# AIR DUCT CLEANING

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section. The drawings are provided as a courtesy and not deemed 100% accurate. Contractor to visit site and his/her proposal shall include all supply, return and exhaust whether shown or not.

### 1.2 SUMMARY

A. This Section includes cleaning of the following existing duct systems:
1. Supply system.
2. Return system.
3. Coils, louvers, screens, dampers, ducts.
4. Entire system.

### 1.3 DEFINITIONS

A. ASCS: Air system cleaning specialist.

B. NADCA: National Air Duct Cleaners Association.

C. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.

D. MSDS: Material Safety Data Sheets.

E. OSHA: Occupational Safety and Health Administration.

F. EPA: Environmental Protection Agency

### 1.4 SUBMITTALS

A. Manufacturer Certificates: Signed by manufacturers certifying that products comply with requirements.

B. MSDS: Submittal of EPA approved cleaning and sanitizing products.

C. Qualification Data: For ASCS.

D. Access Doors

E. Field quality-control test reports.





### 1.5 QUALITY CONTROL

A. ASCS Qualifications: A certified member of NADCA
1. Certification: Employ an ASCS certified by NADCA on a full-time basis
2. Supervisor Qualifications: Certified as an ASCS by NADCA
3. Experience: Submit records of experience in the field of HVAC systems cleaning.
4. Equipment, Materials, and Labor: Have equipment, materials, and labor required to perform specified services.

B. Comply with current published standards of NADCA.

## 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. See Section 15820 "Duct Accessories" for approved manufacturers listings.

### 2.2 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.

B. Galvanized-Steel Sheet: Lock-forming quality; complying with ASTM A 653/A 653M and having G60 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.

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

D. 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 DUCT-MOUNTING ACCESS DOORS

A. General Description: Fabricate doors airtight and suitable for duct pressure class. **No sheet metal patches shall be allowed.**

B. Rectangular Duct Door: Refer to Section 15820 "Duct Accessories" for manufacturers of duct mounted access doors.





### 2.4 FLEXIBLE CONNECTORS

A. General Description: Fabricate flexible connectors of manufactured products suitable for the duct pressure class.

B. Products shall be as listed in Section 15820 "Duct Accessories.

### 2.5 FLEXIBLE DUCTS

A. General Description: Provide flexible ductwork when required to replace existing flexible ductwork that has been removed for access into the duct stream for cleaning operations or has been damaged beyond repair during the cleaning work. Repair or replace any damaged flexible duct connections.

### 2.6 DUCT ACCESSORY HARDWARE

A. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine systems to determine appropriate methods, tools, and equipment required for performance of work.

B. Prepare written report listing conditions detrimental to performance of work.

C. Proceed with work only after unsatisfactory conditions have been corrected.

D. Submit all material and equipment for review and approval to engineer and BOE facility personnel.

### 3.2 CLEANING

A. Engage a qualified ASCS to clean the following systems:
1. Supply system.
2. Return system.
3. Coils, louvers, screens, dampers, ducts.
4. Entire system.

B. Perform cleaning before air balancing and mark position of dampers and air-directional mechanical devices before cleaning. Contractor shall control any water or other cleaning materials and be responsible for all clean up.

C. Use duct-mounted access doors, as required, for physical and mechanical entry and for inspection.
1. Install additional duct-mounting access doors to comply with duct cleaning standards. Comply with requirements in Section 15820 "Duct Accessories" for additional duct-mounting access doors.
2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection. Replace damaged and deteriorated flexible ducts. Comply with requirements in Division 15 Section 15820 "Duct Accessories" for flexible ducts.





3. Disconnect and reconnect flexible connectors as needed for cleaning and inspection. Replace damaged and deteriorated flexible connectors. Comply with requirements in Division 15 Section 15820 "Duct Accessories" for flexible connectors.

4. Replace damaged fusible links on fire and smoke dampers. Replacement fusible links shall be same rating as those being replaced. Comply with requirements in Division 15 Section 15820 "Duct Accessories" for fusible links.
5. Remove and reinstall ceiling components to gain access for duct cleaning. Clean ceiling components after they have been removed and replaced.

D. Contractor shall clean any associated condensate pans and will clean and blow out drains.

E. Mark position of dampers and air-directional mechanical devices before cleaning, and restore to their marked position on completion.

F. Particulate Collection and Odor Control:
1. Where venting vacuuming system inside building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron size (or greater) particles.
2. When venting vacuuming system outside building, use filtration to contain debris removed from the HVAC system and locate exhaust down wind and away from air intakes and other points of entry into building.

G. Clean the following metal-duct system components by removing visible surface contaminants and deposits:
1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, fans including fan housings, plenums, scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling-unit internal surfaces and components including mixing box, coil section.
4. Coils and related components.
5. Return-air ducts, dampers, and actuators.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated ventilation components.
8. Seal any penetrations made in duct work.

