Red Clay Consolidated School District
AI DuPont Middle School HVAC Renovations
Bid Pac "A"

May 12, 2015 .

ADDENDUM #1 ISSUED BY EDiS COMPANY
110 S. POPLAR STREET, WILMINGTON, DE 19801

The bid due date remains unchanged.
Bids are being received until 3:30 p.m. on Thursday, May 21, 2015 at the AI DuPont Middle School.

NOTICE: Attach this addendum to the Project Manual for this project. It modifies and becomes a part of the Contract Documents. Work for materials not specifically mentioned herein are to be as described in the main body of the specifications and as shown on the Drawings. Acknowledge receipt of this Addendum in the space provided on the Bid Form.

SPECIFICATION REVISIONS

a) Specification Section 011100: Contract A-10, Mechanical and Plumbing
   - Page 26 – Add bullet #40, "***Provide saw-cutting, excavation, backfill, and asphalt and concrete patches for new 4" Domestic Water Service Line. Provide new 4" domestic water service line in its entirety including but not limited to; meter pit, valves, meters, and tap into water service line."***

b) Specification Section 004100 : Bid Form and Attachments
   - Remove existing bid form for Contract A-09 – Auditorium Seating (pages 57 - 63) from specification section 004100 and replace with the attached revised specification section 004100, Bid Form and Attachments, Pages 57 - 63.
     i. This specification section has been modified to include alternate #4, 5, and 6 for providing new auditorium seating at Conrad Schools of Science, Richardson Park Elementary, and HB DuPont Middle School.

c) Specification Section 011100 : Summary of Work
   - Remove existing scope of work for Contract A-09 – Auditorium Seating (page 34) from specification section 011100 and replace with the attached revised specification section 011100, Summary of Work for Contract A-09 – Auditorium Seating, Pages 34 – 35.

d) Specification Section 012300 - Alternates
   - Remove existing specification section 012300 and insert attached specification Section 012300 – Alternates

DRAWINGS REVISIONS

Architectural Drawings

a) Insert drawings P1, P2, P3, P4, P5, P6, P7, and P8 into the project documents.

ATTACHMENTS

- Specification Section 004100 – Pages 57 through 63.
- Specification Section 011100 – Pages 34 through 35.

- Specification Section 012300.
- Phasing Plans P1, P2, P3, P4, P5, P6, P7, and P8.
- Addendum No. 1 from Studio JAED dated May 12, 2015.

END OF ADDENDUM #1

Contract No. A-09 : Auditorium Seating

BID FORM

For Bids Due: _____ To: Red Clay Consolidated School District

Name of Bidder: _____

Bidder Address: _____

Contact Name: _____ E-Mail Address: _____

Delaware Business License No.:_____ Taxpayer ID No.: _____

(Other License Nos.): _____

(A copy of Bidder's Delaware Business License must be attached to this form.)

Phone No.: ( ) _____ - _____ Fax No.: ( ) _____ - _____

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

$_____ ($_____)

ALTERNATES

Alternate prices conform to applicable project specification section. Refer to specifications for a complete description of the following Alternates. An "ADD" or "DEDUCT" amount is indicated by the crossed out part that does not apply.

Alternate No. 1: Provide Main Entrance Security Vestibule shown as Keynote 3 on Sheet A 3.3.

Add/Deduct _____($_____)

Alternate No. 2: Demolish existing bleachers and Provide New Bleachers in Gym

Add/Deduct _____($_____)

Alternate No. 3: Provide all Phase 2 through 7 work on Second Shift. Phase 1 and 8 work to remain regular hours.

Add/Deduct _____($_____)

Alternate No. 4: Provide demolition and replacement of auditorium seating in Conrad Schools of Science

Add/Deduct _____($_____)

Alternate No. 5: Provide demolition and replacement of auditorium seating in Richardson Park Elementary School

Add/Deduct _____($_____)

Alternate No. 6: Provide demolition and replacement of auditorium seating in HB DuPont Middle School

Add/Deduct _____($_____)

UNIT PRICES

Unit prices conform to applicable project specification section. Refer to the specifications for a complete description of the following Unit Prices:

N/A

NOTE: The difference in price between Add and Deduct in the above Unit Prices should not exceed fifteen percent (15%).

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for ninety (90) days the date of opening of bids, and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid (if required).

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

_____
(State of Corporation)

Business Address:_____
_____
_____
_____

Witness: _____ By: _____
(Authorized Signature)

(SEAL) _____
(Title)

Date: _____

ATTACHMENTS

Sub-Contractor List
Non-Collusion Statement
Bid Bond
Consent of Surety
Delaware Business License
(Others as Required by Project Manuals)

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor must be listed for each category where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the Owner, **it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.**

Subcontractor Category	Subcontractor	Address (City & State)	Subcontractors tax payer ID # or Delaware Business license #
1. Auditorium Seating (Supply)			
2. Auditorium Seating (Install)			

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date _____.

All the terms and conditions of ***Contract No.:*** _____ have been thoroughly examined and are understood.

NAME OF BIDDER: _____

AUTHORIZED REPRESENTATIVE (TYPED): _____

AUTHORIZED REPRESENTATIVE (SIGNATURE): _____

TITLE: _____

ADDRESS OF BIDDER: _____

_____

_____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20_____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: _____of _____in the County of _____ and State of _____ as Principal, and _____of _____in the County of _____ _____ and State of _____ as Surety, legally authorized to do business in the State of Delaware ('State"), are held and firmly unto the ***Red Clay Consolidated School District*** in the sum of _____ _____ Dollars (S_____), or percent not to exceed _____ _____ Dollars (S_____) of amount of bid on Contract No. _____ to be paid to the ***Red Clay Consolidated School District*** for the use and benefit of the ***Red Clay Consolidated School District*** for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators, and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden Principal who has submitted to the ***Red Clay Consolidated School District*** a certain proposal to enter into this contract for the furnishing of certain material and/or services within the State, shall be awarded this Contract, and if said Principal shall well and truly enter into and execute this Contract as may be required by the terms of this Contract and approved by the ***Red Clay Consolidated School District*** this Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____seal and dated this____day of _____in the year of our Lord two thousand and _____(20__).

SEALED, AND DELIVERED IN THE PRESENCE OF

_____
Name of Bidder (Organization)

Corporate Seal

By:_____
Authorized Signature

Attest _____

_____
Title

_____
Name of Surety

Witness_____

_____

_____
Title

CONSENT OF SURETY

DATE_____

To:

Gentlemen:

We, the _____

_____
(Surety Company's Address)

_____

a Surety Company authorized to do business in the State of Delaware hereby agrees that if

_____
(Contractor)

_____
(Address)

_____

is awarded the Contract No. _____

We will write the required Performance and/or Labor and Material Bond required by Paragraph 9 of the Instructions to Bidders.

_____
(Surety Company)

By _____
(Attorney-in-Fact)

END OF SECTION

CONTRACT NO. A-09 – AUDITORIUM SEATING

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials, and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 126113	Fixed Audience Seating

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

1. Provide demolition ***(including removal of seats and anchor bolts, and disposal of seats from site in dumpster provided by this contractor)*** of existing seating in four schools; AI DuPont Middle School, HB DuPont Middle School, Richardson Park Elementary, and Conrad Schools of Science. Layouts of the existing auditorium seating in these schools are shown on drawings; A 2.4, A2.6, ~~**A3.16, A3.17, and A3.18.**~~ ***A-401, A-402, and A-403.***

2. The existing 26 seats located in the lowest row of the 2nd floor balcony of AI DuPont High School will be demolished by the owner prior to the start of the project.

3. Provide new Fixed audience seating in four schools; AI DuPont Middle School, HB DuPont Middle School, Richardson Park Elementary, and Conrad Schools of Science. New Seating is to be provided as detailed in the drawings and section 126113. Seating plans for the schools are shown on drawings; A3.14, A3.15, ~~**A3.16, A3.17, and A3.18.**~~ ***A-401, A-402, and A-403.***

4. Demolition and installation of seating in the four schools will be scheduled to ensure continuous work for this contractor. The intent of this contract is to start one project and complete each auditorium separately without interruption and proceed to the next without additional mobilizations.

5. Provide seating layout, shop drawings, product data, samples, etc.

6. Provide aisle lights. Coordinate electrical rough-in for these lights with the electrical contractor for each project.

7. New seating demolition and installation is scheduled to be performed during Summer 2016.

8. This contractor responsible for their own layout and drilling of anchors for fixed seating.

9. Provide specified warranty, attic stock, and as-builts.

10. Base bid is to provide demolition of existing seating and supply and installation of new auditorium seating in AI DuPont Middle School. Alternate pricing is requested for demolition of existing seating and supply and installation of new auditorium seating in HB DuPont Middle School, Richardson Park Elementary, and Conrad Schools of Science.

11. Provide pricing for all alternates as described in Section 012300-Alternates.

SECTION 012300 - ALTERNATES

1. GENERAL PROVISIONS

   A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

   B. Refer to provisions in AIA Document A232 – 2009 Edition, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISOR EDITION, for requirements in addition to those specified in Division 1.

   C. For work being constructed under separate prime contracts, provisions of this Section apply to each contract being bid.

2. BASE BID

   A. The Base Bid shall consist of all work shown or specified in the Contract Documents, exclusive of any Additive Alternates specified herein.

   B. The Base Bid shall include all work in any Subtractive Alternates specified herein.

3. ALTERNATES

   A. State in the Bid Form the amount to be added to the Base Bid for each Alternate specified.

   B. See Section 002113 - INSTRUCTIONS TO BIDDERS for related information.

   C. The description of Alternates contained herein is in summary form. Detailed requirements for materials and execution shall be as specified in other sections and as shown on drawings.

      Alternate No. 1: Provide Main Entrance Security Vestibule shown as Keynote 3 on Sheet A 3.3.

      1. **Base Bid Item: No new work.**
      2. **Alternate: Provide new aluminum storefront system, doors, and hardware as described in Keynote 3 on Sheet A 3.3 and shown in elevations and details.**

      Alternate No. 2: Demolish existing bleachers and Provide New Bleachers in Gym

      1. **Base Bid Item: No new work. Existing Bleachers are to remain.**
      2. **Alternate: Demolish existing bleacher system from the gymnasium and patch walls and floor where existing anchors/supports are removed. Supply and install new bleacher system to replace existing system in kind.**

Alternate No. 3: Provide all Phase 2 through 7 work on Second Shift. Phase 1 and 8 work to remain regular hours.

1. **Base Bid Item: All work in phases 1 through 8 are to be performed during standard working hours (7 a.m. to 3:30 p.m.).**
2. **Alternate: All work in phases 2 through 7 are to be performed during second shift working hours (2:30 p.m. to 11:00 p.m.). All work performed in Phase 1 and 8 are to remain regular hours (7 a.m. to 3:30 p.m.).**

Alternate No. 4: Provide demolition and replacement of auditorium seating in Conrad Schools of Science as shown on Drawing A-401.

1. **Base Bid Item: Provide demolition and installation of new fixed auditorium seating in AI DuPont Middle School auditorium as shown on Drawings A3.14 and A3.15.**
2. **Alternate: In addition to new seating in AI DuPont Middle School; Provide demolition of existing seating and supply and installation of new fixed auditorium seating in Conrad Schools of Science as shown on Drawing A-401.**

Alternate No. 5: Provide demolition and replacement of auditorium seating in Richardson Park Elementary School as shown on Drawing A-402.

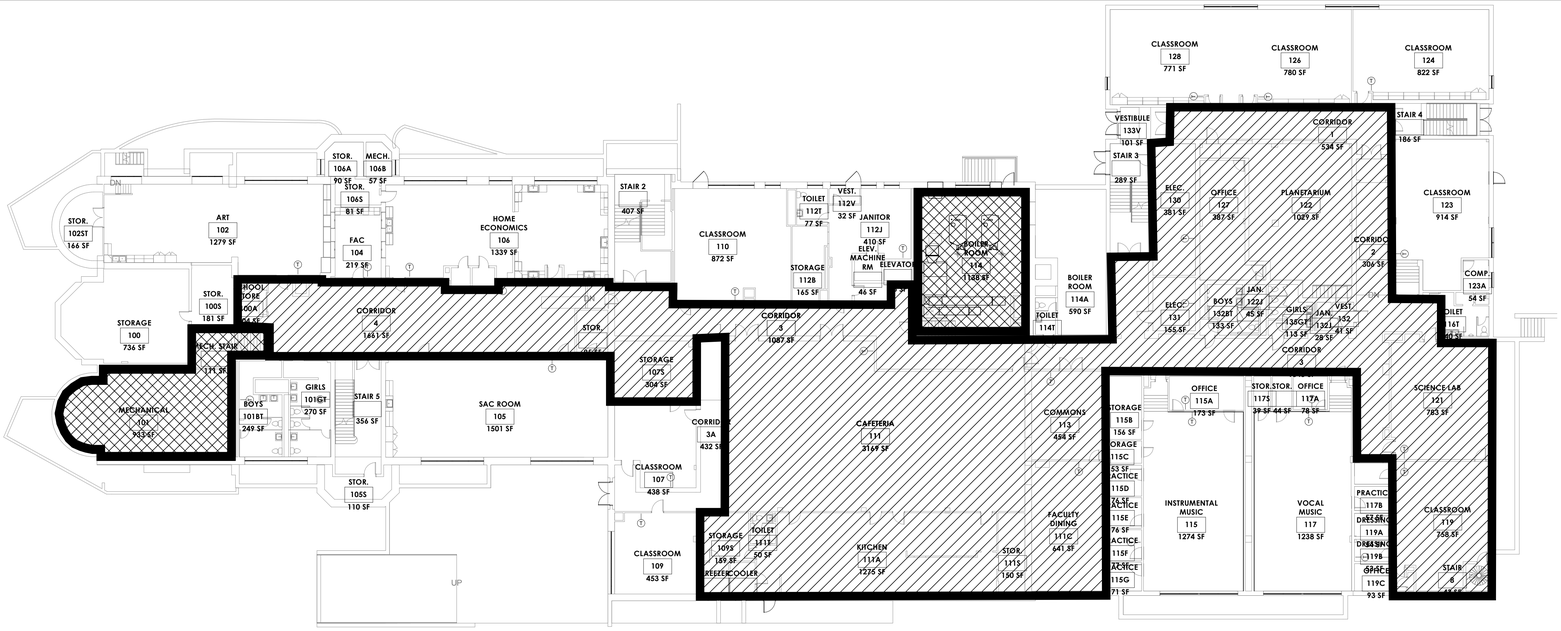
1. **Base Bid Item: Provide demolition and installation of new fixed auditorium seating in AI DuPont Middle School auditorium as shown on Drawings A3.14 and A3.15.**
2. **Alternate: In addition to new seating in AI DuPont Middle School; Provide demolition of existing seating and supply and installation of new fixed auditorium seating in Richardson Park Elementary School as shown on Drawing A-402.**

Alternate No. 6: Provide demolition and replacement of auditorium seating in HB DuPont Middle School as shown on Drawing A-403.

1. **Base Bid Item: Provide demolition and installation of new fixed auditorium seating in AI DuPont Middle School auditorium as shown on Drawings A3.14 and A3.15.**
2. **Alternate: In addition to new seating in AI DuPont Middle School; Provide demolition of existing seating and supply and installation of new fixed auditorium seating in HB DuPont Middle School as shown on Drawing A-403.**

END OF SECTION

PHASE 1 - SUMMER 2015



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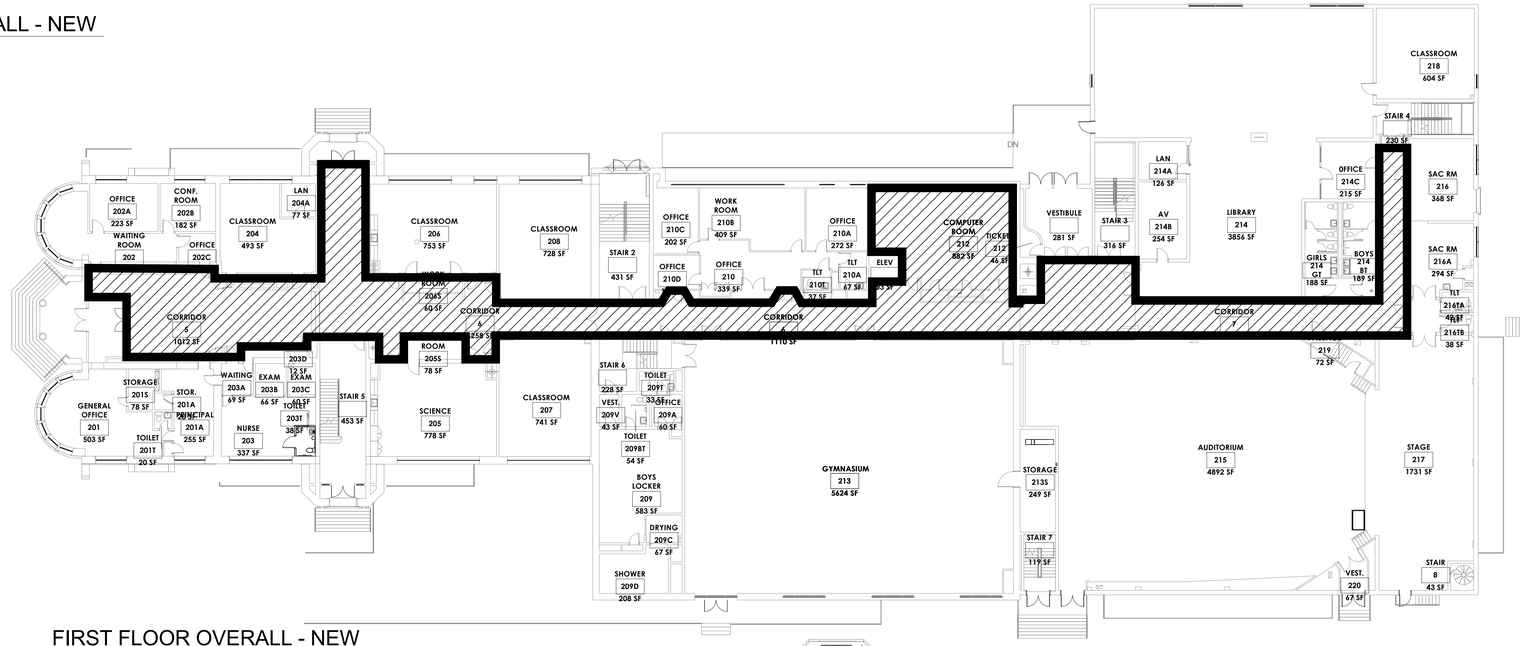

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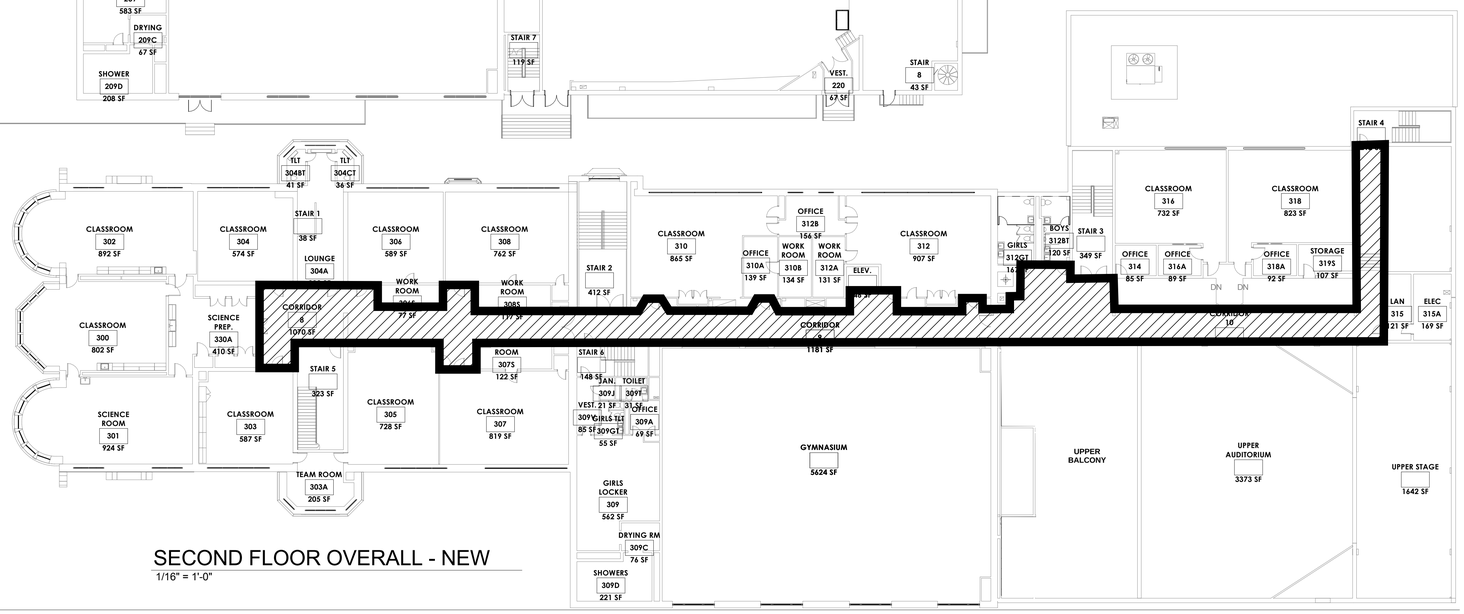

SECOND FLOOR OVERALL - NEW

1/16" = 1'-0"

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Website: www.StudioJAED.com
E-Mail: info@StudioJAED.com

REVISIONS

DESCRIPTION	DATE

PROJECT

RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School
HVAC RENOVATION
3130 KENNETT PIKE
WILMINGTON, DELAWARE 19807

SHEET TITLE

PHASING PLAN
PHASE 1

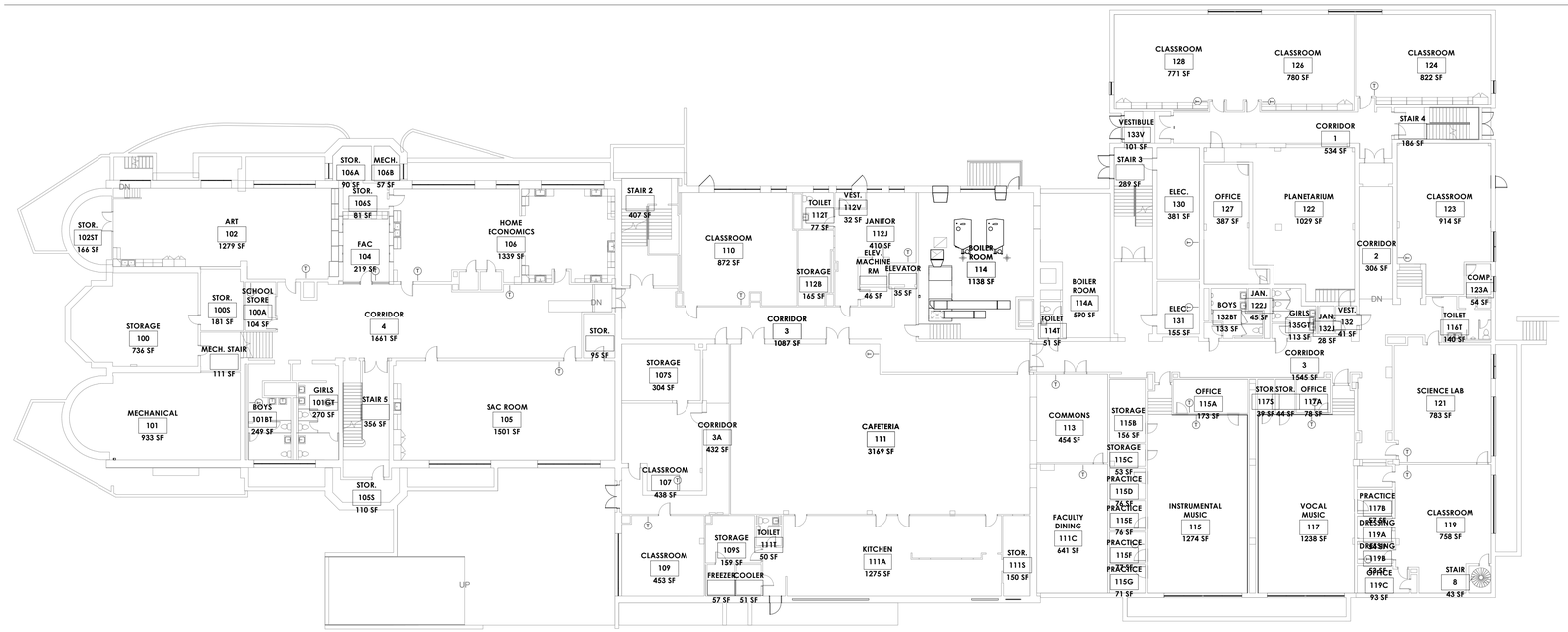
DRAWN | CHK'D / DESIGNER

DISCIPLINE | SHEET NO.

PROJECT NO. 14036

P1

PHASE 2 - SEPT./OCT. 2015



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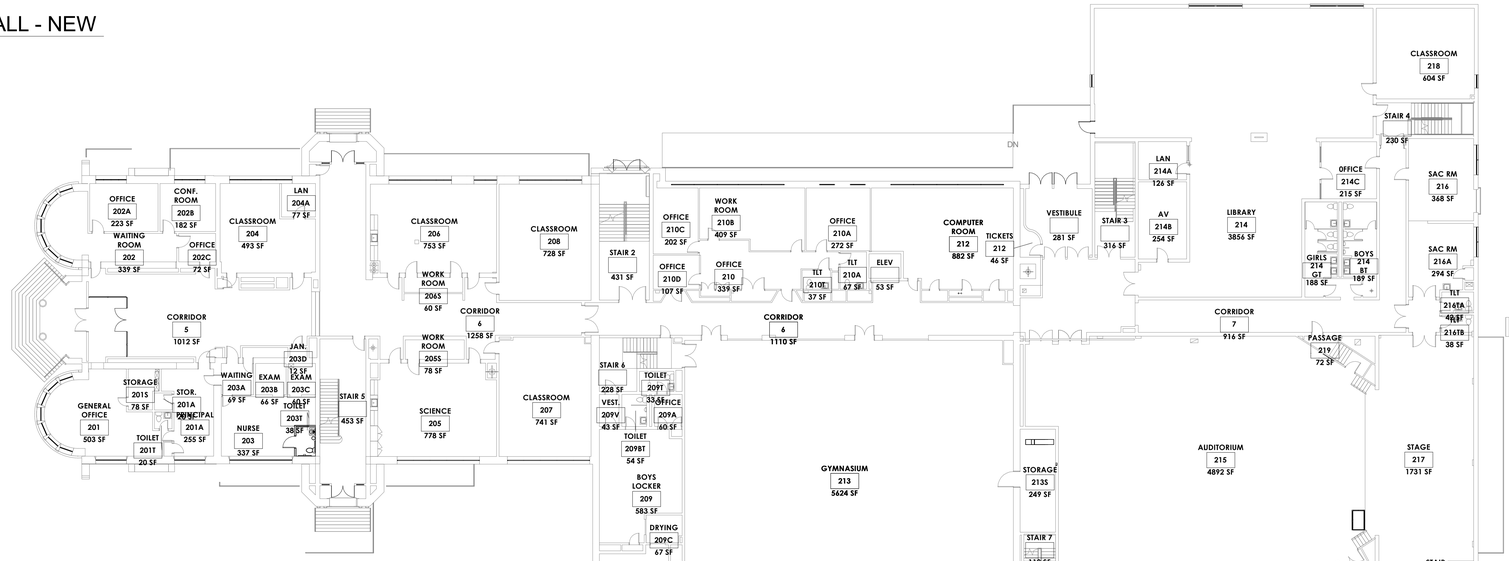

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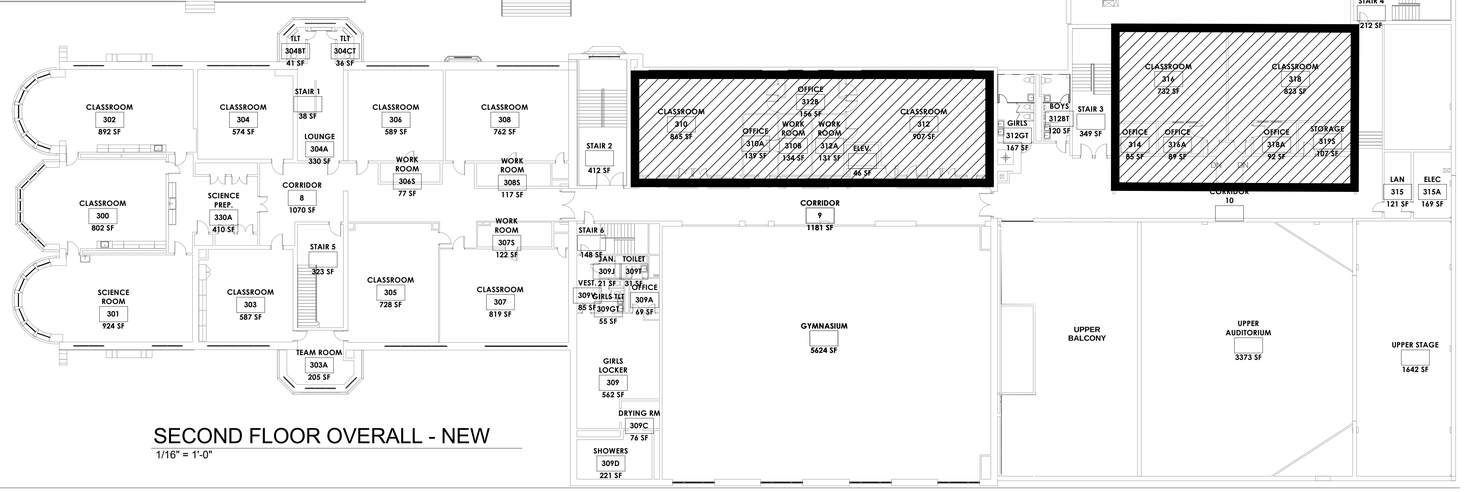

SECOND FLOOR OVERALL - NEW

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PROJECT

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A. I. DuPont Middle School
HVAC RENOVATION
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SHEET TITLE

PHASING PLAN
PHASE 2

DRAWN | CHK'D / DESIGNER

DISCIPLINE | SHEET NO.

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P2

THE ACCURACY OF THE DATA, THE RECEIVER WILL COMPARE THE DATA WITH HIS/HER/ITS OWN DATA AND INFORMATION ON THE PLANS. THE RECEIVER WARRANTS THAT IT WILL NOT REPRODUCE OR OTHERWISE MAKE USE OF THE DATA OR INFORMATION IN ANY WAY WHATSOEVER WITHOUT THE PRIOR WRITTEN PERMISSION OF STUDIO JAED CORPORATION.

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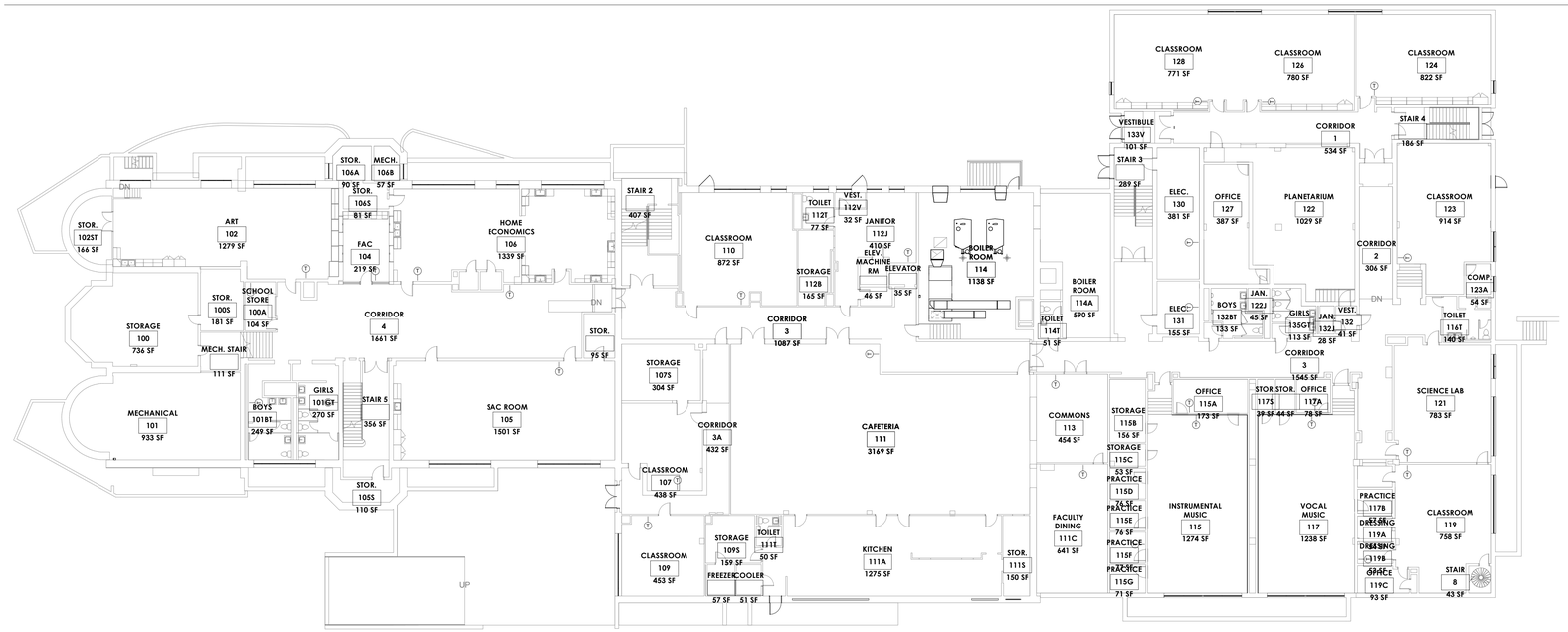
PHASE 3 - OCT./DEC. 2015



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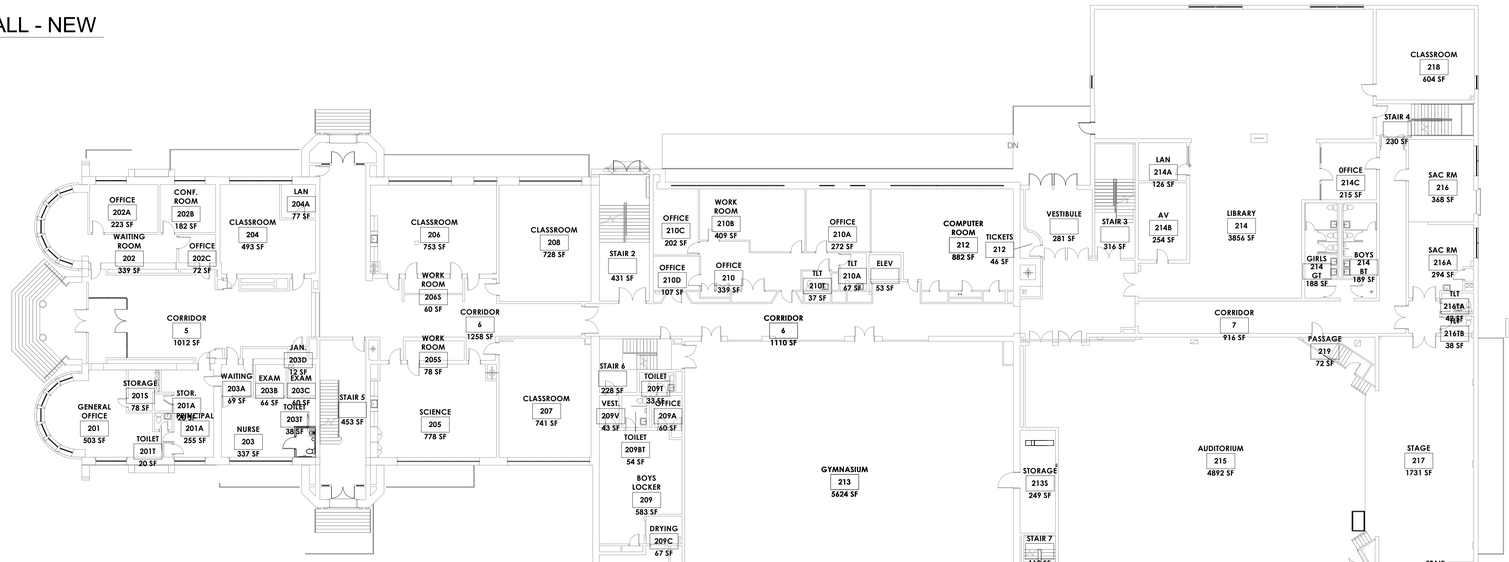

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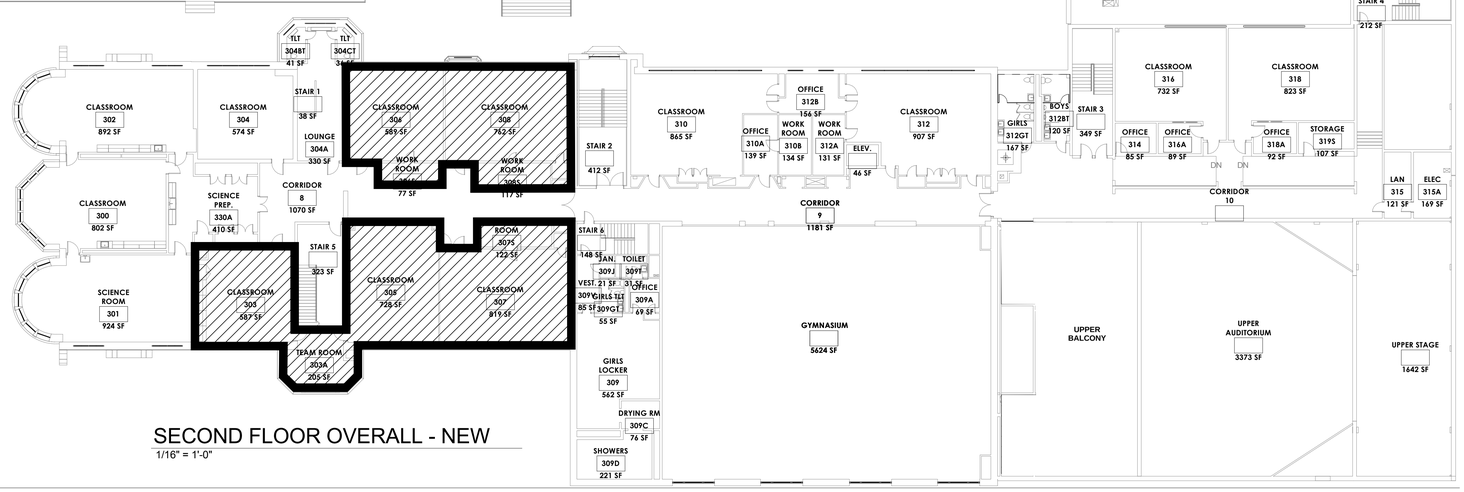

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RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School
HVAC RENOVATION
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SHEET TITLE

PHASING PLAN
PHASE 3

DRAWN | CHK'D / DESIGNER

DISCIPLINE | SHEET NO.

