING BELOW 52 DEGREES FAHRENHEIT (ADJUSTABLE). ECONOMIZER SHALL BE FURNISHED WITH CO2 OVERRIDE. THE SENSIBLE TEMPERATURE AUTOMATIC ECONOMIZER SHALL BE DISABLED WHEN OUTSIDE AIR TEMPERATURE IS ABOVE 70 DEGREES FAHRENHEIT (ADJUSTABLE).
17. GLOBAL OUTSIDE AIR TEMPERATURE SENSOR, T-OA SHALL PREVENT CHILLED WATER COIL OPERATION ANYTIME AMBIENT TEMPERATURE IS 50 DEGREES FAHRENHEIT OR LESS.
18. FURNISH AND INSTALL SPACE RELATIVE HUMIDITY SENSOR AND INTERLOCK WITH SINGLE ZONE VAV UNITS TO PROVIDE AUTOMATIC CONTROL OF HUMIDITY AND HOT WATER RE-HEAT VALVE. RELATIVE HUMIDITY SENSOR SHALL ENABLE DEHUMIDIFICATION SEQUENCE TO REDUCE SPACE RELATIVE HUMIDITY AND AT THE SAME TIME PROVIDE HOT WATER RE-HEAT TO PREVENT SUBCOOLING THE SPACE (BOILER SYSTEM SHALL BE AUTOMATICALLY ENERGIZED TO PROVIDE HEATING WATER).
19. FURNISH AND INSTALL DISCHARGE AIR TEMPERATURE SENSOR (T-1).
20. FURNISH AND INSTALL ENERGY RECOVERY WHEEL DISCHARGE AIR TEMPERATURE SENSOR (T-4).
21. INSTALL GRAPHICS FOR UNITS AND DISPLAY ALL POINTS ON THE ATC SYSTEM. ALL SET POINTS, SCHEDULES, ETC... SHALL BE FULLY ADJUSTABLE FROM THE ATC SYSTEM.
22. FURNISH AND INSTALL WHEEL ROTATION SENSORS AND MONITOR ON ATC SYSTEM.
23. OCCUPIED AND UN-OCCUPIED MODE TEMPERATURE SETPOINTS ARE INTENTIONALLY SET TO MINIMIZE TEMPERATURE/HUMIDITY FLUCTUATIONS WITHIN THE AUDITORIUM. COORDINATE FINAL TEMPERATURE AND RELATIVE HUMIDITY SETPOINTS WITH THE OWNER.
24. CONTROL VALVE SHALL BE FULLY MODULATING PRESSURE INDEPENDENT TYPE.
25. FURNISH AND INSTALL ERV WHEEL BYPASS DAMPERS (D-4 & D-5) THAT SHALL OPEN ANYTIME UNIT IS OPERATING IN ECONOMIZER MODE.
26. ERV WHEEL DISCHARGE AIR TEMPERATURE SENSOR (T-4) SHALL ALSO BE UTILIZED AS A TEMPERATURE ALARM ANY TIME THE TEMPERATURE AT THIS LOCATION IS BELOW 40 DEGREES FAHRENHEIT OR ABOVE 85 DEGREES FAHRENHEIT WHEN IN THE OCCUPIED MODE. UNDER THESE CONDITIONS THE TEMPERATURE ALARM SHALL INDICATE ON ATC SYSTEM INDICATING "WHEEL FAILURE".

B. OCCUPIED CYCLE:

1. THE UNIT CONTROLS SHALL BE ARRANGED FOR A WINTER TIME MORNING WARM-UP CYCLE AND A SUMMER TIME PULL DOWN CYCLE (FROM 5:30 A.M. TO 6:30 A.M.).
2. OUTDOOR, ECONOMIZER AND RETURN AIR DAMPERS SHALL BE INTERLOCKED AND POSITIONED BY A FULLY MODULATING, SPRING-RETURN DAMPER ACTUATOR THROUGH ATC SYSTEM.
3. DURING ECONOMIZER OPERATION, A MIXED AIR TEMPERATURE CONTROLLER SHALL MODULATE THE OUTDOOR AND RETURN AIR DAMPER ASSEMBLY TO PREVENT THE MIXED AIR TEMPERATURE FROM DROPPING BELOW 52 DEGREES F. CHANGEOVER FROM CHILLED WATER COIL TO ECONOMIZER OPERATION SHALL BE PROVIDED BY AN ELECTRONIC SENSIBLE TEMPERATURE CONTROL THAT FEEDS INPUT INTO THE FIELD INSTALLED CONTROLLER. TEMPERATURE SENSORS SUPPLY INPUT TO THE FIELD INSTALLED CONTROLLER WHICH MODULATES BOTH SETS OF DAMPERS FOR ECONOMIZER OPERATION. ENERGY RECOVERY WHEEL SHALL DE-ENERGIZE AND BE BYPASSED IN ECONOMIZER MODE VIA BYPASS DAMPERS (D-4) AND (D-5).
4. ECONOMIZER RELIEF:
DURING ECONOMIZER CYCLE AN INDEPENDENT MEANS OF MAINTAINING SPACE DIFFERENTIAL STATIC PRESSURE SHALL BE PROVIDED. A SPACE DIFFERENTIAL STATIC PRESSURE CONTROLLER, (SP-1) SHALL BE MOUNTED AS SHOWN ON CONTRACT DRAWINGS. THE SPACE DIFFERENTIAL STATIC PRESSURE CONTROLLER, (SP-1) SHALL DIRECTLY MEASURE SPACE DIFFERENTIAL STATIC PRESSURE. THE SPACE DIFFERENTIAL STATIC PRESSURE SENSOR SHALL BE CAPABLE OF HANDLING THREE SETPOINTS. SPACE DIFFERENTIAL STATIC PRESSURE CONTROLLER, SP-1 SHALL OPEN RELIEF AIR DAMPER, (D-7) UPON REACHING A POSITIVE STATIC DIFFERENTIAL PRESSURE OF .05 INCHES W.C. (ADJUSTABLE). SPACE STATIC PRESSURE SENSOR SHALL BE FOR MONITORING SPACE STATIC DIFFERENTIAL AND CONTROL OF RELIEF AIR DAMPER MODULATION.
5. MORNING WARM-UP CYCLE: DURING MORNING WARM-UP CYCLE, THE SUPPLY AIR FAN SHALL RUN CONTINUOUSLY. THE HEATING COIL CONTROL VALVE (V-1) SHALL BE WIDE OPEN. THE UNIT FAN SHALL OPERATE IN MORNING WARM-UP MODE UNTIL THE SPACE AIR TEMPERATURE (T-2) RISES TO 70 DEGREES F (ADJUSTABLE). AT THAT POINT THE HEATING COIL CONTROL VALVE (V-1) SHALL OPERATE UNDER THE CONTROL OF ITS RESPECTIVE TEMPERATURE SENSOR (T-2) AND THE SUPPLY AIR FAN SHALL MODULATE TO MAINTAIN SPACE TEMPERATURE AT 72 DEGREES F (ADJUSTABLE). OUTSIDE AIR DAMPER (D-1) SHALL REMAIN CLOSED DURING MORNING WARM UP CYCLE AND RETURN AIR FAN (D-3) SHALL REMAIN OPEN.
6. MORNING PULL DOWN COOLING CYCLE: DURING MORNING PULL DOWN COOLING CYCLE, THE SUPPLY AIR FAN SHALL OPERATE CONTINUOUSLY. THE UNIT FAN SHALL OPERATE IN MORNING PULL DOWN MODE UNTIL THE SPACE AIR TEMPERATURE (T-2) FALLS TO 78 DEGREES F (ADJUSTABLE). THE DISCHARGE AIR TEMPERATURE CONTROLLER (T-1) SHALL FULLY OPEN CHILLED WATER CONTROL VALVE TO PROVIDE FULL COOLING. THE UNIT SHALL REMAIN IN THE MORNING PULL DOWN CYCLE UNTIL THE ROOM AIR SENSED AT (T-2) DROPS TO 78 DEGREES F (ADJUSTABLE). AT THAT POINT THE CHILLED WATER COIL CONTROL VALVE SHALL BE PLACED UNDER THE CONTROL OF THE DISCHARGE AIR TEMPERATURE CONTROLLER, (T-1). UPON COMPLETION OF MORNING COOL DOWN PERIOD, THE DISCHARGE AIR TEMPERATURE CONTROLLER (T-1) SHALL MODULATE THE CHILLED WATER COIL AND THE SUPPLY AIR FAN SHALL MODULATE TO MAINTAIN SPACE TEMPERATURE AT 75 DEGREES F (ADJUSTABLE). OUTSIDE AIR DAMPER (D-1) SHALL REMAIN CLOSED DURING MORNING COOL DOWN CYCLE AND RETURN AIR DAMPER (D-3) SHALL REMAIN OPEN.
7. SINGLE ZONE VAV: UNIT SHALL MODULATE SUPPLY FAN VFD'S BETWEEN 30-100% IN COOLING MODE AND 50-100% IN HEATING MODE TO MAINTAIN SPACE SETPOINT. DURING CO2 OVERRIDE OPERATION OF OUTDOOR AIR DAMPER, THE SUPPLY FAN WILL BE FORCED TO 75% AND CAN MODULATE UP FROM THERE AS NEEDED.
8. MINIMUM OUTSIDE AIR FLOW AS SCHEDULED SHALL BE MAINTAINED IN OCCUPIED MODE BY MODULATING OUTSIDE AIR DAMPER AND RETURN DAMPER REGARDLESS OF SUPPLY FAN SPEED.
9. SPACE RELATIVE HUMIDITY SENSOR (H-1) SHALL OVERRIDE THE REQUIREMENTS OF THE DISCHARGE AIR TEMPERATURE CONTROLLER (T-1) WHEN RELATIVE HUMIDITY CONDITIONS EXCEED ITS SET POINT (60 PERCENT RH, ADJUSTABLE). THE CONTROLS SHALL MODULATE UNIT COOLING AND HOT WATER COILS AS NECESSARY WHEN DE-HUMIDIFICATION CYCLE IS ACTIVATED TO MAINTAIN SPACE RELATIVE HUMIDITY AT 60% (ADJUSTABLE) AND SPACE TEMPERATURE AT 75 DEGREES F (ADJUSTABLE).
10. DURING DEHUMIDIFICATION MODE THE SINGLE ZONE VAV UNIT DISCHARGE AIR TEMPERATURE SHALL BE RESET TO 50°F (ADJUSTABLE) AND THE HOT WATER HEATING SYSTEM SHALL BE ENERGIZED (IF OFF) TO PROVIDE RE-HEAT AND PREVENT SUB-COOLING. ONCE SPACE RELATIVE HUMIDITY IS SATISFIED, SYSTEM SHALL RETURN TO NORMAL OPERATION.
11. DISCHARGE AIR TEMPERATURE (T-1) SHALL BE RESETTABLE AND ADJUSTABLE THROUGH SOFTWARE.
12. DISCHARGE AIR TEMPERATURE (T-5) SHALL BE RESETTABLE AND ADJUSTABLE THROUGH SOFTWARE.
13. DEMAND CONTROLLED VENTILATION: SPACE CO2 SENSOR SHALL MODULATE THE SUPPLY AND EXHAUST AIR FANS TO MAINTAIN THE CO2 LEVEL AT 1,000PPM (ADJUSTABLE). THE MINIMUM FAN AIR FLOW RATES SHALL BE AS SCHEDULED. SET UP AND TEST MINIMUM AIR FLOW RATES WITH TEST AND BALANCE ENGINEER SO THAT FANS DO NOT OPERATE BELOW MINIMUM AIRFLOW RATES REGARDLESS OF MEASURED CO2 LEVELS. THE SPACE CO2 SENSORS SHALL MODULATE AIR FLOW RATES IN A LINEAR FASHION FROM MINIMUM TO MAXIMUM BASED ON CO2 MEASUREMENTS AND RE-SET SCHEDULE. COORDINATE WITH ATC SUBCONTRACTOR.
14. THE OUTSIDE AIR FLOW MONITORING STATION AND THE EXHAUST AIR FLOW MONITORING STATION SHALL BE UTILIZED IN A FAN TRACKING ARRANGEMENT. THE OUTSIDE AIR FLOW MONITORING STATION SHALL MEASURE THE OUTSIDE AIR FLOW RATE AND THROUGH THE ATC SYSTEM SHALL DETERMINE EXHAUST AIR FLOW RATE SET POINT. THE EXHAUST AIR FLOW RATE SET POINT SHALL THEN BE MAINTAINED BY VARYING THE EXHAUST FAN SPEED TO MAINTAIN THE MATCHING REQUIRED EXHAUST AIR FLOW RATE AS DETERMINED BY THE OUTSIDE AIR FLOW MONITORING STATION AND CONTROLLED TO THE EXHAUST AIR FLOW MONITORING STATION. IN COOLING, HEATING AND DEHUMIDIFICATION MODE OF OPERATION, THE EXHAUST AIR FLOW RATE SHALL MATCH THE OUTSIDE AIR FLOW RATE. IN ECONOMIZER MODE EXHAUST AIR FAN SHALL ONLY TRACK O.A. UP TO ITS SCHEDULED MAXIMUM OUTSIDE AIRFLOW RATE. A SEPARATE ECONOMIZER RELIEF AIR DAMPER (D-7) IS PROVIDED FOR THE SPACE DIFFERENTIAL STATIC PRESSURE CONTROL.
15. PANDEMIC MODE: WHENEVER "PANDEMIC MODE" IS TOGGLED "ON" THROUGH BMS SYSTEM SZVAV SUPPLY FAN AND EXHAUST FAN(S) SHALL MODULATE TO THE MAXIMUM OUTSIDE AIR FLOW RATE (NON ECONOMIZER) TO INCREASE VENTILATION AIR FLOW. PROVIDE SEPARATE SCHEDULE (ADJUSTABLE) FOR PANDEMIC MODE TO ENERGIZE SZVAV 2-HOURS BEFORE OCCUPANCY AND REMAIN OPERATIONAL 2-HOURS AFTER OCCUPANCY. CENTRAL HEATING WATER SYSTEM SHALL ALSO BE ENABLED TO PROVIDE HEATING AS REQUIRED FOR SZVAV UNIT. PANDEMIC MODE SHALL BE TOGGLED "ON" AND "OFF" VIA SOFTWARE SWITCH ON THE BMS GRAPHIC. IF WINTER COOLING IS REQUIRED, ECONOMIZER MODE SHALL BE ALLOWED TO INCREASE OUTSIDE AIRFLOW RATE ABOVE MAXIMUM NON ECOMOMIZER OUTSIDE AIR FLOW RATE WHEN IN PANDEMIC MODE.
16. DEMAND LIMIT TOGGLE: WHENEVER THE DEMAND LIMIT TOGGLE SWITCH IS ENABLED THE BMS SHALL RESET THE SINGLE ZONE VAV UNIT DEMAND CONTROLLED VENTILATION CO_2 SETPOINT TO 1,200 PPM (ADJUSTABLE) AND RESET COOLING COIL DISCHARGE AIR TEMPERATURE SETPOINT TO 55 DEGREES F (ADJUSTABLE).

C. UNOCCUPIED CYCLE:

1. THE ATC SYSTEM SHALL RE-SET THE SPACE TEMPERATURE SENSOR (T-2) TO MAINTAIN A REDUCED NIGHT SETBACK TEMPERATURE OF 68 DEGREES F (ADJUSTABLE) IN HEATING MODE AND AN INCREASED NIGHT SET BACK TEMPERATURE OF 85 DEGREES F IN COOLING MODE (ADJUSTABLE). THE NIGHT SETBACK TEMPERATURE SHALL BE MAINTAINED BY CYCLING THE SINGLE ZONE VAV UNIT FANS AND HEATING COIL CONTROL VALVE (OR CHILLED WATER CONTROL VALVE) TO MAINTAIN SPACE AT 68 DEGREES F (HEATING SETBACK TEMPERATURE-ADJUSTABLE) OR 85 DEGREES F (COOLING SETBACK TEMPERATURE - ADJUSTABLE). OUTSIDE AIR DAMPER (D-1) SHALL BE CLOSED. ENERGY RECOVERY WHEEL SHALL BE OFF, EXHAUST AIR FAN SHALL BE OFF, EXHAUST AIR DAMPER (D-2) SHALL CLOSE. RELIEF AIR FAN SHALL BE OFF, RELIEF AIR FAN DAMPER SHALL CLOSE AND RETURN AIR DAMPER (D-3) SHALL FULLY OPEN. ERV WHEEL BYPASS DAMPERS (D-4 AND D-5) SHALL REMAIN CLOSED DURING ALL UNOCCUPIED CYCLES.

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AUTOMATIC TEMPERATURE CONTROLS HVAC

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SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

M404

ATC POINTS LIST

EQUIPMENT OR SYSTEM	AIRFLOW MEASURING STATIONS (TYP.)	PRIMARY CONDENSATE OVERFLOW SAFETY ALARM	AUX. CONDENSATE OVERFLOW SAFETY ALARM	CONTROL VALVE - CHILLED WATER COIL (2-WAY MODULATING PRESSURE INDEPENDENT)	CONTROL VALVE - HOT WATER COIL (2-WAY MODULATING PRESSURE INDEPENDENT)	COOLING AIR RE-SET	DAMPER - TWO POSITION	DEMAND LIMIT TOGGLE	DUCT SMOKE DETECTORS (TYP.)	ENTHALPY WHEEL DISCHARGE TEMPERATURE	ENTHALPY WHEEL DISCHARGE TEMPERATURE ALARM	ENTHALPY WHEEL MOTOR STATUS	ENTHALPY WHEEL ROTATION	EQUIPMENT STATUS	EXHAUST AIR CO_2	EXHAUST AIR DEWPOINT TEMPERATURE	GLOBAL - OA CO_2	GLOBAL - OA RELATIVE HUMIDITY	GLOBAL - OA TEMP	GRAPHIC DISPLAY	HEATING AIR RE-SET	LOW OUTDOOR AIRFLOW ALARM	LOW TEMPERATURE DETECTION THERMOSTAT	MODE OF OPERATION (HEAT, COOL, PANDEMIC, VENTILATION, DEHUMIDIFICATION)	SPACE CO_2	SPACE RELATIVE HUMIDITY	START & STOP	TEMP - COIL DISCHARGE AIR (CHILLED WATER COIL)	TEMP - DISCHARGE AIR	TEMP - EXHAUST AIR	TIME PROGRAM	TOTAL RUN TIME	VFD AMPERAGE, SPEED, AND BACNET ALARMS	VFD DRIVES
ENERGY RECOVERY VENTILATOR	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

NOTES:
1. PROVIDE ADDITIONAL DIGITAL POINTS AS NECESSARY TO ACCOMPLISH THE SEQUENCE OF OPERATION.
2. ALL ITEMS IN THE POINTS LIST MUST BE VIEWABLE FROM THE OPERATOR'S TERMINAL.

HEATING AIR RE-SET SCHEDULE

T-OA OUTSIDE AIR TEMP.	HEATING AIR SUPPLY TEMP. (T-2)
50°F	65°F
10°F	75°F

COOLING AIR RE-SET SCHEDULE

T-OA OUTSIDE AIR TEMP.	COOLING AIR SUPPLY TEMP. (T-2)
95°F	53°F
70°F	60°F

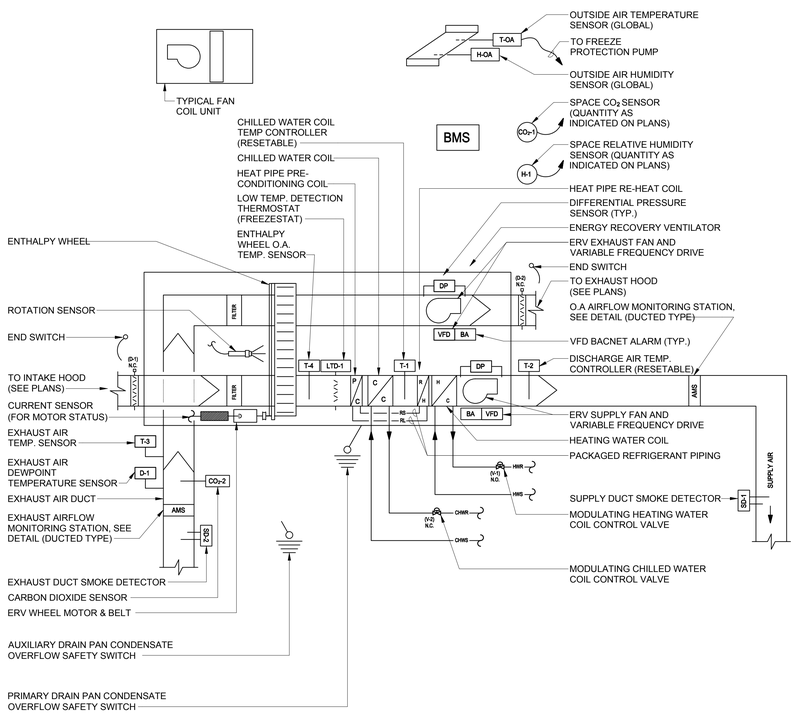
ENERGY RECOVERY UNIT (ERV) ATC INTERLOCK SCHEDULE

ERV NO.	FAN COIL UNIT NO.
ERV-1	FCU-6 THROUGH FCU-31

NOTES:
1. ANYTIME A FAN COIL OPERATES IN OCCUPIED MODE, THE INTERLOCKED ERV UNIT SHALL OPERATE IN OCCUPIED MODE TO PROVIDE CODE REQUIRED FRESH AIR.

DEHUMIDIFICATION MODE DISCHARGE AIR RE-SET SCHEDULE

EXHAUST AIR DEWPOINT TEMP.	COOLING COIL DISCHARGE AIR SUPPLY TEMP. (T-2)
LESS THAN OR EQUAL TO 57°F	53°F
GREATER THAN 57°F	50°F



1 **CONTROLS - ENERGY RECOVERY VENTILATOR**

NO SCALE

ATC CONTROL SEQUENCE

ENERGY RECOVERY VENTILATOR

A. GENERAL

1. ENERGY RECOVERY VENTILATOR (ERV) SHALL BE STARTED AND STOPPED THROUGH THE BMS SYSTEM BY WAY OF SCHEDULE PROGRAM (WITH MANUAL OVERRIDE). ERV SHALL BE INTERLOCKED WITH FAN COIL UNITS LOCATED WITHIN THE AREA SERVED BY THE ERV TO ENERGIZE WHENEVER FAN COIL UNITS ARE INDEXED TO OCCUPIED MODE. ERV SHALL ALSO BE ENERGIZED DURING ALL OCCUPIED PERIODS. ERV UNITS SHALL NOT OPERATE UNTIL TERMINAL UNITS BRING BUILDING TEMPERATURE UP/DOWN PRIOR TO OCCUPANCY.
2. FURNISH SUPPLY AIR AND EXHAUST AIR VARIABLE FREQUENCY DRIVES, SPACE HUMIDITY SENSOR, EXHAUST AIR DEWPOINT TEMPERATURE AND SPACE CARBON DIOXIDE SENSORS TO ALLOW AIR FLOW MODULATION BASED ON CARBON DIOXIDE LEVELS AND EXHAUST AIR DEWPOINT TEMPERATURE. MONITOR VARIABLE FREQUENCY DRIVE FAN SPEEDS AND AMPERAGES ON ATC SYSTEM.
3. ERV SUPPLY FAN, ERV EXHAUST FAN AND ERV WHEEL MOTOR SHALL BE INTERLOCKED TO OPERATE DURING ALL OCCUPIED PERIODS. FAN COIL UNITS SHALL BE INTERLOCKED WITH ERV.
4. WHEN THE ERV IS DE-ENERGIZED, THE OUTSIDE AIR DAMPER, D-1, AND EXHAUST AIR DAMPER, D-2, SHALL CLOSE, THE ENERGY RECOVERY WHEEL SHALL STOP ROTATING, THE HEATING WATER COIL CONTROL VALVE, V-1, SHALL FAIL OPEN AND THE CHILLED WATER CONTROL VALVE, V-2, SHALL CLOSE.
5. THE ERV UNIT DAMPERS SHALL BE PROVIDED WITH END SWITCHES TO PREVENT OPERATION OF ERV SUPPLY FAN AND ERV EXHAUST FAN UNTIL DAMPERS ARE PROVEN OPEN.
6. PROVIDE A MANUAL RE-SET LOW TEMPERATURE DETECTION THERMOSTAT, LTD-1, ON THE ENTERING SIDE OF THE PRE-COOL HEAT PIPE COIL ARRANGED TO STOP THE ERV UNIT, CLOSE ALL DAMPERS, DE-ENERGIZE ALL FANS, DE-ENERGIZE THE ENERGY RECOVERY WHEEL IF THE ENTERING AIR TEMPERATURE DROPS TO THE LOW LIMIT SETTING OF 36 DEGREES F (ADJUSTABLE). THE LOW TEMPERATURE DETECTION THERMOSTAT, LTD-1 SHALL BE OF THE MANUAL RE-SET TYPE AND WILL BE EQUIPPED WITH A 20' ELEMENT SERPENTINE ACROSS THE ENTERING FACE OF THE COIL SENSITIVE TO THE COLDEST POINT ALONG ANY 12 INCH INCREMENT. AN AUDIBLE AND VISUAL ALARM WITH SILENCE SWITCH SHALL ANNUNCIATE ON FRONT END UPON ACTIVATION OF LOW TEMPERATURE DETECTION THERMOSTAT. A ONE MINUTE (ADJUSTABLE) TIME DELAY SHALL LOCKOUT THE LOW TEMPERATURE DETECTION THERMOSTAT, LTD-1 WHEN THE UNIT IS INITIALLY STARTED TO PREVENT NUISANCE TRIPPING.
7. DUCT MOUNTED SMOKE DETECTORS (PROVIDED UNDER DIVISION 26) SHALL BE MOUNTED IN THE SUPPLY AND EXHAUST DUCTS OF THE ERV UNIT. UPON DETECTION OF PRODUCTS OF COMBUSTION, THE ERV SHALL SHUT DOWN AND A SIGNAL SHALL BE SENT TO THE FIRE ALARM SYSTEM. THE ELECTRICAL CONTRACTOR SHALL RUN SIGNAL WIRING FROM THE SMOKE DETECTORS TO THE FIRE ALARM SYSTEM. THE WIRING FROM THE SMOKE DETECTORS TO FANS SHALL BE BY THE ATC CONTRACTOR.
8. PROVIDE DIFFERENTIAL PRESSURE SENSORS (OR MOTORS CURRENT SENSORS ON SMALL FANS) TO DETERMINE THE STATUS OF ALL FANS ASSOCIATED WITH THE ERV.
9. THE ERV SUPPLY AIR FAN SPEED, AMPERAGE/BACNET ALARMS, AND EXHAUST AIR FAN SPEED/AMPERAGE/BACNET ALARMS, SHALL BE MONITORED VIA VFD'S AND SHALL REPORT THE SAME ON THE AUTOMATIC TEMPERATURE CONTROL SYSTEM.
10. THE ERV UNIT EXHAUST AIR CARBON DIOXIDE LEVEL SHALL BE MONITORED/TRENDED ON THE ATC SYSTEM.
11. THE ERV UNIT EXHAUST AIR TEMPERATURE SHALL BE MONITORED BY TEMPERATURE SENSOR, T-3.
12. ALL SET POINT TEMPERATURES SHALL BE RESETTABLE AND ADJUSTABLE THROUGH SOFTWARE. ALL TEMPERATURE SENSORS SHALL BE MONITORED.
13. THE ERV SHALL BE PROVIDED WITH A WRAP AROUND HEAT PIPE THAT SHALL AUTOMATICALLY PRE-CONDITION AND RE-HEAT OUTSIDE WHENEVER CHILLED WATER TEMPERATURE COIL IS IN COOLING MODE.
14. ALL ENERGY RECOVERY VENTILATORS SHALL BE INTERLOCKED WITH THE CENTRAL BMS SYSTEM. THE BMS SYSTEM SHALL DETERMINE WHETHER UNITS ARE IN COOLING MODE, HEATING MODE, VENTILATION MODE, PANDEMIC MODE, OR DEHUMIDIFICATION MODE.
15. THE UNIT DISCHARGE AIR TEMPERATURE (T-2) AND THE ENERGY RECOVERY WHEEL DISCHARGE AIR TEMPERATURE (T-4) SHALL BE MONITORED/TRENDED ON THE AUTOMATIC TEMPERATURE CONTROL SYSTEM.
16. THE ATC SUBCONTRACTOR SHALL INSTALL AND INTERLOCK U.L. 508 LISTED A/C CONDENSATE OVERFLOW SAFETY SWITCHES TO THEIR RESPECTIVE ENERGY RECOVERY VENTILATORS. THE CONDENSATE OVERFLOW SAFETY SWITCHES SHALL BE WIRED TO DE-ENERGIZED THE ENERGY RECOVERY VENTILATORS IN THE CASE OF HIGH LEVEL WATER CONDITION. A LOCAL ALARM SHALL BE ANNUNCIATED UPON ACTIVATION OF PUMP SAFETY SWITCH. FIELD INSTALL THE A/C CONDENSATE OVERFLOW SAFETY SWITCHES IN THE CHILLED WATER COIL DRAIN PAN.
17. INTERLOCK ATC SYSTEM WITH ENERGY RECOVERY WHEEL ROTATION SENSOR. PROVIDE STATUS OF ENERGY RECOVERY WHEEL.
18. MAP OUT ALL POINTS LISTED ON POINT LIST. COORDINATE WITH ENERGY RECOVERY UNIT MANUFACTURER.
19. FURNISH AND INSTALL AIR FLOW MEASURING STATIONS TO MONITOR AND REPORT OUTSIDE AND EXHAUST AIR FLOW RATES (IN CFM) ON ATC SYSTEM.
20. PROVIDE A LOW OUTDOOR AIR FLOW ALARM ON THE ATC SYSTEM THAT WILL ANNUNCIATE ANYTIME THE OUTSIDE AIR FLOW RATE OF THE ERV UNIT DROPS MORE THAN 15% (ADJUSTABLE) BELOW THE DESIGN MINIMUM OUTSIDE AIR FLOW RATE. ALARM SHALL HAVE A 10 MINUTE DELAY (ADJUSTABLE). REFER TO ERV UNIT SCHEDULE FOR MAX./MIN. OUTSIDE AIRFLOW RATES.
21. THE EXHAUST AIR FAN SPEED SHALL TRACK THE SUPPLY AIR FAN SPEED BASED ON FIELD MEASUREMENT OF THE MAXIMUM AND MINIMUM AIR FLOW RATES RECORDED BY THE TEST/BALANCE ENGINEER. THE SUPPLY AIR FAN SPEED/HERTZ AND EXHAUST AIR FAN SPEED/HERTZ SHALL BE PROVIDED TO THE ATC SUBCONTRACTOR FOR INSERTION INTO THE VFD/CONTROLLER FAN TRACKING PROGRAM. ALSO, DOCUMENT FIELD SETTINGS OF BOTH VFD'S ON THE INSIDE OF THE ERV UNIT ACCESS DOORS ADJACENT TO EACH VFD AND ON BMS GRAPHIC.
22. WHEEL DISCHARGE AIR TEMPERATURE SENSOR T-4 SHALL ALSO BE UTILIZED AS A TEMPERATURE ALARM ANYTIME THE TEMPERATURE AT THIS LOCATION IS BELOW 40 DEGREES F OR ABOVE 85 DEGREES F WHEN THE UNIT IS OPERATING IN THE OCCUPIED MODE A TEMPERATURE ALARM SHALL INDICATE ON ATC SYSTEM INDICATING WHEEL FAILURE.
23. FURNISH AND INSTALL EXHAUST AIR DEWPOINT TEMPERATURE SENSOR FOR DEHUMIDIFICATION MODE.
24. FURNISH AND INSTALL SPACE RELATIVE HUMIDITY SENSORS FOR MONITORING SPACE RELATIVE HUMIDITY LEVEL.

B. OCCUPIED CYCLE

1. THE ENERGY RECOVERY VENTILATOR FANS AND ENERGY RECOVERY WHEEL SHALL OPERATE CONTINUOUSLY TO PROVIDE CONDITIONED, 100 PERCENT SPACE NEUTRAL OUTSIDE AIR TO THE SPACES.
2. THE GLOBAL OUTSIDE AIR TEMPERATURE SENSOR, T-OA SHALL DETERMINE HEATING OR COOLING MODE. WHENEVER OUTSIDE AIR TEMPERATURE IS 65 DEGREES F (ADJUSTABLE) OR ABOVE, THE ERV SHALL OPERATE IN COOLING MODE. WHENEVER THE OUTSIDE AIR TEMPERATURE IS 50 DEGREES F (ADJUSTABLE) OR BELOW, THE ERV SHALL OPERATE IN THE HEATING MODE. IN BETWEEN 50 DEGREES AMBIENT AND 65 DEGREES AMBIENT, THE ERV SHALL OPERATE IN VENTILATION MODE WITHOUT HOT WATER OR CHILLED WATER. DEHUMIDIFICATION MODE SHALL ONLY BE ENABLED WHEN IN COOLING MODE AND EXHAUST AIR DEWPOINT TEMPERATURE IS NOT SATISFIED.
3. HEATING MODE: DURING HEATING MODE, THE ERV FANS AND ERV WHEEL SHALL OPERATE CONTINUOUSLY. THE DISCHARGE AIR TEMPERATURE CONTROLLER, T-2 SHALL MODULATE COIL CONTROL VALVE, V-1 TO MAINTAIN VARIABLE DISCHARGE AIR SET POINT PER HEATING AIR RESET SCHEDULE (ADJUSTABLE). THE WRAP-AROUND HEAT PIPE SHALL BE INACTIVE DURING HEATING MODE. DURING HEATING MODE, THE SUPPLY AIR TEMPERATURE SET POINT SHALL BE RE-SET BASED ON OUTSIDE AIR TEMPERATURE AS SCHEDULED.
4. COOLING MODE: DURING COOLING MODE, THE ERV FANS AND ERV WHEEL SHALL OPERATE CONTINUOUSLY. THE CHILLED WATER COIL TEMPERATURE CONTOLLER, T-1, SHALL MODULATE CHILLED WATER COIL CONTROL VALVE, V-2 TO MAINTAIN VARIABLE DISCHARGE AIR SET POINT PER COOLING AIR RESET SCHEDULE (ADJUSTABLE). THE WRAP-AROUND HEAT PIPE SHALL AUTOMATICALLY PRE-COOL AND RE-HEAT OUTSIDE AIR WHENEVER CHILLED WATER FLOWS THROUGH CHILLED WATER COIL. IN COOLING MODE, THE HOT WATER COIL CONTROL VALVE, V-1, SHALL ONLY OPEN WHEN THE WRAP AROUND HEAT PIPE IS NOT CAPABLE OF PROVIDING SET POINT TEMPERATURE AT T-2 OF 70 DEGREES F (ADJUSTABLE). THE HOT WATER COIL CONTROL VALVE, V-1, SHALL ALSO CLOSE WHEN THE OUTSIDE AIR TEMPERATURE IS 80 DEGREES FAHRENHEIT (ADJUSTABLE) OR ABOVE TO ALLOW THE ERV TO DELIVER AIR THAT IS COLDER THAN SPACE NEUTRAL AND CONTRIBUTE TO MEETING THE SPACE SENSIBLE LOADS. WHEN THE OUTSIDE AIR TEMPERATURE DROPS BELOW 80 DEGREES FAHRENHEIT DOWN TO 70 DEGREES FAHRENHEIT, THE HEATING WATER COIL CONTROL VALVE, V-1, SHALL BE ENABLED WHEN SYSTEM IS IN COOLING MODE.
5. DEMAND CONTROL VENTILATION: THE INDICATED SPACES (SEE FLOOR PLANS) AND THE MAIN EXHAUST AIR STREAM PRIOR TO ENERGY RECOVERY WHEEL SHALL CONTAIN C02 SENSORS. SPACE C02 SENSORS SHALL MODULATE THE SUPPLY AND EXHAUST AIR STREAMS TO MAINTAIN THE C02 LEVELS AT 1,000 PPM (ADJUSTABLE). THE EXHAUST CO2 SENSOR SHALL ONLY MONITOR EXHAUST AIR STREAM CO2 CONCENTRATION. AN AUDIBLE/VISUAL ALARM (WITH SILENCER) SHALL INDICATE AN ALARM WHERE SPACE CO2 LEVELS EXCEEDS SET POINT BY 10% (ADJUSTABLE), A TIME DELAY (VIA SOFTWARE) SHALL BE PROVIDED THAT WILL ALLOW A PROGRAMMABLE DELAY OF 5 MINUTES (ADJUSTABLE) PRIOR TO ALARMING TO PREVENT NUISANCE TRIPS. THE MINIMUM FAN AIRFLOW RATES SHALL BE AS SCHEDULED. SET-UP AND TEST MINIMUM AIRFLOW RATES WITH TEST AND BALANCE ENGINEER SO THAT FANS DO NOT OPERATE BELOW MINIMUM FLOW RATES REGARDLESS OF MEASURED C02 LEVEL. SPACE INDICATING THE HIGHEST CO2 LEVELS SHALL GOVERN THE FAN SPEEDS. FAN SPEED SHALL MODULATE LINEARLY FROM MINIMUM TO MAXIMUM BASED IN DEVIATION OF CO2 LEVELS RELATIVE TO SETPOINT. THE EXHAUST AIR FAN SPEED SHALL TRACK THE SUPPLY AIR FAN SPEED BASED ON FIELD MEASUREMENT OF THE MAXIMUM AND MINIMUM AIR FLOW RATES RECORDED BY THE TEST/BALANCE ENGINEER. THE SUPPLY AIR FAN SPEED/HERTZ AND EXHAUST AIR FAN SPEED/HERTZ SHALL BE PROVIDED TO THE ATC SUBCONTRACTOR FOR INSERTION INTO THE VFD/CONTROL SYSTEM FAN TRACKING PROGRAM.
6. DEHUMIDIFICATION MODE: WHENEVER THE EXHAUST AIR DEWPOINT TEMPERATURE EXCEEDS THE EXHAUST AIR DEWPOINT TEMPERATURE SET POINT OF 57°F (ADJUSTABLE) THE ENERGY RECOVERY UNIT SHALL AUTOMATICALLY RESET COOLING COIL DISCHARGE AIR TEMPERATURE SETPOINT TO 50°F (ADJUSTABLE) TO DEHUMIDIFY THE BUILDING. THE HOT WATER COIL CONTROL VALVE, V-1, SHALL ONLY OPEN WHEN THE WRAP AROUND HEAT PIPE IS NOT CAPABLE OF PROVIDING SET POINT TEMPERATURE AT T-2 OF 70 DEGREES F (ADJUSTABLE). THE HOT WATER COIL CONTROL VALVE, V-1, SHALL ALSO CLOSE WHEN THE OUTSIDE AIR TEMPERATURE IS 80 DEGREES FAHRENHEIT (ADJUSTABLE) OR ABOVE TO ALLOW THE ERV TO DELIVER AIR THAT IS COLDER THAN SPACE NEUTRAL AND CONTRIBUTE TO MEETING THE SPACE SENSIBLE LOADS. WHEN THE OUTSIDE AIR TEMPERATURE DROPS BELOW 80 DEGREES FAHRENHEIT DOWN TO 70 DEGREES FAHRENHEIT, THE HEATING WATER COIL CONTROL VALVE, V-1, SHALL BE ENABLED WHEN SYSTEM IS IN DEHUMIDIFICATION MODE. ALSO, TO PREVENT SUB-COOLING OF SPACES FURNISH AND INSTALL INTERLOCK WITH HOT WATER HEATING SYSTEM THAT WILL ENABLE THE SAME (IF "OFF") TO PROVIDE HEAT FOR TERMINAL UNITS (FAN COIL UNITS) WHEN ERV UNITS ARE IN DEHUMIDIFICATION MODE. ONCE DEWPOINT TEMPERATURE SET POINT IS REACHED THE SYSTEM SHALL RETURN TO NORMAL OPERATION.
7. PANDEMIC MODE: WHENEVER "PANDEMIC MODE" IS TOGGLED "ON" THROUGH BMS SYSTEM ERV SUPPLY FAN AND EXHAUST AIR FAN(S) SHALL MODULATE TO MAXIMUM SPEED TO INCREASE VENTILATION AIRFLOW. PROVIDE SEPARATE SCHEDULE (ADJUSTABLE) FOR PANDEMIC MODE TO ENERGIZE ERV 2 HOURS BEFORE OCCUPANCY AND REMAIN OPERATIONAL 2 HOURS AFTER OCCUPANCY. CENTRAL CHILLED WATER AND HEATING WATER PLANTS SHALL ALSO BE ENABLED TO PROVIDE COOLING OR HEATING AS REQUIRED FOR ERV UNIT.
8. UNIT HEATING/COOLING/VENTILATION/DEHUMIDIFICATION MODE SHALL BE DETERMINED BY ATC SYSTEM BASED ON HOT WATER/CHILLED WATER AVAILABILITY AND TIME OF YEAR.
9. DEMAND LIMIT TOGGLE: WHENEVER THE DEMAND LIMIT TOGGLE SWITCH IS ENABLED THE BMS SHALL RESET THE ERV UNIT DEMAND CONTROLLED VENTILATION CO_2 SETPOINT TO 1,200 PPM (ADJUSTABLE) AND RESET COOLING COIL DISCHARGE AIR TEMPERATURE SETPOINT TO 55 DEGREES F (ADJUSTABLE)

C. UNOCCUPIED CYCLE

1. DURING THE UNOCCUPIED CYCLE THE ERV FANS AND ERV WHEEL SHALL BE DE-ENERGIZED. OUTSIDE AIR DAMPER, D-1 AND EXHAUST AIR DAMPER, D-2 SHALL CLOSE, THE ENERGY RECOVERY WHEEL SHALL STOP ROTATING, THE HEATING COIL CONTROL VALVE, V-1, AND CHILLED WATER COIL CONTROL VALVE, V-2, SHALL CLOSE. WHENEVER AMBIENT TEMPERATURE IS 40°F OR BELOW THE HOT WATER COIL SHALL REMAIN OPEN.
2. FAN COIL UNITS SHALL CYCLE INDEPENDENTLY TO MAINTAIN A REDUCED 55 DEGREES F (ADJUSTABLE) NIGHT SET BACK TEMPERATURE.
3. CARBON DIOXIDE (C02) SENSORS AND DEMAND CONTROL VENTILATION SEQUENCE SHALL BE DISABLED.

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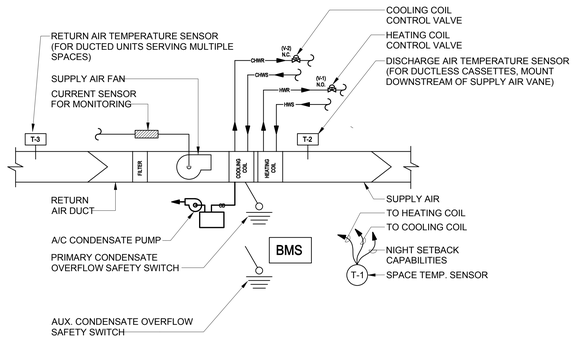


ATC POINT LIST

EQUIPMENT OR SYSTEM	PRIMARY CONDENSATE OVERFLOW AND PUMP	AUX. CONDENSATE OVERFLOW	CONTROL VALVE - CHILLED WATER COIL (2-WAY MODULATING, PRESSURE INDEPENDENT)	CONTROL VALVE - HOT WATER COIL (2-WAY MODULATING, PRESSURE INDEPENDENT)	DEMAND LIMIT TOGGLE	EQUIPMENT STATUS	GRAPHIC DISPLAY	START & STOP	START & STOP - OPTIMAL	TEMP - SPACE	TEMP -RETURN AIR (DUCT UNITS ONLY)	TEMP - SUPPLY AIR	TIME PROGRAM	TOTAL RUN TIME
FAN COIL UNIT (FCU)	●	●	●	●	●	●	●	●	●	●	●	●	●	●

NOTE:
1. PROVIDE ADDITIONAL DIGITAL POINTS AS NECESSARY TO ACCOMPLISH THE SEQUENCE OF OPERATIONS.
2. ALL ITEMS IN THE POINTS LIST MUST BE VIEWABLE FROM THE OPERATOR'S TERMINAL.

ATC CONTROL SEQUENCE

FAN COIL UNITS (100 PERCENT RECIRCULATING AIR TYPE)

A. GENERAL

1. FAN COIL UNITS SHALL BE STARTED AND STOPPED THROUGH THE BMS BY WAY OF OPTIMUM START/STOP PROGRAM (WITH MANUAL OVERRIDE).
2. WHEN A FAN COIL UNIT IS DE-ENERGIZED THE HEATING COIL CONTROL VALVE, (V-1) SHALL CLOSE, AND THE CHILLED WATER CONTROL VALVE, (V-2) SHALL FAIL CLOSED.
3. FAN COILS SHALL BE CONTROLLED BY TEMPERATURE SENSORS WITH DUAL HEATING AND COOLING SET-POINTS WITH DEADBAND. TEMPERATURE SENSORS SHALL SEQUENCE HEATING AND COOLING VALVES AS NECESSARY TO MAINTAIN SET POINTS.
4. WHERE SPACE SENSORS SERVING MORE THAN ONE FAN COIL UNIT ARE INDICATED A MASTER/SLAVE ARRANGEMENT SHALL BE PROVIDED. THE SEQUENCE OF OPERATION SHALL BE IDENTICAL FOR BOTH UNITS EXCEPT FAN COIL UNITS SHALL ACT IN PARALLEL TO EACH OTHER OFF THE INPUT OF ONE SPACE SENSOR, T-1.
5. PROVIDE DISCHARGE AIR TEMPERATURE SENSOR FOR EACH UNIT TO MONITOR SUPPLY AIR TEMPERATURE.
6. CONTROL VALVES SHALL BE PRESSURE INDEPENDENT, FULLY MODULATING TYPE.
7. FAN COIL UNIT FANS SHALL CYCLE WITH SPACE SENSOR. WHENEVER SPACE TEMPERATURE IS SATISFIED THE FAN COIL UNIT SHALL DE-ENERGIZE.
8. ATC CONTRACTOR TO INSTALL AND INTERLOCK A/C PRIMARY CONDENSATE OVERFLOW SAFETY SWITCH. SHOULD OVERFLOW CONDITION OCCUR IN EITHER PAN, UNIT SHALL SHUT-DOWN, CHILLED WATER COIL CONTROL VALVE, V-2 SHALL CLOSE AND ALARM SHALL ANNUNCIATE ON BMS.
9. FOR DUCTED FAN COIL UNITS FURNISH AND INSTALL ADDITIONAL A/C CONDENSATE OVERFLOW SWITCH IN AUXILIARY DRAIN PAN AND ALARM SHALL ANNUNICATE ON BMS.
10. DUCTLESS UNIT CONDENSATE PUMP OPERATION: FOR DUCTLESS FAN COIL UNITS AN INTEGRAL CONDENSATE PUMP WITH FLOAT SWITCH AND RELAY SHALL BE PROVIDED THAT WILL AUTOMATICALLY PUMP A/C CONDENSATE PRODUCED DURING COOLING OPERATION. THE CONDENSATE PUMP SHALL ENERGIZE ANYTIME THE SUPPLY AIR FAN RELAY IS ENERGIZED IN COOLING MODE AND THE SUPPLY FAN MOTOR RELAY IS ENERGIZED OR WHENEVER THE CONDENSATE FLOAT SWITCH IS IN AN OVERFLOW POSITION.
11. FOR DUCTED FAN COIL UNITS THAT SERVE MULTIPLE SPACES FURNISH AND INSTALL RETURN AIR TEMPERATURE SENSOR (T-3).