H. 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 ducts 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 liner.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment, and 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. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide operative drainage system for washdown procedures.
7. Biocidal Agents and Coatings: Apply biocidal agents if fungus is present; use according to manufacturer's written instructions after removal of surface deposits and debris.





I. Cleanliness Verification:
1. Verify cleanliness after mechanical cleaning and before application of treatment, including biocidal agents and protective coatings.
2. Visually inspect metal-duct systems for contaminants.
3. Where contaminants are discovered, reclean and reinspect duct systems.
4. Each unit and associated ductwork shall be inspected and signed off by ASCS and by BOE personnel.

J. Cleanliness Products:
1. All antimicrobial pesticides for use in HVAC systems for duct cleaning are to be registered by the EPA.
2. Products accepted by the EPA for use in the ductwork of HVAC systems include the following claims:
- Fungistatic
- Bacteriostatic
- Inhibits odor-causing bacteria and fungi
- Inhibits stain and damage-causing bacteria, fungi, and algae
- Deodorizes
- Inhibits fungi and algae
- Cleaning (a non pesticidal activity; removal of contaminants)

Antimicrobial products for the treatment of coils, drain pans, and other related HVAC system surfaces.

### 3.3 DUCT ACCESSORIES 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, and Section 15820 "Duct Accessories" of this specification.

B. Provide 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 duct-mounting access doors where access doors do not currently exist to allow for the cleaning of ducts, accessories, and terminal units as follows:
1. On both sides of duct coils.
2. Downstream from volume dampers, turning vanes, and equipment.
3. Adjacent to fire or smoke dampers; reset or install new fusible links.
4. Before and after each change in direction, at maximum 50-foot (15-m) spacing.
5. On sides of ducts where adequate clearance is available.
6. Install access doors "As required".

D. Install the following sizes for duct-mounting, rectangular access doors:
1. One-Hand or Inspection Access: 8 by 5 inches (200 by 125 mm).
2. Two-Hand Access: 12 by 6 inches (300 by 150 mm).
3. Head and Hand Access: 18 by 10 inches (460 by 250 mm).
4. Head and Shoulders Access: 21 by 14 inches (530 by 355 mm).
5. Body Access: 25 by 14 inches (635 by 355 mm).
6. Body Plus Ladder Access: 25 by 17 inches (635 by 430 mm).





E. Install the following sizes for duct-mounting, round access doors:
1. One-Hand or Inspection Access: 8 inches (200 mm) in diameter.
2. Two-Hand Access: 10 inches (250 mm) in diameter.
3. Head and Hand Access: 12 inches (300 mm) in diameter.
4. Head and Shoulders Access: 18 inches (460 mm) in diameter.
5. Body Access: 24 inches (600 mm) in diameter.

F. Install the following sizes for duct-mounting, pressure relief access doors:
1. One-Hand or Inspection Access: 7 inches (175 mm) in diameter.
2. Two-Hand Access: 10 inches (250 mm) in diameter.
3. Head and Hand Access: 13 inches (330 mm) in diameter.
4. Head and Shoulders Access: 19 inches (480 mm) in diameter.

### 3.4 CONNECTIONS

A. Reconnect ducts to fans and air-handling units with existing flexible connectors after cleaning ducts and flexible connectors. Repair or replace existing damaged and deteriorated flexible duct and or connections.

B. For fans developing static pressures of 5-inch wg (1250 Pa) and higher, cover replacement flexible connectors with loaded vinyl sheet held in place with metal straps.

C. Reconnect terminal units to supply ducts with existing flexible ducts or replace damaged and deteriorated existing flexible ducts with maximum 12-inch (300-mm) lengths of new flexible duct.

D. Reconnect diffusers to low-pressure ducts with existing flexible ducts or replace damaged and deteriorated existing flexible ducts with maximum 60-inch (1500-mm) lengths of flexible duct clamped or strapped in place.

E. Reconnect existing and new flexible ducts to metal ducts with liquid duct sealer and draw bands.

F. Seal all penetrations in ductwork; refer to section 2.2.

### 3.5 FIELD QUALITY CONTROL

A. Gravimetric Analysis: Sections of metal-duct system, chosen randomly by Owner, may be tested for cleanliness according to NADCA vacuum test gravimetric analysis.
1. If analysis determines that levels of debris are equal to or lower than suitable levels, system shall have passed cleanliness verification.
2. If analysis determines that levels of debris exceed suitable levels, system cleanliness verification will have failed and metal-duct system shall be re-cleaned and re-verified.

B. Verification of Coil Cleaning: Cleaning shall restore coil pressure drop to within 10 percent of pressure drop measured when coil was first installed. If original pressure drop is not known, coil will be considered clean only if it is free of foreign matter and chemical residue, based on thorough visual inspection.