PROJECT NO. 14036

P3

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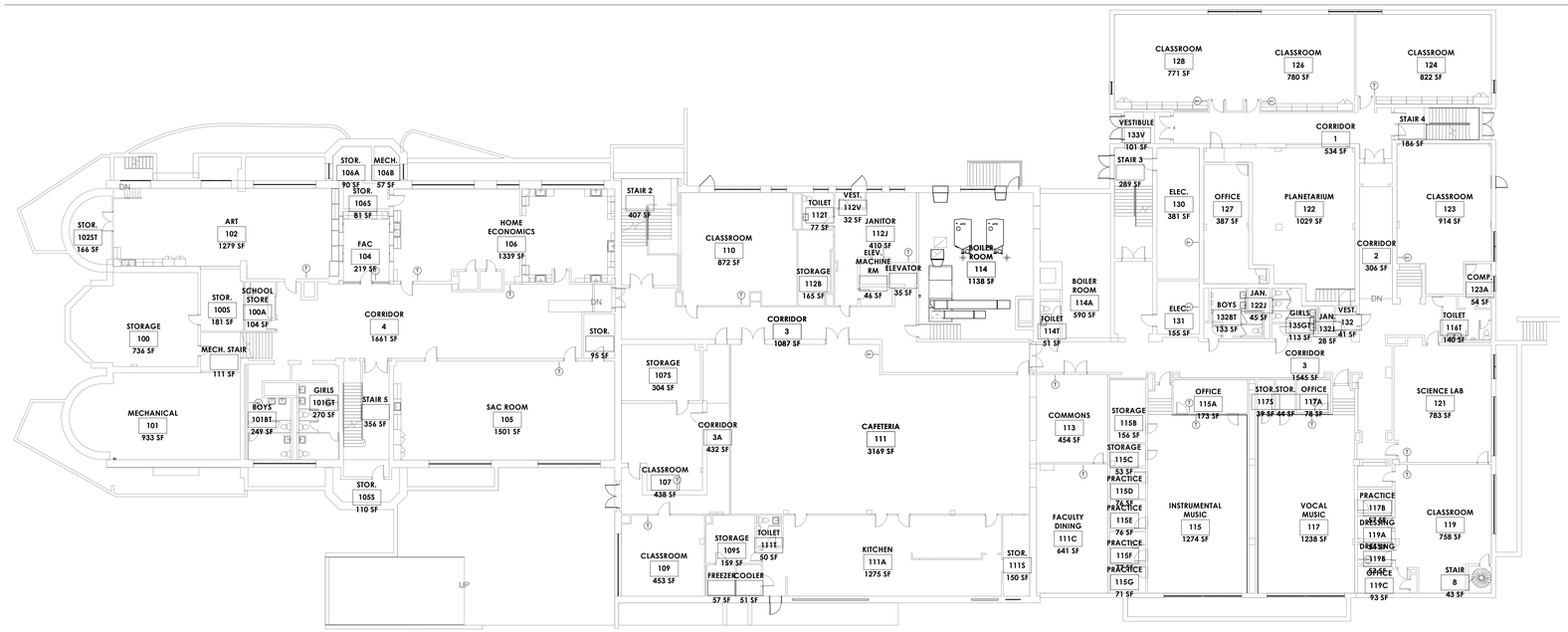
PHASE 4 - DEC.-JAN. 2016



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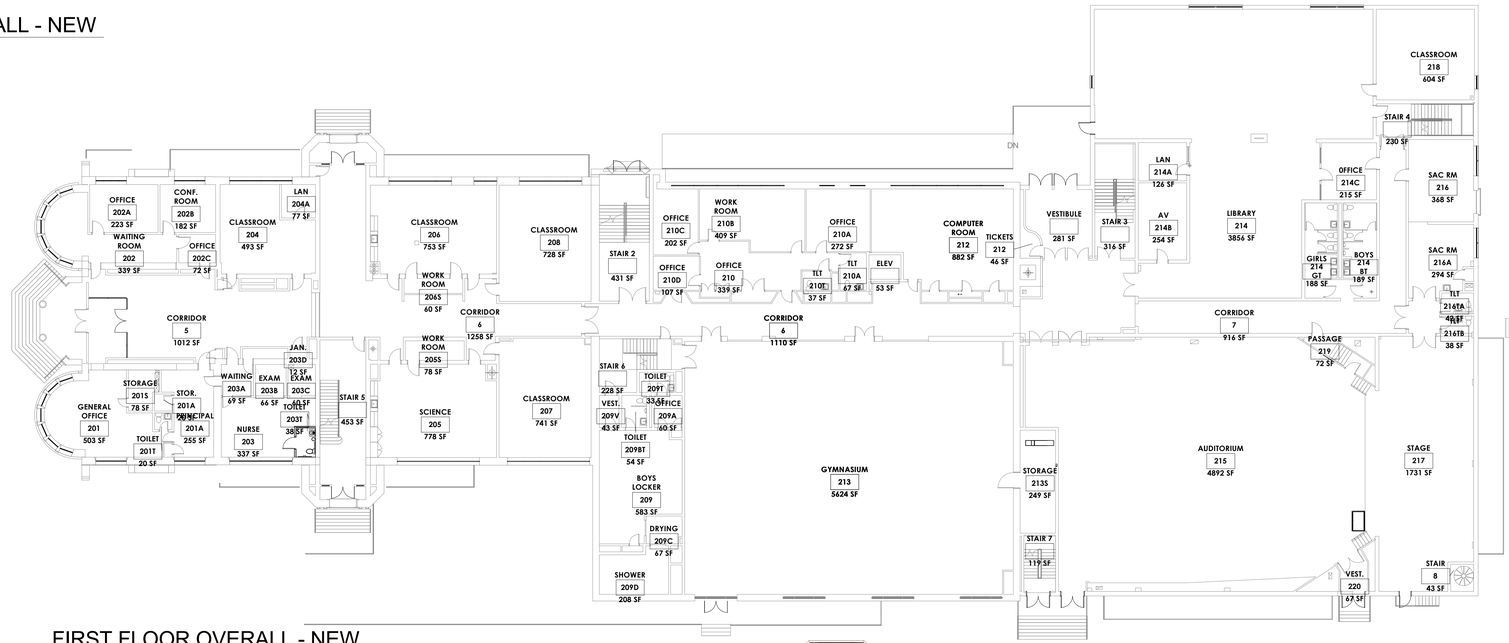

FIRST FLOOR OVERALL - NEW

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SECOND FLOOR OVERALL - NEW

1/16" = 1'-0"

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Website: www.StudioJAED.com
E-Mail: info@StudioJAED.com

REVISIONS

DESCRIPTION	DATE

PROJECT

RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School

HVAC RENOVATION
3130 KENNETT PIKE
WILMINGTON, DELAWARE 19807

SHEET TITLE

PHASING PLAN
PHASE 4

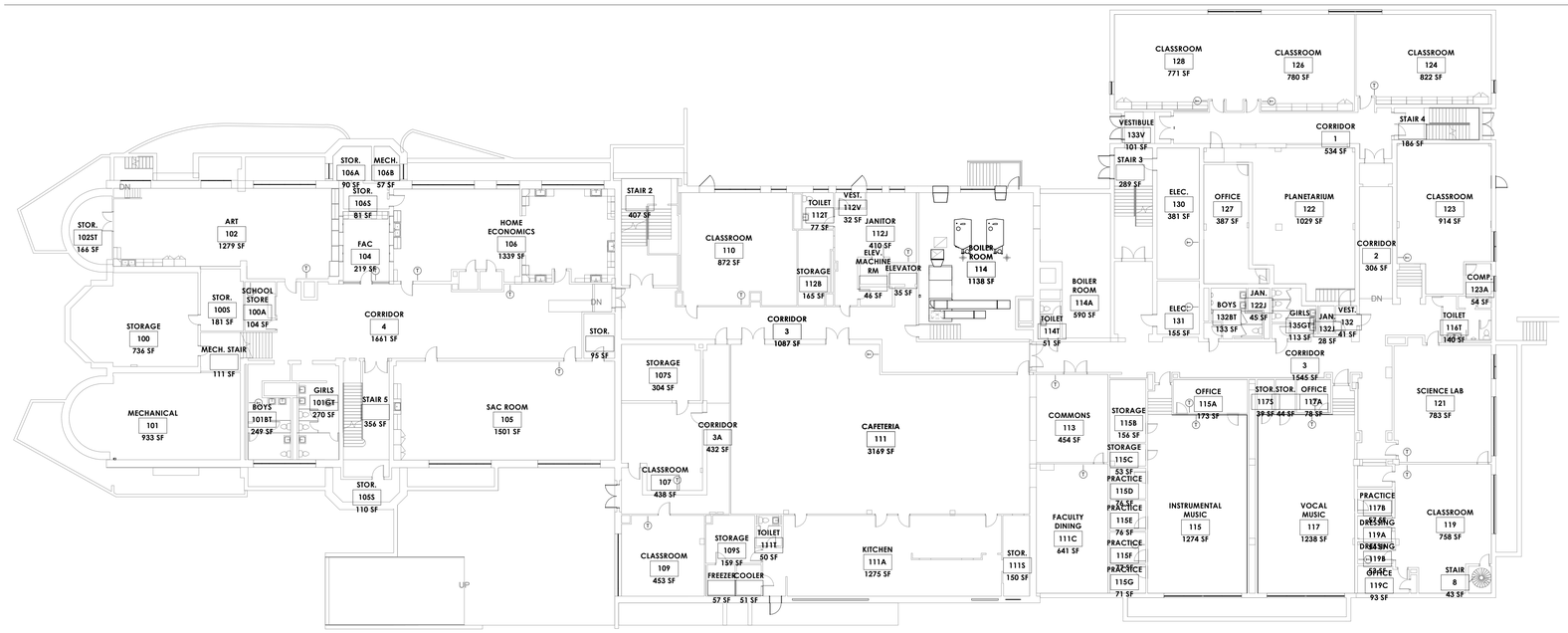
DRAWN | CHK'D / DESIGNER

DISCIPLINE | SHEET NO.

PROJECT NO. 14036

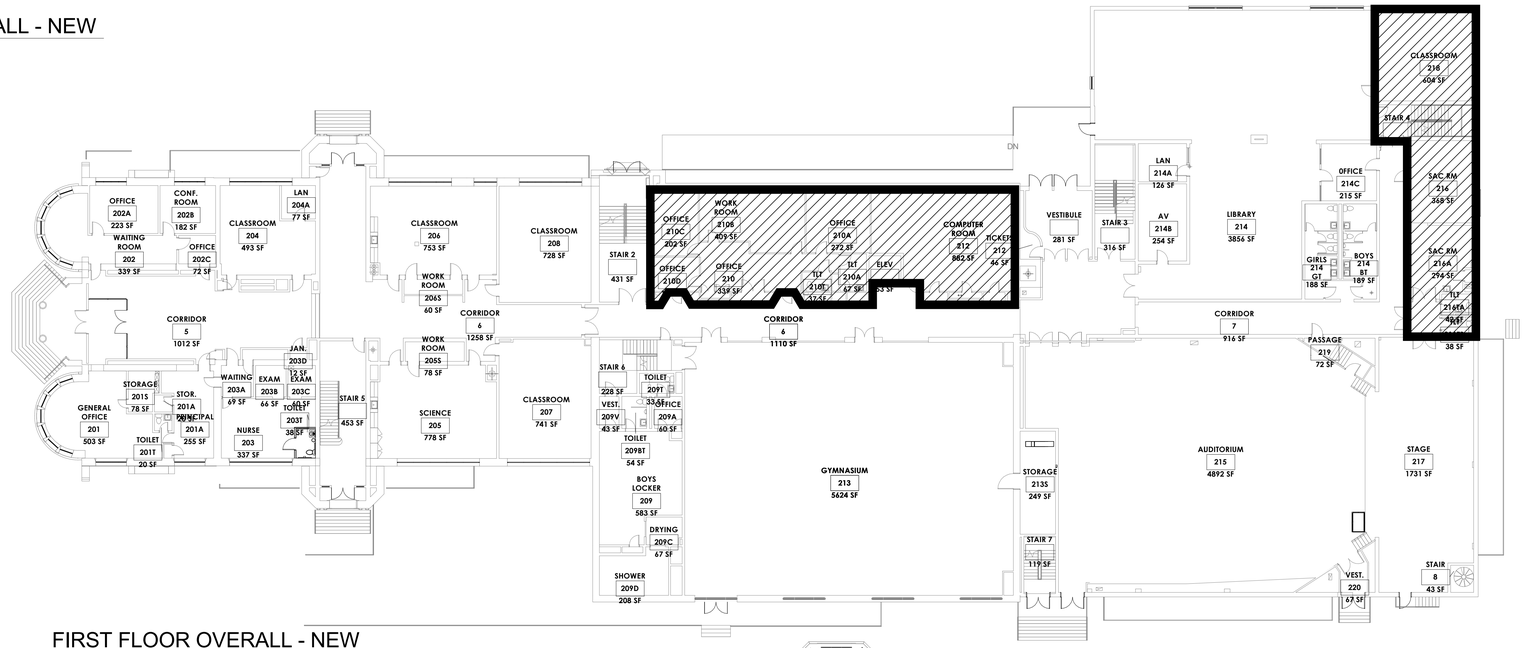
P4

PHASE 5 - JAN./FEB. 2016



LOWER LEVEL OVERALL - NEW

1/16" = 1'-0"



FIRST FLOOR OVERALL - NEW

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SECOND FLOOR OVERALL - NEW

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P5

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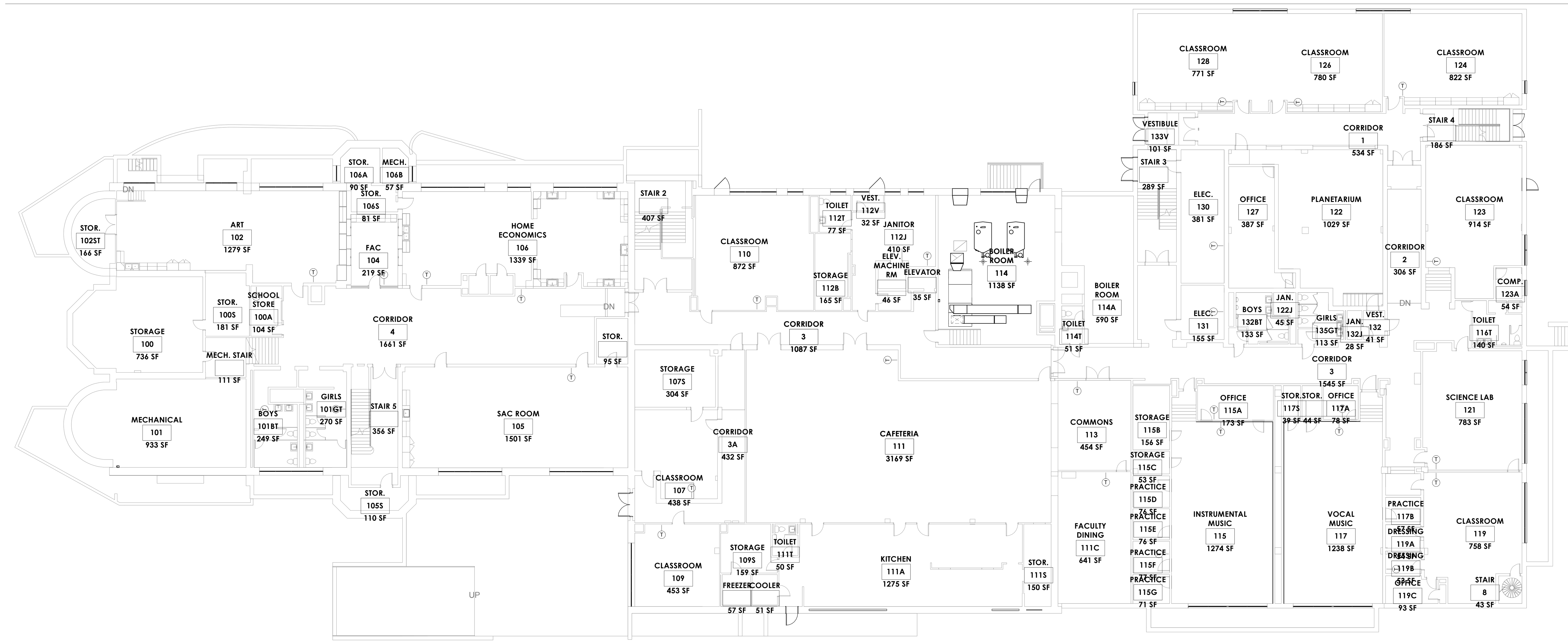
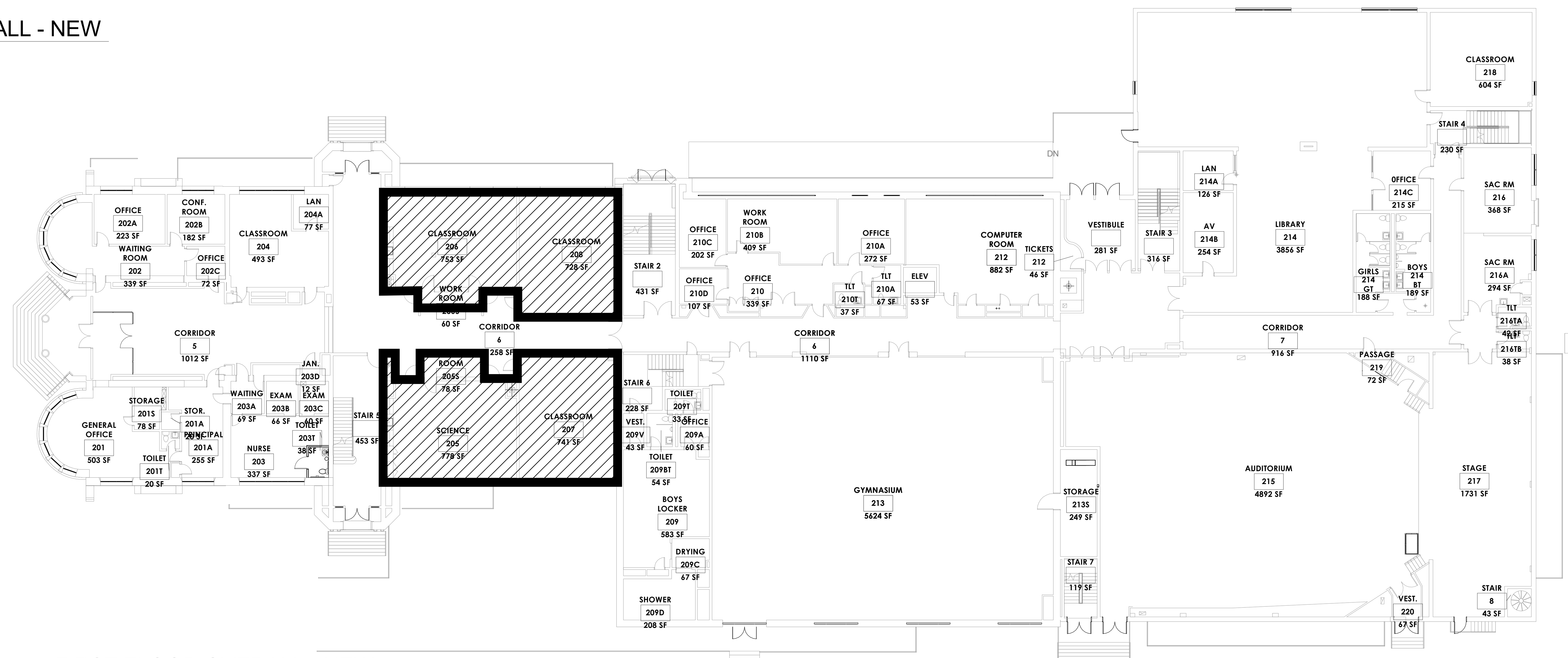
PHASE 6 - FEB./APRIL 2016



LOWER LEVEL OVERALL - NEW

1/16" = 1'-0"



FIRST FLOOR OVERALL - NEW

1/16" = 1'-0"

SECOND FLOOR OVERALL - NEW

1/16" = 1'-0"

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REVISIONS

DESCRIPTION	DATE

PROJECT

RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School
HVAC RENOVATION
3130 KENNETT PIKE
WILMINGTON, DELAWARE 19807

SHEET TITLE

PHASING PLAN
PHASE 6

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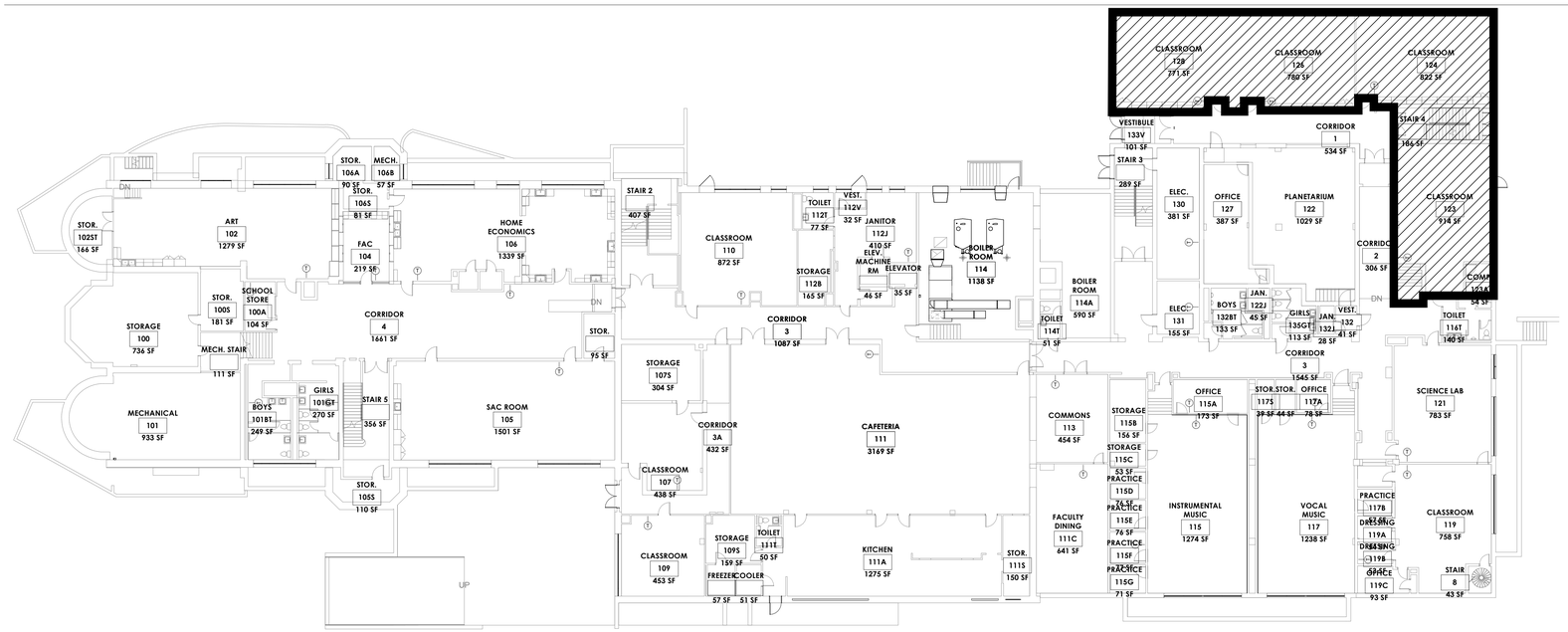
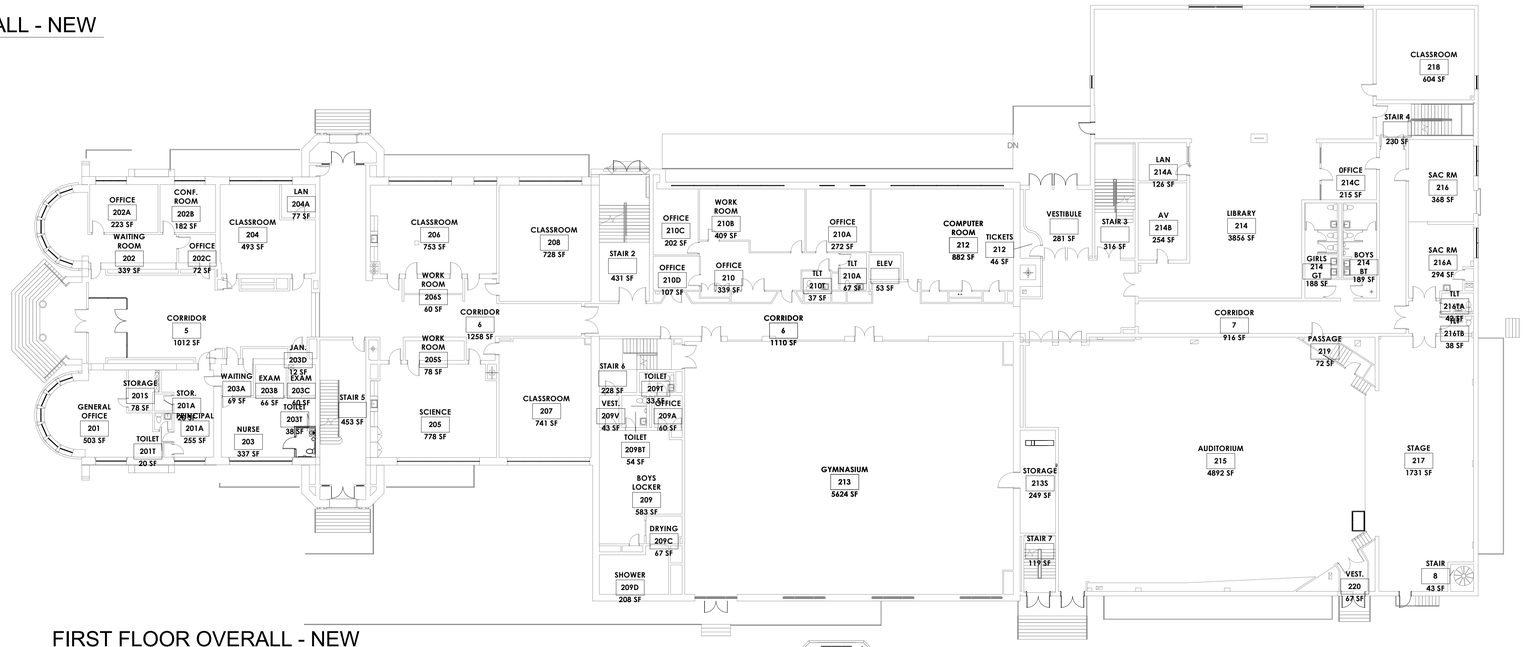
PROJECT NO. 14036	P6

PHASE 7 - APRIL/MAY 2016



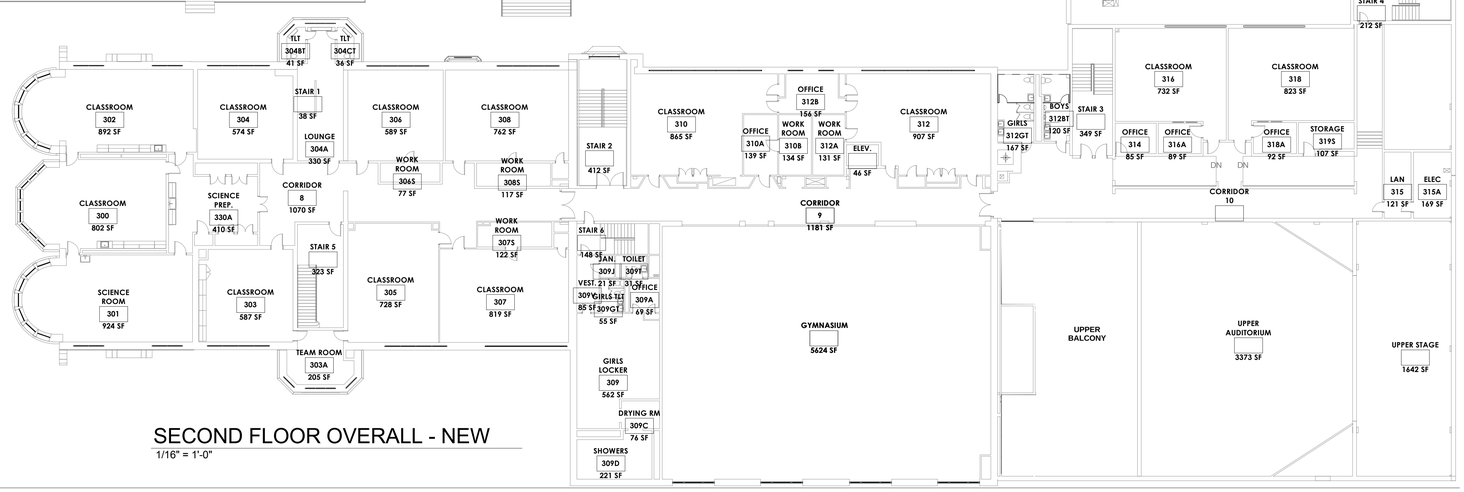
LOWER LEVEL OVERALL - NEW

1/16" = 1'-0"



FIRST FLOOR OVERALL - NEW

1/16" = 1'-0"



SECOND FLOOR OVERALL - NEW

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SHEET TITLE

PHASING PLAN
PHASE 7

DRAWN | CHK'D / DESIGNER

DISCIPLINE | SHEET NO.

PROJECT NO. 14036

P7

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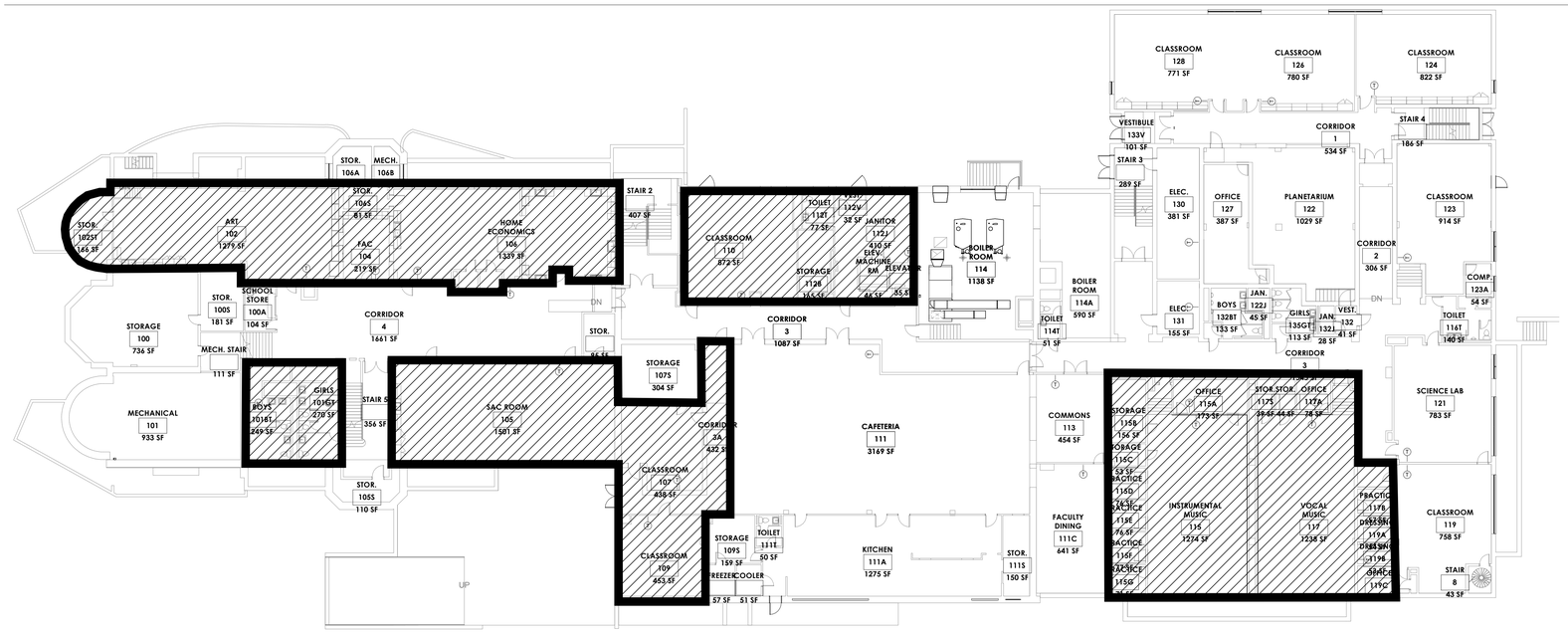
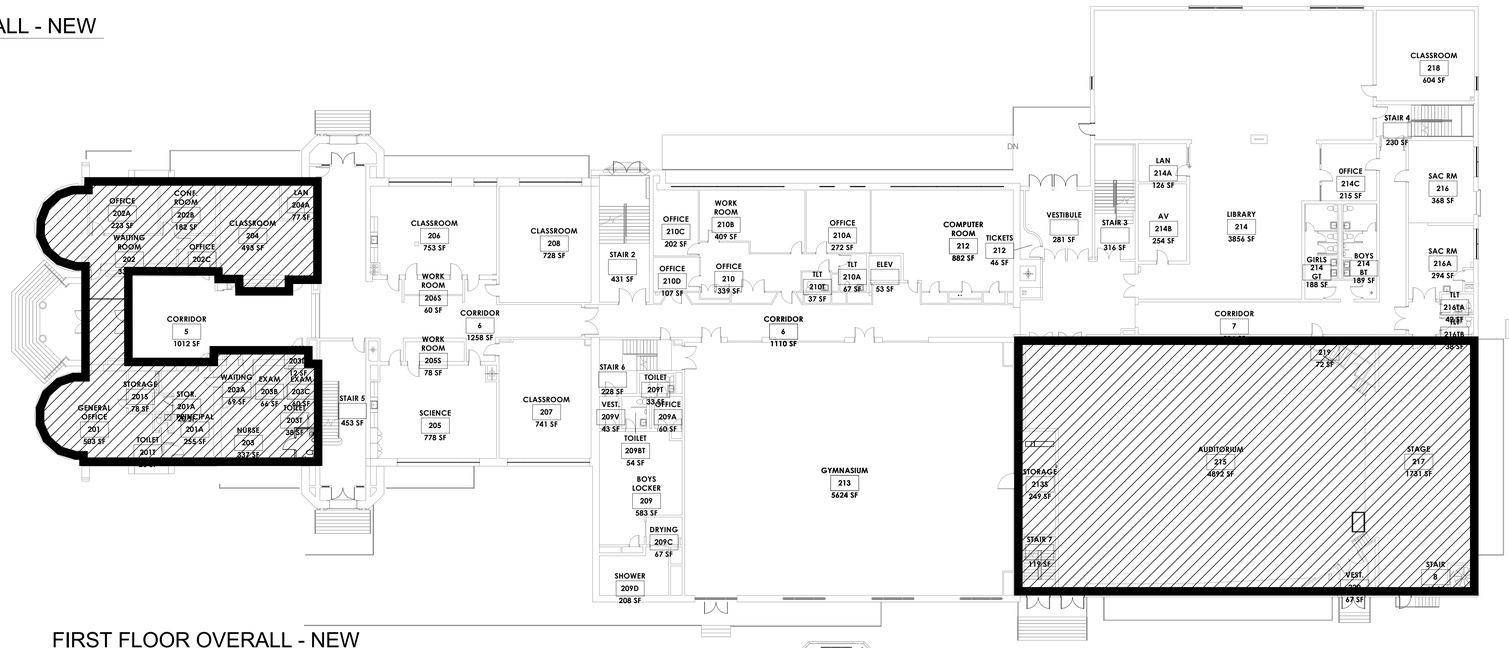
PHASE 8 - SUMMER 2016



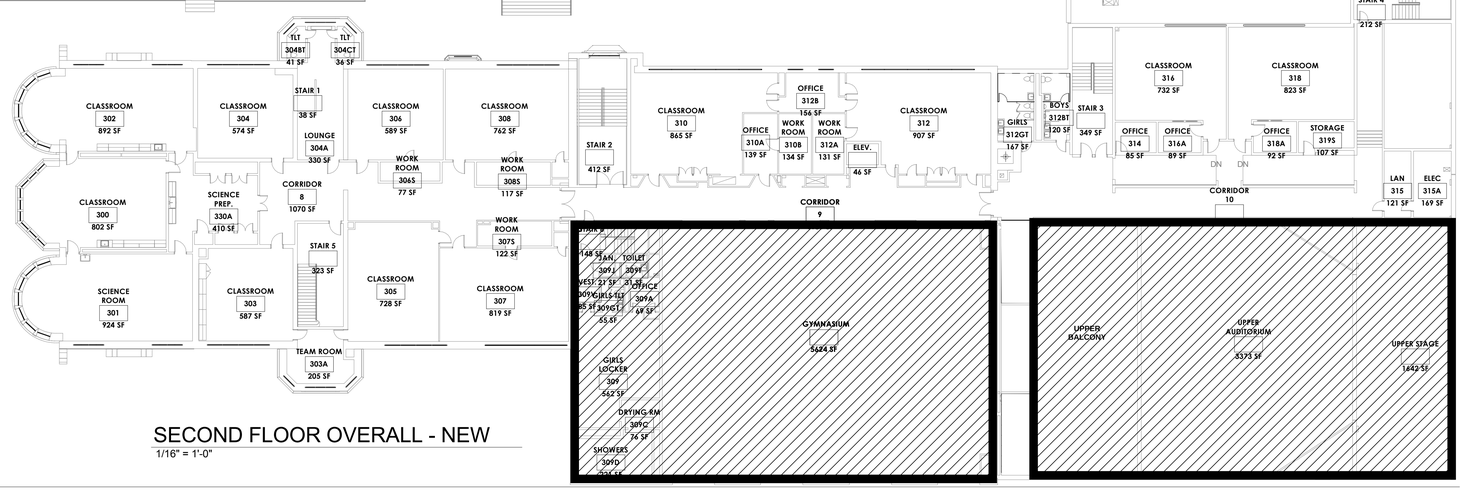
LOWER LEVEL OVERALL - NEW

1/16" = 1'-0"



FIRST FLOOR OVERALL - NEW

1/16" = 1'-0"



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SHEET TITLE

PHASING PLAN
PHASE 8

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PROJECT NO. 14036

P8

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Date: May 12, 2015

Addendum No. 1

Project: **AI DuPont MS Renovations** **Project No:** 14036

The work herein shall be considered part of the bid documents for the referenced project and carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Acknowledge receipt of addendum on the bid form as indicated.

Item ***Description***

Clarifications:

Mechanical

1. All volume dampers and life safety dampers are to be installed in accessible locations. If dampers are to be installed in locations concealed by walls or hard ceilings, access doors are to be installed for damper access.
2. Sizes for all replacement GRDs are to be verified in field.
3. Dampers labeled "SD" are smoke dampers, dampers labeled "FD" are fire dampers, and dampers labeled "FD/SD" are combination fire / smoke dampers.
4. Typical in-line pump details are to be provided for all new in-line pumps and for all new, in-line freeze protection pumps.
5. US Draft is an acceptable alternate manufacturer for the boiler exhaust draft inducer.
6. The boiler exhaust breeching system is to be extended up inside the existing chimney. Coordinate with architectural plans for extent of cutting and patching to chimney. Chimney extends approximately 50' above roof line. Contractor is responsible for providing all necessary rigging and additional activities required to perform the mechanical scope.

Electrical

1. Contractor is to provide wall-mounted duct detector test switches for every duct smoke detector. Switches are to be installed in accessible locations – corridors or mechanical rooms.
2. Contractor is to provide wall-mounted emergency boiler shutdown switches at all boiler room doors to deactivate all boilers.

Changes to Drawings:

General

1. Drawing G1.0 – Add the following drawings to the drawing list: (No sketch issued to reflect this change)
   a. CC-01 – Index Plan
   b. CC-02 – Domestic Water Service Plan
   c. CC-03 – Construction Details
   d. A3.16 – Roof Plan and Details

Civil

1. Add the following drawings (Attached):
   a. CC-01 – Index Plan
   b. CC-02 – Domestic Water Service Plan
   c. CC-03 – Construction Details

Architectural

1. Add the following drawing (attached): A3.16 – Roof Plan and Details
2. Drawing A3.4 – Keynote #4 revised to read, "New ADA platform lift by owner." No sketch issued to reflect this change.
3. Drawing A2.4 – Add demolition of existing floor carpet in Auditorium and partial demolition of existing partition for new electrical panel. See sketch SK-A.1.
4. Drawing A2.6 - Add demolition of existing floor carpet in Auditorium Balcony level. See sketch SK-A.2.
5. Drawing A2.1 – At Boiler Room, remove existing louver, patch and repair floor at housekeeping pad demolition, and width of trench to be determined by contractor. See sketch SK-A.3.
6. Drawing A2.11 – Provide demolition of Gymnasium ceiling at areas of mechanical unit demolition and installation. See sketch SK-A.4.
7. Drawing A2.12 – Revision to note provided to exclude structure in demolition. See sketch SK-A.5.
8. Drawings A3.1-A3.6 – Revision to wall infill hatch legend note. See sketch SK-A.6.
9. Drawing A3.9 – Provide new gypsum soffit where existing is to be demolished. See sketch SK-A.7.
10. Drawing A2.1 – Patch and repair existing concrete at area of existing housekeeping pad demolition. See sketch SK-A.8.
11. Drawing A3.11 - Provide new ceiling patch, repair and paint in Gymnasium at areas of mechanical unit demolition and installation. See sketch SK-A.9.
12. Drawing A3.12 – Add painting of Auditorium ceiling to scope of work. See sketch SK-A.10.
13. Drawing A2.5 – Add partial demolition of existing partition for new electrical panel. See sketch SK-A.11.
14. Drawing A3.5 – New partition wall added to Work Room 306S behind corridor partition wall where new electrical panel to be installed. See sketch SK-A.12.
15. Drawing A2.2 – Revision made to location of existing acoustical wall panels in rooms 115 and 117. See sketch SK-A.13.
16. Drawing A3.2 – Revision made to location of new acoustical wall panels in rooms 115 and 117. See sketch SK-A.14.
17. Drawing A2.3 – Add demolition of existing corridor partitions to scope of work. See sketch SK-A.15.
18. Drawing A2.4 – Revision to keynote on existing door to be demolished in SAC Room 216. Add demolition of masonry at existing chimney chase to scope of work. See sketch SK-A.16.
19. Drawing A2.5 - Add demolition of existing corridor partitions to scope of work. See sketch SK-A.17.
20. Drawing A2.6 - Add demolition of masonry at existing chimney chase to scope of work. See sketch SK-A.18.
21. Drawing A3.2 – Floor hatch added to plan for clarification. See sketch SK-A.19.
22. Drawing A3.3 – Add new walls at corridor where existing walls are to be demolished. See sketch SK-A.20.
23. Drawing A3.5 – Add new walls at corridor where existing walls are to be demolished. See sketch SK-A.21.

24. Drawing A2.10 – Add demolition of existing ceiling finishes to scope of work in Storage 213S and Stair 7. See sketch SK-A.22.
25. Drawing A3.10 – Add new ceilings to scope of work in Storage 213S and Stair 7. See sketch SK-A.23.
26. Drawings A3.4 & A3.6 – Provide masonry infill at existing chimney where demolition occurs for MEP access. See sketch SK-A.24.
27. Drawing A6.4 – Typical Wall Infill Detail added. See sketch SK-A.25.

Mechanical

1. Drawing M8.26 – Revise "TAB Scope of Work for Existing Rooftop Equipment" to include "2. Perform TAB per specifications for AHU-1". No sketch issued to reflect this change.
2. Drawing M8.26 – Add TAB scope of work for AHU-1; See sketch SK-M.1.
3. Drawing M8.26 – Add note to read "Existing exhaust fans EF-42 and EF-50 are to be interlocked with OA damper at AHU-5. No sketch issued to reflect this change.
4. Drawing M8.18 – Revise Supply riser to AHU-1 to 54"x58", move duct detector to main trunk up to AHU, and add hot water duct coil DHC-1. See sketch SK-M.2.
5. Drawing M8.29 – Add Duct Heating Coil Schedule, include DHC-R1 to schedule. See sketch SK-M.3.
6. Drawing M8.28 – Add P-FPD1 to Pump Schedule. See sketch SK-M.4.
7. Drawing M8.24 – Add freeze protection pump (P-FPD1) to DHC-1, and add piping to DHC-1 as shown. See sketch SK-M.5.
8. Drawing M8.30 – Add boiler room HVAC section view. See sketch SK-M.6.
9. Drawing M8.27 – Add section marker for HVAC section view. See sketch SK-M.7.
10. Drawing M8.28 – Add requirement to schedule notes for Air Handling Unit Schedule that units are to be provided with mixing boxes. No sketch issued to reflect this change.
11. Add smoke damper upstream of VAV-006. No sketch issued to reflect this change.
12. Drawings M8.20 through M8.25 – Add note which reads "NOTE: EACH FINNED TUBE RADIATOR SHALL BE PROVIDED WITH WALL-MOUNTED, INDEPENDENT TEMP SENSOR TO BE MOUNTED IN THE SPACE."No sketch issued to reflect this change.
13. Drawing M8.26 – Revise existing RTU tags as follows: Existing library RTU is "RTU-1 (E)", existing gymnasium RTUs are "RTU-2 (E)" and "RTU-3 (E)". No sketch issued to reflect this change.
14. Drawing M8.28 – Revise Pump Schedule. See sketch SK-M.8.
15. Drawing M8.18 – Add duct heating coils DHC-R2 and DHC-R3 to replace existing hot water heating coils. Existing hot water heating coils are to be demolished and associated piping accessories are to be demolished. See sketch SK-M.9. Coils are to be connected to existing piping with new 1-1/2" runout piping.
16. Drawing M8.23 – Add duct heating coil DHC-R1 with freeze protection pump P-FPR1 to replace existing hot water coil. Existing hot water heating coil is to be demolished and associated piping accessories are to be demolished. See sketch SK-M.10. Coils are to be connected to existing piping with new 1-1/2" runout piping.
17. Drawing M8.28 – Add P-FPR1 to Pump Schedule. See sketch SK-M.11.
18. Drawing M8.29 – Add DHC-R1, DHC-R2, and DHC-R3 to Duct Heating Coil Schedule. Add schedule notes. See sketch SK-M.12.
19. Drawing M8.26 – Add note to RTU-1(E): "REPLACE FAN/MOTOR DRIVE PACKAGE IN EXISTING ROOFTOP UNIT TO MAINTAIN 4000 CFM @ ADDITIONAL 0.15" E.S.P. FROM REPLACEMENT DUCT HEATING COIL; COORDINATE WITH LENNOX FACTORY REPRESENTATIVE". Add note to RTU-2(E): "REPLACE FAN/MOTOR DRIVE PACKAGE IN EXISTING ROOFTOP UNIT TO MAINTAIN 5660 CFM @ ADDITIONAL 0.20" E.S.P.

