ADDENDUM NO. 1

TO

CONTRACT DOCUMENTS

FOR

MIDDLETOWN THRALL LIBRARY

HVAC UPGRADES

Middletown Thrall Library
11-19 Depot Street
Middletown, NY 10940

Contact: Mr. Matthew Pfisterer,
Director

LAN Job #4.1603.02
March 14, 2024

LAN
LAN ASSOCIATES
SINCE 1965
ENGINEERING ▪ PLANNING ▪ ARCHITECTURE ▪ SURVEYING, LLP
252 MAIN STREET, GOSHEN, NEW YORK 10924
P. 845-615-0350 ▪ F. 845-615-0351 ▪ WWW.LANASSOCIATES.COM

1.0 General: The original contract documents dated **February 28, 2024,** for this project are hereby amended as noted in this addendum which shall become part of said contract documents, as if originally included therein.

2.0 Amendments to Specifications:

Section No.	Page No.	Addendum Requirements
233113		Specification 233113 – Metal Ducts, section 3.7 was revised to provide additional clarification on duct cleaning for new and existing systems.
233300		Specification 233300 – Air Duct Accessories was revised to include information regarding control dampers.

3.0 Amendments to Drawings:

Drawing No.	Addendum Requirements
T1.00	Removed “EF-2” from note #2 under phase 1 demolition notes.
M0.01	Revised HVAC general note #21 to include reference to revised Specification 233113 – Metal Ducts.
M1.01	Removed flexible ductwork that does not exist.
M1.03	Provided crawl space elevation and revised notes for (2) 8” round ducts going up to the floor above.
M2.01	Removed flexible ductwork that does not exist.
M2.03	Provided crawl space elevation and revised notes for (2) 8” round ducts going up to the floor above.

4.0 Requests for Information:

No.	Question/Response:	
1	Question	Can an additional walkthrough be provided or is there facility personnel on site to escort an contractor?
	Response	Prospective bidders can contact Matthew Pfisterer, Director of Library, for any additional site visits/walkthroughs. Phone: (845) 341-5485 Email: mpfisterer@rcls.org
2	Question	Drawing T1.00 indicates that EF-2 will be demolished in phase #1. Please confirm EF-2 does not currently exist and the new EF-2 will not be replacing an existing fan?
	Response	EF-2 is new and will not be replacing an existing fan.

4.0 Requests for Information: (continued)

No.	Question/Response:	
3	Question	Drawings M1.03's & M2.03's Key Plan indicates Phase 1 work being performed in the middle and southern end of the building. Please clarify which scope of work is part of phase 1 in these areas?
	Response	Please refer to "Project Phasing" on drawing T1.00 for all information regarding phasing and the scope of work for each phase.
4	Question	Drawings M1.03 & M2.03 (Phase 2) indicates (2) 8" round ducts to be removed and replaced. This duct is shown to rise above starting from the basement. These ducts don't seem to be reflected on the floor above or on the roof. Please clarify wheat these two runs of duct are serving?
	Response	The (2) 8" round ducts serve 2 existing to remain floor registers on the first floor. One floor register is in the top right of Reading Room 114 and the second register is in the top right of the adjacent Service Room.
5	Question	Can an RCP be provided which indicates the ceiling type and existing Lighting?
	Response	Contractor shall be responsible for verifying existing RCP in the field.
6	Question	What is the elevation of the crawl space shown on drawing M1.03 & & M2.03?
	Response	The approximate elevation of the crawl space shown on drawings M1.03 & M2.03 is 3'-0" +/-.
7	Question	Can a spec be provided indicating the extent of cleaning involved on the existing ductwork?
	Response	Please refer to revised specification 233113 Metal Ducts, section 3.7 for all information regarding duct cleaning.
8	Question	What is the type and manufacturer of the current roofing system that new equipment is getting mounted on? Is it still under warranty?
	Response	The existing roofing system is EDPM and the existing manufacturer is unknown. The existing roof is not under warranty.
9	Question	Drawing M0.01 "General Notes" Note #25 states if the outdoor temperature is below 50 degrees, uninterrupted heating should be provided at all boiler rooms during occupied hours. When the AHU's are down during phase #1, the VAV's will not have supply air to provide heating. Is there supplemental heat that the boilers are serving to heat the building other then what is being replaced? If not, what is the intent?
	Response	The boilers provide heating hot water to what is being replaced only. Prospective bidders shall have an allowance for any temporary heating and/or cooling that is required. Methods of providing temporary heating and/or cooling is the contractor's responsibility and shall be coordinated with the library staff. In an absolute emergency, were no temporary heating and/or cooling can be provided, the library can be temporarily closed. Any shut down's must be coordinated with the Library Director a minimum of 72 hours in advance.

4.0 Requests for Information: (continued)

No.	Question/Response:	
10	Question	The specs associated with control dampers appear to be missing from the duct accessories spec. Can this be provided?
	Response	Please refer to revised specification 233300 Air Duct Accessories.

5.0 Clarifications:

No.	
1	No additional pre-bid RFI's will be accepted, and no additional pre-bid addendums will be issued after today's date (3/14/24).

END OF ADDENDUM NO. 1

Attachments: #1 – 23 31 13 – Metal Ducts
#2 – 23 33 00 – Air Duct Accessories

Enclosures: #1 – Revised Drawings: T1.00, M0.01, M1.01, M1.03, M2.01 and M2.03

SECTION 233113 – METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes metal ducts for supply, return, outside, and exhaust air-distribution systems in pressure classes from minus 2- to plus 10-inch wg (minus 500 to plus 2500 Pa). Metal ducts include the following:

1. Rectangular ducts and fittings.
2. Single-wall round spiral-seam ducts and formed fittings.
3. Sheet metal materials.
4. Duct liner.
5. Sealants and gaskets.
6. Hangers and supports.

B. Related Sections include the following:

1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 DEFINITIONS

A. NUSIG: National Uniform Seismic Installation Guidelines.

1.4 SYSTEM DESCRIPTION

A. Duct system design, as indicated, has been used to select size and type of air-moving and -distribution equipment and other air system components. Changes to layout or configuration of duct system must be specifically approved in writing by Architect. Accompany requests for layout modifications with calculations showing that proposed layout will provide original design results without increasing system total pressure.

1.5 SUBMITTALS

A. Shop Drawings: CAD-generated and drawn to 1/4 inch equals 1 foot. Show fabrication and installation details for metal ducts.

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.

2. Duct layout indicating sizes and pressure classes.

3. Elevations of top and bottom of ducts.

4. Dimensions of main duct runs from building grid lines.

5. Fittings.

6. Reinforcement and spacing.

7. Seam and joint construction.

8. Penetrations through fire-rated and other partitions.

9. Equipment installation based on equipment being used on Project.

10. Duct accessories, including access doors and panels.

11. Hangers and supports, including methods for duct and building attachment, vibration isolation, and seismic restraints.

B. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Ceiling suspension assembly members.

2. Other systems installed in same space as ducts.

3. Ceiling- and wall-mounting access doors and panels required to provide access to dampers and other operating devices.

4. Ceiling-mounting items, including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

C. Welding certificates.

D. Field quality-control test reports.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," for hangers and supports and AWS D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. NFPA Compliance:

1. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."

2. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

C. Comply with NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations," Ch. 3, "Duct System," for range hood ducts, unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter of the round sides connecting the flat portions of the duct (minor dimension).

C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Transverse Joints in Ducts Larger Than 60 Inches (1524 mm) in Diameter: Flanged.

D. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger than 90 inches (2286 mm) in diameter with butt-welded longitudinal seams.

2. Fabricate flat-oval ducts larger than 72 inches (1830 mm) in width (major dimension) with butt-welded longitudinal seams.

E. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.4 SHEET METAL MATERIALS

A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 (Z275) coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.

C. Carbon-Steel Sheets: ASTM A 366/A 366M, cold-rolled sheets; commercial quality; with oiled, matte finish for exposed ducts.

D. Aluminum Sheets: ASTM B 209 (ASTM B 209M), alloy 3003, temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.

E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.

F. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.5 DUCT LINER

A. Fibrous-Glass Liner: Comply with NFPA 90A or NFPA 90B and with NAIMA AH124.

1. Manufacturers:

a. CertainTeed Corp.; Insulation Group.
b. Johns Manville International, Inc.
c. Knauf Fiber Glass GmbH.
d. Owens Corning.
e. Or approved equal.

2. Materials: ASTM C 1071; surfaces exposed to air stream shall be coated to prevent erosion of glass fibers.

a. Thickness: 2 inch.

b. Thermal Conductivity (k-Value): 0.26 at 75 deg F (0.037 at 24 deg C) mean temperature.

c. Fire-Hazard Classification: Maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM E 84.

d. Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.

e. Mechanical Fasteners: Galvanized steel suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in duct.

1) Tensile Strength: Indefinitely sustain a 50-lb- (23-kg-) tensile, dead-load test perpendicular to duct wall.

2) Fastener Pin Length: As required for thickness of insulation and without projecting more than 1/8 inch (3 mm) into air stream.

3) Adhesive for Attaching Mechanical Fasteners: Comply with fire-hazard classification of duct liner system.

2.6 SEALANT MATERIALS

A. Joint and Seam Sealants, General: The term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics.

B. Joint and Seam Tape: 2 inches (50 mm) wide; glass-fiber-reinforced fabric.

C. Tape Sealing System: Woven-fiber tape impregnated with gypsum mineral compound and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.

D. Water-Based Joint and Seam Sealant: Flexible, adhesive sealant, resistant to UV light when cured, UL 723 listed, and complying with NFPA requirements for Class 1 ducts.

E. Solvent-Based Joint and Seam Sealant: One-part, nonsag, solvent-release-curing, polymerized butyl sealant formulated with a minimum of 75 percent solids.

F. Flanged Joint Mastic: One-part, acid-curing, silicone, elastomeric joint sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.

G. Flange Gaskets: Butyl rubber or EPDM polymer with polyisobutylene plasticizer.

2.7 HANGERS AND SUPPORTS

A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches (100 mm) thick.

2. Exception: Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.

B. Hanger Materials: Galvanized sheet steel or threaded steel rod.

1. Hangers Installed in Corrosive Atmospheres: Electro-galvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

2. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for steel sheet width and thickness and for steel rod diameters.

3. Galvanized-steel straps attached to aluminum ducts shall have contact surfaces painted with zinc-chromate primer.

C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

D. Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

2. Supports for Stainless-Steel Ducts: Stainless-steel support materials.

3. Supports for Aluminum Ducts: Aluminum support materials unless materials are electrolytically separated from ducts.

2.8 RECTANGULAR DUCT FABRICATION

A. Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" and complying with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.

1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure class.

2. Deflection: Duct systems shall not exceed deflection limits according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. Transverse Joints: Prefabricated slide-on joints and components constructed using manufacturer's guidelines for material thickness, reinforcement size and spacing, and joint reinforcement.

1. Manufacturers:

a. Ductmate Industries, Inc.
b. Nexus Inc.
c. Ward Industries, Inc.
d. McGrill AirFlow LLC.
e. Or approved equal

C. Formed-On Flanges: Construct according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," Figure 1-4, using corner, bolt, cleat, and gasket details.

1. Manufacturers:

a. Ductmate Industries, Inc.
b. Lockformer.
c. McGrill AirFlow LLC.
d. SEMCO LLC
e. Or approved equal

2. Duct Size: Maximum 30 inches (750 mm) wide and up to 2-inch wg (500-Pa) pressure class.

3. Longitudinal Seams: Pittsburgh lock sealed with noncuring polymer sealant.

D. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches (480 mm) and larger and 0.0359 inch (0.9 mm) thick or less, with more than 10 sq. ft. (0.93 sq. m) of non-braced panel area unless ducts are lined.

2.9 APPLICATION OF LINER IN RECTANGULAR DUCTS

A. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.

B. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.

C. Butt transverse joints without gaps and coat joint with adhesive.

D. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.

E. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and standard liner product dimensions make longitudinal joints necessary.

F. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm (12.7 m/s).

G. Secure liner with mechanical fasteners 4 inches (100 mm) from corners and at intervals not exceeding 12 inches (300 mm) transversely; at 3 inches (75 mm) from transverse joints and at intervals not exceeding 18 inches (450 mm) longitudinally.

H. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:

1. Fan discharges.

2. Intervals of lined duct preceding unlined duct.

3. Upstream edges of transverse joints in ducts where air velocities are greater than 2500 fpm (12.7 m/s) or where indicated.

I. Terminate inner ducts with build outs attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated build outs (metal hat sections) or other build out means are optional; when used, secure build outs to duct walls with bolts, screws, rivets, or welds.

2.10 ROUND DUCT AND FITTING FABRICATION (WHERE INDICATED ON DRAWINGS)

A. Round, Longitudinal- and Spiral Lock-Seam Ducts: Fabricate exhaust air ducts of aluminum according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

1. Manufacturers:

a. McGill AirFlow Corporation.
b. SEMCO Incorporated.
c. Ductmate Industries, Inc.
d. Spiral Manufacturing Co.
e. Or approved equal

B. Duct Joints:

1. Ducts up to 20 Inches (500 mm) in Diameter: Interior, center-beaded slip coupling, sealed before and after fastening, attached with sheet metal screws.