B. OCCUPIED CYCLE:

1. THE FAN COIL UNIT CONTROLS SHALL BE ARRANGED FOR A WINTER TIME MORNING WARM-UP CYCLE AND A SUMMER TIME PULL DOWN CYCLE (FROM 6:00 A.M. TO 7:30 A.M.) ADJUSTABLE.
2. MORNING WARM-UP CYCLE: (WINTER) THE FAN COIL UNIT SHALL ENERGIZE AND HEATING COIL VALVE, (V-1) SHALL REMAIN WIDE OPEN UNTIL THE SPACE TEMPERATURE AT T-1 RISES TO 72 DEGREES F (ADJUSTABLE). SPACE TEMPERATURE SENSOR (T-1) SHALL THEN MODULATE HEATING COIL CONTROL VALVE (V-1) AND CYCLE FAN TO MAINTAIN SET-POINT TEMPERATURE.
3. MORNING PULL DOWN COOLING CYCLE: (SUMMER) DURING MORNING COOL DOWN, THE FAN COIL UNIT SHALL ENERGIZE AND COOLING COIL CONTROL VALVE, (V-2), SHALL MODULATE TO WIDE OPEN POSITION UNIT THE SPACE TEMPERATURE AT T-1 DROPS TO 78 DEGREES F (ADJUSTABLE). SPACE TEMPERATURE SENSOR (T-1) SHALL THEN MODULATE CHILLED WATER CONTROL VALVE (V-2) AND CYCLE FAN TO MAINTAIN SET-POINT TEMPERATURE.
4. DURING NORMAL OCCUPIED PERIODS THE SUPPLY AIR FAN SHALL CYCLE WITH THE SPACE SENSOR. UPON SENSING A SPACE TEMPERATURE ABOVE HEATING SET-POINT OF 72 DEGREES F (ADJUSTABLE), SPACE TEMPERATURE SENSOR, T-1 SHALL MODULATE HEATING COIL CONTROL VALVE, V-1 CLOSED. UPON A FURTHER INCREASE IN SPACE TEMPERATURE, THE SPACE TEMPERATURE SENSOR, T-1 SHALL MODULATE CHILLED WATER CONTROL VALVE, V-2 OPEN. THE REVERSE SEQUENCE SHALL OCCUR UPON A DROP IN SPACE TEMPERATURE. VALVE SEQUENCES SHALL BE ADJUSTED TO PROVIDE A DEAD BAND WITHIN WHICH BOTH VALVES ARE CLOSED. FAN SHALL ENERGIZE ANYTIME THERE IS A CALL FOR HEATING OR COOLING.

C. UNOCCUPIED CYCLE

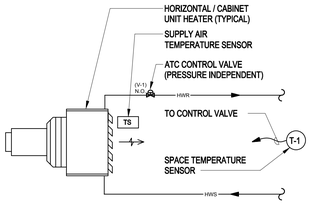
1. DURING THE UNOCCUPIED CYCLE THE FAN COIL UNITS, SHALL BE DE-ENERGIZED. THE HEATING COIL CONTROL VALVE, (V-1) SHALL FAIL OPEN AND THE CHILLED WATER COIL CONTROL VALVE (V-2) SHALL FAIL CLOSED.
2. THE BUILDING DDC SYSTEM SHALL RE-SET ALL FAN COIL UNITS TEMPERATURE SENSORS T-1 TO MAINTAIN A REDUCED NIGHT SET BACK TEMPERATURE OF 50 DEGREES F (ADJUSTABLE). THE NIGHT SET BACK TEMPERATURE SHALL BE MAINTAINED BY CYCLING THE FAN COIL UNITS AND TO MAINTAIN ALL SPACES AT 50 DEGREES F (ADJUSTABLE) OR ABOVE.

D. DEMAND LIMIT TOGGLE

1. WHENEVER THE DEMAND LIMIT TOGGLE SWITCH IS ENABLED THE FAN COIL UNITS SPACE TEMPERATURE SET POINT IN COOLING MODE SHALL BE RE-SET TO 78 DEGREES F (ADJUSTABLE).

1 CONTROLS - TYPICAL FAN COIL UNIT WITH 100% RE-CIRCULATING AIR

NO SCALE



ATC CONTROL SEQUENCE

HOT WATER UNIT HEATER (2-WAY VALVE CONTROL)

A. GENERAL

1. ALL HOT WATER UNIT HEATER CONTROL VALVES SHALL BE NORMALLY OPEN TYPE AND SHALL FAIL IN THE FULLY OPEN POSITION.
2. ON A FALL IN ROOM TEMPERATURE TO 60 DEGREES F (ADJUSTABLE), THE SPACE TEMPERATURE SENSOR, T-1, SHALL ENERGIZE UNIT HEATER FANS AND OPEN UNIT HEATER CONTROL VALVE, V-1, IN SEQUENCE TO MAINTAIN SPACE TEMPERATURE OF 65 DEGREES F (ADJUSTABLE). THE REVERSE SEQUENCE SHALL OCCUR UPON A RISE IN SPACE TEMPERATURE ABOVE SET POINT.
3. UNIT HEATER CONTROL VALVE, V-1, SHALL BE FULLY MODULATING.
4. FOR MECHANICAL ROOMS AND SIMILAR NON-FINISHED SPACES SET POINT SHALL BE 50 DEGREES F (ADJUSTABLE).
5. FURNISH AND INSTALL SUPPLY AIR TEMPERATURE SENSOR TO MAINTAIN DISCHARGE AIR TEMPERATURE.
6. CONTROLS SHALL BE PROVIDED TO DISABLE HEATING SOURCE WHEN AMBIENT OUTDOOR AIR TEMPERATURE IS GREATER THAN 45 DEGREES F (ADJUSTABLE).

ATC POINTS LIST

EQUIPMENT OR SYSTEM	CONTROL VALVE (HEATING WATER) (2-WAY MODULATING, PRESSURE INDEPENDENT)	EQUIPMENT STATUS	GRAPHIC DISPLAY	START & STOP	TEMP - SPACE	SUPPLY AIR TEMPERATURE SENSOR	TIME PROGRAM	TOTAL RUN TIME
HYDRONIC UNIT HEATER	●	●	●	●	●	●	●	●

NOTE:
1. PROVIDE ADDITIONAL DIGITAL POINTS AS NECESSARY TO ACCOMPLISH THE SPECIFIED SEQUENCE OF OPERATION DESCRIBED IN THE SPECIFICATIONS.
2. ALL ITEMS IN THE POINTS LIST MUST BE VIEWABLE FROM THE OPERATOR'S TERMINAL.

2 CONTROLS - HYDRONIC UNIT HEATER

NO SCALE

ATC CONTROL SEQUENCE

GENERAL VENTILATION OF A SPACE FOR HEAT REMOVAL

A. GENERAL

1. WHENEVER THE VENTILATION AIR FAN IS ENERGIZED, ASSOCIATED MOTOR OPERATED DAMPER (D-1) SHALL BE IN WIDE OPEN POSITION.
2. ALL MOTOR OPERATED DAMPERS, D-1 AND D-2, SHALL FAIL IN THE CLOSED POSITION (NORMALLY CLOSED).

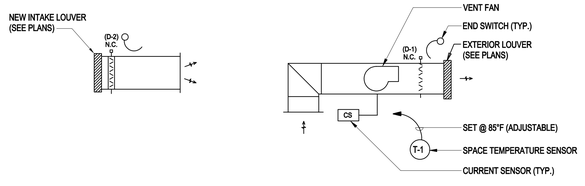
B. OPERATION:

1. A SPACE TEMPERATURE SENSOR, T-1, SHALL UPON A RISE IN ROOM TEMPERATURE ABOVE ITS SET POINT, 85°F, (ADJUSTABLE) SHALL POSITION MOTOR OPERATED DAMPER, D-1, TO THE WIDE OPEN POSITION. AN ELECTRIC END SWITCH (OR TIME DELAY) SHALL BE PROVIDED THAT ONCE THE DAMPER, D-1, IS PROVED WIDE OPEN SHALL ENERGIZE VENTILATION FAN. VENTILATION FAN SHALL BE INTERLOCKED WITH INTAKE HOOD OR LOUVER SUCH THAT WHEN VENTILATION FAN IS ENERGIZED, D-2, SHALL OPEN AND WHEN VENTILATION FAN IS DE-ENERGIZED, D-2, SHALL CLOSE. VENTILATION FAN SHALL CONTINUE TO OPERATE UNTIL SET POINT TEMPERATURE IS REACHED. THE REVERSE SEQUENCE SHALL OCCUR UPON A DROP IN SPACE TEMPERATURE BELOW SET POINT.

ATC POINTS LIST

EQUIPMENT OR SYSTEM	DAMPER - TWO POSITION	EQUIPMENT STATUS	GRAPHIC DISPLAY	START & STOP	TEMP - SPACE	TOTAL RUN TIME
VENTILATION FAN (VF-1)	●	●	●	●	●	●

NOTE:
1. PROVIDE ADDITIONAL DIGITAL POINTS AS NECESSARY TO ACCOMPLISH THE SEQUENCE OPERATION.
2. ALL ITEMS IN THE POINTS LIST MUST BE VIEWABLE FROM THE OPERATOR'S TERMINAL.



3 CONTROLS - GENERAL VENTILATION (VF-1)

NO SCALE

REVISIONS

no.	date	comments

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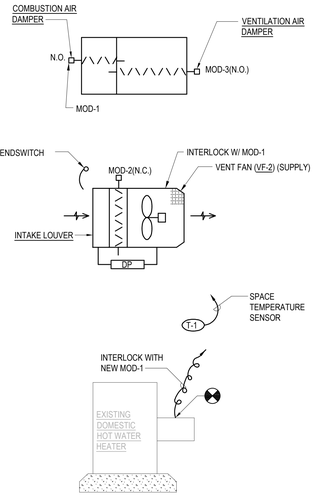
BID DOCUMENTS

AUTOMATIC
TEMPERATURE
CONTROLS
HVAC

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

M406



ATC CONTROL SEQUENCE

FUEL FIRED DOMESTIC WATER HEATER, COMBUSTION AIR SEQUENCE AND VENTILATION OF BOILER ROOM

A. GENERAL

1. THE FOLLOWING CONTROL SEQUENCE FOR COMBUSTION/VENTILATION AIR CONTROL SPECIFICALLY REFERS TO THE COMPONENTS FOUND IN THE BOILER ROOM.

B. VENTILATION:

1. SPACE TEMPERATURE SENSOR, T-1, SHALL UPON A RISE IN ROOM TEMPERATURE ABOVE ITS SETPOINT (85 DEGREES F, ADJUSTABLE) SHALL POSITION MOTOR OPERATED DAMPER (MOD-2) TO THE WIDE OPEN POSITION. AN ELECTRIC END SWITCH SHALL BE PROVIDED THAT ONCE THE DAMPER (MOD-2) IS PROVED WIDE OPEN SHALL ALLOW VENTILATION (VF-1) TO ENERGIZE. VENTILATION FAN -1 SHALL BE INTERLOCKED WITH RELIEF AIR DAMPER MOD-3 SUCH THAT WHEN VENT FAN -1 IS ENERGIZED MOD-3 SHALL OPEN AND WHEN VENT FAN -1 IS DE-ENERGIZED MOD-3 SHALL CLOSE. VENT FAN-1 SHALL CONTINUE TO OPERATE UNTIL SETPOINT TEMPERATURE IS REACHED. THE REVERSE SEQUENCE SHALL OCCUR UPON A DROP IN SPACE TEMPERATURE BELOW SETPOINT.

C. COMBUSTION AIR DAMPERS:

1. DOMESTIC HOT WATER HEATER SHALL BE INTERLOCKED TO ITS ASSOCIATED COMBUSTION AIR DAMPER. MOTOR OPERATED DAMPER, MOD-1, SHALL OPEN WHEN THE DOMESTIC HOT WATER HEATER BURNER IS ENERGIZED.

2. PROVIDE A DAMPER BLADE POSITION SWITCH OR 10 SECOND TIME DELAY FOR ENERGIZING THE EXISTING WATER HEATER BURNER TO ENSURE DAMPER IS IN OPEN POSITION BEFORE EXISTING WATER HEATER BURNER IS ENERGIZED. WHEN EXISTING WATER HEATER BURNER IS DE-ENERGIZED, ITS ASSOCIATED INTERLOCKED COMBUSTION AIR DAMPER SHALL RETURN TO THE CLOSED POSITION.

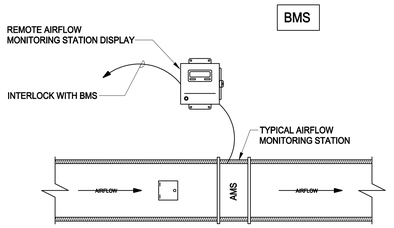
AUTOMATIC TEMPERATURE CONTROL POINT LIST

EQUIPMENT OR SYSTEM	FAN STATUS	END SWITCH	GRAPHIC DISPLAY	HOA OR WALL SW	START & STOP	START & STOP RA - RL - EX - OA	TEMP SPACE	TOTAL RUN TIME	TWO POSITION DPR
VENT FAN (VF-2)	●	●	●	●	●	●	●	●	●
COMBUSTION AIR DAMPER		●	●					●	●

NOTE:
1. PROVIDE ADDITIONAL DIGITAL POINTS AS NECESSARY TO ACCOMPLISH THE SPECIFIED SEQUENCE OF OPERATION DESCRIBED IN THE SPECIFICATIONS.
2. ALL ITEMS IN THE POINTS LIST MUST BE VIEWABLE FROM THE OPERATOR'S TERMINAL.

1 CONTROLS - BOILER ROOM COMBUSTION/VENTILATION (VF-2)

NO SCALE



ATC CONTROL SEQUENCE

DUCT MOUNTED AIR FLOW MONITORING STATION WITH REMOTE READOUT

A. INTERLOCK ALL AIR FLOW MONITORING STATIONS WITH THE BMS.

B. CREATE GRAPHIC ON BMS AND RECORD/DISPLAY ALL INFORMATION INCLUDING AIR FLOW RATE IN CUBIC FEET PER MINUTE.

C. INSTALL REMOTE DISPLAY AND ALL INTERLOCK WIRING BETWEEN AIR FLOW MONITORING STATION, REMOTE DISPLAY, AND ATC SYSTEM.

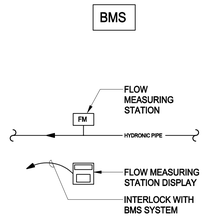
ATC POINTS LIST

EQUIPMENT OR SYSTEM	AIRFLOW RATE IN CFM	GRAPHIC DISPLAY
AIRFLOW MONITORING STATION	●	●

NOTE:
1. PROVIDE ADDITIONAL DIGITAL POINTS AS NECESSARY TO ACCOMPLISH THE SEQUENCE OF OPERATION.
2. ALL ITEMS IN THE POINT LIST MUST BE VIEWABLE FROM THE OPERATOR'S TERMINAL.

2 CONTROLS - DUCT MOUNTED AIRFLOW MONITORING STATION

NO SCALE



ATC CONTROL SEQUENCE

HYDRONIC FLOW MEASURING STATIONS WITH REMOTE DISPLAY

A. INTERLOCK ALL HYDRONIC FLOW MEASURING STATIONS WITH THE BMS SYSTEM.

B. CREATE GRAPHIC ON ATC SYSTEM AND RECORD AND DISPLAY ALL FEATURES INDICATED ON FLOW MEASURING STATION INCLUDING BUT NOT LIMITED TO FLOW RATE.

C. INSTALL REMOTE DISPLAY AND ALL INTERLOCK WIRING BETWEEN INSERTION SENSOR, REMOTE DISPLAY AND BMS SYSTEM.

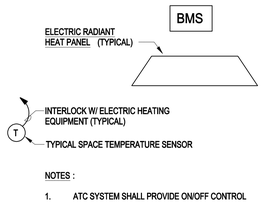
ATC POINTS LIST

EQUIPMENT OR SYSTEM	GRAPHIC DISPLAY	FLOW MEASURING STATION	FLUID FLOW RATE IN GPM
HYDRONIC FLOW MEASURING STATION	●	●	●

NOTE:
1. PROVIDE ADDITIONAL DIGITAL POINTS AS NECESSARY TO ACCOMPLISH THE SEQUENCE OF OPERATION.
2. ALL ITEMS IN THE POINTS LIST MUST BE VIEWABLE FROM THE OPERATOR'S TERMINAL.

3 CONTROLS - HYDRONIC FLOW MEASURING STATION WITH REMOTE DISPLAY

NO SCALE



NOTES :

1. ATC SYSTEM SHALL PROVIDE ON/OFF CONTROL

ATC CONTROL SEQUENCE

ELECTRIC RADIANT HEAT PANELS (DDC CONTROLS)

A. GENERAL:

1. THE ELECTRIC RADIANT HEAT PANELS SHALL BE INTERLOCKED WITH REMOTE TEMPERATURE SENSOR AND CONTROLLED BY CENTRAL MONITORING SYSTEM.

2. THE ATC SUBCONTRACTOR SHALL INSTALL CONTROLS, INTERLOCK WIRING, TEMPERATURE SENSORS, AND CONTROL WIRING FOR A COMPLETE AND OPERATIONAL SYSTEM.

3. RADIANT HEATING PANELS SHALL BE TIED INTO THE BMS CONTROL SYSTEM. HEAT PANELS SHALL BE PROVIDED WITH START/STOP OPTIMIZATION CONTROL.

4. ON A FALL IN SPACE TEMPERATURE TO 65°F (ADJUSTABLE), THE SPACE TEMPERATURE SENSORS (T-1) SHALL ENERGIZE RADIANT HEAT PANEL. THE REVERSE SEQUENCE SHALL OCCUR UPON A RISE IN SPACE TEMPERATURE ABOVE SET POINT.

5. CONTROLS SHALL BE PROVIDED TO DISABLE HEATING SOURCE WHEN AMBIENT OUTDOOR AIR TEMPERATURE IS GREATER THAN 45°F (ADJUSTABLE).

ATC POINTS LIST

EQUIPMENT OR SYSTEM	EQUIPMENT STATUS	GRAPHIC DISPLAY	START & STOP - OPTIMIZATION	TEMP - SPACE	TIME PROGRAM	TOTAL RUN TIME
ELECTRIC RADIANT HEAT PANEL	●	●	●	●	●	●

NOTE:
1. PROVIDE ADDITIONAL DIGITAL POINTS AS NECESSARY TO ACCOMPLISH THE SPECIFIED SEQUENCE OF OPERATION DESCRIBED IN THE SPECIFICATIONS.
2. ALL ITEMS IN THE POINTS LIST SHALL BE VIEWABLE FROM THE OPERATOR'S TERMINAL.

4 CONTROLS - ELECTRIC RADIANT HEAT PANELS

NO SCALE

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AUTOMATIC TEMPERATURE CONTROLS HVAC

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SCALE	AS NOTED
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M407

1 2 3 4 5 6 7 8 9 0

SINGLE ZONE VARIABLE AIR VOLUME UNIT SCHEDULE

UNIT #	SUPPLY FAN TOTAL SUPPLY CFM MAX	SUPPLY FAN TOTAL SUPPLY CFM MIN	SUPPLY FAN # OF FANS	SUPPLY FAN OUTSIDE AIR CFM ECON.	SUPPLY FAN OUTSIDE AIR CFM MAX	SUPPLY FAN OUTSIDE AIR CFM MIN	SUPPLY FAN E.S.P. (IN. W.G.)	SUPPLY FAN MAX RPM	SUPPLY FAN MAX. BHP	SUPPLY FAN MOTOR HP	EXHAUST FAN TOTAL CFM MAX	EXHAUST FAN TOTAL CFM MIN	EXHAUST FAN # OF FANS	EXHAUST FAN E.S.P. (IN. W.G.)	EXHAUST FAN MAX RPM	EXHAUST FAN MAX. BHP	EXHAUST FAN MOTOR HP
SZVAV-1	8,000	4,000	2	8,000	5,000	2,500	2	2,243	5.11	7	5,000	2,500	2	1.25	1,723	1.78	2.5

UNIT #	ENERGY RECOVERY WHEEL PERFORMANCE SUMMER OUTSIDE DB (°F)	SUMMER OUTSIDE WB (°F)	SUMMER ROOM AIR DB (°F)	SUMMER ROOM AIR WB (°F)	SUMMER SUPPLY AIR DB (°F)	SUMMER SUPPLY AIR WB (°F)	WINTER OUTSIDE DB (°F)	WINTER OUTSIDE WB (°F)	WINTER ROOM AIR DB (°F)	WINTER ROOM AIR WB (°F)	WINTER SUPPLY AIR DB (°F)	WINTER SUPPLY AIR WB (°F)
SZVAV-1	95	78	75	55	80	70	10	8	72	35	55	45

UNIT #	COOLING MODE (30% PROPYLENE GLYCOL) TOTAL CAP. (MBH)	SENSIBLE CAP. (MBH)	E.A.T. DB (°F)	E.A.T. WB (°F)	COIL L.A.T. DB (°F)	COIL L.A.T. WB (°F)	FLUID TEMP EWT (°F)	FLUID TEMP LWT (°F)	AIR P.D. (IN.W.G)	WATER P.D. (FT.)	GPM
SZVAV-1	392.8	216.0	78	68	53	52	42	54	0.5	10	70

UNIT #	HEATING MODE (30% PROPYLENE GLYCOL) SENSIBLE CAP. (MBH)	E.A.T. DB (°F)	E.A.T. WB (°F)	COIL L.A.T. DB (°F)	COIL L.A.T. WB (°F)	FLUID TEMP EWT (°F)	FLUID TEMP LWT (°F)	AIR P.D. (IN. W.G.)	WATER P.D. (FT.)	GPM
SZVAV-1	319.7	58	--	95	--	150	130	0.5	10	34

UNIT #	ENERGY RECOVERY EFFICIENCY OUTSIDE AIR WHEEL EFFICIENCY	INSIDE AIR WHEEL EFFICIENCY	CHS SIZE (INCHES)	CHR SIZE (INCHES)	HWS SIZE (INCHES)	HWR SIZE (INCHES)	AC CONDENSATE SIZE (INCHES)	ELECTRICAL CHARACTERISTICS VOLTS	PHASE	HZ	FLA	MCA	MOCP	APPROX WEIGHT (LBS.)	REMARKS
SZVAV-1	70	70	3"	3"	2-1/2"	2-1/2"	1-1/4"	480	3	60	34	39	60	11,000	

NOTE: 1. MOTOR DATA TYPICAL FOR QUANTITY OF FANS INDICATED IN SCHEDULE.

ENERGY RECOVERY VENTILATOR SCHEDULE

UNIT#	SUPPLY FAN MAX CFM	MIN. CFM	E.S.P. (IN. W.G.)	RPM	MAX BHP	MOTOR QTY	MOTOR HP (EACH)	EXHAUST FAN MAX CFM	MIN CFM	E.S.P. (IN. W.G.)	RPM	MAX BHP	MOTOR QTY	MOTOR HP
ERV-1	7,000	3,500	2	2,242	4.56	2	6	7,000	3,500	1.75	2,035	2.67	2	3.5

UNIT#	ENERGY RECOVERY WHEEL PERFORMANCE SUMMER OUTSIDE DB (°F)	SUMMER OUTSIDE WB (°F)	SUMMER ROOM AIR DB (°F)	SUMMER ROOM AIR %RH	SUMMER SUPPLY AIR DB (°F)	SUMMER SUPPLY AIR WB (°F)	WINTER OUTSIDE DB (°F)	WINTER OUTSIDE WB (°F)	WINTER ROOM AIR DB (°F)	WINTER ROOM AIR % R.H.	WINTER SUPPLY AIR DB (°F)	WINTER SUPPLY AIR WB (°F)
ERV-1	95	78	75	60	80	69	10	8	72	35	57	46

UNIT#	HEATING COIL (30% PROPYLENE GLYCOL) EAT DB (°F)	LAT DB (°F)	EWT (°F)	LWT (°F)	GPM	MAX A.P.D. (IN. H20)	MAX W.P.D. (FT. H20)	TOTAL CAP. (MBH)
ERV-1	57	72	150	130	12	0.1	2	113.4

UNIT#	CHILLED WATER COIL (30% PROPYLENE GLYCOL) EAT DB (°F)	EAT WB (°F)	LAT DB (°F)	LAT WB (°F)	EWT (°F)	LWT (°F)	GPM @12°F DELTA T	MAX A.P.D. (IN. H20)	MAX W.P.D. (FT. H20)	SENS. CAP. (MBH)	TOTAL CAP. (MBH)
ERV-1	67	65	53	52	42	54	48	0.4	5	109.6	271.3

UNIT#	HEAT PIPE COIL PRE-CONDITIONING COIL EAT DB (°F)	EAT WB (°F)	LAT DB (°F)	LAT WB (°F)	MAX A.P.D. (IN. H20)	SENS. CAP. (MBH)	LATENT CAP. (MBH)	RE-HEAT COIL EAT DB (°F)	EAT WB (°F)	LAT DB (°F)	LAT WB (°F)	MAX A.P.D. (IN. H20)	SENS. CAP. (MBH)
ERV-1	80	69	67.5	65	0.15	94.5	3.4	53	52	66	58	0.15	98.3

UNIT#	PIPING RUN-OUT SIZES (INCHES) HEATING COIL	COOLING COIL	A/C CONDENSATE DRAIN	WHEEL RECOVERY EFFICIENCY (%) O.A.	EXHAUST	ELECTRICAL CHARACTERISTICS VOLTS	PHASE	HZ	FLA	MCA	MOCP
ERV-1	1-1/4"	2-1/2"	1-1/2	75	74	480	3	60	38	44	60

NOTES:
1. EXTERNAL STATIC PRESSURE, E.S.P., EQUALS THE STATIC PRESSURE REQUIRED AT THE CONNECTIONS OF DUCT WORK TO THE ENERGY RECOVERY VENTILATOR.
2. SUPPLY AND EXHAUST FANS SHALL HAVE VARIABLE FREQUENCY DRIVES (SEE MAX. AND MIN. CFM VALUES IN SCHEDULE).
3. COOLING COIL AND HEATING COIL SELECTIONS SHALL BE BASED ON 30% PROPYLENE GLYCOL.
4. ERV UNITS SHALL HAVE SINGLE POINT POWER CONNECTION.

AIR COOLED CHILLER SCHEDULE

UNIT #	NET TONS	MIN. EER AT DESIGN CONDITIONS	MIN. AHRI RATED EFFICIENCY (BUTH/W*H)	MIN. AHRI NPLV.IP (BUTH/W*H)	DESIGN ENTERING FLUID TEMPERATURE (°F)	DESIGN LEAVING FLUID TEMPERATURE (°F)	CAPACITY (BTU/HR)	FLUID FLOW RATE (GPM)	MAX FLUID PRESSURE DROP (FT OF H2O)	COOLING PLANT GLYCOL TYPE	COOLING PLANT GLYCOL %	FOULING FACTOR	AMBIENT CONDENSER DESIGN AIR TEMP. (°F)	ELECTRICAL V	PHASE	HZ	MCA	MOCP	MINIMUM LOAD PERCENT	FLUID CONTENT (GALLONS)	TYPE	REMARKS
CH-1	150	10.12	11.08	20.47	54	42	1,800,000	320	12.2	PG	30	0.0001	95	480	3	60	282.9	350	10	80	HIGH EFFICIENCY AIR COOLED SCREW CHILLER	PROVIDE SOUND ATTENUATION PACKAGE
CH-2 (ALTERNATE)	150	10.12	11.08	20.47	54	42	1,800,000	320	12.2	PG	30	0.0001	95	480	3	60	282.9	350	10	80	HIGH EFFICIENCY AIR COOLED SCREW CHILLER	PROVIDE SOUND ATTENUATION PACKAGE

NOTES:
1. CAPACITIES BASED ON 30% BY VOLUME PROPYLENE GLYCOL
2. UNIT DIMENSIONS SHALL NOT EXCEED *[292" X 85" 100"]*.

HVAC EXPANSION TANK SCHEDULE

TANK #	SYSTEM	PROPOSED SYSTEM VOLUME (GALLONS)	FUTURE SYSTEM VOLUME (GALLONS)	MAX. TEMPERATURE (°F)	MIN. TEMPERATURE (°F)	MAX. OPERATING PRESSURE, Po (PSIG)	MIN. FILL PRESSURE, Pf (PSIG)	MIN. TOTAL TANK VOLUME (GALLONS)	MIN. TANK ACCEPTANCE VOLUME (GALLONS)	MAX. TANK DIMENSIONS HEIGHT (IN.)	DIAMETER (IN.)	FLUID TYPE AND CONCENTRATION	APPROXIMATE OPERATING WEIGHT (LBS.)	REMARKS
ET-1	CHILLED WATER SYSTEM	2,260	4,060	95	42	67	20	119	48	78	24	PROPYLENE GYLCOL 30%	1,400	FUTURE SYSTEM VOLUME INCLUDES FUTURE PIPING AND EQUIPMENT
ET-2	HEATING WATER SYSTEM	1,500	2,400	180	50	67	20	185	98	81	30	PROPYLENE GYLCOL 30%	2,100	FUTURE SYSTEM VOLUME INCLUDES FUTURE PIPING AND EQUIPMENT

HVAC SYSTEM CHEMICAL FEED TANK SCHEDULE

CHEMICAL FEED TANK #	SYSTEM	NOMINAL CAPACITY (GALLONS)	MAX. TANK DIMENSIONS HEIGHT (INCHES)	DIAMETER (INCHES)	DESIGN FLOW RATE (GPM)	MAX. P.D. @ DESIGN FLOW RATE (FT OF H2O)	TYPE	REMARKS
CFT-1	CHILLED WATER SYSTEM	5	24	12	5	5	BYPASS SHOT FEEDER W/ FILTER	
CFT-2	HEATING WATER SYSTEM	5	24	12	5	5	BYPASS SHOT FEEDER W/ FILTER	

STAINLESS STEEL CONDENSING GAS FIRED HOT WATER HEATING BOILER SCHEDULE

BOILER #	NET I=B=R OUTPUT (MBH)	MIN. SQUARE FT. HEATING SURFACE (FT2)	FLUID TYPE	DESIGN ENTERING FLUID TEMPERATURE (°F)	DESIGN LEAVING FLUID TEMPERATURE (°F)	FLOW RATE (GPM)	MAX P.D. AT DESIGN FLOW RATE (FT OF H20)	BOILER VOLUME (GALLONS)	GAS FIRED BOILER BURNER CHARACTERISTICS GAS CONSUMPTION (MBH)	VOLTAGE	PHASE	HZ	FLA	MCA	MOCP	FUEL TYPE	FUEL HEATING VALUE (BTU/FT3)	FLUE SIZE (INCHES)	COMBUSTION AIR INLET SIZE (INCHES)
B-1	1,255	162.3	PROPYLENE GLYCOL 30%	120	150	110	10	94	1,500	480	3	60	3.6	4.5	15	NATURAL GAS	1,000	8"	8"
B-2	1,255	162.3	PROPYLENE GLYCOL 30%	120	150	110	10	94	1,500	480	3	60	3.6	4.5	15	NATURAL GAS	1,000	8"	8"

NOTES:
1. BOILERS SHALL BE CAPABLE OF OPERATION ON 4" WATER COLUMN MIN. GAS PRESSURE AND 14" WATER COLUMN MAX. GAS PRESSURE AT INLET TO BOILER BURNER GAS TRAIN.

HYDRONIC FLOW MEASURING STATION

UNIT #	ELEC. CHAR. VOLTAGE	PRESSURE DROP (PSI)	ACCURACY (%)	PIPE SIZE (INCHES)	MIN. FLOW (GPM)	MAX. FLOW (GPM)	REMARKS
FMS-1	24	<1	+/- 2%	8	26	3,100	SECONDARY CHILLED WATER LOOP
FMS-2	24	<1	+/- 2%	6	15	1,800	SECONDARY HEATING WATER LOOP

NOTES: 1. COORDINATE ELECTRICAL CONNECTION OF DISPLAY MODULE AND FLOW MEASURING SYSTEM WITH ATC SYSTEM.
2. FURNISH AND INSTALL GPM DISPLY MODULE FOR EACH FLOW MEASURING STATION.
3. REFER TO PUMP SCHEDULES FOR DESIGN FLOW RATE.

HEATING/COOLING PUMP SCHEDULE

PUMP #	SERVICE	TYPE	DESIGN GPM	MIN. GPM	FT. OF HEAD	MAX BHP	MOTOR HP	RPM	VOLTAGE	PHASE	HZ	MIN. MECHANICAL PUMP EFFICIENCY @ DESIGN POINT (%)	CONSTANT SPEED OR VARIABLE VOLUME	REMARKS
PMP-01	CHILLED WATER PRIMARY PUMP	BASE MOUNTED END SUCTION	320	320	40	3.99	5	1760	460	3	60	84	CONSTANT	
PMP-02	CHILLED WATER PRIMARY PUMP	BASE MOUNTED END SUCTION	320	320	40	3.99	5	1760	460	3	60	84	CONSTANT	
PMP-03	CHILLED WATER SECONDARY PUMP (LEAD)	SPLIT COUPLED VERTICAL IN-LINE	320	110	85	9.2	15	1800	460	3	60	72.9	VARIABLE	
PMP-04	CHILLED WATER SECONDARY PUMP (LAG)	SPLIT COUPLED VERTICAL IN-LINE	320	110	85	9.2	15	1800	460	3	60	72.9	VARIABLE	
PMP-05	HEATING WATER PRIMARY PUMP	VERTICAL IN-LINE	110	110	40	1.79	3	1760	460	3	60	64	CONSTANT	
PMP-06	HEATING WATER PRIMARY PUMP	VERTICAL IN-LINE	110	110	40	1.79	3	1760	460	3	60	64	CONSTANT	
PMP-07	HEATING WATER SECONDARY PUMP (LEAD)	SPLIT COUPLED VERTICAL IN-LINE	200	60	80	5.86	10	1800	460	3	60	70.5	VARIABLE	
PMP-08	HEATING WATER SECONDARY PUMP (LAG)	SPLIT COUPLED VERTICAL IN-LINE	200	60	80	5.86	10	1800	460	3	60	70.5	VARIABLE	

BELLOW EXPANSION JOINT SCHEDULE

NO.	PIPE SIZE (INCHES)	MOVEMENT (INCHES)	SPRING FORCE (IN LBS.)	MAX. TEMP. (°F)	SYSTEM	REMARKS
EXP-1	6	2.5	555	100	CHILLED WATER SUPPLY	
EXP-2	6	2.5	555	100	CHILLED WATER RETURN	
EXP-3	4	2.5	406	180	HEATING WATER SUPPLY	
EXP-4	4	2.5	406	180	HEATING WATER RETURN	

NOTES:
1. FOR SELECTION OF EXPANSION FITTINGS SEE SPECIFICATIONS FOR PIPE MATERIAL AND INSULATION THICKNESS. CONTRACTOR SHALL DETERMINE CENTERLINE DISTANCES BETWEEN PIPES FOR NESTED LOOPS.
2. THE SCHEDULED TEMPERATURES DO NOT NECESSARILY REFLECT THE OPERATING TEMPERATURE

FLUID FILTER HOUSING SCHEDULE

CHEMICAL FEED TANK #	SYSTEM	TYPE	ARRANGMENT	MAX FLOW RATE (GPM)	MAX. P.D. @ DESIGN FLOW RATE (FT OF H2O)	UNIT DIMENSIONS HEIGHT (INCHES)	DIAMETER (INCHES)	FILTERS TYPE-1 TYPE	TYPE-1 RATING (MICRONS)	TYPE-2	INLET/OUTLET PIPE SIZE	REMARKS
FF-01	CHILLED WATER SYSTEM	SIDESTREAM FLUID FILTER	VERTICAL	10	10	29"	8-1/2"	CARTRIDGE	5, 10, 20 & 50	MAGNETIC	1-1/4"	
FF-02	HEATING WATER SYSTEM	SIDESTREAM FLUID FILTER	VERTICAL	10	10	29"	8-1/2"	CARTRIDGE	5, 10, 20 & 50	MAGNETIC	1-1/4"	

BOILER CONDENSATE NEUTRALIZER SCHEDULE

UNIT #	UNIT SERVED	PIPE SIZE (INCHES)	REMARKS
NEUTRALIZER #1	BOILER #1	1	PIPE TO FLOOR DRAIN
NEUTRALIZER #2	BOILER #2	1	PIPE TO FLOOR DRAIN

HYDRONIC AIR SEPARATOR SCHEDULE

AIR SEPARATOR #	SYSTEM	LINE SIZE (INCHES)	MAX. TANK DIMENSIONS HEIGHT (INCHES)	DIAMETER (INCHES)	DESIGN FLOW RATE (GPM)	MAX. P.D. @ DESIGN FLOW RATE (FT OF H20)	APPROXIMATE OPERATING WEIGHT (LBS.)	FLUID TYPE AND CONCENTRATION	REMARKS
AS-1	CHILLED WATER SYSTEM	8	48	24	640	10	500	PROPYLENE GLYCOL 30%	
AS-2	HEATING WATER SYSTEM	6	41	19	400	10	890	PROPYLENE GLYCOL 30%	

DUCT SMOKE DETECTOR SCHEDULE

UNIT #	UNIT SERVED	ELECTRICAL CHARACTERISTICS	REMARKS
DD-1	SZVAV-01	REFER TO DIVISION 28	SUPPLY
DD-2	SZVAV-01	REFER TO DIVISION 28	RETURN
DD-3	ERV-01	REFER TO DIVISION 28	SUPPLY
DD-4	ERV-01	REFER TO DIVISION 28	EXHAUST

NOTE: FURNISH UNDER DIVISION 28, INSTALLED UNDER DIVISION 23.

PRESSURE TANK SCHEDULE (EXP)

TANK #	SYSTEM VOLUME (GALLONS)	MAX. TEMP. (ºF)	MAX. OPERATING PRESSURE, Po (PSIG)	DESIGN FILL PRESSURE, Pf (PSIG)	TOTAL TANK VOLUME (GALLONS)	ACCEPTANCE VOLUME (GALLONS)	MAX. TANK DIMENSIONS HEIGHT (INCHES)	DIAMETER (INCHES)	APPROX. OPERATING WEIGHT (LBS.)	REMARKS
PT-1	10	95	67	20	10	2.4	12	20	106	SERVING CHILLED SYSTEM GLYCOL FEEDER
PT-2	10	160	67	20	10	2.4	12	20	106	SERVING HEATING SYSTEM GLYCOL FEEDER

PACKAGED AUTOMATIC GLYCOL FEED SYSTEM SCHEDULE

UNIT #	FLOW RATE (GPM)	HEAD (PSIG)	STORAGE TANK VOLUME (GALLONS)	ELECTRICAL CHARACTERISTICS H.P.	VOLTAGE	PHASE	HERTZ	REMARKS
1	1.5	100	50	1/2	120	1	60	PROVIDE UNIT WITH 8 FOOT CORD AND PLUG
2	1.5	100	50	1/2	120	1	60	PROVIDE UNIT WITH 8 FOOT CORD AND PLUG

NOTES:
1. UNIT SHALL BE PRE-PIPED AND PRE-WIRED INCLUDING LOW ATER CUT-OFF, SOLID STATE CONTROLLER, PRESSURE SWITCH, PRESSURE TANK, RELIEF VALVE, ETC. (SEE SPECIFICATIONS)

ELECTRIC RADIANT HEAT PANEL

NO.	SIZE (L" X W")	ELECTRICAL VOLTS	PHASE	HERTZ	WATTS	REMARKS
ERHP-1	24 X 24	120	1	60	375	RECESSED
ERHP-2	24 X 24	120	1	60	375	RECESSED
ERHP-3	24 X 24	120	1	60	375	RECESSED
ERHP-4	24 X 24	120	1	60	375	RECESSED
ERHP-5	24 X 24	120	1	60	375	RECESSED

AIRFLOW MONITORING STATION (AMS)

UNIT #	SERVICE	ELEC. CHAR. VOLTAGE	MAX. PRESSURE DROP (IN W.C.)	TYPE	DUCT SIZE (__ IN. X __ IN.)	MAX. AIRFLOW RATE (CFM)	MAX. DUCTWORK VELOCITY (FPM)	MIN. AIRFLOW RATE (CFM)	MIN. DUCTWORK VELOCITY (FPM)	REMARKS
AMS-1	SZVAV-1 (MINIMUM OUTSIDE AIR FLOW)	24	0.085	THERMAL DISPERSION	24 X 24	5,000	1,250	2,500	625	INTERLOCK WITH ATC SYSTEM
AMS-2	SZVAV-1 (EXHAUST AIR FLOW)	24	0.085	THERMAL DISPERSION - MOUNTED AT FAN INLET	38 X 22	5,000	900	2,500	450	INTERLOCK WITH ATC SYSTEM
AMS-3	ERV-1 (OUTSIDE AIR)	24	0.085	THERMAL DISPERSION	40 X 22	7,000	1,150	3,500	575	INTERLOCK WITH ATC SYSTEM
AMS-4	ERV-1 (EXHAUST AIR FLOW)	24	0.085	THERMAL DISPERSION	40 X 22	7,000	1,150	3,500	575	INTERLOCK WITH ATC SYSTEM

NOTES: 1. COORDINATE ELECTRICAL CONNECTION OF DISPLAY MODULE AND AIRFLOW MONITORING SYSTEM WITH ATC SYSTEM.
2. FURNISH AND INSTALL CFM DISPLAY MODULE FOR EACH AIR FLOW MONITORING STATION.