FROM REPLACEMENT DUCT HEATING COIL; COORDINATE WITH LENNOX FACTORY REPRESENTATIVE". Add note to RTU-3(E): "REPLACE FAN/MOTOR DRIVE PACKAGE IN EXISTING ROOFTOP UNIT TO MAINTAIN 5660 CFM @ ADDITIONAL 0.20" E.S.P. FROM REPLACEMENT DUCT HEATING COIL; COORDINATE WITH LENNOX FACTORY REPRESENTATIVE". Include TAB per specifications for RTU-1, RTU-2, and RTU-3. No sketch issued to reflect this change.

20. Drawing M8.27 – Add demolition of heat exchanger, pump, and piping. See sketch SK-M.13.
21. Drawing M8.27 – Add heat exchanger HX-1, add P-3, and add associated piping. See sketch SK-M.14.
22. Drawing M8.27 – Add Typical HX Detail. See sketch SK-M.15.
23. Drawing M8.29 – Add Gasketed Plate Heat Exchanger Schedule. See sketch SK-M.16.
24. Drawing M.8.28- Revise Pump Schedule. See sketch SK-M.17.

Electrical

1. Drawing E9.12 – Add exit / emergency light combination fixture at front entrance. See sketch SK-E.1.
2. Drawing E9.23 – Revise panel schedule for Branch Panel: A. See sketch SK-E.2.
3. Drawing E9.23 – Delete notes above Panel C and Panel X that read "EXISTING PANEL", revise Panel A mounting to "SURFACE", revise Panel PLBR mounting to "SURFACE". No sketch issued to reflect this change.
4. Drawing E9.14 – Revise circuit assignment for UV-2 in Girls Locker Room 309 to "PL2A-5". No sketch issued to reflect this change.
5. Drawing E9.15 – Revise circuit assignment for UV-1 in Classroom 316 to "PL2A-11/13/15". No sketch issued to reflect this change.
6. Drawing E9.13 – Revise circuit assignment for MAU-1 to "PL1B-5/7/9". Revise circuit assignment for P-FPM1 to "PL1B-3". No sketch issued to reflect this change.
7. Drawing E9.13 – Add circuit for freeze protection pump P-FPR1. See sketch SK-E.3.
8. Drawing E9.14 – Add circuit for freeze protection pump P-FPD1. See sketch SK-E.4.
9. Drawing E9.23 – Revise panel schedule PL2A to include freeze protection P-FPD1. See sketch SK-E.5.
10. Drawing E9.23 – Revise panel schedule PL1B to include freeze protection pump P-FPR1 and revise circuit tag for PL1B-5/7/9 to "MAU-1." See sketch SK-E.6.
11. Drawing E9.11 – Add circuit for pump P-3. See sketch SK-E.7.
12. Drawing E9.23 – Add pump P-3 to Panel Schedule PLBR. See sketch SK-E.8.
13. Drawing E9.2 – Revised drawing to show outlets to be removed/replaced in demo of sound proofing material.

Plumbing

1. Drawing P10.1: Added Lower Level Plan to show new 4" domestic water tying into existing 4" domestic water. Revised title on sheet.

Changes to Specification Manual:

1. *Specification Section 23 09 93 – Sequence of Operation for HVAC Controls*: See revised specification attached to this addendum.
2. *Specification Section 08 71 00 – Door Hardware:* Replace Section 08 71 00 in the Project Manual with the revised Section 08 71 00 attached to this addendum.

INDEX PLAN
DOMESTIC WATER SERVICE

AI DUPONT MIDDLE SCHOOL

CHRISTIANA HUNDRED - NEW CASTLE COUNTY
DELAWARE

SITE DATA

1. TAX PARCEL NUMBER: 07-030.30-086
2. EXISTING ZONING: NC15 (NEIGHBORHOOD CONSERVATION)
3. TOPOGRAPHIC SURVEY: FIELD SURVEY BY LANDMARK ENGINEERING, INC. MARCH 2013.
4. WATER SUPPLY: CITY OF WILMINGTON

   WATER SUPPLY IS SUBJECT TO THE APPROVAL OF THE DELAWARE STATE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL AND THE DELAWARE DEPARTMENT OF PUBLIC HEALTH.

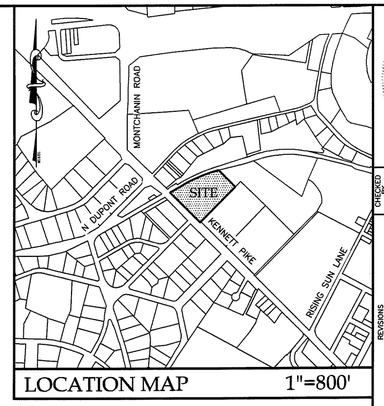
GENERAL CONSTRUCTION NOTES

1. ALL WORK AND MATERIALS WILL BE IN ACCORDANCE WITH THE CITY OF WILMINGTON STANDARDS AND, THE DELAWARE DEPARTMENT OF TRANSPORTATION (DELDOT) STANDARD SPECIFICATIONS, DATED AUGUST 2001, AND/OR THE DELDOT STANDARD DETAILS, LATEST REVISION, OR AS MODIFIED BY THESE PLANS.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK (2004).
3. MATCH PROPOSED PAVING AND CURBING ELEVATIONS TO EXISTING PAVING AND CURBING ELEVATIONS WHEREVER THEY ADJOIN.
4. SAW CUT AT THE JUNCTION FOR ALL EXISTING PAVEMENT AND FOR ALL PAVEMENT REMOVAL.
5. PLAN LOCATIONS AND DIMENSIONS SHALL BE STRICTLY ADHERED TO, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
6. THE CONTRACTOR SHALL NOTIFY MISS UTILITY AT 1-800-282-8555 A MINIMUM OF 72 HOURS PRIOR TO EXCAVATION OR CONSTRUCTION.
7. LANDMARK ENGINEERING, INC. MAKES NO GUARANTEE AS TO THE EXISTENCE OR NON-EXISTENCE, LOCATION, DEPTH, SIZE OR CONDITION OF ANY UNDERGROUND UTILITIES SHOWN ON THIS PLAN NOT ACCESSIBLE FROM THE SURFACE OF THE GROUND. EXISTING UTILITIES ARE SHOWN IN ACCORDANCE WITH INFORMATION PROVIDED BY THE RESPECTIVE UTILITY COMPANIES AT THE TIME THE PLAN WAS PREPARED. THE CONTRACTOR IS TO COORDINATE ALL WORK WITH UTILITY COMPANIES INVOLVED.

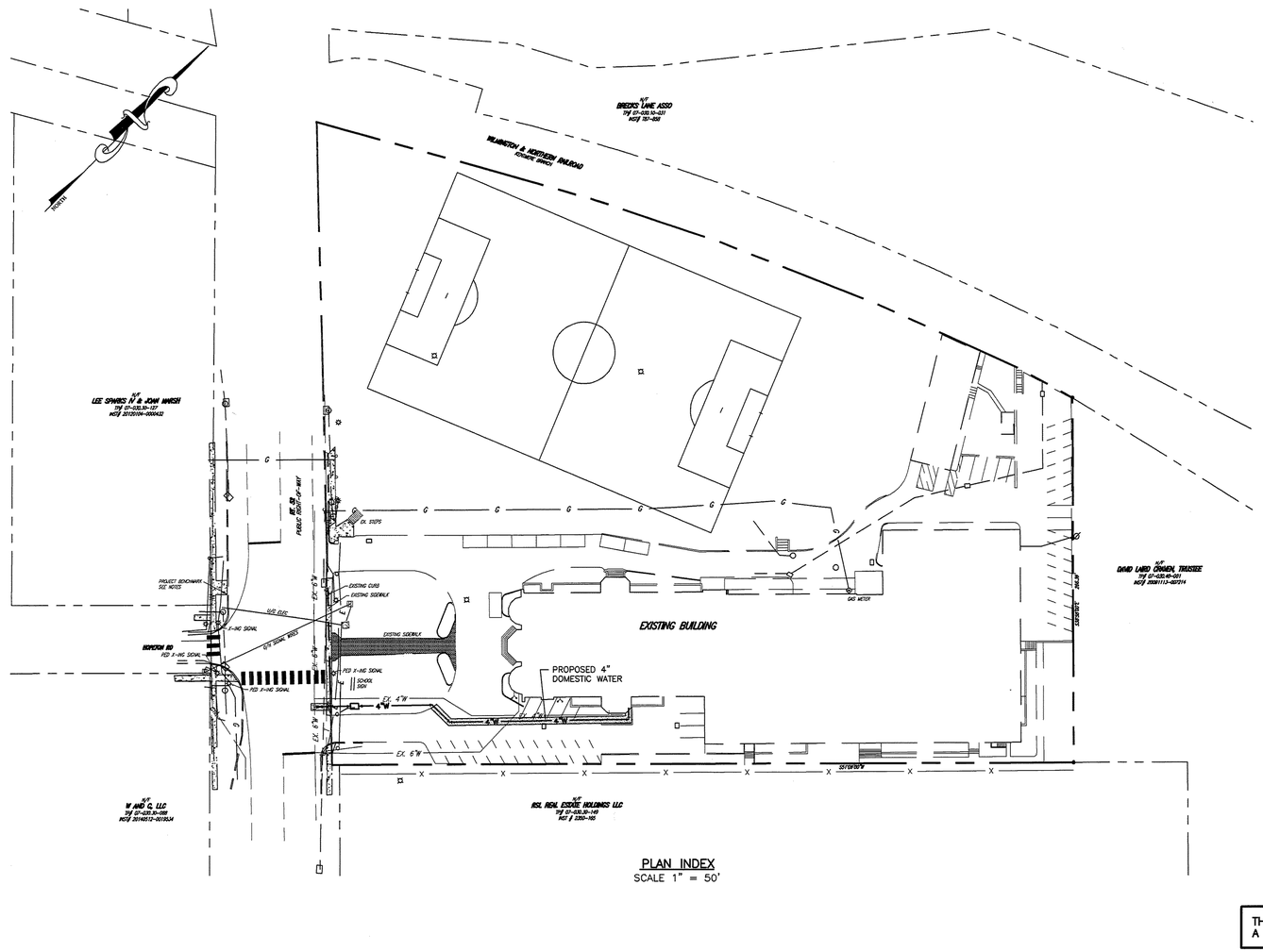
   IT IS THE RESPONSIBILITY OF THE OWNER, OR HIS CONTRACTOR, TO VERIFY AND ALLOW FOR THE LOCATION AND DEPTH OF THE UNDERGROUND UTILITIES WITHIN THE WORK AREA SHOWN ON THIS PLAN. THE CONTRACTOR SHALL NOT BEGIN ANY EXCAVATION OR OTHER CONSTRUCTION AROUND OR IMMEDIATELY ADJACENT TO EXISTING UTILITIES WITHOUT NOTIFYING THE UTILITY OWNER(S) AT LEAST SEVENTY-TWO (72) HOURS IN ADVANCE OF THE START OF EXCAVATION OR CONSTRUCTION. TEST PITS FOR UTILITY LOCATIONS MAY OR MAY NOT BE REQUIRED.

   PRIOR TO ANY CONSTRUCTION, IT IS RECOMMENDED THE CONTRACTOR EXCAVATE IN THE AREA OF ANY POTENTIAL UTILITY CROSSING TO VERIFY THAT THE UTILITY WILL NOT INTERFERE WITH CONSTRUCTION. IF, AFTER UNCOVERING THE UTILITY, THERE IS ANY QUESTION CONCERNING A POSSIBLE CONFLICT, THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE ENGINEER. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT ALL EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE DONE TO THEM DUE TO HIS NEGLIGENCE SHALL BE IMMEDIATELY AND COMPETENTLY REPAIRED AT HIS EXPENSE.
8. EXISTING AERIAL UTILITIES ARE NOT SHOWN.
9. ALL NECESSARY PERMITS, LICENSES, BONDS, INSURANCE POLICIES, ETC. REQUIRED BY LOCAL STATE AND/OR FEDERAL LAWS SHALL BE PROVIDED BY THE CONTRACTOR AT HIS OWN EXPENSE.
10. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THERE IS SUFFICIENT COVER ON ALL PIPING DURING CONSTRUCTION TO PREVENT FAILURE OF PIPES.
11. ALL SIGNING, TRAFFIC CONTROL AND SAFETY SHALL BE THE RESPONSIBILITY OF THE DEVELOPER/CONTRACTOR AND SHALL BE SUBJECT TO THE APPROVAL OF THE DIVISION OF HIGHWAYS. ALL TRAFFIC CONTROL SIGNS SHALL BE IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."
12. PAINT STRIPING AND GRAPHICS FOR LONGITUDINAL STRIPING SHALL BE EPOXY RESIN PAINT. LATERAL STRIPING/ SHAPES SHALL BE ALKYD THERMOPLASTIC TAPE/SYMBOL.
13. ALL PROPOSED UNDERGROUND UTILITIES SHALL BE MARKED WITH 6-INCH WIDE (MIN.) METALLIC MARKING TAPE OF APPROPRIATE COLOR AND MESSAGE TO CONFORM TO UTILITY BURIED BENEATH IT AND SHALL BE INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS.
14. ALL UTILITY EXCAVATION SHALL BE KEPT DRY AT ALL TIMES.
15. ALL AREAS NOT COVERED BY PAVING OR BUILDING SHALL RECEIVE 4" MINIMUM OF TOPSOIL, SEED, AND MULCH AS SOON AS FINAL GRADING IS COMPLETE.
16. NO DEBRIS SHALL BE BURIED ON SITE.
17. DISPOSITION OF ANY EXCESS EXCAVATION AND TOPSOIL TO BE AT THE DISCRETION OF THE CONTRACTOR.
18. PROVIDE EROSION CONTROL MATTING ON ALL SLOPES 3:1 OR STEEPER. (AND IN ALL OPEN CHANNELS.)
19. CONCRETE SIDEWALKS SHALL BE 3,000 PSI PORTLAND CEMENT CONCRETE, 4" THICK, ON 4" GRADED AGGREGATE BASE COURSE, UNLESS OTHERWISE NOTED.
20. MINIMUM COMPACTION AS DEFINED BY (STANDARD/MODIFIED) PROCTOR MAXIMUM DRY DENSITY (ASTM-D698/D1557) SHALL BE:

    BUILDING SUBGRADE: 95 PERCENT
    PAVEMENT SUBGRADE: 95 PERCENT
    SIDEWALK AND LAWN SUBGRADE: 90 PERCENT
21. P.C. CONCRETE BUTTRESSES (2500 PSI MIN.) SHALL BE PLACED AT ALL VERTICAL AND HORIZONTAL WATER MAIN BENDS. BUTTRESSES SHALL BE PLACED AGAINST UNDISTURBED EARTH AND SHALL BE OF ADEQUATE SIZE TO RESIST THE FORCES DEVELOPED IN THE WATER PIPING. ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF WILMINGTON STANDARDS.
22. ALL WATER MAIN SHALL HAVE 42-INCH MINIMUM COVER FROM PROPOSED FINISHED GRADE, EXCEPT AS NOTED.
23. ALL WATER MAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF WILMINGTON STANDARDS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ALL INSPECTIONS AND APPROVALS.
24. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR AND STABILIZE EROSION AND SEDIMENT CONTROLS AND STORMWATER MANAGEMENT PRACTICES DURING CONSTRUCTION, INCLUDING AREAS DISTURBED BY UTILITY COMPANIES.



LOCATION MAP 1"=800'



PLAN INDEX
SCALE 1" = 50'

THE PURPOSE OF THIS PLAN IS TO INSTALL A NEW DOMESTIC WATER SERVICE.

Know what's **below.**
Call before you dig.

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PROTECT YOURSELF, GIVE THREE WORKING DAYS NOTICE

REVISIONS | CHECKED BY

INDEX PLAN
FOR
DOMESTIC WATER SERVICE
AI DUPONT MIDDLE SCHOOL
CHRISTIANA HUNDRED - NEW CASTLE COUNTY, DELAWARE

OWNER/DEVELOPER
OWNER NAME
OWNER ADDRESS LINE 1
OWNER ADDRESS LINE 2
OWNER PHONE
OWNER FAX

Landmark Science & Engineering
100 WEST COMMONS BOULEVARD, SUITE 301
NEW CASTLE, DELAWARE 19720
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0 25 50 100
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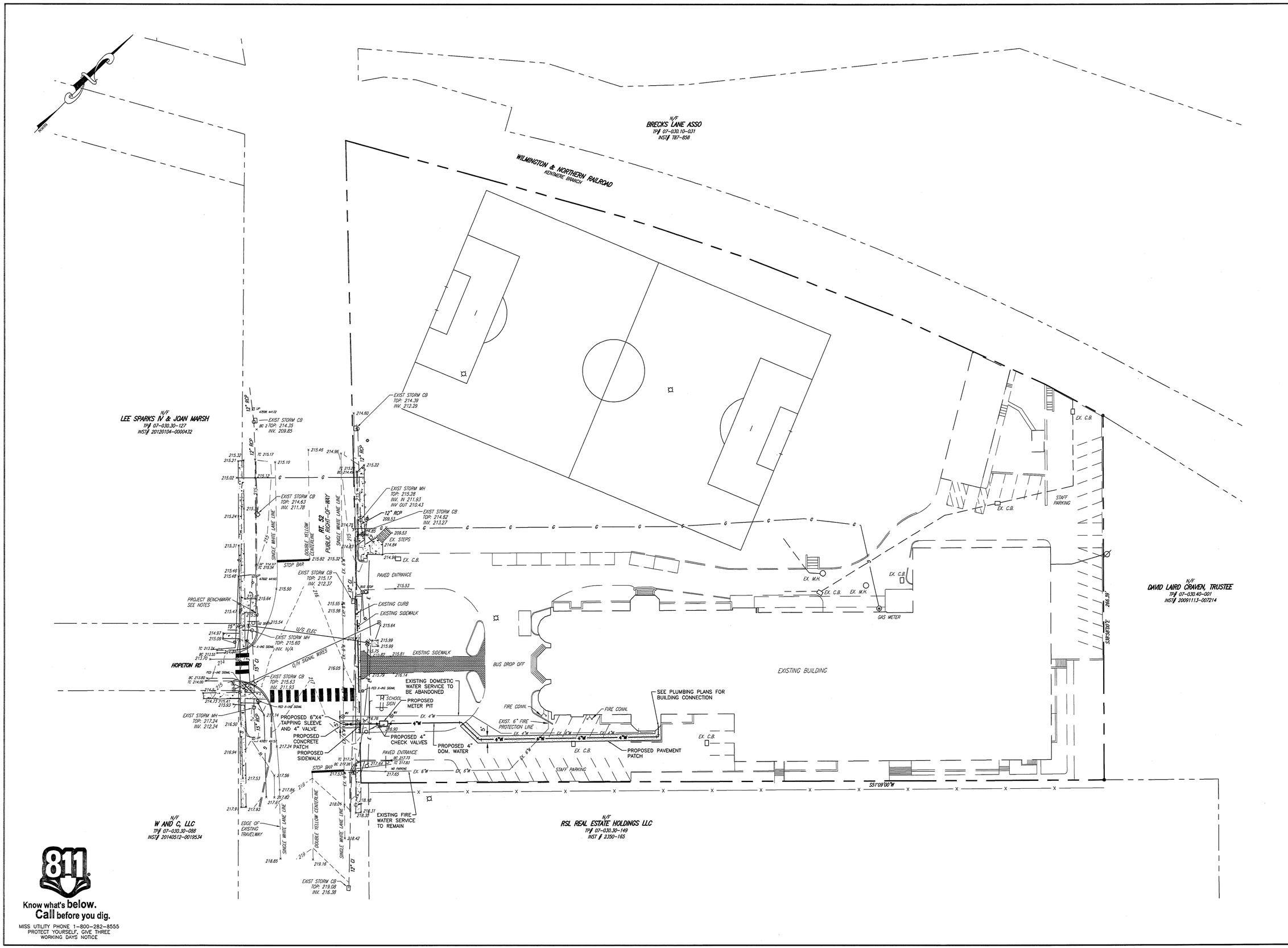
CONSTRUCTION SHALL INCLUDE ALL SAFETY COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 AND THE LATEST REGULATIONS OF THE UNITED STATES.

DRAWN BY:	MEZ	SCALE:	1"=50'
DESIGNED BY:	TCW	DATE:	5/7/15
CHECKED BY:	TCW	LAST MODIFIED	5/7/15
COMM. NO.	C2665	FILE NO.	XXX
DRAWING NAME:		CNST-SET.DWG	

CC-01

SHEET NO. CC-01 of 03



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REVISIONS

DOMESTIC WATER SERVICE PLAN
FOR
AI DUPONT MIDDLE SCHOOL
CHRISTIANA HUNDRED – NEW CASTLE COUNTY, DELAWARE

OWNER/DEVELOPER
OWNER NAME
OWNER ADDRESS LINE 1
OWNER ADDRESS LINE 2
OWNER PHONE
OWNER FAX

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DRAWING NAME:	CAST-SET.DWG		

CC-02

SHEET NO. CC-02 of 03

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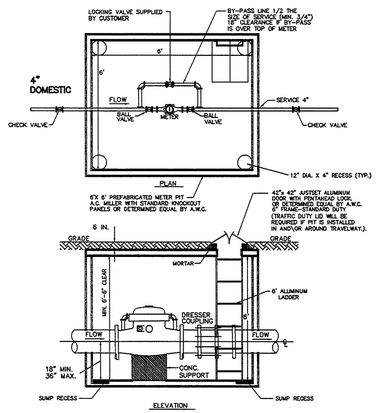

TYPICAL DETECTOR CHECK VALVE

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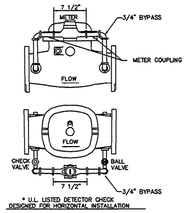

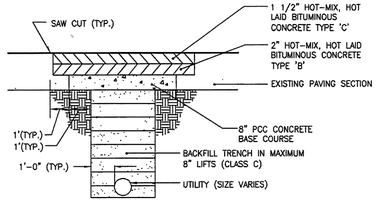

TRENCH PATCH DETAIL

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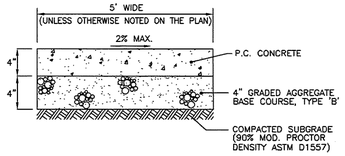

CONCRETE SIDEWALK

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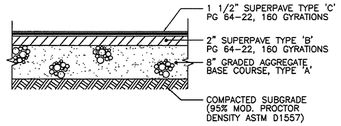
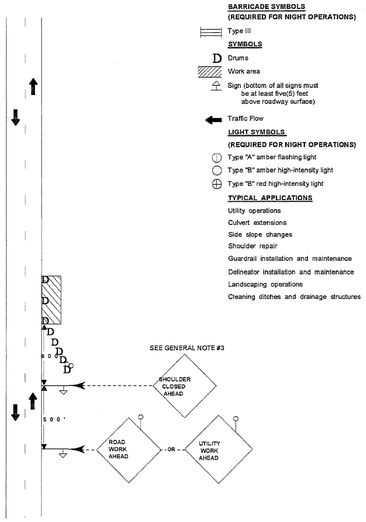


PAVING SECTION

NO SCALE

STANDARD DESIGN
TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES FOR HIGHWAY CONSTRUCTION, MAINTENANCE AND UTILITY OPERATIONS
CASE 2
TWO-LANE, TWO-WAY TRAFFIC - DAY OR NIGHT OPERATIONS
SHOULDER CLOSURE



CASE 2

TWO-LANE, TWO-WAY TRAFFIC, DAY OR NIGHT OPERATIONS
SHOULDER CLOSED

Where, at all times, all vehicles, equipment, workers and their activities are less than the width of the shoulder, or less than six (6) feet from the edge of, but not encroaching on the travelway.

General Notes

1. All vehicles, equipment, workers (except flagger) and their activities are restricted at all times to one side of the pavement, unless otherwise authorized by the Traffic Engineer.
2. If the work operation requires that four (4) or more vehicles enter the through traffic lane in a one (1) hour period, a flagger shall be provided and the Flagger Ahead sign shall be substituted for the WORKER sign.
3. Any unattended obstacle or excavation in the work area shall be protected by Drums.
4. A minimum of two (2) AMBER TYPE "B" high intensity flashing warning lights shall be used at night in advance of the work area. One AMBER flashing light shall be installed above each of the first two (2) advance warning signs in the series. At night two (2) TYPE "B" lights shall be used on the Drum(s) across the approach to the work area. Drums placed along the side of the work area adjacent and perpendicular to the lane open to traffic. The Drums shall be not more than 100 ft. apart on tangent sections and 50 ft. apart on curve sections. Every tangent section 15 feet or longer shall have at least three (3) Drums.
5. Longitudinal dimensions may be adjusted slightly to fit field conditions.
6. All vehicles in a work area shall display flashing lights installed for the purpose of warning approaching drivers of a vehicular traffic hazard requiring unusual care in approaching, overtaking, or passing.
7. Signs will be displayed in both directions if a flagger is on duty.
8. This is the minimum requirement for the condition set forth. The Traffic Engineer may require additional traffic control devices as deemed necessary.
9. Cones may be used in lieu of drums during daylight operations. Reflectorized cones may be used in lieu of drums for a single night operation (emergency work) that is continuously manned.

MAINTENANCE OF TRAFFIC TYPICAL APPLICATION 3

NO SCALE

811
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REVISIONS

CONSTRUCTION DETAILS
FOR
AI DUPONT MIDDLE SCHOOL
CHRISTIANA HUNDRED – NEW CASTLE COUNTY, DELAWARE

OWNER/DEVELOPER
OWNER NAME
OWNER ADDRESS LINE 1
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DESIGNED BY: TCW	DATE: 5/7/15		
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COMM. NO. C2665	FILE NO. XXX		
DRAWING NAME: CN'ST-SET.DWG			
CC-03	SHEET NO. CC-03 of 03		

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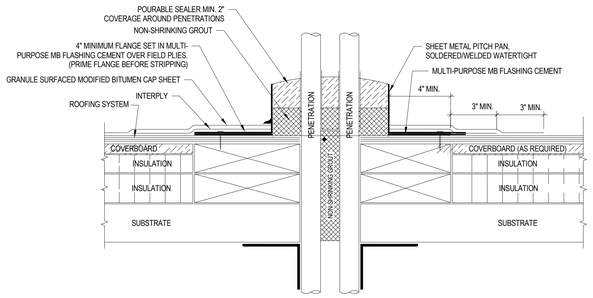
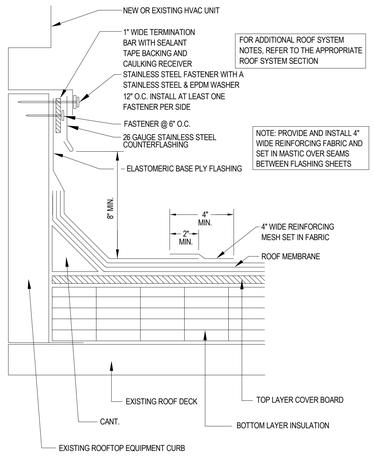


TYP. PITCH POCKET DETAIL

SCALE: 3" = 1'-0"

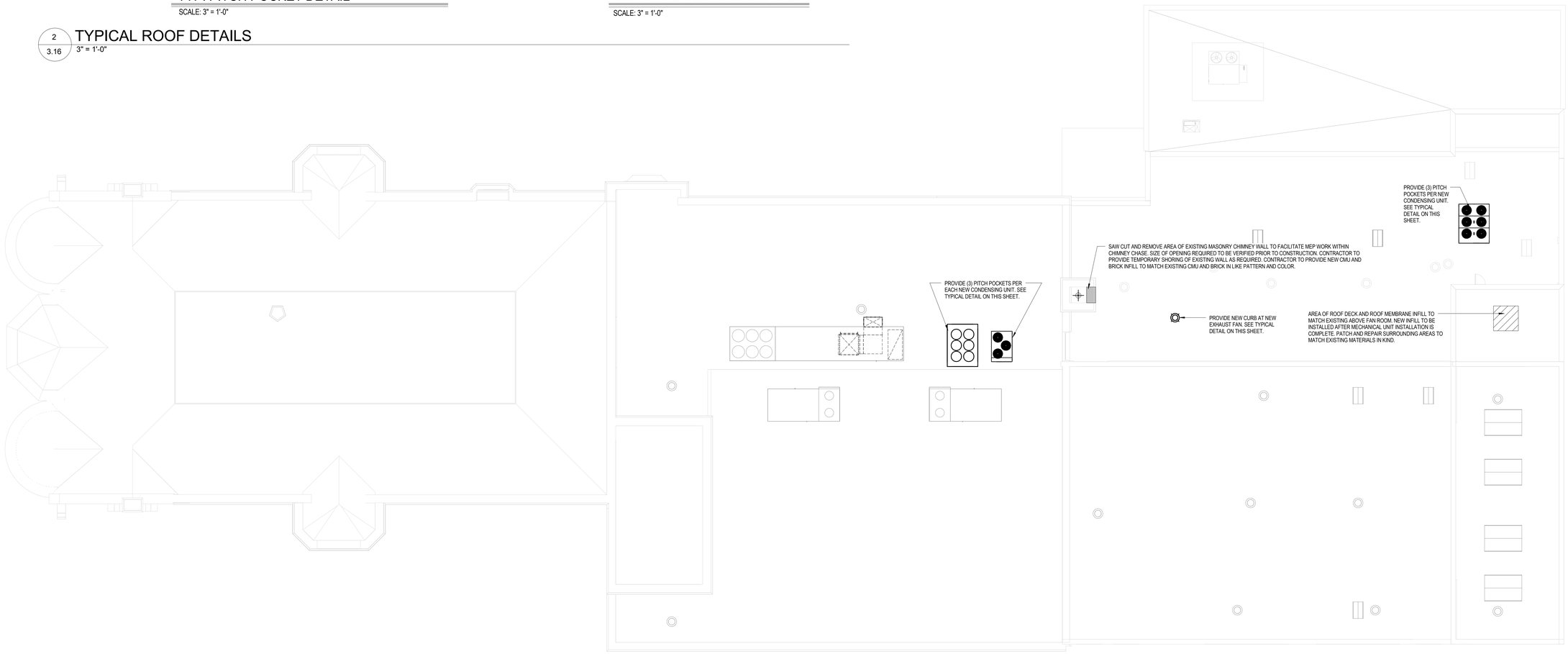


TYP. CURB FLASHING DETAIL

SCALE: 3" = 1'-0"

2 / 3.16 TYPICAL ROOF DETAILS

3" = 1'-0"



1 / 3.16 ROOF PLAN

3/32" = 1'-0"

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Website: www.StudioJAED.com
E-Mail: info@StudioJAED.com

REVISIONS

	DESCRIPTION	DATE
1	ADDENDUM #1	5/13/2015

PROJECT

RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School

HVAC RENOVATION
3130 KENNETT PIKE
WILMINGTON, DELAWARE 19807

SHEET TITLE

ROOF PLAN AND DETAILS

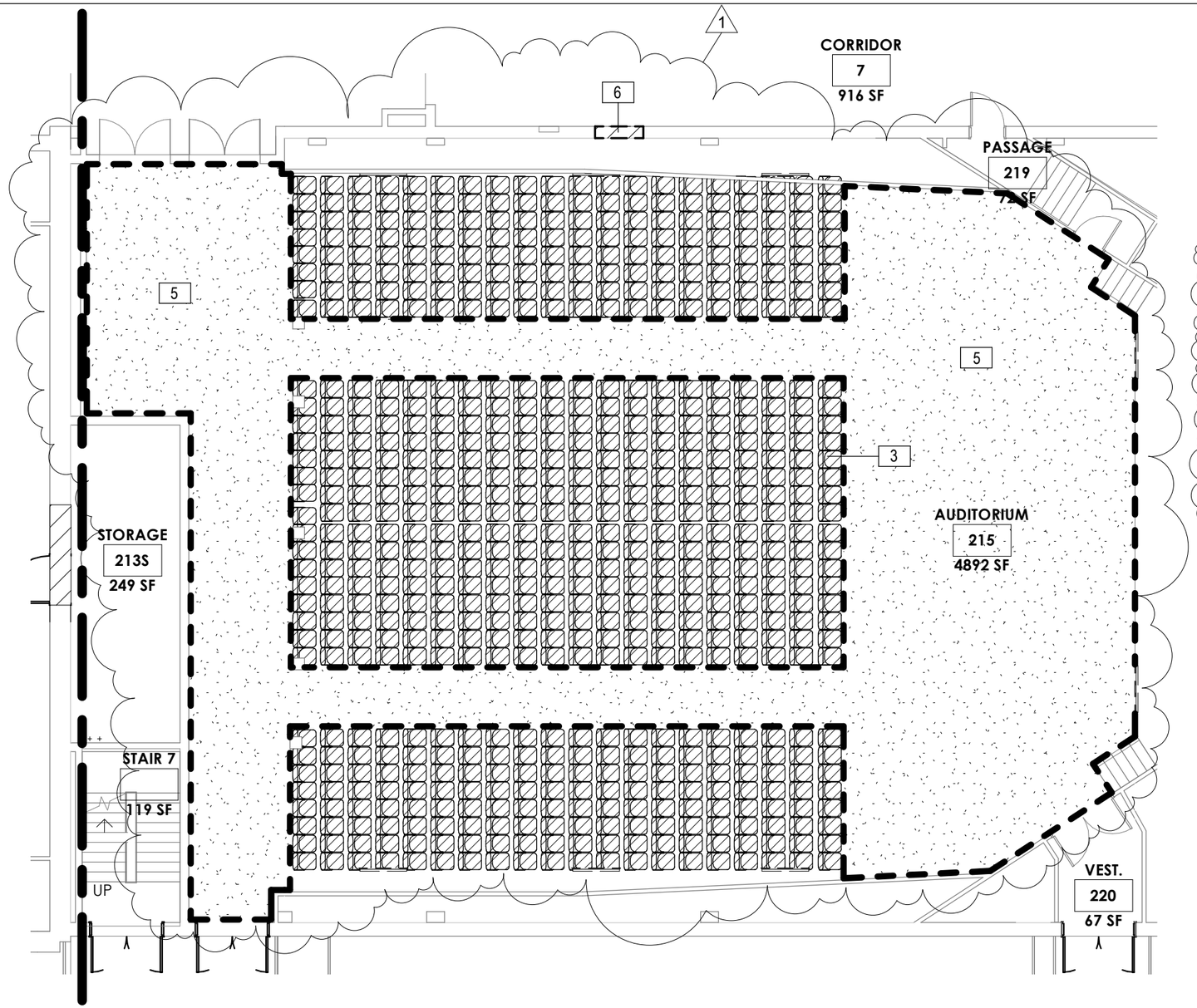
BID DOCUMENTS
MAY 1, 2015

DRAWN: HMS
CHK'D / DESIGNER: PRC

DISCIPLINE: A
SHEET NO. 1: 3.16

PROJECT NO. 14036

5/15/2015 2:37:00 PM



KEYNOTE LEGEND	
KEYNOTE #	Description
3	REMOVE AND DISPOSE OF ALL EXISTING AUDITORIUM SEATING IN ITS ENTIRETY. PATCH, PREP AND PREPARE SURROUNDING SURFACES FOR INSTALLATION OF NEW SEATING.
5	REMOVE AND DISPOSE OF EXISTING CARPET FLOORING, INCLUDING BUT NOT LIMITED TO, PERIMETER BASE, ADHESIVES, TRIM, SUBFLOORING, TRANSITION STRIPS DOWN TO CONCRETE SLAB. CLEAN AND PREP SLAB FOR NEW FINISH FLOORING.
6	SAW CUT AND REMOVE AREA OF EXISTING CMU WALL WHERE SHOWN DASHED TO FACILITATE INSTALLATION OF NEW ELECTRICAL PANEL. PATCH AND REPAIR AROUND PERIMETER OF NEW PANEL WITH NEW CMU INFILL. PAINT CMU TO MATCH EXISTING. COORDINATE LOCATION AND SIZE OF OPENING REQUIRED FOR ELECTRICAL PANEL WITH MEP DRAWINGS AND SPECIFICATIONS.

1

1
SK-A.1

PARTIAL FIRST FLOOR DEMOLITION PLAN - AREA B - 1/A2.4

3/32" = 1'-0"

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RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-A.1
Date	MAY 1, 2015	
Drawn by	HMS	
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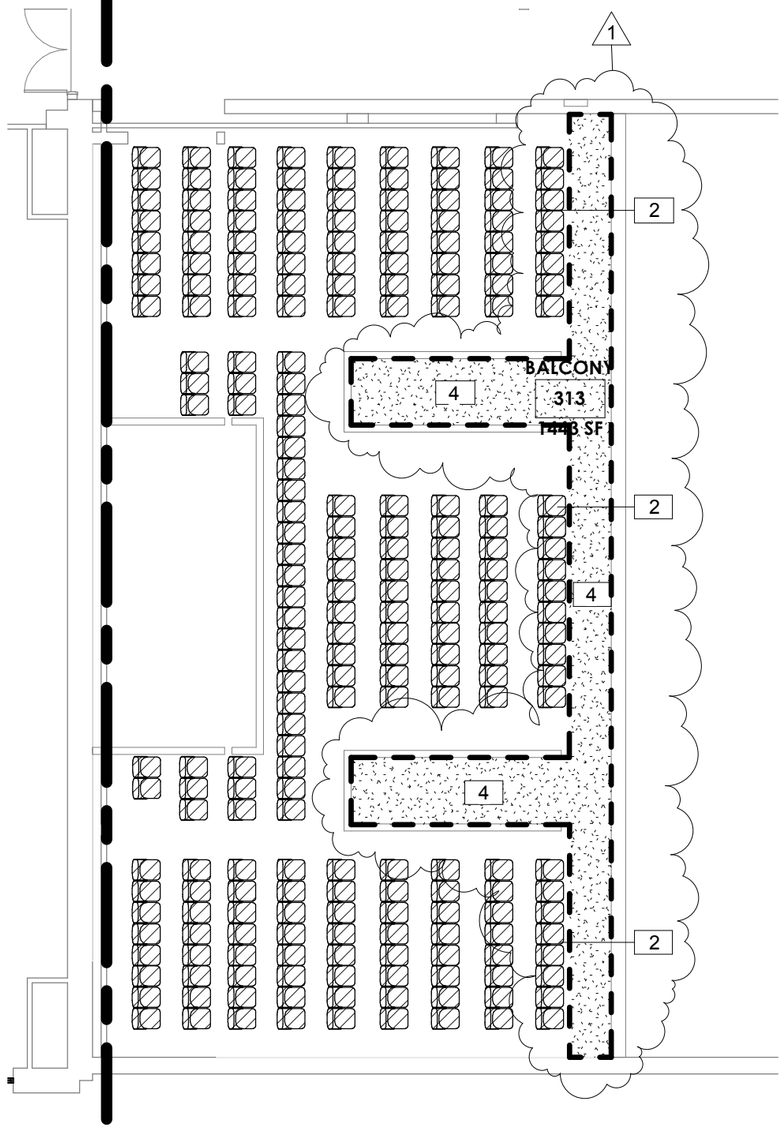
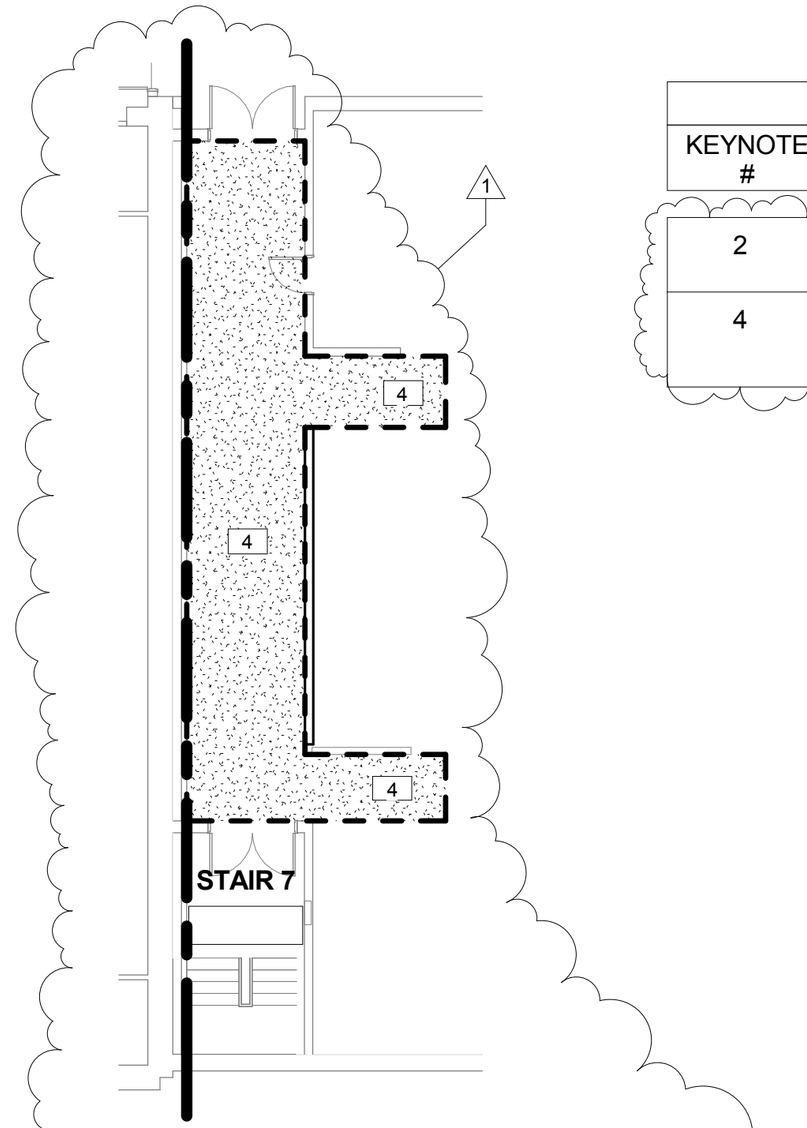


1
SK-A.2

PARTIAL 2ND FLOOR DEMO PLAN - AREA B - 1/A2.6

3/32" = 1'-0"



2
SK-A.2

PARTIAL 2ND FLOOR BELOW BALCONY LEVEL

3/32" = 1'-0"

KEYNOTE LEGEND	
KEYNOTE #	Description
2	REMOVE AND DISPOSE OF ALL EXISTING AUDITORIUM SEATING IN ITS ENTIRETY. PATCH, PREP AND PREPARE SURROUNDING SURFACES FOR INSTALLATION OF NEW SEATING.
4	REMOVE AND DISPOSE OF EXISTING CARPET FLOORING, INCLUDING BUT NOT LIMITED TO, PERIMETER BASE, ADHESIVES, TRIM, SUBFLOORING, TRANSITION STRIPS DOWN TO CONCRETE SLAB. CLEAN AND PREP SLAB FOR NEW FINISH FLOORING.