2. Ducts 21 to 72 Inches (535 to 1830 mm) in Diameter: Three-piece, gasketed, flanged joint consisting of two internal flanges with sealant and one external closure band with gasket.

3. Round Ducts: Prefabricated connection system consisting of double-lipped, EPDM rubber gasket. Manufacture ducts according to connection system manufacturer's tolerances.

a. Manufacturers:

1) Ductmate Industries, Inc.

2) Lindab Inc.

3) SEMCO Incorporated.

4) McGill AirFlow Corporation.

5) Or Approved equal

C. 90-Degree Tees and Laterals and Conical Tees: Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," with metal thicknesses specified for longitudinal-seam straight ducts.

D. Diverging-Flow Fittings: Fabricate with reduced entrance to branch taps and with no excess material projecting from fitting onto branch tap entrance.

E. Fabricate elbows using die-formed, gored, pleated, or mitered construction. Bend radius of die-formed, gored, and pleated elbows shall be 1-1/2 times duct diameter. Unless elbow construction type is indicated, fabricate elbows as follows:

1. Mitered-Elbow Radius and Number of Pieces: Welded construction complying with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.

2. Round Mitered Elbows: Welded construction with the following metal thickness for pressure classes from minus 2- to plus 2-inch wg (minus 500 to plus 500 Pa):

a. Ducts 3 to 36 Inches (75 to 915 mm) in Diameter: 0.034 inch (0.85 mm).

b. Ducts 37 to 50 Inches (940 to 1270 mm) in Diameter: 0.040 inch (1.0 mm).

3. Round Mitered Elbows: Welded construction with the following metal thickness for pressure classes from 2- to 10-inch wg (500 to 2500 Pa):

a. Ducts 3 to 26 Inches (75 to 660 mm) in Diameter: 0.034 inch (0.85 mm).

b. Ducts 27 to 50 Inches (685 to 1270 mm) in Diameter: 0.040 inch (1.0 mm).

4. Round Elbows 8 Inches (200 mm) and Less in Diameter: Fabricate die-formed elbows for 45- and 90-degree elbows and pleated elbows for 30, 45, 60, and 90 degrees only. Fabricate nonstandard bend-angle configurations or nonstandard diameter elbows with gored construction.

5. Round Elbows 9 through 14 Inches (225 through 355 mm) in Diameter: Fabricate gored or pleated elbows for 30, 45, 60, and 90 degrees unless space restrictions require mitered elbows. Fabricate nonstandard bend-angle configurations or nonstandard diameter elbows with gored construction.

6. Die-Formed Elbows for Sizes through 8 Inches (200 mm) in Diameter and All Pressures 0.040 inch (1.0 mm) thick with 2-piece welded construction.

7. Round Gored-Elbow Metal Thickness: Same as non-elbow fittings specified above.

8. Pleated Elbows for Sizes through 14 Inches (355 mm) in Diameter and Pressures through 10-Inch wg (2500 Pa): 0.022 inch (0.55 mm).

PART 3 - EXECUTION

3.1 DUCT APPLICATIONS

A. Static-Pressure Classes: Unless otherwise indicated, construct ducts according to the following:

1. Return Ducts (Negative Pressure): 2 inch wg.

2. Exhaust Ducts (Negative Pressure): 2-inch wg.

B. All ducts shall be galvanized steel except exhaust air duct for chemical fume hood shall be aluminum construction.

3.2 DUCT INSTALLATION

A. Construct and install ducts according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.

B. Install round ducts in lengths not less than 12 feet (3.7 m) unless interrupted by fittings.

C. Install ducts with fewest possible joints.

D. Install fabricated fittings for changes in directions, size, and shape and for connections.

E. Install couplings tight to duct wall surface with a minimum of projections into duct. Secure couplings with sheet metal screws. Install screws at intervals of 12 inches (300 mm), with a minimum of 3 screws in each coupling.

F. Install ducts, unless otherwise indicated, vertically and horizontally and parallel and perpendicular to building lines; avoid diagonal runs.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.

I. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions unless specifically indicated.

J. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.

K. Seal all joints and seams. Apply sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws.

L. Electrical Equipment Spaces: Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures.

M. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls and are exposed to view, conceal spaces between construction openings and ducts or duct insulation with sheet metal flanges of same metal thickness as ducts. Overlap openings on 4 sides by at least 1-1/2 inches (38 mm).

N. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire dampers, sleeves, and firestopping sealant. Fire and smoke dampers are specified in Division 23 Section "Duct Accessories." And firestop penetration

O. Install ducts with hangers and braces designed to withstand, without damage to equipment, seismic force required by applicable building codes. Refer to SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."

P. Protect duct interiors from the elements and foreign materials until building is enclosed. Follow SMACNA's "Duct Cleanliness for New Construction."

Q. Paint interiors of metal ducts, that do not have duct liner, for 24 inches (600 mm) upstream of registers and grilles. Apply one coat of flat, black, latex finish coat over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 9 painting Sections.

3.3 SEAM AND JOINT SEALING

A. Seal duct seams and joints according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for duct pressure class indicated.

1. For pressure classes lower than 2-inch wg (500 Pa), seal transverse joints.

B. Seal ducts before external insulation is applied.

3.4 HANGING AND SUPPORTING

A. Support horizontal ducts within 24 inches (600 mm) of each elbow and within 48 inches (1200 mm) of each branch intersection.

B. Support vertical ducts at maximum intervals of 16 feet (5 m) and at each floor.

C. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.

D. Install concrete inserts before placing concrete.

E. Install powder-actuated concrete fasteners after concrete is placed and completely cured.

1. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors according to Division 23 Section "Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections according to SMACNA's "HVAC Air Duct Leakage Test Manual" and prepare test reports:

1. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.

2. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If pressure classes are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.

3. Maximum Allowable Leakage: Comply with requirements for Leakage Class 3 for round ducts, Leakage Class 12 for rectangular ducts in pressure classes lower than and equal to 2-inch wg (500 Pa) (both positive and negative pressures), and Leakage Class 6 for pressure classes from 2- to 10-inch wg (500 to 2500 Pa).

4. Remake leaking joints and retest until leakage is equal to or less than maximum allowable.

3.7 CLEANING NEW & EXISTING SYSTEMS

A. Clean new and existing duct system(s) before testing, adjusting, and balancing.

B. Mark position of dampers and air-directional mechanical devices before cleaning.

C. Use service openings, as required, for physical and mechanical entry and for inspection.

1. Create other openings to comply with duct standards.

2. Disconnect flexible ducts as needed for cleaning and inspection.

3. Remove and reinstall ceiling sections to gain access during the cleaning process.

D. Particulate Collection and Order Control.

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-mirco-size (or larger) particles.

2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

E. Clean the following metal duct systems by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).

2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.

3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.

4. Coils and related components.

5. Return-air ducts, dampers, and actuators except in ceiling plenums and mechanical equipment rooms.

6. Supply-air ducts, dampers, actuators, and turning vanes.

F. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.

2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.

3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts or duct accessories.

4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold or fungus growth.

5. Provide drainage and cleanup for wash-down procedures.

6. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer’s written instructions after removal of surface deposits and debris.

G. Cleanliness Verification:

1. Visually inspect metal ducts for contaminants.

2. Where contaminants are discovered, re-clean and reinspect ducts.

END OF SECTION 233113

SECTION 233300 – AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Manual volume dampers.
2. Control dampers.
3. Flange connectors.
4. Turning vanes.
5. Flexible connectors.
6. Flexible ducts.

1.3 ACTION SUBMITTALS

A. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.

1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:

a. Special fittings.
b. Manual volume damper installations.
c. Control-damper installations.
d. Fire-damper, ceiling, and corridor damper installations, including sleeves; and duct-mounted access doors and remote damper operators.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from Installers of the items involved.

B. Source quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G90 (Z275).

B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

C. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.3 MANUAL VOLUME DAMPERS

A. Standard, Steel, Manual Volume Dampers:

1. Standard leakage rating, with linkage outside airstream.

2. Suitable for horizontal or vertical applications.

3. Frames:

a. Frame: Hat-shaped, 0.094-inch- (2.4-mm-) thick, galvanized sheet steel.
b. Mitered and welded corners.
c. Flanges for attaching to walls and flangeless frames for installing in ducts.

4. Blades:

a. Multiple or single blade.
b. Parallel- or opposed-blade design.

c. Stiffen damper blades for stability.
d. Galvanized-steel, 0.064 inch (1.62 mm) thick.

5. Blade Axles: Galvanized steel.

6. Bearings:

a. Oil-impregnated bronze.
b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

7. Tie Bars and Brackets: Galvanized steel.

B. Low-Leakage, Steel, Manual Volume Dampers:

1. Comply with AMCA 500-D testing for damper rating.

2. Low-leakage rating with linkage outside airstream and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.

3. Suitable for horizontal or vertical applications.

4. Frames:

a. Angle shaped.
b. 0.094-inch- (2.4-mm-) thick, galvanized sheet steel.
c. Mitered and welded corners.
d. Flanges for attaching to walls and flangeless frames for installing in ducts.

5. Blades:

a. Multiple or single blade.
b. Parallel- or opposed-blade design.
c. Stiffen damper blades for stability.
d. Galvanized, roll-formed steel, 0.064 inch (1.62 mm) thick.

6. Blade Axles: Galvanized steel.

7. Bearings:

a. Oil-impregnated bronze.
b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

8. Blade Seals: Neoprene.

9. Jamb Seals: Cambered aluminum.

10. Tie Bars and Brackets: Galvanized steel.

11. Accessories:

a. Include locking device to hold single-blade dampers in a fixed position without vibration.

2.4 CONTROL DAMPERS

A. Frames:

1. Hat shaped.
2. 0.094-inch- thick, galvanized sheet steel
3. Mitered and welded corners.

B. Blades:

1. Multiple blade with maximum blade width of 6 inches.
2. Parallel or Opposed-blade design.
3. Galvanized-steel.
4. 0.064 inch thick single skin.
5. Blade Edging: Closed-cell neoprene.
6. Blade Edging: Inflatable seal blade edging, or replaceable rubber seals.

C. Blade Axles: 1/2-inch- diameter; galvanized steel; blade-linkage hardware of zinc-plated steel and brass; ends sealed against blade bearings.

1. Operating Temperature Range: From minus 40 to plus 200 deg F.

D. Bearings:

1. Oil-impregnated bronze.
2. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
3. Thrust bearings at each end of every blade.

2.5 FLANGE CONNECTORS

A. Description: roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.

B. Material: Galvanized steel.

C. Gage and Shape: Match connecting ductwork.

2.6 FLEXIBLE CONNECTORS

A. Materials: Flame-retardant or noncombustible fabrics.

B. Coatings and Adhesives: Comply with UL 181, Class 1.

C. Metal-Edged Connectors: Factory fabricated with a fabric strip 5-3/4 inches wide attached to two strips of 2-3/4-inch- (70-mm-) wide, 0.028-inch- (0.7-mm-) thick, galvanized sheet steel or 0.032-inch- (0.8-mm-) thick aluminum sheets. Provide metal compatible with connected ducts.

D. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 26 oz./sq. yd. (880 g/sq. m).
2. Tensile Strength: 480 lbf/inch (84 N/mm) in the warp and 360 lbf/inch (63 N/mm) in the filling.
3. Service Temperature: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install volume dampers at points on supply and return systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.

1. Install steel volume dampers in steel ducts.

2. Install aluminum volume dampers in aluminum ducts.

D. Set dampers to fully open position before testing, adjusting, and balancing.

E. Install test holes at fan inlets and outlets and elsewhere as indicated.

F. Install fire dampers according to UL listing.

G. Install flexible connectors to connect ducts to equipment.

H. Connect terminal units to supply ducts with maximum 6-inch lengths of flexible duct. Do not use flexible ducts to change directions.

I. Connect flexible ducts to metal ducts with [adhesive plus sheet metal screws.

J. Install duct test holes where required for testing and balancing purposes.

K. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch (6-mm) movement during start and stop of fans.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.

2. Inspect locations of access doors and verify that purpose of access door can be performed.

3. Operate fire dampers to verify full range of movement and verify that proper heat-response device is installed.

4. Inspect turning vanes for proper and secure installation.

5. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION 233300

1 No additional pre-bid RFI's will be accepted, and no additional pre-bid addendums will be issued after today's date (3/14/24).