C. Report results of tests in writing.

D. Each system and all components as per section 1.2 shall be signed off by ASCS and BOE personnel.



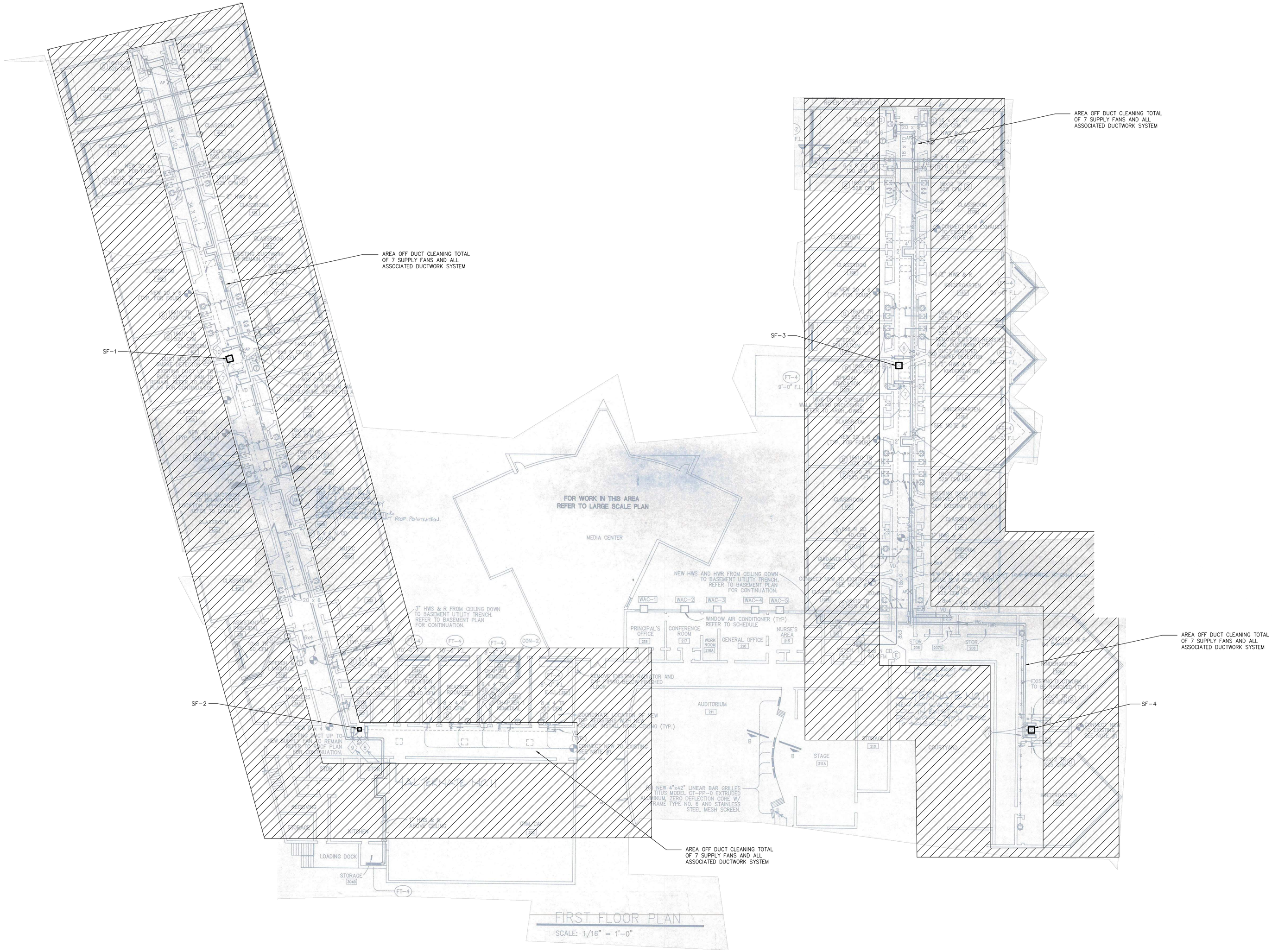
DUCT CLEANING PROJECT
STAMFORD, CT

DRAWING TITLE:
AIR DUCT CLEANING SPECIFICATIONS

COLLECTIVE DESIGN ASSOCIATES
46 Riverside Avenue
Westport, Connecticut 06880
Telephone (203) 299-0250 Fax (203) 299-0245
Copyright © 2021 CDA.

REVISIONS:
03.18.22 – ISSUED FOR PERMIT

SCALE: AS NOTED
DATE: 03.18.22
DRAWN BY: B.D.T.
SHEET NO: M-001
JOB NO: 2021.101.01




# NEWFIELD ELEMENTARY SCHOOL
# DUCT CLEANING PROJECT

**STAMFORD, CT**

DRAWING TITLE: MECHANICAL HVAC FIRST FLOOR PLAN

**COLLECTIVE DESIGN ASSOCIATES**
46 Riverside Avenue
Westport, Connecticut 06880
Telephone (203) 299-0250 Fax (203) 299-0245

Copyright © 2021 CDA.