1

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A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-A.2
Date	MAY 1, 2015	
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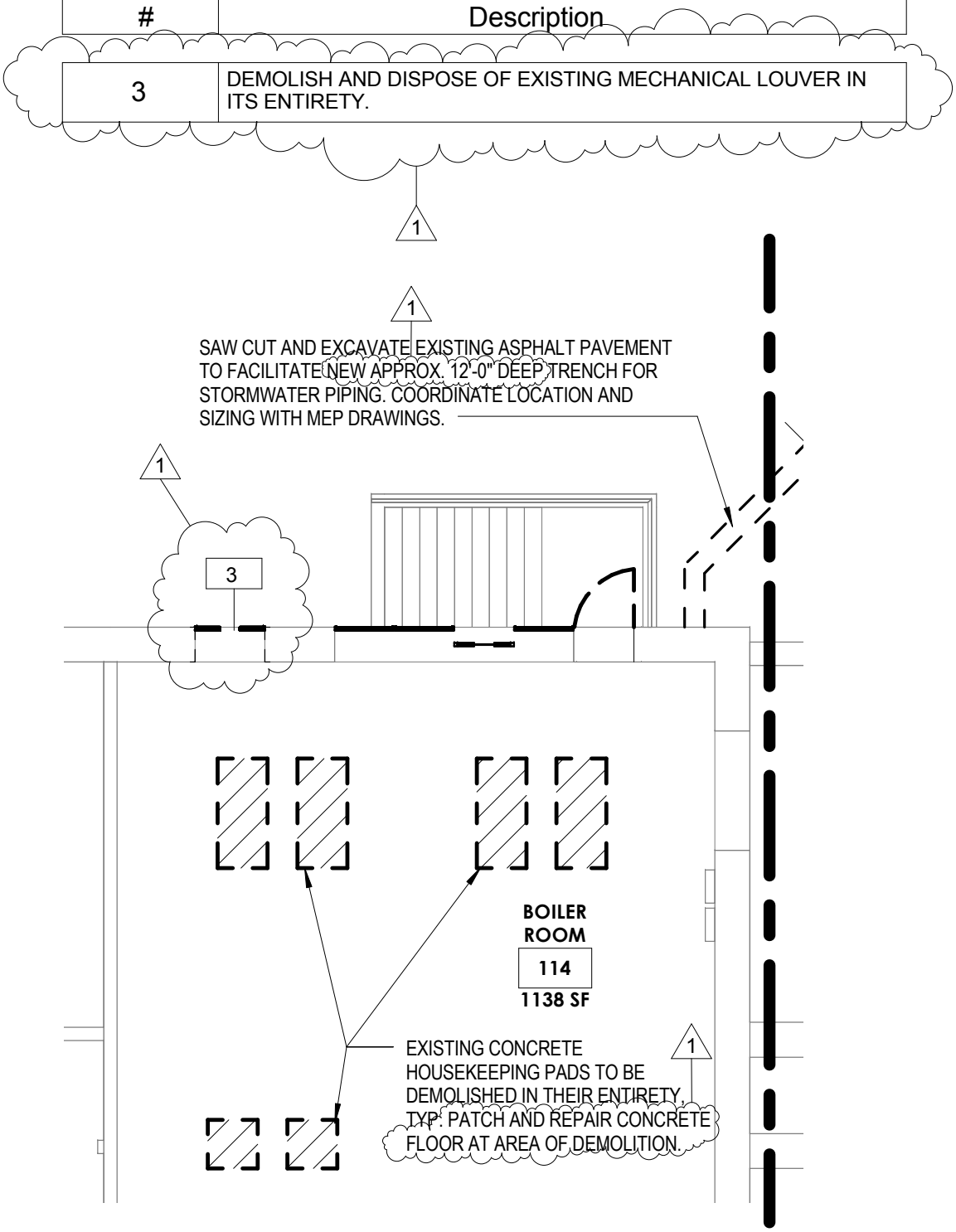
KEYNOTE LEGEND	
KEYNOTE #	Description
3	DEMOLISH AND DISPOSE OF EXISTING MECHANICAL LOUVER IN ITS ENTIRETY.



PARTIAL LOWER LEVEL DEMO PLAN - AREA A - 1/A2.1

1 / SK-A.3

1/8" = 1'-0"

05/07/15 DATE	1/A2.1 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com
14036 PROJECT NO.	SK-A.3		

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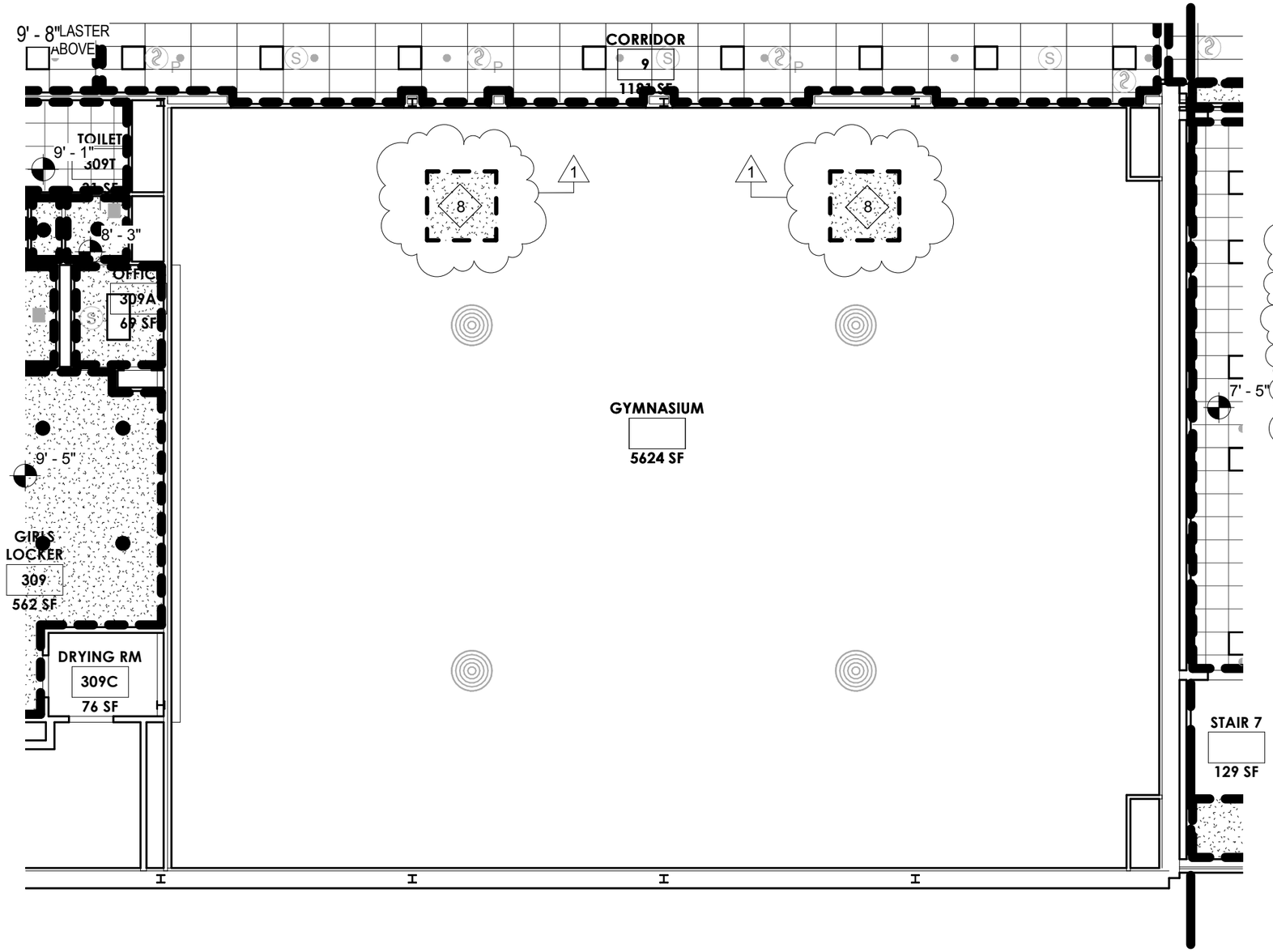
1 ADDENDUM #1



KEYNOTE LEGEND	
KEYNOTE #	Description
8	REMOVE EXISTING SUSPENDED GYPSUM OR PORTLAND CEMENT PLASTER CEILING TO FACILITATE DEMOLITION AND INSTALLATION OF MECHANICAL UNITS. APPROXIMATE AREA OF DEMOLITION TO BE 6'-0" x 6'-0". TEMPORARILY SECURE ALL ELECTRICAL DEVICES, MECHANICAL DEVICES, FIRE PROTECTION DEVICES, SPRINKLER HEADS, AND EMERGENCY DEVICES IN AREA OF DEMOLITION ONLY AND REINSTALL. CONTRACTOR IS TO PROVIDE TEMPORARY PROTECTION OVER EXISTING GYM FLOOR DURING DURATION OF CONSTRUCTION. REFER TO MEP DRAWINGS FOR COORDINATION OF SIZE AND LOCATIONS.

1

1 / SK-A.4

PARTIAL SECOND FLOOR RCP DEMOLITION PLAN - AREA A - 1/A2.11

3/32" = 1'-0"

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A. I. DuPont Middle School

ADDENDUM #1

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Date	MAY 1, 2015	
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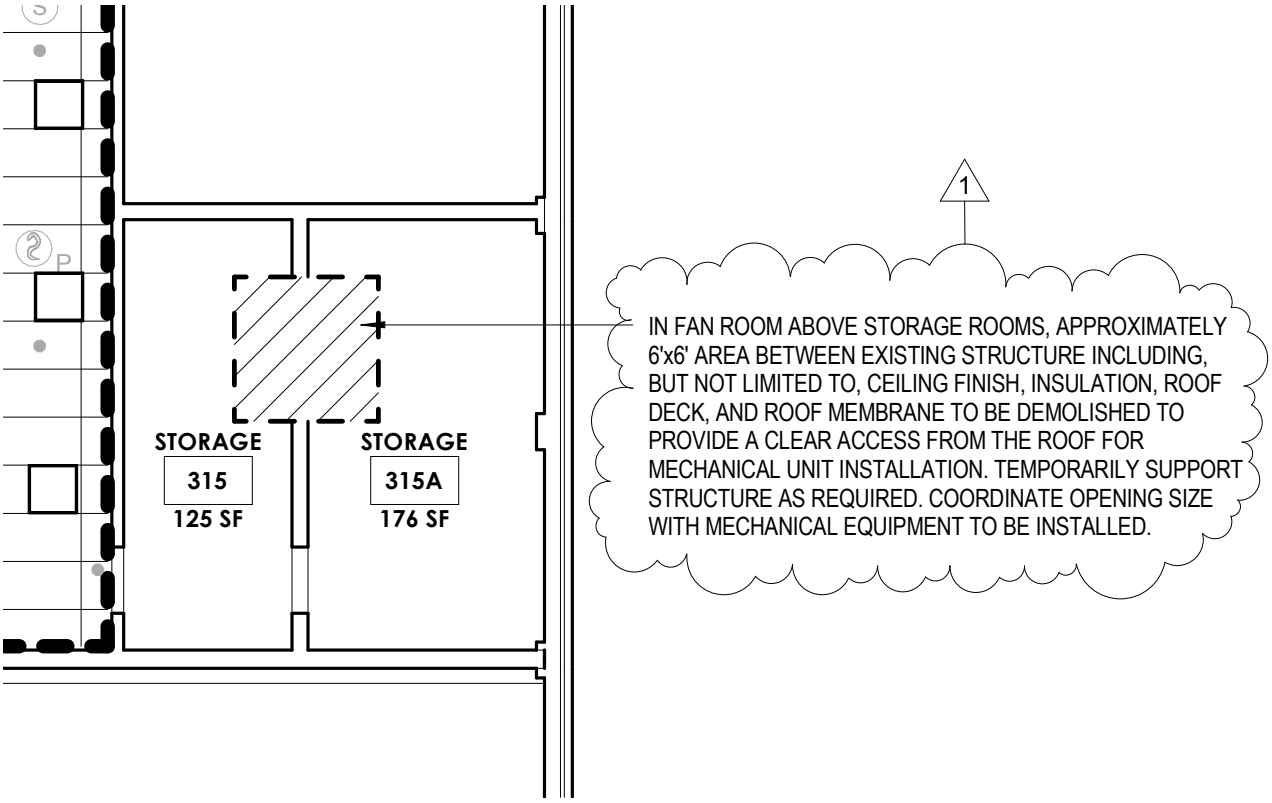
5/11/2015 2:39:44 PM



PARTIAL 2ND FLOOR RCP DEMO PLAN - AREA B - 1/A2.12

1
SK-A.5

1/8" = 1'-0"

05/07/15 DATE	1/A2.12 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com	1 ADDENDUM #1
14036 PROJECT NO.	SK-A.5		This drawing is the property of StudioJAED and is prepared for the use of the client named at the location indicated. No other use is authorized or intended.	

LEGEND

NEW VCT FLOOR FINISH. REFER TO KEY NOTES.

NEW CARPET FLOOR FINISH. REFER TO KEY NOTES.

COLORED SEALED EXISTING CONCRETE FLOOR FINISH. REFER TO KEY NOTES.

LINE INDICATES NEW 6" RUBBER BASE

KEYNOTE SYMBOL

ES / # EXTERIOR STOREFRONT TAG

IS / # INTERIOR STOREFRONT TAG

1

HATCH INDICATES AREA OF WALL INFILL. WHERE HEIGHT & WIDTH SIZES ARE PROVIDED ON PLAN, PROVIDE CMU WALL INFILL TO MATCH EXISTING WALL THICKNESS. AT ALL OTHER AREAS, INCLUDING WHERE INFILL NOTES ARE LABELED WITH HEIGHTS ONLY, INFILL WALL UP TO UNDERSIDE OF DECK ABOVE. SEE TYPICAL WALL INFILL DETAIL ON SKETCH SHEET SK-A.25. COORDINATE SIZE AND LOCATION WITH MEP DRAWINGS. THESE AREAS ARE MEANT TO REFERENCE EXISTING CONDITIONS BUT ARE NOT MEANT TO BE ALL INCLUSIVE. CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS.

1 / SK-A.6

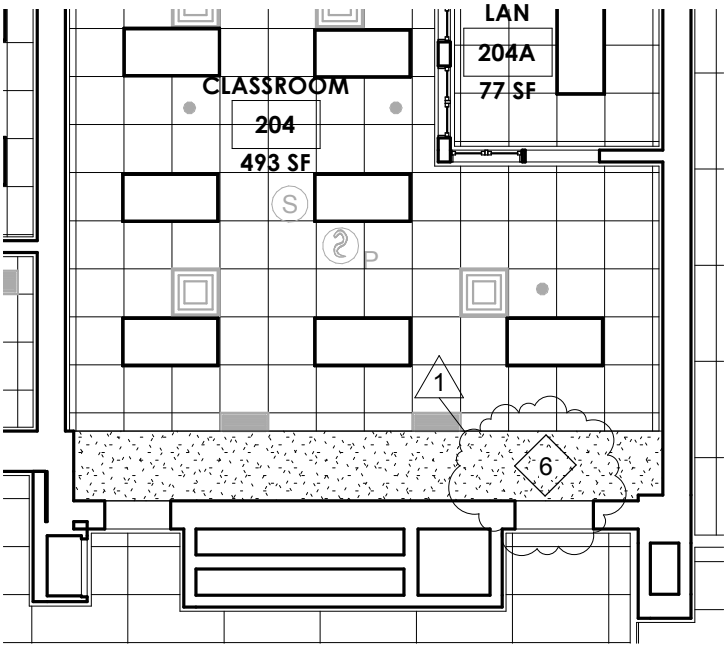
REVISED LEGEND

NTS

05/07/15 DATE	A3.1-A3.6 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com	This drawing is the property of StudioJAED and is prepared for the location indicated. No other use is authorized or intended.	1 ADDENDUM #1
14036 PROJECT NO.	SK-A.6				

KEYNOTE LEGEND	
KEYNOTE #	Description
6	INSTALL NEW 5/8" GYPSUM SOFFIT ON 3 5/8" CFMF AT 16" O.C. REINSTALL ALL EXISTING ELECTRICAL DEVICES, MECHANICAL DEVICES, FIRE PROTECTION DEVICES, SPRINKLER HEADS, AND EMERGENCY DEVICES IN NEW CEILING.

1



PARTIAL FIRST FLOOR RCP - AREA A - 1/A3.9

1
SK-A.7

1/8" = 1'-0"

05/07/15	1/A3.9	RED CLAY CONSOLIDATED SCHOOL DISTRICT	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS
DATE	SHEET NO.	A. I. DuPont Middle School	CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423
14036	SK-A.7	HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	Website: www.StudioJAED.com E-Mail: info@StudioJAED.com
PROJECT NO.			

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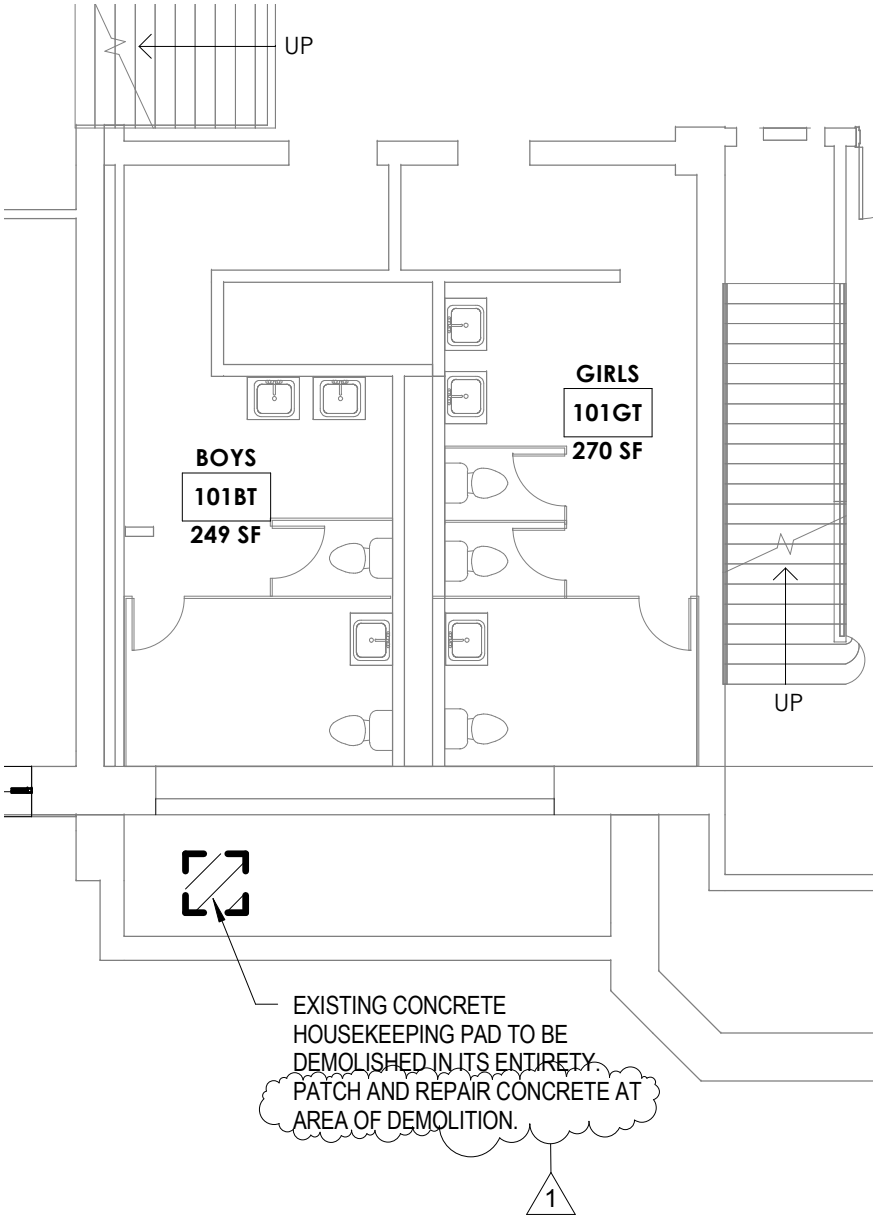
1 ADDENDUM #1

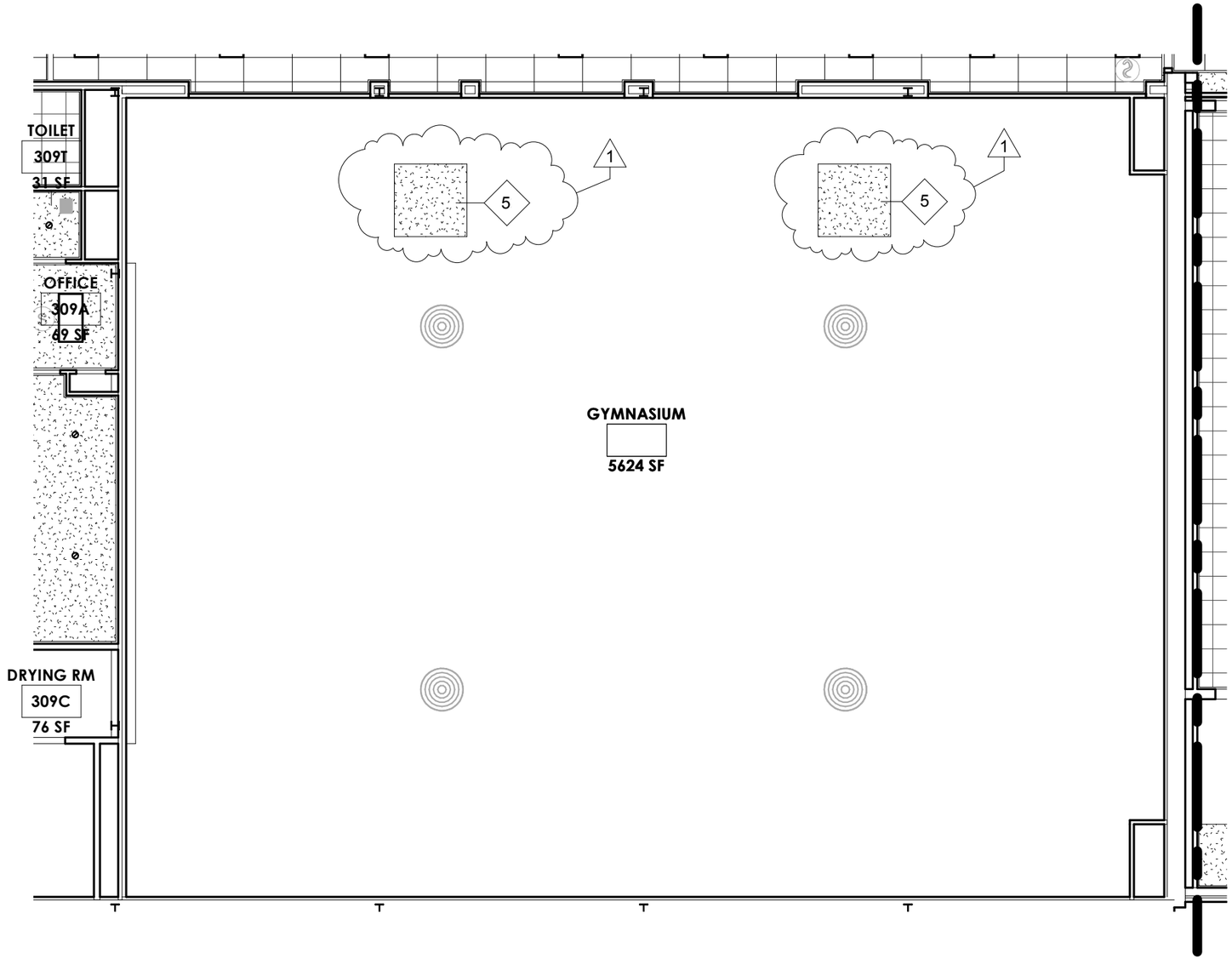


PARTIAL LOWER LEVEL DEMO PLAN - AREA A - 1/A2.1

1 / SK-A.8

1/8" = 1'-0"

05/07/15 DATE	1/A2.1 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com	1 ADDENDUM #1
14036 PROJECT NO.	SK-A.8		This drawing is the property of StudioJAED and is prepared for the location indicated. No other use is authorized or intended.	



KEYNOTE LEGEND	
KEYNOTE #	Description
5	INSTALL NEW SUSPENDED GYPSUM OR PORTLAND CEMENT PLASTER CEILING PATCH AT AREA OF DEMOLITION. APPROXIMATE AREA OF PATCH AND REPAIR TO BE 6'-0" x 6'-0". REINSTALL ALL ELECTRICAL DEVICES, MECHANICAL DEVICES, FIRE PROTECTION DEVICES, SPRINKLER HEADS, AND EMERGENCY DEVICES IN EXISTING LOCATIONS AT AREA OF NEW CEILING PATCH. PAINT NEW CEILING TO MATCH EXISTING. CONTRACTOR IS TO PROVIDE TEMPORARY PROTECTION OVER EXISTING GYM FLOOR DURING DURATION OF CONSTRUCTION. REFER TO MEP DRAWINGS FOR COORDINATION OF SIZE AND LOCATIONS.

1

SECOND FLOOR REFLECTED CEILING PLAN - AREA A - 1/A3.11

1 / SK-A.9

3/32" = 1'-0"

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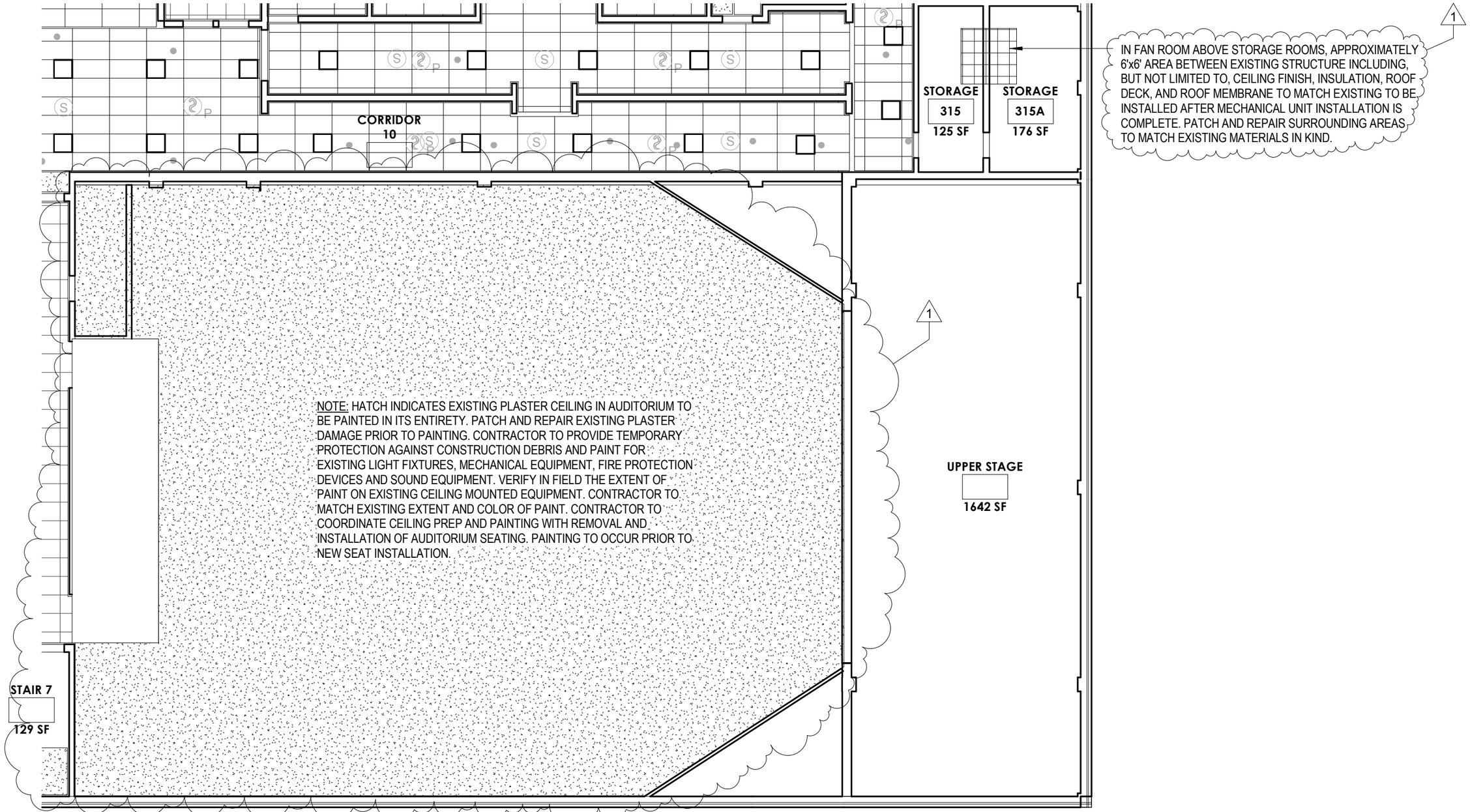
A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-A.9
Date	MAY 1, 2015	
Drawn by	HMS	
Checked by	PRC	Scale 3/32" = 1'-0"

5/11/2015 2:39:44 PM



1
SK-A.10

PARTIAL SECOND FLOOR NEW RCP - AREA B - 1/A3.12

3/32" = 1'-0"

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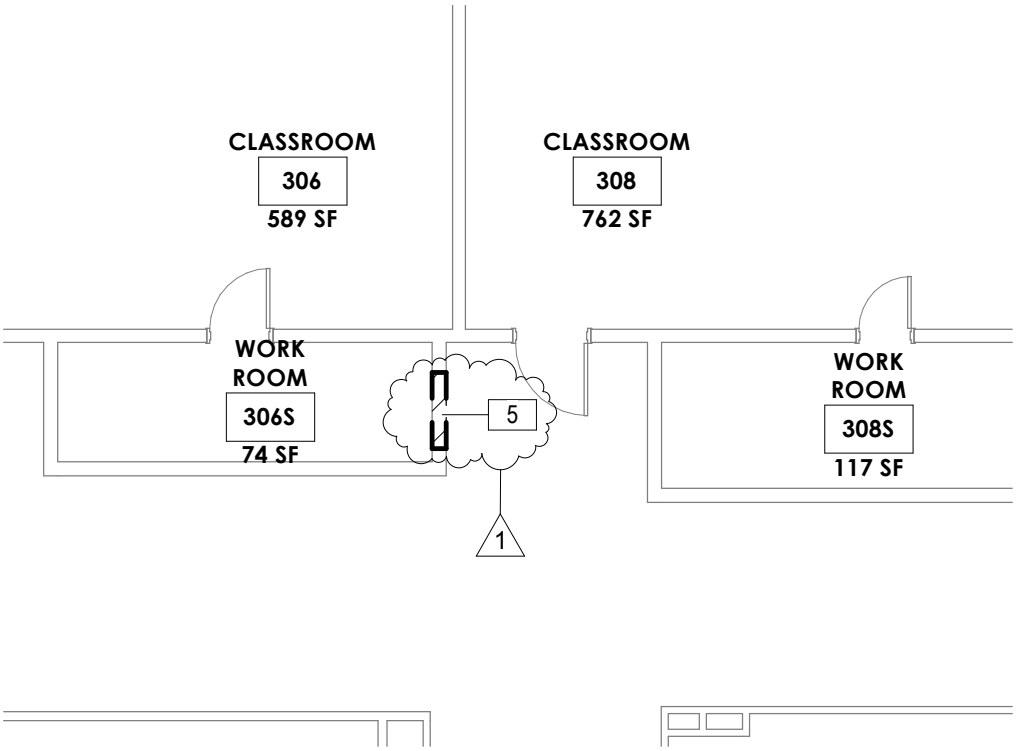
A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-A.10
Date	MAY 1, 2015	
Drawn by	Author	
Checked by	Checker	Scale 3/32" = 1'-0"

5/11/2015 2:39:44 PM



PARTIAL SECOND FLOOR DEMO PLAN - AREA A - A2.5

1
SK-A.11

1/8" = 1'-0"

KEYNOTE LEGEND	
KEYNOTE #	Description
5	DEMOLISH PORTION OF EXISTING CMU WALL WHERE SHOWN DASHED. PROVIDE TEMPORARY SHORING TO FACILITATE INSTALLATION OF NEW ELECTRICAL PANEL. PATCH AND REPAIR AROUND PERIMETER OF NEW PANEL WITH NEW CMU INFILL. PAINT CMU TO MATCH EXISTING. COORDINATE LOCATION AND SIZE OF OPENING REQUIRED FOR ELECTRICAL PANEL WITH MEP DRAWINGS AND SPECIFICATIONS.

1

05/08/15 DATE
A2.5 SHEET NO.
14036 PROJECT NO.
SK-A.11

RED CLAY CONSOLIDATED SCHOOL DISTRICT
A. I. DuPont Middle School
HVAC RENOVATION
3130 KENNETT PIKE
WILMINGTON, DELAWARE 19807

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CORPORATE HEADQUARTERS
2500 WRANGLE HILL ROAD, STE. 110
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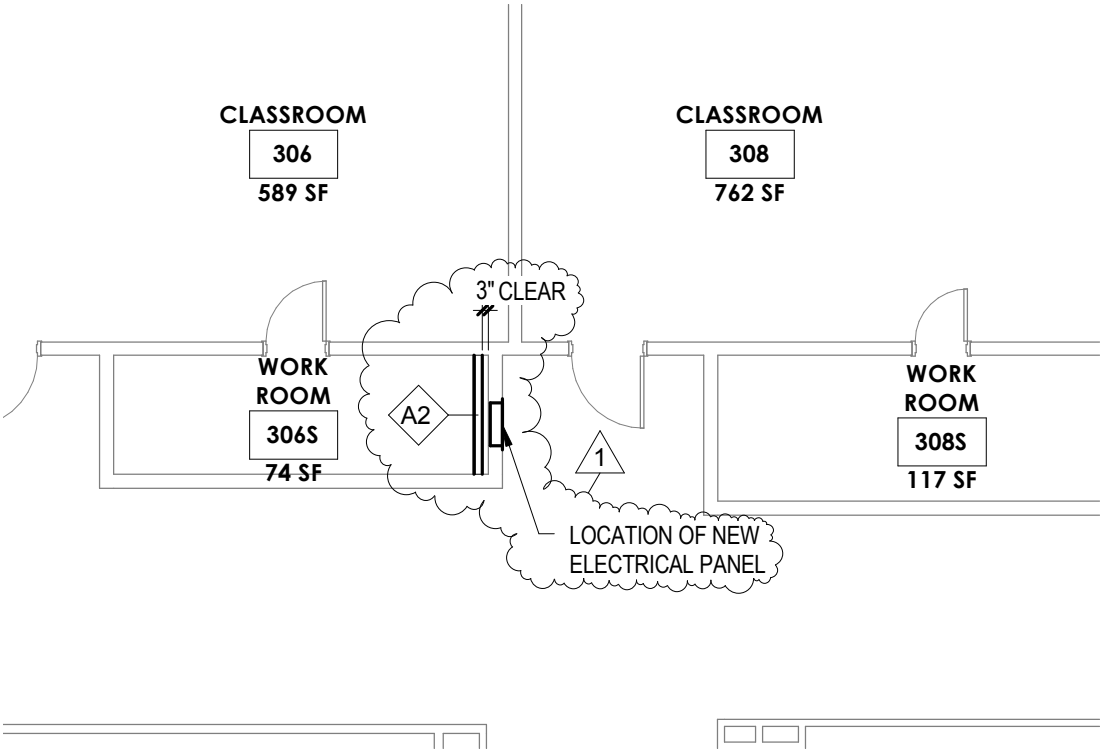
1 ADDENDUM #1

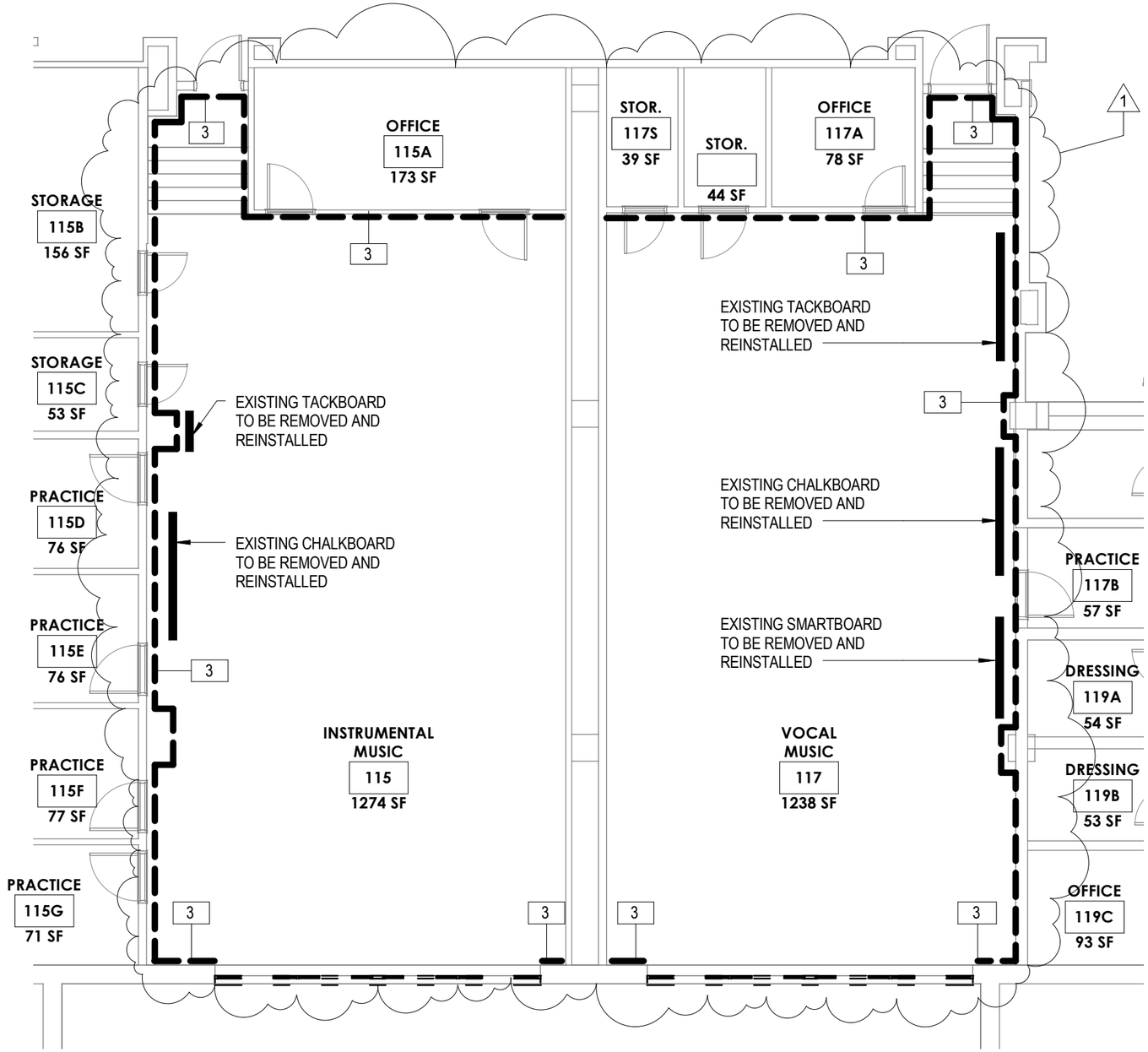


PARTIAL SECOND FLOOR PLAN - AREA A - 1/A3.5

1
SK-A.12

1/8" = 1'-0"

05/08/15 DATE	A3.5 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com	This drawing is the property of StudioJAED and is prepared for the specific project at the location indicated. No other use is authorized or intended.	1 ADDENDUM #1
14036 PROJECT NO.	SK-A.12				



KEYNOTE LEGEND	
KEYNOTE #	Description
3	REMOVE AND DISPOSE OF EXISTING ACOUSTICAL WALL PANELS AND TACKSTRIP. TEMPORARILY DISCONNECT ALL DEVICES, INCLUDING BUT NOT LIMITED TO, FIRE ALARM DEVICES, DATA OUTLETS, POWER OUTLETS, AND MARKERBOARDS TO BE REINSTALLED IN EXISTING LOCATIONS.