END OF ADDENDUM NO. 1

Attachments: #1 – 23 31 13 – Metal Ducts
#2 – 23 33 00 – Air Duct Accessories

Enclosures: #1 – Revised Drawings: T1.00, M0.01, M1.01, M1.03, M2.01 and M2.03

HVAC UPGRADES

THRALL LIBRARY
11 Depot Street
Middletown, New York 10940

Drawing Index

SHEET No.	DESCRIPTION
T1.00	TITLE SHEET
M0.01	MECHANICAL ABBREVIATIONS, NOTES AND SYMBOLS
M1.01	MECHANICAL FIRST FLOOR DEMOLITION PLAN
M1.02	MECHANICAL DEMOLITION PLANS
M1.03	MECHANICAL DEMOLITION PLANS
M2.01	MECHANICAL FIRST FLOOR PROPOSED PLAN
M2.02	MECHANICAL PROPOSED PLANS
M2.03	MECHANICAL PROPOSED PLANS
M6.01	MECHANICAL SCHEDULES
M6.02	MECHANICAL DETAILS
M6.03	MECHANICAL DETAILS & CONTROL SCHEMATIC
M6.04	CONTROL SCHEMATICS
E2.01	ELECTRICAL FIRST FLOOR PROPOSED POWER PLAN
E2.02	ELECTRICAL PROPOSED POWER PLANS
E2.03	ELECTRICAL PROPOSED POWER PLANS
E6.01	ELECTRICAL PANEL SCHEDULES & DETAIL

PROJECT PHASING

PHASE 1
DEMOLITION:

1. EVACUATE REFRIGERANT FROM AHU-1 / CU-1 AND AHU-2 / CU-2 AND REMOVE EACH UNIT.
2. REMOVE EF-1 AND RI-1.
3. DEMOLISH ALL INDICATED DUCTWORK, PIPING, VALVES, CONTROLS, ETC. ASSOCIATED WITH EACH UNIT.

PROPOSED INSTALLATION:

4. INSTALLATION OF NEW AHU-1, AHU-2, CU-1, CU-2, EF-1, EF-2, EF-4, RI-1, RI-2.
5. INSTALLATION OF NEW DUCTWORK, PIPING, VALVES, CONTROLS, ETC. ASSOCIATED WITH EACH UNIT.
6. TESTING, ADJUSTING, AND BALANCING OF ALL NEW SYSTEMS.
7. CONTRACTOR TO THOROUGHLY CLEAN ALL EXISTING DUCTWORK WHICH IS TO REMAIN (TOILET EXHAUST, SUPPLY, RETURN AND OUTDOOR AIR). PROVIDE SIX (6) COPIES OF REPORT INCLUDING COLOR PHOTOS INDICATING DUCTWORK CONDITION BEFORE & AFTER CLEANING.

PHASE 2
DEMOLITION:

1. EVACUATE REFRIGERANT FROM AHU-3 / CU-3 AND REMOVE BOTH UNITS.
2. DEMOLISH ALL INDICTED DUCTWORK, PIPING, VALVES, CONTROLS, ETC. ASSOCIATED WITH EACH UNIT.
3. REMOVAL OF CEILING TILES, CEILING GRID, LIGHTS, ETC. ASSOCIATED WITH NEW EF-3 ON FIRST FLOOR.

PROPOSED INSTALLATION:

4. INSTALLATION OF NEW AHU-3, CU-3 AND EF-3.
5. INSTALLATION OF NEW DUCTWORK, PIPING, VALVES, CONTROLS, ETC. ASSOCIATED WITH EACH UNIT.
6. REINSTALLATION OF CEILING TILES, CEILING GRID, LIGHTS, ETC. ASSOCIATED ON FIRST FLOOR.
7. TESTING, ADJUSTING, AND BALANCING OF ALL NEW SYSTEMS.
8. CONTRACTOR TO THOROUGHLY CLEAN ALL EXISTING DUCTWORK WHICH IS TO REMAIN (TOILET EXHAUST, SUPPLY, RETURN AND OUTDOOR AIR). PROVIDE SIX (6) COPIES OF REPORT INCLUDING COLOR PHOTOS INDICATING DUCTWORK CONDITION BEFORE & AFTER CLEANING.

PHASE 3
DEMOLITION:

1. REMOVAL OF CEILING TILES, CEILING GRID, LIGHTS, ETC. ASSOCIATED WITH EACH FAN POWERED VAV TO BE REMOVED AND REPLACED.
2. REMOVAL OF FAN POWERED VAV BOXES, DUCTWORK, PIPING, VALVES, CONTROLS, ETC. ON FIRST AND SECOND FLOORS.

PROPOSED INSTALLATION:

3. INSTALLATION OF NEW FAN POWERED VAV BOXES, DUCTWORK, PIPING, VALVES, CONTROLS, ETC. ON FIRST AND SECOND FLOORS.
4. TESTING, ADJUSTING, AND BALANCING OF ALL NEW SYSTEMS.
5. CONTRACTOR TO THOROUGHLY CLEAN ALL EXISTING DUCTWORK WHICH IS TO REMAIN (TOILET EXHAUST, SUPPLY, RETURN AND OUTDOOR AIR). PROVIDE SIX (6) COPIES OF REPORT INCLUDING COLOR PHOTOS INDICATING DUCTWORK CONDITION BEFORE & AFTER CLEANING.

PHASE 4
DEMOLITION:

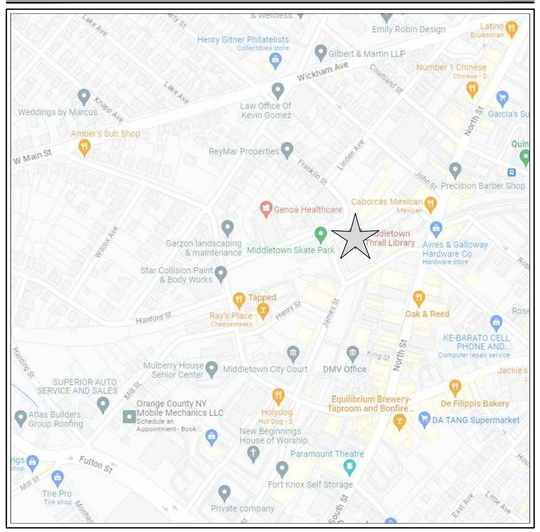
1. REMOVAL OF EXISTING BMS SYSTEM,

PROPOSED INSTALLATION:

3. PROVIDE NEW BMS SYSTEM AND INTERLOCK ALL NEW MECHANICAL EQUIPMENT INSTALLED IN PHASE 1,2, & 3, IN ADDITION, THE NEW BMS SYSTEM SHALL CONNECT EXISTING EQUIPMENT, E.G. BOILERS AND PUMPS LOCATED IN THE BSMNT.

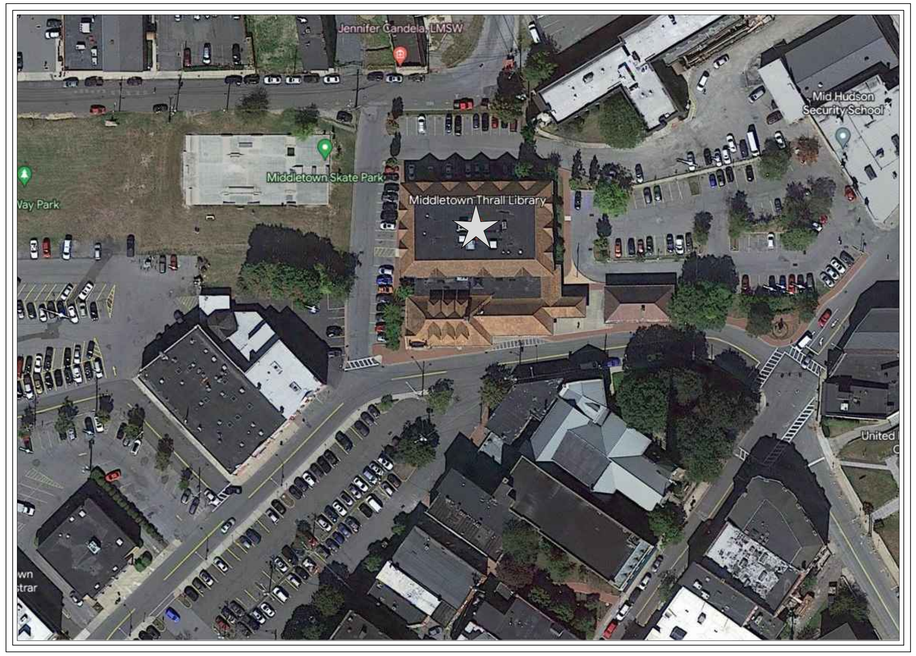
Location Map

NOT TO SCALE



Aerial View

NOT TO SCALE



THOMAS WIGHARD, P.E.
The PROFESSIONAL ENGINEER
License No. NY 090385

Date 01/25/24
Checked MAM
Drawn JDD

Revisions:

1. ISSUED FOR BID 6/1/23
1. BID ADDENDUM NO. 1 3/14/24

LAN ASSOCIATES
Engineering, Planning, Architecture, Surveying LLP
252 Main Street, Goshen, New York 10924 | t. 845-615-0350 | f. 845-615-0351

TITLE SHEET

THRALL LIBRARY
HVAC UPGRADES
11 DEPOT STREET
MIDDLETOWN, NY 10940

Job No. 4.1603.02

File No. 4160302T100

T1.00

ABBREVIATIONS

&	=	AND			
@	=	AT	ID	=	INSIDE DIAMETER (DIM)
℄	=	CENTERLINE	IN	=	INCH
℄	=	CFM	INSUL	=	INSULATION
℄	=	DIAMETER OR ROUND			
℄			JAN	=	JANITOR
ABV	=	ABOVE			
ACCU	=	AIR COOLED CONDENSING UNIT	LSD	=	LINEAR SLOT DIFFUSER
AD	=	ACCESS DOOR			
ADD'L	=	ADDITIONAL	MAX	=	MAXIMUM
ADJ	=	ADJUSTABLE	MD	=	MOTORIZED DAMPER
AHU	=	AIR HANDLING UNIT	MECH	=	MECHANICAL
ALT	=	ALTERNATE	MEP	=	MECHANICAL/ELECTRICAL/PLUMBING
AS-#	=	AIR SEPARATOR	MFR	=	MANUFACTURER
B-#	=	BOILER	MIN	=	MINIMUM
BLDG	=	BUILDING	MISC	=	MISCELLANEOUS
BOD	=	BOTTOM OF DUCT	MO	=	MASONRY OPENING
BOS	=	BOTTOM OF STEEL			
BP-#	=	BOILER PUMP	N.A.	=	NOT APPLICABLE
			NK	=	NECK SIZE
CD	=	CONDENSATE DRAIN	NTS	=	NOT TO SCALE
CL	=	CLOSET			
CLG	=	CEILING	OA	=	OUTSIDE AIR
CO	=	CARBON MONOXIDE	OC	=	ON CENTER
COL	=	COLUMN	OD	=	OUTSIDE DIAMETER
CONSTR	=	CONSTRUCTION	OPG	=	OPENING
CONT	=	CONTINUOUS			
CORR	=	CORRIDOR	P-#	=	PUMP
CTR	=	CENTER			
			R	=	RISER
DIA	=	DIAMETER	RA	=	RETURN AIR
DIM	=	DIMENSION	RAD	=	RADIUS
DN	=	DOWN	RAG	=	RETURN AIR GRILLE
DSD	=	DUCT SMOKE DETECTOR	RAR	=	RETURN AIR REGISTER
DWG	=	DRAWING	RM	=	ROOM
EA	=	EACH	SA	=	SUPPLY AIR
EAR	=	EXHAUST AIR REGISTER	SAD	=	SUPPLY AIR DIFFUSER
EF	=	EXHAUST FAN	SAG	=	SUPPLY AIR GRILLE
ELEC	=	ELECTRIC	SAR	=	SUPPLY AIR REGISTER
ENGR	=	ENGINEER (ING)	SD	=	SMOKE DETECTOR
EQ	=	EQUAL	SECT	=	SECTION
EQUIP	=	EQUIPMENT	SPEC	=	SPECIFICATION
ET-#	=	EXPANSION TANK	STD	=	STANDARD
ETR	=	EXISTING TO REMAIN	STG	=	STORAGE
(E)/EXIST	=	EXISTING			
			TG	=	TRANSFER AIR GRILLE
FAI	=	FRESH AIR INTAKE	TOD	=	TOP OF DUCT
FC	=	FLEXIBLE CONNECTION	TX	=	TOILET EXHAUST
FD	=	FIRE DAMPER	TYP	=	TYPICAL
FF	=	FINISHED FLOOR			
FLR	=	FLOOR	UH-#	=	UNIT HEATER
FP	=	FIRE PROTECTION	UTIL	=	UTILITY ROOM
FSD	=	FIRE/SMOKE DAMPER			
			VAV	=	VARIABLE AIR VOLUME BOX
GA	=	GAUGE	VD	=	VOLUME DAMPER
GALV	=	GALVANIZED	VFD	=	VARIABLE FREQUENCY DRIVE
GPM	=	GALLONS PER MINUTE	VIF	=	VERIFY IN FIELD
GRD	=	GRAVITY RELIEF DAMPER			
			W/	=	WITH
HVAC	=	HEAT/VENT/AIR COND.	W/O	=	WITHOUT
HW	=	HOT WATER	WMS	=	WIRE MESH SCREEN
HWH	=	HOT WATER HEATER	WT	=	WEIGHT
HWR	=	HOT WATER RETURN			
HWRR	=	HOT WATER REVERSE RETURN			
HWS	=	HOT WATER SUPPLY			

H.V.A.C. MATERIALS

EQUIPMENT:

- REFER TO SCHEDULES FOR UNIT MANUFACTURER, SIZE, AND CAPACITY DATA.