DESIGN FLUID HEAT TRANSFER CHARACTERISTICS

FLUID	SYSTEM	SPECIFIC HEAT Cp@60°F	% VOLUME	FREEZING POINT (°F)	BURSTING POINT (°F)	HEAT TRANSFER COEFFICIENT (K)
PROPYLENE GLYCOL	CHILLED SYSTEM	.939	30	9	-20	472
PROPYLENE GLYCOL	HEATING SYSTEM	.939	30	9	-20	472

A B C D E F G H I

REVISIONS

no.	date	comments

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SUBMISSION
BID DOCUMENTS

SCHEDULES
HVAC

DESIGN BY RAK
CHECKED BY DRH
SCALE AS NOTED
JOB NO. 24008B
DATE 03/05/2025

M501

FLOW METER FITTING SCHEDULE

FMF NO.	PIPE SIZE (INCHES)	FLOW METER SIZE (INCHES)	DESIGN FLOW (GPM)	FLOW METER FLOW RANGE (LOW-HIGH)	MAX. PRESSURE DROP (FEET)	EQUIPMENT	COIL
FMF-1	6	6	320.0	140-624	0.4	AIR COOLED CHILLER #1	--
FMF-2	6	6	320.0	140-624	0.4	AIR COOLED CHILLER #2 (ALTERNATE)	--
FMF-3	8	8	640.0	260-1,180	0.4	SECONDARY CHILLED WATER SUPPLY	--
FMF-4	1-1/4	1-1/4	10.0	7.2-32.3	0.5	FLUID FILTER #1 (CHILLED)	--
FMF-5	3/4	3/4	5.0	1.2-5.4	3.3	CHEMICAL FEED TANK #1 (CHILLED)	--
FMF-6	3	3	110.0	32-147	0.8	BOILER #1	--
FMF-7	3	3	110.0	32-147	0.8	BOILER #2	--
FMF-8	6	6	400.0	140-624	0.6	SECONDARY HEATING WATER SUPPLY	--
FMF-9	1-1/4	1-1/4	10.0	7.2-32.3	0.5	FLUID FILTER #2 (HEATING)	--
FMF-10	3/4	3/4	5.0	1.2-5.4	3.3	CHEMICAL FEED TANK #2 (HEATING)	--
FMF-11	4	4	110.0	58-260	0.2	MIN. FLOWRATE BYPASS - CHILLED	--
FMF-12	3	3	75.0	32-147	0.4	MIN. FLOWRATE BYPASS - HEATING	--
FMF-13	4	4	143.0	58-260	0.3	FUTURE CHILLED WATER	--
FMF-14	3	3	70.5	32-147	0.3	FUTURE HEATING WATER	--
FMF-15	2	1-1/2	22.0	13.9-62.0	0.4	FUTURE CHILLED WATER	--
FMF-16	1-1/2	1-1/4	16.0	7.2-32.3	1.2	FUTURE HEATING WATER	--
FMF-17	6	4	230.0	58-260	0.8	FUTURE CHILLED WATER	--
FMF-18	3	3	100.0	32-147	0.6	FUTURE HEATING WATER	--
FMF-19	3	3	70.0	32-147	0.3	SZVAV-1	CHILLED COIL
FMF-20	2-1/2	2	34.0	21.6-96.5	0.2	SZVAV-1	HEATING COIL
FMF-21	2-1/2	2	48.0	21.6-96.5	0.5	ERV-1	CHILLED COIL
FMF-22	1-1/4	1-1/4	12.0	7.2-32.3	0.7	ERV-1	HEATING COIL
FMF-23	3/4	3/4	2.5	1.2-5.4	0.8	FCU-01	CHILLED COIL
FMF-24	1/2	1/2	1.0	0.3-1.4	1.9	FCU-01	HEATING COIL
FMF-25	1	1	6.0	2.6-11.5	1.4	FCU-02	CHILLED COIL
FMF-26	1	1	4.5	2.6-11.5	0.8	FCU-02	HEATING COIL
FMF-27	1	1	6.0	2.6-11.5	1.4	FCU-03	CHILLED COIL
FMF-28	1	1	4.5	2.6-11.5	0.8	FCU-03	HEATING COIL
FMF-29	3/4	3/4	1.5	1.2-5.4	0.3	FCU-04	CHILLED COIL
FMF-30	1/2	1/2	1.0	0.3-1.4	1.9	FCU-04	HEATING COIL
FMF-31	3/4	3/4	1.5	1.2-5.4	0.3	FCU-05	CHILLED COIL
FMF-32	1/2	1/2	1.0	0.3-1.4	1.9	FCU-05	HEATING COIL
FMF-33	1	1	4.0	2.6-11.5	0.6	FCU-06	CHILLED COIL
FMF-34	3/4	3/4	2.5	1.2-5.4	0.8	FCU-06	HEATING COIL
FMF-35	1	1	4.0	2.6-11.5	0.6	FCU-07	CHILLED COIL
FMF-36	3/4	3/4	2.5	1.2-5.4	0.8	FCU-07	HEATING COIL
FMF-37	1	1	4.0	2.6-11.5	0.6	FCU-08	CHILLED COIL
FMF-38	3/4	3/4	2.5	1.2-5.4	0.8	FCU-08	HEATING COIL
FMF-39	1/2	1/2	1.0	0.3-1.4	1.9	FCU-09	CHILLED COIL
FMF-40	1/2	1/2	0.5	0.3-1.4	0.5	FCU-09	HEATING COIL
FMF-41	1/2	1/2	1.0	0.3-1.4	1.9	FCU-10	CHILLED COIL
FMF-42	1/2	1/2	0.5	0.3-1.4	0.5	FCU-10	HEATING COIL
FMF-43	3/4	3/4	1.5	1.2-5.4	0.3	FCU-11	CHILLED COIL
FMF-44	1/2	1/2	1.0	0.3-1.4	1.9	FCU-11	HEATING COIL
FMF-45	1/2	1/2	1.0	0.3-1.4	1.9	FCU-12	CHILLED COIL
FMF-46	1/2	1/2	0.5	0.3-1.4	0.5	FCU-12	HEATING COIL
FMF-47	3/4	3/4	1.5	1.2-5.4	0.3	FCU-13	CHILLED COIL
FMF-48	1/2	1/2	1.0	0.3-1.4	1.9	FCU-13	HEATING COIL
FMF-49	1	1	5.0	2.6-11.5	1.0	FCU-14	CHILLED COIL
FMF-50	3/4	3/4	3.0	1.2-5.4	1.2	FCU-14	HEATING COIL
FMF-51	1	1	5.5	2.6-11.5	1.2	FCU-15	CHILLED COIL
FMF-52	3/4	3/4	3.0	1.2-5.4	1.2	FCU-15	HEATING COIL
FMF-53	3/4	3/4	2.5	1.2-5.4	0.8	FCU-16	CHILLED COIL
FMF-54	1/2	1/2	1.0	0.3-1.4	1.9	FCU-16	HEATING COIL
FMF-55	3/4	3/4	2.5	1.2-5.4	0.8	FCU-17	CHILLED COIL
FMF-56	1/2	1/2	1.0	0.3-1.4	1.9	FCU-17	HEATING COIL
FMF-57	3/4	3/4	2.5	1.2-5.4	0.8	FCU-18	CHILLED COIL
FMF-58	1/2	1/2	1.0	0.3-1.4	1.9	FCU-18	HEATING COIL
FMF-59	1	1	4.0	2.6-11.5	0.6	FCU-19	CHILLED COIL
FMF-60	3/4	3/4	2.5	1.2-5.4	0.8	FCU-19	HEATING COIL
FMF-61	1	1	7.0	2.6-11.5	2.0	FCU-20	CHILLED COIL
FMF-62	1	1	4.0	2.6-11.5	0.6	FCU-20	HEATING COIL
FMF-63	3/4	3/4	1.5	1.2-5.4	0.3	FCU-21	CHILLED COIL
FMF-64	1/2	1/2	0.5	0.3-1.4	0.5	FCU-21	HEATING COIL
FMF-65	1	1	5.5	2.6-11.5	1.2	FCU-22	CHILLED COIL
FMF-66	3/4	3/4	3.0	1.2-5.4	1.2	FCU-22	HEATING COIL
FMF-67	3/4	3/4	3.0	1.2-5.4	1.2	FCU-23	CHILLED COIL
FMF-68	3/4	3/4	2.0	1.2-5.4	0.5	FCU-23	HEATING COIL
FMF-69	1	1	4.5	2.6-11.5	0.8	FCU-24	CHILLED COIL
FMF-70	3/4	3/4	2.5	1.2-5.4	0.8	FCU-24	HEATING COIL
FMF-71	1	1	4.5	2.6-11.5	0.8	FCU-25	CHILLED COIL
FMF-72	3/4	3/4	2.5	1.2-5.4	0.8	FCU-25	HEATING COIL
FMF-73	1	1	4.5	2.6-11.5	0.8	FCU-26	CHILLED COIL
FMF-74	3/4	3/4	2.5	1.2-5.4	0.8	FCU-26	HEATING COIL
FMF-75	1	1	5.5	2.6-11.5	1.2	FCU-27	CHILLED COIL
FMF-76	3/4	3/4	3.0	1.2-5.4	1.2	FCU-27	HEATING COIL
FMF-77	3/4	3/4	1.5	1.2-5.4	0.3	FCU-28	CHILLED COIL
FMF-78	3/4	3/4	1.0	1.2-5.4	0.1	FCU-28	HEATING COIL
FMF-79	1	1	6.0	2.6-11.5	1.4	FCU-29	CHILLED COIL
FMF-80	3/4	3/4	3.5	1.2-5.4	1.6	FCU-29	HEATING COIL
FMF-81	1	1	5.5	2.6-11.5	1.2	FCU-30	CHILLED COIL
FMF-82	3/4	3/4	3.0	1.2-5.4	1.2	FCU-30	HEATING COIL
FMF-83	1	1	5.5	2.6-11.5	1.2	FCU-31	CHILLED COIL
FMF-84	3/4	3/4	3.0	1.2-5.4	1.2	FCU-31	HEATING COIL
FMF-85	3/4	3/4	3.0	1.2-5.4	1.2	UH-1	HEATING COIL
FMF-86	3/4	3/4	2.5	1.2-5.4	0.8	UH-2	HEATING COIL

FOUR PIPE FAN COIL UNIT SCHEDULE

UNIT #	TYPE	FAN/MOTOR					COOLING COIL CAPACITY (30% PROPYLENE GLYCOL)										HEATING COIL CAPACITY (30% PROPYLENE GLYCOL)							PIPING RUN-OUT SIZES			REMARKS
		CFM	E.S.P. (IN.W.G.)	HP	VOLTS	PHASE	GPM	MAX WPD (FT)	EAT (°F) DB (°F)	EAT (°F) WB (°F)	LAT (°F) DB (°F)	LAT (°F) WB (°F)	SENS CAP. (BTUH)	TOTAL CAP. (BTUH)	EWT (°F)	LWT (°F)	MAX A.P.D. (IN H2O)	GPM	MAX WPD (FT)	EAT (°F)	LAT (°F)	TOTAL CAP. (BTUH)	EWT (°F)	LWT (°F)	MAX A.P.D. (IN H2O)	COOLING (INCHES)	HEATING (INCHES)	CONDENSATE DRAIN (INCHES)	
FCU-01	CASSETTE	600	-	1/6	208	1	2.5	1.20	75	63	59.2	--	10,215	12,567	42	52.7	0.10	1	0.17	72	93.4	13,862	150	120.6	0.10	3/4	1/2	1	
FCU-02	CASSETTE	1,080	-	(2) 1/6	208	1	6	4.37	75	63	58.0	--	19,846	25,940	42	51.2	0.10	4.5	1.67	72	96.9	29,021	150	136.3	0.10	1	1	1	
FCU-03	CASSETTE	1,080	-	(2) 1/6	208	1	6	4.37	75	63	58.0	--	19,846	25,940	42	51.2	0.10	4.5	1.67	72	96.9	29,021	150	136.3	0.10	1	1	1	
FCU-04	CASSETTE	600	-	1/6	208	1	1.5	0.52	75	63	61.4	--	8,844	9,883	42	56.0	0.10	1	0.17	72	93.4	13,862	150	120.6	0.10	3/4	1/2	1	
FCU-05	CASSETTE	600	-	1/6	208	1	1.5	0.52	75	63	61.4	--	8,844	9,883	42	56.0	0.10	1	0.17	72	93.4	13,862	150	120.6	0.10	3/4	1/2	1	
FCU-06	HORIZONTAL DUCTED	800	0.5	0.5	460	3	4	1.70	75	63	55	54	17,280	21,240	42	53.3	0.10	2.5	1.5	72	95	19,872	150	133.1	0.10	1	3/4	1	
FCU-07	HORIZONTAL DUCTED	800	0.5	0.5	460	3	4	1.70	75	63	55	54	17,280	21,240	42	53.3	0.10	2.5	1.5	72	95	19,872	150	133.1	0.10	1	3/4	1	
FCU-08	HORIZONTAL DUCTED	800	0.5	0.5	460	3	4	1.70	75	63	55	54	17,280	21,240	42	53.3	0.10	2.5	1.5	72	95	19,872	150	133.1	0.10	1	3/4	1	
FCU-09	CASSETTE	330	-	1/6	208	1	1	1.20	75	63	63.1	--	4,232	5,115	42	52.8	0.10	0.5	0.17	72	95.0	8,184	150	115.3	0.10	1/2	1/2	1	
FCU-10	CASSETTE	330	-	1/6	208	1	1	1.20	75	63	63.1	--	4,232	5,115	42	52.8	0.10	0.5	0.17	72	95.0	8,184	150	115.3	0.10	1/2	1/2	1	
FCU-11	CASSETTE	600	-	1/6	208	1	1.5	0.52	75	63	61.4	--	8,844	9,883	42	56.0	0.10	1	0.17	72	93.4	13,862	150	120.6	0.10	3/4	1/2	1	
FCU-12	CASSETTE	330	-	1/6	208	1	1	1.20	75	63	63.1	--	4,232	5,115	42	52.8	0.10	0.5	0.17	72	95.0	8,184	150	115.3	0.10	1/2	1/2	1	
FCU-13	CASSETTE	600	-	1/6	208	1	1.5	0.52	75	63	61.4	--	8,844	9,883	42	56.0	0.10	1	0.17	72	93.4	13,862	150	120.6	0.10	3/4	1/2	1	
FCU-14	HORIZONTAL DUCTED	1,000	0.5	0.5	460	3	5	2.10	75	63	55	54	21,600	26,550	42	53.3	0.10	3	15.3	72	95	24,840	150	132.4	0.10	1	3/4	1	
FCU-15	HORIZONTAL DUCTED	1,100	0.5	1	460	3	5.5	2.80	75	63	55	54	23,760	29,210	42	53.3	0.10	3	2.6	72	95	27,324	150	130.7	0.10	1	3/4	1	
FCU-16	CASSETTE	600	-	1/6	208	1	2.5	1.20	75	63	59.2	--	10,215	12,567	42	52.7	0.10	1	0.17	72	93.4	13,862	150	120.6	0.10	3/4	1/2	1	
FCU-17	CASSETTE	600	-	1/6	208	1	2.5	1.20	75	63	59.2	--	10,215	12,567	42	52.7	0.10	1	0.17	72	93.4	13,862	150	120.6	0.10	3/4	1/2	1	
FCU-18	CASSETTE	600	-	1/6	208	1	2.5	1.20	75	63	59.2	--	10,215	12,567	42	52.7	0.10	1	0.17	72	93.4	13,862	150	120.6	0.10	3/4	1/2	1	
FCU-19	HORIZONTAL DUCTED	850	0.5	0.5	460	3	4	1.70	75	63	55	54	18,360	22,570	42	54	0.10	2.5	10.9	72	95	21,114	150	132.1	0.10	1	3/4	1	
FCU-20	HORIZONTAL DUCTED	1,400	0.5	1	460	3	7	3.60	75	63	55	54	30,240	37,170	42	53.3	0.10	4	32.1	72	95	34,776	150	131.5	0.10	1	1	1	
FCU-21	CASSETTE	330	-	1/6	208	1	1.5	1.20	75	63	62.0	--	4,616	5,983	42	50.5	0.10	0.5	0.17	72	95.0	8,184	150	115.3	0.10	3/4	1/2	1	
FCU-22	HORIZONTAL DUCTED	1,200	0.5	1	460	3	5.5	2.80	75	63	55	54	24,840	30,530	42	53.8	0.10	3	2.6	72	95	28,566	150	129.8	0.10	1	3/4	1	
FCU-23	HORIZONTAL DUCTED	600	0.5	0.5	460	3	3	6.20	75	63	55	54	12,960	15,930	42	53.3	0.10	2	5.7	72	95	14,904	150	134.2	0.10	3/4	3/4	1	
FCU-24	HORIZONTAL DUCTED	900	0.5	0.5	460	3	4.5	25.80	75	63	55	54	19,440	23,900	42	53.3	0.10	2.5	10.9	72	95	22,356	150	131	0.10	1	3/4	1	
FCU-25	HORIZONTAL DUCTED	950	0.5	0.5	460	3	4.5	25.80	75	63	55	54	20,520	25,220	42	53.9	0.10	2.5	10.9	72	95	23,598	150	130	0.10	1	3/4	1	
FCU-26	HORIZONTAL DUCTED	900	0.5	0.5	460	3	4.5	25.80	75	63	55	54	19,440	23,900	42	53.3	0.10	2.5	10.9	72	95	22,356	150	131	0.10	1	3/4	1	
FCU-27	HORIZONTAL DUCTED	1,100	0.5	1	460	3	5.5	2.80	75	63	55	54	23,760	29,210	42	53.3	0.10	3	2.6	72	95	27,324	150	130.7	0.10	1	3/4	1	
FCU-28	CASSETTE	600	-	1/6	208	1	1.5	0.52	75	63	61.4	--	8,844	9,833	42	55.9	0.10	1	0.17	72	93.4	13,862	150	120.6	0.10	3/4	3/4	1	
FCU-29	HORIZONTAL DUCTED	1,250	0.5	1	460	3	6	3.10	75	63	55	54	27,000	33,190	42	53.7	0.10	3.5	3.4	72	95	31,050	150	131.2	0.10	1	3/4	1	
FCU-30	HORIZONTAL DUCTED	1,100	0.5	1	460	3	5.5	2.80	75	63	55	54	23,760	29,210	42	53.3	0.10	3	2.6	72	95	27,324	150	130.7	0.10	1	3/4	1	
FCU-31	HORIZONTAL DUCTED	1,150	0.5	1	460	3	5.5	2.80	75	63	55	54	24,840	30,530	42	53.8	0.10	3	18.7	72	95	28,566	150	129.8	0.10	1	3/4	1	

NOTES:
1. ALL DUCTED UNITS BASED ON 0.5" H2O EXTERNAL STATIC PRESSURE
2. ALL COOLING AND HEATING CAPACITIES/FLOW RATES BASED ON 30% PROPYLENE GLYCOL
3.ALL UNITS SHALL OPERATE @ SPECIFIED CFMPRESSURE WITHOUT EXCEEDING NC-35.

VENTILATION AIR FAN SCHEDULE

UNIT #	STD. AIR CFM	MIN AIR CFM	TOTAL SP (IN. H2O)	MOTOR WATTS	MAX. RPM	ELECTRICAL CHAR. VOLTS	PHASE	HERTZ	TYPE	REMARKS
VF-1	1,500	1,500	0.5	934	1625	120	1	60	IN-LINE CABINET FAN	
VF-2	700	700	0.5	368	1035	120	1	60	IN-LINE CABINET FAN	

NOTES:
1. PROVIDE END SWITCH ON MOTOR OPERATED DAMPER TO PROVE DAMPER OPEN BEFORE ALLOWING FAN OPERATION (SEE ATC SPECIFICATIONS)

HYDRONIC UNIT HEATER SCHEDULE

NO.	SUPPLY FAN				HOT WATER SYSTEM CONDITION							PIPING RUN-OUT SIZES (INCHES)	MOUNTING HEIGHT ABOVE FINISHED FLOOR	REMARKS
	CFM	HP	RPM	ELEC. CHARC. V/ø/HZ	EAT (°F)	LAT (°F)	EWT (°F)	LWT (°F)	GPM	MAX. W.P.D. (FT.)	TOTAL CAP. (MBH)	HEATING COIL	INCHES	
UH-1	900	1/20	1000	120/1/60	60	89	150	130	3	5	28	3/4	96	MECH. MEZZ - EAST
UH-2	750	1/20	1000	120/1/60	60	89	150	130	2.5	5	23.6	3/4	96	MECH. MEZZ. - M203

AUTOMATIC TEMPERATURE CONTROL PANEL SCHEDULE (ATC)

UNIT #	SYSTEM/EQUIPMENT SERVED	ELECTRICAL CHARACTERISTICS VOLTAGE/PHASE/HERTZ	REMARKS
ATC PANEL-1	SZVAV-01	120/1/60	
ATC PANEL-2	GENERAL	120/1/60	
ATC PANEL-3	ERV-01	120/1/60	
ATC PANEL-4	GENERAL	120/1/60	
ATC PANEL-5	GENERAL	120/1/60	

NOTES:
1. ATC SUBCONTRACTOR SHALL PROVIDE ADDITIONAL PANELS AND POWER WIRING IF REQUIRED.
2. PROVIDE DATA CONDUIT AND BACK BOX. COORDINATE DATA CABLE AND OUTLET WITH OWNER.
3. SIZE OF ATC PANEL SHALL BE COORDINATED BASED ON QUANTITY OF CONTROLLERS INSTALLED WITHIN THE SAME.

LOUVER SCHEDULE

ITEM	NOMINAL SIZE WXH (INCHES)	UNIT(S) SERVED	SERVICE	MIN. FREE AREA (FT^2)	MAX. STATIC PRESSURE (IN. W.G.)	TOTAL AIR FLOW (CFM)	REMARKS
LV-1	26X26	VF-1	EXHAUST	2	0.2	1,500	
LV-2	32X32	VF-1 & VF-2	INTAKE	3.3	0.2	2,200	
LV-3	80X60	SZVAV-1	EXHAUST	18.38	0.2	5,000	
LV-4	80X60	SZVAV-1	RELIEF	18.38	0.2	3,000	

NOTES:
1. EXTRUDED ALUMINUM WITH BAKED ENAMEL FINISH, COLOR AS SELECTED BY ARCHITECT.
2. PROVIDE ALUMINUM BIRD SCREEN WITH 1/4"OPENINGS.
3. DRAINABLE BLADES WITH ZERO WATER PENETRATION AT 900 FPM VELOCITY.
4. ALL LOUVERS SHALL BE PROVIDE UNDER DIVISION 23.

INTAKE/RELIEF HOOD SCHEDULE

UNIT #	AIR FLOW RATE (CFM)	MAXIMUM PRESS DROP (INCHES H2O)	THROAT SIZE ("X") (INCHES)	CURB SIZE ("X") (INCHES)	SERVICE	UNIT SERVED	TYPE	REMARKS
RH-1	7,000	0.1	42X28	48X34	INTAKE	ERV-1	LOW PROFILE HOOD	
RH-2	7,000	0.1	48X36	54X42	EXHAUST	ERV-1	LOW PROFILE HOOD	

NOTES:
1. PROVIDE FACTORY FURNISHED, FULLY INSULATED 12" HIGH ROOF CURB
2. FURNISH 1/4"X1/4" ALUMINUM BIRD SCREEN.

GRILLES, REGISTERS AND DIFFUSERS SCHEDULE

ID	DESCRIPTION	REMARKS
RG1	LOUVERED GRILLE	--
RG2	LOUVERED FILTER GRILLE	--
RG3	LOUVERED FILTER GRILLE	STEEL - HEAVY DUTY
SD1	LOUVERED FACE DIFFUSER	HIGH PERFORMANCE LOUVERED DIFFUSER

NOTE: PROVIDE 24X24 AUXILIARY PANEL FOR ALL AIR DEVICES INSTALLED IN ACOUSTICAL TILE CEILINGS.

REVISIONS

no.	date	comments

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MAGNOLIA MIDDLE SCHOOL
HVAC RENOVATIONS
SRS 2503
MAGNOLIA MIDDLE SCHOOL
133 THOMAS MORE DR,
MAGNOLIA, DE 19962

SUBMISSION

BID DOCUMENTS

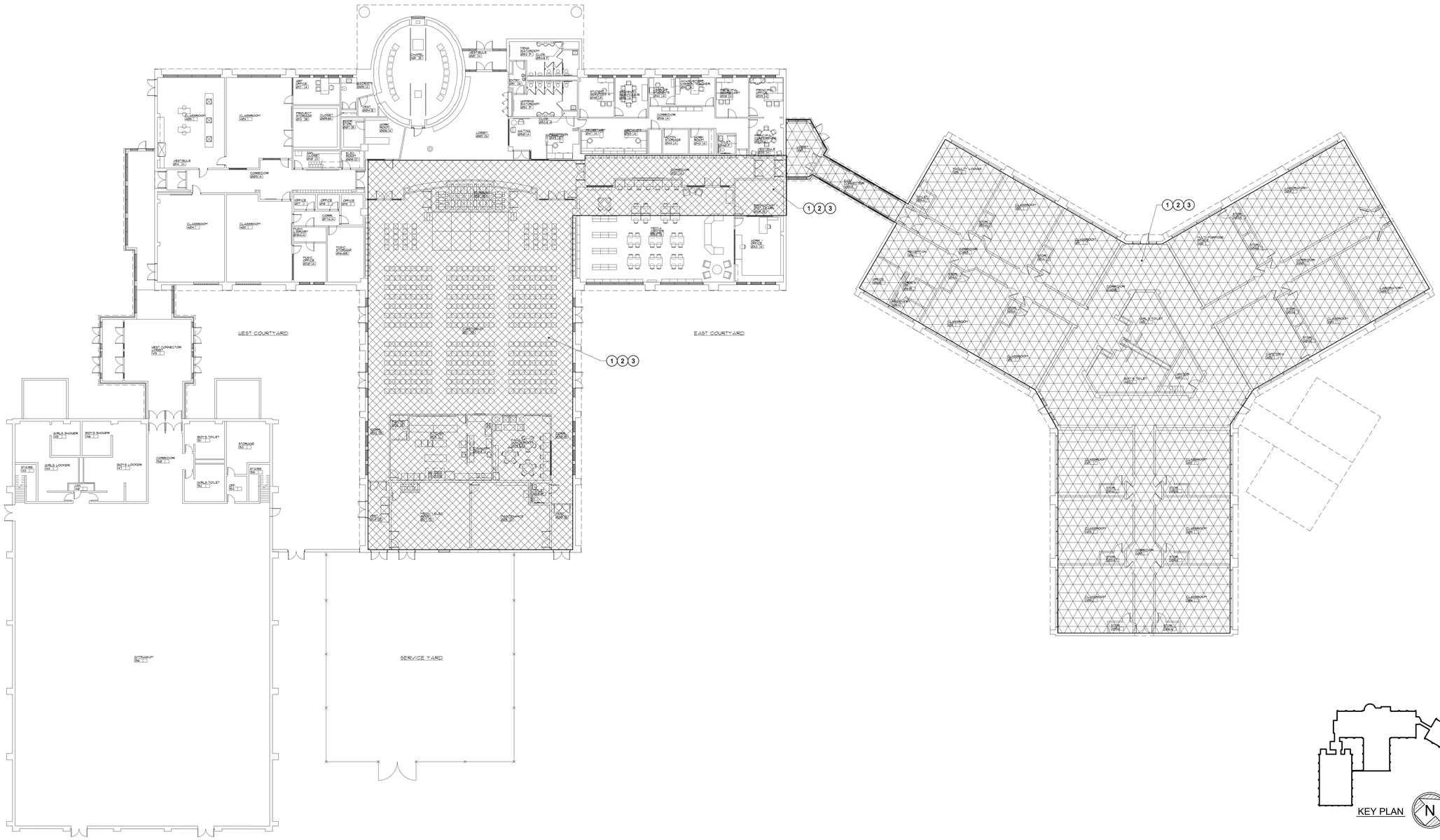
SCHEDULES
HVAC

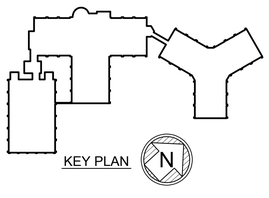
DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

M502

DRAWING NOTES:
(APPLY TO THIS DRAWINGS)

1. REMOVE ALL EXISTING SPRINKLER HEADS AND PIPING AFFECTED BY DEMOLITION AND NEW WORK.
2. PROVIDE NEW SPRINKLER HEADS AND PIPING BASED ON NEW CEILING GRIDS AND BULKHEADS AS REQUIRED FOR NEW HVAC WORK.
3. FIRE PROTECTION DEMOLITION AND NEW WORK DESIGN TO BE PROVIDED BY LICENSED FIRE PROTECTION ENGINEER IN DELAWARE AND APPROVED BY FIRE MARSHAL BEFORE WORK BEGINS. AS-BUILTS/RECORD DOCUMENTS TO BE PROVIDED FIRE PROTECTION ENGINEER OF RECORD SIGNED/SEALED.





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

16 8 0 16 32

FIRE SUPPRESSION PLAN N

REVISIONS

no.	date	comments

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FIRE SUPPRESSION PLAN

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FP101

CODE REVIEW

APPLICABLE CODES FOR PROJECT:

BUILDING	2021 INTERNATIONAL BUILDING CODE (IBC)
EXISTING	2018 INTERNATIONAL EXISTING BUILDING CODE (IEBC)
LIFE SAFETY	2021 NFPA 101 LIFE SAFETY CODE
ACCESSIBILITY	2009 ICC/ANSI A117.1, ADAAG
PLUMBING	2018 INTERNATIONAL PLUMBING CODE (IPC)
MECHANICAL	2018 INTERNATIONAL MECHANICAL CODE (IMC)
ELECTRICAL	2018 INTERNATIONAL ELECTRICAL CODE (IEC)
ENERGY	2018 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)
FIRE	DELAWARE STATE FIRE PREVENTION REGULATIONS

PLUMBING LEGEND

SYMBOL	ABBREVIATION	DEFINITION
		SHOCK ABSORBER
		THERMOMETER
		PRESSURE GAUGE W/ NEEDLE VALVE
	VTR	VENT THRU ROOF
		FIRE PROTECTION SHUT-OFF VALVE W/ TAMPER SWITCH
		STRAINER W/ BLOW DOWN VALVE AND HOSE END DRAIN CONNECTION
		GAS COCK
		GAUGE VALVE
		BALL VALVE
		CIRCUIT SETTER
		BALANCE & SHUT-OFF VALVE W/ MEMORY
		UNION
		FLEXIBLE CONNECTION
	NFWH	WALL HYDRANT (NON-FREEZE)
	HB	HOSE BIBB
	IRWH	INTERIOR RECESSED WALL HYDRANT
		GLOBE VALVE
		GATE VALVE
		MULTI-PURPOSE VALVE
		RPZ BACKFLOW PREVENTER
		BALANCE VALVE
		STRAINER W/ ¾ TURN BLOW DOWN VALVE
	OS&Y	OUTSIDE SCREW AND YOKE
		CHECK VALVE
		VACUUM RELIEF VALVE
		PIPE ANCHOR
		PIPE GUIDE/SLEEVE
		CAPPED PIPE
		PIPE UP
		PIPE DOWN
		BOTTOM PIPE CONNECTION
		TOP PIPE CONNECTION
	FDR	FLOOR SINK W/ TRAP PRIMING LINE
	FDR	FLOOR DRAIN W/ TRAP PRIMING LINE
	SAN, W	SANITARY, SOIL, WASTE
	V	PLUMBING VENT
	SW	STORMWATER PIPING
	FD	FOUNDATION DRAIN PIPING
		BACKWATER VALVE
	CO	CLEANOUT: LINE, FLUSH
		BELOW SLAB/GRADE PIPING
	CW	COLD WATER
	CW	COLD WATER (BELOW GRADE)
	HW	HOT WATER (110°F)
	HW	HOT WATER (110°F, BELOW GRADE)
	HWR	HOT WATER RECIRCULATING (110°F)
	CD	A/C CONDENSATE DRAIN
	NG	NATURAL GAS PIPING
	NG	NATURAL GAS PIPING (BELOW GRADE)
	PDI	PLUMBING & DRAINAGE INSTITUTE
	IW	INDIRECT WASTE
	AFF	ABOVE FINISHED FLOOR
	AFG	ABOVE FINISHED GRADE
	EX	EXISTING
		DOUBLE CHECK VALVE BACKFLOW PREVENTER
#		DRAWING NOTE - NEW WORK
XX/X	PART PLAN NO. / DRAWING NO.	PART PLAN DESIGNATION

REVISIONS

no.	date	comments

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LEGEND
PLUMBING

DESIGN BY	RAK
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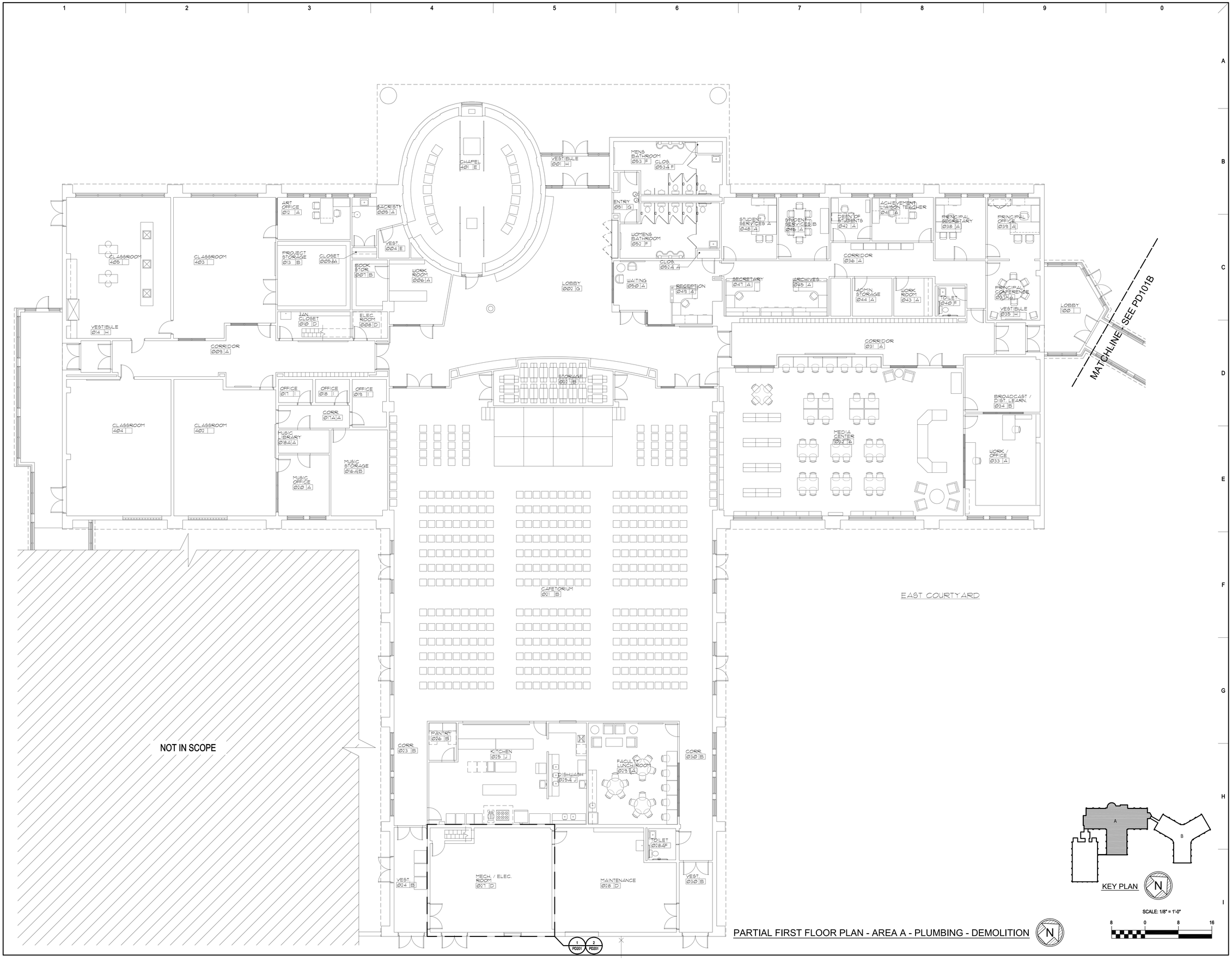
P001



PARTIAL FIRST FLOOR PLAN - AREA A - PLUMBING - DEMOLITION

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

8 0 8 16

REVISIONS

no.	date	comments

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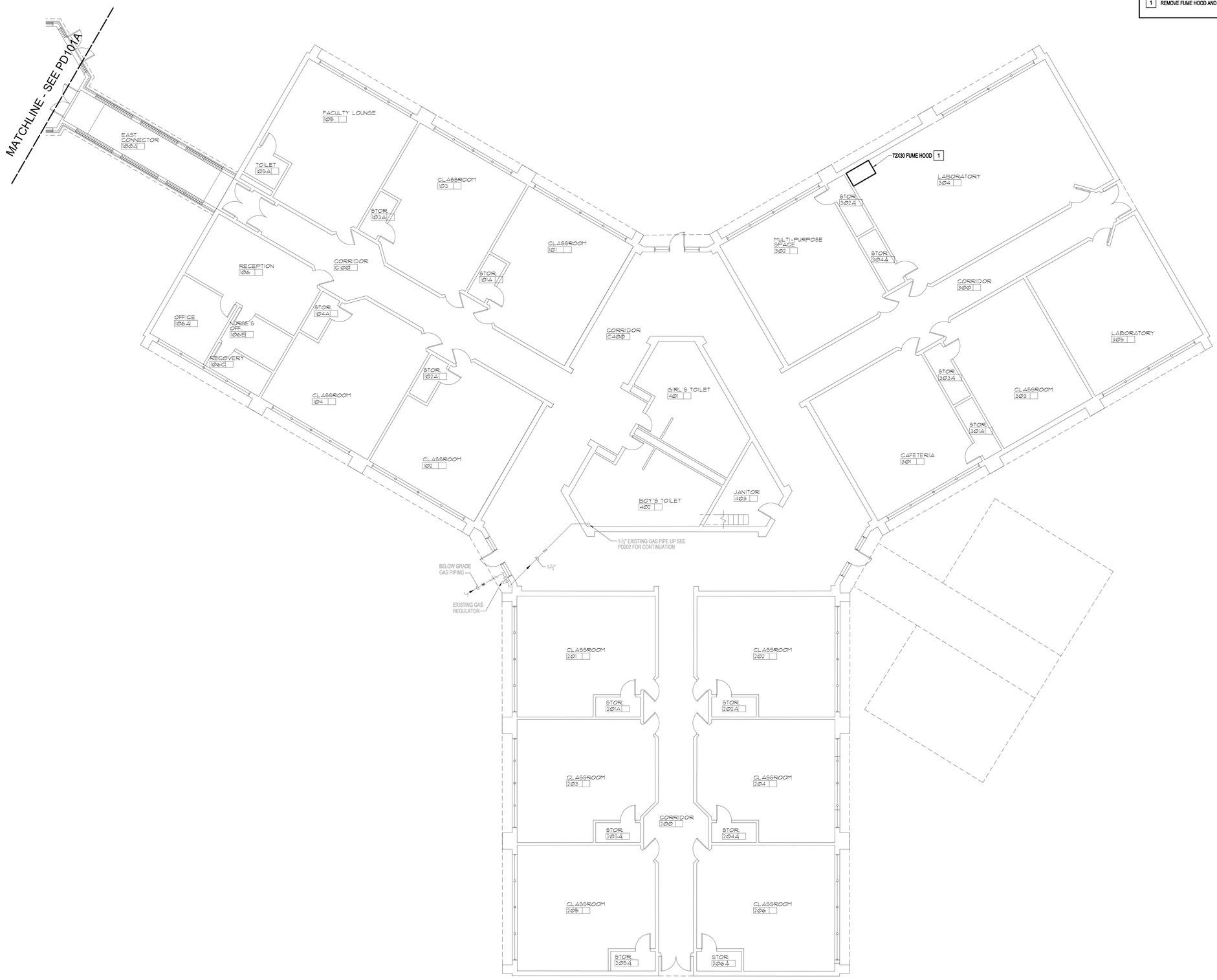
PARTIAL FIRST FLOOR PLAN AREA A PLUMBING DEMOLITION

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

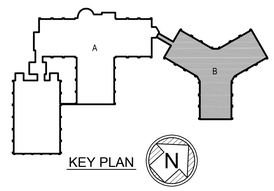
PD101A

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1 REMOVE FUME HOOD AND ALL ASSOCIATED UTILITIES, CUT AND PERMANENTLY CAP PIPING.



PARTIAL FIRST FLOOR PLAN - AREA B - PLUMBING - DEMOLITION



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

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REVISIONS

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Project No. 2024-21

PILOTTOWN ENGINEERS
Structural Engineers

17585 Nassau Commons Blvd Unit 3
Lewes, Delaware 19958

Project No. 118.048

CAESAR RODNEY SCHOOL DISTRICT
MAGNOLIA MIDDLE SCHOOL
HVAC RENOVATIONS
SRS 2503

MAGNOLIA MIDDLE SCHOOL
133 THOMAS MORE DR,
MAGNOLIA, DE 19962

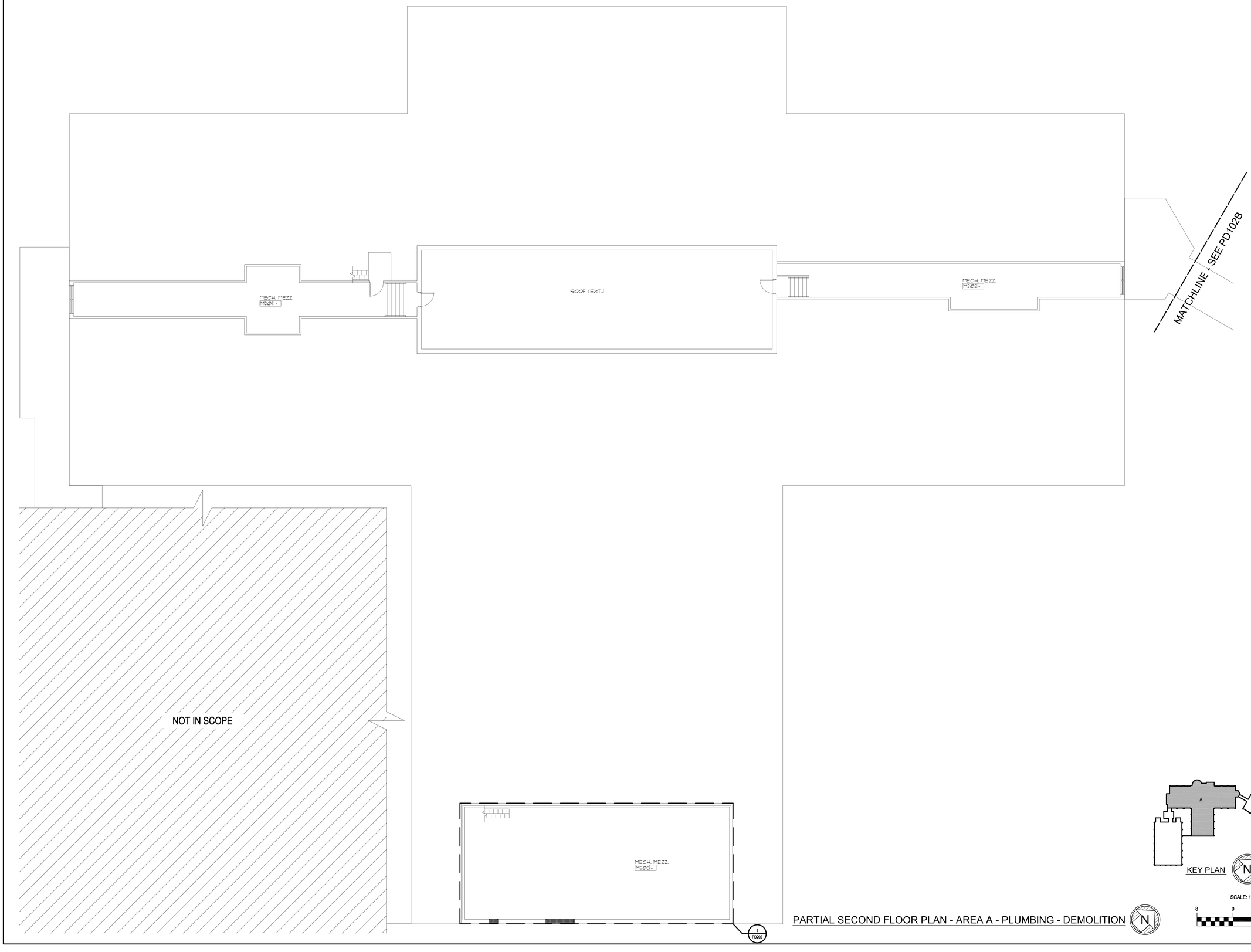
SUBMISSION

BID DOCUMENTS

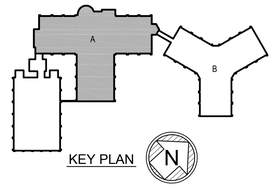
PARTIAL FIRST FLOOR PLAN AREA B PLUMBING DEMOLITION

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

PD101B



PARTIAL SECOND FLOOR PLAN - AREA A - PLUMBING - DEMOLITION



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

8 0 8 16

REVISIONS

no.	date	comments

ENGINEER

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WO# 24008B

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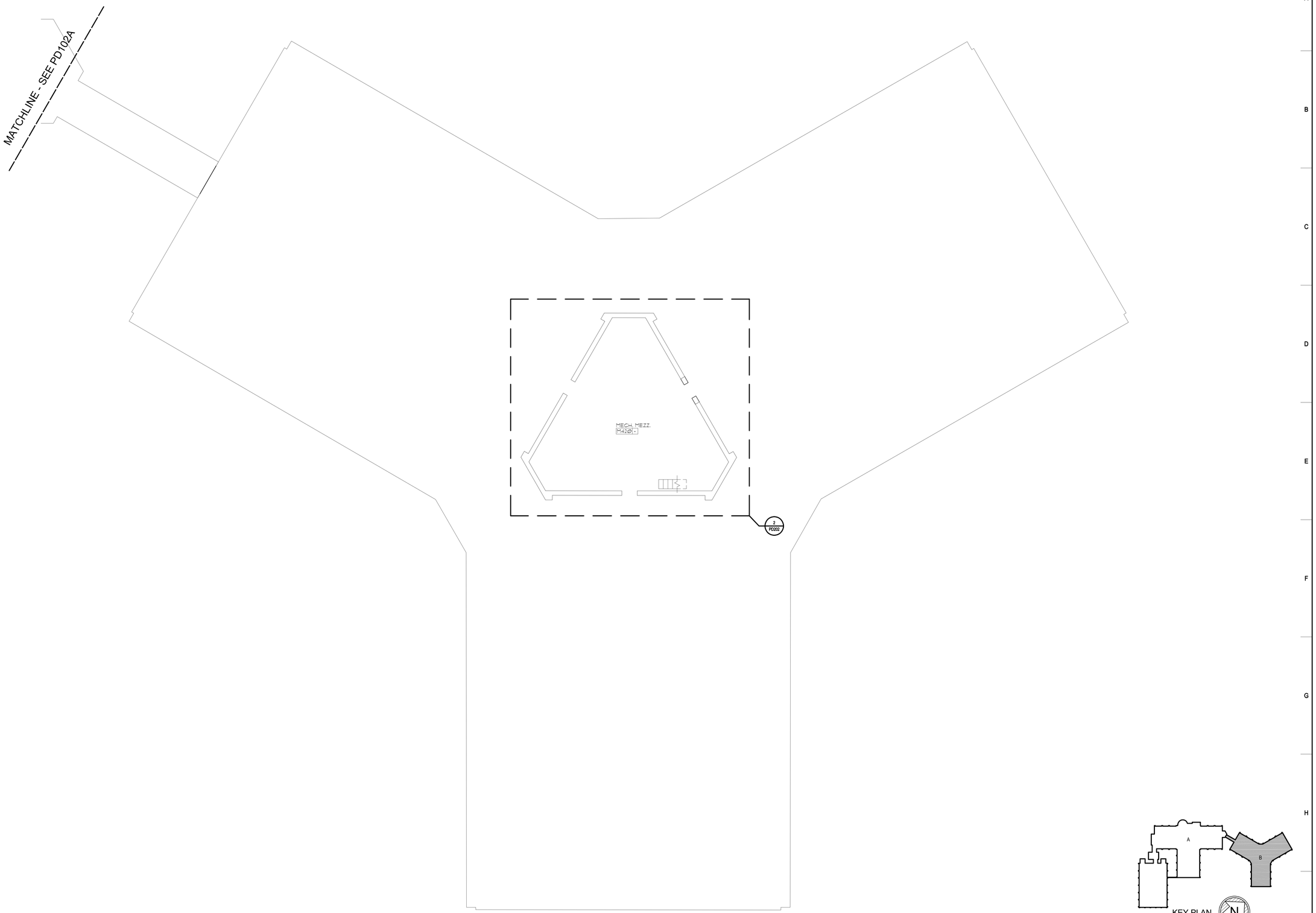
SUBMISSION

BID DOCUMENTS

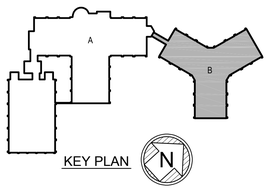
PARTIAL SECOND FLOOR PLAN AREA A PLUMBING DEMOLITION

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

PD102A



PARTIAL SECOND FLOOR PLAN - AREA B - PLUMBING - DEMOLITION



KEY PLAN

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

8 0 8 16

REVISIONS

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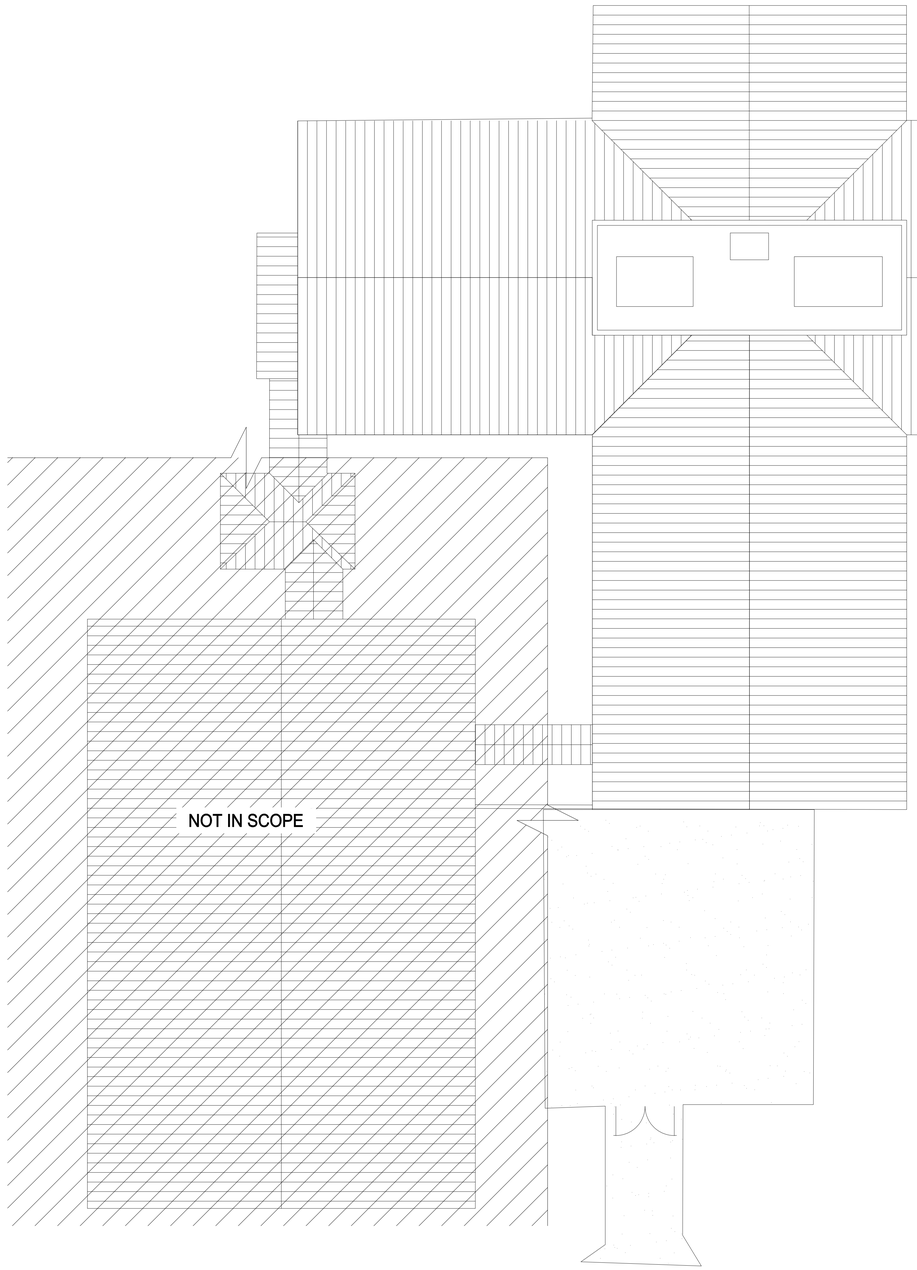
PARTIAL SECOND FLOOR PLAN AREA B PLUMBING DEMOLITION

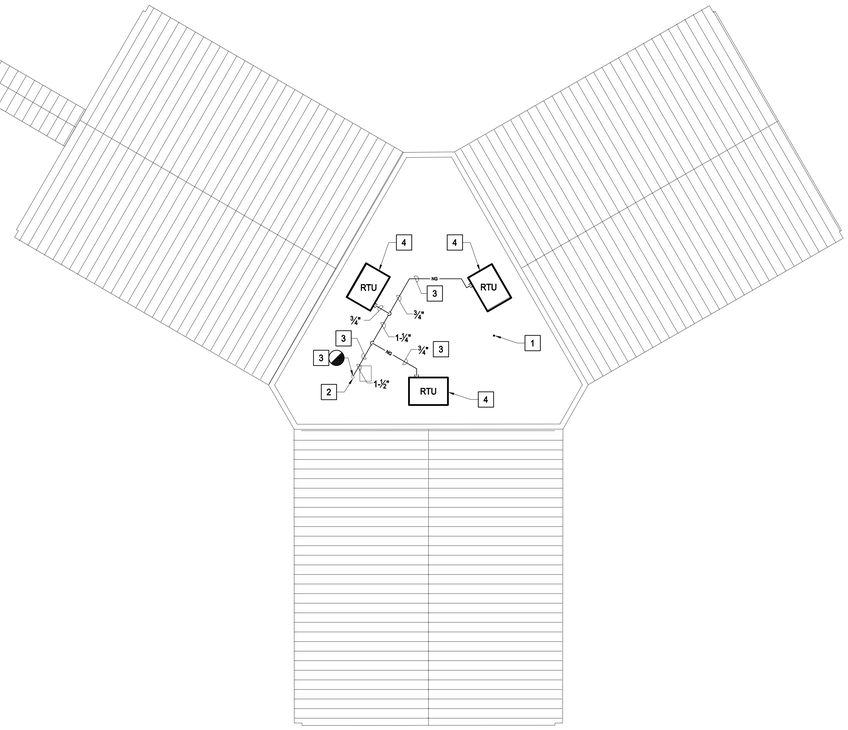
DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

PD102B

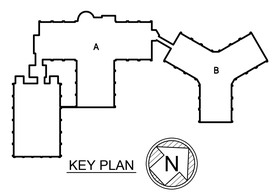
DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. 4" WATER HEATER FLUE TERMINATION, SEE PART PLAN #2 ON MD202 FOR CONTINUATION.
2. 1-1/2" GAS PIPE DOWN, SEE PART PLAN #2 ON PD202 FOR CONTINUATION.
3. REMOVE GAS PIPING, VALVES AND ALL ASSOCIATED SUPPORTS TO POINT INDICATED AND PERMANENTLY VALVE AND CAP PIPING ABOVE ROOF CURB.
4. REMOVE PACKAGED GAS FIRED ROOF TOP UNITS AND ALL ASSOCIATED PIPING, REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL DEMOLITION INFORMATION.