REVISIONS:
03.18.22 – ISSUED FOR PERMIT

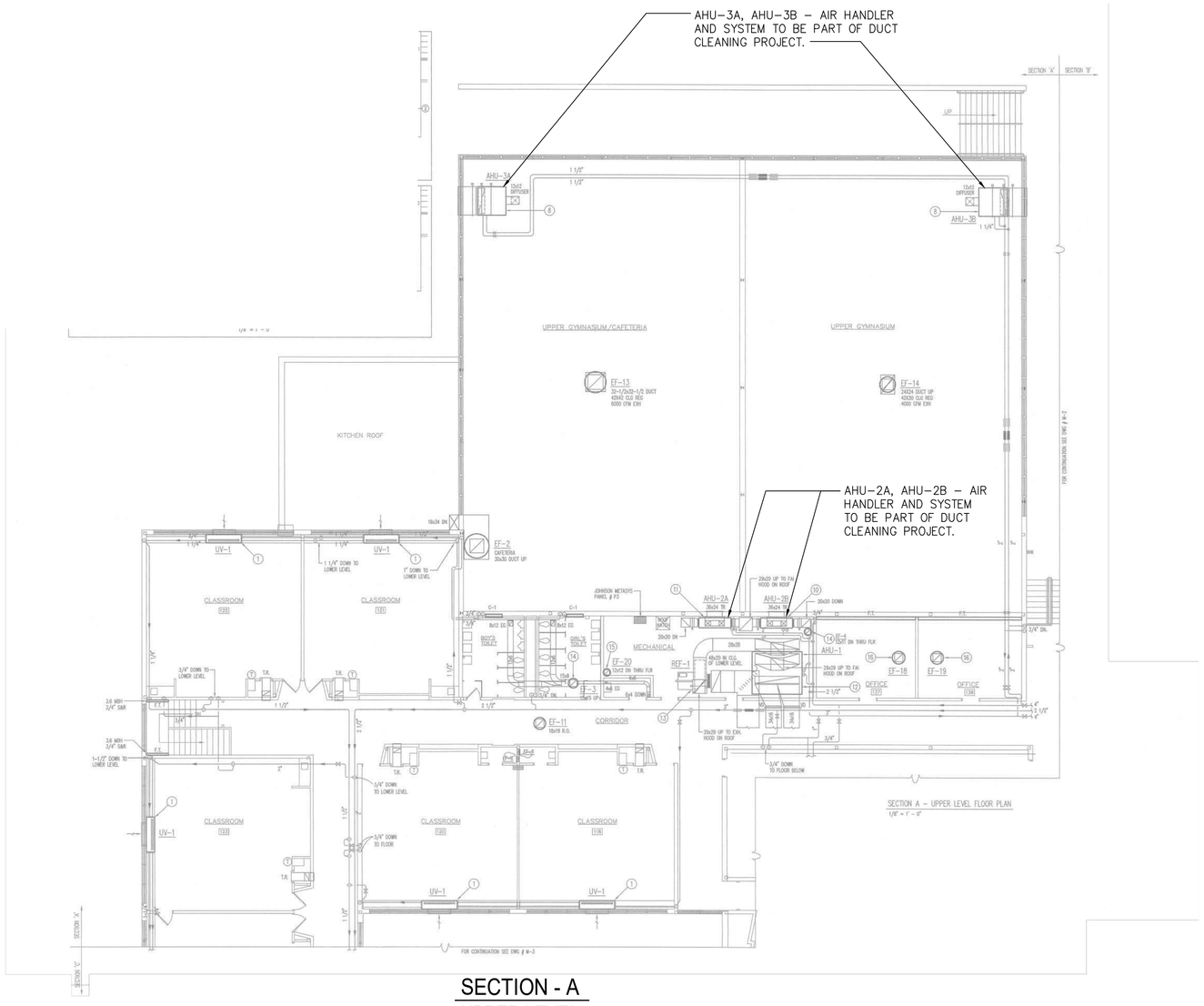
SCALE: AS NOTED

DATE: 03.18.22

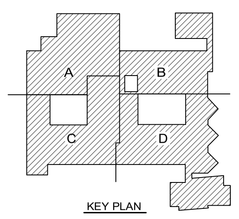
DRAWN BY: B.D.T.

SHEET NO: M-101

JOB NO: 2021.101.01




SECTION - A
UPPER LEVEL




KEY PLAN

# NORTHEAST ELEMENTARY SCHOOL DUCT CLEANING PROJECT

**STAMFORD, CT**

DRAWING TITLE: UPPER LEVEL FLOOR PLAN SECTIONS

**COLLECTIVE DESIGN ASSOCIATES**
**45 Riverside Avenue**
**Westport, Connecticut 06880**
**Telephone (203) 299-0250 Fax (203) 299-0245**

Copyright © 2021 CDA.