DUCTWORK:

- INDOOR SUPPLY, RETURN AND EXHAUST DUCTWORK, EXCEPT AS INDICATED BELOW, SHALL BE GALVANIZED STEEL CONSTRUCTION. WEIGHTS AND CONSTRUCTION DETAIL SHALL BE IN ACCORDANCE WITH THE LATEST ASHRAE GUIDE AND/OR SMACNA STANDARDS.
- OUTDOOR AIR INTAKE DUCTWORK SHALL BE ALUMINUM CONSTRUCTION, CLASS "A" SEALED.
- FLEXIBLE DUCTWORK: SHALL NOT EXCEED THREE (3) FEET IN LENGTH. FOR ANY HORIZONTAL FLEX DUCT BRANCH TO A CEILING DIFFUSER, FURNISH A 90° BRACE TO MAINTAIN A LONG RADIUS ELBOW TO THE DIFFUSER ("TITUS" MAKE, MODEL "FLEXRIGHT").
- FIRE DAMPER: GREENHECK MAKE, MODEL FD-150 TYPE B (BLADES OUT OF AIRSTREAM), 1-1/2 HOUR RATED (UNLESS OTHERWISE NOTED) UL-555 LABELED DAMPER WITH STANDARD FRAME OR APPROVED EQUAL. PROVIDE WITH A RETAINING ANGLE AND AN ACCESS DOOR.

PIPING:

- HOT WATER PIPING: SHALL BE HARD COPPER TYPE "L" WITH WROUGHT COPPER SOLDER FITTINGS (3" OR UNDER) OR SCHEDULE 40 BLACK STEEL WITH WELDED FITTINGS (4" OR OVER).
- CONDENSATE DRAIN PIPING: SHALL BE HARD COPPER TYPE "L" WITH WROUGHT COPPER FITTINGS.
- REFRIGERANT PIPING: SHALL BE HARD COPPER TYPE "K" WITH WROUGHT COPPER FITTINGS.

INSULATION:

- EXTERNAL DUCT INSULATION: R-6, 1-1/2" THICK, MIN. 1 LB. DENSITY FLEXIBLE FIBERGLASS DUCT INSULATION WITH REINFORCED FOIL FACED FLAME RESISTANT KRAFT VAPOR BARRIER, ADHERED TO DUCT W/ SEALED LAPS AND TAPED JOINTS.
- INTERNALLY LINED DUCT: R-6, 1-1/2" THICK, MIN. 1.0 LB. DENSITY RIGID INSULATION ADHERED TO DUCT. DUCTS WIDER THAN 12" TO HAVE WELDED PINS AND WASHERS. DUCT DIMENSIONS AS INDICATED ARE CLEAR INSIDE DUCT DIMENSIONS.
  NOTES:
  1. ALL SUPPLY & RETURN AIR DUCTWORK SHALL BE INTERNALLY LINED FOR A MIN. OF 25' TO AND FROM ANY RTU OR AHU.
  2. ALL SUPPLY AIR DUCTWORK SHALL BE INTERNALLY LINED FOR A MINIMUM OF 15' DOWNSTREAM OF ALL VAV BOXES.
- DUCT INSULATION NOTE: PROVIDE A MINIMUM 6" OVERLAP WHERE INTERNAL INSULATION ENDS AND EXTERNAL INSULATION BEGINS.
- ALL CONDENSATE DRAIN PIPING SHALL BE INSULATED WITH 1" THICK FLEXIBLE ELASTOMERIC ("AP ARMAFLEX BLACK LAPSEAL").
- FRESH AIR INTAKE AND EXPOSED DUCT: R-6, 1-1/2" THICK, MIN. 1 LB. DENSITY RIGID FIBERGLASS DUCT INSULATION WITH FOIL FACING VAPOR BARRIER FASTENED WITH WELDED CLIPS, CEMENTED JOINTS WITH ALUMINUM TAPE.
- HEATING HOT WATER PIPES SHOULD BE INSULATED WITH FIBERGLASS PIPE INSULATION WITH FACTORY APPLIED ASJ JACKET. INSTALL WITH APPROVED ADHESIVE AND STAPLES. REFER TO SPECIFICATIONS FOR INSULATION THICKNESS.
- REFRIGERANT SUCTION & HOT GAS BY-PASS PIPING SHALL BE INSULATED WITH MIN. 1" THICK FLEXIBLE ELASTOMERIC INSULATION.
- EXTERIOR REFRIGERANT SUCTION & HOT GAS BYPASS SHALL BE PROVIDED WITH 1" THICK FLEXIBLE ELASTOMERIC INSULATION AND BE PROVIDED WITH A MIN. 30 MIL PVC FIELD-APPLIED JACKET.

AIR DEVICES:

- RAR - TITUS MAKE, MODEL 50F, 24"x24" EGG CRATE
- NOTES:
  1. ALL CEILING DIFFUSERS LOCATED IN ACOUSTIC CEILING GRID SHALL BE PROVIDED WITH FRAME TYPE FOR GRID MOUNTING. IF THE TILE IS SMALLER THAN TILE SIZE, THE DIFFUSER SHALL BE PROVIDED WITH FRAME TYPE FOR CEILING TYPE.
  2. ALL CEILING DIFFUSERS LOCATED IN GYPSUM BOARD AND/OR CONCEALED SPLINE CEILINGS SHALL BE PROVIDED WITH FRAME TYPE FOR SURFACE MOUNTING
  3. COLOR OF AIR OUTLETS/INLETS SHALL MATCH THE CEILING COLOR.
  4. ALL AIR OUTLETS/INLETS TOILETS, CORRIDORS, AND KITCHEN SHALL BE ALUMINUM CONSTRUCTION

ACCESS DOORS

- FURNISH AND INSTALL ACCESS DOORS AT ALL LOCATIONS WHERE VALVES, DAMPERS, CONTROLS, VENTS, DRAINS, ETC. ARE TO BE INSTALLED ABOVE OR BEHIND ANY INACCESSIBLE SURFACE (GYPSUM BOARD, CMU, ETC.), IRRESPECTIVE OF WHETHER THEY ARE INDICATED ON ALL DRAWINGS OR NOT. ACCESS DOORS SHALL BE A SUITABLE SIZE TO MAINTAIN, OPERATE, REPAIR, AND REPLACE ALL EQUIPMENT. ACCESS DOORS SHALL BE FACTORY PRIMED AND PAINTED TO MATCH THE SURFACE IN WHICH THEY ARE INSTALLED.

VALVES: ISOLATION VALES SHALL BE BALL VALVES. BALANCING VALVES SHALL BE GLOBE VALVES.

SYMBOLS

NOT TO SCALE

- = SUPPLY AIR CEILING DIFFUSER (SAD) WITH NECK SIZE AND CFM INDICATED ON PLANS
- = 3-WAY SUPPLY AIR CEILING DIFFUSER (SAD) WITH NECK SIZE AND CFM INDICATED ON PLANS.
- = 2-WAY SUPPLY AIR CEILING DIFFUSER (SAD) WITH NECK SIZE AND CFM INDICATED ON PLANS.
- = RETURN AIR REGISTER (RAR) WITH NECK SIZE AND CFM INDICATED ON PLANS
- = EXHAUST AIR REGISTER (EAR); GRAVITY RELIEF GRILLE (GRG) WITH NECK SIZE AND CFM INDICATED ON PLANS
- = SUPPLY AIR WALL REGISTER/GRILLE (SAR) WITH NECK SIZE AND CFM INDICATED ON PLANS
- = RETURN AIR WALL REGISTER (RAR) WITH NECK SIZE AND CFM INDICATED ON PLAN
- = POINT OF CONNECTION OF NEW PIPING/DUCTWORK TO EXISTING
- = POINT OF DISCONNECTION OF NEW PIPING/DUCTWORK TO EXISTING
- OR W" X D" = INDICATES HARD DUCT WITH INTERNAL LINING (DIMENSIONS ARE INSIDE CLEAR WIDTH & DEPTH)
- OR W" X D" = INDICATES HARD DUCT (DIMENSIONS ARE INSIDE CLEAR WIDTH & DEPTH)
- Ø" = INDICATES FLEXIBLE DUCT (DIMENSIONS ARE INSIDE CLEAR DIAMETER; LENGTH NOT TO EXCEED THREE (3) FEET.
- = DUCT TURN UP (SUPPLY, RETURN, EXHAUST)
- = DUCT TURN DOWN (SUPPLY, RETURN, EXHAUST)
- DSD/AD = DUCT SMOKE DETECTOR WITH ACCESS DOOR
- FD/AD = FIRE DAMPER WITH ACCESS DOOR
- FSD/AD = FIRE/SMOKE DAMPER WITH ACCESS DOOR
- VD = VOLUME DAMPER
- BDD = BACK DRAFT DAMPER
- M = MOTORIZED DAMPER
- T = INDICATES NEW WALL MOUNTED THERMOSTAT.
- CO2 = CO_2 SENSOR
- = SHUT OFF VALVE (SUPPLY SIDE)
- = BALANCING VALVE (RETURN SIDE)
- = MECHANICAL EXPANSION JOINT
- M = MOTORIZED VALVE
- = CHECK VALVE
- OR = BALL VALVE
- = STRAINER
- = OS&Y VALVE
- = 2-WAY CONTROL VALVE
- = 3-WAY CONTROL VALVE
- = UNION
- = PRESSURE GAUGE
- = TEMPERATURE GAUGE
- = INDICATES EXISTING TO BE REMOVED
- = 6" HIGH CONCRETE HOUSEKEEPING PAD (TYP. FOR ALL FLOOR MOUNTED EQUIPMENT)
- = REFRIGERANT PIPING
- = MATCH LINE
- = PHASE SEPARATION LINE
- = HOT WATER SUPPLY
- = HOT WATER RETURN
- = CONDENSATE DRAIN
- = PIPE TURN UP
- = PIPE TURN DOWN
- NORTH = PROJECT NORTH
- CLOSET 101 = ROOM NAME, ROOM NUMBER
- # = REVISION
- NUMBER B, SHEET A-9 = ELEVATION
- NUMBER B, SHEET A-9 = SECTION/DETAIL
- = UNDERCUT DOOR (1/2 INCH)