ROOF PLAN - AREA A & B - PLUMBING - DEMOLITION



KEY PLAN

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

16 8 0 16 32

REVISIONS

no.	date	comments

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SUBMISSION

BID DOCUMENTS

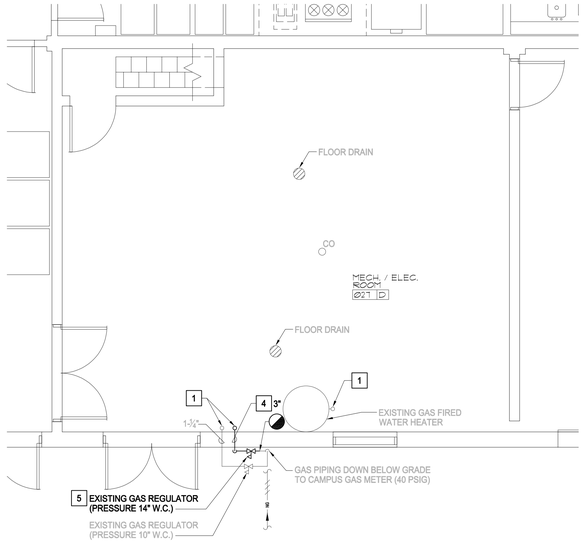
ROOF PLAN
PLUMBING
DEMOLITION

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

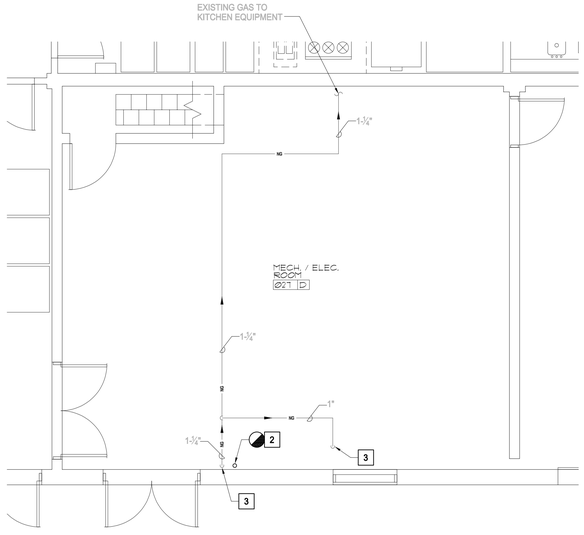
PD103

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

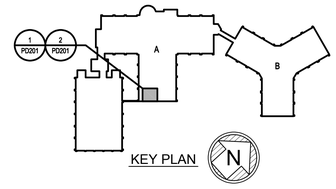
1. NATURAL GAS PIPING UP, SEE UPPER PART PLAN ON THIS SHEET FOR CONTINUATION .
2. 3" NATURAL GAS PIPING UP AND DOWN, SEE PART PLAN #1 ON PD202 FOR CONTINUATION UP, SEE LOWER PART PLAN ON THIS SHEET FOR CONTINUATION DOWN.
3. NATURAL GAS PIPING DOWN, SEE PART PLAN #1 ON THIS SHEET FOR CONTINUATION.
4. REMOVE NATURAL GAS PIPING AND ALL ASSOCIATED SUPPORTS AND VALVES TO CEILING OF MECHANICAL ROOM, TEMPORARILY CAP FOR CONNECTION UNDER NEW WORK.
5. REMOVE NATURAL GAS REGULATOR AND ASSOCIATED PIPING, VALVES AND SUPPORTS.



PD201 MECHANICAL ROOM LOWER PART PLAN - PLUMBING - DEMOLITION



1 PD201 MECHANICAL ROOM UPPER PART PLAN - PLUMBING - DEMOLITION



REVISIONS

no.	date	comments

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BID DOCUMENTS

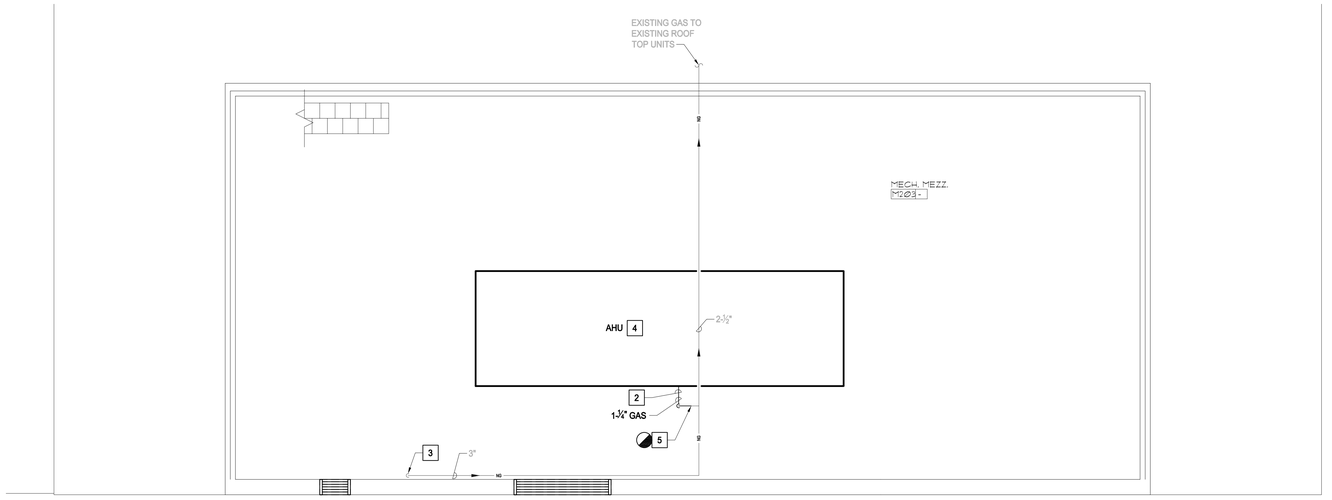
MECHANICAL ROOM PART PLANS PLUMBING DEMOLITION

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

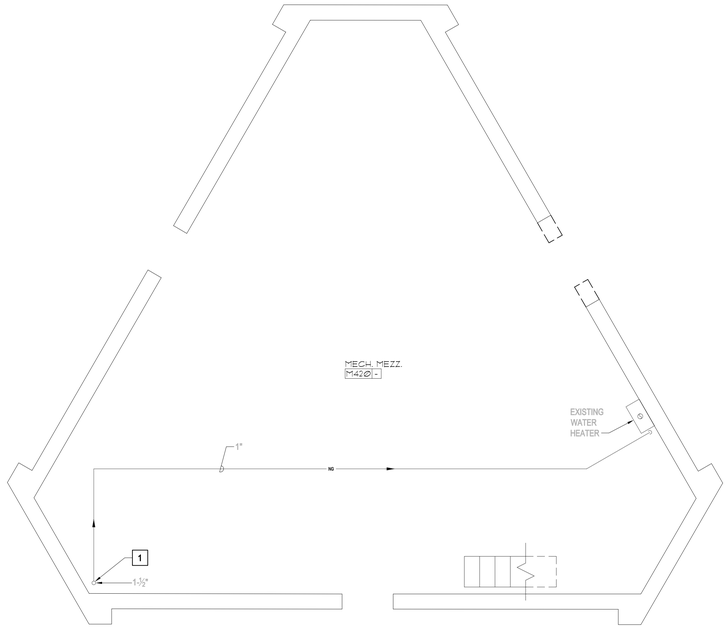
PD201

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

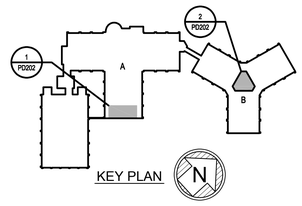
1. GAS PIPING UP AND DOWN, FOR CONTINUATION UP SEE PD103, FOR CONTINUATION DOWN SEE PD101B.
2. REMOVE GAS PIPING AND ALL ASSOCIATED SUPPORTS AND VALVING.
3. GAS PIPING DOWN, SEE UPPER PART PLAN ON PD201 FOR CONTINUATION.
4. REMOVE AIR HANDLING UNIT AND ALL ASSOCIATED PIPING. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL DEMOLITION INFORMATION.
5. REMOVE GAS PIPING TO POINT INDICATED AND PERMANENTLY VALVE AND CAP.



1 PD202 MEZZANINE PART PLAN - PLUMBING - DEMOLITION



2 PD202 MEZZANINE PART PLAN - PLUMBING - DEMOLITION



KEY PLAN

SCALE: 1/4" = 1'-0"

4 0 4 8

REVISIONS

no.	date	comments

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MAGNOLIA, DE 19962

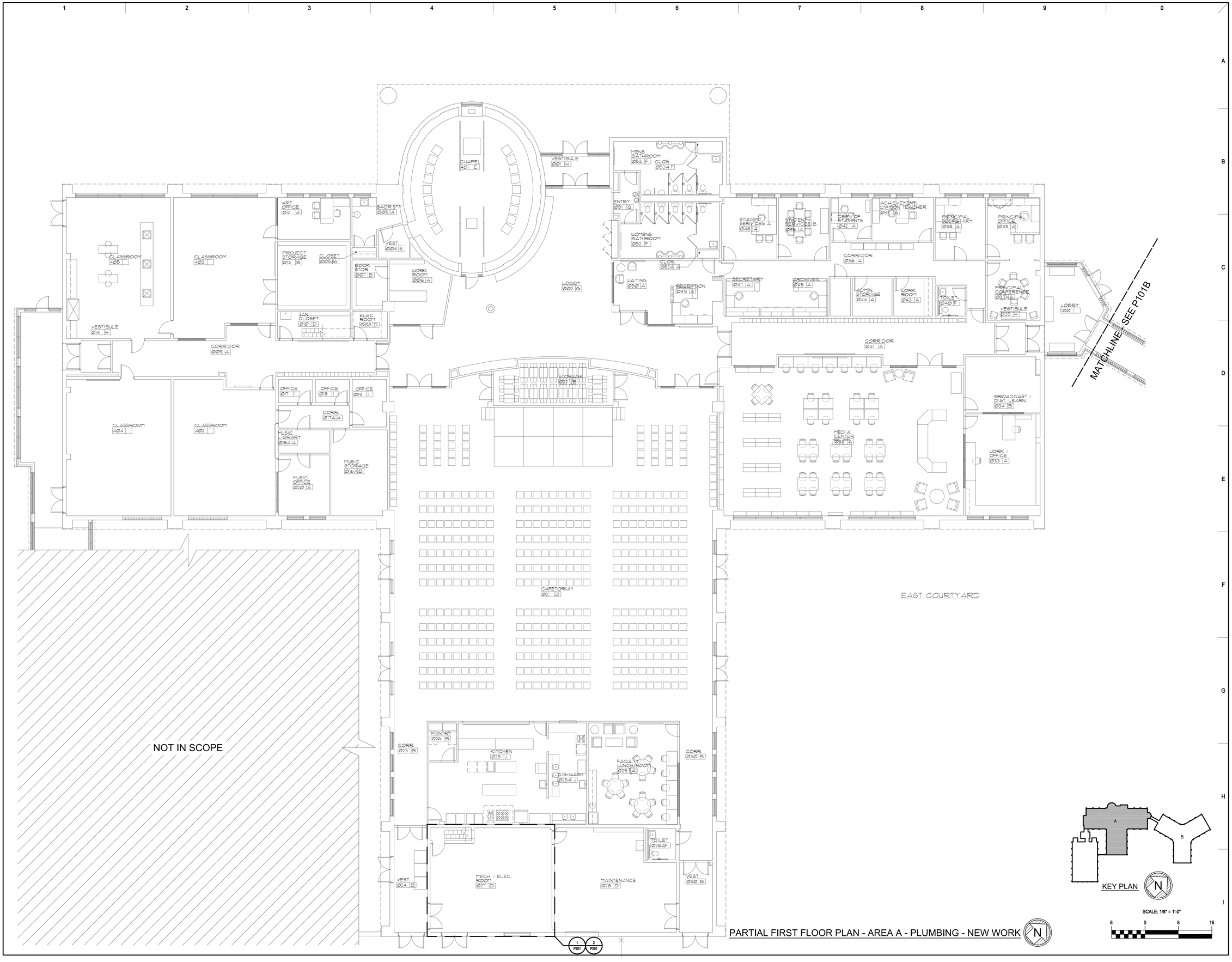
SUBMISSION

BID DOCUMENTS

MEZZANINE PART PLANS
PLUMBING
DEMOLITION

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

PD202



PARTIAL FIRST FLOOR PLAN - AREA A - PLUMBING - NEW WORK

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

8 0 8 16

REVISIONS

no.	date	comments

ENGINEER

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MAGNOLIA, DE 19962

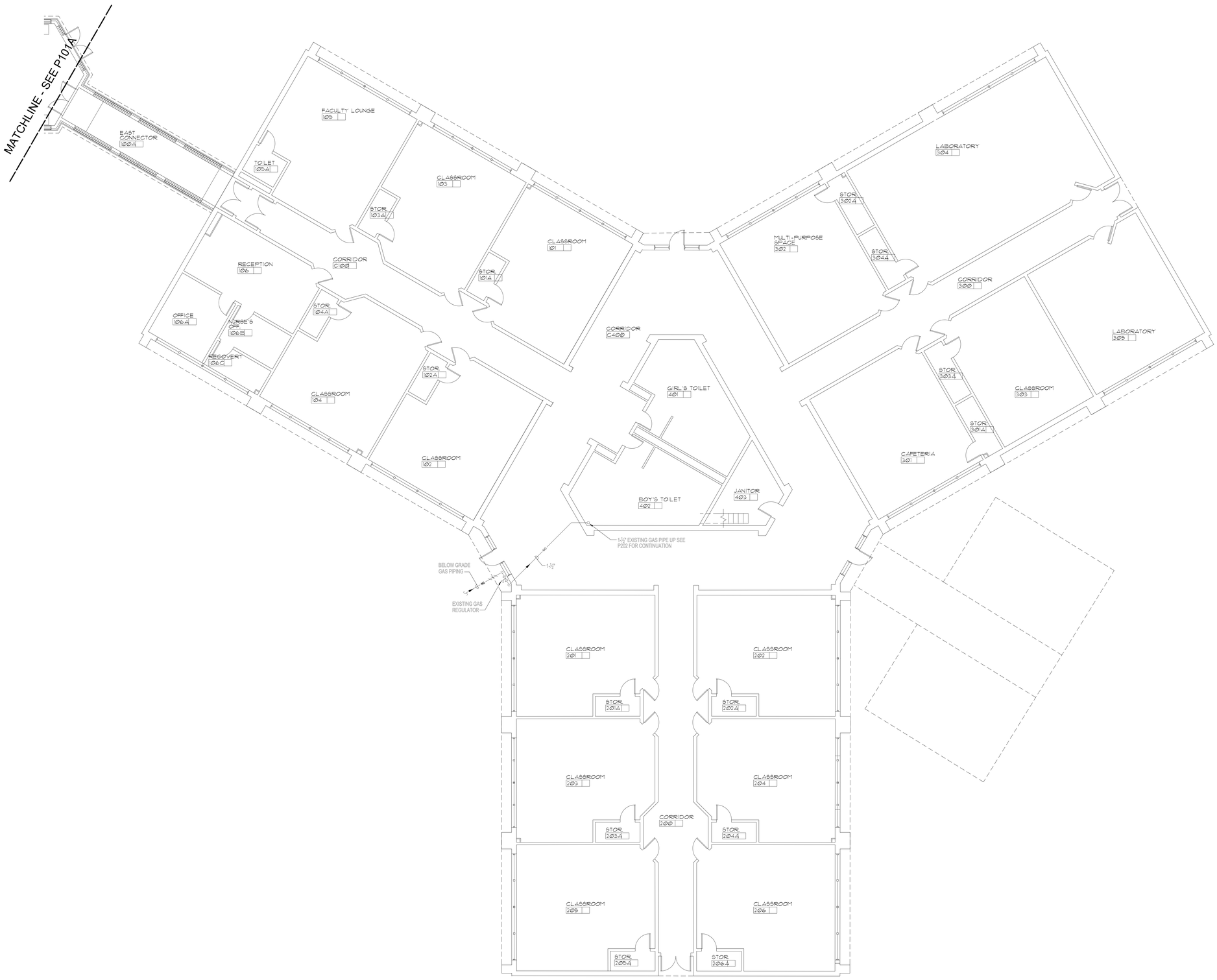
SUBMISSION

BID DOCUMENTS

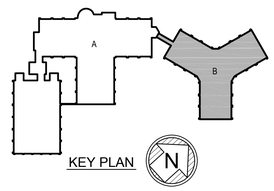
PARTIAL FIRST FLOOR PLAN AREA A PLUMBING NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

P101A



PARTIAL FIRST FLOOR PLAN - AREA B - PLUMBING - NEW WORK



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

8 0 8 16

REVISIONS

no.	date	comments

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SUBMISSION

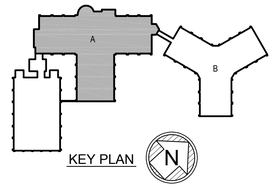
BID DOCUMENTS

PARTIAL FIRST FLOOR PLAN
AREA B
PLUMBING
NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

P101B

PARTIAL SECOND FLOOR PLAN - AREA A - PLUMBING - NEW WORK



KEY PLAN

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

8 0 8 16

REVISIONS

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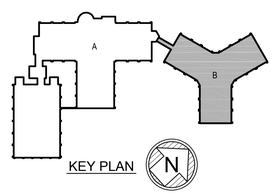
BID DOCUMENTS

PARTIAL SECOND FLOOR PLAN AREA A PLUMBING NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

P102A

PARTIAL SECOND FLOOR PLAN - AREA B - PLUMBING - NEW WORK



KEY PLAN

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

8 0 8 16

REVISIONS

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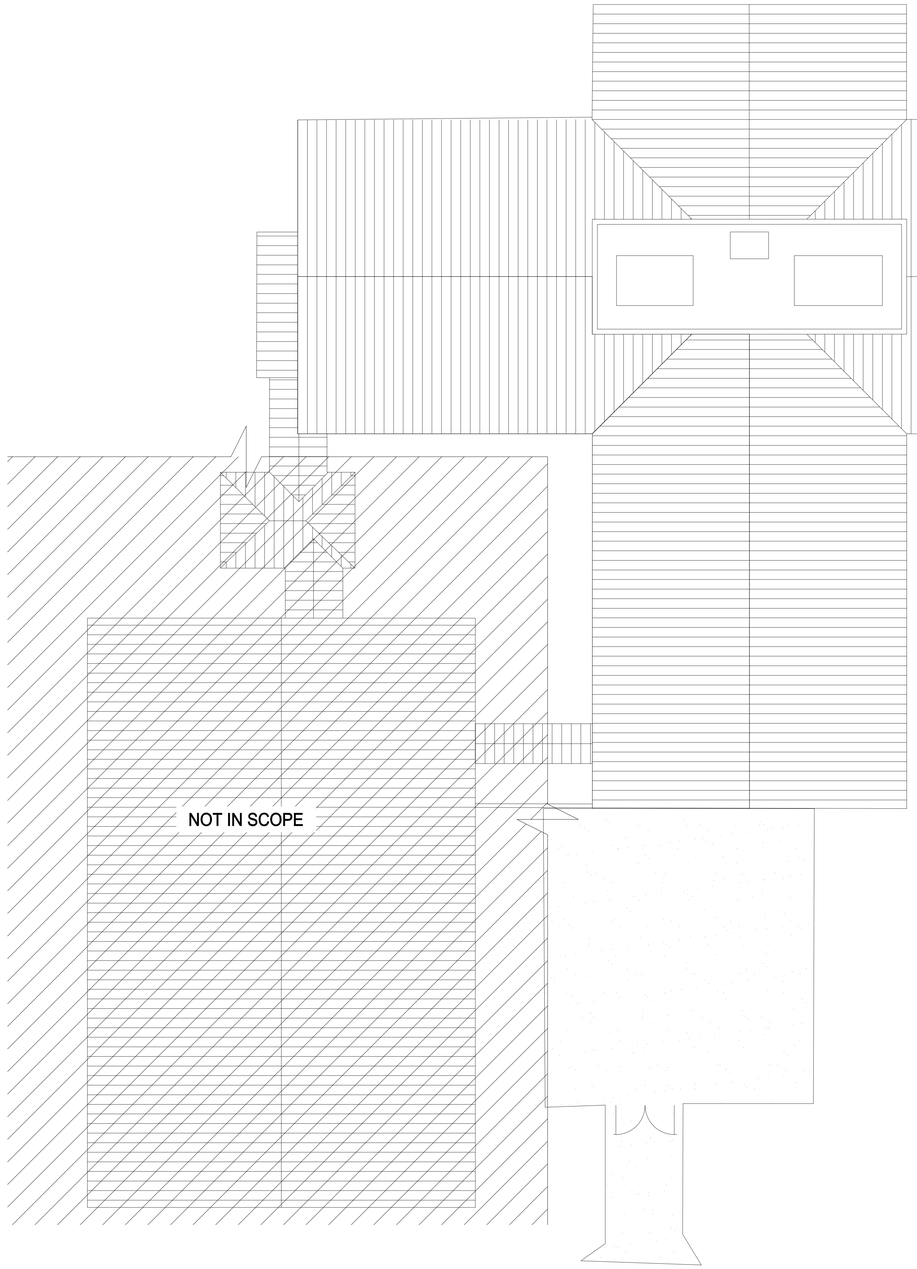
PARTIAL SECOND FLOOR PLAN
AREA B
PLUMBING
NEW WORK

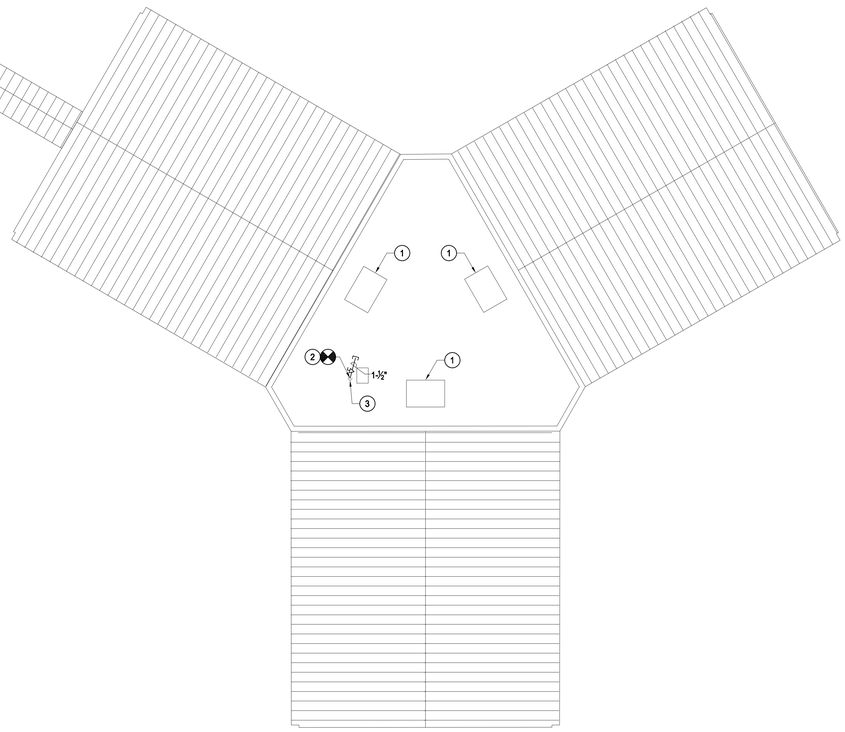
DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

P102B

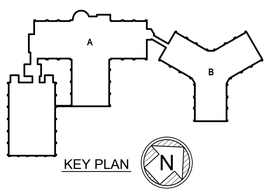
DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. NEW INSULATED ROOF CAPS, REFER TO HVAC DRAWINGS.
2. PERMANENTLY VALVE AND CAP GAS PIPING.
3. GAS PIPING DOWN, SEE PART PLAN #2 ON P202 FOR CONTINUATION.





ROOF PLAN - AREA A & B - PLUMBING - NEW WORK



KEY PLAN

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

16 8 0 16 32

REVISIONS

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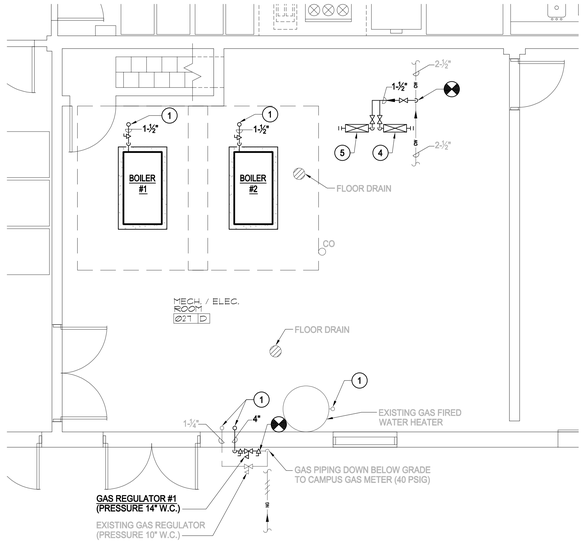
ROOF PLAN
PLUMBING
NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

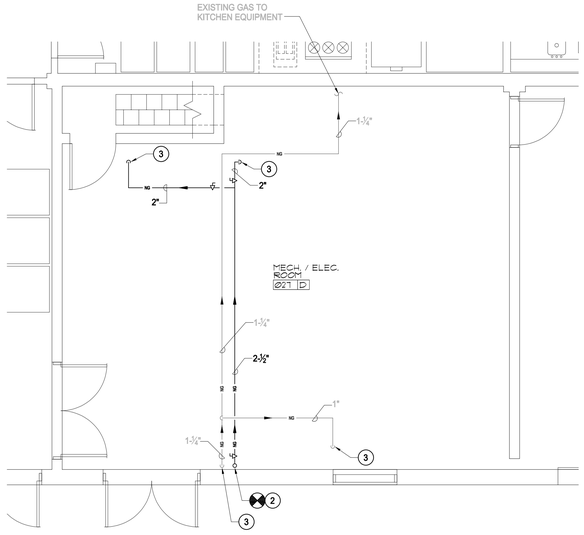
P103

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

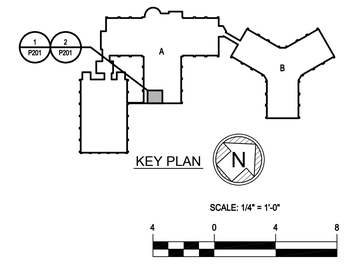
1. NATURAL GAS PIPING UP, SEE UPPER PART PLAN ON THIS SHEET FOR CONTINUATION .
2. 3" NATURAL GAS PIPE UP AND 4" NATURAL GAS PIPE DOWN, SEE PART PLAN #1 ON P202 FOR CONTINUATION UP, SEE LOWER PART PLAN ON THIS SHEET FOR CONTINUATION DOWN.
3. NATURAL GAS PIPING DOWN, SEE PART PLAN #1 ON THIS SHEET FOR CONTINUATION.
4. CHILLED WATER SYSTEM MAKE-UP WATER VALVE TRAIN (BFP-1 & DWM-1, SEE HVAC PLANS FOR CONTINUATION), RACK ON STAND BETWEEN 2-5 FEET A.F.F.)
5. HEATING WATER SYSTEM MAKE-UP WATER VALVE TRAIN (BFP-2 & DWM-2, SEE HVAC PLANS FOR CONTINUATION), RACK ON STAND BETWEEN 2-5 FEET A.F.F.)



P201 MECHANICAL ROOM LOWER PART PLAN - PLUMBING - NEW WORK



1 P201 MECHANICAL ROOM UPPER PART PLAN - PLUMBING - NEW WORK



REVISIONS

no.	date	comments

ENGINEER

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MAGNOLIA MIDDLE SCHOOL
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MAGNOLIA MIDDLE SCHOOL
133 THOMAS MORE DR,
MAGNOLIA, DE 19962

SUBMISSION

BID DOCUMENTS

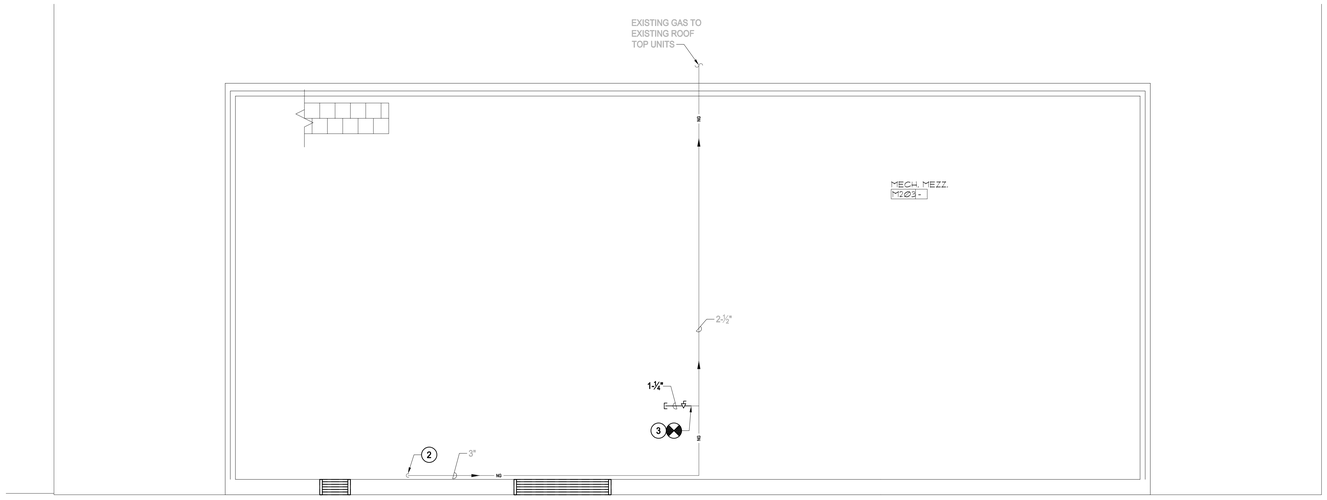
MECHANICAL ROOM
PART PLANS
PLUMBING
NEW WORK

DESIGN BY	RAK
CHECKED BY	DRH
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

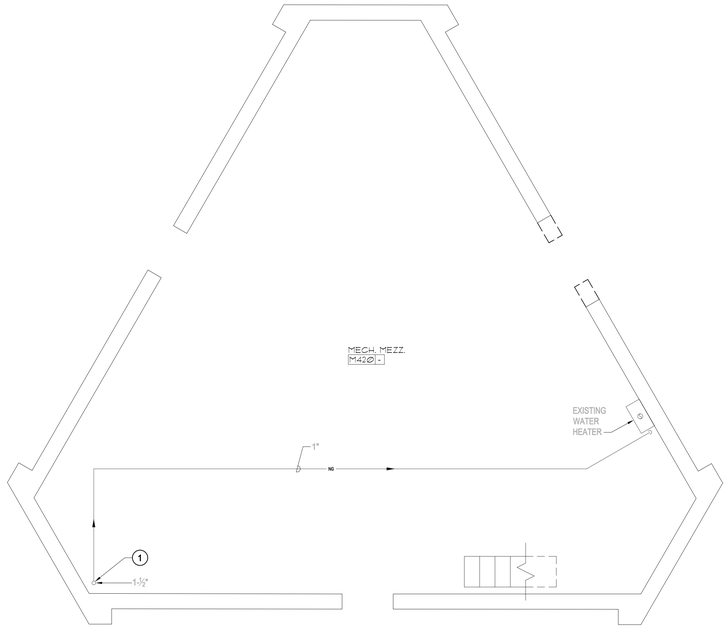
P201

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

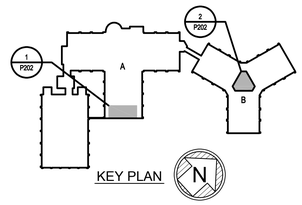
1. EXISTING GAS PIPING UP AND DOWN, SEE P103 FOR CONTINUATION UP, SEE P101B FOR CONTINUATION DOWN.
2. EXISTING GAS PIPING DOWN, SEE UPPER PART PLAN ON P201 FOR CONTINUATION.
3. PERMANENTLY VALVE AND CAP GAS PIPING.



1/P202 MEZZANINE PART PLAN - PLUMBING - NEW WORK



2/P202 MEZZANINE PART PLAN - PLUMBING - NEW WORK



KEY PLAN

SCALE: 1/4" = 1'-0"

4 0 4 8

REVISIONS

no.	date	comments

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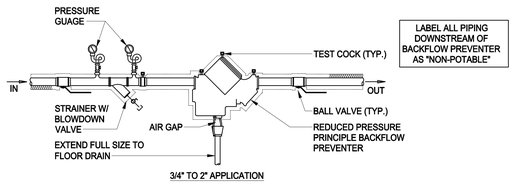
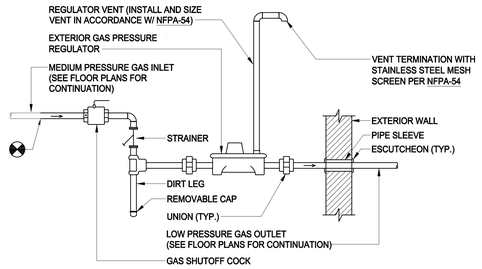


NOTES:

1. UNLESS OTHERWISE NOTED MOUNTING HEIGHT SHALL BE BETWEEN 12" AND 60 " ABOVE FINISHED FLOOR.
2. EXTERNALLY INSULATE AS SPECIFIED, PROVIDE REMOVABLE INSULATION COVERS FOR TEST PORTS.

1 DETAIL - REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTERS

NO SCALE

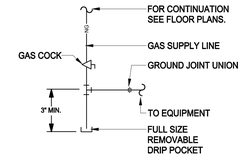


NOTE:

1. GAS PRESSURE REGULATOR SHALL BE SUITABLE FOR EXTERIOR INSTALLATION.
2. PAINT ALL EXTERIOR GAS PIPING WITH 2 COATS OF EPOXY PAINT.

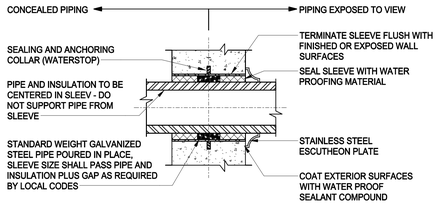
2 DETAIL - TYPICAL MEDIUM PRESSURE EXTERIOR GAS PRESSURE REGULATOR

NO SCALE



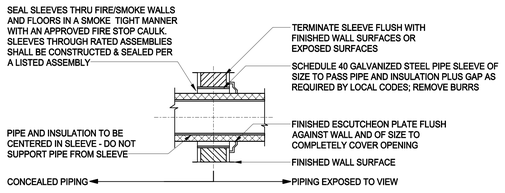
3 DETAIL - GAS PIPING CONNECTIONS TO INTERIOR EQUIPMENT

NO SCALE



4 DETAIL - TYPICAL PIPE SLEEVE THRU EXTERIOR WALL (ABOVE GRADE)

NO SCALE

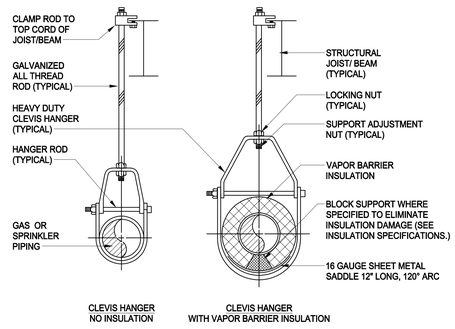


NOTE:

1. FOR INTERIOR FRAME PARTITIONS - PIPE SLEEVES MAY BE FABRICATED FROM GALVANIZED SHEET METAL; ROUND TUBE CLOSED WITH SNAPLOCK JOINT, WELDED SPIRAL SEAMS, OR WELDED LONGITUDINAL JOINT. FABRICATE FROM THE FOLLOWING GAUGES: 3" AND SMALLER, 20 GAUGE; 4" TO 6", 16 GAUGE; OVER 6", 14 GAUGE.

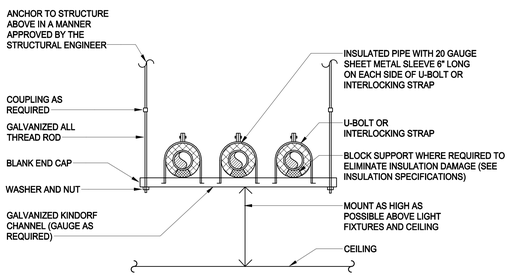
5 DETAIL - TYPICAL PIPE SLEEVE THRU INTERIOR WALL

NO SCALE



6 DETAIL - TYPICAL INDIVIDUAL PIPE SUPPORT

NO SCALE

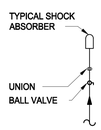


NOTES:

1. ALL PIPING SUPPORT SYSTEM COMPONENTS SHALL HAVE A NON-CORROSIVE METAL FINISH, GALV-KROM OR EQUAL.
2. COORDINATE CROSS PIPING WITH MECHANICAL PIPING ROUTED IN CORRIDORS & SPRINKLER PIPING MAINS CROSSING IN CORRIDORS.

7 DETAIL - TYPICAL TRAPEZE PIPING SUPPORT

NO SCALE



NOTE:

1. REFER TO DOMESTIC WATER RISER DIAGRAM FOR "PDI" SIZE CLASSIFICATION

8 DETAIL - TYPICAL SHOCK ABSORBER

NO SCALE

9 NOT USED

NO SCALE

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DETAILS
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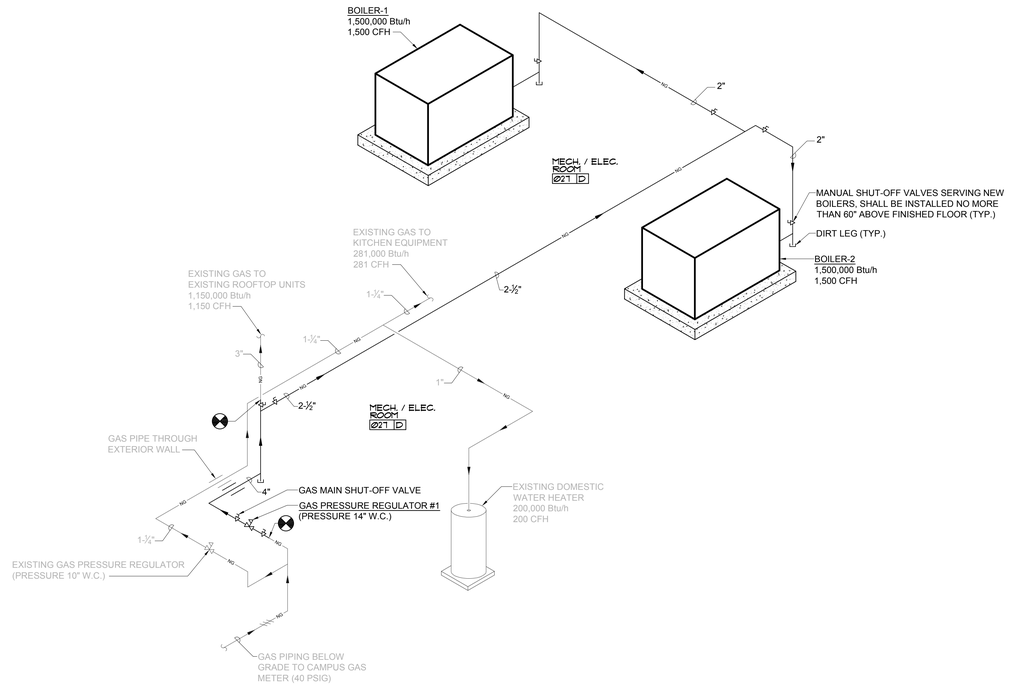
P301



NATURAL GAS SYSTEM
PIPE SIZES ARE BASED ON 1.0" W.C. PRESSURE DROP AND 320' TOTAL EQUIVALENT LENGTH

NATURAL GAS RISER DIAGRAM - MECHANICAL ROOM

SCALE: NONE

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RISERS - PLUMBING

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P401

BACKFLOW PREVENTER SCHEDULE

NO.	SERVICE	LINE SIZE (in)	MAX. PRESSURE DROP (psig)	FLOW (gpm)	REMARKS
1	CHILLED WATER MAKE-UP	1-1/2	5	20	REDUCED PRESSURE PRINCIPLE TYPE
2	HEATING WATER MAKE-UP	1-1/2	5	20	REDUCED PRESSURE PRINCIPLE TYPE

DOMESTIC WATER METER SCHEDULE

UNIT #	RUN-OUT PIPE SIZE (INCHES)	PEAK BUILDING FLOW RATE (GPM)	METER SIZE "INCHES"	MAX. PRESSURE DROP @ PEAK FLOW RATE (PSIG)	REMARKS
DWM-1	1-1/2	20	1-1/4	5	CHILLED WATER MAKE-UP
DWM-2	1-1/2	20	1-1/4	5	HEATING WATER MAKE-UP

GAS PRESSURE REGULATOR SCHEDULE

GAS REGULATOR NO.	GAS TYPE	CAPACITY (SCFH)	INLET PRESSURE (PSIG)	OUTLET PRESSURE SETPOINT (INCHES W.C.)	REMARKS
1	NATURAL	4,150	40	14"	

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SCHEDULES
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P501

ABBREVIATIONS

A	AMPERE, AMPERES	HOA	HAND-OFF-AUTOMATIC	RGS	RIGID GALVANIZED STEEL
AFF	ABOVE FINISHED FLOOR	HP	HORSEPOWER	RL	RELOCATED
AFG	ABOVE FINISHED GRADE	IDF	INTERMEDIATE DISTRIBUTION FRAME	RR	REMOVE AND RELOCATE
AHU	AIR HANDLING UNIT	IMC	INTERMEDIATE METAL CONDUIT	RX	REMOVE EXISTING
AIC	AMPERE INTERRUPTING CAPACITY	KCMIL	THOUSAND CIRCULAR MILS	SWBD	SWITCHBOARD
ATS	AUTOMATIC TRANSFER SWITCH	KVA	KILOVOLT-AMPERES	SWGR	SWITCHGEAR
AWG	AMERICAN WIRE GAUGE	KW	KILOWATT	TTB	TELEPHONE TERMINAL BOARD
C	CONDUIT	L	LOW	TYP	TYPICAL
CB	CIRCUIT BREAKER	LRA	LOCKED ROTOR AMPERES	UH	UNIT HEATER
CKT	CIRCUIT	MCA	MINIMUM CIRCUIT AMPERES	V	VOLT, VOLTS
CT	CURRENT TRANSFORMER	MCB	MAIN CIRCUIT BREAKER	UON	UNLESS OTHERWISE NOTED
DIA	DIAMETER	MCC	MOTOR CONTROL CENTER	UTP	UNSHIELDED TWISTED PAIR
DWG	DRAWING	MDF	MAIN DISTRIBUTION FRAME	UV	UNIT VENTILATOR
EC	ELECTRICAL CONTRACTOR	MLO	MAIN LUGS ONLY	VFD	VARIABLE FREQUENCY DRIVE
ECB	ENCLOSED CIRCUIT BREAKER	MPOP	MAIN POINT OF PRESENCE	VSD	VARIABLE SPEED DRIVE
EF	EXHAUST FAN	MTD	MOUNTED	VR	VANDALL RESISTANT
EPO	EMERGENCY POWER OFF	MH	MOUNTING HEIGHT/MANHOLE	W	WATTS, WIRE, WIRES
ETR	EXISTING TO REMAIN	NEC	NATIONAL ELECTRICAL CODE	WP	WEATHERPROOF
EWC	ELECTRIC WATER COOLER	NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION	XFMR	TRANSFORMER
EX	EXISTING	NFSS	NONFUSED SAFETY SWITCH		
FAAP	FIRE ALARM ANNUNCIATOR PANEL	NIC	NOT IN CONTRACT		
FACP	FIRE ALARM CONTROL PANEL	NO	NUMBER		
FLA	FULL LOAD AMPERES	OC	ON CENTERS		
FSS	FUSED SAFETY SWITCH	P	POLE, POLES		
GFEP	GROUND FAULT EQUIPMENT PROTECTION	Ø,PH	PHASE		
GFI	GROUND FAULT INTERRUPTING	PNL	PANEL		
G	GROUND	PVC	POLYVINYL CHLORIDE		
GW	GROUND WIRE	RAF	RETURN AIR FAN		
H	HIGH				

GENERAL NOTES

1. GENERAL NOTES ON THIS DRAWING SHALL APPLY TO ALL ELECTRICAL DRAWINGS ON THIS PROJECT. CAREFULLY READ ALL GENERAL NOTES PRIOR TO COMMENCEMENT OF WORK.
2. THE ELECTRICAL CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE DRAWINGS OF ALL OTHER TRADES ON THE PROJECT. ELECTRICAL OR SYSTEMS CONNECTIONS INDICATED ON ARCHITECTURAL, MECHANICAL, CIVIL, STRUCTURAL, KITCHEN AND ALL OTHER DRAWINGS WHICH ARE PART OF THIS PROJECT, SHALL BE CONSIDERED A PART OF THIS CONTRACT AND SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR AT NO EXTRA COST TO THE OWNER.
3. THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE AND AS SUCH SHALL NOT BE SCALED. REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF DEVICES AND EQUIPMENT AND DIMENSIONAL INFORMATION PRIOR TO ROUGH-IN. COORDINATE LOCATIONS OF MECHANICAL EQUIPMENT WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN OF SERVICE EQUIPMENT AND WIRING.
4. PROVIDE PROPER WORKING CLEARANCE AT ALL ELECTRICAL EQUIPMENT IN ACCORDANCE WITH 2017 NATIONAL ELECTRICAL CODE ARTICLE 110-26 SPACES ABOUT ELECTRICAL EQUIPMENT. ALL SPACES SHALL BE CONSIDERED AS CONDITION 2 OR 3. MINIMUM WORKING SPACE WIDTH SHALL BE 30 INCHES OR MATCH THE WIDTH OF THE EQUIPMENT WHICH EVER IS GREATER. IN ALL CASES WORK SPACE SHALL PERMIT AT LEAST 90 DEGREE OPENING OF EQUIPMENT DOORS OR HINGED PANELS.
5. COORDINATE MOUNTING HEIGHTS OF ALL DEVICES WITH ARCHITECTURAL PLANS, SECTIONS, ELEVATIONS AND CASEWORK DRAWINGS PRIOR TO ROUGH-IN.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT ROUTING OF WIRING AND CONDUITS AND SHALL BE RESPONSIBLE FOR SIZING ALL BRANCH CIRCUIT WIRING TO LIMIT VOLTAGE DROP TO 3%. CONTRACTOR SHALL SIZE CONDUIT TO ACCOMMODATE WIRING PER NEC. 20 AMPERE CIRCUITS SHALL BE SIZED AS FOLLOWS:

20 AMPERE CIRCUITS

120 VOLT		277 VOLT		MINIMUM CONDUIT SIZE
WIRING LENGTH	WIRE SIZE	WIRING LENGTH	WIRE SIZE	
0' - 60'	#12	0' - 130'	#12	3/4"
60' - 100'	#10	130' - 210'	#10	3/4"
100' - 150'	#8	210' - 340'	#8	3/4"
150' - 240'	#6	340' - 540'	#6	3/4"
OVER 240'	#4	OVER 540'	#4	1"

NOTES:
BRANCH CIRCUITS IN PANELBOARDS WITH 200% RATED NEUTRAL BUS, ALL DIMMED LIGHTING CIRCUITS, AND ALL CIRCUITS WITH ECM MOTORS SHALL HAVE DEDICATED NEUTRAL CONDUCTORS.