REVISIONS:
03.18.22 – ISSUED FOR PERMIT

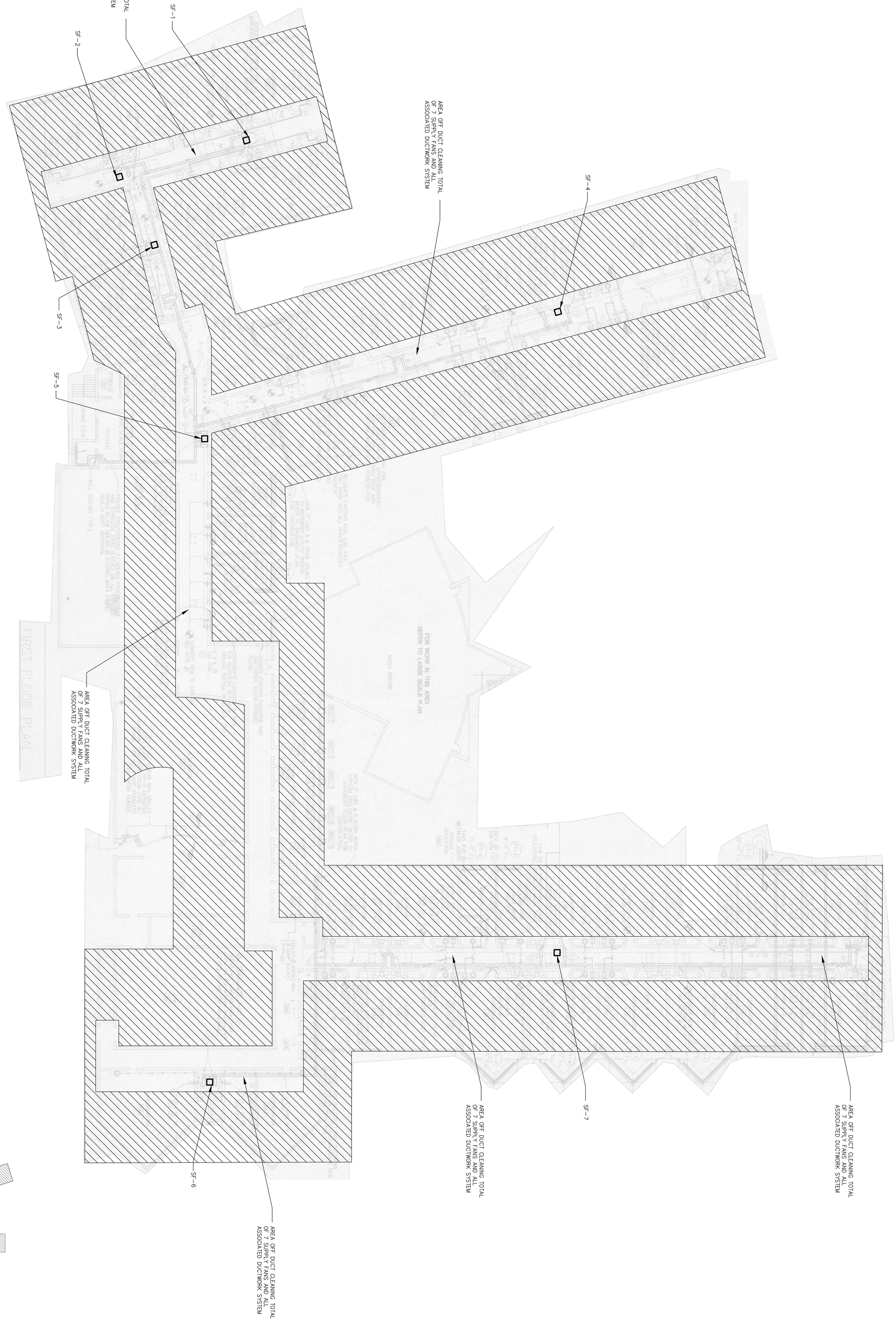
SCALE:

DATE: 03.18.22

DRAWN BY:

SHEET NO: M-102

JOB NO: 2021.101.02




DRAWING TITLE: FIRST FLOOR PLAN

REVISIONS: 03.18.22 - ISSUED FOR PERMIT

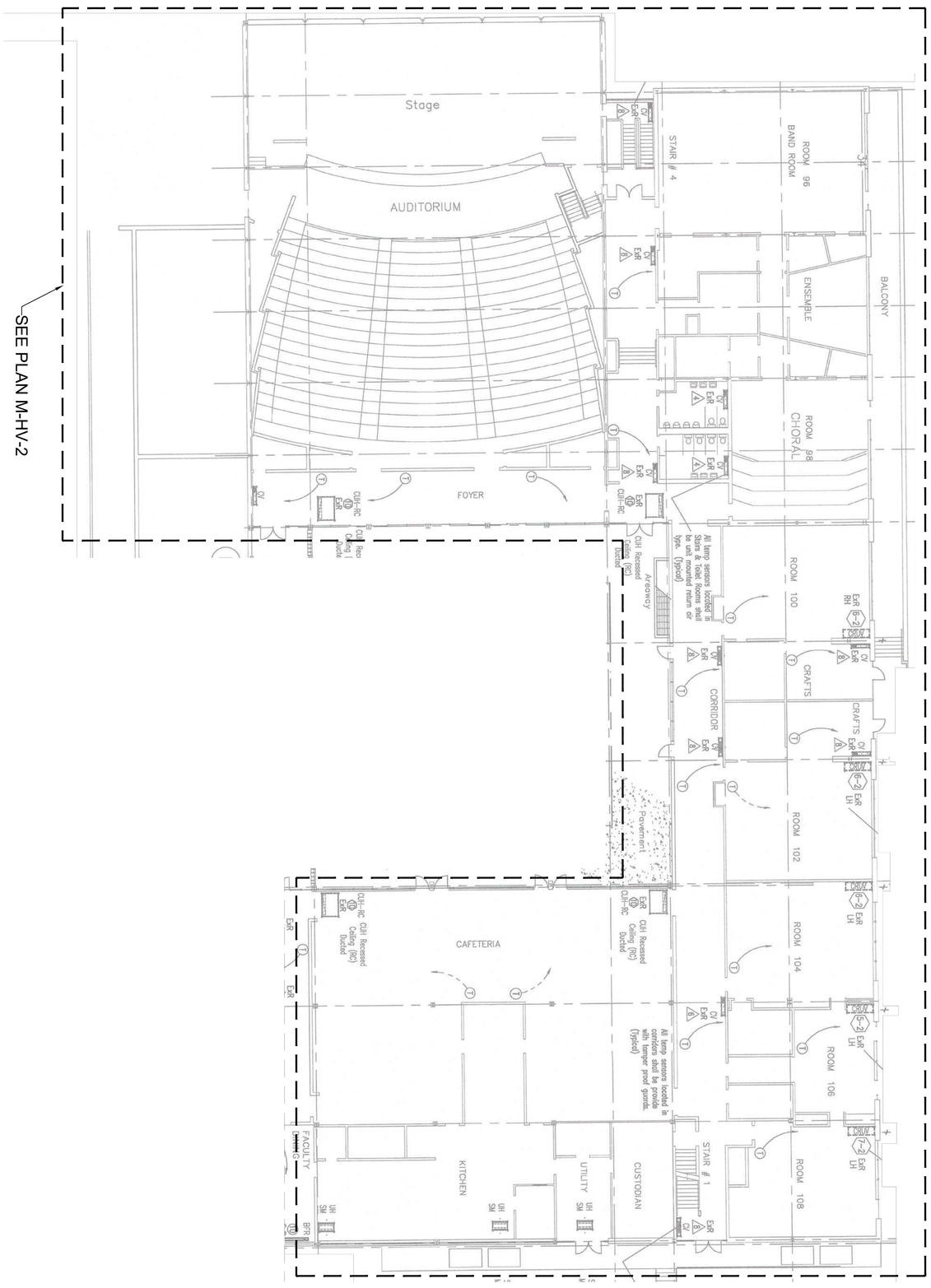
**COLLECTIVE DESIGN ASSOCIATES**
46 Riverside Avenue
Westport, Connecticut 06880
Telephone (203) 299-0250 Fax (203) 299-0245

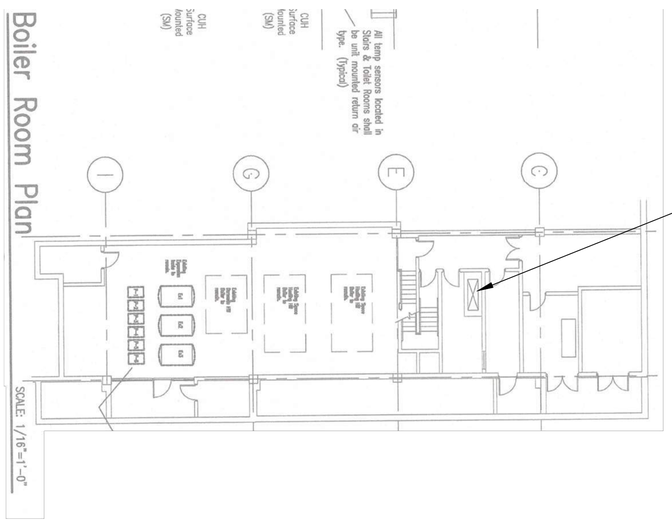
Copyright © 2021 CDA.

STATE OF CONNECTICUT
BRADFORD A. COLLINS
No. 20818
LICENSED PROFESSIONAL ENGINEER

ROXBURY ELEMENTARY SCHOOL
DUCT CLEANING PROJECT
STAMFORD, CT

JOB NO: 2021.101.03
SHEET NO: M-103
DRAWN BY:
DATE: 03.18.22
SCALE:




JOB NO: 2021.101.04

SHEET NO: M-104

DRAWN BY: B.D.T.