1
SK-A.13

PARTIAL LOWER LEVEL DEMOLITION PLAN - AREA B - 1/A2.2

1/8" = 1'-0"

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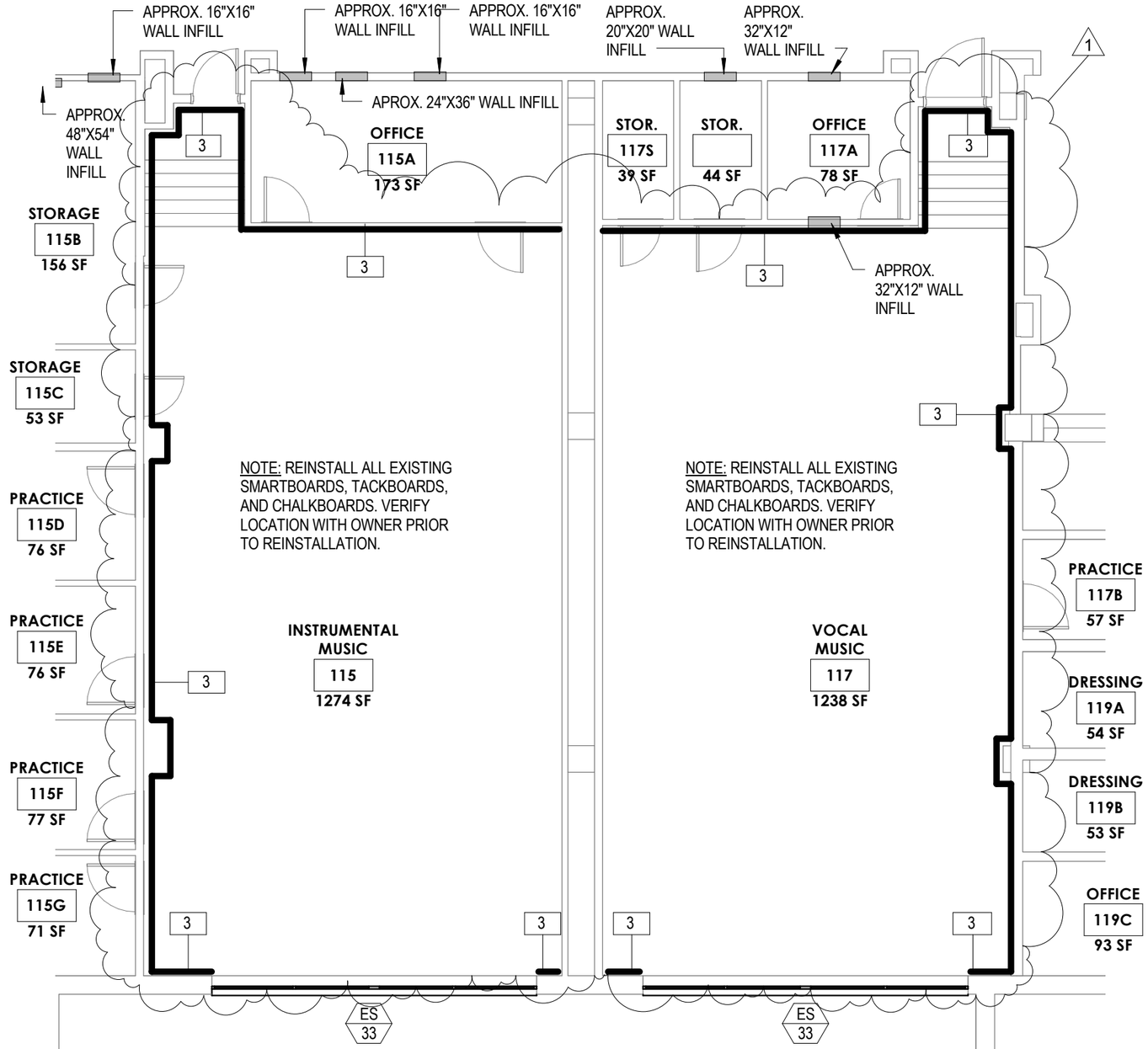
ADDENDUM #1

Project number	14036	SK-A.13
Date	MAY 1, 2015	
Drawn by	HMS	
Checked by	PRC	Scale 1/8" = 1'-0"

5/11/2015 2:39:45 PM



1
SK-A.14

PARTIAL LOWER LEVEL PLAN - AREA B - 1/A3.2

1/8" = 1'-0"

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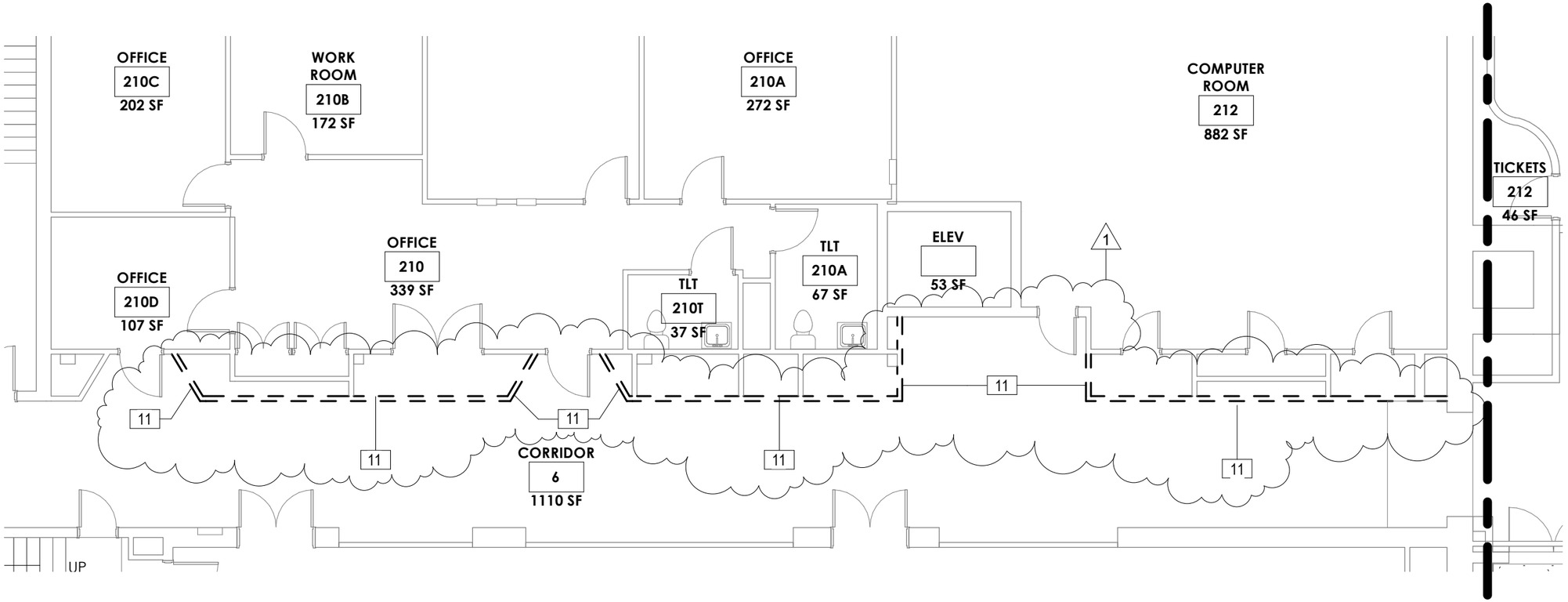
ADDENDUM #1

Project number	14036	SK-A.14
Date	MAY 1, 2015	
Drawn by	HMS	
Checked by	PRC	Scale 1/8" = 1'-0"

5/11/2015 2:39:46 PM



1
SK-A.15

PARTIAL FIRST FLOOR DEMOLITION PLAN - AREA A - 1/A2.3

1/8" = 1'-0"

KEYNOTE LEGEND	
KEYNOTE #	Description
11	DEMOLISH AND DISPOSE OF EXISTING INTERIOR CMU PARTITION IN ITS ENTIRETY WHERE SHOWN DASHED ON PLAN TO FACILITATE MEP WORK WITHIN EXISTING CHASES. TEMPORARILY SECURE ALL EXISTING ELECTRICAL AND FIRE PROTECTION DEVICES FOR REINSTALLATION. WHERE EXISTING ACCESS PANELS EXIST IN DEMOLISHED WALLS, CONTRACTOR IS TO PROVIDE NEW ACCESS PANELS AT SAME LOCATION ON NEW WALLS TO MATCH EXISTING SIZES, U.N.O.

1

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A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-A.15
Date	MAY 1, 2015	
Drawn by	HMS	
Checked by	PRC	Scale 1/8" = 1'-0"

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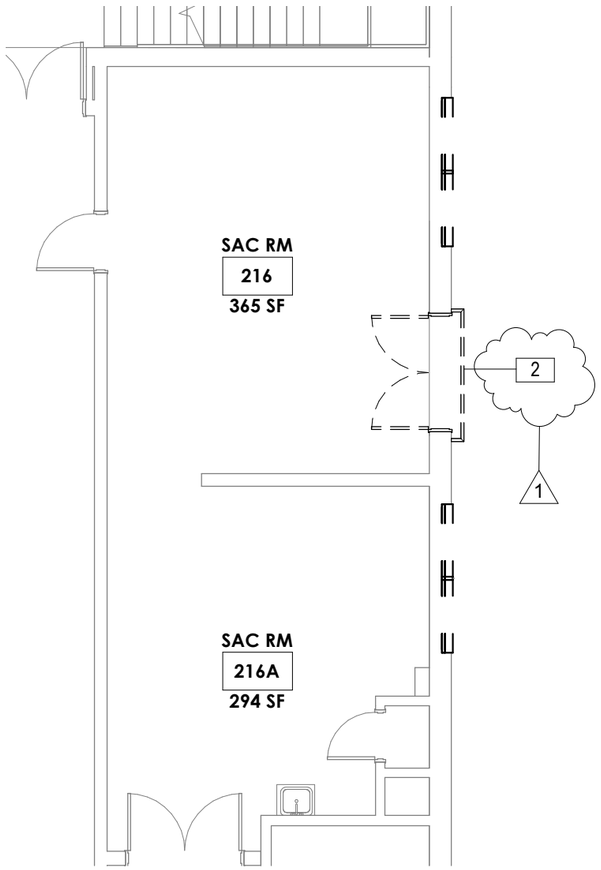
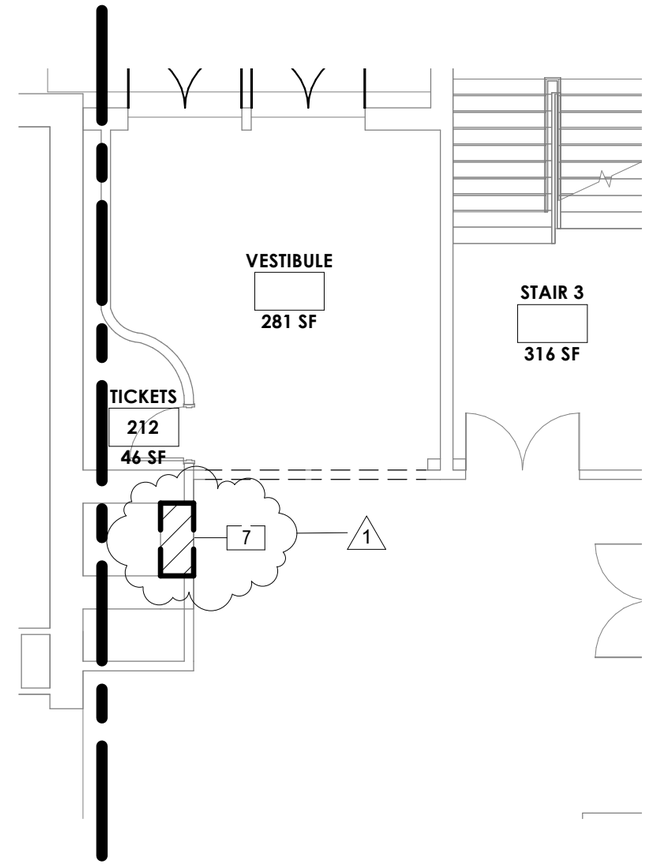


PARTIAL FIRST FLOOR DEMO PLAN - AREA B - 1/A2.4

1 / SK-A.16

1/8" = 1'-0"



PARTIAL FIRST FLOOR DEMO PLAN - AREA B - 1/A2.4

2 / SK-A.16

1/8" = 1'-0"

KEYNOTE LEGEND	
KEYNOTE #	Description
7	SAW CUT AND REMOVE AREA OF EXISTING MASONRY CHIMNEY WALL WHERE SHOWN DASHED ON PLAN TO FACILITATE MEP WORK WITHIN CHIMNEY CHASE. SIZE OF OPENING REQUIRED TO BE VERIFIED PRIOR TO CONSTRUCTION. CONTRACTOR TO PROVIDE TEMPORARY SHORING OF EXISTING WALL AS REQUIRED.

1

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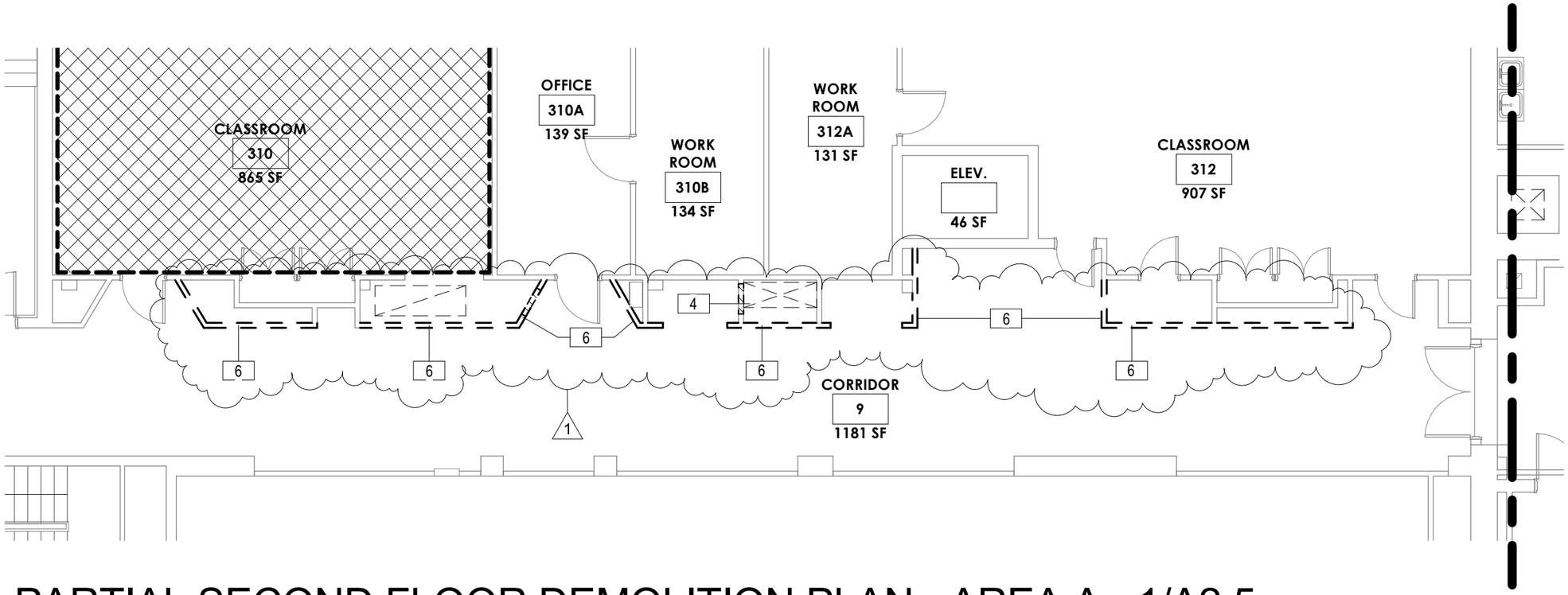
ADDENDUM #1

Project number	14036	SK-A.16
Date	MAY 1, 2015	
Drawn by	HMS	
Checked by	PRC	Scale 1/8" = 1'-0"

5/11/2015 2:39:48 PM



1
SK-A.17

PARTIAL SECOND FLOOR DEMOLITION PLAN - AREA A - 1/A2.5

1/8" = 1'-0"

KEYNOTE LEGEND	
KEYNOTE #	Description
6	DEMOLISH AND DISPOSE OF EXISTING INTERIOR CMU PARTITION IN ITS ENTIRETY WHERE SHOWN DASHED ON PLAN TO FACILITATE MEP WORK WITHIN EXISTING CHASES. TEMPORARILY SECURE ALL EXISTING ELECTRICAL AND FIRE PROTECTION DEVICES FOR REINSTALLATION. WHERE EXISTING ACCESS PANELS EXIST IN DEMOLISHED WALLS, CONTRACTOR IS TO PROVIDE NEW ACCESS PANELS AT SAME LOCATION ON NEW WALLS TO MATCH EXISTING SIZES, U.N.O.

1

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A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-A.17
Date	MAY 1, 2015	
Drawn by	HMS	
Checked by	PRC	Scale 1/8" = 1'-0"

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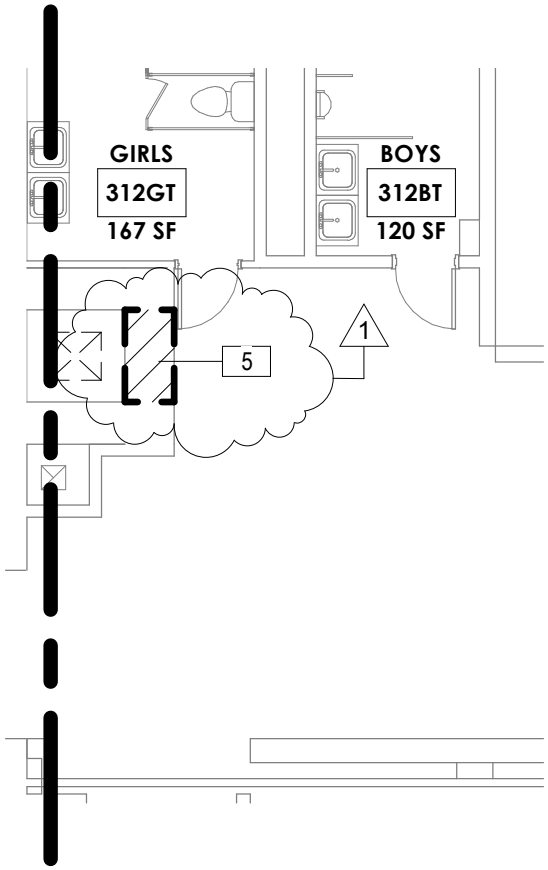

PARTIAL SECOND DEMO PLAN - AREA B - 1/A2.6

1
SK-A.18

1/8" = 1'-0"

KEYNOTE LEGEND	
KEYNOTE #	Description
5	SAW CUT AND REMOVE AREA OF EXISTING MASONRY CHIMNEY WALL WHERE SHOWN DASHED ON PLAN TO FACILITATE MEP WORK WITHIN CHIMNEY CHASE. SIZE OF OPENING REQUIRED TO BE VERIFIED PRIOR TO CONSTRUCTION. CONTRACTOR TO PROVIDE TEMPORARY SHORING OF EXISTING WALL AS REQUIRED.

1

05/08/15 DATE	A2.6 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com
14036 PROJECT NO.	SK-A.18		

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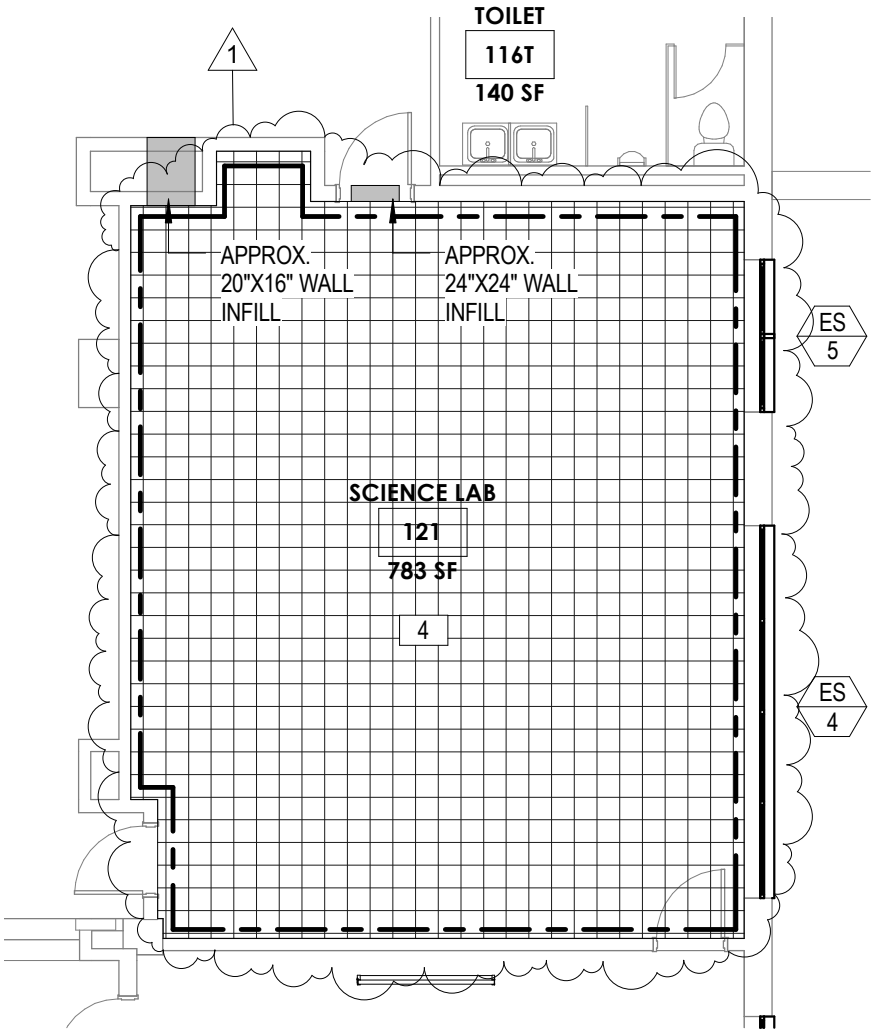

PARTIAL LOWER LEVEL PLAN - AREA B - 1/A3.2

1
SK-A.19

1/8" = 1'-0"

05/08/15 DATE	A3.2 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com	1 ADDENDUM #1
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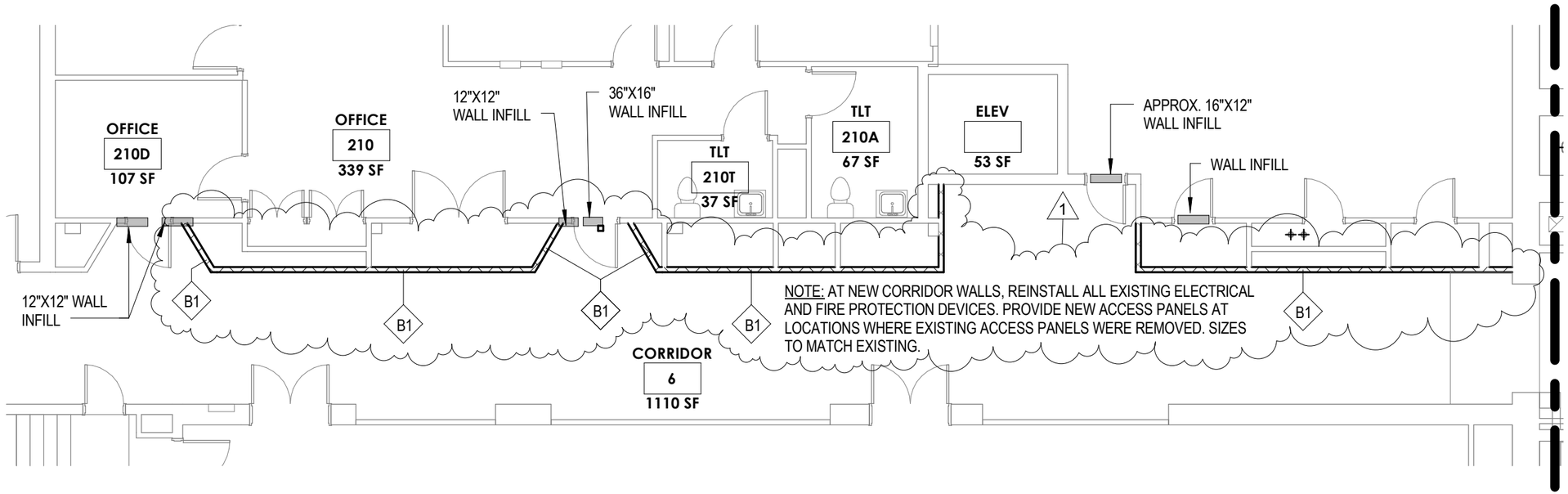

1
SK-A.20

PARTIAL FIRST FLOOR PLAN - AREA A - 1/A3.3

1/8" = 1'-0"

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A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-A.20
Date	MAY 1, 2015	
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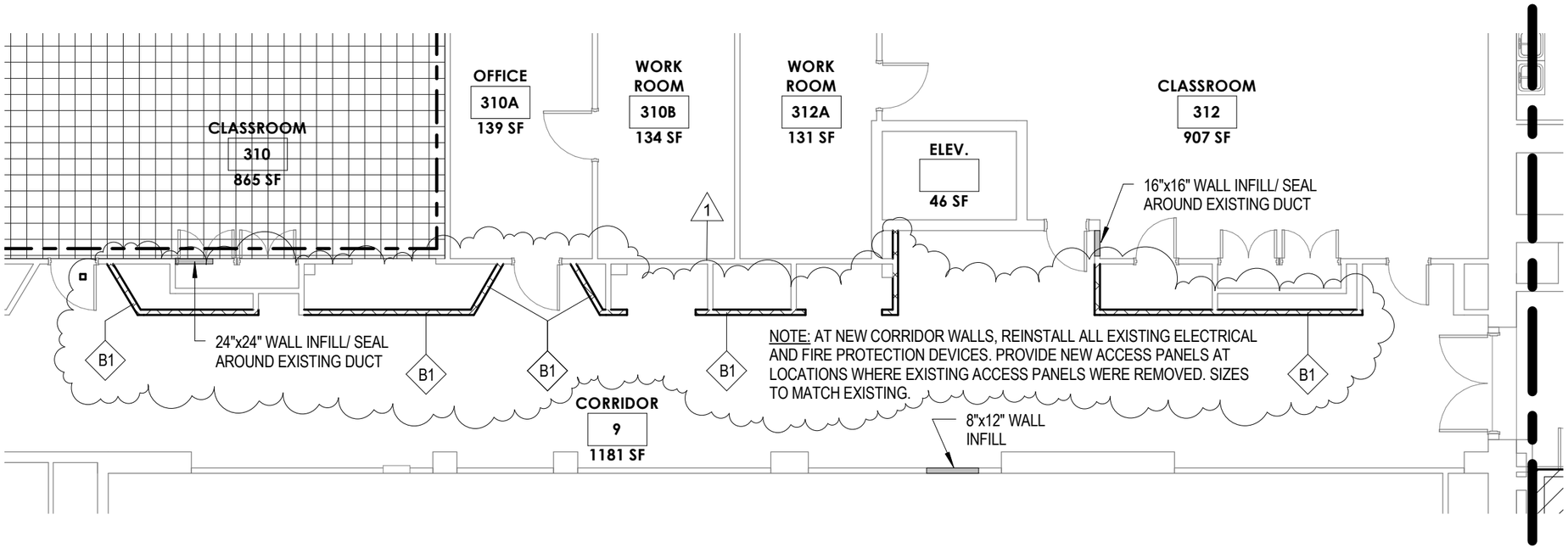
Checked by	PRC	Scale 1/8" = 1'-0"

5/11/2015 2:39:49 PM



1
SK-A.21

PARTIAL SECOND FLOOR PLAN - AREA A - 1/A3.5

1/8" = 1'-0"

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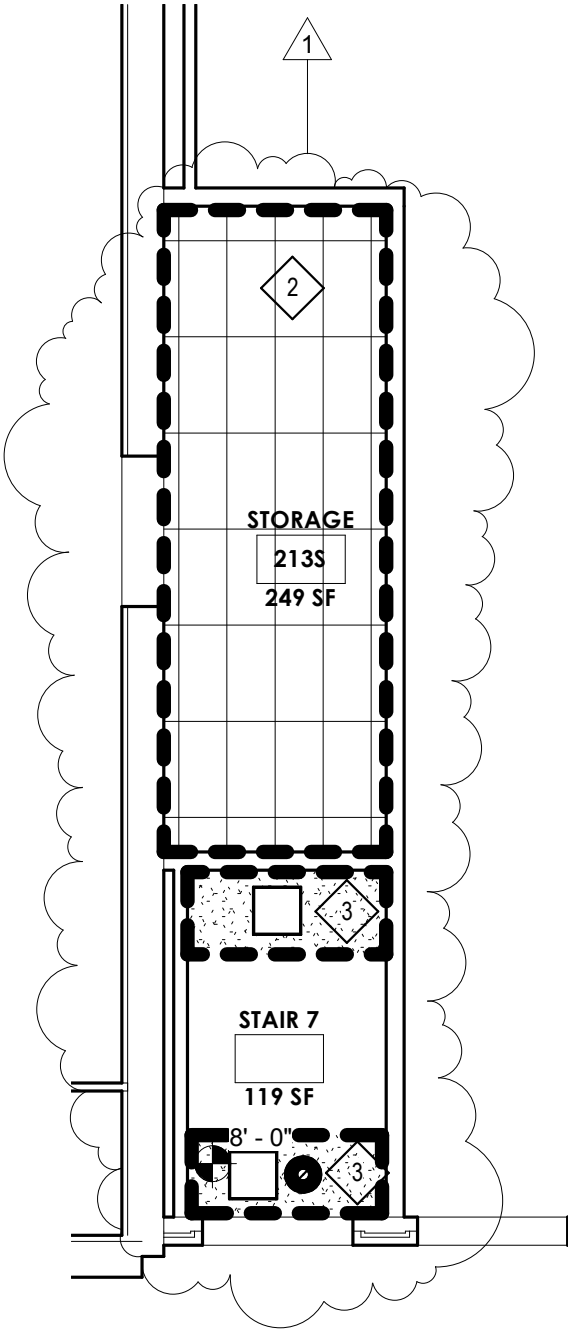
RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-A.21
Date	MAY 1, 2015	
Drawn by	HMS	
Checked by	PRC	Scale 1/8" = 1'-0"

5/11/2015 2:39:49 PM



PARTIAL FIRST FLOOR RCP DEMOLITION PLAN - AREA B - A/2.10

1
SK-A.22

1/8" = 1'-0"

05/11/15 DATE	A2.10 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com
14036 PROJECT NO.	SK-A.22		

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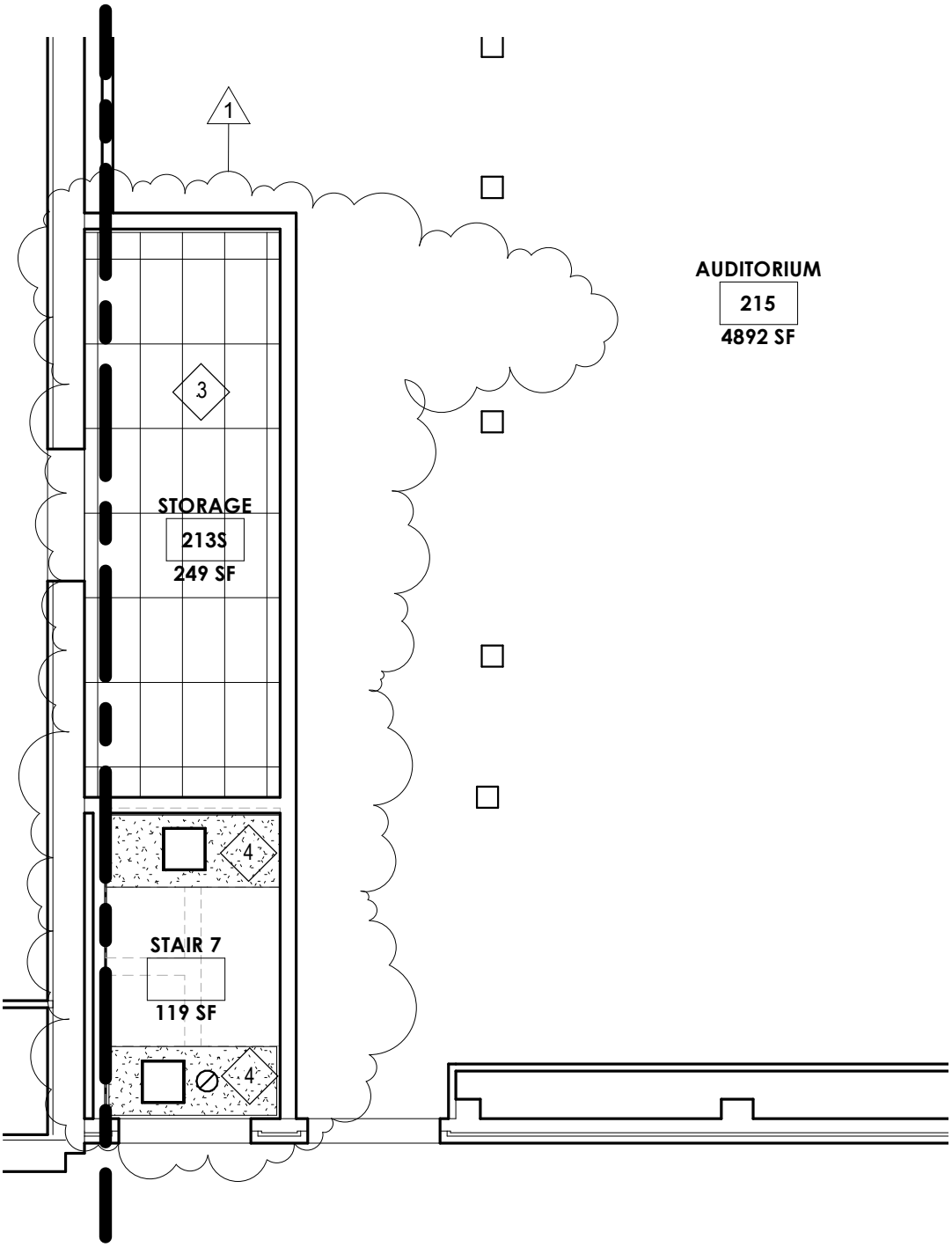
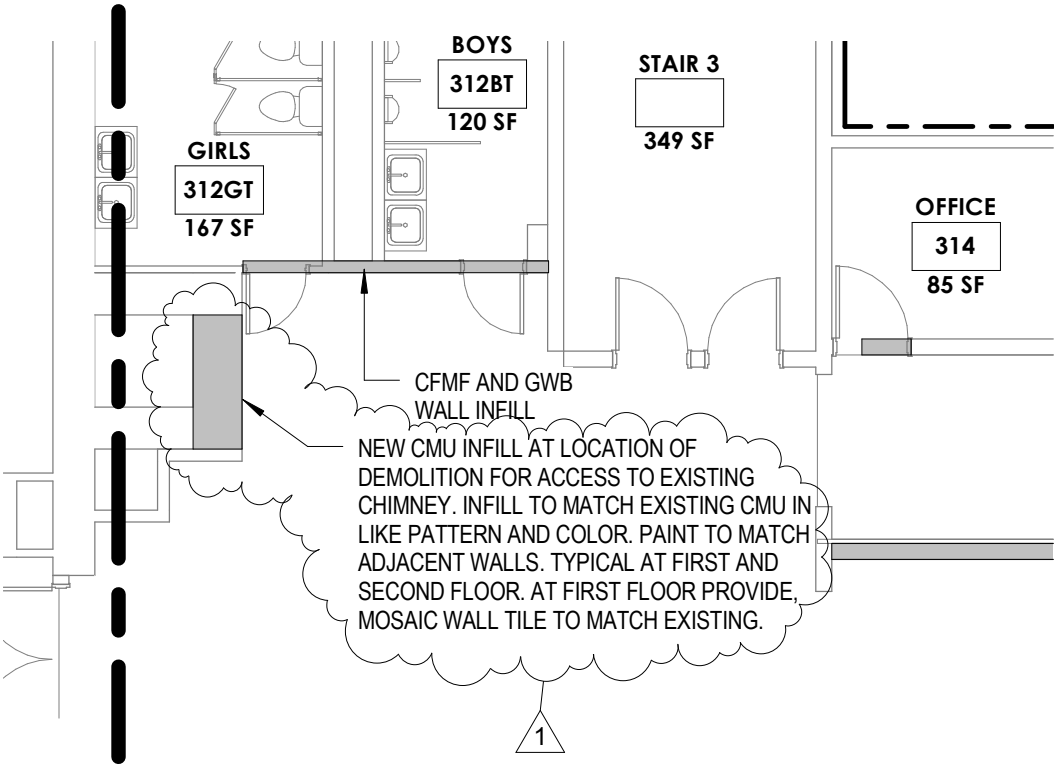


PARTIAL FIRST FLOOR NEW RCP - AREA B - 1/A3.10

1
SK-A.23

1/8" = 1'-0"

05/11/15 DATE	A3.10 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com	This drawing is the property of StudioJAED and is prepared for the use of the client named at the location indicated. No other use is authorized or intended.	1 ADDENDUM #1
14036 PROJECT NO.	SK-A.23				



1
SK-A.24

PARTIAL SECOND FLOOR PLAN - AREA B

1/8" = 1'-0"

NOTE: FIRST FLOOR SIMILAR

05/11/15 DATE	A3.4 & A3.6 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com	1 ADDENDUM #1
14036 PROJECT NO.	SK-A.24			

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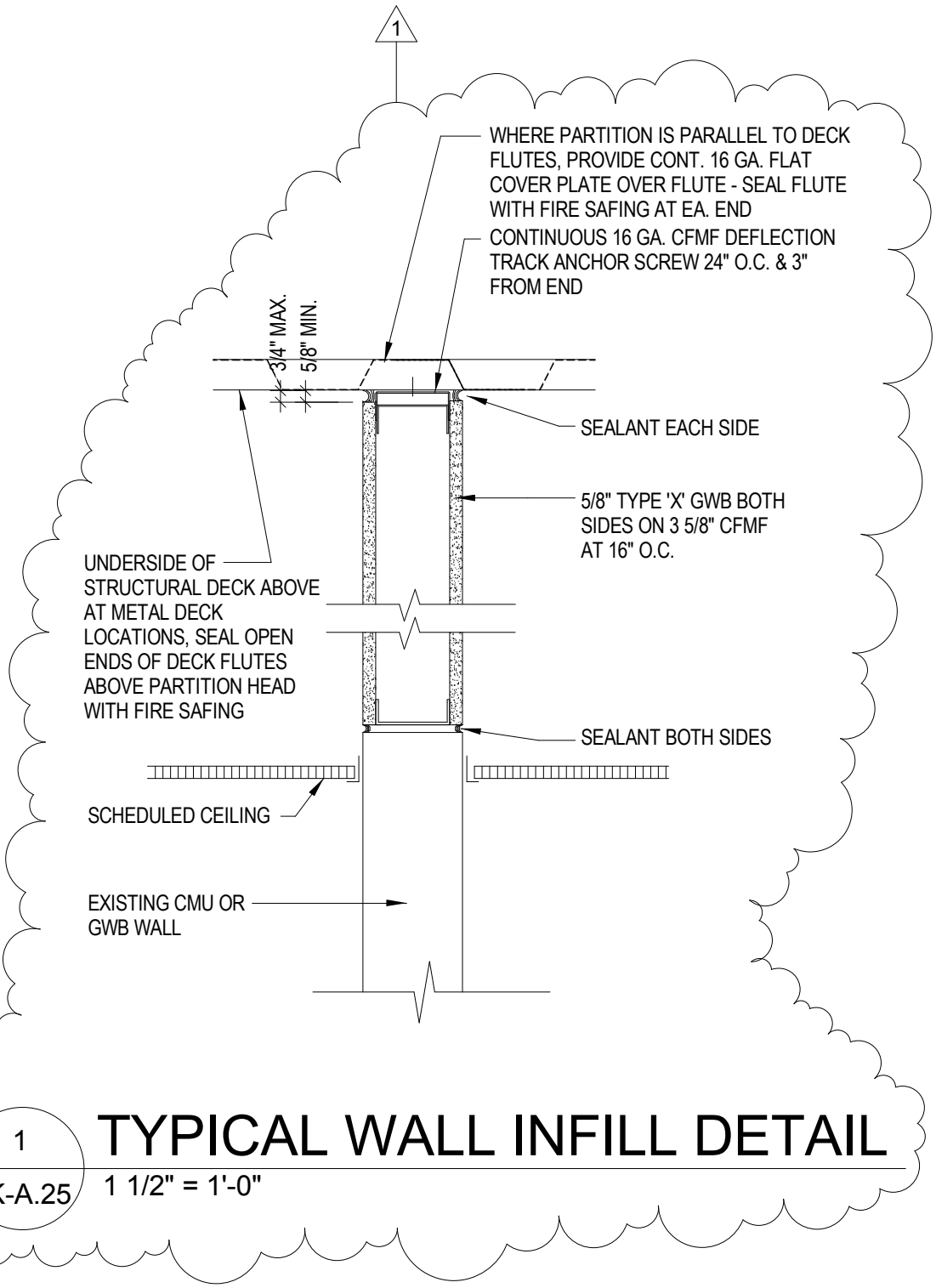

1

SK-A.25

TYPICAL WALL INFILL DETAIL

1 1/2" = 1'-0"