7. WIRING AND CONDUIT SIZES INDICATED IN PANEL SCHEDULES ARE MINIMUM ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING EXACT WIRING AND CONDUIT SIZES. CONTRACTOR SHALL PROVIDE SPLICE BLOCKS AND REDUCING PINS AS REQUIRED TO TERMINATE WIRING AND MAKE FINAL CONNECTIONS.
8. FEEDERS, BRANCH CIRCUITS AND TELECOMMUNICATIONS WIRING WHICH MUST BE RUN ACROSS FINISHED OPEN AREAS SHALL BE ROUTED AS DIRECTED BY THE ARCHITECT.
9. ELECTRICAL BOXES IN FIRE RATED PARTITIONS SHALL NOT EXCEED 16 SQUARE INCHES IN AREA (IF 4"x4"), SHALL BE MADE OF STEEL, AND SHALL BE SUCH THAT THE CUMULATIVE AREA OF BOX "CUTOUTS" IN THE FIREWALL DOES NOT EXCEED 100 SQUARE INCHES PER 100 SQUARE FEET OF WALL AREA. ELECTRICAL BOXES ON OPPOSITE SIDES OF THE SAME FIREWALL SHALL BE SEPARATED BY A HORIZONTAL AND VERTICAL DISTANCE OF NOT LESS THAN 24 INCHES. THE ELECTRICAL CONTRACTOR SHALL MAKE MINOR ADJUSTMENTS, AS NECESSARY, TO ELECTRICAL BOX LOCATIONS TO ENSURE COMPLIANCE WITH THIS REQUIREMENT SINCE BOX LOCATIONS ARE TYPICALLY NOT DIMENSIONED ON THE DRAWINGS. CONSULT ARCHITECT IF CLARIFICATION IS REQUIRED.

PHASING NOTES

1. ELECTRICAL WORK IN AREAS WHERE MECHANICAL AND ARCHITECTURAL WORK ARE TAKING PLACE SHALL BE PERFORMED AT THE SAME TIME. REFER TO MECHANICAL/ARCHITECTURAL DRAWINGS FOR SPECIFIC CONSTRUCTION PHASING INFORMATION.
2. PERFORM ALL ELECTRICAL WORK WITHIN THE PHASE CONSTRUCTION AREA INDICATED DURING THAT PHASE UON. ALL WORK REQUIRED TO BE ROUTED THROUGH CONSTRUCTION AREAS SERVING SUBSEQUENT PHASES SHALL BE INSTALLED DURING THE EARLIER PHASE AND CAPPED FOR FUTURE EXTENSION.

SECURITY LEGEND

SYMBOL	DESCRIPTION
WP PTZ	VIDEO SURVEILLANCE CAMERA - CEILING-MOUNTED, WALL-MOUNTED AND CORNER MOUNTED 10'-0" AFG TO BOTTOM OF DEVICE IF EXTERIOR, 7'-6" AFF TO BOTTOM OF DEVICE IF INTERIOR U.O.N.; WP DENOTES WEATHERPROOF, PTZ DENOTES PAN-TILT-ZOOM
CR	ACCESS CONTROL SYSTEM - CARD READER - M.H. 48" AFF TO TOP
X	ACCESS CONTROL SYSTEM - REQUEST TO EXIT MOTION DETECTOR - CEILING MOUNTED ABOVE DOOR
MD MD	INTRUSION DETECTION SYSTEM - MOTION DETECTOR - CEILING MOUNTED, WALL MOUNTED 7'-6' AFF U.O.N.
GB	GLASS BREAK DETECTOR - CEILING MOUNTED
KP	INTRUSION DETECTION SYSTEM - KEY PAD

GENERAL ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	BRANCH CIRCUIT CONDUIT AND WIRING CONCEALED IN CEILING OR WALL SPACE, OR SURFACE MOUNTED WHERE NO CEILING OR WALL SPACE EXISTS; REFER TO PANEL SCHEDULES FOR MINIMUM WIRE AND CONDUIT SIZES
	BRANCH CIRCUIT CONDUIT AND WIRING IN SLAB, UNDER FLOOR OR UNDERGROUND; REFER TO PANEL SCHEDULES FOR MINIMUM WIRE AND CONDUIT SIZES
	4" CONDUIT SLEEVE THROUGH WALL, LOCATED ABOVE CEILING. PROVIDE FIRE STOP AS REQUIRED.
L1A1-1	HOMERUN TO PANELBOARD - REFER TO PANEL SCHEDULES FOR MINIMUM WIRE AND CONDUIT SIZES. (NOTE: CONDUCTOR SIZE DEPENDENT ON HOMERUN LENGTH)
	EQUIPMENT CONNECTION
	CONDUIT UP
	CONDUIT DOWN
	JUNCTION BOX; CEILING, WALL MOUNTED
	ENCLOSURE OR CABINET AS NOTED
#	DRAWING NOTE - NEW WORK
#	EQUIPMENT DESIGNATION
#/E###	DETAIL REFERENCE: DETAIL NUMBER/DRAWING NUMBER
	ITEMS SHOWN DASHED/HEAVY ARE TO BE REMOVED
	ITEMS SHOWN SOLID/HEAVY ARE NEW WORK
	ITEMS SHOWN SOLID/LIGHT ARE EXISTING TO REMAIN
RL	ITEMS SHOWN DASHED/HEAVY WITH RL SUBSCRIPT ARE TO BE REMOVED AND RELOCATED. EXTEND ASSOCIATED CONDUIT AND WIRING TO NEW LOCATION AS REQUIRED.
# #	CIRCUIT NUMBERS INDICATED ADJACENT TO WIRING DEVICES AND FIXTURES INDICATE CIRCUIT DESIGNATIONS. EXTEND HOMERUNS TO DEVICES WITH SAME CIRCUIT DESIGNATIONS.
X PART PLAN NO. / X/XX DRAWING NO.	PART PLAN DESIGNATION
X VIEW DIRECTION / X SECTION NO. / X/XX DRAWING NO.	SECTION DESIGNATION

COMMUNICATIONS LEGEND

SYMBOL	DESCRIPTION
	DATA DROP - M.H. 18" A.F.F. U.O.N. - REFER TO DETAILS FOR CONFIGURATION
	VOICE DROP - M.H. 18" A.F.F. U.O.N. - REFER TO DETAILS FOR CONFIGURATION
WI	WIRELESS ACCESS POINT OUTLET - CEILING MOUNTED
S SH	PUBLIC ADDRESS SYSETM SPEAKER - CEILING-MOUNTED, WALL-MOUNTED 96" AFF U.O.N. - SUBSCRIPT H DENOTES HORN TYPE

FIRE ALARM LEGEND

SYMBOL	DESCRIPTION
FACP FACP	FIRE ALARM SYSTEM - CONTROL PANEL - SURFACE-MOUNTED, FLUSH-MOUNTED - TOP 5'-6" AFF
FAAP FAAP	FIRE ALARM SYSTEM - ANNUNCIATOR PANEL - SURFACE-MOUNTED, FLUSH-MOUNTED - TOP 5'-6" AFF
NAC NAC	FIRE ALARM SYSTEM - NAC PANEL - SURFACE-MOUNTED, FLUSH-MOUNTED - TOP 5'-6" AFF
F	FIRE ALARM - MANUAL PULL STATION - M.H. 48" TO TOP
15cd F	FIRE ALARM SYSTEM - COMBINATION HORN/FLASHING STROBE LIGHT - WALL-MOUNTED 7'-6" AFF OR 6" FROM CEILING, WHICHEVER IS LOWER, CEILING MOUNTED, NUMBER INDICATES CANDELLA RATING. IF NO CANDELA RATING IS INDICATED PROVIDE 110CD
15cd F 15cd	FIRE ALARM SYSTEM - FLASHING STROBE LIGHT - WALL-MOUNTED 7'-6" AFF OR 6" FROM CEILING, WHICHEVER IS LOWER, CEILING MOUNTED, NUMBER INDICATES CANDELLA RATING. IF NO CANDELA RATING IS INDICATED PROVIDE 110CD
SD	FIRE ALARM SYSTEM - SMOKE DETECTOR - CEILING MOUNTED, WALL MOUNTED 7'-6" AFF U.O.N.
HD	FIRE ALARM SYSTEM - HEAT DETECTOR - CEILING MOUNTED, WALL MOUNTED 7'-6" AFF U.O.N.
CO	FIRE ALARM SYSTEM - CARBON MONOXIDE DETECTOR - CEILING MOUNTED, WALL MOUNTED 18" AFF U.O.N.
FS	FIRE ALARM SYSTEM - FLOW SWITCH
TS	FIRE ALARM SYSTEM - TAMPER SWITCH
DD DD WP	FIRE ALARM SYSTEM - DUCT DETECTOR - STANDARD, WEATHERPROOF
RT	FIRE ALARM SYSTEM - DUCT DETECTOR REMOTE TEST STATION - M.H. 42" AFF TO BOTTOM, 48" AFF TO TOP
MH	FIRE ALARM SYSTEM - ADDRESSIBLE MONITOR MODULE
CH	FIRE ALARM SYSTEM - ADDRESSIBLE CONTROL MODULE

POWER LEGEND

SYMBOL	DESCRIPTION
	SINGLE RECEPTACLE - M.H. 18" AFF U.O.N.
	DUPLEX, DOUBLE DUPLEX RECEPTACLE - M.H. 18" AFF U.O.N.
	DUPLEX, DOUBLE DUPLEX RECEPTACLE - M.H. 6" ABOVE COUNTER OR 42" AFF U.O.N., 48" AFF MAX.
	DUPLEX, DOUBLE DUPLEX RECEPTACLE - GFCI TYPE - M.H. 18" AFF U.O.N.
WP WP	DUPLEX, DOUBLE DUPLEX RECEPTACLE - WEATHER-RESISTANT GFCI TYPE WITH WEATHERPROOF WHILE-IN-USE COVER - M.H. 18" AFF U.O.N.
SPR	SPECIAL PURPOSE RECEPTACLE OUTLET - NEMA CONFIGURATION AS NOTED - M.H. 18" AFF U.O.N.
	DISTRIBUTION PANELBOARD - SURFACE-MOUNTED, TOP 6-6" AFF
	PANELBOARD - SURFACE-MOUNTED, FLUSH-MOUNTED, TOP 5-6" AFF
T#	TRANSFORMER - REFER TO DRY TYPE TRANSFORMER SCHEDULE
T#	TRANSFORMER - PAD-MOUNTED
	ENCLOSURE OR CABINET AS NOTED
	ENCLOSED CIRCUIT BREAKER IN NEMA 1 ENCLOSURE U.O.N.; MOUNT 5'-6" AFF, SIZE AS NOTED
	SAFETY DISCONNECT SWITCH - FUSED, NON-FUSED IN NEMA 1 ENCLOSURE U.O.N. - MOUNT TOP 48" AFF U.O.N.; RATING AND FUSING AS NOTED
	MAGNETIC MOTOR CONTROLLER; FVNR WITH CONTROL XFMR, RED AND GREEN INDICATING LIGHTS, HOA SELECTOR SWITCH IN NEMA 1 ENCLOSURE U.O.N.; MOUNT 5'-6" AFF TO TOP U.O.N.
	COMBINATION MAGNETIC MOTOR CONTROLLER; FVNR WITH CONTROL XFMR, RED AND GREEN INDICATING LIGHTS, HOA SELECTOR SWITCH AND DISCONNECT SWITCH IN NEMA 1 ENCLOSURE U.O.N.; MOUNT 5'-6" AFF TO TOP U.O.N.
S_{L1} S_{L2}	TOGGLE SWITCH - SINGLE POLE, TWO POLE - HORSEPOWER RATED, WITH LOCKABLE HANDLE GUARD COVERPLATE - M.H. 42" AFF TO BOTTOM, 48" AFF TO TOP UON
S_M	MANUAL MOTOR CONTROLLER - SINGLE POLE, WITH H.O.A. SWITCH AND LOCKABLE HANDLE GUARD COVERPLATE IN NEMA 1 ENCLOSURE U.O.N. - M.H. 48" AFF TO TOP UON
S_M S_{33}	MANUAL MOTOR SWITCH - TWO POLE, THREE POLE - 30A, 600VAC, WITH LOCKABLE HANDLE GUARD COVERPLATE - M.H. 48" AFF TO TOP UON
S_{MD}	MOTOR DISCONNECT SWITCH - 60A, 3P, 600V WITH LOCKABLE HANDLE, M.H. 48" AFF TO TOP UON
S_{FS}	FAN SPEED CONTROL SWITCH - M.H. 48" AFF TO TOP - FURNISHED UNDER DIVISION 23, INSTALLED UNDER DIVISION 26
	TO GROUND
	EPO PUSH-BUTTON - M.H. 48" AFF TO TOP
	ELECTRIC HEAT TRACE TAPE
	ELECTRIC HEAT TRACE THERMOSTAT
SV	SOLENOID VALVE
VFD	VARIABLE FREQUENCY DRIVE - FURNISEHD UNDER DIVISION 23, INSTALLED UNDER DIVISION 26
ATC	AUTOMATIC TEMPERATURE CONTROL PANEL
SPD	SURGE PROTECTION DEVICE
	MOTOR; AS NOTED
	PUSHBUTTON - M.H. 48" AFF TO TOP UON
J	EXTERIOR IN-GRADE JUNCTION BOX

*NOTE:
1. NOT ALL ITEMS WITHIN LEGEND(S) MAY BE UTILIZED ON THIS PROJECT.

LIGHTING LEGEND

SYMBOL	DESCRIPTION
A a	LIGHTING FIXTURE - 1'x4' UPPER-CASE LETTER INDICATES FIXTURE TYPE, LOWER-CASE LETTER INDICATES SWITCH DESIGNATION (WHERE INDICATED)
A a	LIGHTING FIXTURE - 2'x4' - UPPER-CASE LETTER INDICATES FIXTURE TYPE, LOWER-CASE LETTER INDICATES SWITCH DESIGNATION (WHERE INDICATED)
A a	LIGHTING FIXTURE - 2'x2' - UPPER-CASE LETTER INDICATES FIXTURE TYPE, LOWER-CASE LETTER INDICATES SWITCH DESIGNATION (WHERE INDICATED)
	STRIP LIGHTING FIXTURE - UPPER-CASE LETTER INDICATES FIXTURE TYPE, LOWER-CASE LETTER INDICATES SWITCH DESIGNATION (WHERE INDICATED)
	WALL SCONCE LIGHTING FIXTURE - NORMAL POWER, EMERGENCY POWER - UPPER-CASE LETTER INDICATES FIXTURE TYPE, LOWER-CASE LETTER INDICATES SWITCH LEG (WHERE INDICATED)
	DOWNLIGHT LIGHTING FIXTURE - NORMAL POWER, EMERGENCY POWER - UPPER-CASE LETTER INDICATES FIXTURE TYPE, LOWER-CASE LETTER INDICATES SWITCH LEG (WHERE INDICATED)
	INDICATES LIGHTING FIXTURE [ON EMERGENCY CIRCUIT][WITH INTEGRAL EMERGENCY BATTERY BACKUP]
	EMERGENCY LIGHTING UNIT - INTEGRAL BATTERY; REMOTE HEAD - M.H. 8'-0"AFF U.O.N.
	EXIT SIGN - CEILING-MOUNTED, WALL-MOUNTED; SHADING INDICATES ILLUMINATED FACE, DIRECTIONAL ARROWS AS INDICATED/REQUIRED - EXIT SIGNS SHALL GENERALLY BE CENTERED OVER THE DOOR OPENING
	EXIT SIGN - CEILING-MOUNTED, WALL-MOUNTED; WITH INTEGRAL EMERGENCY LIGHTING HEADS
	LINE VOLTAGE TOGGLE SWITCH - SINGLE POLE, 3-WAY, 4-WAY; SUBSCRIPT INDICATES FIXTURES/OUTLETS CONTROLLED - M.H. 48" TO TOP
S S_3 S_4	LOW VOLTAGE SWITCH; SUBSCRIPT INDICATES FIXTURES/OUTLETS CONTROLLED. PROVIDE NUMBER OF SWITCHES TO MATCH SUBSCRIPT. M.H. 48" AFF TO TOP
S^D	LOW VOLTAGE DIMMER SWITCH; SUBSCRIPT INDICATES FIXTURES/OUTLETS CONTROLLED. PROVIDE NUMBER OF SWITCHES TO MATCH SUBSCRIPT. M.H. 48" AFF TO TOP
OS a OS F	OCCUPANCY SENSOR, LOW VOLTAGE DIGITAL W/ CONTROLLER, DUAL TECHNOLOGY, CEILING, WALL MOUNT 10'-0" AFF UON; SUBSCRIPT F- CORNER COVERAGE. LOWER-CASE SUBSCRIPT INDICATES FIXTURES CONTROLLED
VS a VS F	VACANCY SENSOR, LOW VOLTAGE DIGITAL W/ CONTROLLER, DUAL TECHNOLOGY, CEILING, WALL MOUNT 10'-0" AFF UON; SUBSCRIPT F- CORNER COVERAGE. LOWER-CASE SUBSCRIPT INDICATES FIXTURES CONTROLLED
OS A	OCCUPANCY SENSOR, LINE VOLTAGE, DUAL TECHNOLOGY - SINGLE LOAD, WALL SWITCH TYPE; M.H. 48" AFF TO TOP
VS A	VACANCY SENSOR, LINE VOLTAGE, DUAL TECHNOLOGY - SINGLE LOAD, WALL SWITCH TYPE; M.H. 48" AFF TO TOP
LC#	LIGHTING CONTACTOR - SEE LIGHTING CONTACTOR SCHEDULE
T/C	TIME CLOCK - SEE TIME CLOCK SCHEDULE

REVISIONS

no.	date	comments

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BID DOCUMENTS

ELECTRICAL LEGEND, ABBREVIATIONS AND CONVENTIONS

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

E001

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER	CATALOG NO.	VOLTS	INPUT WATTS	LAMP	MOUNTING	REMARKS
A1	2'X4' LED TROFFER 4" DEEP WITH CRS HOUSING, WHITE POWDERCOAT FINISH, CENTER SHIELDING WITH CURVED ACRYLIC LENS, 0-10V 1% ELECTRONIC DIMMING DRIVER	COLUMBIA	LCAT24-40LWG-ED1U	277	32.1	LED 4000K, 4617 LUMENS	RECESSED/CEILING	
A2	AS A1 BUT WITH HIGHER LUMEN OUTPUT	COLUMBIA	LCAT24-40XLG-ED1U	277	63	LED 4000K, 8367 LUMENS	RECESSED/CEILING	
B1	1'X4' LED TROFFER 4 13/16" DEEP WITH 22-GA. CRS HOUSING, WHITE POWDERCOAT FINISH, ACRYLIC LENS, ELECTRONIC NON-DIMMING DRIVER	COLUMBIA	LJT14-40LWG-FS-A12125-EU	277	34	LED 4000K, 3824 LUMENS	RECESSED/CEILING	
C1	2'X2' LED TROFFER 4" DEEP WITH CRS HOUSING, WHITE POWDERCOAT FINISH, CENTER SHIELDING WITH CURVED ACRYLIC LENS, ELECTRONIC NON-DIMMING DRIVER	COLUMBIA	LCAT22-40MLG-EU	277	25.8	LED 4000K, 3532 LUMENS	RECESSED/CEILING	
D1	4' LENGTH SUSPENDED LINEAR DIRECT LED FIXTURE, WITH CRS HOUSING, FROSTED PRISMATIC ACRYLIC LENS, AND ELECTRONIC NON-DIMMING DRIVER	COLUMBIA	LCL4-40ML-EU	277	42	LED 4000K, 5411 LUMENS	SUSPENDED 9' AFF UON	
EXIT	LED EMERGENCY EXIT SIGN WITH FLAME RESISTANT UV PROTECTED THERMOPLASTIC HOUSING, RED STENCIL LETTERS AND DIRECTIONAL CHEVRON KNOCKOUTS, WHITE FINISH, SINGLE OR TWIN FACE AND UNIVERSAL MOUNTING AS INDICATED, VANDAL SHIELD, NI-CAD BATTERY	COMPASS	CER	277	1.9	LED ARRAY	UNIVERSAL	

LIGHTING FIXTURE SCHEDULE NOTES

1. COORDINATE LIGHTING FIXTURES INDICATED ON DRAWINGS WITH ARCHITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS FOR EXACT LOCATIONS. VERIFY CEILING CONSTRUCTION IN ALL AREAS WITH ARCHITECTURAL DRAWINGS AND PROVIDE ALL MOUNTING FRAMES AND HARDWARE AS REQUIRED FOR A COMPLETE INSTALLATION, SUITABLE FOR THE CEILING TYPE AND CONFIGURATION.
2. REFER TO INTERIOR/EXTERIOR LIGHTING SPECIFICATIONS FOR ADDITIONAL LAMP AND DRIVER INFORMATION. PROVIDE DRIVERS FOR VOLTAGE AS INDICATED.
3. FIRST NAMED PRODUCT IS BASIS OF DESIGN. PROVIDE PRODUCTS WHICH INCLUDE ALL FEATURES AND ACCESSORIES AS INDICATED IN THE DESCRIPTION AND MODEL NUMBER OF THE BASIS OF DESIGN PRODUCT.
4. ALTERNATE MANUFACTURERS INCLUDE, BUT ARE NOT LIMITED TO, THOSE LISTED BELOW. BEING LISTED DOES NOT GUARANTEE APPROVAL OF SUBMITTED FIXTURES; FIXTURE MUST COMPLY WITH PROJECT REQUIREMENTS AND MEET OR EXCEED BASIS OF DESIGN FIXTURE PERFORMANCE.
5. FIXTURES WITH "D" SUFFIX SHALL BE CONTROLLED BY LIGHT LEVEL SENSOR FOR DAYLIGHT HARVESTING.
6. FIXTURES WITH "E" SUFFIX SHALL BE PROVIDED WITH INTEGRAL UL 924 EMERGENCY LIGHTING TRANSFER RELAY.
7. ALL FINISH SELECTIONS SHALL BE AS APPROVED BY THE ARCHITECT. COLOR TO BE SELECTED FROM THE MANUFACTURER'S FULL RANGE, INCLUDING CUSTOM COLOR AS NOTED.
8. MOUNTING HEIGHTS ARE TO THE BOTTOM OF THE FIXTURE UNLESS OTHERWISE NOTED.
9. FIXTURES INDICATED AS EMERGENCY (SHADED) SHALL BE PROVIDED WITH INTEGRAL EMERGENCY BATTERY, 10-WATT MINIMUM CAPACITY.

LIGHTING CONTROL MATRIX

	AUTO ON	MANUAL ON	AUTO OFF	DELAY TIME	DIMMING	TIME SCHEDULE ON	TIME SCHEDULE OFF	SPECIAL COMMENTS
GENERAL CLASSROOMS		Y	Y	20	Y			
OPEN OFFICE	Y		Y	20	Y AUTO-ON TO 50%			SEPARATE CONTROL FOR EACH LIGHTING ZONE.
ENCLOSED OFFICE		Y	Y	15	Y			WALL SWITCH SENSORS
STORAGE ROOMS		Y	Y	10	N			WALL SWITCH SENSORS
RESTROOMS (GANG)	Y		Y	20	N			KEYED WALL SWITCHES.
RESTROOMS (SINGLE)	Y		Y	15	N			WALL SWITCH SENSORS
MECHANICAL/ ELECTRICAL ROOMS					N			TOGGLE SWITCHES
CORRIDORS	Y		Y	15	N			ACTIVATION OF FIRE ALARM SYSTEM SHALL TURN LIGHTING 'ON' TO 100%.
INTERIOR INTEGRAL EMERGENCY LIGHTING	CONTROLLED WITH NORMAL LIGHTS - REFER TO DETAILS				WHERE INDICATED			ACTIVATION OF FIRE ALARM SYSTEM SHALL TURN LIGHTING 'ON' TO 100%.

REVISIONS

no.	date	comments

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BID DOCUMENTS

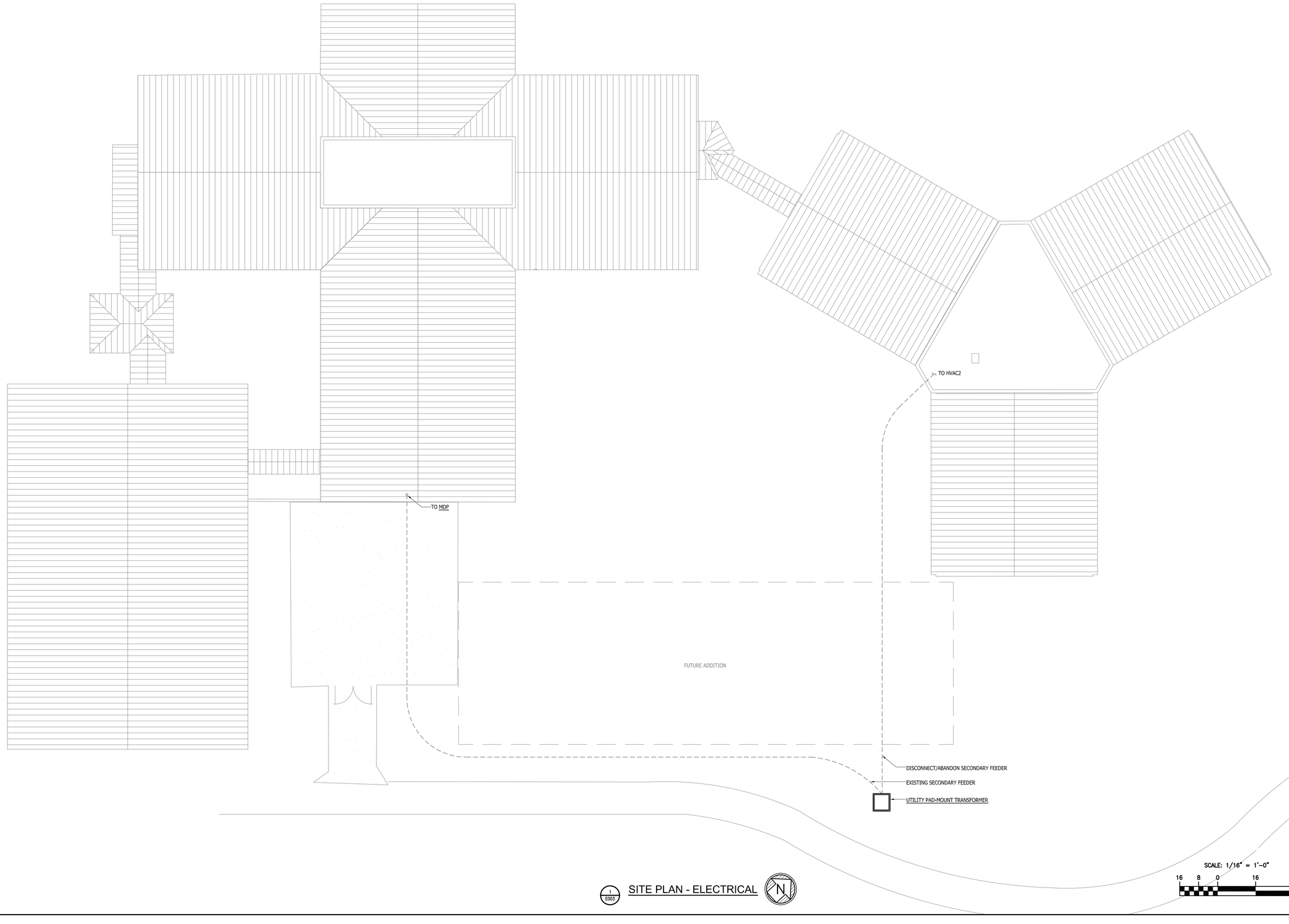
LIGHTING FIXTURE SCHEDULE AND LIGHTING CONTROL MATRIX

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

E002

GENERAL NOTES
(APPLY TO THIS DRAWING ONLY)

1. MAINTAIN EXISTING SECONDARY FEEDER FOR RECONNECTION TO NEW PAD-MOUNT TRANSFORMER.
2. COORDINATE WITH UTILITY FOR REPLACEMENT OF EXISTING PAD-MOUNT TRANSFORMER. REMOVE EXISTING PAD AND PROVIDE LARGER PAD AS REQUIRED, IN ACCORDANCE WITH UTILITY REQUIREMENTS.



1 E003 SITE PLAN - ELECTRICAL

SCALE: 1/16" = 1'-0"
16 8 0 16 32

REVISIONS

no.	date	comments

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SITE PLAN
ELECTRICAL

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

E003

DEMOLITION NOTES
(APPLY TO THIS DRAWING ONLY)

1. DEMOLITION DRAWINGS ARE DIAGRAMMATIC IN NATURE; NO ATTEMPT HAS BEEN MADE TO SHOW ALL EXISTING ELECTRICAL WORK. IN AREAS INDICATED TO BE RENOVATED, ALL EXISTING ELECTRICAL WORK SHALL REMAIN UNLESS OTHERWISE NOTED. WHEN AN ITEM IS INDICATED TO BE REMOVED, REMOVE ALL ASSOCIATED ELECTRICAL WORK BACK TO POINT OF SOURCE UNLESS OTHERWISE NOTED. DISCONNECT AND REMOVE ELECTRICAL WORK ASSOCIATED WITH HVAC EQUIPMENT INDICATED TO BE REMOVED. REMOVAL OF EQUIPMENT SHALL BE BY OTHERS.
2. WHERE WORK PASSES THROUGH THE RENOVATION AREA TO SERVE OTHER PORTIONS OF THE BUILDING, OR WORK IN THE REMOVATION AREA IS INDICATED TO REMAIN, IT SHALL BE SUITABLY RELOCATED AND THE SYSTEMS RESTROED TO NORMAL. COORDINATE ANY OUTAGES WITH OWNER 7 DAYS IN ADVANCE.
3. WORK INDICATED TO REMAIN SHALL BE SUITABLY PROTECTED AGAINST DAMAGE.

GENERAL NOTES:
(APPLY TO ALL DEMOLITION DRAWINGS)

1. HVAC UNITS INDICATED TO BE REMOVED WILL BE REMOVED UNDER MECH DIVISION. REMOVE ASSOCIATED ELECTRICAL WORK BACK TO POINT OF SOURCE.
2. REMOVE AND STORE EXISTING LIGHTS AND OTHER CEILING MOUNTED DEVICES AS REQUIRED TO ACCOMODATE MECHANICAL WORK. REINSTALL AFTER MECHANICAL WORK IS COMPLETE UON. GENERAL SCOPE IS INDICATED.
3. WHERE LIGHTING FIXTURES ARE INDICATED TO BE REMOVED, MAINTAIN EX CIRCUIT FOR RECONNECTION TO NEW FIXTURE IN SAME LOCATION.

WEST COURTYARD

EAST COURTYARD

MATCHLINE SEE ED101B

REINSTALL ON NEW BULKHEAD

REINSTALL ON NEW BULKHEAD

RELOCATE

RELOCATE AS REQUIRED TO SUIT NEW CHW PIPING

CONDENSING UNIT

EVAPORATOR

TTB/FODE DATA RACK

1 ED101A — PARTIAL FIRST FLOOR PLAN - AREA A
ELECTRICAL - DEMOLITION

KEY PLAN

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

8 0 8 16

REVISIONS

no.	date	comments

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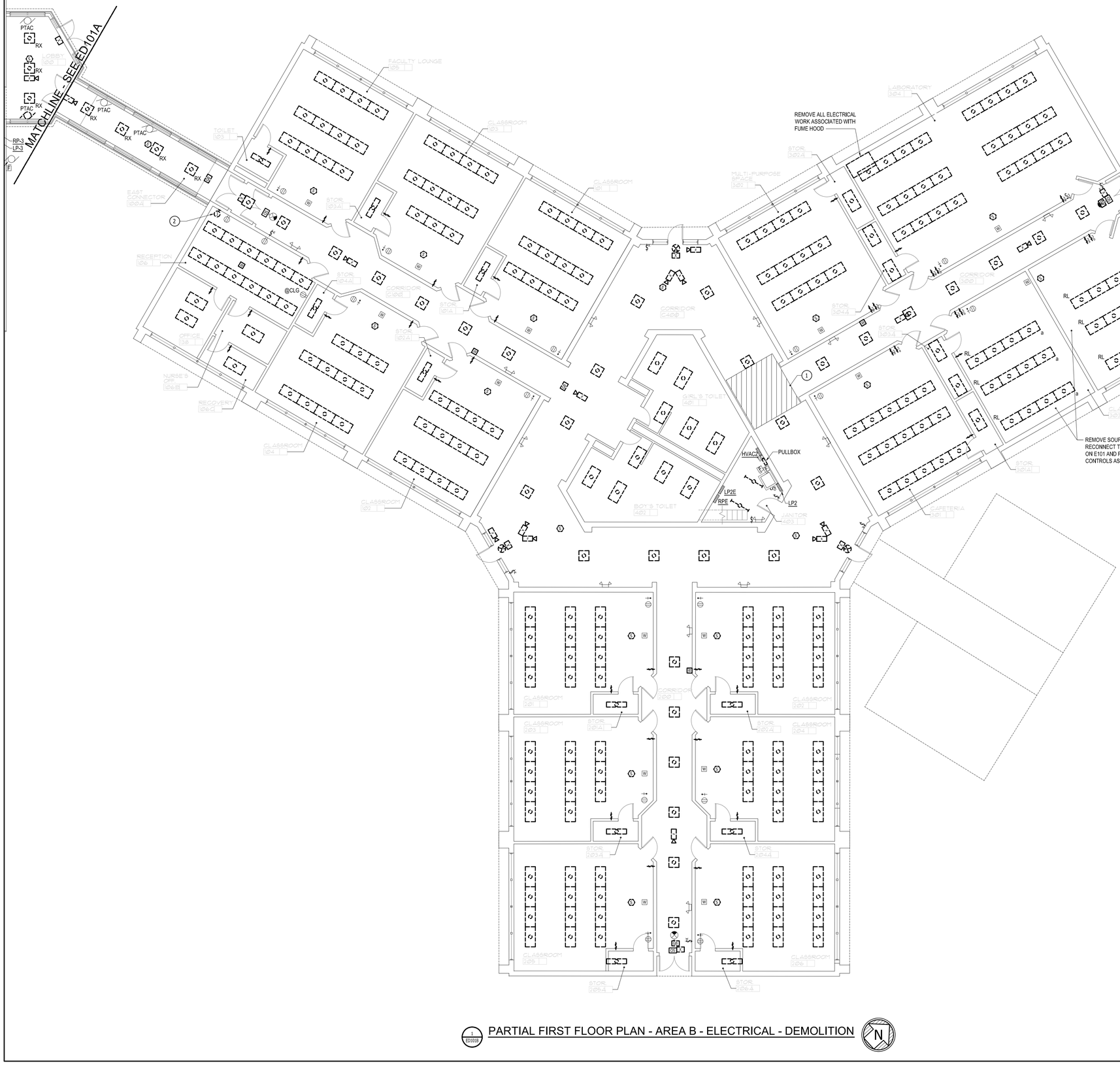
PARTIAL FIRST FLOOR PLAN - AREA A ELECTRICAL DEMOLITION

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

ED101A



1 ED101B PARTIAL FIRST FLOOR PLAN - AREA B - ELECTRICAL - DEMOLITION

GENERAL NOTES:
(APPLY TO ALL DEMOLITION DRAWINGS)

1. HVAC UNITS INDICATED TO BE REMOVED WILL BE REMOVED UNDER MECH DIVISION. REMOVE ASSOCIATED ELECTRICAL WORK BACK TO POINT OF SOURCE.
2. REMOVE AND STORE EXISTING LIGHTS AND OTHER CEILING MOUNTED DEVICES AS REQUIRED TO ACCOMODATE MECHANICAL WORK. REINSTALL AFTER MECHANICAL WORK IS COMPLETE UON. GENERAL SCOPE IS INDICATED.
3. REMOVE EXISTING LIGHTING AND CONTROLS IN SPACES OTHER THAN CORRIDORS.
4. REMOVE AND RELOCATE SPEAKERS IN CLASSROOMS TO LOWER HEIGHT. REFER TO PHOTO. EXTEND ASSOCIATED CONDUIT AND WIRING AS REQUIRED.

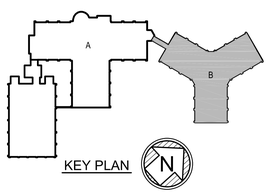
DEMOLITION NOTES
(APPLY TO THIS DRAWING ONLY)

1. DEMOLITION DRAWINGS ARE DIAGRAMMATIC IN NATURE; NO ATTEMPT HAS BEEN MADE TO SHOW ALL EXISTING ELECTRICAL WORK. IN AREAS INDICATED TO BE RENOVATED, ALL EXISTING ELECTRICAL WORK SHALL REMAIN UNLESS OTHERWISE NOTED. WHEN AN ITEM IS INDICATED TO BE REMOVED, REMOVE ALL ASSOCIATED ELECTRICAL WORK BACK TO POINT OF SOURCE UNLESS OTHERWISE NOTED. DISCONNECT AND REMOVE ELECTRICAL WORK ASSOCIATED WITH HVAC EQUIPMENT INDICATED TO BE REMOVED. REMOVAL OF EQUIPMENT SHALL BE BY OTHERS.
2. WHERE WORK PASSES THROUGH THE RENOVATION AREA TO SERVE OTHER PORTIONS OF THE BUILDING, OR WORK IN THE REMOVATION AREA IS INDICATED TO REMAIN, IT SHALL BE SUITABLY RELOCATED AND THE SYSTEMS RESTROED TO NORMAL. COORDINATE ANY OUTAGES WITH OWNER 7 DAYS IN ADVANCE.
3. WORK INDICATED TO REMAIN SHALL BE SUITABLY PROTECTED AGAINST DAMAGE.

DRAWING NOTES
(APPLY TO THIS DRAWING ONLY)

1. REMOVE AND REINSTALL ALL EXISTING ELECTRICAL WORK IN THIS AREA ABOVE CEILING AS REQUIRED FOR HVAC EQUIPMENT ACCESS TO MEZZANINE. REFER TO MECHANICAL DRAWINGS.
2. REMOVE SURFACE MOUNTED JB AND RACEWAY WITH ASSOCIATED WIRING IN WAY OF NEW SHAFT. PROVIDE NEW, ROUTED AS REQUIRED, TO ACCOMODATE NEW SHAFT CONSTRUCTION

PHOTO
TYPICAL CLASSROOM PA SPEAKER
NO SCALE



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

8 0 8 16

REVISIONS

no.	date	comments

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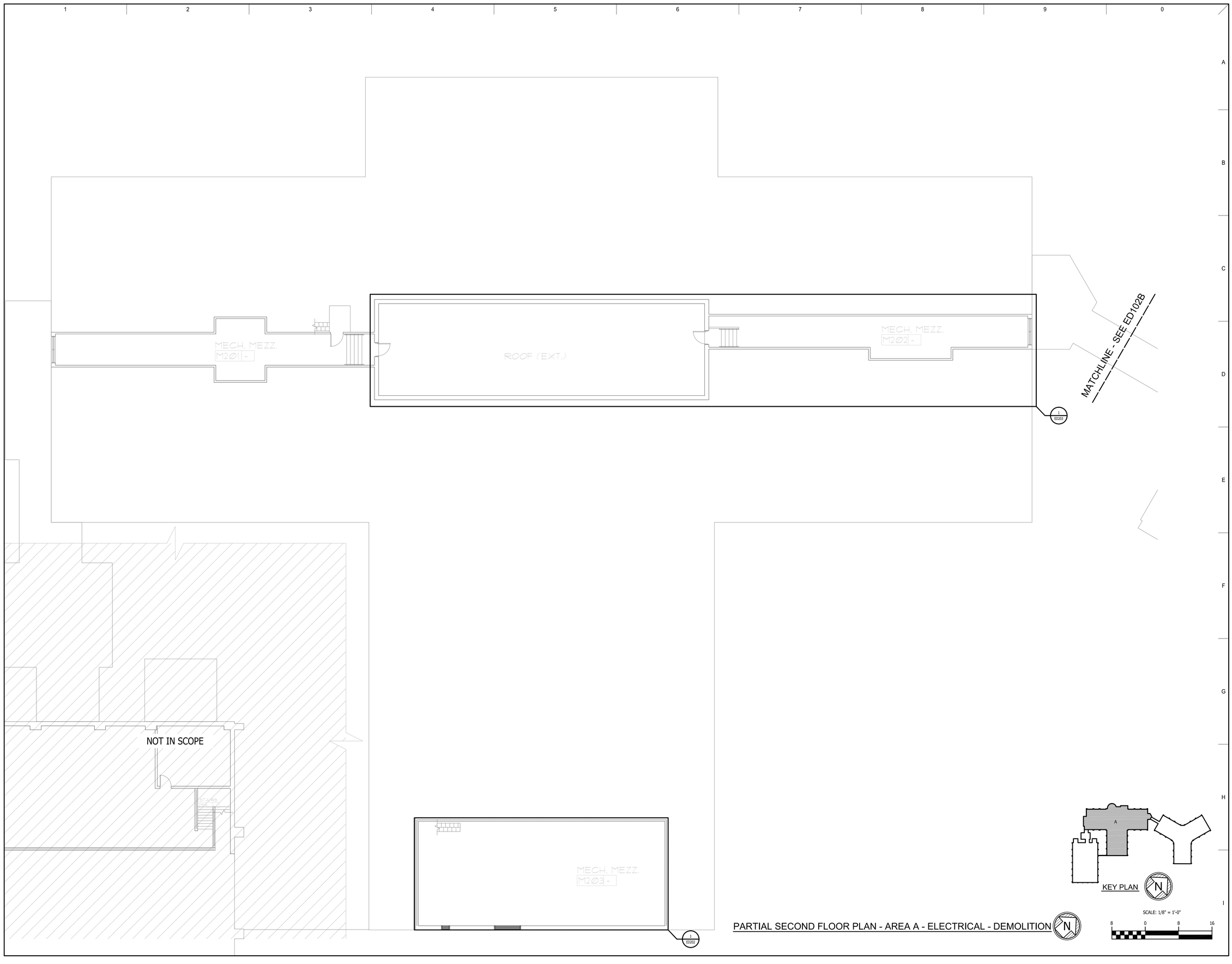
SUBMISSION
BID DOCUMENTS

PARTIAL FIRST FLOOR PLAN - AREA B ELECTRICAL DEMOLITION

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

ED101B



PARTIAL SECOND FLOOR PLAN - AREA A - ELECTRICAL - DEMOLITION

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

8 0 8 16

REVISIONS

no.	date	comments

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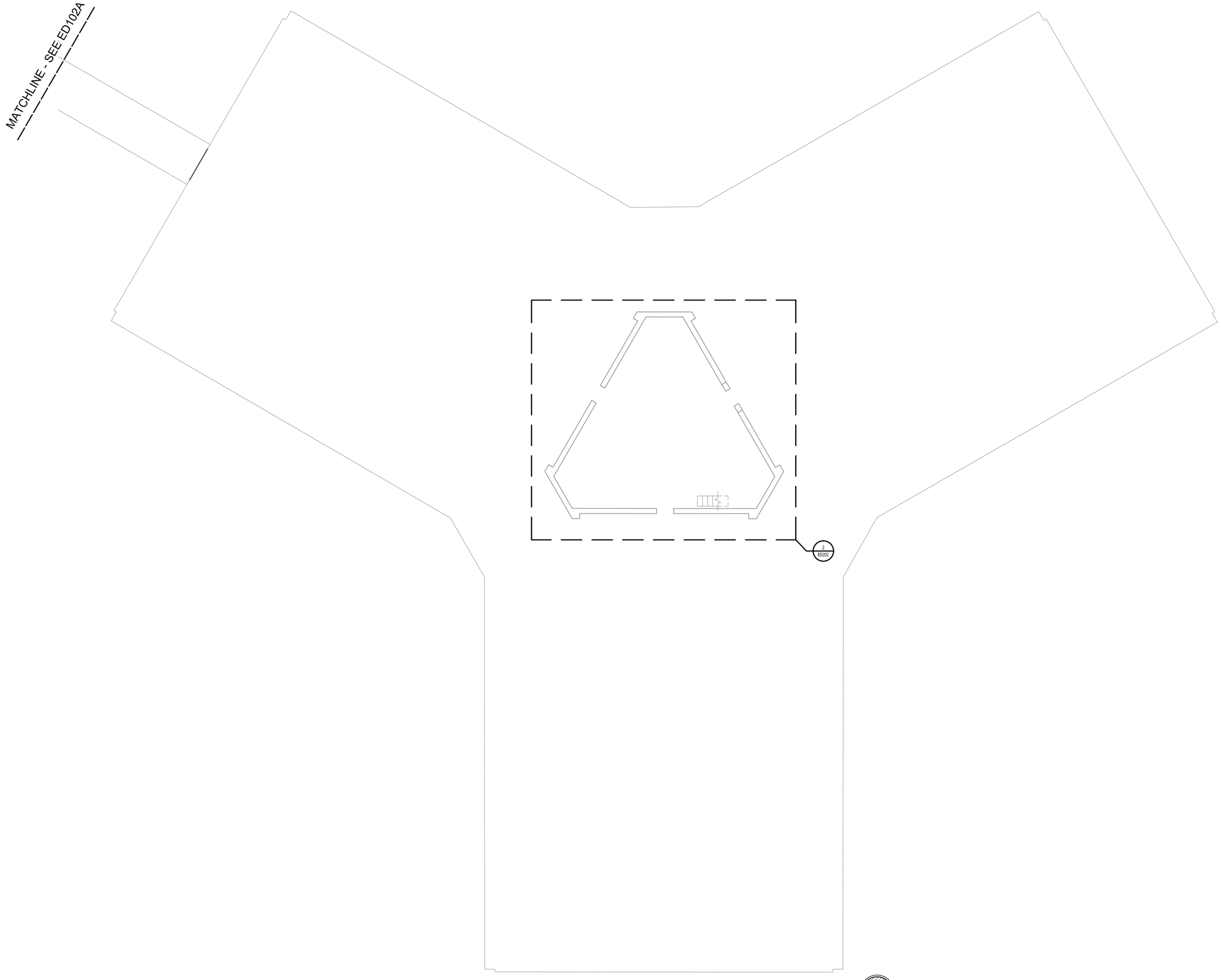
BID DOCUMENTS

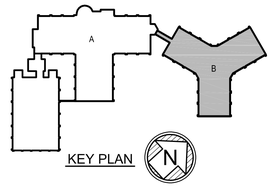
PARTIAL SECOND FLOOR PLAN AREA A ELECTRICAL DEMOLITION

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

ED102A



1 ED102B PARTIAL SECOND FLOOR PLAN - AREA B - ELECTRICAL - DEMOLITION



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

8 0 8 16

REVISIONS

no.	date	comments

ENGINEER

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SEAL

DANA M DIXON LICENSE No. 17123 PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF DELAWARE, LICENSE No. 17123, EXPIRATION DATE: 06/30/2026.