H.V.A.C. GENERAL NOTES

1. PROCURE AND PAY ALL NECESSARY PERMITS AND LICENSES REQUIRED TO CARRY OUT THE WORK SHOWN. OBTAIN AND PAY FOR ALL FEES.
2. COMPLY WITH ALL FEDERAL, STATE AND MUNICIPAL LAWS AND CODES, ORDINANCES, RULES AND REGULATIONS OF HEALTH, PUBLIC OR OTHER AUTHORITIES CONTROLLING OR LIMITING THE METHODS, MATERIALS TO BE USED OR ACTIONS OF THOSE EMPLOYED.
3. GUARANTEE H.V.A.C. SYSTEMS FOR A PERIOD OF TWO (2) YEARS FROM OWNER'S ACCEPTANCE TO BE FREE FROM DEFECTS AND REPAIR OR REPLACE, AT NO COST TO OWNER, FAILURES OR DEFECTS.
4. H.V.A.C. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL HIS DEBRIS.
5. BALANCE AIR AND WATER SYSTEMS TO QUANTITIES INDICATED. CONTRACTOR TO SUBMIT SIX (6) SETS OF AIR, WATER AND UNIT BALANCING REPORT TO ARCH./ENGR./OWNER PRIOR TO FINAL ACCEPTANCE OF THE SYSTEM.
6. BIDDERS FOR THIS WORK SHALL VISIT THE PREMISES AND CAREFULLY EXAMINE ALL EXISTING CONDITIONS BEFORE SUBMITTING BIDS. NOT ALL EXISTING CONDITIONS HAVE BEEN IDENTIFIED ON DRAWINGS. CONTRACTOR SHALL NOTIFY ARCH. & ENGR. OF ALL DISCREPANCIES PRIOR TO SUBMITTING BID.
7. ALL BIDDERS SHALL ALSO FAMILIARIZE THEMSELVES WITH THE MEANS OF ENTRANCE AND EXIT AT THE PROPERTY AND ALL OTHER INFORMATION NECESSARY TO PROPERLY CARRY OUT THE WORK.
8. THE CONTRACTOR SHALL, WITH THE APPROVAL OF THE ENGINEER AND WITHOUT ADDITIONAL COST TO THE OWNER, MAKE ALL NECESSARY CHANGES OR MODIFICATIONS TO LOCATIONS AS MAY BE NECESSARY TO SUIT REQUIREMENTS AND CONDITIONS FOR THE PROPER AND CONVENIENTLY ACCESSIBLE LOCATIONS OF ALL PARTS OF EACH SYSTEM.
9. SMALL DETAILS ARE NOT USUALLY SHOWN OR SPECIFIED BUT ALL MATERIALS & COMPONENTS NECESSARY FOR THE PROPER INSTALLATION AND OPERATION OR WORK SHALL BE FURNISHED AND INSTALLED AT NO ADDITIONAL COST.
10. THE CONTRACTOR SHALL NOTE THAT ALL SERVICE CONNECTIONS MAY NOT BE SHOWN IN TRUE POSITIONS. EACH BIDDER IS CAUTIONED, THEREFORE, TO VERIFY SAME WITH FIELD CONDITIONS.
11. CONTRACTOR SHALL CHECK FOR INTERFERENCE AND VERIFY ALL DIMENSIONS PRIOR TO FABRICATION OR INSTALLATION OF PIPING AND DUCTWORK.
12. IF AN ITEM OF EQUIPMENT OTHER THAN THE ITEM(S) SPECIFIED IS APPROVED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ADDITIONAL COST ARISING OUT OF ADDITIONAL OR CHANGED GENERAL CONSTRUCTION AND MECHANICAL WORK REQUIRED TO ACCOMMODATE THE SUBSTITUTED EQUIPMENT.
13. ALL EQUIPMENT INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURERS DIRECTIONS AND RECOMMENDATIONS.
14. CONTRACTOR TO SUBMIT SIX (6) SETS OF DUCT AIR LEAKAGE TESTING REPORT FOR REVIEW.
15. PROVIDE ONE SET OF SPARE FILTERS FOR ALL INSTALLED HV/HVAC UNITS.
16. PROVIDE TWO YEAR MAINTENANCE SERVICE FOR ALL INSTALLED HV/HVAC/MECHANICAL SYSTEMS. THIS INCLUDES A MINIMUM OF THREE PERIODIC SERVICE VISITS TO INSPECT, TEST & CHECK ALL COMPONENTS OF HVAC/HV UNITS AND ANY ADDITIONAL VISITS REQUIRED IF ANY HVAC/HV UNIT FAILS. ALL NECESSARY BELT ALIGNMENTS, PROPER OPERATIONS OF ALL DAMPERS, ETC IS INCLUDED IN THIS SCOPE OF WORK.
17. PROVIDE FIRE DAMPERS/ACCESS DOORS AT ALL DUCT PENETRATIONS THROUGH CORRIDORS, SLABS AND OTHER RATED PARTITIONS, IRRESPECTIVE OF WHETHER IT IS INDICATED ON THE DRAWINGS OR NOT.
18. PROVIDE FIRE STOPPING AROUND ALL OPENINGS FOR DUCT, PIPING, CONDUIT, ETC. PENETRATIONS THROUGH CORRIDORS, SLABS AND OTHER RATED PARTITIONS.
19. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ALL DEMOLITION AND RESTORATION OF AREAS OF MECHANICAL REMOVALS.
20. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ALL CONTAINER SERVICES AND LABOR TO KEEP THE BUILDING FREE OF DEBRIS.
21. CONTRACTOR TO THOROUGHLY CLEAN ALL EXISTING DUCTWORK WHICH IS TO REMAIN (TOILET EXHAUST, SUPPLY, RETURN AND OUTDOOR AIR). PROVIDE SIX (6) COPIES OF REPORT INCLUDING COLOR PHOTOS INDICATING DUCTWORK CONDITION BEFORE & AFTER CLEANING. REFER TO SPECIFICATION 233113 METAL DUCTS, SECTION 3.7 FOR MORE INFORMATION.
22. PROVIDE NEW VOLUME DAMPERS IN EXISTING DUCTWORK (SUPPLY/RETURN/EXHAUST) WHICH IS TO BE REUSED WHERE THERE ARE NO EXISTING VOLUME DAMPERS (TYPICAL FOR ALL).
23. CONTRACTOR TO PROVIDE NEW WALL MOUNTED THERMOSTATS IN TAMPER PROOF ENCLOSURES FOR ALL AHU'S, RTU'S, VAV BOXES, CABINET HEATERS, UV'S FCU'S, AC UNITS, ETC. IRRESPECTIVE OF WHETHER THEY ARE INDICATED ON ALL DRAWINGS OR NOT. CONTRACTOR TO INDICATE THERMOSTAT LOCATIONS ON ALL SHOP DRAWINGS.
24. CONTRACTOR TO NOTE THAT BOTH DWGS. & SPECS. ARE COLLECTIVELY A PART OF BID REQUIREMENTS. IN CASE OF ANY DIFFERENCES BETWEEN VARIOUS DWGS. OR BETWEEN DWGS. & SPECS, THE MOST STRINGENT REQUIREMENT WILL PREVAIL.
25. CONTRACTOR TO SUBMIT SIX (6) SETS OF OPERATION & MAINTENANCE MANUALS, INCLUDING A SUMMARY SHEET OF ALL EQUIPMENT MFRS/MODEL #/SERIAL #'S, SHOP DRAWING SUBMITTALS, WARRANTY INFORMATION, O&M MANUALS, PROJECT INFORMATION, CONTACT DETAILS & AS-BUILT DRAWINGS.
26. CONTRACTOR TO PROVIDE SIX (6) SETS AND AN ELECTRONIC COPY OF AS-BUILT DRAWINGS OF THE ENTIRE SYSTEM.
27. PROVIDE PROPER IDENTIFICATION TAGS, ARROWS, AND LABELS FOR ALL EQUIPMENT INCLUDING BOILERS, PUMPS, PIPING, VALVES, ELECTRICAL PANELS, ETC.
28. CONTRACTOR TO PROVIDE A MINIMUM OF TWO (2) TRAINING SESSIONS (TWO HOURS EACH) THAT ARE TO BE VIDEOTAPED FOR THE OWNERS USE, TO OWNER'S MAINTENANCE STAFF ON PROPER OPERATION, MAINTENANCE & COMMON TROUBLE-SHOOTING GUIDELINES.
29. CONTRACTOR TO PROVIDE A MINIMUM OF TWO (2) TRAINING SESSIONS (TWO HOURS EACH) THAT ARE TO BE VIDEOTAPED FOR THE OWNERS USE, TO OWNER'S MAINTENANCE STAFF ON PROPER OPERATION, MAINTENANCE, TROUBLE-SHOOTING, ALARM MANAGEMENT, ETC. OF THE NEW BUILDING MANAGEMENT SYSTEM. REFER TO SPECIFICATION 230900 FOR ADDITIONAL INFORMATION.
30. REFRIGERANT EVACUATION AND DISPOSAL FOR REMOVAL OF EXISTING AIR-CONDITIONING EQUIPMENT SHALL BE DONE AS PRESCRIBED IN EPA REFRIGERANT RECYCLING REQUIREMENTS OF SECTION 608 OF THE CLEAR AIR ACT, AS AMENDED, INCLUDING FINAL REGULATIONS. TECHNICIANS AND THEIR RECOVERY EQUIPMENT MUST BE EPA CERTIFIED. EACH PIECE OF EQUIPMENT RECOVERED MUST BE DOCUMENTED. THE TYPE AND QUANTITIES OF REFRIGERANT REMOVED MUST BE RECORDED AND PROOF OF PROPER DISPOSAL AVAILABLE FOR EPA INSPECTION.

GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE LATEST EDITIONS OF THE NEW YORK STATE ENERGY CODE, INTERNATIONAL MECHANICAL CODE, ASHRAE GUIDELINES, SMACNA, ORANGE COUNTY GUIDELINES, NEC, NATIONAL STANDARD PLUMBING CODE, AND ALL OTHER APPLICABLE CODES, ORDINANCES, ETC. FOR NEW YORK STATE AND THE LOCAL AUTHORITY HAVING JURISDICTION.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE AND FAMILIARIZING HIMSELF WITH THE EXISTING CONDITIONS AND SCOPE OF THE WORK PRIOR TO SUBMITTING BIDS AND COMMENCING WORK, AND INCLUDE ALL SUCH NECESSARY WORK BASED ON THIS SITE FAMILIARIZATION IN THIS BID.
3. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL SAFE WORKING CONDITIONS AND SHALL OBSERVE ALL SAFETY REQUIREMENTS ESTABLISHED BY JURISDICTIONAL AGENCIES AND THE OWNER. WHERE CONFLICTS EXIST, THE MORE STRINGENT REQUIREMENT SHALL APPLY. CARE SHALL BE EXERCISED TO AVOID ENDANGERING PERSONNEL OR STRUCTURES.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS & METHODS, PROCEDURES AND JOB SITE CONDITIONS INCLUDING SAFETY. CONSTRUCTION SHALL BE PERFORMED IN SUCH A MANNER TO PROTECT WORKMEN, OCCUPANTS AND THE PUBLIC FROM INJURY AND ADJOINING PROPERTY SHALL BE PROTECTED FROM DAMAGE BY USE OF SCAFFOLDING, UNDERPINNING OR OTHER APPROVED METHOD. THE CONTRACTOR SHALL REPAIR ANY AND ALL DAMAGE CAUSED DURING OR RESULTING FROM HIS OPERATIONS IN KIND TO THE SATISFACTION OF THE OWNER AT NO ADDITIONAL COST TO THE OWNER.
5. CONTRACTOR SHALL MAINTAIN THE JOB SITE IN A CLEAN, DEBRIS FREE CONDITION. THE DUST RESULTING FROM REMOVALS SHALL BE CONTROLLED SO AS TO PREVENT ITS SPREAD TO OCCUPIED PORTIONS OF THE BUILDING AND TO AVOID CREATION OF A NUISANCE IN THE SURROUNDING AREA.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL REQUIRED PERMITS, FEES, APPROVALS, ETC. PRIOR TO COMMENCING WORK AND SHALL SECURE CERTIFICATE OF OCCUPANCY UPON COMPLETION OF WORK.
7. CONTRACTOR SHALL BE RESPONSIBLE TO DISPOSE OF ALL DEMOLISHED MATERIAL OFF SITE IN AN APPROVED MANNER. THE OWNER SHALL BE CONSULTED PRIOR TO DISPOSAL OF ANY SALVAGED OR EXCESS MATERIALS AT THE COMPLETION OF THE PROJECT.
8. UPON COMPLETION OF WORK, ALL EXCESS MATERIAL, DEBRIS, ETC. SHALL BE REMOVED AND THE WORK AREA SHALL BE LEFT CLEAN TO THE OWNER'S SATISFACTION.
9. ALL WORK SHALL BE SCHEDULED IN COMPLIANCE WITH THE OWNER'S REQUIREMENTS FOR THE USE OF THE EXISTING FACILITY.
10. CONTRACTOR SHALL FURNISH ALL EQUIPMENT THAT MAY BE REQUIRED TO PERFORM THE WORK INDICATED IN A SAFE AND ORDERLY MANNER, AND AS NECESSARY FOR A PROPER OPERATIONAL SYSTEM.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR THE RELOCATION AND TEMPORARY SUPPORT OF ANY UTILITIES ENCOUNTERED DURING THE COURSE OF HIS WORK AND TO ENSURE THE OWNER'S FACILITY TO BE OPERATIONAL.
12. CONTRACTOR SHALL REVIEW DRAWINGS AND FIELD VERIFY ALL DIMENSIONS, CONDITIONS AND ELEVATIONS PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES AND ADDRESS ALL QUESTIONS TO ARCHITECT/ENGINEER PRIOR TO COMMENCING WORK.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING, PATCHING, FILLING AND CLEANING UPON COMPLETION OF WORK.
14. CONTRACTOR SHALL NOT SCALE DRAWINGS FOR DIMENSIONS. ALL WRITTEN OR DIMENSIONED INFORMATION TAKES PRECEDENCE OVER THE DRAWING.
15. CONTRACTOR SHALL SUBMIT, WHERE REQUIRED BY THE ARCH/ENGR, SHOP DRAWINGS AND SUBMITTALS FOR APPROVAL PRIOR TO THE START OF FABRICATION OF THOSE ITEMS. THIS INCLUDES ALL EQUIPMENT, SCHEMATIC DUCTWORK AND PIPING LAYOUT, BOILER ROOM LAYOUT, ETC. CONTRACTOR IS RESPONSIBLE FOR ENSURING ALL EQUIPMENT ETC WILL FIT (WITH PROPER MAINTENANCE CLEARANCES) AT ALL LOCATIONS. REVIEW OF SHOP DRAWINGS/SUBMITTALS BY THE ARCH/ENGR DOES NOT RELIEVE THE CONTRACTOR FROM PROVIDING THE CURRENT MODEL NUMBERS, TYPE, & FEATURES OF ALL EQUIPMENT'S & MATERIALS.
16. CONTRACTOR SHALL PROVIDE THE OWNER AND ARCHITECT WITH CERTIFICATES OF INSURANCE PRIOR TO STARTING THE WORK.
17. CONTRACTOR SHALL SHALL BE RESPONSIBLE FOR SHORING AND BRACING OF EXISTING STRUCTURES AS NEEDED TO COMPLETE THE NEW WORK.
18. ALL MANUFACTURER'S MATERIALS, COMPONENTS, FASTENERS, ASSEMBLIES, ETC. SHALL BE HANDLED AND INSTALLED IN ACCORDANCE TO WITH MANUFACTURERS INSTRUCTIONS AND RECOMMENDATIONS. WHERE BRAND NAMES AND MANUFACTURED PRODUCTS ARE CALLED FOR, APPROVED EQUALS WHICH MEET APPLICABLE STANDARDS AND SPECIFICATIONS MAY BE SUBSTITUTED WITH WRITTEN PERMISSION OF THE ARCHITECT AND THE OWNER. WHENEVER BRAND NAMES OR SPECIFIC PRODUCT SYSTEMS ARE INDICATED IT SHALL BE CLEARLY UNDERSTOOD THAT SUCH IDENTIFICATION IS FOR THE PURPOSE OF ILLUSTRATING THE TYPE OF PRODUCT AND DEGREE OF QUALITY DESIRED. SUCH IDENTIFICATION IN NO WAY PRECLUDES THE CONTRACTOR FROM USING PRODUCTS OF OTHER MANUFACTURERS WHICH CAN BE SHOWN IN ADVANCE TO BE OF LIKE AND OF EQUAL OR BETTER QUALITY.
19. ALL CHANGES SHALL BE REQUESTED IN WRITING AND MAY ONLY BE APPROVED IN WRITING BY THE ARCHITECT/ENGINEER AND THE OWNER PRIOR TO ANY CHANGES BEING MADE.
20. THE ARCHITECT HAS THE RIGHT TO REJECT ANY PORTION OF WORK THAT IS POORLY INSTALLED, DOES NOT MEET INDUSTRY STANDARD, UNAUTHORIZED, OR WORK DONE CONTRARY TO THE THE INTENT OF THE CONTRACT DOCUMENTS. SUCH WORK SHALL BE REPLACED, REPAIRED OR REMOVED AT THE CONTRACTOR'S EXPENSE.
21. CONTRACTOR SHALL GUARANTEE ALL HIS WORK AND THE WORK OF HIS SUBCONTRACTORS FOR A PERIOD TWO (2) YEARS AFTER RECEIVING FINAL ACCEPTANCE AND DO ALL REPAIR WORK AND REPLACEMENT AS NECESSARY DURING THAT PERIOD AT THE CONTRACTOR'S EXPENSE.
22. IN NO EVENT SHALL STRUCTURAL MEMBERS BE CUT OR DRILLED WITHOUT THE WRITTEN APPROVAL OF A LICENSED STRUCTURAL ENGINEER.
23. CONTRACTOR SHALL PROVIDE SAFE AND SANITARY CONDITIONS WHERE DEMOLITION AND WRECKING OPERATIONS ARE BEING CARRIED ON. WORK SHALL BE EXECUTED IN SUCH A MANNER THAT HAZARD FROM FIRE, POSSIBILITY OF INJURY, DANGER TO HEALTH AND CONDITIONS WHICH MAY CONSTITUTE A PUBLIC NUISANCE SHALL BE MINIMIZED.
24. ENGINEER/OWNER MAY ASK THE CONTRACTOR TO PROVIDE DETAILED SHOP DRAWINGS & SUBMITTALS OF ANY/ALL PARTS OF THIS PROJECT WHICH THE ENGINEER/OWNER DEEMS NECESSARY FOR.
25. CONTRACTOR TO NOTE THAT WHENEVER THE OUTDOOR TEMPERATURE IS BELOW 50°F, UNINTERRUPTED HEATING SHOULD BE PROVIDED AT ALL BOILER ROOMS IN THIS PROJECT DURING OCCUPIED HOURS. WORK SHOULD BE SCHEDULED ACCORDINGLY.