05/11/15 DATE	A6.4 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com	1 ADDENDUM #1
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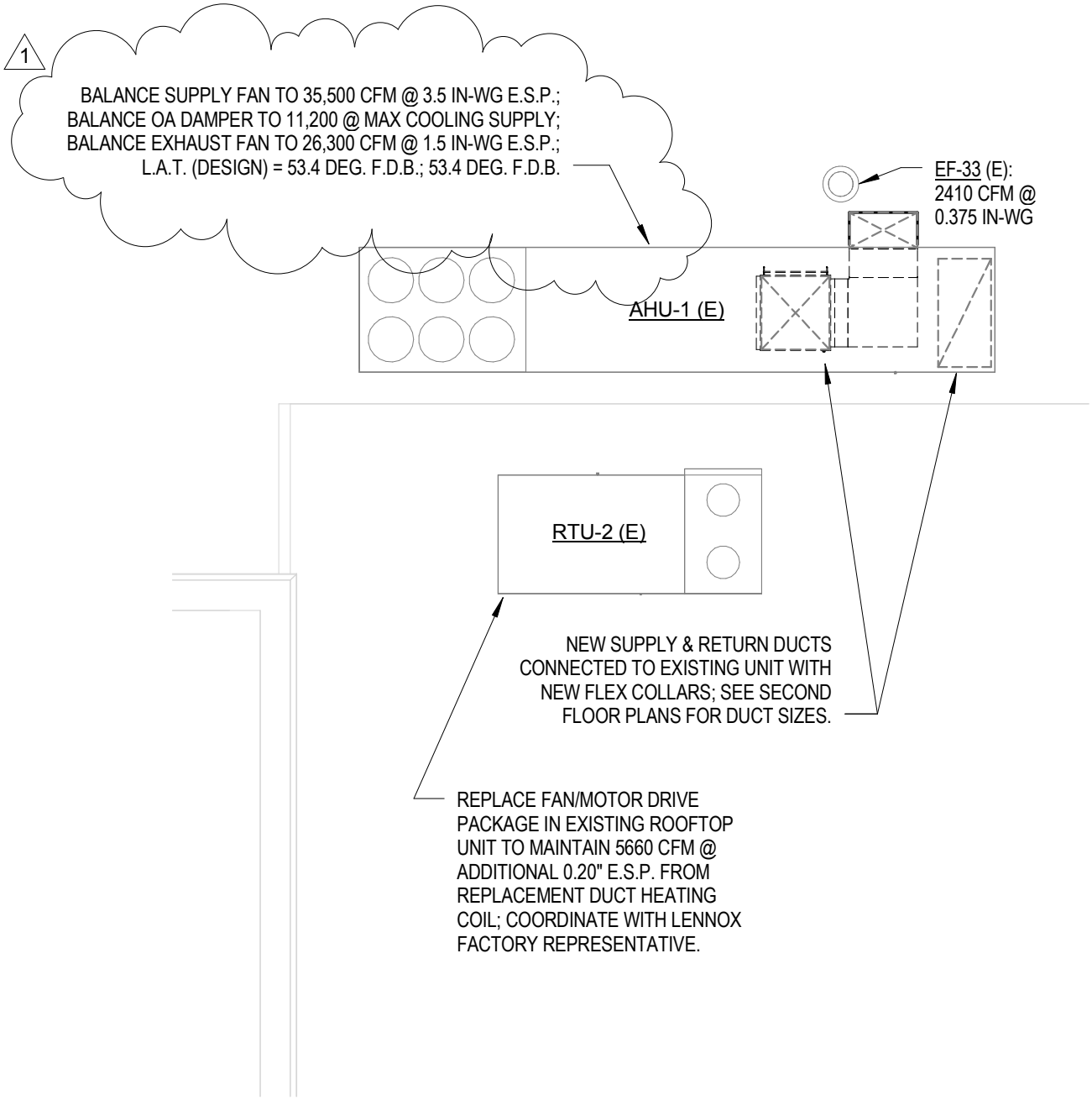

1
SK-M.1

PARTIAL MECHANICAL ROOF PLAN

3/32" = 1'-0"

05/06/15 DATE	M8.26 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com	1 ADDENDUM #1
14036 PROJECT NO.	SK-M.1			

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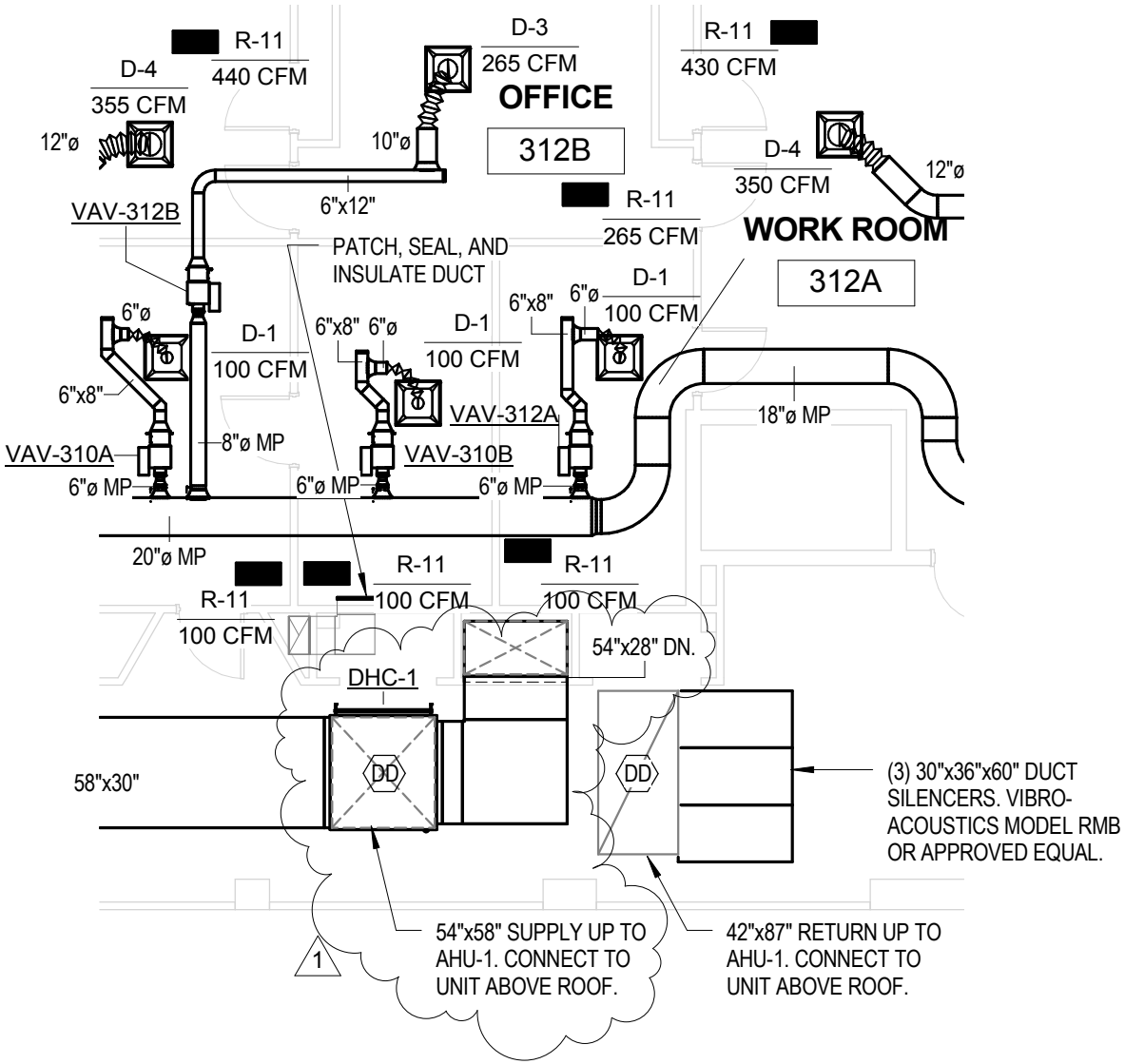

1
SK-M.2

PARTIAL SECOND FLOOR MECHANICAL PLAN

1/8" = 1'-0"

1 ADDENDUM #1

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RED CLAY CONSOLIDATED SCHOOL DISTRICT
A. I. DuPont Middle School
HVAC RENOVATION
3130 KENNETT PIKE
WILMINGTON, DELAWARE 19807

05/06/15 DATE
M8.18 SHEET NO.
14036 PROJECT NO.
SK-M.2

1

Duct Heating Coil Schedule

Mark	Airflow (CFM)	E.A.T. (deg. F)	L.A.T. (deg. F)	Heating Capacity (MBh)	A.P.D. (in-wg)	E.W.T. (deg. F)	L.W.T. (deg. F)	Water Flow Rate (GPM)	W.P.D. (ft H20)	Fin Height (in)	Fin Length (in)	Manufacturer	Model	Comments
DHC-1	21,750	40.0	60.0	493	0.50	130.0	100.0	32.0	1.3	54.0	58.0	Daikin	5MH0802B	
DHC-R1	4,000	59.0	100.0	177	0.40	120.0	100.0	18.0	6.2	24.0	48.0	Daikin	5WH1004B	
DHC-R2	5,660	56.0	95.0	240	0.50	120.0	100.0	25.0	10.0	33.0	48.0	Daikin	5WH1204B	Working Fluid is 40% Propylene Glycol
DHC-R3	5,660	56.0	95.0	240	0.50	120.0	100.0	25.0	10.0	33.0	48.0	Daikin	5WH1204B	Working Fluid is 40% Propylene Glycol

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A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-M.3
Date	MAY 1, 2015	
Drawn by	DLS	
Checked by	BMZ	Scale

5/8/2015 9:11:30 AM

Pump Schedule									
Mark	Pump Type	Rated Speed (RPM)	Impeller Size (in)	GPM	Pump Head (ft H20)	Electrical	Pump HP	Bell & Gossett Model #	Comments
P-1	Base-Mounted	1150	9.25	440	75	208/3/60	15	1510-3BC	Provide with Vendor-Supplied VFD
P-2	Base-Mounted	1150	9.25	440	75	208/3/60	15	1510-3BC	Provide with Vendor-Supplied VFD
P-3	In-Line	1750	7	50	50	208/3/60	1.5	80-1.5x1.5x7B	
P-B1	In-Line	1150	6	253	12	208/3/60	1.5	80-5x5x7	
P-B2	In-Line	1150	6	253	12	208/3/60	1.5	80-5x5x7	
P-FP2	In-Line Freeze Protection	3300	-	28	12	120/1/60	0.17	PL-36	
P-FP3	In-Line Freeze Protection	2650	-	5	12	120/1/60	0.08	PL-30	1
P-FP4	In-Line Freeze Protection	3200	-	43	12	120/1/60	0.4	PL-130	
P-FP5	In-Line Freeze Protection	3200	-	61	12	120/1/60	0.4	PL-130	
P-FPD1	In-Line Freeze Protection	3300	-	32	10	120/1/60	0.17	PL-36	
P-FPM1	In-Line Freeze Protection	3300	-	35	12	120/1/60	0.17	PL-45	
P-FPR1	In-Line Freeze Protection	2650	-	18	10	120/1/60	0.08	PL-30	

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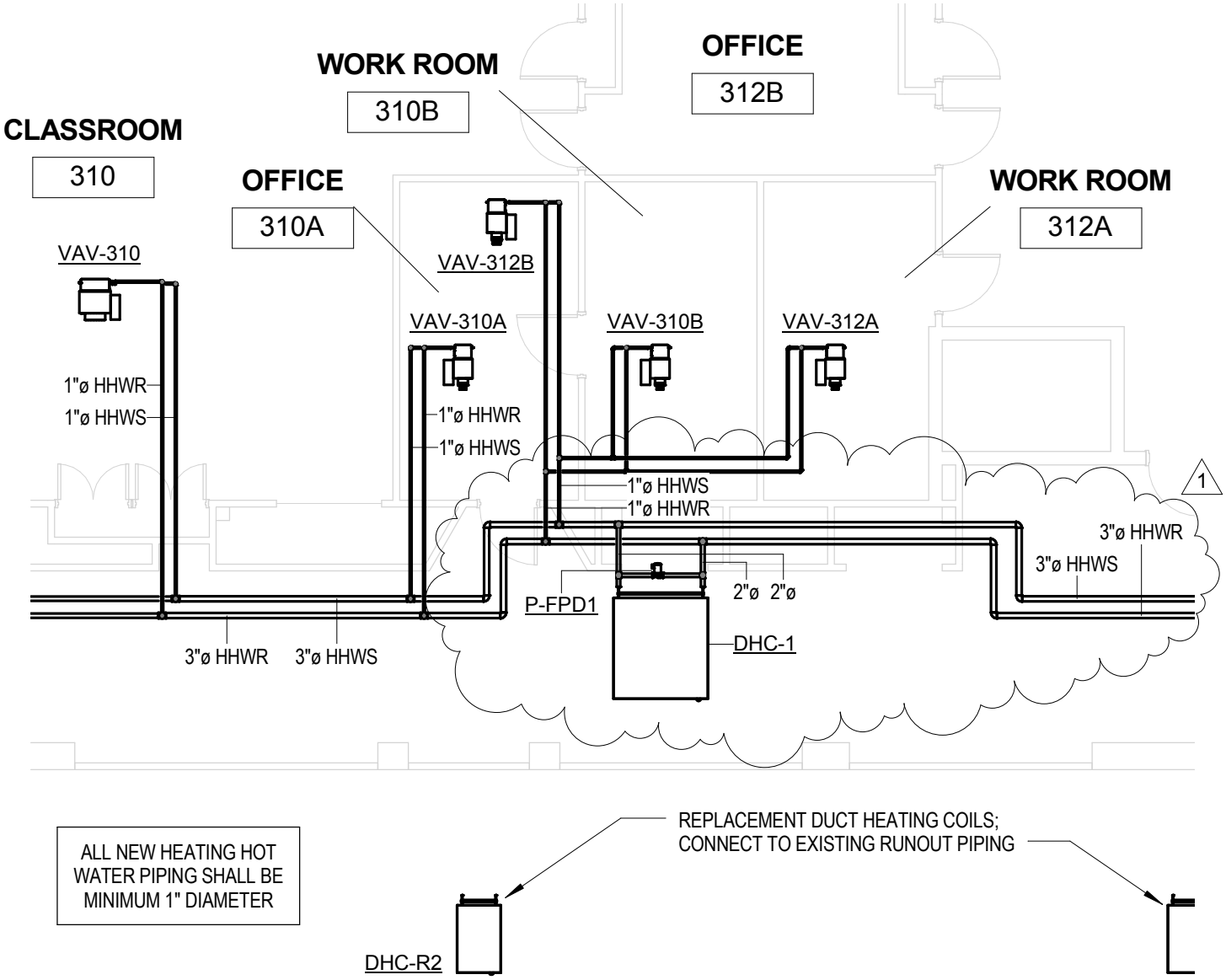
A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-M.4
Date	MAY 1, 2015	
Drawn by	Author	
Checked by	BMZ	Scale

5/8/2015 9:11:54 AM



1
SK-M.5

PARTIAL SECOND FLOOR HYDRONIC PLAN

1/8" = 1'-0"

1 ADDENDUM #1

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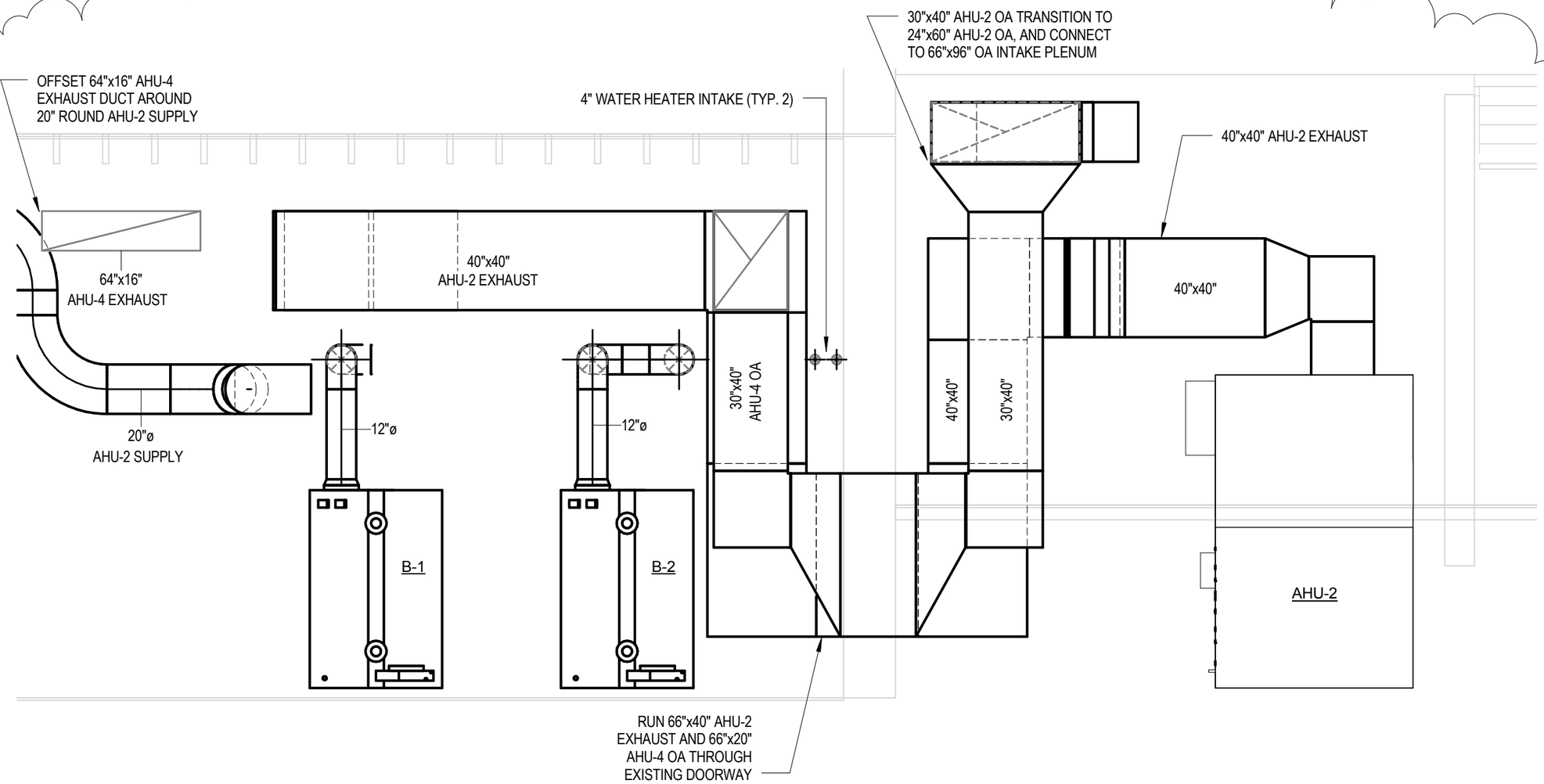
RED CLAY CONSOLIDATED SCHOOL DISTRICT
A. I. DuPont Middle School
HVAC RENOVATION
3130 KENNETT PIKE
WILMINGTON, DELAWARE 19807

05/06/15	DATE
M8.24	SHEET NO.
14036	PROJECT NO.
SK-M.5	



1
SK-M.6

BOILER ROOM HVAC SECTION

1/4" = 1'-0"

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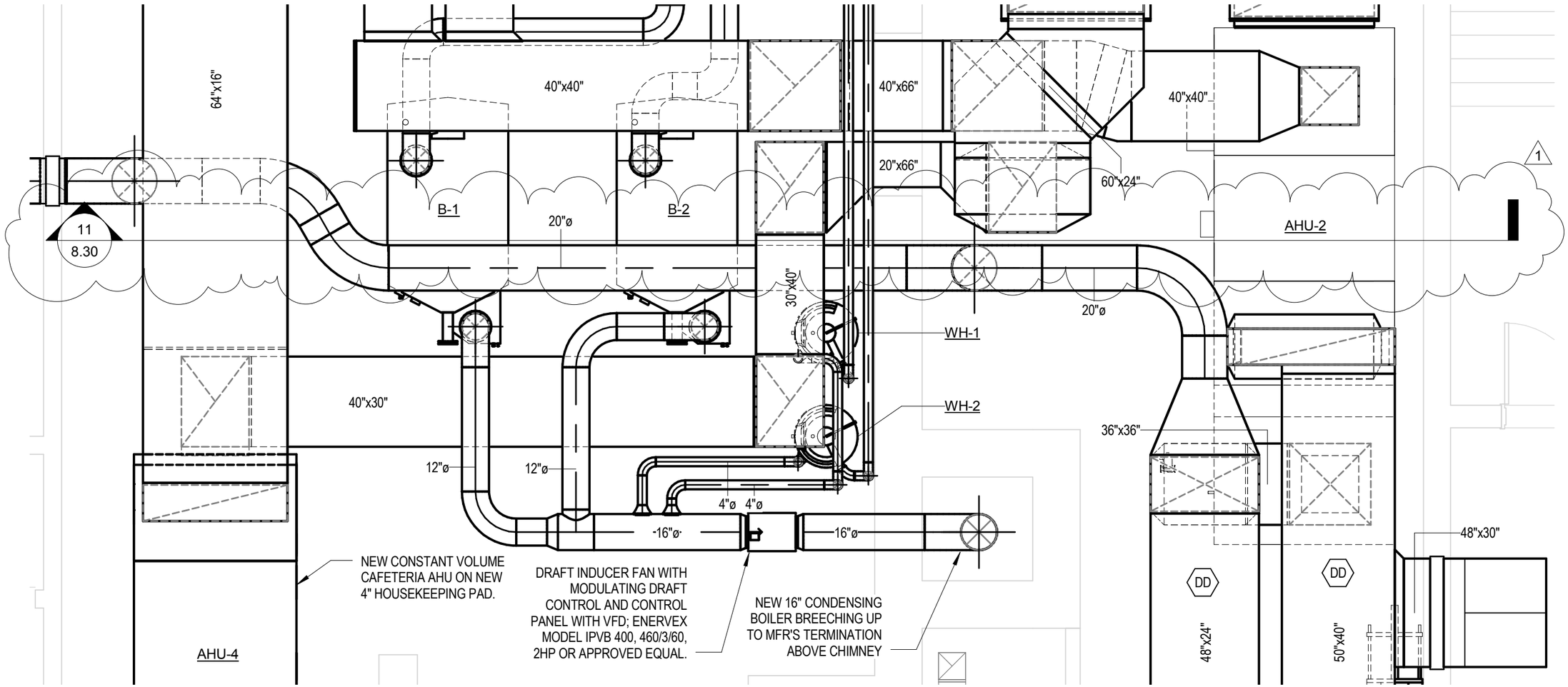
A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-M.6
Date	MAY 1, 2015	
Drawn by	Author	
Checked by	Checker	Scale 1/4" = 1'-0"

5/8/2015 9:15:16 AM



1
SK-M.7

PARTIAL ENLARGED BOILER ROOM PLAN

1/4" = 1'-0"

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A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-M.7
Date	MAY 1, 2015	
Drawn by	Author	
Checked by	Checker	Scale 1/4" = 1'-0"

5/8/2015 9:15:37 AM

Pump Schedule

Mark	Pump Type	Rated Speed (RPM)	Impeller Size (in)	GPM	Pump Head (ft H20)	Electrical	Pump HP	Bell & Gossett Model #	Comments
P-1	Base-Mounted	1150	9.25	440	75	208/3/60	15	1510-3BC	Provide with Vendor-Supplied VFD
P-2	Base-Mounted	1150	9.25	440	75	208/3/60	15	1510-3BC	Provide with Vendor-Supplied VFD
P-3	In-Line	1750	7	50	50	208/3/60	1.5	80-1.5x1.5x7B	
P-B1	In-Line	1150	6	253	12	208/3/60	1.5	80-5x5x7	
P-B2	In-Line	1150	6	253	12	208/3/60	1.5	80-5x5x7	
P-FP2	In-Line Freeze Protection	3300	-	28	12	120/1/60	0.17	PL-36	
P-FP3	In-Line Freeze Protection	2650	-	5	12	120/1/60	0.08	PL-30	
P-FP4	In-Line Freeze Protection	3200	-	43	12	120/1/60	0.4	PL-130	
P-FP5	In-Line Freeze Protection	3200	-	61	12	120/1/60	0.4	PL-130	
P-FPD1	In-Line Freeze Protection	3300	-	32	10	120/1/60	0.17	PL-36	
P-FPM1	In-Line Freeze Protection	3300	-	35	12	120/1/60	0.17	PL-45	
P-FPR1	In-Line Freeze Protection	2650	-	18	10	120/1/60	0.08	PL-30	

1

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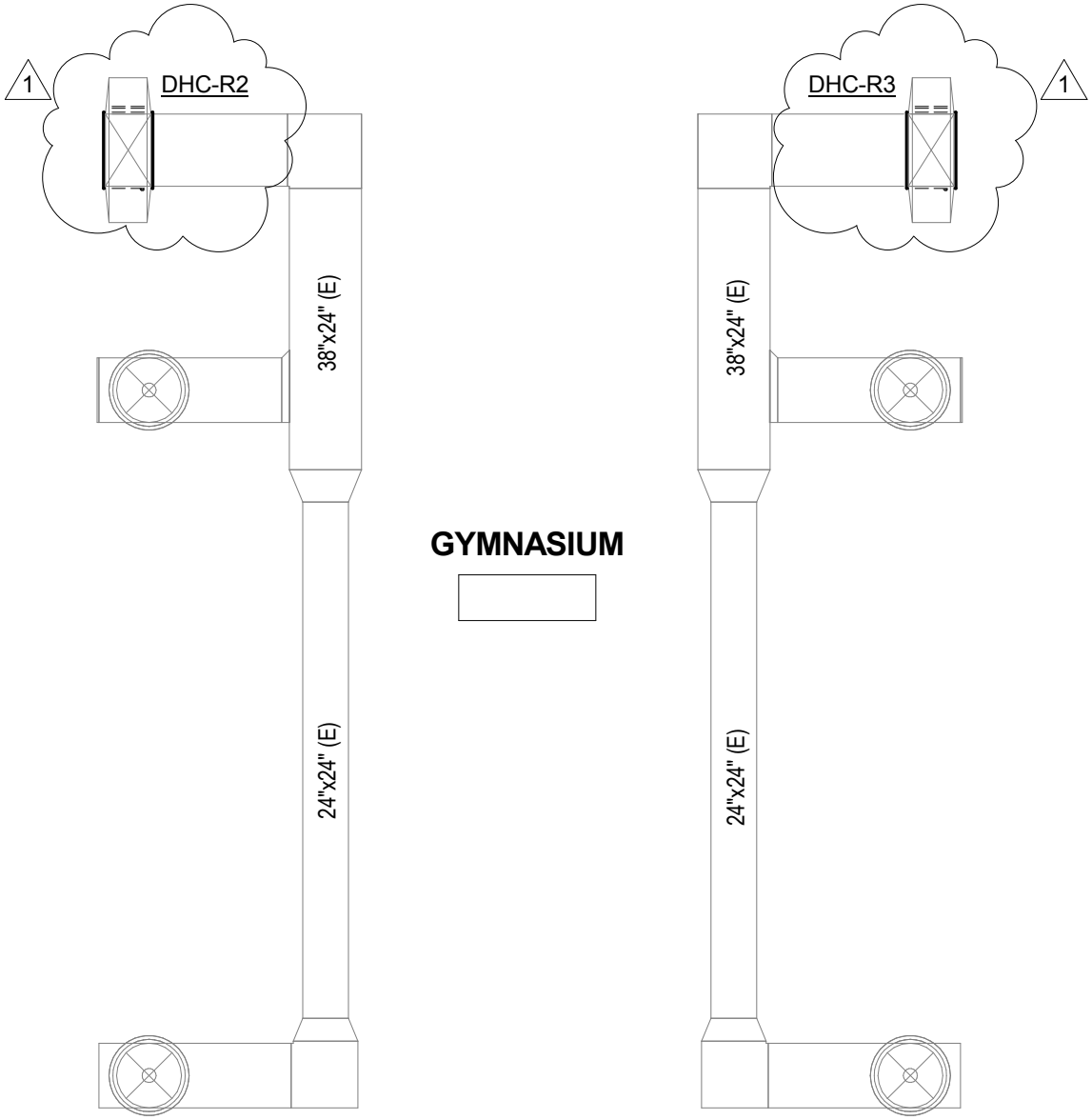
ADDENDUM #1

Project number	14036	SK-M.8
Date	MAY 1, 2015	
Drawn by	DLS	
Checked by	BMZ	Scale

5/8/2015 9:16:16 AM



1
SK-M.9

PARTIAL SECOND FLOOR MECHANICAL PLAN

1/8" = 1'-0"

1 ADDENDUM #1

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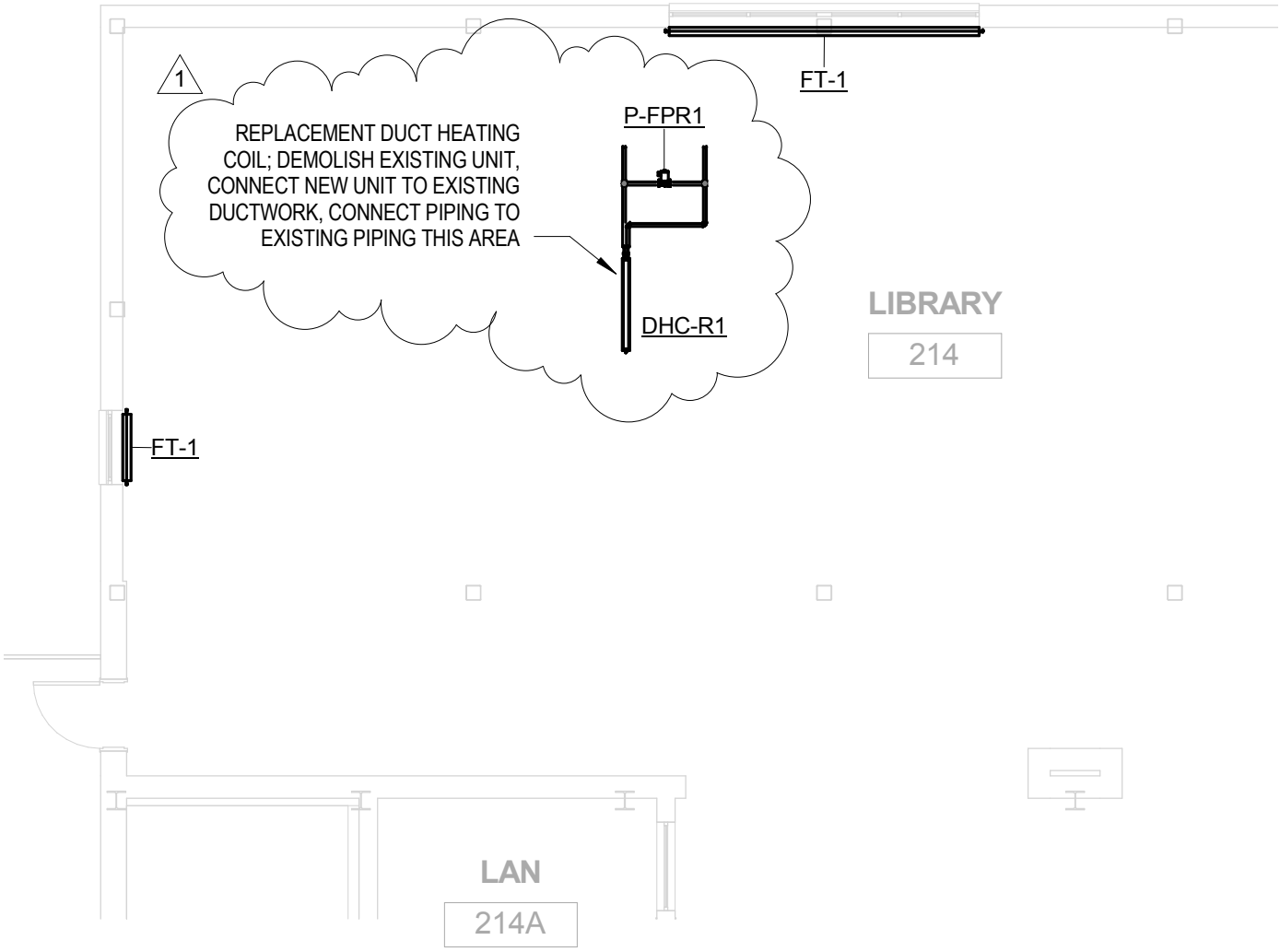
RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School
HVAC RENOVATION
3130 KENNETT PIKE
WILMINGTON, DELAWARE 19807

05/07/15 DATE
M8.18 SHEET NO.
14036 PROJECT NO.
SK-M.9



1
SK-M.10

FIRST FLOOR HYDRONIC PLAN - SK-M.10

1/8" = 1'-0"

05/07/15 DATE	M8.23 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com
14036 PROJECT NO.	SK-M.10		

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1 ADDENDUM #1

Pump Schedule									
Mark	Pump Type	Rated Speed (RPM)	Impeller Size (in)	GPM	Pump Head (ft H20)	Electrical	Pump HP	Bell & Gossett Model #	Comments
P-1	Base-Mounted	1150	9.25	440	75	208/3/60	15	1510-3BC	Provide with Vendor-Supplied VFD
P-2	Base-Mounted	1150	9.25	440	75	208/3/60	15	1510-3BC	Provide with Vendor-Supplied VFD
P-3	In-Line	1750	7	50	50	208/3/60	1.5	80-1.5x1.5x7B	
P-B1	In-Line	1150	6	253	12	208/3/60	1.5	80-5x5x7	
P-B2	In-Line	1150	6	253	12	208/3/60	1.5	80-5x5x7	
P-FP2	In-Line Freeze Protection	3300	-	28	12	120/1/60	0.17	PL-36	
P-FP3	In-Line Freeze Protection	2650	-	5	12	120/1/60	0.08	PL-30	
P-FP4	In-Line Freeze Protection	3200	-	43	12	120/1/60	0.4	PL-130	
P-FP5	In-Line Freeze Protection	3200	-	61	12	120/1/60	0.4	PL-130	
P-FPD1	In-Line Freeze Protection	3300	-	32	10	120/1/60	0.17	PL-36	
P-FPM1	In-Line Freeze Protection	3300	-	35	12	120/1/60	0.17	PL-45	
P-FPR1	In-Line Freeze Protection	2650	-	18	10	120/1/60	0.08	PL-30	

1

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RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-M.11
Date	MAY 1, 2015	
Drawn by	DLS	
Checked by	BMZ	Scale

5/8/2015 9:19:12 AM

Duct Heating Coil Schedule

Mark	Airflow (CFM)	E.A.T. (deg. F)	L.A.T. (deg. F)	Heating Capacity (MBh)	A.P.D. (in-wg)	E.W.T. (deg. F)	L.W.T. (deg. F)	Water Flow Rate (GPM)	W.P.D. (ft H20)	Fin Height (in)	Fin Length (in)	Manufacturer	Model	Comments
DHC-1	21,750	40.0	60.0	493	0.50	130.0	100.0	32.0	1.3	54.0	58.0	Daikin	5MH0802B	
DHC-R1	4,000	59.0	100.0	177	0.40	120.0	100.0	18.0	6.2	24.0	48.0	Daikin	5WH1004B	
DHC-R2	5,660	56.0	95.0	240	0.50	120.0	100.0	25.0	10.0	33.0	48.0	Daikin	5WH1204B	Working Fluid is 40% Propylene Glycol
DHC-R3	5,660	56.0	95.0	240	0.50	120.0	100.0	25.0	10.0	33.0	48.0	Daikin	5WH1204B	Working Fluid is 40% Propylene Glycol

PROVIDE UNIT(S) AS SCHEDULED OR APPROVED EQUAL. PROVIDE DHC-1, DHC-R1 WITH TYPICAL 2-WAY CONTROL VALVE WITH FREEZE PROTECTION PUMP DETAIL; PROVIDE DHC-R2, DHC-R3 WITH TYPICAL 3-WAY CONTROL VALVE DETAIL.

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RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School

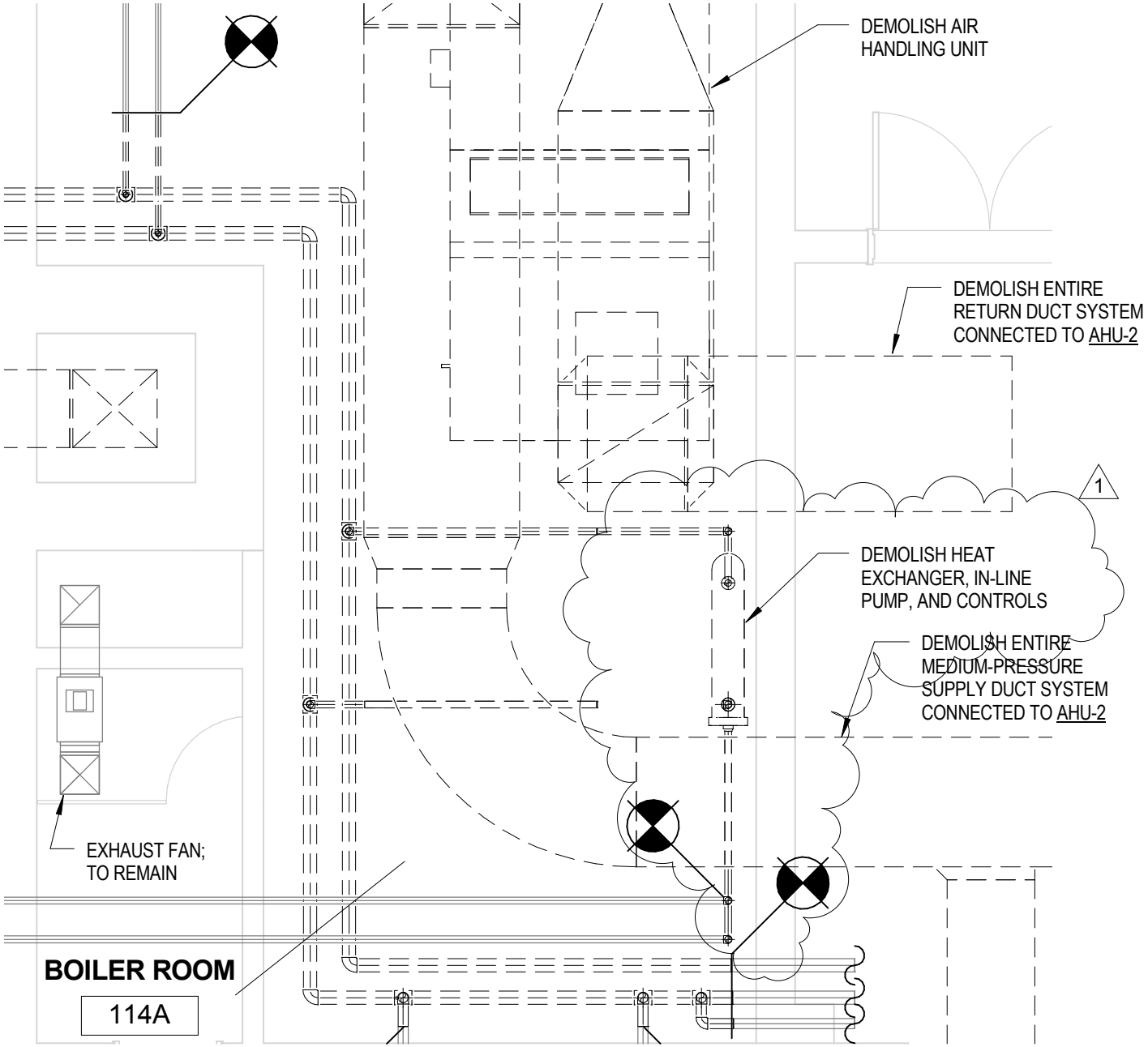
ADDENDUM #1

Project number	14036
Date	MAY 1, 2015
Drawn by	DLS
Checked by	BMZ

SK-M.12

Scale

5/8/2015 9:21:42 AM



1
SK-M.13

PARTIAL BOILER ROOM DEMOLITION PLAN

1/4" = 1'-0"

1 ADDENDUM #1

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Website: www.StudioJAED.com
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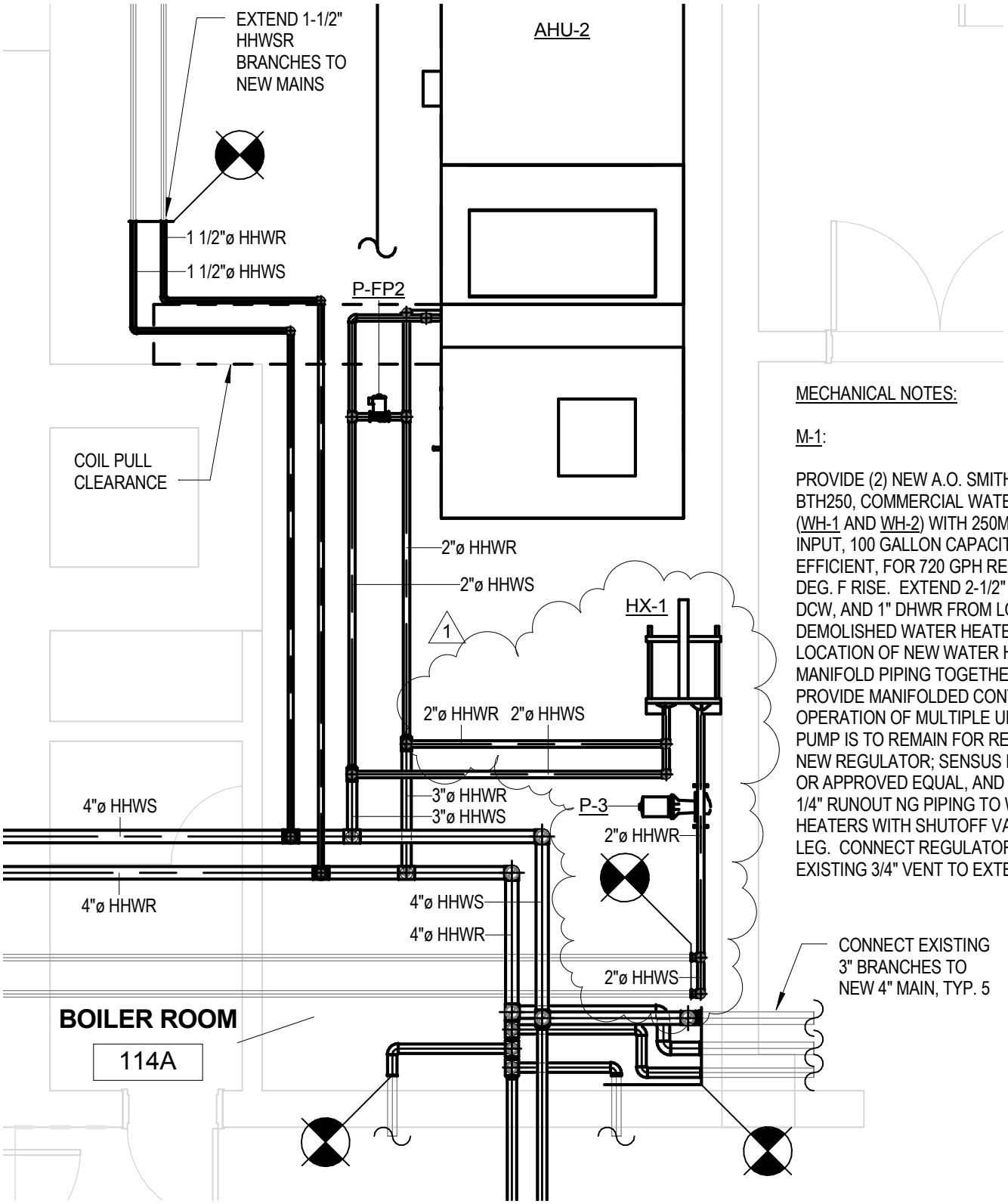
RED CLAY CONSOLIDATED SCHOOL DISTRICT
A. I. DuPont Middle School
HVAC RENOVATION
3130 KENNETT PIKE
WILMINGTON, DELAWARE 19807

05/07/15 DATE
M8.27 SHEET NO.
14036 PROJECT NO.
SK-M.13



MECHANICAL NOTES:

M-1:

PROVIDE (2) NEW A.O. SMITH CYCLONE BTH250, COMMERCIAL WATER HEATERS (WH-1 AND WH-2) WITH 250MBH NAT. GAS INPUT, 100 GALLON CAPACITY, 95% EFFICIENT, FOR 720 GPH RECOVERY @ 40 DEG. F RISE. EXTEND 2-1/2" DHW, 2-1/2" DCW, AND 1" DHWR FROM LOCATION OF DEMOLISHED WATER HEATER TO LOCATION OF NEW WATER HEATERS. MANIFOLD PIPING TOGETHER AND PROVIDE MANIFOLDED CONTROLS FOR OPERATION OF MULTIPLE UNITS. DHWR PUMP IS TO REMAIN FOR REUSE. PROVIDE NEW REGULATOR; SENSUS MODEL 121 OR APPROVED EQUAL, AND PROVIDE 1-1/4" RUNOUT NG PIPING TO WATER HEATERS WITH SHUTOFF VALVE AND DRIP LEG. CONNECT REGULATOR VENT TO EXISTING 3/4" VENT TO EXTERIOR.