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Project No. 2024-21

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Structural Engineers
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HVAC RENOVATIONS
SRS 2503
MAGNOLIA MIDDLE SCHOOL
133 THOMAS MORE DR,
MAGNOLIA, DE 19962

SUBMISSION

BID DOCUMENTS

PARTIAL SECOND FLOOR PLAN
AREA B
ELECTRICAL
DEMOLITION

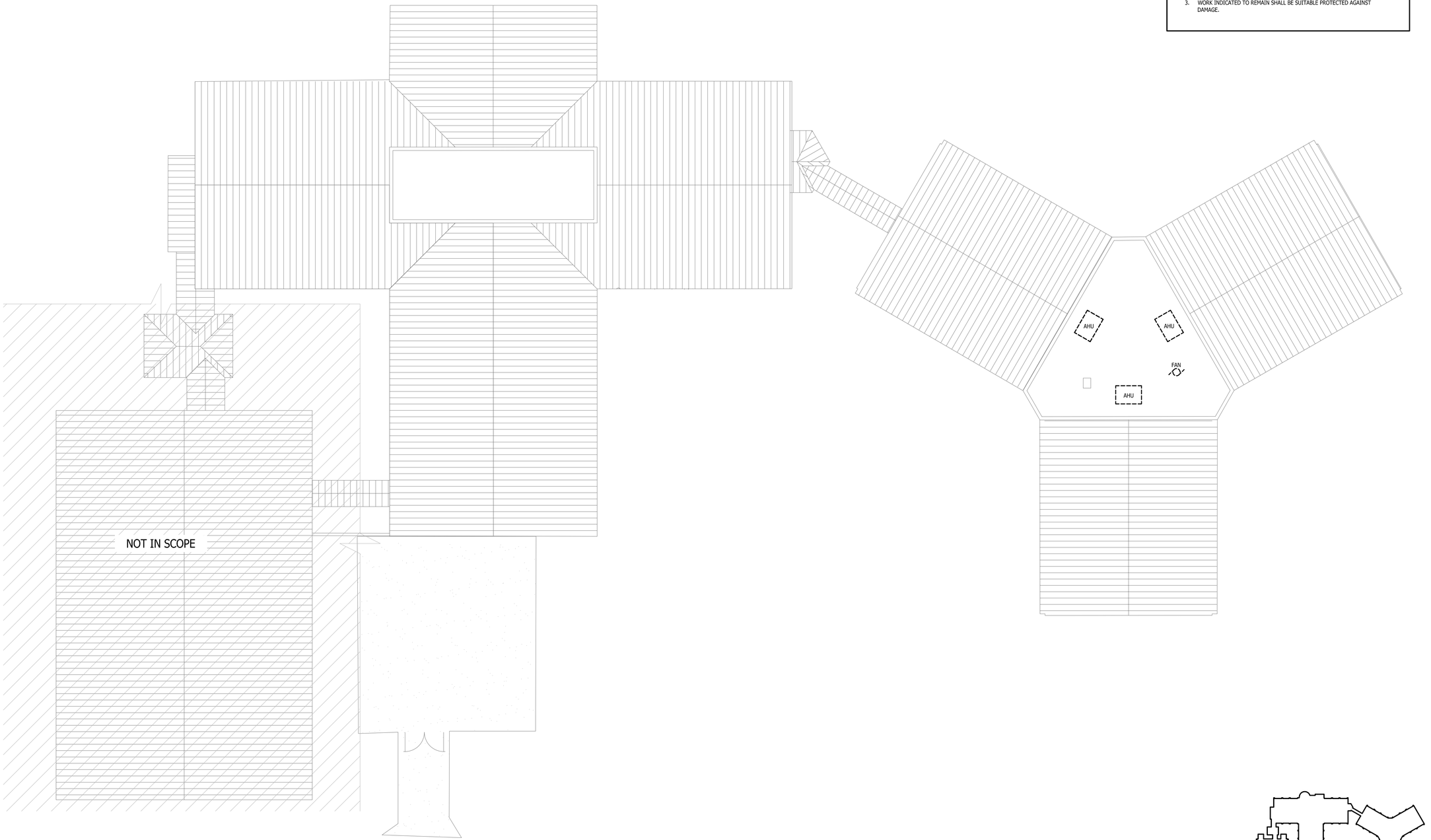
DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

ED102B

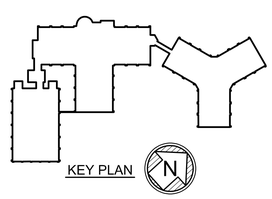
DEMOLITION NOTES

(APPLY TO THIS DRAWING ONLY)

1. DEMOLITION DRAWINGS ARE DIAGRAMMATIC IN NATURE; NO ATTEMPT HAS BEEN MADE TO SHOW ALL EXISTING ELECTRICAL WORK. IN AREAS INDICATED TO BE RENOVATED, ALL EXISTING ELECTRICAL WORK SHALL REMAIN UNLESS OTHERWISE NOTED. WHEN AN ITEM IS INDICATED TO BE REMOVED, REMOVE ALL ASSOCIATED ELECTRICAL WORK BACK TO POINT OF SOURCE UNLESS OTHERWISE NOTED. DISCONNECT AND REMOVE ELECTRICAL WORK ASSOCIATED WITH HVAC EQUIPMENT INDICATED TO BE REMOVED. REMOVAL OF EQUIPMENT SHALL BE BY OTHERS.
2. WHERE WORK PASSES THROUGH THE RENOVATION AREA TO SERVE OTHER PORTIONS OF THE BUILDING, OR WORK IN THE REMOVATION AREA IS INDICATED TO REMAIN, IT SHALL BE SUITABLY RELOCATED AND THE SYSTEMS RESTROED TO NORMAL. COORDINATE ANY OUTAGES WITH OWNER 7 DAYS IN ADVANCE.
3. WORK INDICATED TO REMAIN SHALL BE SUITABLE PROTECTED AGAINST DAMAGE.



KEY PLAN



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

16 8 0 16 32

1 ED103 ROOF PLAN - ELECTRICAL - DEMOLITION

REVISIONS

no.	date	comments

ENGINEER

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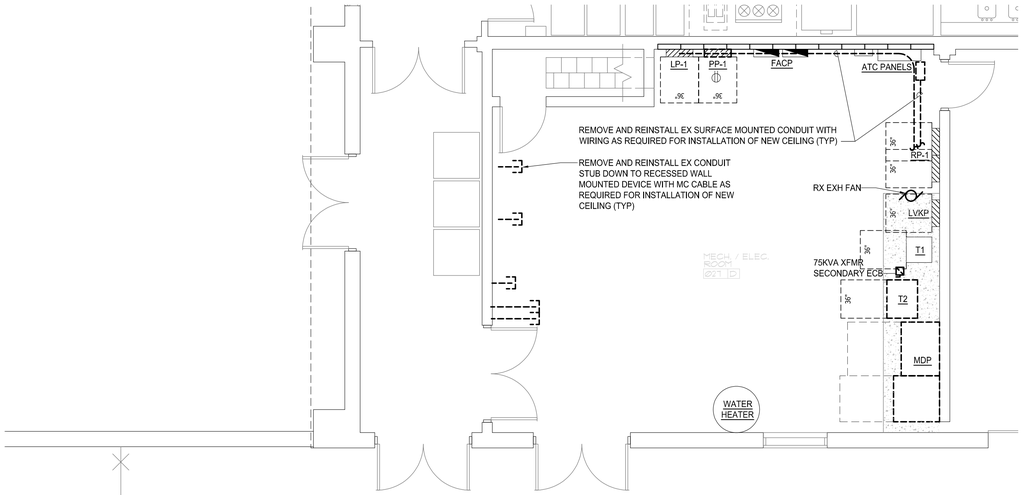
SUBMISSION

BID DOCUMENTS

ROOF PLAN
ELECTRICAL
DEMOLITION

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

ED103



1 ED201 MECHANICAL ROOM PART PLAN - ELECTRICAL - DEMOLITION

DEMOLITION NOTES

(APPLY TO THIS DRAWING ONLY)

1. DEMOLITION DRAWINGS ARE DIAGRAMMATIC IN NATURE; NO ATTEMPT HAS BEEN MADE TO SHOW ALL EXISTING ELECTRICAL WORK. IN AREAS INDICATED TO BE RENOVATED, ALL EXISTING ELECTRICAL WORK SHALL REMAIN UNLESS OTHERWISE NOTED. WHEN AN ITEM IS INDICATED TO BE REMOVED, REMOVE ALL ASSOCIATED ELECTRICAL WORK BACK TO POINT OF SOURCE UNLESS OTHERWISE NOTED. DISCONNECT AND REMOVE ELECTRICAL WORK ASSOCIATED WITH HVAC EQUIPMENT INDICATED TO BE REMOVED. REMOVAL OF EQUIPMENT SHALL BE BY OTHERS.
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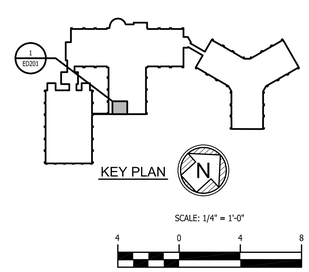
3. WORK INDICATED TO REMAIN SHALL BE SUITABLY PROTECTED AGAINST DAMAGE.



SCALE: 1/4" = 1'-0"

4 0 4 8

REVISIONS

no.	date	comments

ENGINEER

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DYNA M DIXON LICENSE No. 17123 PROFESSIONAL ENGINEER

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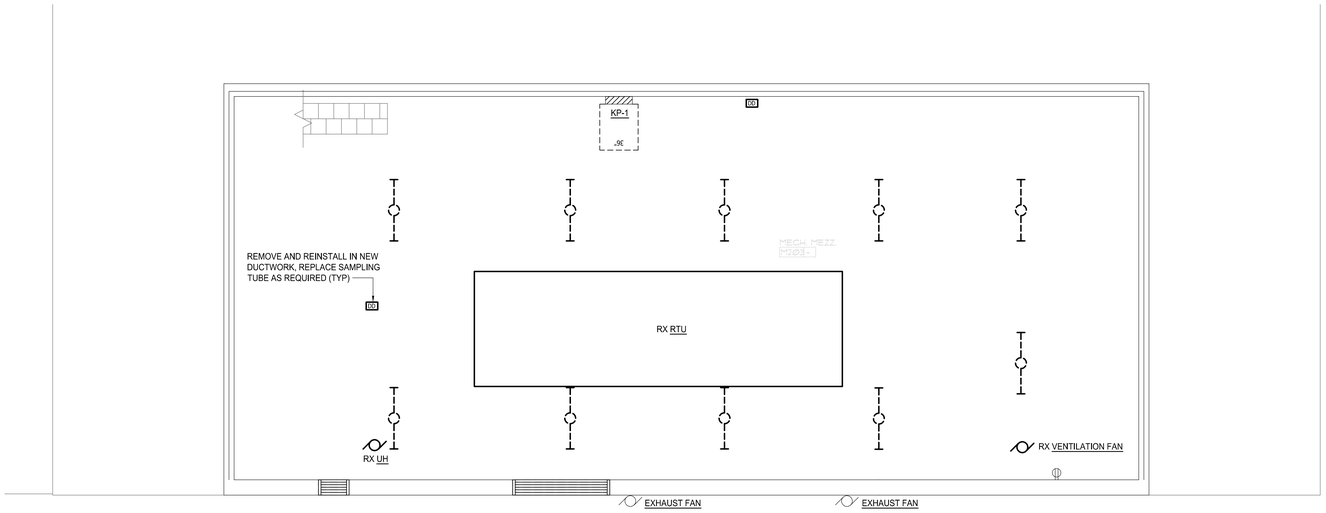
SUBMISSION

BID DOCUMENTS

MECHANICAL ROOM PART PLAN ELECTRICAL DEMOLITION

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

ED201



1 ED202 MEZZANINE PART PLAN - ELECTRICAL - DEMOLITION

DEMOLITION NOTES
(APPLY TO THIS DRAWING ONLY)

1. DEMOLITION DRAWINGS ARE DIAGRAMMATIC IN NATURE: NO ATTEMPT HAS BEEN MADE TO SHOW ALL EXISTING ELECTRICAL WORK. IN AREAS INDICATED TO BE RENOVATED, ALL EXISTING ELECTRICAL WORK SHALL REMAIN UNLESS OTHERWISE NOTED. WHEN AN ITEM IS INDICATED TO BE REMOVED, REMOVE ALL ASSOCIATED ELECTRICAL WORK BACK TO POINT OF SOURCE UNLESS OTHERWISE NOTED. DISCONNECT AND REMOVE ELECTRICAL WORK ASSOCIATED WITH HVAC EQUIPMENT INDICATED TO BE REMOVED. REMOVAL OF EQUIPMENT SHALL BE BY OTHERS.
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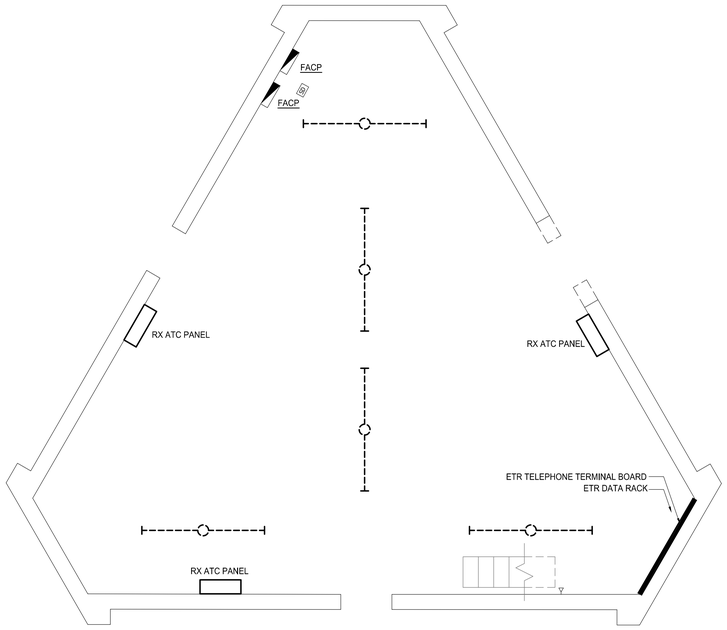
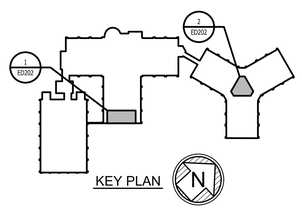
3. WORK INDICATED TO REMAIN SHALL BE SUITABLY PROTECTED AGAINST DAMAGE.



2 ED202 MEZZANINE PART PLAN - ELECTRICAL - DEMOLITION



SCALE: 1/4" = 1'-0"

4 0 4 8

REVISIONS

no.	date	comments

ENGINEER

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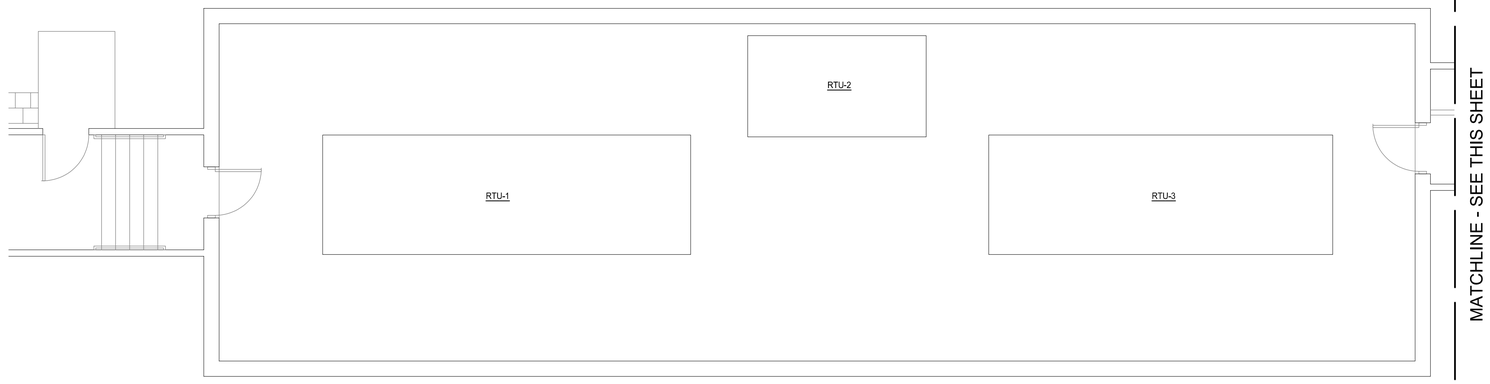
SUBMISSION

BID DOCUMENTS

MEZZANINE PART PLANS
ELECTRICAL
DEMOLITION

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

ED202



DEMOLITION NOTES
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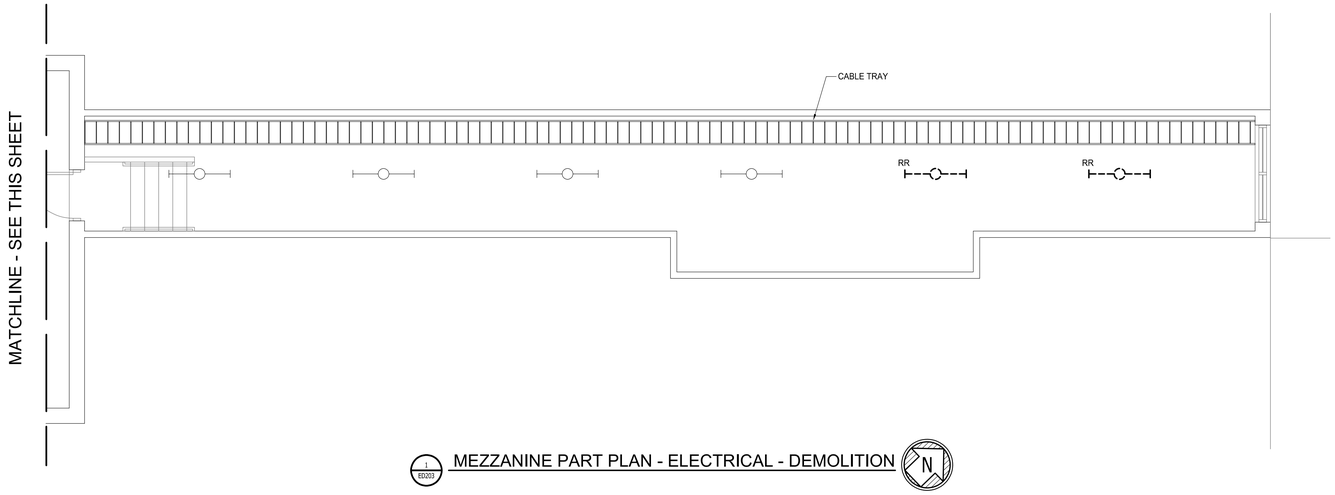
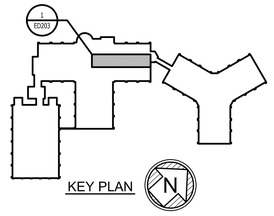
3. WORK INDICATED TO REMAIN SHALL BE SUITABLY PROTECTED AGAINST DAMAGE.



1 / ED203 MEZZANINE PART PLAN - ELECTRICAL - DEMOLITION



SCALE: 1/4" = 1'-0"

4 0 4 8

REVISIONS

no.	date	comments

ENGINEER

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SEAL

DINA M. DIXON LICENSE No. 17123 PROFESSIONAL ENGINEER

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HVAC RENOVATIONS
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MAGNOLIA, DE 19962

SUBMISSION

BID DOCUMENTS

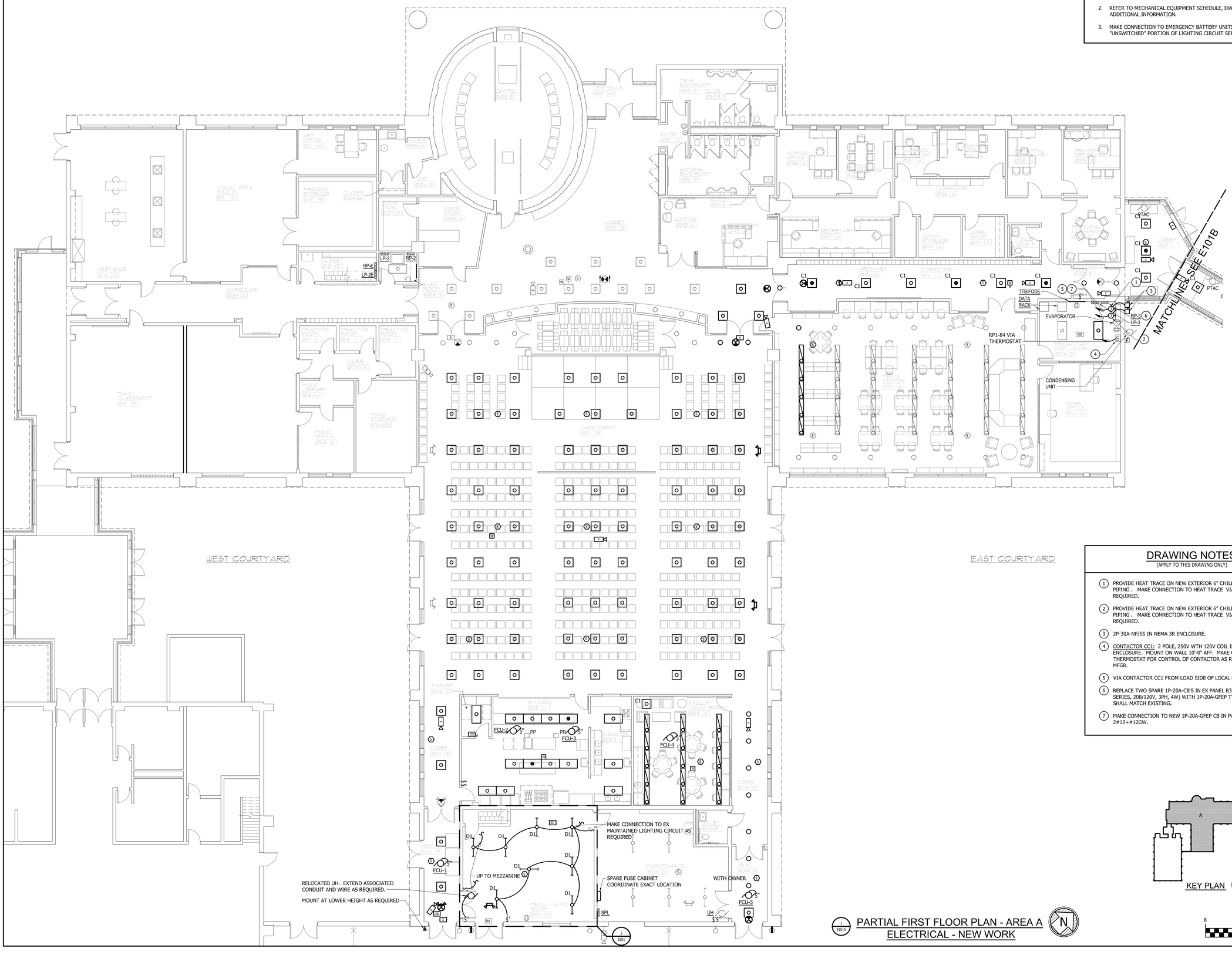
MEZZANINE PART PLANS
ELECTRICAL
DEMOLITION

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

ED203

GENERAL NOTES:
(APPLY TO ALL NEW WORK DRAWINGS)

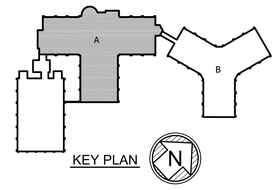
1. REINSTALL EXISTING CEILING MOUNTED DEVICES REMOVED TO ACCOMODATE NEW CEILINGS/HVAC WORK AS REQUIRED. REFER TO DEMOLITION DRAWINGS.
2. REFER TO MECHANICAL EQUIPMENT SCHEDULE, DWG. E402, FOR ADDITIONAL INFORMATION.
3. MAKE CONNECTION TO EMERGENCY BATTERY UNITS AND DRIVERS FROM "UNSWITCHED" PORTION OF LIGHTING CIRCUIT SERVING THE ROOM.



DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. PROVIDE HEAT TRACE ON NEW EXTERIOR 6" CHILLED WATER SUPPLY PIPING . MAKE CONNECTION TO HEAT TRACE VIA DISCONNECT AS REQUIRED.
2. PROVIDE HEAT TRACE ON NEW EXTERIOR 6" CHILLED WATER RETURN PIPING . MAKE CONNECTION TO HEAT TRACE VIA DISCONNECT AS REQUIRED.
3. 2P-30A-NF/SS IN NEMA 3R ENCLOSURE.
4. CONTACTOR CC1: 2 POLE, 250V WTH 120V COIL IN NEMA 1 ENCLOSURE. MOUNT ON WALL 10'-0" AFF. MAKE CONNECTION TO THERMOSTAT FOR CONTROL OF CONTACTOR AS REQUIRED BY SYSTEM MFGR.
5. VIA CONTACTOR CC1 FROM LOAD SIDE OF LOCAL DISCONNECT.
6. REPLACE TWO SPARE 1P-20A-CB'S IN EX PANEL R3 (GENERAL ELEC A SERIES, 208/120V, 3PH, 4W) WITH 1P-20A-GFEP TYPE CB'S. NEW CB'S SHALL MATCH EXISTING.
7. MAKE CONNECTION TO NEW 1P-20A-GFEP CB IN PANEL R3 WITH 2#12+#12GW.

1 E101A — PARTIAL FIRST FLOOR PLAN - AREA A
ELECTRICAL - NEW WORK



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

8 0 8 16

REVISIONS

no.	date	comments

ENGINEER

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SUBMISSION

BID DOCUMENTS

PARTIAL FIRST FLOOR PLAN - AREA A
ELECTRICAL
NEW WORK

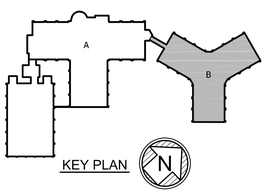
DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

E101A

GENERAL NOTES:
(APPLY TO ALL NEW WORK DRAWINGS)

1. REINSTALL EXISTING CEILING MOUNTED DEVICES REMOVED TO ACCOMODATE NEW CEILINGS/HVAC WORK AS REQUIRED. REFER TO DEMOLITION DRAWINGS.
2. REFER TO MECHANICAL EQUIPMENT SCHEDULE, DWG. E402, FOR ADDITIONAL INFORMATION.
3. RELOCATE SPEAKERS IN CLASSROOMS. REFER TO DEMOLITION DRAWINGS.
4. MAKE CONNECTION TO EMERGENCY BATTERY UNITS AND DRIVERS FROM "UNSWITCHED" PORTION OF LIGHTING CIRCUIT SERVING THE ROOM.

PARTIAL FIRST FLOOR PLAN - AREA B - ELECTRICAL - NEW WORK



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

8 0 8 16

REVISIONS

no.	date	comments

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WO# 24008B

SEAL

DINA M. DIXON — LICENSE — No. 17123 — DELAWARE — PROFESSIONAL ENGINEER

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HVAC RENOVATIONS
SRS 2503

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MAGNOLIA, DE 19962

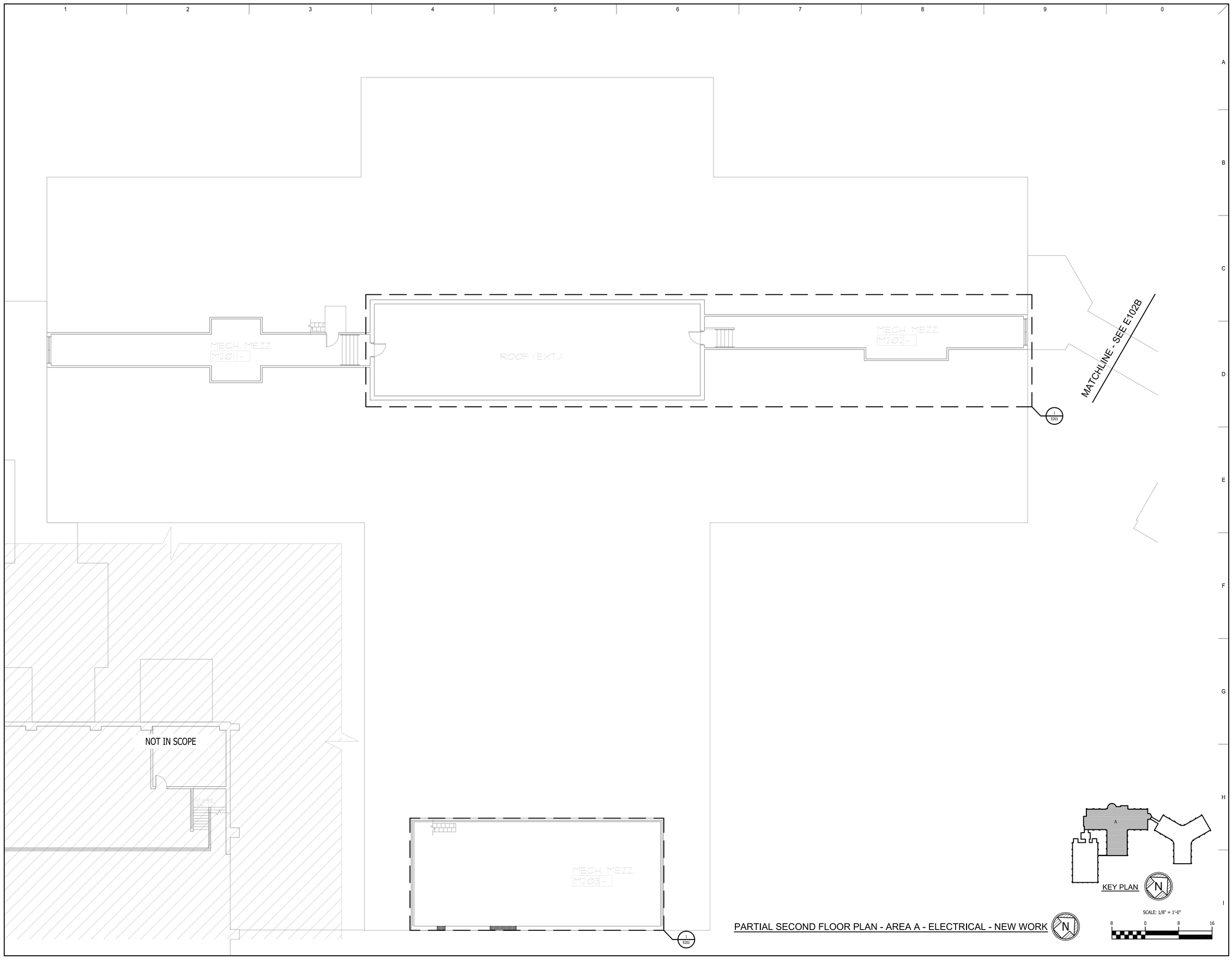
SUBMISSION

BID DOCUMENTS

PARTIAL FIRST FLOOR PLAN - AREA B ELECTRICAL NEW WORK

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

E101B



PARTIAL SECOND FLOOR PLAN - AREA A - ELECTRICAL - NEW WORK

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

8 0 8 16

REVISIONS

no.	date	comments

ENGINEER

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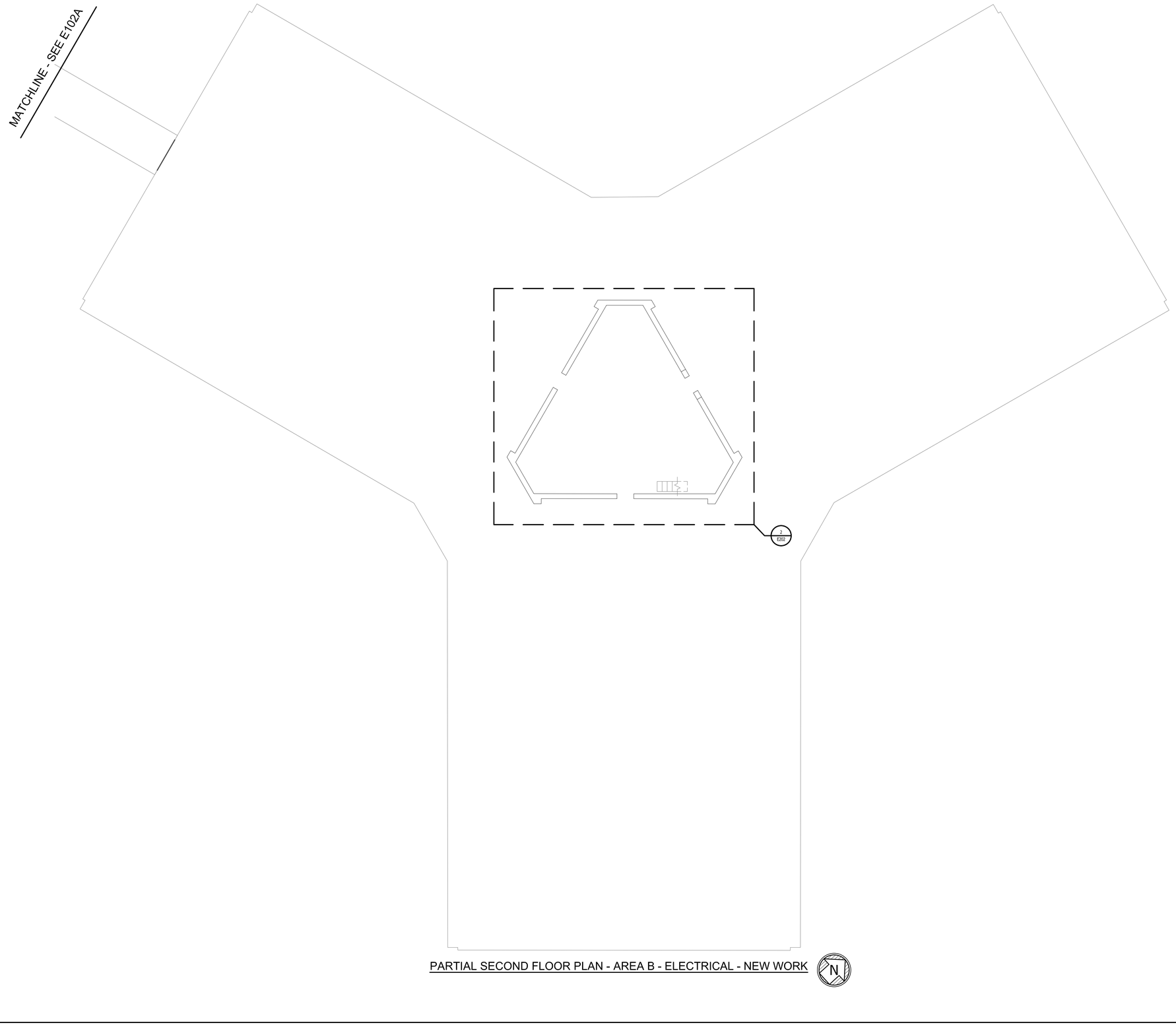
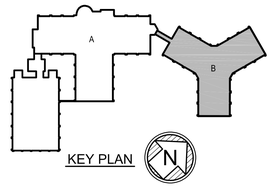
PARTIAL SECOND FLOOR PLAN
AREA A
ELECTRICAL
NEW WORK

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

E102A



PARTIAL SECOND FLOOR PLAN - AREA B - ELECTRICAL - NEW WORK



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

8 0 8 16

REVISIONS

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SEAL

DINA M. DIXON LICENSE No. 17123 STATE OF DELAWARE PROFESSIONAL ENGINEER

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CONSULTANT

ABHA
Architects

1621 North Lincoln Street
Wilmington, Delaware 19806
(302) 658-6426
Project No. 2024-21

PILOTTOWN ENGINEERS
Structural Engineers

17585 Nassau Commons Blvd Unit 3
Lewes, Delaware 19958

Project No. 118.048

CAESAR RODNEY SCHOOL DISTRICT
MAGNOLIA MIDDLE SCHOOL
HVAC RENOVATIONS
SRS 2503

MAGNOLIA MIDDLE SCHOOL
133 THOMAS MORE DR,
MAGNOLIA, DE 19962

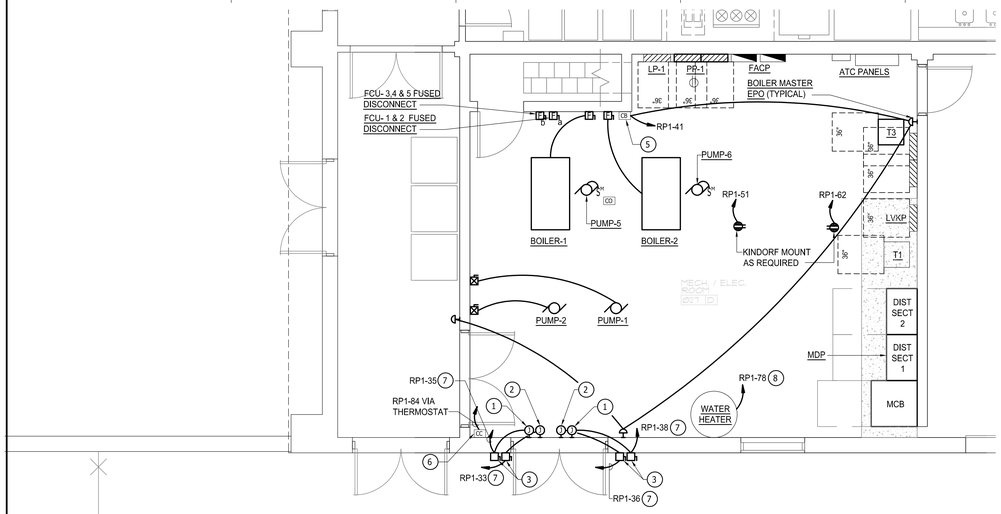
SUBMISSION

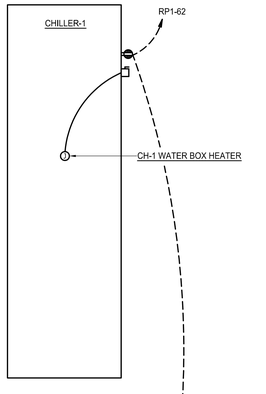
BID DOCUMENTS

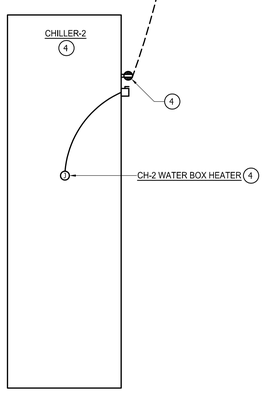
PARTIAL SECOND FLOOR PLAN
AREA B
ELECTRICAL
NEW WORK

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

E102B







SERVICE YARD

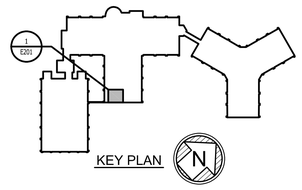
1/E201 MECHANICAL ROOM PART PLAN - ELECTRICAL - NEW WORK

GENERAL NOTES:
(APPLY TO ALL NEW WORK DRAWINGS)

1. REFER TO MECHANICAL EQUIPMENT SCHEDULE, DWG. E402, FOR ADDITIONAL INFORMATION.
2. EXTEND ALL CONDUITS ASSOCIATED WITH CHILLER-2, INCLUDING WATER BOX HEATER AND RECEPTACLE CONDUITS, TO EDGE OF CHILLER-1 AND CAP UNDER BASE BID FOR FUTURE EXTENSION .

DRAWING NOTES:
(APPLY TO THIS DRAWING ONLY)

1. PROVIDE HEAT TRACE ON NEW EXTERIOR 6" CHILLED WATER SUPPLY PIPING . REFER TO MECHANICAL DRAWINGS FOR BASE BID AND ALTERNATE PIPING CONFIGURATIONS. MAKE CONNECTION TO HEAT TRACE VIA DISCONNECT AS REQUIRED.
2. PROVIDE HEAT TRACE ON NEW EXTERIOR 6" CHILLED WATER RETURN PIPING . REFER TO MECHANICAL DRAWINGS FOR BASE BID AND ALTERNATE PIPING CONFIGURATIONS. MAKE CONNECTION TO HEAT TRACE VIA DISCONNECT AS REQUIRED.
3. 2P-30A-NF/SS IN NEMA 3R ENCLOSURE.
4. PROVIDE ALL ASSOCIATED ELECTRICAL WORK UNDER ADD ALTERNATE. REFER TO ALTERNATES LIST IN SPECIFICATIONS.
5. CONTACTOR CB: 8 POLE, 480V WTH 120V COIL IN NEMA 1 ENCLOSURE. MOUNT ON WALL 10'-0" AFF.
6. CONTACTOR CC: 4 POLE, 250V WTH 120V COIL IN NEMA 1 ENCLOSURE. MOUNT ON WALL 10'-0" AFF. MAKE CONNECTION TO THERMOSTAT FOR CONTROL OF CONTACTOR AS REQUIRED BY SYSTEM MFGR.
7. VIA CONTACTOR CC FROM LOAD SIDE OF LOCAL DISCONNECT.
8. INTERCEPT EX WATER HEATER CIRCUIT AND EXTEND VIA CONTACTOR CB AS REQUIRED FOR EMERGENCY SHUT-OFF WITH BOILERS.



SCALE: 1/4" = 1'-0"

4 0 4 8

REVISIONS

no.	date	comments

ENGINEER

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WO# 24008B

SEAL

DANA M. DIXON LICENSE No. 17123 PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF DELAWARE, LICENSE No. 17123, EXPIRATION DATE: 06/30/2026.

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SRS 2503
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MAGNOLIA, DE 19962

SUBMISSION

BID DOCUMENTS

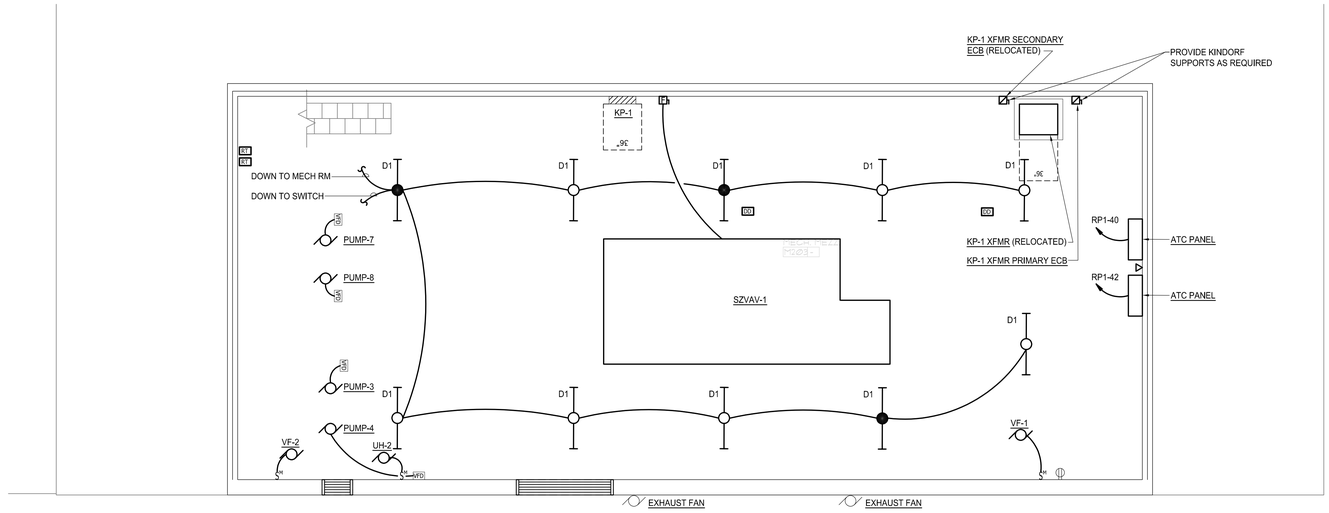
MECHANICAL ROOM
PART PLAN
ELECTRICAL
NEW WORK

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

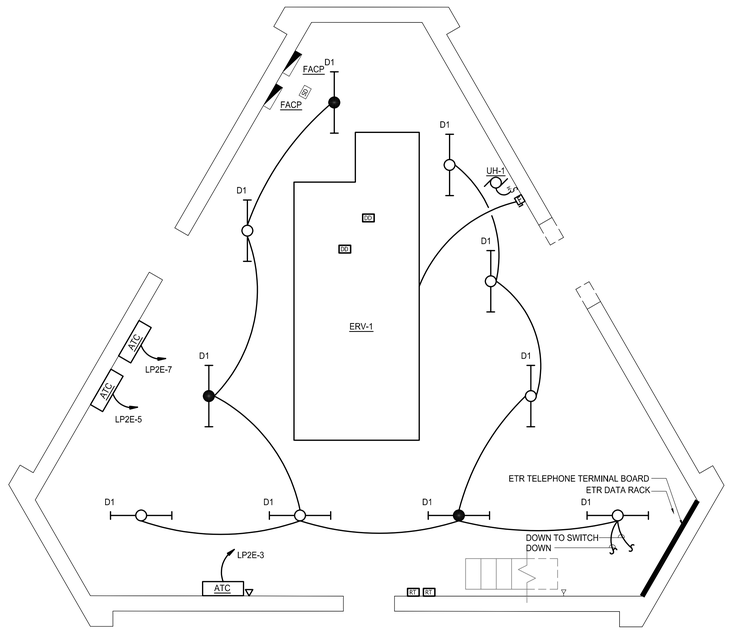
E201

GENERAL NOTES:
(APPLY TO ALL NEW WORK DRAWINGS)

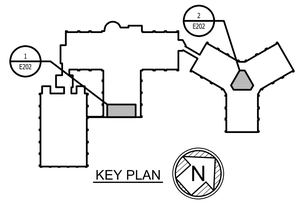
1. REFER TO MECHANICAL EQUIPMENT SCHEDULE, DWG. E402, FOR ADDITIONAL INFORMATION.
2. FIELD COORDINATE EXACT LOCATION OF LIGHTING FIXTURES WITH EQUIPMENT, DUCTWORK AND PIPING.
3. MAKE CONNECTION TO EMERGENCY BATTERY UNITS AND DRIVERS FROM "UNSWITCHED" PORTION OF LIGHTING CIRCUIT SERVING THE ROOM.