DATE: 03.18.22

SCALE: AS NOTED

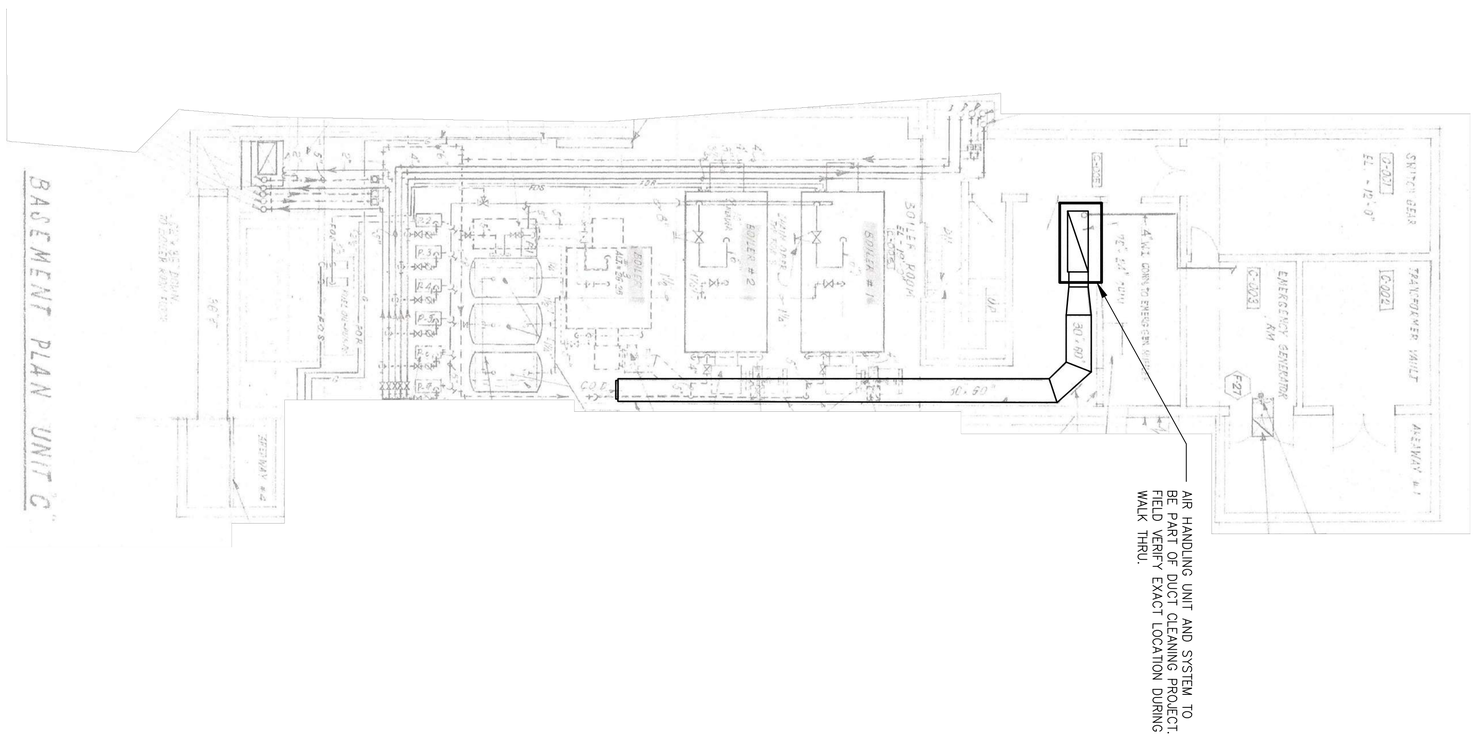
REVISIONS: 03.18.22 – ISSUED FOR PERMIT

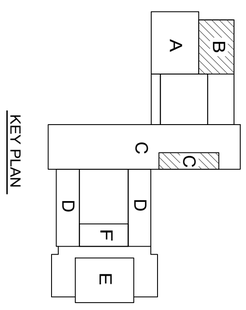
DRAWING TITLE: FLOOR PLANS ENTIRE BUILDING

**COLLECTIVE DESIGN ASSOCIATES**
46 Riverside Avenue
Westport, Connecticut 06880
Telephone (203) 299-0250 Fax (203) 299-0245
Copyright © 2021 CDA.

STATE OF CONNECTICUT BRUCE D. TUTTLE 24 LICENSED PROFESSIONAL ENGINEER

TURN OF RIVER ELEMENTARY SCHOOL
DUCT CLEANING PROJECT
**STAMFORD, CT**




KEY PLAN

DRAWING TITLE: BASEMENT PLAN UNITS "A"&"B"/MEZZANINE FLOOR PLAN UNIT "C"