Date 01/25/24
Checked MAM
Drawn JPD

THOMAS WIGHARD, P.E.
The PROFESSIONAL ENGINEER
License No. NY 090385

Revisions:

1 ISSUED FOR BID 6/1/23

1 BID ADDENDUM NO. 1 3/14/24

Engineering, Planning, Architecture, Surveying LLP
LAN ASSOCIATES
252 Main Street, Goshen, New York 10924 | t. 845-615-0350 | f. 845-615-0351

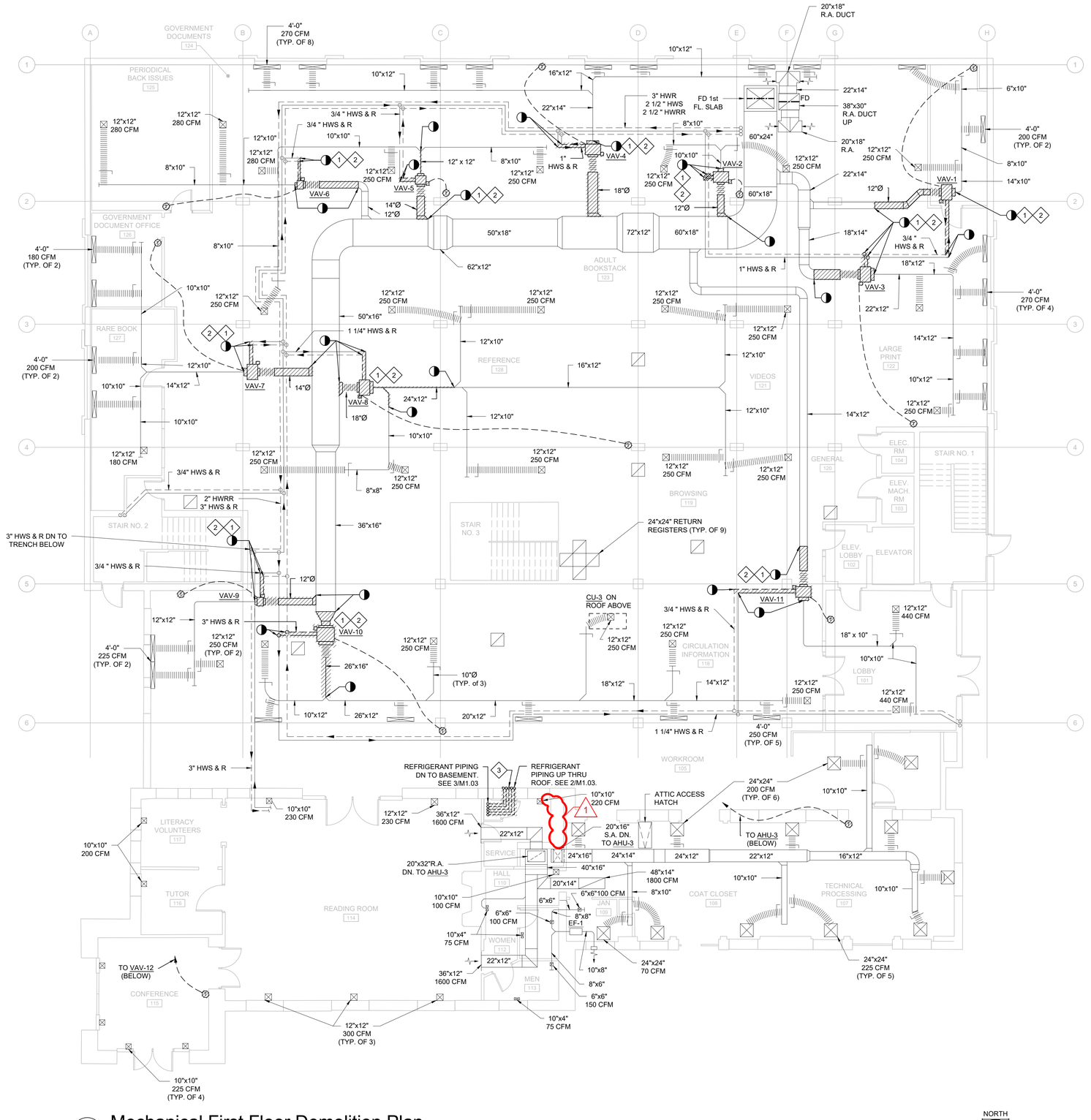
MECH. ABBREVIATIONS, NOTES AND SYMBOLS

THRALL LIBRARY
HVAC UPGRADES
11 DEPOT STREET
MIDDLETOWN, NY 10940

Job No. 4.1603.02

File No. 41160302M001

M0.01



1 M1.01 Mechanical First Floor Demolition Plan

1/8" = 1'-0"

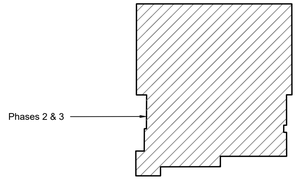
Demolition Key Notes

◇ # SYMBOL INDICATES DEMOLITION KEY NOTE

1. TEMPORARILY DISCONNECT ELECTRICAL CONNECTION TO FAN POWERED VAV BOX. REFER TO ELECTRICAL PLANS FOR DISCONNECT AND RECONNECTION OF (N) VAV BOXES.
2. REMOVE FAN POWERED VAV UNIT & ALL APPURTENANCES INCLUDING THERMOSTAT, CONTROLS WIRING, INLET FLEXIBLE DUCT CONNECTION, AND 3-WAY CONTROL VALVE.
3. REMOVE REFRIGERANT PIPING IN ITS ENTIRETY FROM AHU-3 TO CU-3. REUSE ROUTING FOR (N) PIPING.

Demolition Plan Notes

1. EXISTING CEILING GRID. ACOUSTIC TILES, LIGHTING, ETC. SHALL BE CAREFULLY REMOVED TO ACCESS THE EXISTING DUCTWORK AND VAV BOXES. UPON COMPLETION OF THE DUCT CLEANING AND AIR DEVICES BALANCING, ALL CEILINGS, LIGHTING, ETC. SHALL BE REINSTALLED. CONTRACTOR SHALL REPLACE ANY DAMAGED TILES TO MATCH EXISTING AND CLEAN CEILING GRID & TILES OF ALL FINGERPRINTS, ETC.
2. CONTRACTOR SHALL VERIFY IN FIELD EXACT DUCT ROUTING AND CONNECTIONS. CONTRACTOR SHALL COORDINATE WITH ALL TRADES BEFORE ANY WORK IS TO BE PERFORMED. REPORT ANY DISCREPANCIES TO ENGINEER.
3. CONTRACTOR SHALL VERIFY IN FIELD EXACT PIPE ROUTING AND CONNECTIONS. CONTRACTOR SHALL COORDINATE WITH ALL TRADES BEFORE ANY WORK IS TO BE PERFORMED. REPORT ANY DISCREPANCIES TO ENGINEER.
4. FURNISH AND INSTALL ISOLATION VALVES AND BLIND FLANGES/CAPS FOR ANY PIPING THAT IS TO BE REUSED AND MUST REMAIN ENERGIZED.
5. CONTRACTOR SHALL VERIFY EXISTING DUCTWORK AND PIPE SIZES IN FIELD AND REPORT ANY DISCREPANCIES TO ENGINEER.
6. ALL ELECTRICAL RELATED TO EQUIPMENT BEING REMOVED SHALL BE PROPERLY TERMINATED IN ACCORDANCE WITH THE LATEST NEC CODES. REFER TO ELECTRICAL DRAWINGS.



Key Plan

N.T.S.

NORTH

Date	01/25/24
Checked	MAM
Drawn	JPD

THOMAS WIGHARD, P.E.
Title PROFESSIONAL ENGINEER License No. NY 090385

Revisions:

1 ISSUED FOR BID 6/1/23

1 BID ADDENDUM NO. 1 3/14/24

LAN ASSOCIATES
Engineering, Planning, Architecture, Surveying LLP
252 Main Street, Goshen, New York 10924 | t. 845-615-0350 | f. 845-615-0351

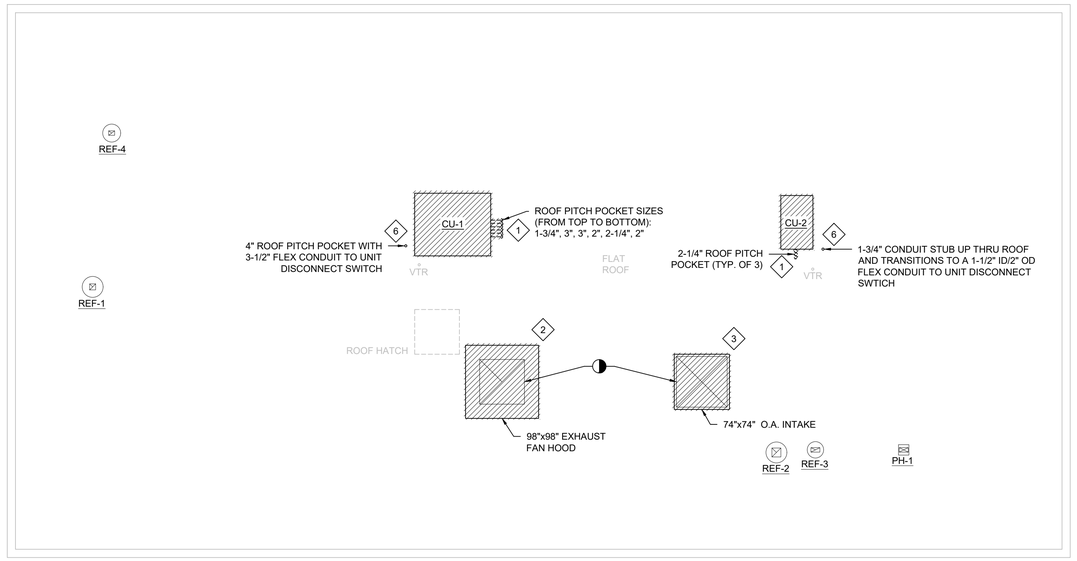
MECHANICAL FIRST FLOOR DEMOLITION PLAN

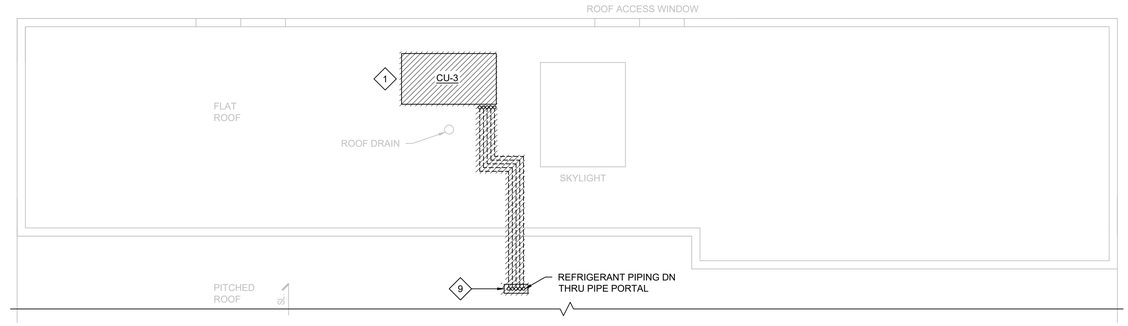
THRALL LIBRARY
HVAC UPGRADES
11 DEPOT STREET
MIDDLETOWN, NY 10940