E202 MEZZANINE PART PLAN - ELECTRICAL - NEW WORK



1 E202 MEZZANINE PART PLAN - ELECTRICAL - NEW WORK



REVISIONS

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SEAL

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SUBMISSION

BID DOCUMENTS

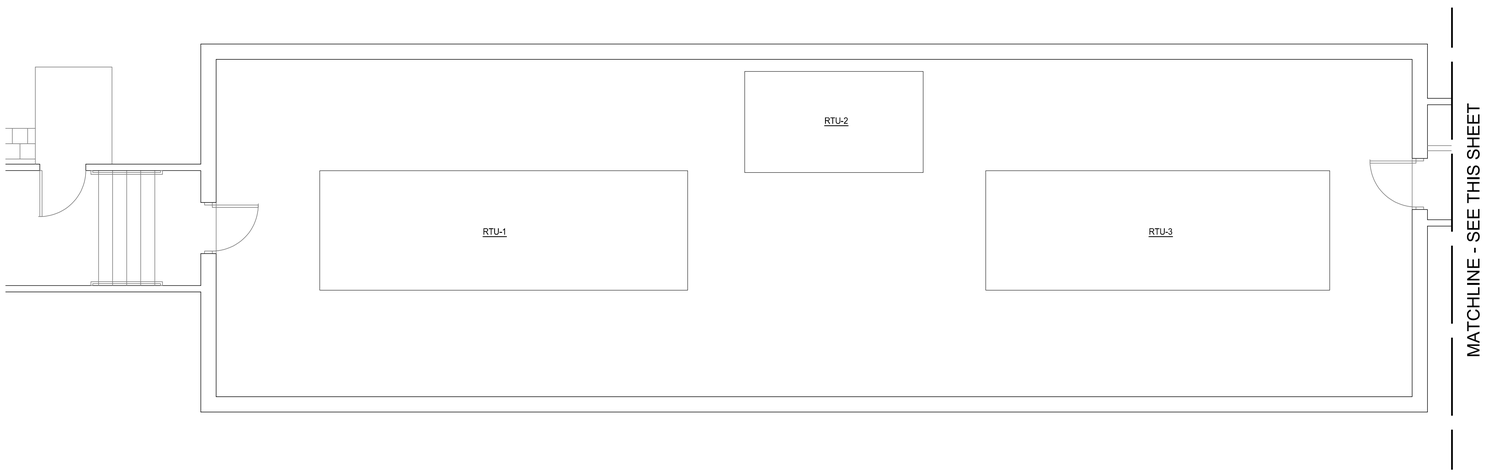
MEZZANINE PART PLANS
ELECTRICAL
NEW WORK

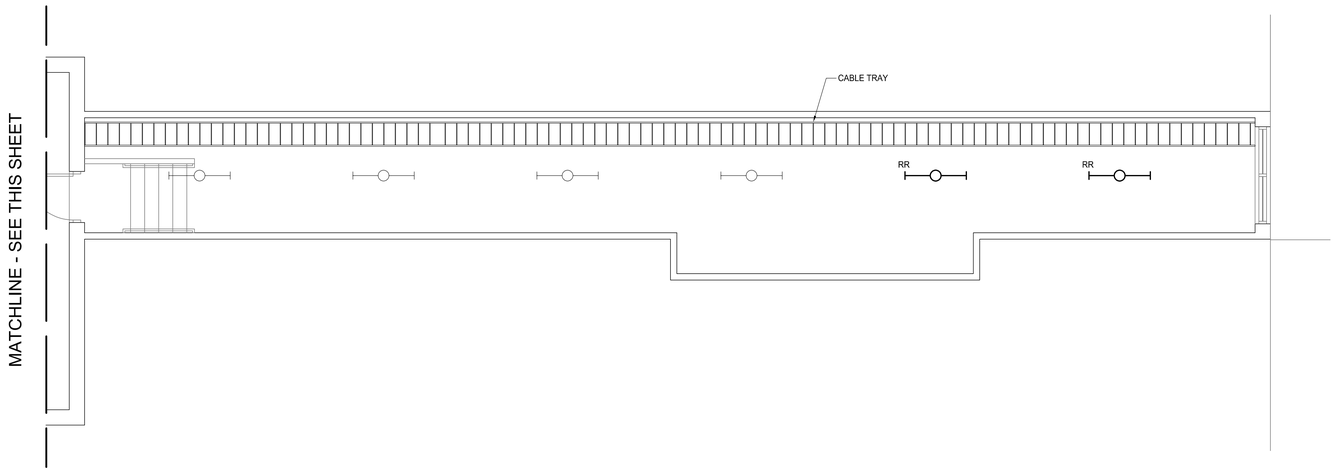
DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

E202

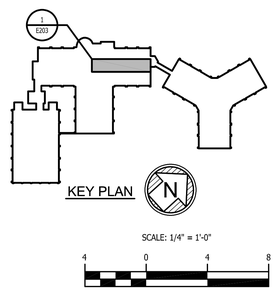
GENERAL NOTES:
(APPLY TO ALL NEW WORK DRAWINGS)

1. REINSTALL EXISTING CEILING MOUNTED DEVICES REMOVED TO ACCOMODATE NEW CEILINGS/HVAC WORK AS REQUIRED. REFER TO DEMOLITION DRAWINGS.





1/E203 MEZZANINE PART PLAN - ELECTRICAL - NEW WORK



REVISIONS

no.	date	comments

ENGINEER

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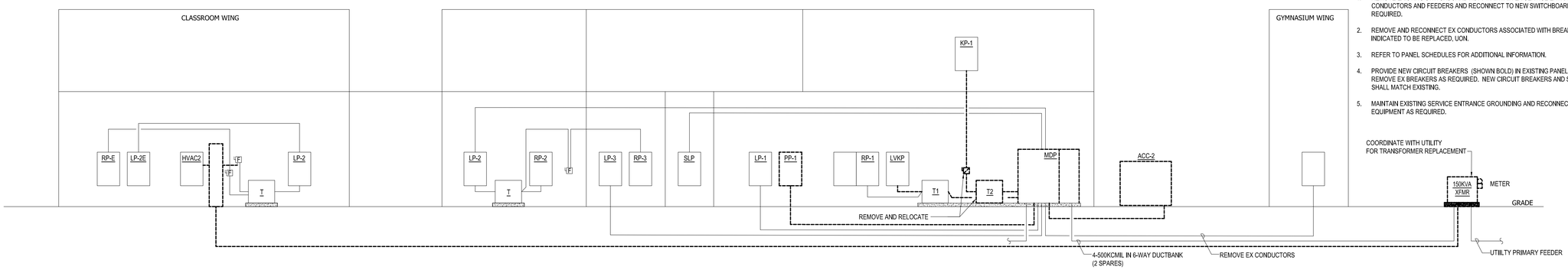
SUBMISSION

BID DOCUMENTS

MEZZANINE PART PLANS
ELECTRICAL
NEW WORK

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

E203

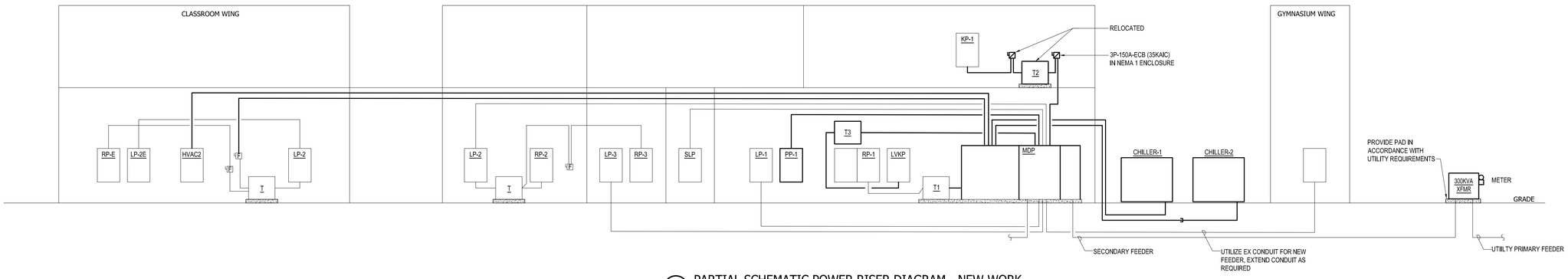


1 E301 PARTIAL SCHEMATIC POWER RISER DIAGRAM - DEMOLITION

SCALE: NONE

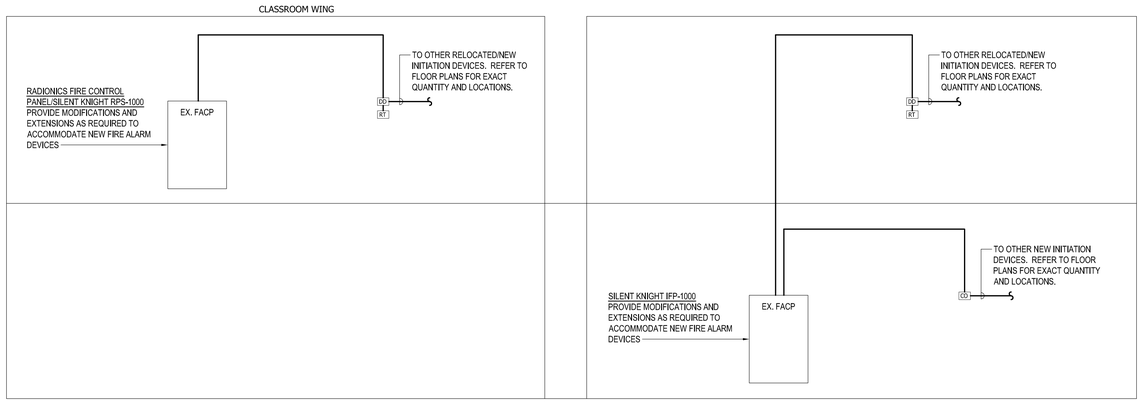
GENERAL NOTES:

1. REMOVE EXISTING SWITCHBOARD MDP. MAINTAIN EX SERVICE ENTRANCE CONDUCTORS AND FEEDERS AND RECONNECT TO NEW SWITCHBOARD AS REQUIRED.
2. REMOVE AND RECONNECT EX CONDUCTORS ASSOCIATED WITH BREAKERS INDICATED TO BE REPLACED, UON.
3. REFER TO PANEL SCHEDULES FOR ADDITIONAL INFORMATION.
4. PROVIDE NEW CIRCUIT BREAKERS (SHOWN BOLD) IN EXISTING PANELBOARDS. REMOVE EX BREAKERS AS REQUIRED. NEW CIRCUIT BREAKERS AND STARTERS SHALL MATCH EXISTING.
5. MAINTAIN EXISTING SERVICE ENTRANCE GROUNDING AND RECONNECT TO NEW EQUIPMENT AS REQUIRED.



1 E301 PARTIAL SCHEMATIC POWER RISER DIAGRAM - NEW WORK

SCALE: NONE



1 E301 PARTIAL SCHEMATIC FIRE ALARM RISER DIAGRAM - NEW WORK

SCALE: NONE

NOTES:

1. REFER TO FLOOR PLANS FOR EXACT DEVICE COUNT AND LOCATIONS.
2. PROVIDE CABLING AS RECOMMENDED BY SYSTEM MANUFACTURER IN CONDUIT.

EX SWITCHBOARD MDP — GENERAL ELECTRIC SPECTRA SERIES

MOUNTING: FLOOR	**A.I.C. RATING: 65,000**	**LOCATION: MAIN ELECTRIC ROOM**
VOLTAGE: 480/277, 3 PHASE, 4 WIRE	**2000A MAIN BUS**	**2000A MCB (1200A TRIP) W/ GFP**

DISTRIBUTION SECTION

FDR NO	SERVES	CIRCUIT BREAKER P	FRAME	TRIP	WIRING SETS	NO	SIZE	GND	C	REMARKS	CONN KVA
1	SPACE	3	100								
2	PP-1	3	100	90	1	4	2	8	1 1/4		47.1
3	LP-3	3	100	100	1	4	2	8	1 1/4		
4	LP-1	3	100	100	1	4	2	8	1 1/4		
5	SPARE	3	225	225							
6	ACC-2	3	225	125							96.3
7	SPACE	3	225								
8	LP-2	3	225	225	1	4	4/0	4	2 1/2		
9	KP-1	3	225	100	1	3	2	8	1 1/4		
10	*GYM PANEL*	3	225	225	1	4	4/0	4	2 1/2		
11	RTU-3	3	100	100							56.5
12	SLP	3	100	100	1	4	2	8	1 1/4		
13	RTU-1	3	100	100							56.5
14	SPACE	3	100								
15	TRANS#1	3	100	60	1	3	6	10	1		
16	SPACE	3	100								
										CONNECTED LOAD BEING REMOVED:	**256.4 KVA**
239KW PEAK DEMAND LOAD										**TOTAL MDP & HVAC2 CONNECTED LOAD REMOVED**	**359.0 KVA**

SWITCHBOARD MDP — **PROVIDE ERMS ON MAIN BREAKER**

MOUNTING: FLOOR	**A.I.C. RATING: 65,000**	**LOCATION: MAIN ELECTRIC ROOM**
VOLTAGE: 480/277, 3 PHASE, 4 WIRE	**2000A MAIN BUS**	**1200A MCB (100% RATED) W/ GFP**

DISTRIBUTION SECTION 1

FDR NO	SERVES	CIRCUIT BREAKER P	FRAME	TRIP	WIRING SETS	NO	SIZE	GND	C	REMARKS	CONN KVA
1	SPD	3	100	60							
2	PP-1	3	225	225	1	4	4/0	4	2 1/2		127.5
3	LP-3	3	100	100	EXISTING						
4	LP-1	3	100	100	EXISTING						
5	SPARE	3	400	400						FUTURE LP-4/RP-4	180.0
6	HVAC2	3	100	100	1	4	1	6	1 1/2		57.4
7	SPARE	3	225	150							
8	LP-2	3	225	225	EXISTING						
9	KP-1 (VIA XFMR T2)	3	225	150	REFER TO XFMR SCHEDULE						
10	CLASSROOM WING LP2 (VIA XFMR)	3	200	200	1	3	3/0	6	2		20.1
11	RTU-3	3	100	100	EXISTING						
12	SLP	3	100	100	EXISTING						
13	RTU-1	3	100	100	EXISTING						
14	LVKP (VIA XFMR T3)	3	100	60	REFER TO XFMR SCHEDULE						
15	RP-1 (VIA XFMR T1)	3	100	60	REFER TO XFMR SCHEDULE						19.9
16	SPACE	3	100								

DISTRIBUTION SECTION 2

FDR NO	SERVES	FUSED SWITCH P	FRAME	FUSE	WIRING SETS	NO	SIZE	GND	C	REMARKS	CONN KVA
17	CHILLER-1	3	400	350	1	3	350KCMIL	3	2 1/2		247.5
18	CHILLER-2	3	400	350	1	3	350KCMIL	3	2 1/2	ALTERNATE	0.0
19	GYM PANEL	3	400	225	1	4	4/0	4	2 1/2		
20	SPARE	3	400	350							
21	SPACE	3	400								
22	SPACE	3	400								
NET CONNECTED LOAD ADDED (BASE BID ONLY):			*87.8 KVA*							MDP NEW CONNECTED LOAD	652.4 KVA
NET CONNECTED LOAD ADDED (incl FUTURE):			*267.8 KVA*							MDP NET CONNECTED LOAD	293.4 KVA
EX DEMAND LOAD + NET ADDED LOAD										**MDP TOTAL LOAD**	***593.4 KVA***

DRY TYPE TRANSFORMER SCHEDULE

XFMR	KVA	PRIMARY ø	VOLTS	WIRING	PRIMARY CB	SECONDARY ø	VOLTS	WIRING	SECONDARY CB	NEUTRAL & CASE GRD	MOUNTING	NOTES
EX T1	45	3	480	3#4+#10GW-1"C	60	3	208/120	EX		EX	FLOOR	
EX T2	75	3	480	3#1/0+#6GW- 1 1/2"C	150	3	208/120	4#4/0+#4GW-2 1/2"C	EX 225	#2	FLOOR	
T3	30	3	480	3#4+#10GW-1"C	60	3	208/120	4#3+#8GW-1 1/4"C	100	#6	SUSPENDED	

REVISIONS

no.	date	comments

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SUBMISSION

BID DOCUMENTS

SCHEMATIC RISER DIAGRAMS

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

E301

1 2 3 4 5 6 7 8 9 0

EX PANEL RP1

(SECTION I) GE A SERIES — MOUNTING: SURFACE
VOLTAGE:208/120, 3PH, 4W — LOCATION: MECH RM
225 AMPERE BUS — 225 A MCB — 100% RATED NEUTRAL BUS — 10,000 A.I.C.

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CONN KVA
0.6	1	EF-5	1	20					2		1	20					
	3	TV CAFÉ	1	20					4	EF-9	1	20					
	5	FIRE BELL	1	20					6	FACP	1	20					
	7	WEST COURTYARD GFI	1	20					8	SOUND CLOSET	1	20					
1.0	9	EWH-8	2	20					10	MOVIE CURTAIN	1	20					
1.0	11	-	-	-	-	-	-	-	12	ATHLETIC FIELD MAINT	2	100					
	13		1	20					14	SHED	-	-	-	-	-	-	
	15		1	20					16		1	20					
	17	TRANE CONTAL	1	20					18		1	20					
	19	SODA MACHINE	1	20					20	SODA COOLER	1	20					
	21	SODA DISPENSER	1	20					22	MICROWAVE	1	20					
	23	ICE DISPENSER	1	20					24	MICROWAVE	1	20					
	25	MICROWAVE	1	20					26	MICROWAVE	1	20					
	27	MICROWAVE	1	20					28	MICROWAVE	1	20					
	29		2	30					30	OUTSIDE COOLER	2	35					
	31	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-	
	33	SPACE	1						34	SPACE	1						
	35	SPACE	1						36	SPACE	1						
	37	SPACE	1						38	SPACE	1						
	39	SPACE	1						40	SPACE	1						
	41	SPACE	1						42	SPACE	1						

CONNECTED LOAD (SECTION I) 2.6 KVA — KVA PER PHASE: A 0.6 B 1 C 1.0

EX PANEL RP1

(SECTION II - RIGHT SIDE) — MOUNTING: SURFACE
VOLTAGE:208/120, 3PH, 4W — LOCATION: MECH RM
225 AMPERE BUS — 225 A MLO — 100% RATED NEUTRAL BUS — 10,000 A.I.C.

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CONN KVA
	43	ELEC, CORR, KITCHEN REC	1	20					44	ELEC & MAINT RECP	1	20					
	45	MAINT RM RECP	1	20					46	FACULTY BATH CTR RECP	1	20					
	47	FACULTY & CARR RECP	1	20					48	FACULTY REFRIG	1	20					
	49	FACULTY SINK & KITCHEN	1	20					50	FACULTY KITCHEN, CAFÉ	1	20					
	51	SPARE	1	20					52	SODA MACHINE	1	20					
	53	SODA MACHINE	1	20					54	KITCHEN & CAFÉ RECP	1	20					
	55	ELEC RM, MAINT, BATH LTS	1	20					56	EF-6	1	20					0.3
	57	HALL & LUNCH RM LTS	1	20					58	OUTLET ABOVE LT BAR	1	20					
	59	OUTLET ABOVE LT BAR	1	20					60	STAGE FLOOR BOX	1	20					
	61	STAGE FLOOR BOX	1	20					62	SPARE	1	20					
	63	STAGE WALL RECP	1	20					64	STAGE WALL ECT	1	20					
	65	IG TECT FACULTY RM	1	20					66	IG RECP FACULTY	1	20					
	67	CAFÉ RECORD LTS	1	20					68	CAFÉ RECESSED LTS	1	20					
	69		1	20					70	CAFÉ RECESSED LTS	1	20					
	71	MUSIC OFFICE, COURT REC	1	20					72	STAGE FLOOR BOX	1	20					
	73	CAFÉ RECESSED LTS	1	20					74		1	20					
	75	KITCHEN FLOOR RECP	1	20					76	SODA MACHINE	1	20					
1.0	77	EWH-4	2	20					78	WATER HEATER	1	20					
1.0	79	-	-	-	-	-	-	-	80	SPACE	1						
	81	MEZZ RECP	1	20					82	SPACE	1						
0.4	83	EF-7 & BATHROOM	1	20					84	SPACE	1						

CONNECTED LOAD (SECTION II) 2.7 KVA — KVA PER PHASE: A 1.3 B 0 C 1.4
TOTAL CONNECTED LOAD 5.3 **KVA** — KVA PER PHASE: A 1.9 B 1 C 2.4

EX PANEL RP1 (MODIFIED)

(SECTION I) GE A SERIES — MOUNTING: SURFACE
VOLTAGE:208/120, 3PH, 4W — LOCATION: MECH RM
225 AMPERE BUS — 225 A MCB — 100% RATED NEUTRAL BUS — 10,000 A.I.C.

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CONN KVA
	1	EF-5	1	20					2		1	20					
	3	TV CAFÉ	1	20					4	EF-9	1	20					
	5	FIRE BELL	1	20					6	FACP	1	20					
	7	WEST COURTYARD GFI	1	20					8	SOUND CLOSET	1	20					
	9	EWH-8	2	20					10	MOVIE CARTAIN	1	20					
	11	-	-	-	-	-	-	-	12	ATHLETIC FIELD MAINT	2	100					
	13		1	20					14	SHED	-	-	-	-	-	-	
	15		1	20					16		1	20					
	17	TRANE CONTAL	1	20					18		1	20					
	19	SODA MACHINE	1	20					20	SODA COOLER	1	20					
	21	SODA DISPENSER	1	20					22	MICROWAVE	1	20					
	23	ICE DISPENSER	1	20					24	MICROWAVE	1	20					
	25	MICROWAVE	1	20					26	MICROWAVE	1	20					
	27	MICROWAVE	1	20					28	MICROWAVE	1	20					
	29		2	30					30	OUTSIDE COOLER	2	35					
	31	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-	
1.5	33	HEAT TRACE	**1**	**20GFEP**	2	12	12	3/4	34	GLYCOL FEED SYSTEM	**1**	**20**	2	12	12	3/4	0.4
1.5	35	HEAT TRACE	**1**	**20GFEP**	2	12	12	3/4	36	HEAT TRACE	**1**	**20GFEP**	2	12	12	3/4	1.5
1.5	37	CH-1 WATER BOX HTR	**1**	**20**	2	10	10	1	38	HEAT TRACE	**1**	**20GFEP**	2	12	12	3/4	1.5
1.5	39	CH-2 WATER BOX HTR	**1**	**20**	2	10	10	1	40	ATC PANEL	**1**	**20**	2	12	12	3/4	1.0
0.5	41	BOILER EPO	**1**	**20**	2	12	12	3/4	42	ATC PANEL	**1**	**20**	2	12	12	3/4	1.0

CONNECTED LOAD (SECTION I) 11.9 KVA — KVA PER PHASE: A 3 B 4.4 C 4.5

EX PANEL RP1 (MODIFIED)

(SECTION II - RIGHT SIDE) — MOUNTING: SURFACE
VOLTAGE:208/120, 3PH, 4W — LOCATION: MECH RM
225 AMPERE BUS — 225 A MLO — 100% RATED NEUTRAL BUS — 10,000 A.I.C.

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CONN KVA
	43	ELEC, CORR, KITCHEN REC	1	20					44	ELEC & MAINT RECP	1	20					
	45	MAINT RM RECP	1	20					46	FACULTY BATH CTR RECP	1	20					
	47	FACULTY & CARR RECP	1	20					48	FACULTY REFRIG	1	20					
	49	FACULTY SINK & KITCHEN	1	20					50	FACULTY KITCHEN, CAFÉ	1	20					
1.2	51	RECPS	1	20	2	12	12	3/4	52	SODA MACHINE	1	20					
	53	SODA MACHINE	1	20					54	KITCHEN & CAFÉ RECP	1	20					
	55	ELEC RM, MAINT, BATH LTS	1	20					56	EF-6	1	20					
	57	HALL & LUNCH RM LTS	1	20					58	OUTLET ABOVE LT BAR	1	20					
	59	OUTLET ABOVE LT BAR	1	20					60	STAGE FLOOR BOX	1	20					
	61	STAGE FLOOR BOX	1	20					62	RECPS	1	20	2	12	12	3/4	1.6
	63	STAGE WALL RECP	1	20					64	STAGE WLAL ECT	1	20					
	65	IG TECT FACULTY RM	1	20					66	IG RECP FACULTY	1	20					
	67	CAFÉ RECORD LTS	1	20					68	CAFÉ RECESSED LTS	1	20					
	69		1	20					70	CAFÉ RECESSED LTS	1	20					
	71	MUSIC OFFICE, COURT REC	1	20					72	STAGE FLOOR BOX	1	20					
	73	CAFÉ RECESSED LTS	1	20					74		1	20					
	75	KITCHEN FLOOR RECP	1	20					76	SODA MACHINE	1	20					
1.8	77	FCU-1 - 5	**2**	**30**	2	10	10	3/4	78	WATER HEATER	1	20	2	12	12	3/4	
1.8	79	-	-	-	-	-	-	-	80	VF-1	**1**	**20**	2	12	12	3/4	1.0
	81	MEZZ RECP	1	20					82	VF-2, UH-2	**1**	**15**	2	12	12	3/4	0.5
	83	EF-7 & BATHROOM	1	20					84	HEAT TRACE CONTROLS	**1**	**20**	2	12	12	3/4	0.1

CONNECTED LOAD (SECTION II) 8 KVA — KVA PER PHASE: A 4.4 B 1.7 C 1.9
TOTAL CONNECTED LOAD 19.9 **KVA** — KVA PER PHASE: A 7.4 B 6.1 C 6.4

EX PANEL PP1

GE A SERIES — MOUNTING: SURFACE
VOLTAGE: 480/277, 3PH, 4W — LOCATION: MECH RM
125 AMPERE BUS — 125 A MLO — 100% RATED NEUTRAL BUS — A.I.C.

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CONN KVA
	1	SPACE	1						2	SPACE	1						
	3	SPACE	1						4	SPACE	1						
	5	SPACE	1						6	SPACE	1						
	7	SPACE	1						8	SPACE	1						
	9	SPACE	1						10	SPACE	1						
	11	SPACE	1						12	SPACE	1						
	13	SPACE	1						14	SPACE	1						
	15	SPACE	1						16	SPACE	1						
	17	SPACE	1						18	SPACE	1						
	19	KITCHEN OVEN	3	20					20	RTU-2	3	40					8.6
	21	-	-	-	-	-	-	-	22	-	-	-	-	-	-	-	8.6
	23	-	-	-	-	-	-	-	24	-	-	-	-	-	-	-	8.6
7.1	25	RTU-4	3	40					26	?	3	50					
7.1	27	-	-	-	-	-	-	-	28	-	-	-	-	-	-	-	
7.1	29	-	-	-	-	-	-	-	30	-	-	-	-	-	-	-	

TOTAL CONNECTED LOAD 47.1 **KVA** — KVA PER PHASE: A 15.7 B 15.7 C 15.7

PANEL PP1

MOUNTING: SURFACE
VOLTAGE: 480/277, 3PH, 4W — LOCATION: MECH RM
225 AMPERE BUS — 225 A MLO — 100% RATED NEUTRAL BUS — 35,000 A.I.C.

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CONN KVA
2.1	1	PUMP-1	3	15	3	12	12	3/4	2	PUMP-2	3	15	3	12	12	3/4	2.1
2.1	3	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	2.1
2.1	5	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	2.1
9.4	7	SZVAV-1	3	60	3	8	10	3/4	8	PUMP-7	3	30	3	10	10	3/4	0.0
9.4	9	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	0.0
9.4	11	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	0.0
0.0	13	PUMP-3	3	40	3	8	10	3/4	14	PUMP-8	3	30	3	10	10	3/4	4.7
0.0	15	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	4.7
0.0	17	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	4.7
4.4	19	KITCHEN OVEN	3	20	EX CIRCUIT				20	RTU-2	3	40	EX CIRCUIT				8.6
4.4	21	-	-	-	-	-	-	-	22	-	-	-	-	-	-	-	8.6
4.4	23	-	-	-	-	-	-	-	24	-	-	-	-	-	-	-	8.6
5.8	25	PUMP-4	3	40	3	8	10	3/4	26	?	3	50	EX CIRCUIT				
5.8	27	-	-	-	-	-	-	-	28	-	-	-	-	-	-	-	
5.8	29	-	-	-	-	-	-	-	30	-	-	-	-	-	-	-	
1.3	31	PUMP-5	3	15	3	12	12	3/4	32	PUMP-6	3	15	3	12	12	3/4	1.3
1.3	33	-	-	-	-	-	-	-	34	-	-	-	-	-	-	-	1.3
1.3	35	-	-	-	-	-	-	-	36	-	-	-	-	-	-	-	1.3
1.4	37	BOILER-1	3	15	3	12	12	3/4	38	BOILER-2	3	15	3	12	12	3/4	1.4
1.4	39	-	-	-	-	-	-	-	40	-	-	-	-	-	-	-	1.4
1.4	41	-	-	-	-	-	-	-	42	-	-	-	-	-	-	-	1.4

CONNECTED LOAD (SECTION I) 127.5 KVA — KVA PER PHASE: A 42.51 B 42.5 C 42.5

PANEL PP1

(SECTION II) — MOUNTING: SURFACE
VOLTAGE: 480/277, 3PH, 4W — LOCATION: MECH RM
225 AMPERE BUS — 225 A MLO — 100% RATED NEUTRAL BUS — 35,000 A.I.C.

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CONN KVA
	43	SPARE	3	40					44	SPARE	3	40					
	45	-	-	-	-	-	-	-	46	-	-	-	-	-	-	-	
	47	-	-	-	-	-	-	-	48	-	-	-	-	-	-	-	
	49	SPARE	3	15					50	SPARE	3	15					
	51	-	-	-	-	-	-	-	52	-	-	-	-	-	-	-	
	53	-	-	-	-	-	-	-	54	-	-	-	-	-	-	-	
	55	SPACE	3	15					56	SPACE	3	15					
	57	-	-	-	-	-	-	-	58	-	-	-	-	-	-	-	
	59	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	
	61	SPACE	3	15					62	SPACE	3	15					
	63	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	
	65	-	-	-	-	-	-	-	66	-	-	-	-	-	-	-	
	67	SPACE	3	15					68	SPACE	3	15					
	69	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	
	71	-	-	-	-	-	-	-	72	-	-	-	-	-	-	-	
	73	SPACE	3	15					74	SPACE	3	15					
	75	-	-	-	-	-	-	-	76	-	-	-	-	-	-	-	
	77	-	-	-	-	-	-	-	78	-	-	-	-	-	-	-	
	79	SPACE	3	15					80	SPACE	3	15					
	81	-	-	-	-	-	-	-	82	-	-	-	-	-	-	-	
	83	-	-	-	-	-	-	-	84	-	-	-	-	-	-	-	

CONNECTED LOAD (SECTION II) 0 KVA — KVA PER PHASE: A 0 B 0 C 0
TOTAL CONNECTED LOAD 127.5 **KVA** — KVA PER PHASE: A 42.5 B 42.5 C 42.5

EX LOADCENTER LP2E

CUTLER-HAMMER — MOUNTING: SURFACE
VOLTAGE: 208/120, 3PH, 4W — LOCATION: CLASSROOM WING CLOSET
AMPERE BUS — A MLO — 100% RATED NEUTRAL BUS — 10,000 A.I.C.

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CONN KVA
	1	RM 202 RECP	1	20					2	RM 205 LTS	1	20					
	3	RM 202 LTS	1	20					4	RM 201 LTS	1	20					
	5	RM 204 LTS	1	20					6	RM 203 LTS	1	20					
	7	RM 206 LTS	1	20					8	RM 203, 201 RECP	1	20					
	9	RM 204 RECP	1	20					10	RM 205, 203 RECP	1	20					
	11	CORRIDOR LTS & EXIT	1	20					12	SPACE	1	20					
	13	SPARE	1	20					14	COPIER	2	20					
	15	CHAPEL WING TV RECP	1	20					16	-	-	-	-	-	-	-	
	17	SPARE	1	20					18	LAB WING TV RECP	1	30					
	19	LUNCH RM VENDING	1	20					20	ADMIN WING RECP	1	20					
	21	LUNCH RM VENDING	1	20					22	LUNCH RM VENDING	1	20					
	23	SPACE	1						24	SPACE	1						

TOTAL CONNECTED LOAD 0.0 **KVA** — KVA PER PHASE: A 0.0 B 0.0 C 0.0

EX LOADCENTER LP2E (MODIFIED)

CUTLER-HAMMER — MOUNTING: SURFACE
VOLTAGE: 208/120, 3PH, 4W — LOCATION: CLASSROOM WING CLOSET
AMPERE BUS — A MLO — 100% RATED NEUTRAL BUS — 10,000 A.I.C.

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CONN KVA
	1	RM 202 RECP	1	20					2	RM 205 LTS	1	20					
0.6	3	ATC PANEL	1	20	2	12	12	3/4	4	RM 201 LTS	1	20					
0.6	5	ATC PANEL	1	20	2	12	12	3/4	6	UH-1	1	20	2	12	12	3/4	0.1
0.6	7	ATC PANEL	1	20	2	12	12	3/4	8	RM 203, 201 RECP	1	20					
	9	RM 204 RECP	1	20					10	RM 205, 203 RECP	1	20					
	11	CORRIDOR LTS & EXIT	1	20					12	SPACE	1	20					
	13	SPARE	1	20					14	COPIER	2	20					
	15	CHAPEL WING TV RECP	1	20					16	-	-	-	-	-	-	-	
	17	SPARE	1	20					18	LAB WING TV RECP	1	30					
	19	LUNCH RM VENDING	1	20					20	ADMIN WING RECP	1	20					
	21	LUNCH RM VENDING	1	20					22	LUNCH RM VENDING	1	20					
	23	SPACE	1						24	SPACE	1						

TOTAL CONNECTED LOAD 1.9 **KVA** — KVA PER PHASE: A 0.6 B 0.6 C 0.7

EX PANEL LP2

CUTLER HAMMER PRL1A — MOUNTING: SURFACE
VOLTAGE: 208/120, 3PH, 4W — LOCATION: CLASSROOM WING CLOSET
225 AMPERE BUS — 225 A MCB — 100% RATED NEUTRAL BUS — 10,000 A.I.C.

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CONN KVA
	1	RM 303 LTS	1	20					2	RM 304 LTS	1	20					
	3	RM 303 RECP	1	20					4	RM 304 RECP	1	20					
	5	RM 303 LTS	1	20					6	RM 304 LTS	1	20					
	7	RM 301 LTS	1	20					8	RM 302 LTS	1	20					
	9	RM 301 RECP	1	20					10	RM 302,304 RECP	1	20					
	11	RM 301 LTS	1	20					12	RM 302 LTS	1	20					
	13	H2O HTR & RECIRC PUMP	1	20					14	CORRIDOR LTS AND EXIT	1	20					
	15	PHONE BOARD	1	20					16	PANEL LP2E	3	80					
	17	RM 304,303 RECP	1	20					18	-	-	-	-	-	-	-	
	19	LAB BENCH FRONT RECP	1	20					20	-	-	-	-	-	-	-	
	21	LAB BENCH BACK RECP	1	20					22	RM 14=36-139 RECP	1	20					
	23	RM 303 HW HEATER	1	30GFI					24	CORRIDOR LTS AND EXIT	1	20					
	25	RM 127, 156, 139 LTS	1	20					26	HVAC CONTROL CIRCUIT	1	30					
	27	RM 13 LTS	1	20					28	RM 304 HW HEATER	1	30GFI					
	29	RM 107 LTS	1	20					30	RM 105 RECP	1	20					
	31	RM 107 RECP	1	20					32	RM 106, 104 RECP	1	20					
	33	RM 104 LTS	1	20					34	RM 108 RECP	1	20					
	35	RM 106 LTS	1	20					36	EWC	1	20					
	37	RM 108 LTS	1	20					38	CORRIDOR LTS AND EXIT	1	20					
	39	RM 140-142 RESTRMS/JC	1	20					40	SECURITY/FIRE PANELS	1	20					
	41	EXTERIOR WALL LTS	1	20					42	GFI RECP JC STOR 2ND FLR	1	20					

TOTAL CONNECTED LOAD 0.0 **KVA** — KVA PER PHASE: A 0 B 0 C 0.0

EX PANEL LP2 (MODIFIED)

CUTLER HAMMER PRL1A — MOUNTING: SURFACE
VOLTAGE: 208/120, 3PH, 4W — LOCATION: CLASSROOM WING CLOSET
225 AMPERE BUS — 225 A MCB — 100% RATED NEUTRAL BUS — 10,000 A.I.C.

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CONN KVA
1.0	1	ERHP-1,2,3	1	20	2	12	12	3/4	2	LTG	1	20	2	12	12	3/4	1.5
	3	RM 303 RECP	1	20					4	RM 304 RECP	1	20					
1.3	5	FCU-9,10,11,12,13	**2**	**15**	2	12	12	3/4	6	LTG	1	20	2	12	12	3/4	0.7
1.3	7	-	-	-	-	-	-	-	8	LTG	1	20	2	12	12	3/4	0.8
	9	RM 301 RECP	1	20					10	RM 302,304 RECP	1	20					
1.5	11	ERHP-4,5	1	20	2	12	12	3/4	12	ATC PANEL	1	20	2	12	12	3/4	1.8
	13	H2O HTR & RECIRC PUMP	1	20					14	CORRIDOR LTS AND EXIT	1	20					
	15	PHONE BOARD	1	20					16	PANEL LP2E	3	80					0.6
	17	RM 304,303 RECP	1	20					18	-	-	-	-	-	-	-	0.6
	19	LAB BENCH FRONT RECP	1	20					20	-	-	-	-	-	-	-	0.7
	21	LAB BENCH BACK RECP	1	20					22	RM 14=36-139 RECP	1	20					
	23	RM 303 HW HEATER	1	30GFI					24	CORRIDOR LTS AND EXIT	1	20					
1.3	25	FCU-16,17,18,21,28	**2**	**15**	2	12	12	3/4	26	HVAC CONTROL CIRCUIT	1	30					
1.3	27	-	-	-	-	-	-	-	28	RM 304 HW HEATER	1	30GFI					
1.2	29	LTG	1	20	2	12	12	3/4	30	RM 105 RECP	1	20					
	31	RM 107 RECP	1	20					32	RM 106, 104 RECP	1	20					
1.3	33	LTG	1	20	2	12	12	3/4	34	RM 108 RECP	1	20					
1.3	35	LTG	1	20	2	12	12	3/4	36	EWC	1	20					
1.3	37	LTG	1	20	2	12	12	3/4	38	CORRIDOR LTS AND EXIT	1	20					
0.7	39	RM 140-142 RESTRMS/JC	1	20	2	12	12	3/4	40	SECURITY/FIRE PANELS	1	20					
	41	EXTERIOR WALL LTS	1	20					42	GFI RECP JC STOR 2ND FLR	1	20					

TOTAL CONNECTED LOAD 20.1 **KVA** — KVA PER PHASE: A 7.9 B 3.9 C 8.3

EX PANEL HVAC2

CUTLER HAMMER PRL2A — MOUNTING: SURFACE
VOLTAGE: 480/277, 3PH, 4W — LOCATION: CLASSROOM WING CLOSET
400 AMPERE BUS — 250 A MCB (SERVICE DISCONNECT) — 100% RATED NEUTRAL BUS — 35,000 A.I.C.

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CONN KVA
11.4	1	RTU SOUTHEAST	3	45					2	RTU WEST	3	45					11.4
11.4	3	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	11.4
11.4	5	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	11.4
11.4	7	RTU NORTHEAST	3	45					8	SPARE	3	30					
11.4	9	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	
11.4	11	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	
	13	SPACE	1						14	SPARE	3	30					
	15	SPACE	1						16	-	-	-	-	-	-	-	
	17	SPACE	1						18	-	-	-	-	-	-	-	
	19	SPACE	1						20	SIGN & PATH PARKG LTS	1	20					
	21	SPACE	1						22	2ND FLR, STOR LTS	1	20					
	23	SPACE	1						24	SPACE	1						
	25	SPACE	1						26	SPACE	1						
	27	SPACE	1						28	SPACE	1						
	29	SPACE	1						30	SPACE	1						
	31	SPACE	1						32	SPACE	1						
	33	SPACE	1						34	SPACE	1						
	35	SPACE	1						36	SPACE	1						
	37	SPACE	1						38	SPACE	1						
	39	SPACE	1						40	SPACE	1						
	41	SPACE	1						42	SPACE	1						

TOTAL CONNECTED LOAD 102.6 **KVA** — KVA PER PHASE: A 34.22 B 34.2 C 34.2

EX PANEL HVAC2 (MODIFIED)

CUTLER HAMMER PRL2A — MOUNTING: SURFACE
VOLTAGE: 480/277, 3PH, 4W — LOCATION: CLASSROOM WING CLOSET
400 AMPERE BUS — 250 A MCB (SERVICE DISCONNECT) — 100% RATED NEUTRAL BUS — 35,000 A.I.C.

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	SIZE	GND	C	CONN KVA
1.7	1	FCU-6,7,8,14,15	3	45	3	6	10	1	2	FCU-28,29.30,31	3	45	3	6	10	1	2.2
1.7	3	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	2.2
1.7	5	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	2.2
1.9	7	FCU-19,20,22,23,24	3	45	3	6	10	1	8	ERV-1	**3**	**60**	3	6	10	3/4	5.5
1.9	9	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	5.5
1.9	11	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	5.5
	13	SPACE	1						14	FCU-25,26,27	3	30	3	10	10	3/4	1.1
	15	SPACE	1						16	-	-	-	-	-	-	-	1.1
	17	SPACE	1						18	-	-	-	-	-	-	-	1.1
	19	SPACE	1						20	SIGN & PATH PARKG LTS	1	20					
	21	SPACE	1						22	2ND FLR, STOR LTS	1	20					
	23	SPACE	1						24	SPACE	1						
	25	SPACE	1						26	SPACE	1						
	27	SPACE	1						28	SPACE	1						
	29	SPACE	1						30	SPACE	1						
	31	SPACE	1						32	SPACE	1						
	33	SPACE	1						34	SPACE	1						
	35	SPACE	1						36	SPACE	1						
	37	SPACE	1						38	SPACE	1						
	39	SPACE	1						40	SPACE	1						
	41	SPACE	1						42	SPACE	1						

TOTAL CONNECTED LOAD 37.3 **KVA** — KVA PER PHASE: A 12.5 B 12.4 C 12.4

GENERAL NOTES:

1. PROVIDE NEW CIRCUIT BREAKERS AND STARTERS (SHOWN BOLD) IN EXISTING SWITCHBOARDS, MOTOR CONTROL CENTERS AND/OR PANELBOARDS. REMOVE EX BREAKERS AND STARTERS AS REQUIRED. NEW CIRCUIT BREAKERS AND STARTERS SHALL MATCH EXISTING.

A B C D E F G H I

REVISIONS

no.	date	comments

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SEAL
DINA M. DIXON LICENSE No. 17123 DELAWARE PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF DELAWARE, LICENSE No. 17123, EXPIRATION DATE: 06/30/2026.