CONNECT EXISTING 3" BRANCHES TO NEW 4" MAIN, TYP. 5

1

SK-M.14

PARTIAL BOILER ROOM HYDRONIC PLAN

1/4" = 1'-0"

05/07/15 DATE	M8.27 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com
14036 PROJECT NO.	SK-M.14		

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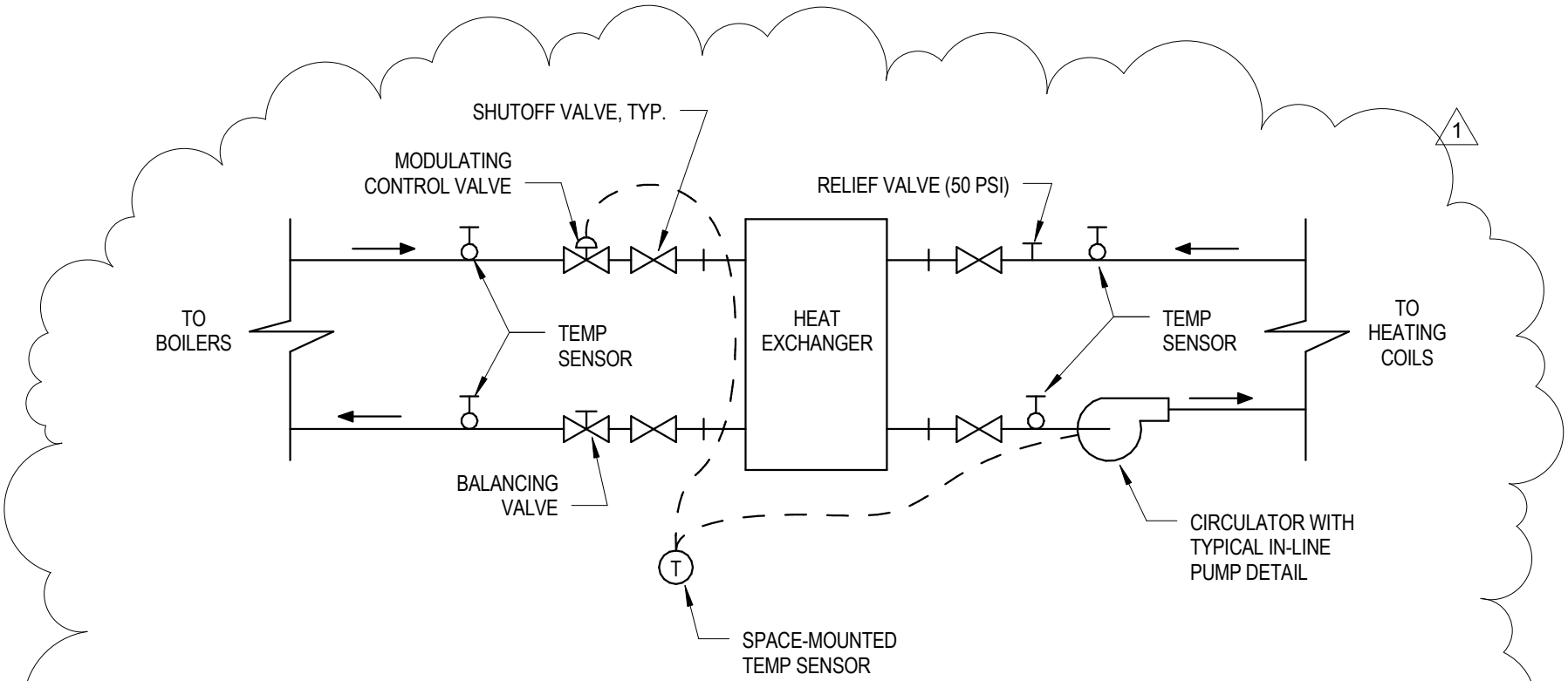
1 ADDENDUM #1



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SK-M.15

TYPICAL HX PIPING SCHEMATIC

NTS

1 ADDENDUM #1

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Website: www.StudioJAED.com
E-Mail: info@StudioJAED.com

RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School
HVAC RENOVATION
3130 KENNETT PIKE
WILMINGTON, DELAWARE 19807

05/07/15 DATE

M8.27 SHEET NO.

14036 PROJECT NO.

SK-M.15

1

Gasketed Plate Heat Exchanger Schedule

Mark	Source E.W.T. (deg. F)	Source L.W.T. (deg. F)	Source Flow (GPM)	Source P.D. (ft-H20)	Sink E.W.T. (deg. F)	Sink L.W.T. (deg. F)	Sink Flow (GPM)	Sink P.D. (ft-H20)	Manufacturer	Model	Operating Weight (lbs)	Comments
HX-1	130.0	110.0	46.5	20.0	100.0	120.0	50.0	20.0	Bell & Gossett	GPX	431	

PROVIDE UNIT(S) AS SCHEDULED OR APPROVED EQUAL. PROVIDE UNIT(S) WITH TYPICAL HEAT EXCHANGER DETAIL. PROVIDE PAINTED STEEL ANGLE FRAME, HARDWARE, AND MOUNT UNIT TO WALL WHERE INDICATED. SOURCE FLUID IS TO BE PURE WATER; SINK FLUID IS TO BE 40% PROPYLENE GLYCOL SOLUTION.

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RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-M.16
Date	MAY 1, 2015	
Drawn by	DLS	
Checked by	BMZ	Scale

5/8/2015 9:25:38 AM

Pump Schedule									
Mark	Pump Type	Rated Speed (RPM)	Impeller Size (in)	GPM	Pump Head (ft H20)	Electrical	Pump HP	Bell & Gossett Model #	Comments
P-1	Base-Mounted	1150	9.25	440	75	208/3/60	15	1510-3BC	Provide with Vendor-Supplied VFD
P-2	Base-Mounted	1150	9.25	440	75	208/3/60	15	1510-3BC	Provide with Vendor-Supplied VFD
P-3	In-Line	1750	7	50	50	208/3/60	1.5	80-1.5x1.5x7B	
P-B1	In-Line	1150	6	253	12	208/3/60	1.5	80-5x5x7	
P-B2	In-Line	1150	6	253	12	208/3/60	1.5	80-5x5x7	
P-FP2	In-Line Freeze Protection	3300	-	28	12	120/1/60	0.17	PL-36	
P-FP3	In-Line Freeze Protection	2650	-	5	12	120/1/60	0.08	PL-30	
P-FP4	In-Line Freeze Protection	3200	-	43	12	120/1/60	0.4	PL-130	
P-FP5	In-Line Freeze Protection	3200	-	61	12	120/1/60	0.4	PL-130	
P-FPD1	In-Line Freeze Protection	3300	-	32	10	120/1/60	0.17	PL-36	
P-FPM1	In-Line Freeze Protection	3300	-	35	12	120/1/60	0.17	PL-45	
P-FPR1	In-Line Freeze Protection	2650	-	18	10	120/1/60	0.08	PL-30	

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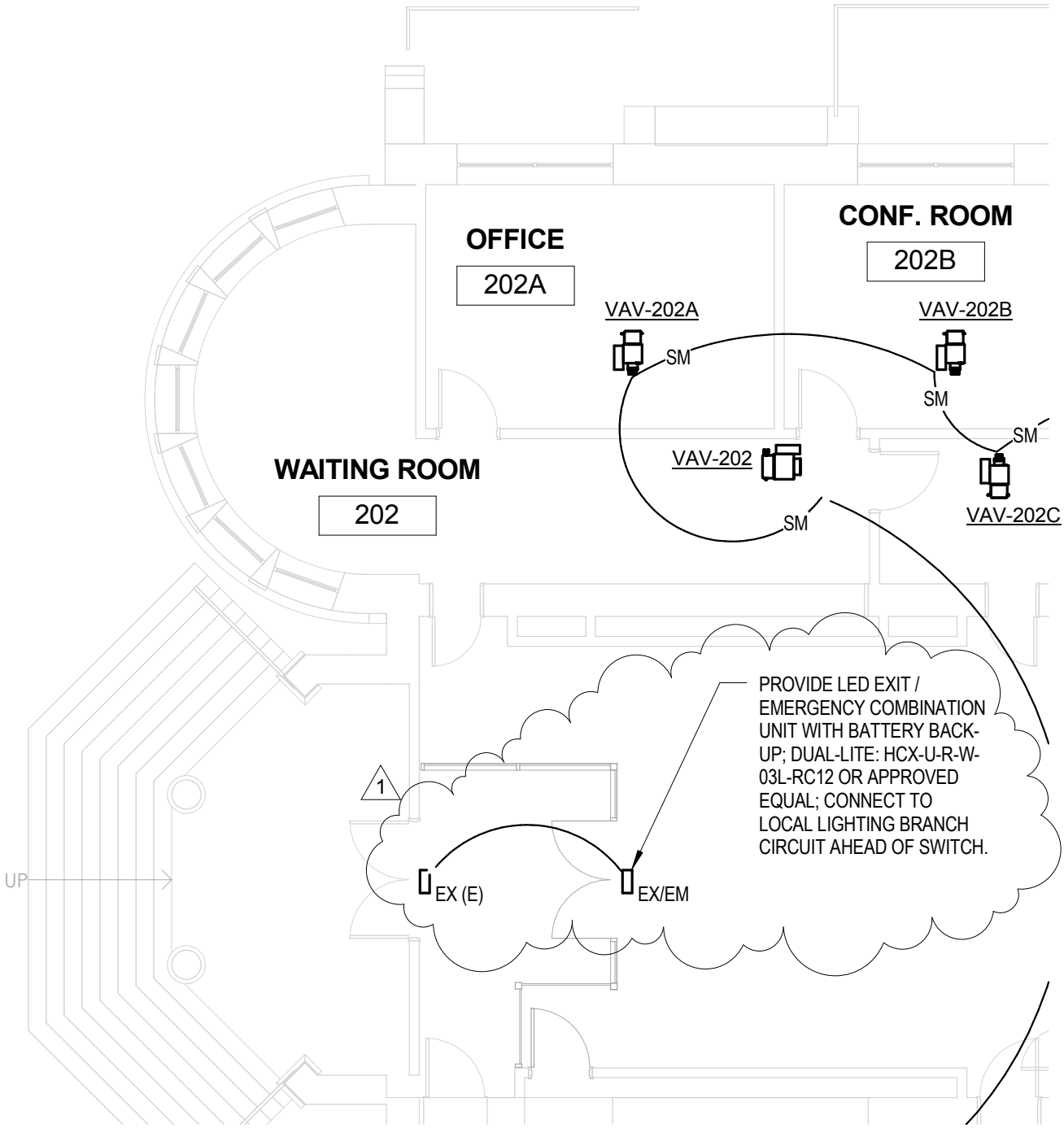
RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-M.17
Date	MAY 1, 2015	
Drawn by	DLS	
Checked by	BMZ	Scale

5/8/2015 9:25:59 AM



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SK-E.1

PARTIAL FIRST FLOOR ELECTRICAL PLAN

1/8" = 1'-0"

05/07/15 DATE	E9.12 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com	1 ADDENDUM #1
14036 PROJECT NO.	SK-E.1		The drawing is the property of StudioJAED and is not to be used for any purpose not specified at the location indicated. No other use is authorized or intended.	

Branch Panel: A

Location: BOILER RM
Supply From:
Mounting: RECESSED
Enclosure: NEMA 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 22,000
Mains Type: FULL
Mains Rating: 225 A, MLO
MCB Rating:
Manufacturer: --

CKT	Circuit Description	Wire Size	Trip	Poles	A	B	C	A	B	C	Poles	Trip	Wire Size	Circuit Description	CKT
1	PUMP P-1	6	70	3	5.54 kVA			5.54 kVA			3	70	6	PUMP P-2	2
3	--	6	--	--		5.54 kVA			5.54 KVA		--	--	6	--	4
5	--	6	--	--			5.54 kVA			5.54 KVA	--	--	6	--	6
7	PUMP PB-1	12	20	3	0.79 kVA			0.79 kVA			3	20	12	PUMP PB-2	8
9	--	12	--	--		0.79 kVA			0.79 KVA		--	--	12	--	10
11	--	12	--	--			0.79 kVA			0.79 KVA	--	--	12	--	12
13	BOILER B-1	12	20	3	1.44 kVA			1.44 kVA			3	20	12	BOILER B-2	14
15	--	12	--	--		1.44 kVA			1.44 kVA		--	--	12	--	16
17	--	12	--	--			1.44 kVA			1.44 kVA	--	--	12	--	18
19	INDUCTION DRAFT FAN	12	20	3	0.90 kVA			1.89 kVA			3	20	8	AIR HANDLING UNIT AHU-3	20
21	--	12	--	--		0.90 kVA			1.89 kVA		--	--	8	--	22
23	--	12	--	--			0.90 kVA			1.89 kVA	--	--	8	--	24
25	--	--	--	--	-- kVA			0.04 kVA			1	20	12	FREEZE PUMP PROTECTION	26
27	--	--	--	--		-- kVA			0.04 KVA		1	20	12	FREEZE PUMP PROTECTION	28
29	--	--	--	--			-- kVA			0.04 KVA	1	20	12	FREEZE PUMP PROTECTION	30
31	CABINET UNIT HEATER	12	20	1	0.25 kVA			0.05kVA			1	20	12	WATER HEATER	32
33	CONTROL XMFR SMOKE DAMPER	12	20	1		0.05 kVA			0.05 kVA		1	20	12	WATER HEATER	34
35	CONTROL XMFR SMOKE DAMPER	12	20	1			0.05 kVA			-- kVA	--	--	--	--	36
37	CONTROL XMFR SMOKE DAMPER	12	20	1	0.05 kVA			0.04 kVA			1	20	12	CABINET UNIT HEATER	38
39	CABINET UNIT HEATER	12	20	1		0.04 kVA			0.05 kVA		1	20	12	CONTROL TRANSFORMER FOR VAVS	40
41	CONTROL TRANSFORMER VAVS	12	20	1			0.05 kVA			0.05 kVA	1	20	12	CONTROL TRANSFORMER FOR VAVS	42
				Total Load:	-- kVA		-- kVA		-- kVA						
				Total Amps:	-- A		-- A		-- A						

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Notes:

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RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School

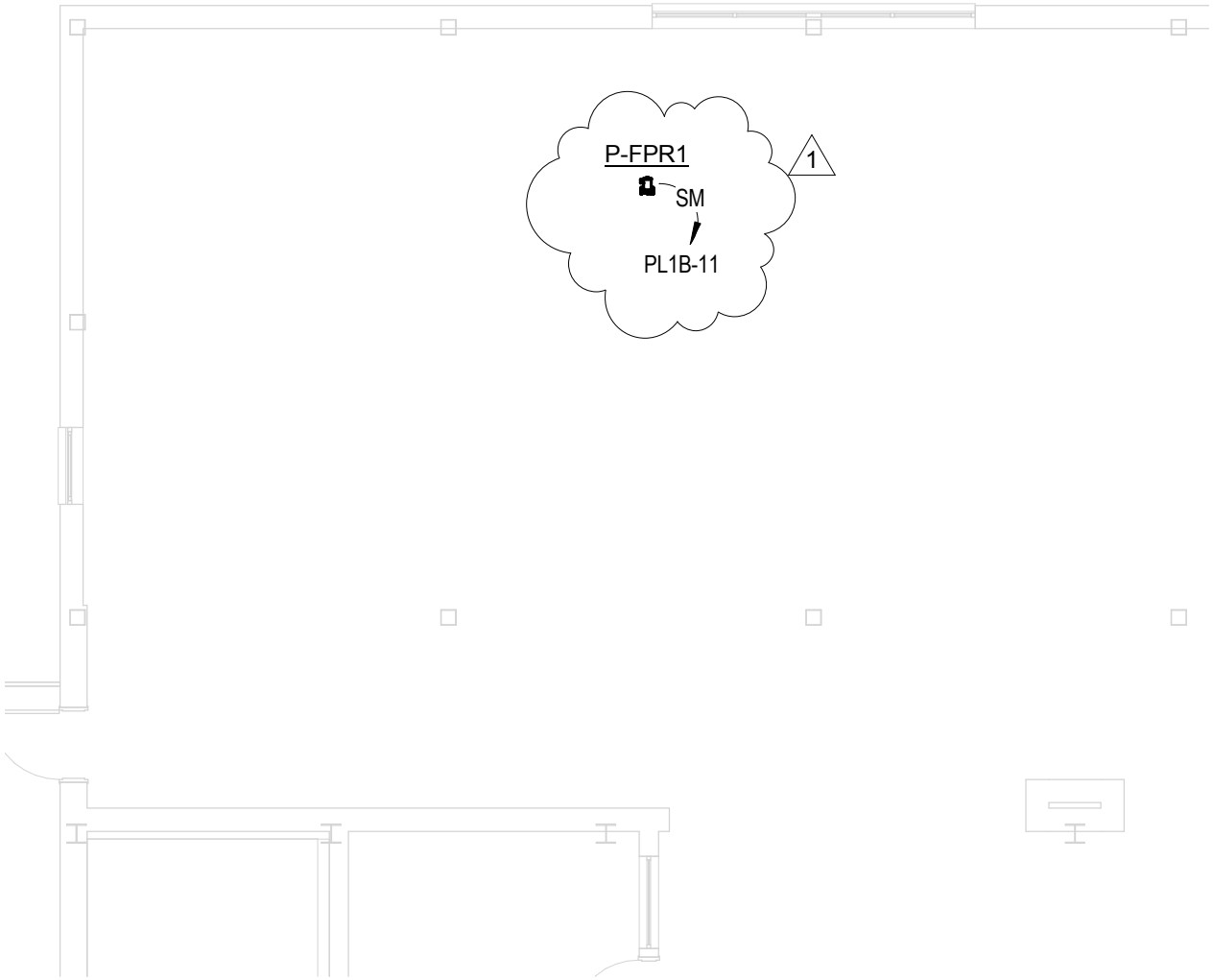
ADDENDUM #1

Project number	14036
Date	MAY 1, 2015
Drawn by	DLS
Checked by	PP

SK-E.2

Scale 12" = 1'-0"

5/8/2015 9:03:45 AM



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SK-E.3

PARTIAL FIRST FLOOR ELECTRICAL PLAN

1/8" = 1'-0"

05/07/15	E9.13	RED CLAY CONSOLIDATED SCHOOL DISTRICT	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS
DATE	SHEET NO.	A. I. DuPont Middle School	CORPORATE HEADQUARTERS 2500 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1652 F: (302) 832-1423
14036	SK-E.3	HVAC RENOVATION	Website: www.StudioJAED.com
PROJECT NO.		3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	E-Mail: info@StudioJAED.com

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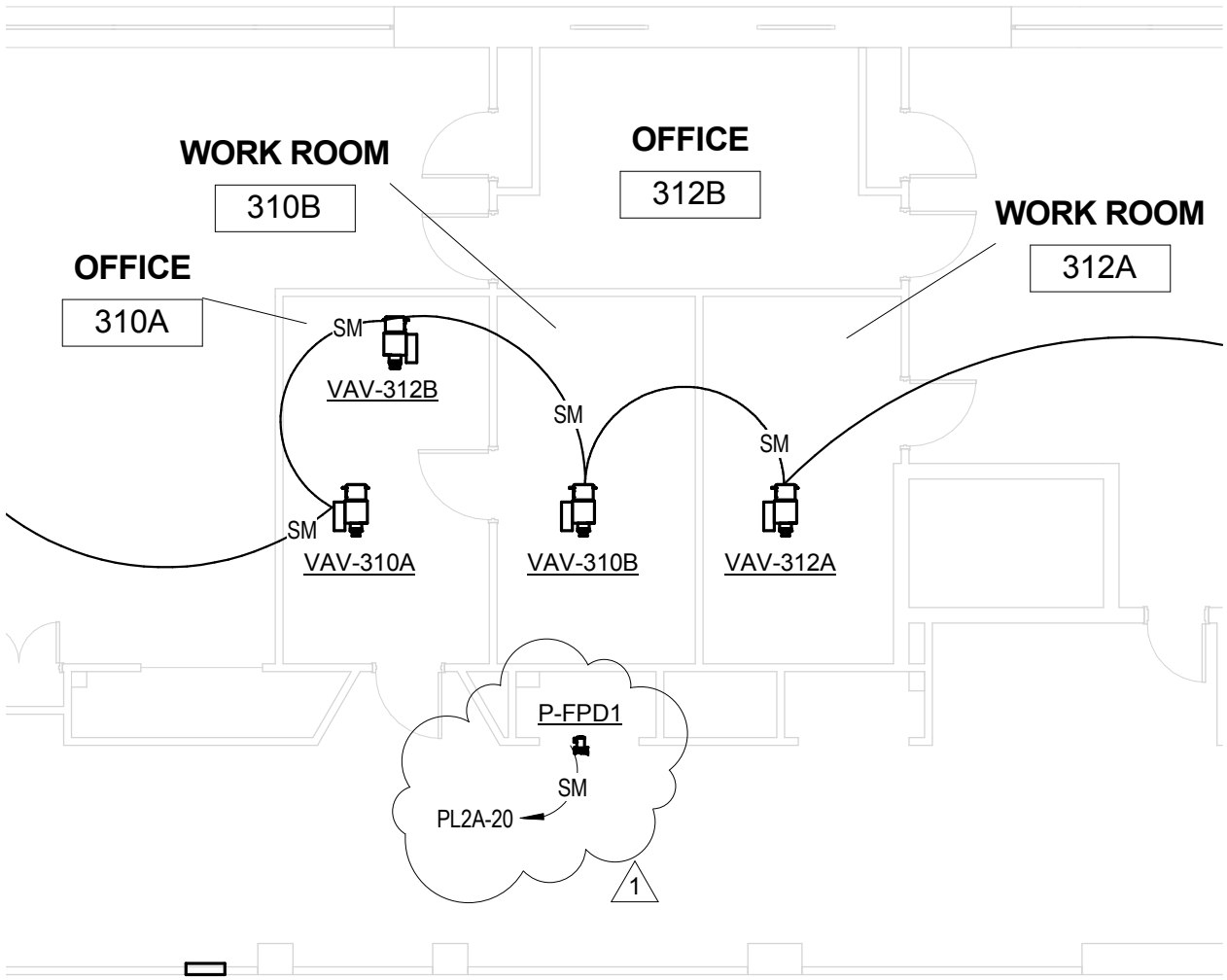
1 ADDENDUM #1



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SK-E.4

PARTIAL SECOND FLOOR ELECTRICAL PLAN

1/8" = 1'-0"

1 ADDENDUM #1

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CORPORATE HEADQUARTERS
2600 VERANDLE HILL ROAD, STE. 110
BRIDGEVILLE, DE 19711
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Website: www.StudioJAED.com
E-Mail: info@StudioJAED.com

RED CLAY CONSOLIDATED SCHOOL DISTRICT
A. I. DuPont Middle School
HVAC RENOVATION
3130 KENNETT PIKE
WILMINGTON, DELAWARE 19807

05/07/15	DATE
E9.14	SHEET NO.
14036	PROJECT NO.
SK-E.4	

Branch Panel: PL2A

Location: CORRIDOR 2ND FLR
Supply From:
Mounting: RECESSED
Enclosure: NEMA 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 14,000
Mains Type: FULL
Mains Rating: 225 A, MLO
MCB Rating:
Manufacturer: --

CKT	Circuit Description	Wire Size	Trip	Poles	A	B	C	A	B	C	Poles	Trip	Wire Size	Circuit Description	CKT
1	CONTROL XMFR FOR VAVS	12	20	1	0.50 kVA			0.04 kVA			20	1	12	CABINET UNIT HEATER - CUH-3	2
3	CONTROL XMFR FOR VAVS	12	20	1		0.50 kVA			0.04 KVA		20	1	12	CABINET UNIT HEATER - CUH-3	4
5	UNIT VENTILATOR UV - 2	12	15	3			1.04 kVA			0.04 KVA	20	1	12	CABINET UNIT HEATER - CUH-3	6
7	--	12	--	--	1.04 kVA			0.04 KVA			20	1	12	CABINET UNIT HEATER - CUH-1	8
9	--	12	--	--		1.04 kVA			0.04 KVA		20	1	12	CABINET UNIT HEATER - CUH-1	10
11	UNIT VENTILATOR RM 316	8	35	3			3.12 kVA			3.12 kVA	35	3	8	UNIT VENTILATOR RM. 316	12
13	--	8	--	--	3.12 kVA			3.12 kVA			--	--	8	--	14
15	--	8	--	--		3.12 kVA			3.12 kVA		--	--	8	--	16
17	EXHAUST FAN EF-2	12	20	1			.0.50 kVA			0.40 kVA	20	1	12	FREEZE PRETECTION PUMP	18
19	CONTROL XFMR SOME DAMPERS	12	20	1	0.05 kVA			0.40 kVA			20	1	12	FREEZE PROTECTION PUMP	20
21	CONTROL XFMR SOME DAMPERS	12	20	1		0.05 kVA			-- kVA		--	--	--	--	22
23	--	--	--	--			-- kVA			-- kVA	--	--	--	--	24
25	--	--	--	--	-- kVA			-- kVA			--	--	--	--	26
27	--	--	--	--		-- kVA			-- kVA		--	--	--	--	28
29	--	--	--	--			-- kVA			-- kVA	--	--	--	--	30
31	--	--	--	--	-- kVA			-- kVA			--	--	--	--	32
33	--	--	--	--		-- kVA			-- kVA		--	--	--	--	34
35	--	--	--	--			-- kVA			-- kVA	--	--	--	--	36
37	--	--	--	--	-- kVA			-- kVA			--	--	--	--	38
39	--	--	--	--		-- kVA			-- kVA		--	--	--	--	40
41	--	--	--	--			-- kVA			-- kVA	--	--	--	--	42
				Total Load:	-- kVA		-- kVA		-- kVA						
				Total Amps:	-- A		-- A		-- A						

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Notes:

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RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-E.5
Date	MAY 1, 2015	
Drawn by	DLS	
Checked by	PP	Scale 12" = 1'-0"

5/8/2015 9:05:19 AM

Branch Panel: PL1B

LOCATION: CORRIDOR 1ST FLR
Supply From:
Mounting: RECESSED
Enclosure: NEMA 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 14,000
Mains Type: FULL
Mains Rating: 225 A
MCB Rating:
Manufacturer: --

CKT	Circuit Description	Wire Size	Trip	Poles	A	B	C	A	B	C	Poles	Trip	Wire Size	Circuit Description	CKT
1	CONTROL XFMR FOR VAVS	12	20	1	0.05 kVA			0.04 kVA			1	20	12	CABINET UNIT HEATER	2
3	FREEZE PROTECTION PUMP	12	20	1		0.15 kVA			0.04 kVA		1	20	12	CABINET UNIT HEATER	4
5	MAU-1	8	25	3			2.00 kVA			0.04 kVA	1	20	12	CABINET UNIT HEATER	6
7	--	8	--	--	2.00 kVA			0.05 kVA			1	20	12	CONTROL XMFR SMOKE DAMPER	8
9	--	8	--	--		2.00 kVA			0.05 kVA		1	20	12	CONTROL XMFR SMOKE DAMPER	10
11	FREEZE PROTECTION PUMP	12	20	1			0.15 kVA			-- kVA	--	--	--	--	12
13	--	--	--	--	-- kVA			-- kVA			--	--	--	--	14
15	--	--	--	--		-- kVA			-- kVA		--	--	--	--	16
17	--	--	--	--			-- kVA			-- kVA	--	--	--	--	18
19	--	--	--	--	-- kVA			-- kVA			--	--	--	--	20
21	--	--	--	--		-- kVA			-- kVA		--	--	--	--	22
23	--	--	--	--			-- kVA			-- kVA	--	--	--	--	24
25	--	--	--	--	-- kVA			-- kVA			--	--	--	--	26
27	--	--	--	--		-- kVA			-- kVA		--	--	--	--	28
29	--	--	--	--			-- kVA			-- kVA	--	--	--	--	30
31	--	--	--	--	-- kVA			-- kVA			--	--	--	--	32
33	--	--	--	--		-- kVA			-- kVA		--	--	--	--	34
35	--	--	--	--			-- kVA			-- kVA	--	--	--	--	36
37	--	--	--	--	-- kVA			-- kVA			--	--	--	--	38
39	--	--	--	--		-- kVA			-- kVA		--	--	--	--	40
41	--	--	--	--			-- kVA			-- kVA	--	--	--	--	42
				Total Load:	-- kVA		-- kVA		-- kVA						
				Total Amps:	-- A		-- A		-- A						

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Notes:

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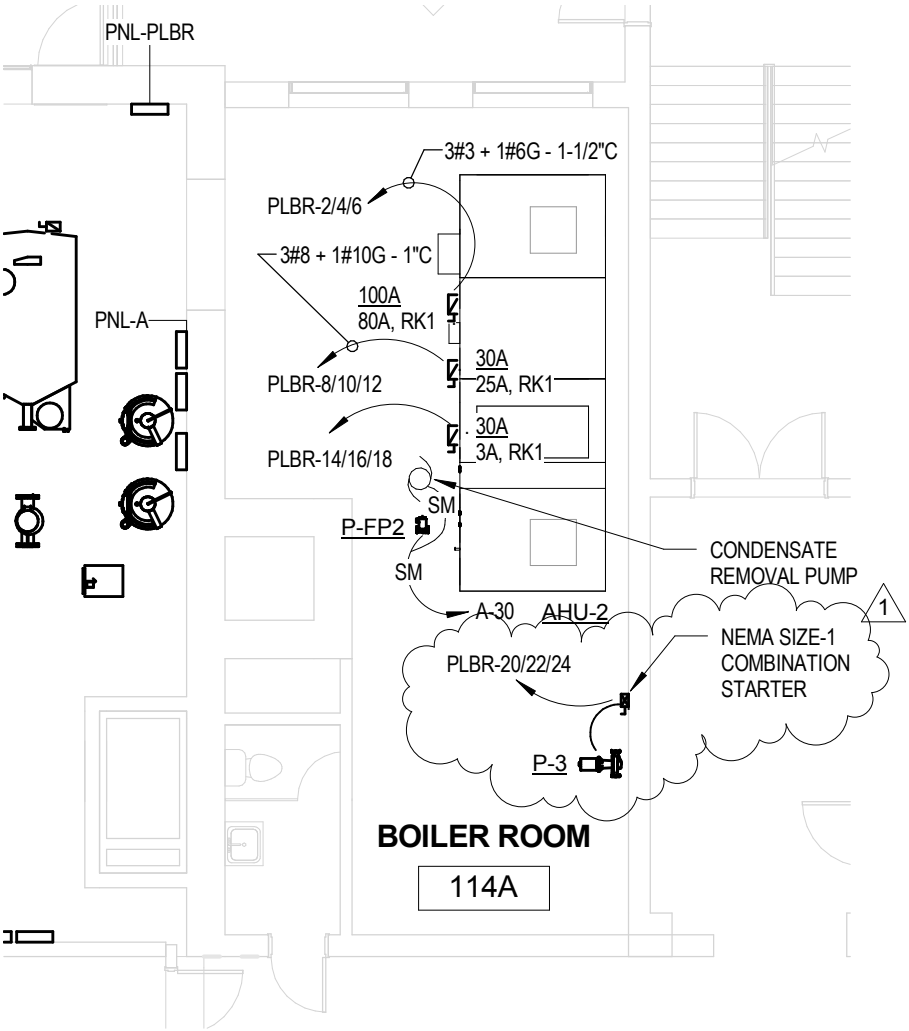
RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School

ADDENDUM #1

Project number	14036	SK-E.6
Date	MAY 1, 2015	
Drawn by	DLS	
Checked by	PP	Scale 12" = 1'-0"

5/8/2015 9:05:42 AM



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SK-E.7

PARTIAL LOWER LEVEL ELECTRICAL PLAN

1/8" = 1'-0"

05/08/15 DATE	E9.11 SHEET NO.	RED CLAY CONSOLIDATED SCHOOL DISTRICT A. I. DuPont Middle School HVAC RENOVATION 3130 KENNETT PIKE WILMINGTON, DELAWARE 19807	STUDIO JAED ARCHITECTS ■ ENGINEERS ■ FACILITIES SOLUTIONS CORPORATE HEADQUARTERS 2920 WRANGLE HILL ROAD, STE. 110 BEAR, DE 19701 P: (302) 832-1852 F: (302) 832-1423 Website: www.StudioJAED.com E-Mail: info@StudioJAED.com	1 ADDENDUM #1
14036 PROJECT NO.	SK-E.7			

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Branch Panel: PLBR

Location: BOILER ROOM
Supply From:
Mounting: SURFACE
Enclosure: NEMA 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 14,000
Mains Type: FULL
Mains Rating: 400 A,
MCB Rating: MLO
Manufacturer: --

CKT	Circuit Description	Wire Size	Trip	Poles	A	B	C	A	B	C	Poles	Trip	Wire Size	Circuit Description	CKT
1	AHU - 2 SUPPLY FANS	1	125	3	8.55 kVA			5.93 kVA			3	80	3	AHU - 4 SUPPLY FANS	2
3	--	1	--	--		8.55 kVA			5.93 kVA		--	--	3	--	4
5	--	1	--	--			8.55 kVA			5.93 kVA	--	--	3	--	6
7	AHU - 2 EXHAUST FANS	8	35	3	2.35 kVA			1.78 kVA			3	25	8	AHU - 4 SUPPLY FANS	8
9	--	8	--	--		2.35 KVA			1.78 kVA		--	--	8	--	10
11	--	8	--	--			2.35 KVA			1.78 kVA	--	--	8	--	12
13	AHU - 2 ENERGY WHEEL	12	20	3	0.16 kVA			0.16 kVA			3	20	12	AHU - 4 SUPPLY FANS	14
15	--	12	--	--		0.16 kVA			0.16 kVA		--	--	12	--	16
17	--	12	--	--			0.16 kVA			0.16 kVA	--	--	12	--	18
19	CONDENSING UNIT CU-3	8	20	3	5.00 kVA			0.9 kVA			3	20	12	PUMP P-3	20
21	--	8	--	--		5.00 kVA			0.9 kVA		--	--	12	--	22
23	--	8	--	--			5.00 kVA			0.9 kVA	--	--	12	--	24
25	--	--	--	--	-- kVA			-- kVA			--	--	--	--	26
27	--	--	--	--		-- kVA			-- kVA		--	--	--	--	28
29	--	--	--	--			-- kVA			-- kVA	--	--	--	--	30
31	--	--	--	--	-- kVA			-- kVA			--	--	--	--	32
33	--	--	--	--		-- kVA			-- kVA		--	--	--	--	34
35	EXHAUST FAN (EF) CORRIDOR 1	12	20	1			0.12 kVA			-- kVA	--	--	--	--	36
37	CABINET UNIT HEATER	12	20	1	0.04 kVA			-- kVA			--	--	--	--	38
39	CABINET UNIT HEATER	12	20	1		0.04 kVA			-- kVA		--	--	--	--	40
41	AHU-2 CONTROLS	12	20	1			0.04 kVA			-- kVA	--	--	--	--	42
				Total Load:	-- kVA		-- kVA		-- kVA						
				Total Amps:	-- A		-- A		-- A						

1

Notes:

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RED CLAY CONSOLIDATED SCHOOL DISTRICT

A. I. DuPont Middle School

ADDENDUM #1

Project number	14036
Date	MAY 1, 2015
Drawn by	DLS
Checked by	PP

SK-E.8

Scale 12" = 1'-0"

5/8/2015 10:14:26 AM

SECTION 08 71 00

DOOR HARDWARE

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 the following:

1. Commercial door hardware for the following:

   a. Swinging doors.
   b. Folding doors.
   c. Other doors to the extent indicated.

B. Related Sections include the following:

1. Division 8 Section "Steel Doors and Frames"
2. Division 8 Section "Flush Wood Doors"
3. Division 8 Section "Aluminum Entrances and Storefronts"

1.3 SUBMITTALS

A. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Include the following:

   a. System schematic.
   b. Point-to-point wiring diagram.
   c. Riser diagram.
   d. Elevation of each door.

2. Detail interface between electrified door hardware and access fire alarm, control, and security building control system.

C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of door hardware indicated.

1. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.

D. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.

   a. Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.

3. Content: Include the following information:

   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   e. Explanation of abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for door hardware.
   g. Door and frame sizes and materials.
   h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

      1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
5. Submittal Sequence: Submit initial draft of final schedule along with essential Product Data to facilitate the fabrication of other work that is critical in the Project construction schedule. Submit the final Door Hardware Schedule after Samples, Product Data, coordination with Shop Drawings of other work, delivery schedules, and similar information has been completed and accepted.

E. Keying Schedule: Prepared by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

F. Product Certificates: Signed by manufacturers of electrified door hardware certifying that products furnished comply with requirements.

1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.

G. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

1. Include lists of completed projects with project names and addresses of architects and owners, and other information specified.

H. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, indicating current products comply with requirements.

I. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 1.

J. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

1. Electrified Door Hardware Supplier Qualifications: An experienced door hardware supplier who has completed projects with electrified door hardware similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.

a. Engineering Responsibility: Prepare data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

2. Scheduling Responsibility: Preparation of door hardware and keying schedules.

C. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

1. Electrified Door Hardware Qualifications: Experienced in providing consulting services for electrified door hardware installations.

D. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that are listed to perform electrical modifications, by a testing and inspecting agency acceptable to authorities having jurisdiction, are acceptable.

E. Regulatory Requirements: Comply with provisions of the following:

1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1, FED-STD-795, "Uniform Federal Accessibility Standards**,"** as follows:

a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
b. Door Closers: Comply with the following maximum opening-force requirements indicated:

1) Interior Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
2) Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
3) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

c. Thresholds: Not more than 1/2 inch (13 mm) high, Not more than 3/4 inch (19 mm) high for exterior sliding doors. Bevel raised thresholds with a slope of not more than 1:2.

2. NFPA 101: Comply with the following for means of egress doors:

a. Latches, Locks, and Exit Devices: Not more than 15 lbf (67 N) to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
b. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force not more than 15 lbf (67 N) for not more than 3 seconds.
c. Door Closers: Not more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.
d. Thresholds: Not more than 1/2 inch (13 mm) high.

3. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

F. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

1. Test Pressure: Test at atmospheric pressure.

G. Keying Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2. Preliminary key system schematic diagram.
3. Requirements for key control system.
4. Address for delivery of keys.

H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

I. All Electric Door Hardware shall be furnished and installed by the General Contractor. All Electric Door Hardware shall be wired by the Electrical Contractor. Both the Electrical & General Contractor shall meet and coordinate all work before proceeding.

J. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." Review methods and procedures related to electrified door hardware including, but not limited to, the following:

1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.

2. Review sequence of operation for each type of electrified door hardware.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review required testing, inspecting, and certifying procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item with Door Number related to the final Approved Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver keys to manufacturer of key control system, or Owner as Directed.

D. Deliver keys to Owner by registered mail or overnight package service.

1.6 COORDINATION

A. Coordinate layout and installation of recessed pivots and closers with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 3 Section "Cast-in-Place Concrete."

B. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system, and building control system.

1.7 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of operators and door hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

C. Warranty Period for Locksets: Three, (3) years from date of Substantial Completion, unless otherwise indicated.

D. Warranty Period for Manual Closers: Ten, (10) years from date of Substantial Completion, unless otherwise indicated.

E. Warranty Period for Exit Devices: Three, (3) years from date of Substantial Completion, unless otherwise indicated.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies as used in the manufacture and installation of original products.

C. Engage a factory authorized service representative to train Owner’s maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in this Section**,** door hardware sets indicated in door and frame schedule, and the Door Hardware Schedule at the end of Part 3.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturer's products**.** Retain subparagraph below for electrified door hardware.
2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Schedule at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

2.2 HINGES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Butt Hinges:
   a. Stanley Commercial Hardware

2. Continuous Hinges:

   a. Architectural Builders Hardware Mfg., Inc.

b. Stanley Commercial Hardware

B. Standards: Comply with the following:
1. Hinges ANSI/BHMA Standard A156.1 Grade 1
2. Continuous Hinges ANSI/BHMA Standard A156.26 Grade 1

C. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

D. Concealed bearings are made from engineered polymer material with PTFE and Aramid fiber; bearing is maintenance free, no oil, no grease.

E. Butt hinges equipped with easily seated, non-rising pin. Hole in bottom of pin enables quick pin removal for ease of installation.

F. Continuous hinge material to be 14 gauge, 304 stainless steel

G. Continuous hinge steel pin to be .25 diameter, 304 stainless steel

H. Continuous hinge exterior barrel diameter .438 (7/16)

I. Continuous hinge knuckle to be 2”, including split nylon bearing at each separation for a quiet, smooth, self-lubricating operation

J. All hinges to carry Warnock Hersey Int. or UL for fire rated doors and frames up to 3 hours

K. Continuous hinges to have Symmetrically templated hole pattern

L. Continuous hinge to have a 10 year Warranty

M. Hinge Weight: Unless otherwise indicated, provide the following:
1. Supports weights up to 600lbs.

N. Hinge Base Metal: Unless otherwise indicated, provide the following:

1. Exterior Continuous Hinges: Stainless steel, with stainless-steel pin,
2. Interior Continuous Hinges: Stainless steel, with stainless-steel pin.
3. Continuous Hinges for Fire-Rated Assemblies: Stainless steel, with stainless-steel pin.
4. Exterior Butt Hinges: Stainless Steel or Brass or Bronze
5. Interior Butt Hinges: Steel or Brass or Bronze

O. Hinge Options: Comply with the following where indicated in the Door Hardware Schedule or on Drawings:

1. Hospital Tips: Slope ends of hinge barrel.
2. Maximum Security Pin: Fix pin in hinge barrel after it is inserted.
3. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:

a. Outswinging exterior doors.
b. Outswinging corridor doors with locks.