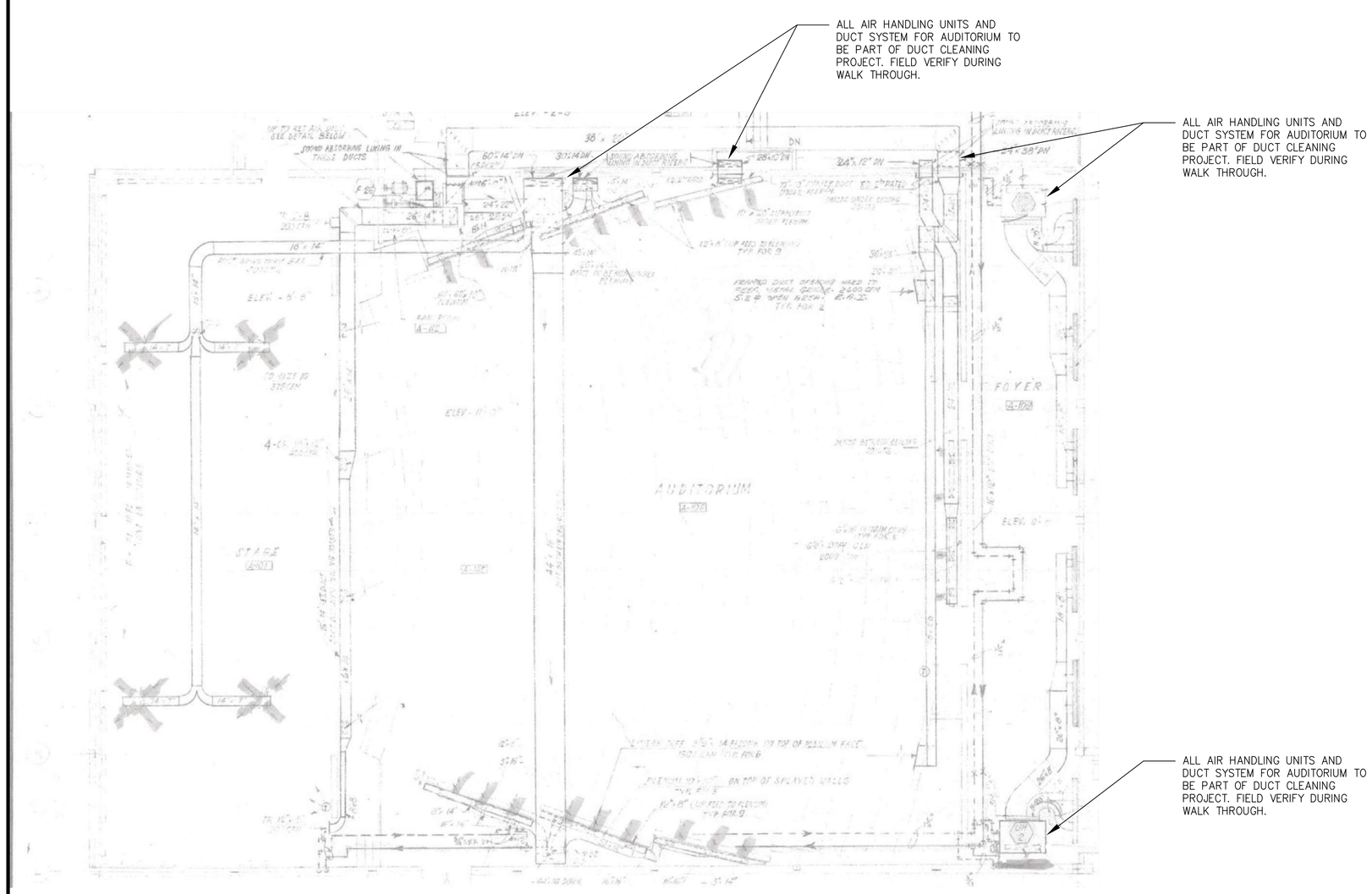
REVISIONS: 03.18.22 - ISSUED FOR PERMIT

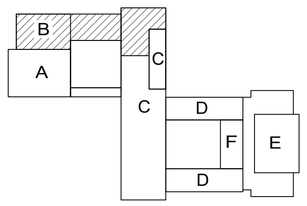
**COLLECTIVE DESIGN ASSOCIATES**
46 Riverside Avenue
Westport, Connecticut 06880
Telephone (203) 299-0250 Fax (203) 299-0245
Copyright © 2021 CDA.

STATE OF CONNECTICUT
BRUCE D. TOMASZEWSKI
No. 24,385
LICENSED PROFESSIONAL ENGINEER

TURN OF RIVER ELEMENTARY SCHOOL
DUCT CLEANING PROJECT
**STAMFORD, CT**

SCALE: AS NOTED
DATE: 03.18.22
DRAWN BY: B.D.T.
SHEET NO: M-105
JOB NO: 2021.101.04




KEY PLAN

# TURN OF RIVER ELEMENTARY SCHOOL
## DUCT CLEANING PROJECT
**STAMFORD, CT**

DRAWING TITLE: FIRST FLOOR PLAN UNIT "A", "B" AND "C" NORTH

**COLLECTIVE DESIGN ASSOCIATES**
46 Riverside Avenue
Westport, Connecticut 06880
Telephone (203) 299-0250 Fax (203) 299-0245
Copyright © 2021 CDA.

REVISIONS:
03.18.22 – ISSUED FOR PERMIT

SCALE: AS NOTED
DATE: 03.18.22
DRAWN BY: B.D.T.
SHEET NO: M-106
JOB NO: 2021.101.04