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Project No. 2024-21

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CAESAR RODNEY SCHOOL DISTRICT
MAGNOLIA MIDDLE SCHOOL
HVAC RENOVATIONS
SRS 2503

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133 THOMAS MORE DR,
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SUBMISSION
BID DOCUMENTS

PANELBOARD SCHEDULES

DESIGN BY DMD
CHECKED BY DMD
SCALE AS NOTED
JOB NO. 24008B
DATE 03/05/2025

E401

EX PANEL LP1 — GE A SERIES — **MOUNTING: SURFACE**
VOLTAGE: 480/277, 3PH, 4W — **LOCATION: MECH RM**
125 AMPERE BUS — **125 A MLO** — **100% RATED NEUTRAL BUS** — **14,000 A.I.C.**

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	CIRCUIT WIRING SIZE	CIRCUIT WIRING GND	CIRCUIT WIRING C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	CIRCUIT WIRING SIZE	CIRCUIT WIRING GND	CIRCUIT WIRING C	CONN KVA
	1	SPACE	1						2	SPACE	1						
	3	SPACE	1						4	SPACE	1						
	5	SPACE	1						6	SPACE	1						
	7	SPACE	1						8	SPACE	1						
	9	SPACE	1						10	SPACE	1						
	11	SPACE	1						12	SPACE	1						
	13	ELEC RM, MAINT RM LTS	1	20					14	KITCHEN & HALL LTS	1	20					
	15	HALLWAY & LUNCH RM LTS	1	20					16	SPARE	1	20					
	17	SPARE	1	20					18	SPARE	1	20					
	19	SPARE	1	20					20	EWH-1	1	20					
	21	SPARE	1	20					22	EWH-2	1	20					
	23	SPARE	1	20					24	CAFE PENDANT LT	1	20					
	25	EF-8	1	20					26	CAFÉ PENDANT LT	1	20					
	27	EF-8	1	20					28	CAFÉ PENDANT LT	1	20					
	29	EF-8	1	20					30	EWH-3	1	20					

TOTAL CONNECTED LOAD 0.0 **KVA** — KVA PER PHASE: A 0.0 B 0.0 C 0.0

EX PANEL LP1(MODIFIED) — GE A SERIES — **MOUNTING: SURFACE**
VOLTAGE: 480/277, 3PH, 4W — **LOCATION: MECH RM**
125 AMPERE BUS — **125 A MLO** — **100% RATED NEUTRAL BUS** — **35,000 A.I.C.**

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	CIRCUIT WIRING SIZE	CIRCUIT WIRING GND	CIRCUIT WIRING C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	CIRCUIT WIRING SIZE	CIRCUIT WIRING GND	CIRCUIT WIRING C	CONN KVA
	1	SPACE	1						2	SPACE	1						
	3	SPACE	1						4	SPACE	1						
	5	SPACE	1						6	SPACE	1						
	7	SPACE	1						8	SPACE	1						
	9	SPACE	1						10	SPACE	1						
	11	SPACE	1						12	SPACE	1						
	13	ELEC RM, MAINT RM LTS	**1**	**20**		EX CIRCUIT			14	KITCHEN & HALL LTS	**1**	**20**		EX CIRCUIT			
	15	HALLWAY & LUNCH RM LTS	**1**	**20**		EX CIRCUIT			16	SPARE	**1**	**20**					
	17	SPARE	**1**	**20**					18	SPARE	**1**	**20**					
	19	SPARE	**1**	**20**					20	EWH-1	**1**	**20**		EX CIRCUIT			
	21	SPARE	**1**	**20**					22	EWH-2	**1**	**20**		EX CIRCUIT			
	23	SPARE	**1**	**20**					24	CAFÉ PENDANT LT	**1**	**20**		EX CIRCUIT			
	25	EF-8	**3**	**20**		EX CIRCUIT			26	CAFÉ PENDANT LT	**1**	**20**		EX CIRCUIT			
	27	EF-8	**-**	**-**					28	CAFÉ PENDANT LT	**1**	**20**		EX CIRCUIT			
	29	EF-8	**-**	**-**					30	EWH-3	**1**	**20**		EX CIRCUIT			

TOTAL CONNECTED LOAD 0.0 **KVA** — KVA PER PHASE: A 0.0 B 0.0 C 0.0

EX PANEL SLP — GE A SERIES — **MOUNTING: SURFACE**
VOLTAGE: 480/277, 3PH, 4W — **LOCATION: MAINTENANCE**
125 AMPERE BUS — **125 A MLO** — **100% RATED NEUTRAL BUS** — **14,000 A.I.C.**

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	CIRCUIT WIRING SIZE	CIRCUIT WIRING GND	CIRCUIT WIRING C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	CIRCUIT WIRING SIZE	CIRCUIT WIRING GND	CIRCUIT WIRING C	CONN KVA
	1	SPACE	1						2	SPACE	1						
	3	SPACE	1						4	SPACE	1						
	5	SPACE	1						6	SPACE	1						
	7	SPACE	1						8	SPACE	1						
	9	SPACE	1						10	SPACE	1						
	11	SPACE	1						12	SPACE	1						
	13	SPACE	1						14	SPACE	1						
	15	SPACE	1						16	SPACE	1						
	17	SPACE	1						18	SPACE	1						
	19		1	20		EX CIRCUIT			20		1	20		EX CIRCUIT			
	21		1	20		EX CIRCUIT			22		1	20		EX CIRCUIT			
	23		1	20		EX CIRCUIT			24	SPARE	1	20					
	25		1	20		EX CIRCUIT			26		1	20		EX CIRCUIT			
	27		1	20		EX CIRCUIT			28		1	20		EX CIRCUIT			
	29		1	20		EX CIRCUIT			30		1	20		EX CIRCUIT			

TOTAL CONNECTED LOAD 0.0 **KVA** — KVA PER PHASE: A 0.0 B 0.0 C 0.0

EX PANEL SLP (MODIFIED) — GE A SERIES — **MOUNTING: SURFACE**
VOLTAGE: 480/277, 3PH, 4W — **LOCATION: MAINTENANCE**
125 AMPERE BUS — **125 A MLO** — **100% RATED NEUTRAL BUS** — **35,000 A.I.C.**

CONN KVA	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	CIRCUIT WIRING SIZE	CIRCUIT WIRING GND	CIRCUIT WIRING C	CKT	DESCRIPTION	BREAKER P	BREAKER AMPS	CIRCUIT WIRING NO	CIRCUIT WIRING SIZE	CIRCUIT WIRING GND	CIRCUIT WIRING C	CONN KVA
	1	SPACE	1						2	SPACE	1						
	3	SPACE	1						4	SPACE	1						
	5	SPACE	1						6	SPACE	1						
	7	SPACE	1						8	SPACE	1						
	9	SPACE	1						10	SPACE	1						
	11	SPACE	1						12	SPACE	1						
	13	SPACE	1						14	SPACE	1						
	15	SPACE	1						16	SPACE	1						
	17	SPACE	1						18	SPACE	1						
	19		**1**	**20**		EX CIRCUIT			20		**1**	**20**		EX CIRCUIT			
	21		**1**	**20**		EX CIRCUIT			22		**1**	**20**		EX CIRCUIT			
	23		**1**	**20**		EX CIRCUIT			24	SPARE	**1**	**20**					
	25		**1**	**20**		EX CIRCUIT			26		**1**	**20**		EX CIRCUIT			
	27		**1**	**20**		EX CIRCUIT			28		**1**	**20**		EX CIRCUIT			
	29		**1**	**20**		EX CIRCUIT			30		**1**	**20**		EX CIRCUIT			

TOTAL CONNECTED LOAD 0.0 **KVA** — KVA PER PHASE: A 0.0 B 0.0 C 0.0

GENERAL NOTES:

1. PROVIDE NEW CIRCUIT BREAKERS (SHOWN BOLD) IN EXISTING PANELBOARDS. REMOVE EX BREAKERS AS REQUIRED. NEW CIRCUIT BREAKERS SHALL BE COMPATIBLE WITH EXISTING PANELBOARD, WITH HIGHER AIC RATING AS INDICATED. RECONNECT EXISTING BRANCH CIRCUIT WIRING TO NEW BREAKERS.

MECHANICAL EQUIPMENT CONNECTION SCHEDULE

EQUIPMENT NAME	LOAD KW	LOAD HP	LOAD AMPS	SERVICE VOLTS	SERVICE PH	SOURCE PANELBOARD	STARTER SIZE	DISCONNECT (MOUNT AT UNIT UON) POLE	DISCONNECT AMPS	DISCONNECT FUSE (VERIFY W/ NAMEPLATE)	DISCONNECT NEMA ENCLOSURE	NOTES
SZVAV-1			34.0	480	3	PP1-7		3	60	60	1	9
ERV-1			38.0	480	3	HVAC2-8		3	60	60	1	
CHILLER-1			297.5	480	3	MDP-17						3
CH-1 WATER BOX HEATER				120	1	RP1-37		2	30		3R	
CHILLER-2			297.5	480	3	MDP-18						3,ALTERNATE
CH-2 WATER BOX HEATER				120	1	RP1-39		2	30		3R	ALTERNATE
BOILER-1			10.0	480	3	PP1-37		3	30	15	1	1,4
BOILER-2			10.0	480	3	PP1-38		3	30	15	1	1,4
PUMP-1		5		480	3	PP1-1	0	3	30		1	8
PUMP-2		5		480	3	PP1-2	0	3	30		1	8
PUMP-3		15		480	3	PP1-13						7,9
PUMP-4		15		480	3	PP1-25						7,9
PUMP-5		3		480	3	PP1-31	0	3	30		1	8
PUMP-6		3		480	3	PP1-32	0	3	30		1	8
PUMP-7		10		480	3	PP1-8						7,9
PUMP-8		10		480	3	PP1-14						7,9
FCU-1		1/6		208	1	RP1-77 (a)						5
FCU-2		(2) 1/6		208	1	RP1-77 (a)						5
FCU-3		(2) 1/6		208	1	RP1-77 (b)						5
FCU-4		1/6		208	1	RP1-77 (b)						5
FCU-5		1/6		208	1	RP1-77 (b)						5
FCU-6		1/2		480	3	HVAC2-1		3	30	15	1	
FCU-7		1/2		480	3	HVAC2-1		3	30	15	1	
FCU-8		1/2		480	3	HVAC2-1		3	30	15	1	
FCU-9		1/6		208	1	LP2-5						5
FCU-10		1/6		208	1	LP2-5						5
FCU-11		1/6		208	1	LP2-5						5
FCU-12		1/6		208	1	LP2-5						5
FCU-13		1/6		208	1	LP2-5						5
FCU-14		1/2		480	3	HVAC2-1		3	30	15	1	
FCU-15		1		480	3	HVAC2-1		3	30	15	1	
FCU-16		1/6		208	1	LP2-25						5
FCU-17		1/6		208	1	LP2-25						5
FCU-18		1/6		208	1	LP2-25						5
FCU-19		1/2		480	3	HVAC2-7		3	30	15	1	
FCU-20		1		480	3	HVAC2-7		3	30	15	1	
FCU-21		1/6		208	1	LP2-25						5
FCU-22		1		480	3	HVAC2-7		3	30	15	1	
FCU-23		1/2		480	3	HVAC2-7		3	30	15	1	
FCU-24		1/2		480	3	HVAC2-7		3	30	15	1	
FCU-25		1/2		480	3	HVAC2-14		3	30	15	1	
FCU-26		1/2		480	3	HVAC2-14		3	30	15	1	
FCU-27		1		480	3	HVAC2-14		3	30	15	1	
FCU-28		1/6		208	1	LP2-25						5
FCU-29		1		480	3	HVAC2-2		3	30	15	1	
FCU-30		1		480	3	HVAC2-2		3	30	15	1	
FCU-31		1		480	3	HVAC2-2		3	30	15	1	
ERHP-1	0.375			120	1	LP2-1						6
ERHP-2	0.375			120	1	LP2-1						6
ERHP-3	0.375			120	1	LP2-1						6
ERHP-4	0.375			120	1	LP2-11						6
ERHP-5	0.375			120	1	LP2-11						6
UH-1		1/20		120	1	LP2E-6					1	2
UH-2		1/20		120	1	RP1-82					1	2
VF-1	0.93			120	1	RP1-80					1	2
VF-2	0.4			120	1	RP1-82					1	2

MECHANICAL SCHEDULE NOTES:
1. ROUTE HOMERUN VIA CONTACTOR CB
2. PROVIDE SINGLE POLE MANUAL MOTOR STARTER WITH HOA SWITCH.
3. MAKE CONNECTION TO INTEGRAL DISCONNECT.
4. DISCONNECT SHALL BE LOCKABLE (OPEN AND CLOSED POSITION).
5. PROVIDE TWO-POLE HP RATED TOGGLE DISCONNECT SWITCH AT UNIT. CIRCUIT VIA A COMMON 2P-30A-F/SS (F@15A) FOR THE CIRCUIT INDICATED ON FLOOR PLANS.
6. PROVIDE TOGGLE DISCONNECT SWITCH AT UNIT. MAKE CONNECTION VIA LINE VOLTAGE THERMOSTAT FURNISHED WITH UNIT. INSTALL THERMOSTAT 56"AFF.
7. INSTALL VFD (FURNISHED UNDER MECHANICAL DIVISION) MAKE ALL CONNECTIONS TO EQUIPMENT.
8. PROVIDE COMBINATION STARTER/DISCONNECT.
9. PROVIDE KINDORF SUPPORTS AS REQUIRED.

REVISIONS

no.	date	comments

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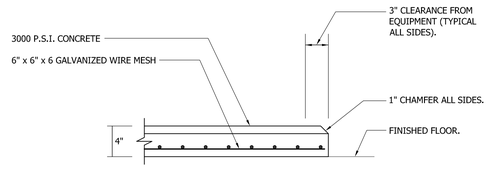
SUBMISSION

BID DOCUMENTS

MECHANICAL EQUIPMENT CONNECTION SCHEDULE

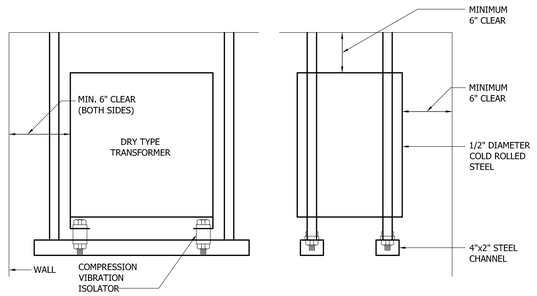
DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

E402



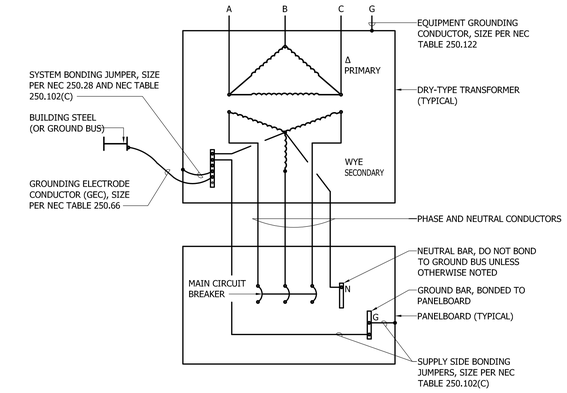
1 TYPCIAL CONCRETE HOUSEKEEPING PAD

SCALE: NONE



2 SUSPENDED MOUNTING OF DRY TYPE TRANSFORMERS

SCALE: NONE



3 TYPICAL DRY TYPE TRANSFORMER GROUNDING

SCALE: NONE

4 ELECTRICAL HEAT TRACE SCHEMATIC CONTROL

SCALE: NONE

NOTE:
SEE POWER PLANS FOR LOCATION OF EMERGENCY POWER OFF PUSH BUTTON IN EACH RESPECTIVE ROOM

5 TYPICAL EMERGENCY SHUT-OFF WIRING DIAGRAM - CONTACTORS

SCALE: NONE

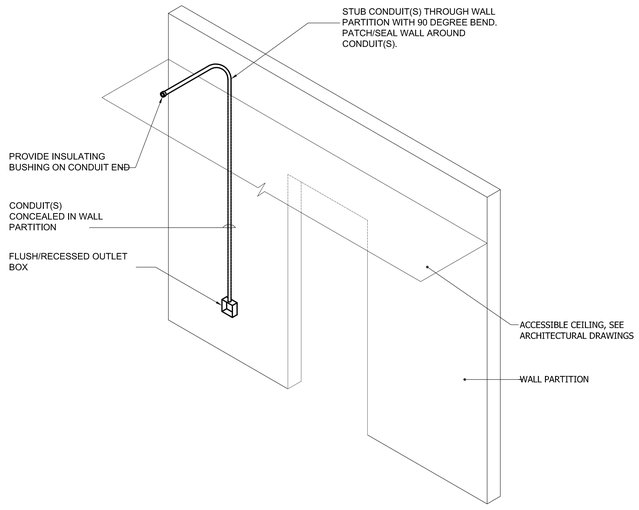
NOTES:
1. EMERGENCY PUSHBUTTON SHALL BE MAINTAINED TYPE WITH PROTECTIVE COVER.
2. REMOTE SHUTDOWN SWITCH SHALL COMPLY WITH ASME CSD-1-1992 "CONTROLS & SAFETY DEVICES FOR AUTOMATICALLY FIRED BOILERS".
3. PROVIDE CONTROL WIRING IN 3/4" CONDUIT FROM SHUTDOWN SWITCH TO ASSOCIATED EQUIPMENT CONTROL PANEL AND/OR CONTACTOR.

LABELS:
(REFER TO FLOOR PLANS FOR EXACT QUANTITIES AND LOCATIONS)
1. "BOILER/BURNER OFF"

PLAN SYMBOL:

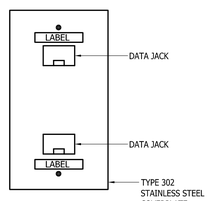
6 TYPICAL REMOTE SHUT-OFF SWITCH

SCALE: NONE



7 CONDUIT STUB ABOVE ACCESSIBLE CEILING

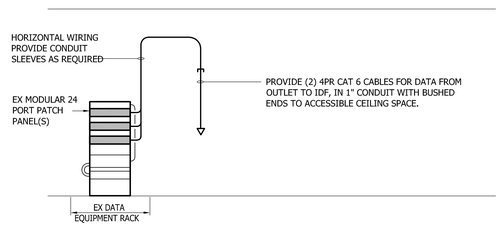
SCALE: NONE



PLAN SYMBOL:

8 TYPICAL DATA DROP

SCALE: NONE



NOTES:
1. REFER TO FLOOR PLANS FOR EXACT DEVICE COUNT AND LOCATIONS.
2. COORDINATE WITH OWNER FOR LOCATION OF NEAREST DATA RACK.

9 PARTIAL SCHEMATIC DATA SYSTEM RISER DIAGRAM

SCALE: NONE

REVISIONS

no.	date	comments

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SUBMISSION

BID DOCUMENTS

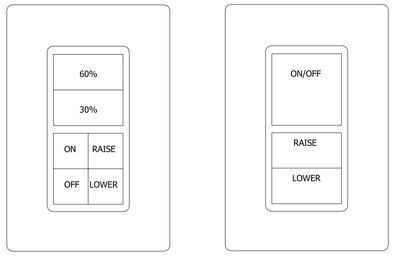
DETAILS
ELECTRICAL

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

E501

1 TYPICAL LOW-VOLTAGE LIGHTING CONTROL DIMMER SWITCHES

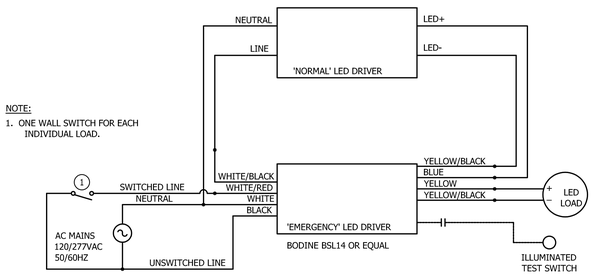
SCALE: NONE



SYMBOL: S^{D1} SYMBOL: S^{D}

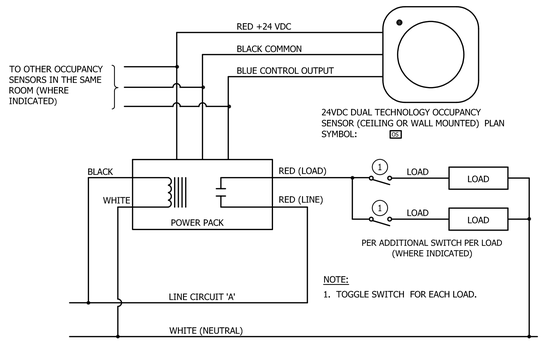
2 INTERNAL EMERGENCY DRIVER WIRING DIAGRAM

SCALE: NONE



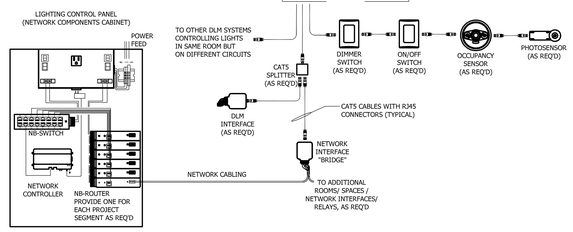
3 TYPICAL OCCUPANCY SENSOR WIRING

SCALE: NONE



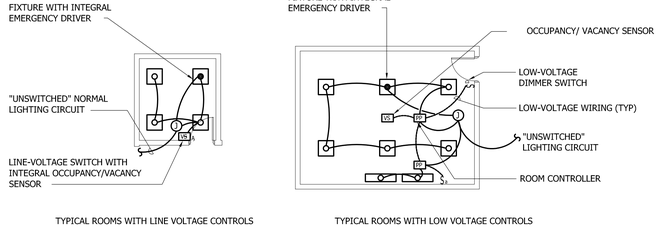
4 LOW VOLTAGE DIGITAL LIGHTING CONTROL SCHEMATIC

SCALE: NONE



5 TYPICAL ROOM LIGHTING CONTROL

SCALE: NONE

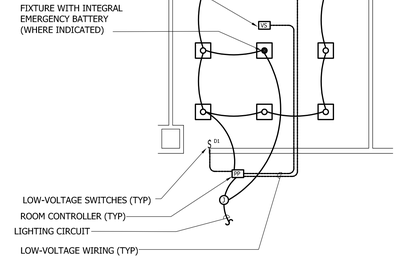


TYPICAL ROOMS WITH LINE VOLTAGE CONTROLS

TYPICAL ROOMS WITH LOW VOLTAGE CONTROLS

NOTES:

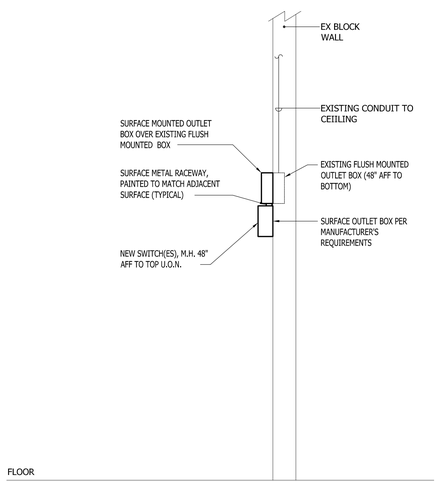
1. SETTINGS TO BE APPLIED TO ROOM CONTROLLER AS INDICATED ON PLANS. REFER TO LIGHTING CONTROL MATRIX FOR ADDITIONAL INFORMATION.
2. PROVIDE NUMBER OF FIXTURES, SWITCHES, OCCUPANCY OR VACANCY SENSORS, EMERGENCY FIXTURES, ETC. IN EACH ROOM AS INDICATED ON THE FLOOR PLANS



NOTE: SETTINGS SHALL BE APPLIED TO ROOM CONTROLLER FOR MANUAL-ON, AUTOMATIC-OFF.

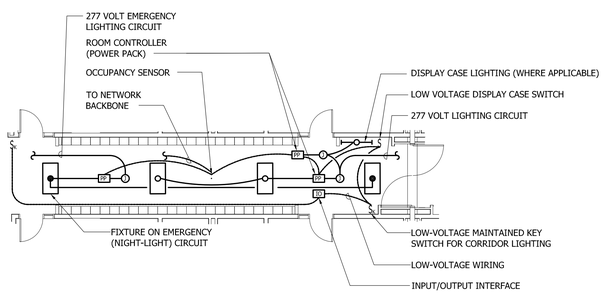
6 SURFACE MOUNTED SWITCH

SCALE: NONE



7 TYPICAL CORRIDOR LIGHTING CONTROL

SCALE: NONE



NOTE: SETTINGS TO BE APPLIED TO ROOM CONTROLLER FOR AUTOMATIC-ON, AUTOMATIC-OFF.

8 TYPICAL CLASSROOM LIGHTING CONTROL

SCALE: NONE

NOTES:

MOUNT ROOM CONTROLLERS OUTSIDE OF ENTRY DOOR OF CLASSROOM ABOVE CEILING TILE IN ACCESSIBLE CEILING SPACE OF CORRIDOR. PROVIDE IDENTIFICATION PLATE ON THE CEILING OR OVER DOOR TO IDENTIFY THE LOCATION OF ROOM CONTROLLER IN ROOM.

MANUFACTURER TO SUBMIT SHOP DRAWING SHOWING LOCATION OF OCCUPANCY / VACANCY SENSOR(S) AND DAYLIGHT SENSOR(S) INCLUDING COVERAGE.

LIGHTING RELAY ROOM CONTROLLERS SHALL BE TIED TO A CENTRAL LOCATION IN THE SCHOOL USING LIGHTING SOFTWARE INSTALLED ON A COMPUTER IN THE CUSTODIAN OFFICE, AN ETHERNET INTERFACE MODULE SHALL BE INSTALLED IN THE MAIN TELECOM ROOM TO CONNECT TO THE SCHOOL'S DATA NETWORK. THE LIGHTING SOFTWARE SHALL BE SET UP ON THE CHIEF CUSTODIAN'S COMPUTER TO COMMUNICATE WITH THE LIGHTING RELAY ROOM CONTROLLERS. LIGHTING ROOM CONTROLLERS TO BE NETWORKED TOGETHER IN ORDER TO TROUBLESHOOT THE SYSTEM VIA WEB-BASED SOFTWARE OR FROM OWNER'S CENTRAL OFFICE.

LIGHTING CONTROLS IN A TYPICAL CLASSROOM SHALL CONSIST OF A RELAY-BASED LIGHTING CONTROL PANEL (LIGHTING RELAY ROOM CONTROLLER), WIRED LOW-VOLTAGE CEILING-MOUNTED VACANCY SENSOR(S), SIX-BUTTON DIMMER CONTROL SCENE STATION(S).

A. TWO CONTROL ZONES IN A TYPICAL CLASSROOM
   - ZONE 1: STANDARD ZONE - ALL FIXTURES NOT IN ZONE 2
   - ZONE 2: DAYLIGHT ZONE - IDENTIFIED ON PLANS WITH "D" SUFFIX ON FIXTURE TYPE (WHERE APPLICABLE)

B. SIX-BUTTON CONTROL STATIONS:
   - ON/OFF/RAISE/LOWER/60%/30%

"ON" CONTROL WILL RETURN THE FIXTURES TO THE 100% LIGHT LEVEL

REVISIONS

no.	date	comments

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BID DOCUMENTS

DETAILS
ELECTRICAL

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SCALE	AS NOTED
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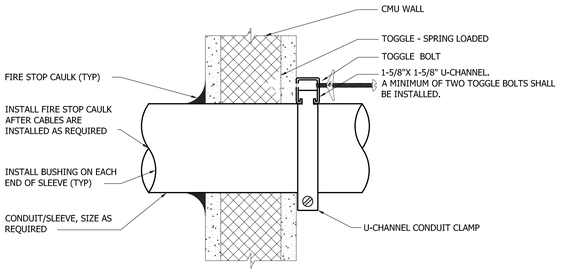
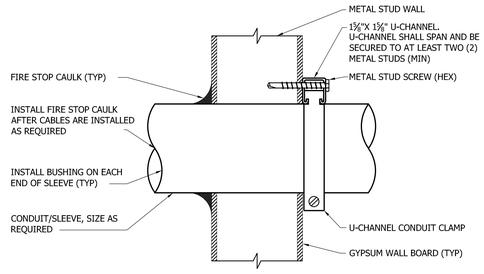
DATE	03/05/2025

E502



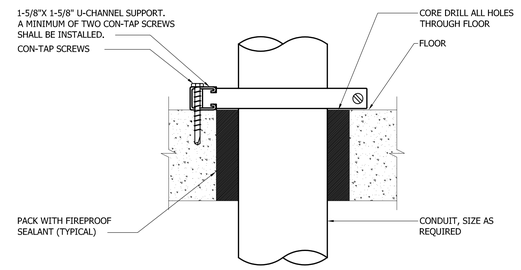
1 TYPICAL CONDUIT SLEEVE THROUGH INTERIOR CMU WALL

NO SCALE



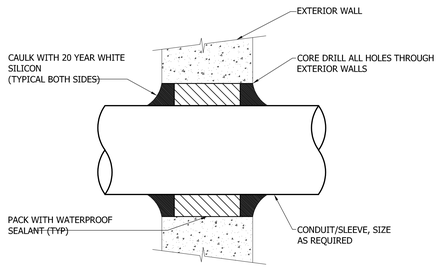
2 TYPICAL CONDUIT SLEEVE THROUGH INTERIOR STUD WALL

NO SCALE



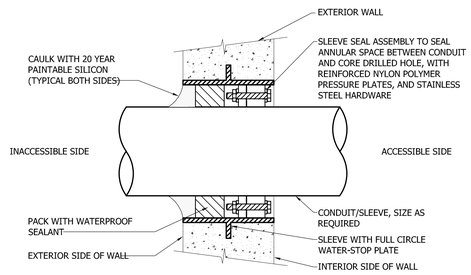
3 TYPICAL CONDUIT THROUGH FLOOR

NO SCALE



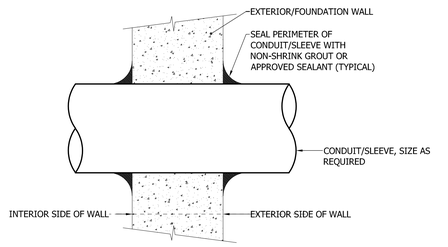
4 TYPICAL CONDUIT THROUGH EXTERIOR WALL - ABOVE GRADE

NO SCALE



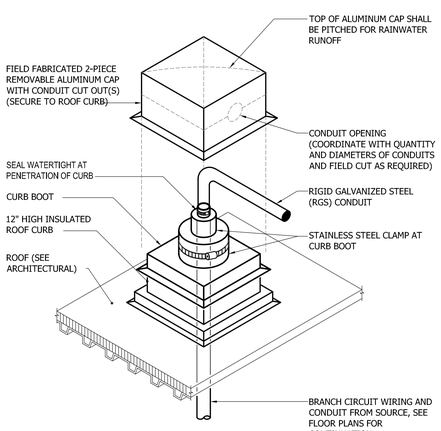
5 TYPICAL CONDUIT THROUGH EXTERIOR WALL - BELOW GRADE ON ONE SIDE, ACCESSIBLE SPACE ON OTHER SIDE, E.G. CRAWLSPACE/BASEMENT

NO SCALE



6 TYPICAL CONDUIT THROUGH EXTERIOR WALL - BELOW GRADE ON BOTH SIDES

NO SCALE

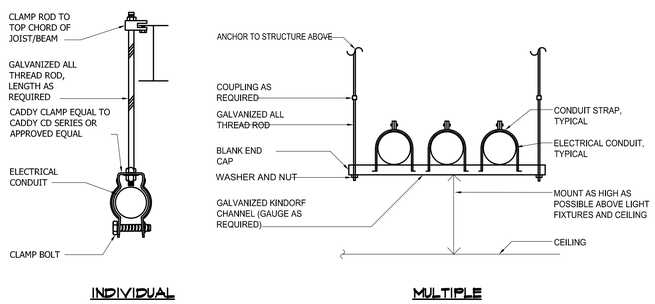


NOTES:

1. PROVIDE ADDITIONAL BOOTS FOR MULTIPLE CONDUIT PENETRATIONS THROUGH ROOF.
2. PROVIDE SLOPED CURBS TO MATCH ROOF PITCH WHERE REQUIRED.

7 TYPICAL CONDUIT THROUGH ROOF DECK

NO SCALE

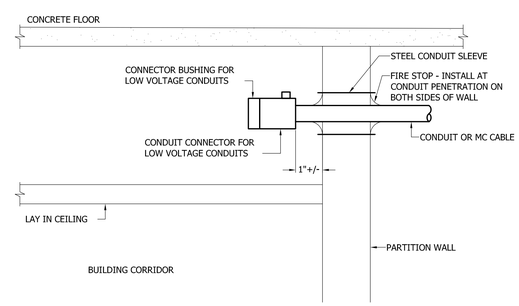


NOTES:

1. ALL ELECTRICAL HANGERS AND SUPPORT COMPONENTS IN DRY INTERIOR LOCATIONS SHALL HAVE A NON-CORROSIVE METAL FINISH, GALV-KROM OR EQUAL.
2. ALL ELECTRICAL HANGERS AND SUPPORT COMPONENTS IN DAMP/WET LOCATIONS SHALL BE STAINLESS STEEL .
3. ALL EXPOSED CONDUIT HANGERS AND SUPPORTS SHALL BE PAINTED WITH RUST INHIBITING PAINT AS SPECIFIED, UNLESS OTHERWISE NOTED.

8 TYPICAL CONDUIT SUPPORT

NO SCALE



9 CORRIDOR WALL PENETRATION DETAIL

NO SCALE

REVISIONS

no.	date	comments

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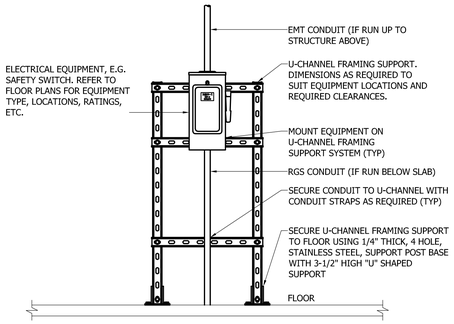
E503

1 NOT USED

NO SCALE

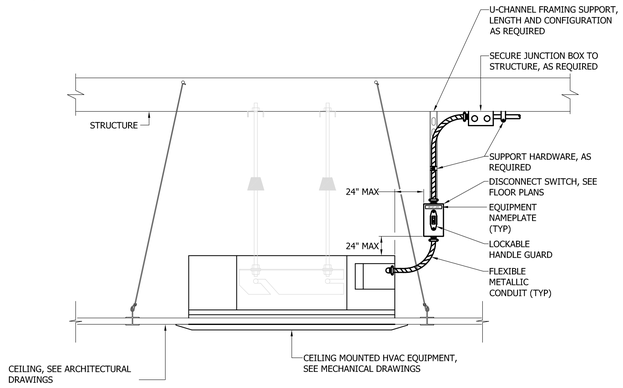
2 FREE-STANDING U-CHANNEL SUPPORT FOR ELECTRICAL EQUIPMENT

NO SCALE



3 HVAC EQUIPMENT CONNECTION - CEILING MOUNTED EQUIPMENT

NO SCALE

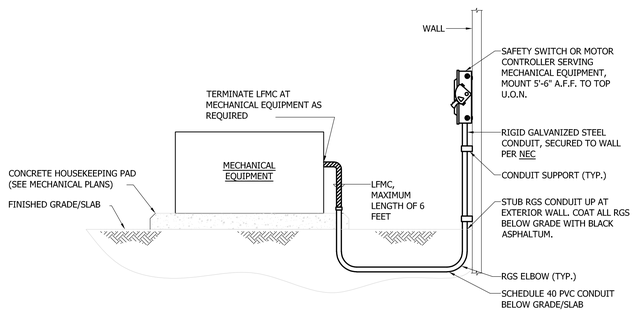


NOTES:

1. COORDINATE LOCATION WITH DIVISION 23, SEE MECHANICAL DRAWINGS.
2. REFRIGERATION PIPING NOT SHOWN, SEE MECHANICAL DRAWINGS.
3. MAKE FINAL CONNECTION TO EQUIPMENT PER MANUFACTURER'S INSTRUCTIONS.

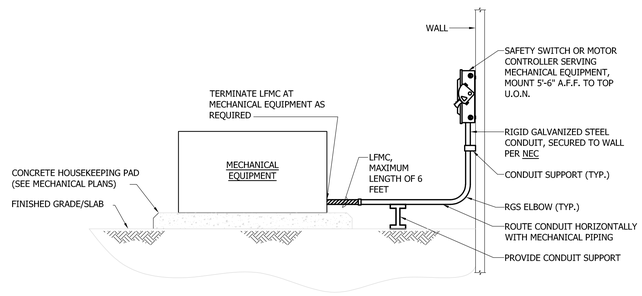
4 PAD-MOUNTED MECHANICAL EQUIPMENT CONNECTION - CONDUIT BELOW SLAB

NO SCALE



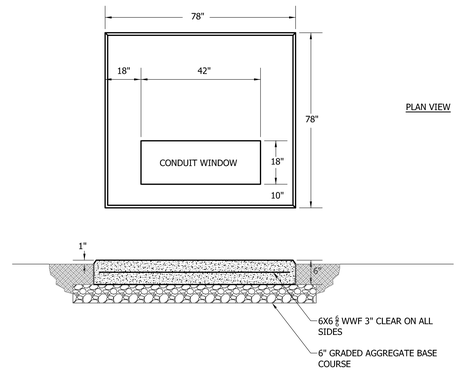
5 PAD-MOUNTED MECHANICAL EQUIPMENT CONNECTION - CONDUIT ABOVE SLAB

NO SCALE



6 UTILITY PAD DIMENSION DETAIL

NO SCALE

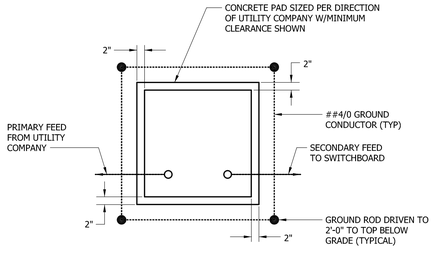


NOTES:

1. REFER TO DELAWARE ELECTRIC COOP DETAIL DT-1 FOR ADDITIONAL INFORMATION.
2. LOCATE PAD SO THAT EXISTING PRIMARY AND SECONDARY CONDUITS ARE WITHIN THE CONDUIT WINDOW.

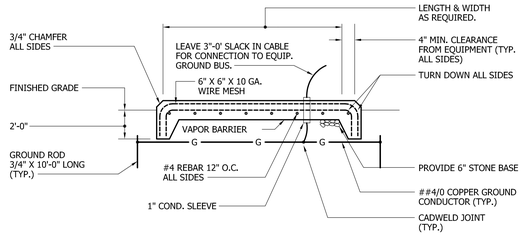
7 TRANSFORMER PAD GROUNDING

NO SCALE



8 UTILITY PAD GROUNDING

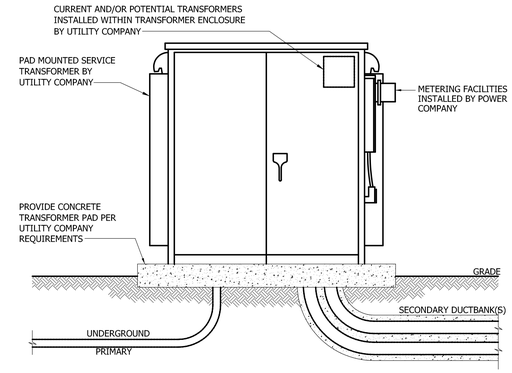
NO SCALE



NOTE: TRANSFORMER PAD CONSTRUCTION/INSTALLATION SHALL BE COORDINATED IN ADVANCE WITH UTILITY COMPANY.

9 UTILITY PAD-MOUNT TRANSFORMER

NO SCALE



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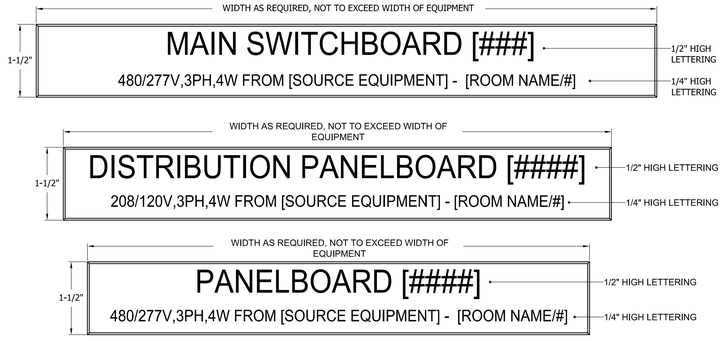
E504

1 NOT USED

NO SCALE

2 TYPICAL EQUIPMENT NAMEPLATES

NO SCALE

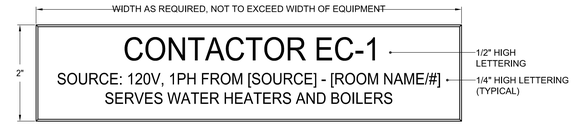


NOTES:

1. LINE #1 IDENTIFIES EQUIPMENTDESIGNATION: SWITCHBOARD, DISTRIBUTION PANELBOARD, PANELBOARD [PANELBOARD DESIGNATION, E.G. DP1D1]
2. LINE #2 IDENTIFIES FEEDER CIRCUIT INFORMATION: [VOLTAGE], [PHASE], [# WIRES] FROM [SOURCE EQUIPMENT/CIRCUIT DESIGNATION] - [ROOM WHERE SOURCE IS LOCATED]

3 NOT USED

NO SCALE



NOTES:

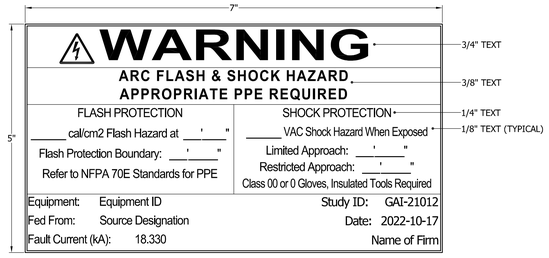
1. LINE #1 IDENTIFIES CONTACTOR DESIGNATION: CONTACTOR [CONTACTOR DESIGNATION, E.G. "EC-1"]
2. LINE #2 IDENTIFIES CONTROL POWER CIRCUIT INFORMATION: [VOLTAGE], [PHASE], [# WIRES] FROM [SOURCE PANELBOARD - [ROOM WHERE SOURCE PANELBOARD IS LOCATED]
3. LINE #3 IDENTIFIES LOAD CONTROLLED BY CONTACTOR.

4 NOT USED

NO SCALE

5 TYPICAL ARC FLASH HAZARD LABEL

NO SCALE



NOTES:

1. APPLY ARCH FLASH HAZARD LABELS AT EACH PIECE OF ELECTRICAL DISTRIBUTION EQUIPMENT REQUIRED BY NFPA 70 AND NFPA70E.
2. ARC FLASH HAZARD LABELS SHALL BE SPECIFIC TO EACH PIECE OF EQUIPMENT. GENERIC LABELS SUPPLIED WITH EQUIPMENT ARE NOT ACCEPTABLE.

6 DETAIL - TYPICAL EQUIPMENT NAMEPLATE - ENCLOSED CONTACTOR

NO SCALE

NOTES:

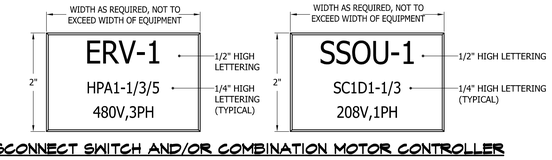
1. LINE #1 IDENTIFIES TRANSFORMER DESIGNATION: TRANSFORMER [TRANSFORMER DESIGNATION, E.G. TDP1D1]
2. LINE #2 IDENTIFIES PRIMARY CIRCUIT INFORMATION: [VOLTAGE], [PHASE], [# WIRES] FROM [SOURCE EQUIPMENT/CIRCUIT DESIGNATION] - [ROOM WHERE SOURCE IS LOCATED]
3. LINE #3 IDENTIFIES SECONDARY INFORMATION: [VOLTAGE], [PHASE], [# WIRES] TO [LOAD EQUIPMENT/CIRCUIT DESIGNATION] - [ROOM WHERE LOAD IS LOCATED]

7 TYPICAL EQUIPMENT NAMEPLATE - DRY-TYPE TRANSFORMER

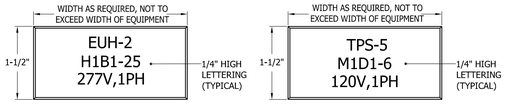
NO SCALE

8 TYPICAL EQUIPMENT NAMEPLATES

NO SCALE



DISCONNECT SWITCH AND/OR COMBINATION MOTOR CONTROLLER



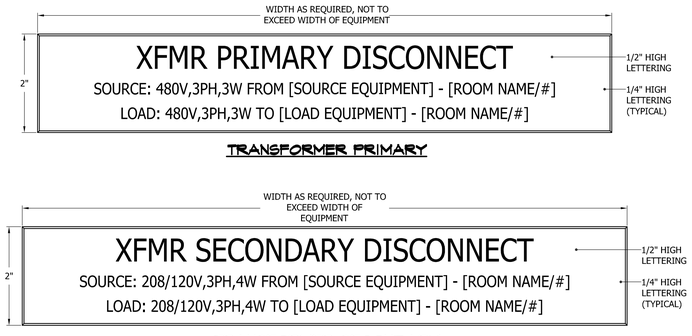
MANUAL MOTOR STARTER/CONTROL SWITCH

NOTES:

1. LINE #1 IDENTIFIES LOAD DESIGNATION: [LOAD DESIGNATION, E.G. ERV-1]
2. LINE #2 IDENTIFIES BRANCH CIRCUIT: [SOURCE EQUIPMENT/CIRCUIT DESIGNATION, E.G. [HPA1-1/3/5]
3. LINE #3 IDENTIFIES BRANCH CIRCUIT INFORMATION: [VOLTAGE], [PHASE], [# WIRES (NOT REQUIRED FOR SINGLE PHASE CIRCUITS)]
4. WHERE MOTOR SWITCH IS DOWNSTREAM OF THE MOTOR CONTROLLER, ADD A FOURTH LINE OF TEXT TO IDENTIFY MOTOR CONTROLLER LOCATION: [MOTOR CONTROLLER] [VFD] SERVING THIS MOTOR IS LOCATED IN [ROOM NAME] [ROOM NUMBER].
5. PROVIDE NAMEPLATES FOR ALL DISCONNECTING MEANS FOR EQUIPMENT, INCLUDING FACTORY DISCONNECTS PROVIDED INTEGRAL WITH EQUIPMENT.

9 TYPICAL EQUIPMENT NAMEPLATE - TRANSFORMER PRIMARY / SECONDARY DISCONNECTING MEANS

NO SCALE



TRANSFORMER PRIMARY

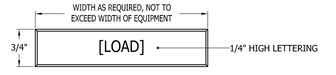
TRANSFORMER SECONDARY

NOTES:

1. LINE #1 IDENTIFIES DISCONNECT: XFMR [PRIMARY] [SECONDARY] DISCONNECT
2. LINE #2 IDENTIFIES SOURCE CIRCUIT INFORMATION: SOURCE: [VOLTAGE], [PHASE], [# WIRES] FROM [SOURCE EQUIPMENT/CIRCUIT DESIGNATION] - [ROOM WHERE SOURCE IS LOCATED]
3. LINE #3 IDENTIFIES LOAD CIRCUIT INFORMATION: LOAD: [VOLTAGE], [PHASE], [# WIRES] TO [LOAD EQUIPMENT/CIRCUIT DESIGNATION] - [ROOM WHERE LOAD IS LOCATED]

10 TYPICAL EQUIPMENT NAMEPLATE - CIRCUIT BREAKER IN DISTRIBUTION PANELBOARD OR SWITCHBOARD

NO SCALE



NOTES:

1. LINE #1 IDENTIFIES LOAD SERVED BY CIRCUIT BREAKER.
2. APPLY TO ALL CIRCUIT BREAKERS IN THE MAIN SWITCHBOARD AND EACH DISTRIBUTION PANELBOARD.

11 TYPICAL EQUIPMENT NAMEPLATE - SPARE FUSE CABINET

NO SCALE

NOTES:

1. LINE #1 IDENTIFIES SPARE FUSE CABINET.
2. APPLY TO ALL SPARE FUSE CABINETS LOCATED IN MECHANICAL / ELECTRICAL ROOMS AND PENTHOUSES / MEZZANINES.

REVISIONS

no.	date	comments

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SEAL

PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF DELAWARE, LICENSE No. 17123, EXPIRATION DATE: 06/30/2026.

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Project No. 118.048

CAESAR RODNEY SCHOOL DISTRICT
MAGNOLIA MIDDLE SCHOOL
HVAC RENOVATIONS
SRS 2503

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SUBMISSION

BID DOCUMENTS

DETAILS
ELECTRICAL

DESIGN BY	DMD
CHECKED BY	DMD
SCALE	AS NOTED
JOB NO.	24008B
DATE	03/05/2025

E505