Job No. 4.1603.02

File No. 4160302M101

M1.01





1 M1.03 Mechanical Penthouse Roof Demolition Plan

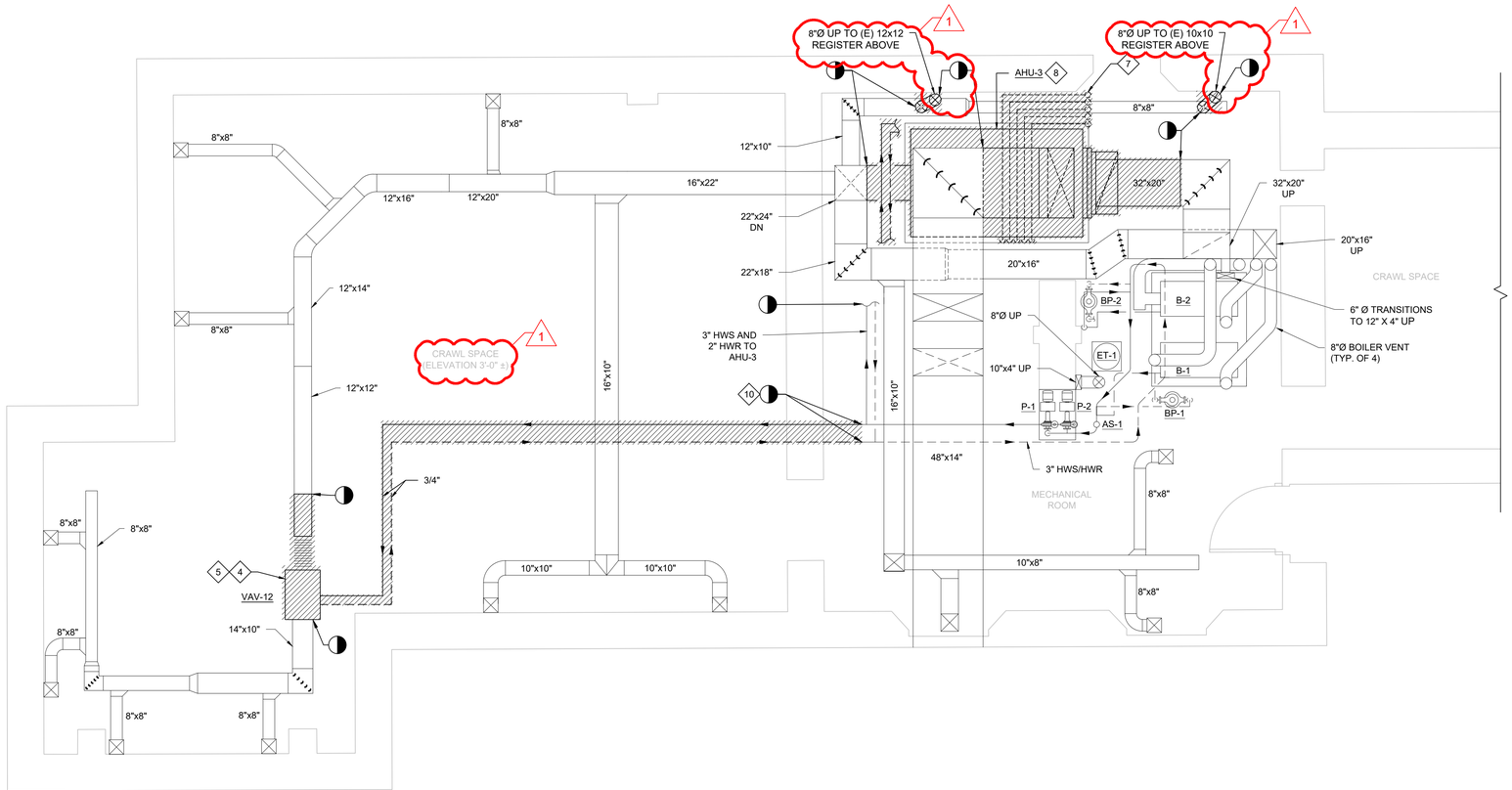
1/8" = 1'-0"

NORTH

2 M1.03 Mechanical Roof Demolition Plan

1/8" = 1'-0"

NORTH



3 M1.03 Mechanical Basement Demolition Plan

1/4" = 1'-0"

NORTH

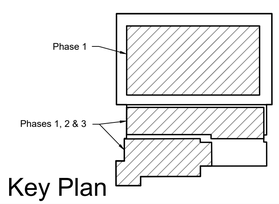
Demolition Key Notes

◇ # SYMBOL INDICATES DEMOLITION KEY NOTE

1. REMOVE CONDENSING UNIT, REFRIGERANT PIPING IN ITS ENTIRETY BACK TO AHU (RE-USE PATH FOR (N) PIPING), ROOF PITCH POCKET, NEOPRENE ROOF PADS UNDER CU AND ALL ELECTRICALS PER LATEST NEC.
2. REMOVE EXHAUST FAN HOOD IN ITS ENTIRETY INCLUDING ROOF CURB AND ELECTRICALS PER LATEST NEC.
3. REMOVE INTAKE LOUVERED PENTHOUSE AND ROOF CURB.
4. TEMPORARILY DISCONNECT ELECTRICAL CONNECTION TO FAN POWERED VAV BOX. REFER TO ELECTRICAL PLANS FOR DISCONNECTION AND RECONNECTION OF ALL EQUIPMENT.
5. REMOVE FAN POWERED VAV UNIT & ALL APPURTENANCES INCLUDING THERMOSTAT, CONTROLS WIRING, INLET FLEXIBLE DUCT CONNECTION, 3-WAY CONTROL VALVE AND ELECTRICALS PER LATEST NEC.
6. REMOVE CONDUCTORS AND CONDUIT. RE-USE PIPE PORTAL FOR (N) ELECTRICAL FEED.
7. REFRIGERANT PIPE UP TO CU-3. REMOVE REFRIGERANT PIPING DOWN FROM ABOVE IN ITS ENTIRETY. REFER TO 1/M1.01 & 2/M1.03 FOR CONTINUATION.
8. REMOVE EXISTING FLOOR MOUNTED AHU AND REMOVE ALL DUCTWORK AND PIPING AS INDICATED UP TO POINTS OF DISCONNECT SHOWN ON THE PLANS. REMOVE ALL REFRIGERANT PIPING AND ASSOCIATED VALVES. REFER TO ELECTRICAL PLANS FOR REMOVAL AND TERMINATION OF ELECTRICAL FEEDERS. REMOVE 3-WAY CONTROL VALVE & CONTROL WIRING ON HOT WATER SUPPLY/RETURN PIPING TO AHU-3. CONCRETE PAD UNDER EXIST. AHU IS E.T.R.
9. REMOVE PIPE PORTAL AND RE-USE OPENING FOR (N) REFRIGERANT. PROTECT OPENING DURING DEMOLITION AND CONSTRUCTION OF (N) PIPE PORTAL. SEE 1/M1.01 & 3/M1.03 FOR CONTINUATION.
10. DEMOLISH (E) HWS/HWR PIPING TO LOCATION INDICATED. PROVIDE AND INSTALL (N) SHUT-OFF VALVE AND CAP.

Demolition Plan Note

1. EXISTING AIR HANDLING UNITS AND ALL RELATED CONTROLS AND TRIMS INCLUDING CONTROL VALVES, SHUT-OFF VALVES, STRAINERS, ETC. TO BE REMOVED, UNLESS OTHERWISE NOTED.
2. CONTRACTOR SHALL VERIFY IN FIELD EXACT DUCT ROUTING AND CONNECTIONS. CONTRACTOR SHALL COORDINATE WITH ALL TRADES BEFORE ANY WORK IS TO BE PERFORMED. REPORT ANY DISCREPANCIES TO ENGINEER.
3. CONTRACTOR SHALL VERIFY IN FIELD EXACT PIPE ROUTING AND CONNECTIONS. CONTRACTOR SHALL COORDINATE WITH ALL TRADES BEFORE ANY WORK IS TO BE PERFORMED. REPORT ANY DISCREPANCIES TO ENGINEER.
4. FURNISH AND INSTALL ISOLATION VALVES AND BLIND FLANGES/CAPS FOR ANY PIPING THAT IS TO BE REUSED AND MUST REMAIN ENERGIZED.
5. CONTRACTOR SHALL VERIFY EXISTING DUCTWORK AND PIPE SIZES IN FIELD AND REPORT ANY DISCREPANCIES TO ENGINEER.
6. ALL ELECTRICAL RELATED TO EQUIPMENT BEING REMOVED SHALL BE PROPERLY TERMINATED IN ACCORDANCE WITH THE LATEST NEC CODES. REFER TO ELECTRICAL DRAWINGS.



Key Plan

N.T.S.

NORTH

Date	01/25/24
Checked	MAM
Drawn	JPD

THOMAS WIGHARD, P.E.
The PROFESSIONAL ENGINEER
License No. NY 090385

Revisions:

- ISSUED FOR BID 6/1/23
- 1 BID ADDENDUM NO. 1 3/14/24

LAN ASSOCIATES
Engineering, Planning, Architecture, Surveying LLP
252 Main Street, Goshen, New York 10924 | t. 845-615-0350 | f. 845-615-0351

MECHANICAL DEMOLITION PLANS

THRALL LIBRARY
HVAC UPGRADES
11 DEPOT STREET
MIDDLETOWN, NY 10940

Job No. 4.1603.02

File No. 4160302M103

M1.03

Construction Key Notes

(#) SYMBOL INDICATES CONSTRUCTION KEY NOTE

1. PROVIDE AND INSTALL (N) FAN POWERED VAV BOX. PROVIDE AND INSTALL 2-WAY CONTROL VALVE ON HWR LINE FROM FAN POWERED VAV BOX. CONNECT DUCTWORK TO INLET AND OUTLET OF FAN POWERED VAV BOX. TIE FAN POWERED VAV BOX AND CONTROL VALVE INTO (N) BMS, SEE M6.04. PROVIDE AND INSTALL (N) SPACE TEMPERATURE SENSOR, SEE FLOOR PLANS FOR LOCATION. TYPICAL OF 11 VAV BOXES.
2. PROVIDE AND INSTALL (N) MOTORIZED DAMPER AND ACTUATOR. TIE DAMPER INTO (N) BMS, SEE M6.04.
3. PROVIDE AND INSTALL (N) 2'x2' RETURN GRILLE IN (E) CEILING GRID.
4. CONNECT (N) 46"x16" DUCT TO (E) RETURN PLENUM IN FIRST FLOOR CEILING/ATTIC SPACE AND ROUTE AS SHOWN.
5. (N) REFRIGERANT PIPING DN FROM ACCU-3. SEE 2/M2.03. FIRE STOP ALL PIPE PENETRATIONS.

General Construction Notes

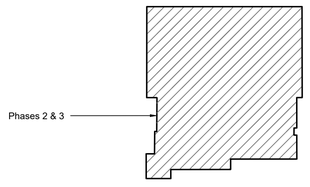
1. INSTALLATION OF (N) FAN POWERED VAV BOXES AND DUCTWORK WILL REQUIRE PARTIAL REMOVAL AND RE-INSTALLATION OF THE EXISTING CEILING GRID. ACOUSTIC TILES, LIGHTING, ETC. SHALL BE CAREFULLY REMOVED TO ACCESS THE EXISTING DUCTWORK AND VAV BOXES. UPON COMPLETION OF THE DUCT CLEANING AND AIR DEVICES BALANCING, ALL CEILINGS, LIGHTING, ETC. SHALL BE REINSTALLED. CONTRACTOR SHALL REPLACE ANY DAMAGED TILES TO MATCH EXISTING AND CLEAN CEILING GRID & TILES OF ALL FINGERPRINTS, ETC.

Mechanical First Floor Proposed Plan

1/M2.01 — 1/8" = 1'-0"

NORTH

Key Plan



N.T.S.

NORTH

Date	01/25/24
Checked	MAM
Drawn	JPD

THOMAS WIGHARD, P.E.
The PROFESSIONAL ENGINEER
License No. NY 090385

Revisions:

1 ISSUED FOR BID 6/1/23

1 BID ADDENDUM NO. 1 3/14/24

LAN ASSOCIATES
Engineering, Planning, Architecture, Surveying LLP
252 Main Street, Goshen, New York 10924 | t. 845-615-0350 | f. 845-615-0351

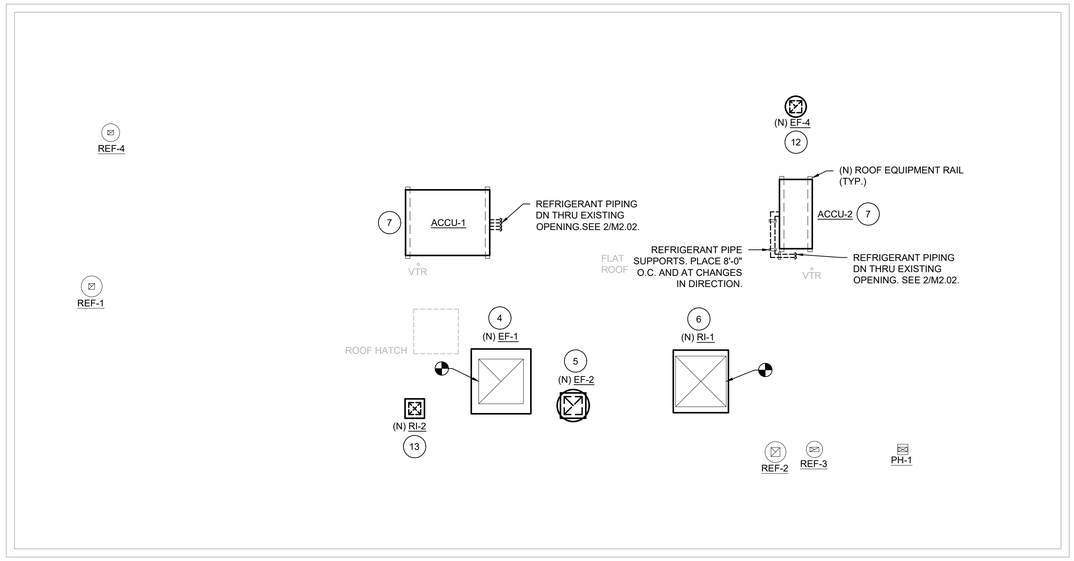
MECHANICAL FIRST FLOOR PROPOSED PLAN

THRALL LIBRARY
HVAC UPGRADES
11 DEPOT STREET
MIDDLETOWN, NY 10940

Job No. 4.1603.02

File No. 4160302M201

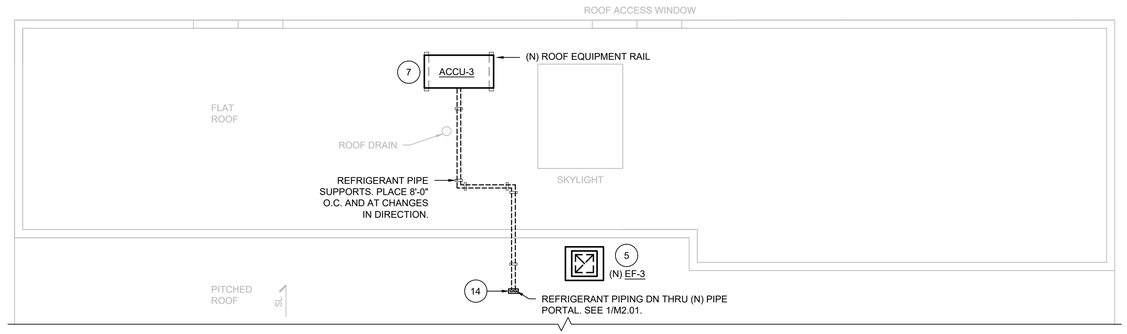
M2.01



1 M2.03 **Mechanical Penthouse Roof Proposed Plan**

1/8" = 1'-0"

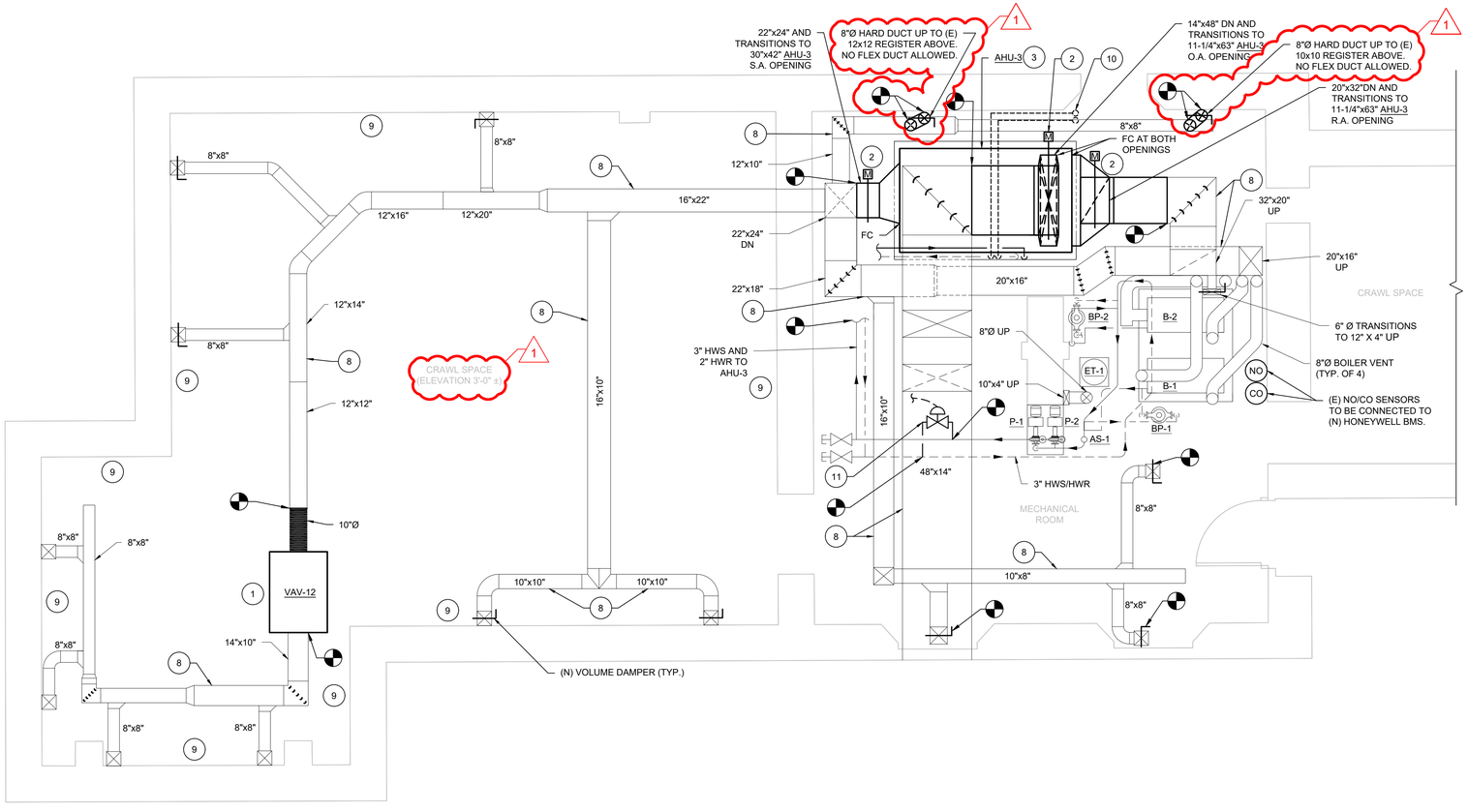
NORTH



2 M2.03 **Mechanical Roof Proposed Plan**

1/8" = 1'-0"

NORTH



3 M2.03 **Mechanical Basement Proposed Plan**

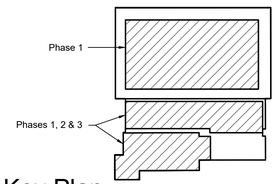
1/8" = 1'-0"

NORTH

Construction Key Notes

(#) SYMBOL INDICATES CONSTRUCTION KEY NOTE

1. PROVIDE AND INSTALL (N) FAN POWERED VAV BOX. PROVIDE AND INSTALL 2-WAY CONTROL VALVE ON HWR LINE FROM FAN POWERED VAV BOX. CONNECT DUCTWORK TO INLET AND OUTLET OF FAN POWERED VAV BOX. TIE FAN POWERED VAV BOX AND CONTROL VALVE INTO (N) BMS, SEE M6.04. PROVIDE AND INSTALL (N) SPACE TEMPERATURE SENSOR, SEE FLOOR PLANS FOR LOCATION. PROVIDE AND INSTALL (N) SECONDARY DRAIN PAN UNDER VAV BOX.
2. PROVIDE AND INSTALL (N) MOTORIZED DAMPER AND ACTUATOR. TIE DAMPER INTO (N) BMS, SEE M6.04.
3. PROVIDE AND INSTALL (N) FLOOR-MOUNTED AHU ON (E) CONCRETE PAD ON (N) NEOPRENE VIBRATION PADS. CONNECT AHU TO (E) DUCTWORK. PROVIDE AND INSTALL (N) 2-WAY CONTROL VALVE ON HWR LINE FROM AHU. INSTALL (N) REFRIGERANT PIPES TO CORRESPONDING ACCU USING THE PATH OF THE OLD REFRIGERANT PIPING. INSTALL PIPING PER MANUFACTURER'S INSTRUCTIONS. (N) AHU SHALL BE KNOCKDOWN. UNIT SHALL BE DISASSEMBLED ON SITE, BROUGHT INTO THE MECH ROOM THROUGH THE MECH ROOM DOOR AND REASSEMBLED INSIDE THE MECH ROOM PER MANUFACTURER'S INSTRUCTIONS.
4. PROVIDE AND INSTALL (N) EF AND (N) ROOF CURB. CONNECT TO (E) DUCTWORK.
5. PROVIDE AND INSTALL (N) EF AND (N) ROOF CURB WITH (N) ROOF PENETRATION. CONNECT TO (N) DUCTWORK. SEE DETAIL 2/M6.02.
6. PROVIDE AND INSTALL (N) INTAKE LOUVERED PENTHOUSE RI-1 AND (N) ROOF CURB. CONNECT TO (E) DUCTWORK.
7. PROVIDE AND INSTALL (N) ACCU IN SAME LOCATION AS DEMOLISHED CU. UTILIZE PREVIOUS REFRIGERANT PIPE PATH FROM (N) ACCU TO ITS CORRESPONDING (N) AHU AND PROVIDE (N) PIPE PORTAL. PROVIDE (N) ROOF EQUIPMENT RAILS UNDERNEATH OF THE ACCU. PLACE MECHANICALLY ATTACHED ROOF CURB TO ROOF DECK AND ANCHOR EQUIPMENT RAIL IN LINE WITH ROOF STEEL FRAMING BELOW. UTILIZE (E) CONDUIT ROOF PENETRATION.
8. RE-INSULATE (E) DUCTWORK.
9. PROVIDE (N) 6" (R39) CLOSED SPRAY FOAM INSULATION ALONG ENTIRE WALL SURFACE.
10. REFRIGERANT PIPING DN FROM 1ST FLR CEILING TO AHU-3 COOLING COIL. SEE 1/M2.01.
11. PROVIDE AND INSTALL (N) TWO-WAY CONTROL VALVE BYPASS AND INTERLOCK WITH (N) DIFFERENTIAL PRESSURE SENSORS LOCATED 2/3 DOWNSTREAM FROM SECONDARY PUMPS.
12. PROVIDE AND INSTALL (N) EF AND (N) ROOF CURB WITH (N) ROOF PENETRATION. CONNECT TO (N) DUCTWORK.
13. PROVIDE AND INSTALL (N) GRAVITY ROOF INTAKE AND ROOF CURB WITH (N) ROOF PENETRATION. CONNECT TO (N) DUCTWORK.
14. PROVIDE AND INSTALL (N) PIPE PORTAL ON SLOPED CLAY TILE ROOF. RE-USE (E) OPENING FOR (N) REFRIGERANT PIPING.



Key Plan

N.T.S.

NORTH

Date	01/25/24
Checked	MAM
Drawn	JPD

THOMAS WIGHARD, P.E.
The PROFESSIONAL ENGINEER
License No. NY 090385

Revisions:

1 ISSUED FOR BID 6/1/23

1 BID ADDENDUM NO. 1 3/14/24

LAN ASSOCIATES
Engineering, Planning, Architecture, Surveying LLP
252 Main Street, Goshen, New York 10924 | t. 845-615-0350 | f. 845-615-0351

MECHANICAL PROPOSED PLANS

THRALL LIBRARY
HVAC UPGRADES
11 DEPOT STREET
MIDDLETOWN, NY 10940

Job No. 4.1603.02

File No. 4160302M203

M2.03