P. Fasteners: Comply with the following:

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.

2. Wood Screws: For wood doors and frames.
3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
4. Screws: Phillips flat-head screws; machine screws drilled and tapped holes for metal doors, wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

2.3 LOCKS AND LATCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mechanical Locks and Latches:
   a. Schlage Lock Corporation, Red Clay School District Standard

B. Standards: Comply with the following:

1. Bored Locks and Latches: BHMA A156.2.

C. Bored Locks: ANSI A156.2, BHMA Series 4000, Grade 1, and is UL Listed.

D. Certified Products: Provide door hardware listed in the following BHMA directories:

1. Mechanical Locks and Latches: BHMA's "Directory of Certified Locks & Latches."

E. Lock Trim: Comply with the following:

1. Lever: Cylindrical Locks & Latches, Zinc material with a minimum wall thickness of .060
2. Dummy Trim: Match lever lock trim and escutcheons.

F. Lock Functions: Function numbers and descriptions indicated in the Door Hardware Schedule comply with the following:

1. Bored Locks: BHMA A156.2.

G. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:

1. Bored Locks: Minimum 9/16-inch latch bolt throw.
2. Deadbolts: Minimum 1-inch bolt throw.

H. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

I. Cylindrical Locks & Latches to have solid shank with no opening for access to keyed lever keeper.

2.4 DOOR BOLTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flush Bolts:
   a. Burns Manufacturing Company, Inc.
   b. Triangle Brass Manufacturing Company, Inc.

B. Standards: Comply with the following:

1. Automatic and Self-Latching Flush Bolts: BHMA A156.3.
2. Manual Flush Bolts: BHMA A156.16.

C. Flush Bolts: BHMA Grade 1, designed for mortising into door edge.

D. Bolt Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:

1. Mortise Flush Bolts: Minimum 3/4-inch (19-mm) throw.

2.5 EXIT DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Von Duprin, Inc., Red Clay School District Standard

B. Standard: BHMA A156.3.

1. BHMA Grade: Grade 1

C. Certified Products: Provide exit devices listed in BHMA's "Directory of Certified Exit Devices."

D. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

E. Fire Exit Devices: Complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

F. Warranty: Exit device to have published Five (5) Year Warranty.

G. Exit device shall be “touch pad” type with a touch pad that shall extend a minimum of one half (1/2) of the door width.

H. Exit device shall have a one-quarter (1/4) gap between the face of the door and the touch bar channel eliminating the need for shims or cutting away the glass molding.

I. Exit device lock stile chassis shall be investment cast steel. Stamped steel units will not be accepted. All device latch bolts shall be stainless steel and shall be deadlocking type.

J. Exit device strikes shall be adjustable type investment cast stainless steel.

K. Exit device shall include sound reduction dampening for both depression and extension of the touch pad.

L. Exit device end cap shall be all metal and secured with a bracket that interlocks both at the touch bar channel base and hinge side filler to prevent end cap “peel-back”.

M. All exposed surfaces of the exit device housing shall be no less than 14 gauge brass or bronze; or no less than 16 gauge stainless steel. Aluminum housing type exit devices are not acceptable.

N. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

1. Operation: Rigid

O. Outside Trim: Lever, Lever with cylinder, Pull, Pull with cylinder**,** material and finish to match locksets, unless otherwise indicated.

1. Match design for locksets and latchsets, unless otherwise indicated.

2.6 CYLINDERS AND KEYING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cylinders:
a. Schlage Lock Corporation, Red Clay School District Standard

B. Standards: Comply with the following:

1. Cylinders: BHMA A156.5.

C. Cylinder Grade: BHMA Grade 1**,** Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:

1. Number of Pins: Seven.
2. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
3. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
4. Bored-Lock Type: Cylinders with tailpieces to suit locks.

D. Keying System: Unless otherwise indicated, provide a factory-registered keying system complying with the following requirements:
1. Existing System: Master key or grand master key locks to Owner's existing system.

E. Keys: Provide nickel-silver keys complying with the following:

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

a. Notation: **"DO NOT DUPLICATE."**

2. Quantity: In addition to one extra blank key for each lock, provide the following:

a. Cylinder Change Keys: Three.
b. Master Keys: Five.
c. Grand Master Keys: Five.
d. Great-Grand Master Keys: Five.
e. Construction Master Keys: Ten
f. Construction Core Control Keys: Five

2.7 STRIKES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Electric Strikes:

a. Security Door Controls Inc.
b. Folger Adam Security Inc.

B. Standards: Comply with the following:

1. Strikes for Bored Locks and Latches: BHMA A156.2.
2. Strikes for Auxiliary Deadlocks: BHMA A156.5.

C. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latch bolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

2.8 OPERATING TRIM

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Burns Manufacturing Company, Inc.
2. Stanley Commercial Hardware

B. Standard: Comply with BHMA A156.6.

C. Materials: Fabricate from aluminum, brass, bronze, stainless steel, unless otherwise indicated.

2.9 ACCESSORIES FOR PAIRS OF DOORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Coordinators:
   a. Burns Manufacturing Company, Inc.
   b. Triangle Brass Manufacturing Company, Inc.

2. Removable Mullions:
   a. Von Duprin, Inc., Red Clay School District Standard

3. Astragals:
   a. Stanley Commercial Hardware
   b. Architectural Builders Hardware, Inc.

B. Standards: Comply with the following:

1. Coordinators: BHMA A156.3.
2. Removable Mullions: BHMA A156.3.

C. Fire-Exit Removable Mullions: Provide removable mullions for use with fire exit devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252. Mullions shall be used only with exit devices for which they have been tested.

2.10 CLOSERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Surface-Mounted Closers:
   a. LCN Door Closers, Red Clay School District Standard

B. Standards: Comply with the following:

1. Closers: BHMA A156.4.

C. Surface Closers: BHMA Grade 1

D. Certified Products: Provide door closers listed in BHMA's "Directory of Certified Door Closers."

E. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

2.11 PROTECTIVE TRIM UNITS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Metal Protective Trim Units:
   a. Burns Manufacturing Company, Inc.
   b. Triangle Brass Manufacturing Company, Inc.

B. Standard: Comply with BHMA A156.6.

C. Materials: Fabricate protection plates from the following:
   1. Stainless Steel: 0.050 inch (1.3 mm) thick; beveled 4 sides.

D. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine or self-tapping screws.

E. Furnish protection plates sized 2” less than door width on push side and 1” less than door width on pull side, by height specified in Door Hardware Schedule.

2.12 STOPS AND HOLDERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Architectural Builders Hardware Mfg., Inc.
2. Triangle Brass Manufacturing Company, Inc.

B. Standards: Comply with the following:

1. Stops and Bumpers: BHMA A156.16.
2. Mechanical Door Holders: BHMA A156.16.
3. Electromagnetic Door Holders: BHMA A156.15.
4. Combination Overhead Holders and Stops: BHMA A156.8.
5. Door Silencers: BHMA A156.16.

C. Stops and Bumpers: BHMA Grade 1

D. Mechanical Door Holders: BHMA Grade 1

E. Combination Overhead Stops and Holders: BHMA Grade 1

F. Electromagnetic Door Holders for Labeled Fire Door Assemblies: Coordinate with fire detectors and interface with fire alarm system.

G. Silencers for Metal Door Frames: BHMA Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame.

2.13 DOOR GASKETING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Door Gasketing:
   a. Reese Manufacturing Co., Inc.
   b. National Guard Products, Inc.

2. Door Bottoms:
   a. Reese Manufacturing Co., Inc.
   b. National Guard Products

B. Standard: Comply with BHMA A156.22.

C. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

D. Air Leakage: Not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.

E. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.

1. Provide smoke-labeled gasketing on 20-minute-rated doors and on smoke-labeled doors.

F. Fire-Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL 10B or NFPA 252.

G. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.

H. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

I. Gasketing Materials: Comply with ASTM D 2000 and AAMA 701/702.

2.14 THRESHOLDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Reese Manufacturing Co., Inc.
   2. National Guard Products, Inc.

B. Standard: Comply with BHMA A156.21.

2.15 FABRICATION

A. Manufacturer's Nameplate: Do not provide manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise approved by Architect.

   1. Manufacturer's identification will be permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

   1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
   2. Steel Machine or Wood Screws: For the following fire-rated applications:

      a. Mortise hinges to doors.
      b. Strike plates to frames.
      c. Closers to doors and frames.

   3. Steel Through Bolts: For the following fire-rated applications, unless door blocking is provided:

      a. Surface hinges to doors.
      b. Closers to doors and frames.
      c. Surface-mounted exit devices.

   4. Spacers or Sex Bolts: For through bolting of hollow metal doors.
   5. Fasteners for Wood Doors: Comply with requirements of DHI WDHS.2, "Recommended Fasteners for Wood Doors."

2.16 FINISHES

A. Standard: Comply with BHMA A156.18.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. BHMA Designations: Comply with base material and finish requirements indicated by the following:

1. BHMA 600: Primed for painting, over steel base metal.
2. BHMA 626: Satin chromium plated over nickel, over brass or bronze base metal.
3. BHMA 628: Satin aluminum, clear anodized, over aluminum base metal.
4. BHMA 630: Satin stainless steel, over stainless steel base metal.
5. BHMA 652: Satin chromium plated over nickel, over steel base metal.
6. BHMA 689: Aluminum painted, over any base metal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

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

3.2 PREPARATION

A. Steel Doors and Frames: Comply with DHI A115 series.

1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.

B. Wood Doors: Comply with DHI A115-W series.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Key Control System: Place keys on markers and hooks in key control system cabinet, as determined by final keying schedule. Supply key cabinet with 25% expansion. Factory install keys in cabinet or in field with owner's representative. Key cabinet to be supplied with a "Complete System" equal to the Telkee System.

D. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings, in equipment room. Verify location with Architect.

1. Configuration: Provide one power supply for each door opening.
2. Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.

E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

3.4 FIELD QUALITY CONTROL

A. Independent Architectural Hardware Consultant: Owner or Architect will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

B. Six-Month Adjustment: Approximately six months after date of Substantial Completion, Installer shall perform the following:

1. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
2. Consult with and instruct Owner's personnel on recommended maintenance procedures.
3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes.

3.8 DOOR HARDWARE SCHEDULE

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Hardware Set #: 0001   - SGL DRS FRP DRS & HMF EXTERIOR
D001    D111A    D114    D123    D214    DS8

  Opening to Have:

  Qty Description                                                Finish Mfg
    1 CONTINUOUS HINGE A500 x FULL HEIGHT                        630    ABH
    1 RIM CYLINDER (PRIMUS) 20-709                               626    SCHLAGE
    1 MORTISE CYLINDER (IC) 20-700 x XQ11-949                    626    SCHLAGE
    1 RIM EXIT DEVICE CD99NL-OP                                  626    VON DUPRIN
    1 VANDAL RESISTANT TRIM VR910-NL                             630    VON DUPRIN
    1 DOOR CLOSER 4111 x SPRING-H-CUSH                           689    LCN
    1 DOOR CONTACT MC-7 x SPDT x 1" DIA                                 SDC
    1 TEAR DROP SEAL 797B x HEAD & JAMBS                         BLK    REESE
    1 RAIN DRIP R201A x FULL WIDTH + 4"                          628    REESE
    1 THRESHOLD S483APR x SRS x FHSL x FULL WIDTH                628    REESE
    1 ADJUSTABLE DOOR BOTTOM SWEEP BY FRP DOOR SUPPLER (CONCEALED)


Hardware Set #: 0002   - PRS DRS FRP DRS & HMF EXTERIOR
D133V    D215    D220    D3A    DS3    DS4    DS7

  Opening to Have:

  Qty Description                                                Finish Mfg
    2 CONTINUOUS HINGE A500 x FULL HEIGHT                        630    ABH
    1 RIM CYLINDER (PRIMUS) 20-709                               626    SCHLAGE
    2 MORTISE CYLINDER (IC) 20-700 x XQ11-949                    626    SCHLAGE
    1 MORTISE CYLINDER (IC) 20-700                               626    SCHLAGE
    1 RIM EXIT DEVICE CD99EO                                     626    VON DUPRIN
    1 RIM EXIT DEVICE CD99NL-OP                                  626    VON DUPRIN
    1 REMOVABLE MULLION KR4954 x (2) 154 x SIZE AS REQ           689    VON DUPRIN
    1 MULLION WALL MOUNT KIT MT54                                689    VON DUPRIN
    1 VANDAL RESISTANT TRIM VR910-NL                             630    VON DUPRIN
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1	VANDAL RESISTANT TRIM VR910-DT	630	VON DUPRIN
2	DOOR CLOSER 4111 x SPRING-H-CUSH x SRI	689	LCN
2	DOOR CONTACT MC-7 x SPDT x 1" DIA		SDC
1	TEAR DROP SEAL 797B x HEAD & JAMBS	BLK	REESE
2	TEAR DROP SEAL 797B x MULLION x FULL HEIGHT	BLK	REESE
1	RAIN DRIP R201A x FULL WIDTH + 4"	628	REESE
1	THRESHOLD S483APR x SRS x FHSL x FULL WIDTH	628	REESE
2	ADJUSTABLE DOOR BOTTOM SWEEP BY FRP DOOR SUPPLER (CONCEALED)		

Hardware Set #: 0003 - SGL DRS FRP DRS & ALUM FR EXTERIOR
D110 D112V

Opening to Have:

Qty	Description	Finish	Mfg
1	CONTINUOUS HINGE A500 x FULL HEIGHT	630	ABH
1	RIM CYLINDER (PRIMUS) 20-709	626	SCHLAGE
1	MORTISE CYLINDER (IC) 20-700 x XQ11-949	626	SCHLAGE
1	RIM EXIT DEVICE CD99NL-OP	626	VON DUPRIN
1	VANDAL RESISTANT TRIM VR910-NL	630	VON DUPRIN
1	BLADE STOP SPACER 4040-61	689	LCN
1	DOOR CLOSER 4111 x SPRING-H-CUSH	689	LCN
1	DOOR CONTACT MC-7 x SPDT x 1" DIA		SDC
1	TEAR DROP SEAL 797B x HEAD & JAMBS	BLK	REESE
1	RAIN DRIP R201A x FULL WIDTH + 4"	628	REESE
1	THRESHOLD S483APR x SRS x FHSL x FULL WIDTH	628	REESE
1	ADJUSTABLE DOOR BOTTOM SWEEP BY FRP DOOR SUPPLER (CONCEALED)		

Hardware Set #: 0004 - PRS DRS FRP DRS & EXISTING WD-FR EXTERIOR
D6 DS2 DS5

Opening to Have:

Qty	Description	Finish	Mfg
2	CONTINUOUS HINGE A500 x FULL HEIGHT	630	ABH
1	RIM CYLINDER (PRIMUS) 20-709	626	SCHLAGE
2	MORTISE CYLINDER (IC) 20-700 x XQ11-949	626	SCHLAGE
1	MORTISE CYLINDER (IC) 20-700	626	SCHLAGE
1	RIM EXIT DEVICE CD99EO	626	VON DUPRIN
1	RIM EXIT DEVICE CD99NL-OP	626	VON DUPRIN
1	REMOVABLE MULLION KR4954 x (2) 154 x SIZE AS REQ	689	VON DUPRIN
1	MULLION WALL MOUNT KIT MT54	689	VON DUPRIN
1	VANDAL RESISTANT TRIM VR910-NL	630	VON DUPRIN
1	VANDAL RESISTANT TRIM VR910-DT	630	VON DUPRIN
2	DOOR CLOSER 4111 x SPRING-H-CUSH x SRI	689	LCN
2	MOUNTING PLATE 4110-18CNS	689	LCN
2	DOOR CONTACT MC-7 x SPDT x 1" DIA		SDC
1	TEAR DROP SEAL 797B x HEAD & JAMBS	BLK	REESE
2	TEAR DROP SEAL 797B x MULLION x FULL HEIGHT	BLK	REESE
1	RAIN DRIP R201A x FULL WIDTH + 4"	628	REESE
1	THRESHOLD S483APR x SRS x FHSL x FULL WIDTH	628	REESE
2	ADJUSTABLE DOOR BOTTOM SWEEP BY FRP DOOR SUPPLER (CONCEALED)		

Hardware Set #: 0005 - PRS DRS FRP DRS & ALUM FR EXTERIOR
D213 D281A D281B

Opening to Have:

Qty	Description	Finish	Mfg
2	CONTINUOUS HINGE A500 x FULL HEIGHT	630	ABH
1	RIM CYLINDER (PRIMUS) 20-709	626	SCHLAGE
2	MORTISE CYLINDER (IC) 20-700 x XQ11-949	626	SCHLAGE
1	MORTISE CYLINDER (IC) 20-700	626	SCHLAGE
1	RIM EXIT DEVICE CD99EO	626	VON DUPRIN
1	RIM EXIT DEVICE CD99NL-OP	626	VON DUPRIN
1	REMOVABLE MULLION KR4954 x (2) 154 x SIZE AS REQ	689	VON DUPRIN
1	MULLION WALL MOUNT KIT MT54	689	VON DUPRIN
1	VANDAL RESISTANT TRIM VR910-NL	630	VON DUPRIN
1	VANDAL RESISTANT TRIM VR910-DT	630	VON DUPRIN
2	BLADE STOP SPACER 4040-61	689	LCN
2	DOOR CLOSER 4111 x SPRING-H-CUSH x SRI	689	LCN
2	DOOR CONTACT MC-7 x SPDT x 1" DIA		SDC
1	TEAR DROP SEAL 797B x HEAD & JAMBS	BLK	REESE
2	TEAR DROP SEAL 797B x MULLION x FULL HEIGHT	BLK	REESE
1	RAIN DRIP R201A x FULL WIDTH + 4"	628	REESE
1	THRESHOLD S483APR x SRS x FHSL x FULL WIDTH	628	REESE
2	ADJUSTABLE DOOR BOTTOM SWEEP BY FRP DOOR SUPPLER (CONCEALED)		

Hardware Set #: 0006 - PRS DRS ALUM DRS & ALUM FR
D5 D7A D7B

Opening to Have:

Qty	Description	Finish	Mfg
2	CONTINUOUS HINGE A500 x FULL HEIGHT	630	ABH
2	PUSH / PULL BAR 1747-1 x (2) TYPE-N x (1) TYPE-L	630	TRIMCO
2	BLADE STOP SPACER 4040-61	689	LCN
2	DOOR CLOSER 4111 x SPRING-H-CUSH	689	LCN
2	MOUNTING PLATE 4110-18CNS	689	LCN

Hardware Set #: 0007 - SGL DRS WD & HMF
D201

Opening to Have:

Qty	Description	Finish	Mfg
3	HINGE CB168 4.5 x 4.5 x NRP	652	STANLEY
2	PRIMUS CYLINDER 20-765 (ND-LINE)	626	SCHLAGE
1	CLASSROOM LOCKSET ND93LD x SPA x 10-025	626	SCHLAGE
1	DOOR CLOSER 4111 x SPRING-H-CUSH	689	LCN
1	KICK PLATE 10" x 2" LDW .050 x B4E x CTSK	630	TRIMCO
1	MOP PLATE 6" x 1" LDW .050 x B4E x CTSK	630	TRIMCO
3	SILENCERS 1229A	GRAY	TRIMCO

Hardware Set #: 0008 - SGL DRS WD & HMF
D203T

Opening to Have:

Qty	Description	Finish	Mfg
3	HINGE CB168 4.5 x 4.5 x NRP	652	STANLEY
1	PRIVACY LOCKSET ND40S x SPA x 10-025	626	SCHLAGE
1	KICK PLATE 10" x 2" LDW .050 x B4E x CTSK	630	TRIMCO
1	MOP PLATE 6" x 1" LDW .050 x B4E x CTSK	630	TRIMCO
1	O/H CONCEALED STOP 4024 x STOP (36" TO 48" DR)	630	ABH
3	SILENCERS 1229A	GRAY	TRIMCO

Hardware Set #: 0009 - PRS DRS HMD & HMF
D202

Opening to Have:

Qty	Description	Finish	Mfg
6	HINGE CB168 4.5 x 4.5 x NRP	652	STANLEY
2	FLUSH BOLT 3917 1" x 6-3/4" x 12"	626	TRIMCO
1	DUST PROOF STRIKE 3910	630	TRIMCO
1	PRIMUS CYLINDER 20-765 (ND-LINE)	626	SCHLAGE
1	STOREROOM LOCKSET ND96LD x SPA	626	SCHLAGE
1	ASTRAGAL A548S x SQUARE EDGE x FULL HEIGHT	630	ABH
2	KICK PLATE 16" x 1" LDW .050 x B4E x CTSK	630	TRIMCO
2	MOP PLATE 6" x 1" LDW .050 x B4E x CTSK	630	TRIMCO
2	WALL STOP 1270WV	630	TRIMCO
2	SILENCERS 1229A	GRAY	TRIMCO

Hardware Set #: 0010 - PRS DRS WD & HMF
D007

Opening to Have:

Qty	Description	Finish	Mfg
6	HINGE CB168 4.5 x 4.5 x NRP	652	STANLEY
2	FLUSH BOLT 3917 1" x 6-3/4" x 12"	626	TRIMCO
1	DUST PROOF STRIKE 3910	630	TRIMCO
1	PRIMUS CYLINDER 20-765 (ND-LINE)	626	SCHLAGE
1	CLASSROOM LOCKSET ND94LD x SPA	626	SCHLAGE
1	ASTRAGAL A548S x SQUARE EDGE x FULL HEIGHT	630	ABH
1	DOOR CLOSER 4111 x H-EDA	689	LCN
2	KICK PLATE 16" x 1" LDW .050 x B4E x CTSK	630	TRIMCO
2	MOP PLATE 6" x 1" LDW .050 x B4E x CTSK	630	TRIMCO
2	WALL STOP 1270WV	630	TRIMCO
2	SILENCERS 1229A	GRAY	TRIMCO

END OF SECTION

SECTION 23 09 93
SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section defines the manner and method by which controls function. Requirements for each type of control system operation are specified. Equipment, devices, and system components required for control systems are specified in other sections.

B. Sequence of operation for:
   1. Hot Water Heating System
   2. Air Handling Units, including Variable Air Volume Terminals
   3. Fan Coil Units
   4. Exhaust Fans
   5. Packaged Terminal Vertical Unit Ventilators.
   6. Glycol Heat Exchangers

1.02 RELATED SECTIONS

A. Section 23 09 23 - Direct-Digital Control System for HVAC.

B. Section 23 09 13 - Instrumentation and Control Devices for HVAC.

C. Section 26 27 17 - Equipment Wiring: Electrical characteristics and wiring connections.

1.03 SYSTEM DESCRIPTION

A. This Section defines the manner and method by which controls function. Requirements for each type of control system operation are specified. Equipment, devices, and system components required for control systems are specified in other Sections.

1.04 SUBMITTALS

A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.

B. Sequence of Operation Documentation: Submit written sequence of operation for entire HVAC system and each piece of equipment.
   1. Preface: 1 or 2 paragraph overview narrative of the system describing its purpose, components and function.
   2. State each sequence in small segments and give each segment a unique number for referencing in Functional Test procedures; provide a complete description regardless of the completeness and clarity of the sequences specified in the contract documents.
   3. Include at least the following sequences:
      a. Start-up.
      b. Warm-up mode.
      c. Normal operating mode.
      d. Unoccupied mode.
      e. Shutdown.
      f. Capacity control sequences and equipment staging.
      g. Temperature and pressure control, such as setbacks, setups, resets, etc.
      h. Detailed sequences for all control strategies, such as economizer control, optimum start/stop, staging, optimization, demand limiting, etc.
      i. Effects of power or equipment failure with all standby component functions.
      j. Sequences for all alarms and emergency shut downs.
      k. Seasonal operational differences and recommendations.
      l. Interactions and interlocks with other systems.
   4. Include initial and recommended values for all adjustable settings, setpoints and parameters that are typically set or adjusted by operating staff; and any other control

settings or fixed values, delays, etc. that will be useful during testing and operating the equipment.

5. For packaged controlled equipment, include manufacturer's furnished sequence of operation amplified as required to describe the relationship between the packaged controls and the control system, indicating which points are adjustable control points and which points are only monitored.
6. Include schedules, if known.

C. Control System Diagrams: Submit graphic schematic of the control system showing each control component and each component controlled, monitored, or enabled.
1. Label with settings, adjustable range of control and limits.
2. Include flow diagrams for each control system, graphically depicting control logic.
3. Include the system and component layout of all equipment that the control system monitors, enables or controls, even if the equipment is primarily controlled by packaged or integral controls.
4. Include draft copies of graphic displays indicating mechanical system components, control system components, and controlled function status and value.
5. Include all monitoring, control and virtual points specified in elsewhere.
6. Include a key to all abbreviations.

D. Points List: Submit list of all control points indicating at least the following for each point.
1. Name of controlled system.
2. Point abbreviation.
3. Point description; such as dry bulb temperature, airflow, etc.
4. Display unit.
5. Control point or setpoint (Yes / No); i.e. a point that controls equipment and can have its setpoint changed.
6. Monitoring point (Yes / No); i.e. a point that does not control or contribute to the control of equipment but is used for operation, maintenance, or performance verification.
7. Intermediate point (Yes / No); i.e. a point whose value is used to make a calculation which then controls equipment, such as space temperatures that are averaged to a virtual point to control reset.
8. Calculated point (Yes / No); i.e. a “virtual” point generated from calculations of other point values.

E. Project Record Documents: Record actual locations of components and setpoints of controls, including changes to sequences made after submission of shop drawings.

1.05 QUALITY ASSURANCE

A. Design system under direct supervision of a Professional Engineer experienced in design of this Work and licensed in the State in which the Project is located.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL SYSTEM DESIGN AND OPERATION STANDARDS

A. The new BAS shall control the mechanical systems within the Rising Sun High School based upon a central heating plant with a hydronic distribution system serving air handling units and variable-air volume terminals throughout the facility. Boiler/burner systems shall be controlled via local fire-control units.

B. Hot water hydronic distribution system shall be part of a 2-pipe variable-flow system with two-way control valves mounted at each unit.

C. Each air handling unit shall be controlled by an individual DDC Controller. The DDC Controller shall be wired to a space temperature sensor, discharge air temperature sensor, return air

temperature sensor, damper motors, control valve, and a serpentine freeze stat. Units shall include occupied/unoccupied control, night-setback, morning warm-up/cool-down, and enthalpy-based economizer functions.

3.02 HEATING WATER SYSTEM

A. General
   1. The heating water system shall be manually enabled and disabled from the operator workstation. The hot water circulator pumps shall be energized and run continuously in a lead-lag manner whenever the heating system is enabled.
   2. Heating lockout shall prevent heating water system from operating if outdoor air temperature rises above 55 F (adj.).

B. Boilers
   1. The boilers shall be enabled / disabled by the BAS based on manual operator command. Once enabled, the boiler's integrated combustion controls and integral thermostat shall cycle the boiler.
   2. When the designated lead boiler is enabled, its associated circulator pump shall run continuously. Operation of the circulator pump must be proven via a current switch mounted on one phase of power feeding the pump before the boiler is allowed to fire. An alarm shall be activated at the Operator's Terminal if pump operation is not detected when pump is commanded to operate.
   3. The BAS shall monitor a general failure alarm and a low water cut off alarm from each boiler.
   4. When an alarm is detected at the designated lead boiler, it shall be disabled by the BAS and the designated lag boiler shall be enabled while an alarm is generated at the Operator's Terminal.
   5. If the lead boiler is unable to maintain the heating load as detected by the hot water loop return temperature sensor, the designated lag pump and boiler shall be activated.

C. Building Water Loop - Heating mode
   1. When the heating system is enabled via manual operator command, the designated lead pump shall run continuously.
   2. On a loss of flow, as indicated by a differential pressure switch, a “heating water loop failure” shall be indicated at the operator's terminal.
   3. If the designated lead pump alone is unable to maintain the differential pressure setpoint, the designated lag pump shall be energized and the load shall be shared equally by both pumps to maintain the setpoint. Variable frequency drives on both building loop water pumps shall modulate in response to the differential pressure sensor to maintain a constant differential pressure of 7-10 psig. When the control signal for the two pumps drops below 45 percent, the lag pump shall be de-energized and the lead pump speed shall be increased to maintain setpoint.
   4. The primary circulator pumps shall automatically alternate lead status weekly via the BAS. At no time shall more than two pumps be operating simultaneously.
   5. The building system loop temperature sensor shall control the three-way hot water reset valve at the boiler primary/secondary connection to maintain the loop temperatures as shown in the reset schedules. All values are user adjustable.
      a. Reset Schedule:
      b. Outdoor TemperatureBuilding Loop Temperature (All temperatures are user adjustable)
         1) <30 ºF130 ºF
         2) <35 ºF<125 ºF
         3) <45 ºF<120 ºF
         4) <50 ºF<110 ºF

D. Boiler Loop Heating Water Pumps
   1. When the heating system is enabled via manual operator command, the boiler secondary circulator pumps shall run continuously.
   2. On a loss of flow, as indicated by a differential pressure switch, and after a twenty second delay, the secondary circulator pump shall be de-energized and “secondary circulator heating water pump failure alarm” shall be displayed at the operator's terminal.

E. Heating Water System Monitoring
   1. The following points shall be monitored:
   2. Building Loop Supply Temperature
   3. Building Loop Return Temperature
   4. Boiler Loop Supply Temperature
   5. Boiler Loop Return Temperature
   6. Boiler Status Contacts
   7. Boiler Alarm Contacts
   8. Boiler low water cut off
   9. Building Loop Circulator pump(s) status via current switch
   10. Building Loop pump flow status via differential pressure switch
   11. Boiler loop pump flow status via differential pressure switch
   12. VFD status and alarm for each pump.
   13. Lead / lag status of each boiler and pump
   14. Diagram showing the layout of the boiler room, boiler loop, and building loop with major components and dynamic temperatures shown where temperature sensors exist in the system

3.03 MAKE UP AIR UNIT (KITCHEN)

A. Unit shall be interlocked with kitchen exhaust hood. Provide new on/off switch for kitchen exhaust fan.

B. On call for kitchen exhaust fan the following hsall occur:
   1. Outside are dampers for man-1 supply air and combustion air shall modulate open. When open dampers are proven open via end switch, exhaust fan and mau-1 supply air fan shall be energized.
   2. The modulating control valve shall open and close as required to maintain space temperature of 70F (adjustable).
   3. A discharge air temperature controller shall prevent the air temperature from falling below 70F (adjustable) when the system is in heating mode.
   4. Upon activation of smoke detector fans shall de-energize, dampers shall modulate closed and a signal shall be sent to fire alarm control panel.

3.04 VARIABLE AIR VOLUME AIR HANDLING UNIT WITH DX COOLING, HOT GAS REHEAT, HOT WATER HEAT, ENERGY RECOVERY WHEEL, AND VAV TERMINAL UNITS

A. Each unit shall be controlled by an individual DDC Controller. The DDC Controller shall be wired to the required air temperature sensors noted in paragraph "G" below, damper motors, control valve, duct static pressure sensor, energy recovery wheel, outdoor airflow monitoring station, and condensing unit control relays. Each VAV terminal unit shall also be provided with its own controller that shall be wired to a space temperature sensor, control valve, and damper actuator.

B. Sequence of operation:
   1. Cooling Mode: Cooling mode shall be selected based on outdoor air temperatures or manually enabled or scheduled from the workstation. During the programmed occupied mode, the supply fan shall run continuously with the outside air damper open to the minimum position as defined by the outdoor airflow monitoring station CFM value. Unless

economizer mode is engaged, the outdoor air damper shall modulate in response to the outdoor airflow monitoring station to maintain the minimum required airflow as defined by the drawing schedule. The variable frequency drive shall modulate the supply and return fans to maintain a given static pressure within the ductwork (0.25” wc, adjustable). The Energy Recovery Wheel will be energized and will rotate at the rate defined by the factory sequence of operation. The compressor(s) and hot-gas bypass system shall modulate to maintain a discharge air temperature of 55 degrees (adjustable). On a rise in space temperature above the setpoint (75 degrees, adjustable), the associated VAV terminal unit shall modulate open to allow greater airflow to meet the space setpoint. If the space temperature continues to rise more than 4 degrees (adjustable) above the setpoint, an alarm shall be generated at the workstation terminal noting “High Space Temperarture.” On a fall in space temperature the reverse shall occur. On a continued fall in more than one space temperature associated with the unit of more than 5 degrees (adjustable) below the setpoint the unit shall reset the discharge air to provide a 65 degree (adjustable) discharge air temperature. If the temperature space temperature continues to fall an alarm shall be generated at the workstation terminal noting “Low Space Temperature".

a. For units equipped with an outdoor air economizer: The DDC Controller shall receive input from the Enthalpy Sensor. If the enthalpy of the outdoor air is lower than the defined minimum level (user adjustable) the mixing box economizer sequence shall be activated upon a call for cooling. The outside air damper shall never close past the minimum position called for by the outdoor airflow monitoring station during the occupied period.

2. Heating Mode: Heating mode shall be selected based on outdoor air temperatures or manually enabled or scheduled from the workstation. During the programmed occupied mode, the supply fan shall run continuously with the outside air damper open to the minimum position as defined by the outdoor airflow monitoring station CFM value. Unless economizer mode is engaged, the outdoor air damper shall modulate in response to the outdoor airflow monitoring station to maintain the minimum required airflow as defined by the drawing schedule. The variable frequency drive shall modulate the supply and return fans to maintain a given static pressure within the ductwork (0.25” wc, adjustable). The Energy Recovery Wheel will be energized and will turn at the rate defined by the factory sequence of operation. The hot water control valve in the primary heating coil shall modulate to maintain a discharge air setpoint of 55 degrees (adjustable). The VAV terminal unit modulating air damper shall be in its minimum position. On a fall in space temperature below the setpoint (68 degrees, adjustable), the associated VAV terminal unit shall modulate the associated hot water coil towards the open position. On a continued fall in space temperature of more than 4 degrees (adjustable) below setpoint, an alarm shall be generated at the workstation terminal noting “Low Space Temperature”. On a rise in space temperature, the reverse shall occur. On a continued rise in space temperature, an alarm shall be generated at the workstation noting “High Space Temperature”.
   a. The sequence of operation shall provide frost-protection for the energy recovery wheel via modulation of wheel rotation speed, damper actuation, and control valve operation.
3. Unoccupied Mode: During the programmed un-occupied mode, the fan, compressor, hot water valves, and mixing box dampers shall be cycled / modulated to maintain the un-occupied setpoints (80 degrees cooling, 60 degrees heating, adjustable). The VAV boxes shall be opened to their maximum position in unoccupied cooling mode, and minimum position in unoccupied heating mode. Unless required for economizer cycle, the outside air damper shall remain closed. The VAV boxes shall be opened to their maximum position in unoccupied mode.
4. VAV / AHU Static Pressure Reset: The static pressure setpoint in the duct system shall be dynamically reset using a "trim and respond" logic program to control that static pressure between 0.2" WG and 1" WG. When the fan is commanded off, the setpoint shall be 0.5"

WG (Adustable) when the fan is energized. The setpoint shall be adjusted (trimmed) every 2 minutes by 0.05" WG. The dynamic response shall be an increase in the setpoint by 0.04" WG times the number of zone pressure requests, but never higher than 0.15" WG per cycle. A zone pressure request is generated when the VAV damper of any given terminal unit is opened to greater than 95% until it falls under 80% open.

C. Provide a current sensor on one phase of power feeding the supply fan, and compressor(s) for status indication at the Operator's Terminal.

D. If the discharge temperature fails to rise to a programmed minimum temperature during a call for heating; a low temperature alarm shall be activated at the Operator's Terminal. If the discharge temperature fails to fall to a programmed minimum temperature on a call for mechanical cooling, a high temperature alarm shall be activated at the Operator's Terminal.

E. A serpentine freeze stat shall be furnished, installed and wired in the unit by the BAS contractor. When tripped, the freeze stat shall function to de-energize the supply fan, mixing box damper actuators, and hot water control valve. When de-energized, the mixing box damper actuators shall spring return the outside and relief air dampers closed, the hot water or dual temperature water control valve shall spring return open to the coil, the freeze-protection pump associated with the unit shall be energized, and the isolation valve to the freeze-protection pump shall be opened (see detail on drawings). When the freeze stat trips, an alarm shall be generated at the Operator's Terminal.

F. A duct smoke detector shall be furnished, installed and wired to the fire alarm system as required by the electrical contractor. The duct smoke detector shall be provided with an auxiliary alarm contact which will be used by the BAS Contractor to de-energize the supply fan, mixing box damper actuators, chilled water, hot water control valve. When de-energized, the mixing box damper actuators shall spring return the outside and relief air dampers closed, and an alarm shall be generated at the Operator's Terminal.

G. The following items shall be displayed at the Operator's Terminal:
   1. Space temperature for each VAV unit.
   2. Space temperature setpoint for each VAV unit.
   3. Commanded position of each VAV damper.
   4. Commanded position of each VAV control valve.
   5. Outdoor Airflow Monitoring station flowrate reading
   6. Low Space temperature alarm
   7. High Space temperature alarm
   8. AHU Discharge temperature.
   9. AHU Return air temperature.
   10. AHU Mixed Air Temperature
   11. Dynamic temperatures on each side of the Energy Recovery Wheel section.
   12. Outside air temperature, humidity and enthalpy.
   13. Fan operational status via current sensor.
   14. Energy recovery wheel status via current sensor.
   15. Commanded status of fan.
   16. Commanded status of compressor(s).
   17. Commanded status of hot-water valve(s).
   18. Commanded position of dampers.
   19. Commanded status of energy recovery wheel.
   20. Diagram showing the layout of the unit with major components and dynamic temperatures shown where temperature sensors exist in the system.

3.05 SINGLE ZONE DX COOLING / HOT WATER HEATING AIR HANDLING UNIT WITH ENERGY RECOVERY WHEEL, OUTDOOR AIR ECONOMIZER, AND CO2 CONTROLS.

A. Each unit shall be controlled by an individual DDC Controller. The DDC Controller shall be wired to a space temperature sensor, the required air temperature sensors noted, space CO2 sensor, return air temperature sensor, damper motors, control valve, and a freeze stat.

B. Cooling Mode:
   1. During the programmed occupied mode, the supply fan shall run continuously with the outside air damper open to the minimum position (10% outdoor air unless otherwise shown on Schedule). The amount of outside air will be increased above the minimum setting on a rise in return air CO2 above the setpoint of 750 PPM (adjustable). On a return to setpoint the reverse occurs. Upon a rise in CO2 level above 1200 PPM, a high CO2 level will be displayed at the BAS workstation. Setpoints are adjustable at the BAS workstation. As the outdoor air damper adjusts, the return exhaust fan shall automatically adjust it's speed to maintain a constant static pressure within the space (0.3" WC, adjustable).
   2. On a rise in temperature above the programmed cooling setpoint, the unit shall energize the first compressor. The hot-gas bypass valve shall be modulated by the factory provided HGPB controls to provide part-load capacity. On a continued rise in space temperature, the second compressor shall be energized. On a fall in temperature the compressor(s) shall de-energize in stages as they were energized.
   3. For units equipped with an outdoor air economizer: The DDC Controller shall receive input from the Global Enthalpy Sensor. If the enthalpy of the outdoor air is lower than the defined minimum level (user adjustable) the mixing box economizer sequence shall be activated upon a call for cooling. The outside air damper shall never close past the minimum position during the occupied period.

C. Heating Mode:
   1. During the programmed occupied mode, the supply fan shall run continuously with the outside air damper open to the minimum position (10% outdoor air unless otherwise shown on the schedule). The amount of outside air will be increased above the minimum setting on a rise in return air CO2 above the setpoint of 500 PPM (adjustable). On a return to setpoint the reverse occurs. Upon a rise in CO2 level above 1000 PPM, a high CO2 level will be displayed at the BAS workstation. Setpoints are adjustable at the BAS workstation.
   2. On a drop in temperature below the programmed heating setpoint, the modulating hot water control valve shall be modulated open towards the coil. On a rise in temperature the reverse shall occur.
   3. The factory-provided sequence of operation shall provide frost-protection for the energy recovery wheel via modulation of wheel rotation speed, damper actuation, and control valve operation.

D. Unoccupied Mode:
   1. During the programmed un-occupied mode, the fan, hot water valve, DX compressors, and mixing box dampers shall be cycled / modulated to maintain the un-occupied setpoints. Unless required for economizer cycle, the outside air damper shall remain closed.

E. Provide a current sensor on one phase of power feeding the supply fan and each compressor for status indication at the Operator's Terminal.

F. If the discharge temperature fails to rise to a programmed minimum temperature during a call for heating; a low temperature alarm shall be activated at the Operator's Terminal. If the discharge temperature fails to fall to a programmed minimum temperature on a call for mechanical cooling, a high temperature alarm shall be activated at the Operator's Terminal.

G. A serpentine freeze stat shall be furnished, installed and wired in the unit by the BAS contractor. When tripped, the freeze stat shall function to de-energize the supply fan, mixing box damper actuators, and hot water control valve. When de-energized, the mixing box damper actuators shall spring return the outside and relief air dampers closed, the hot water or dual temperature water control valve shall spring return open to the coil, the freeze-protection pump associated with the unit shall be energized, and the isolation valve to the freeze-protection pump shall be opened (see detail on drawings). When the freeze stat trips, an alarm shall be generated at the Operator's Terminal.

H. A duct smoke detector shall be furnished, installed and wired to the fire alarm system as required by the electrical contractor. The duct smoke detector shall be provided with an auxiliary alarm contact which will be used by the BAS Contractor to de-energize the supply fan, mixing box damper actuators, chilled water, hot water control valve. When de-energized, the mixing box damper actuators shall spring return the outside and relief air dampers closed, and an alarm shall be generated at the Operator's Terminal.

I. The following items shall be displayed at the Operator's Terminal:
   1. Space temperature for each VAV unit.
   2. Space temperature setpoint for each VAV unit.
   3. Commanded position of each VAV damper.
   4. Commanded position of each VAV control valve.
   5. Low Space temperature alarm
   6. High Space temperature alarm
   7. AHU Discharge temperature.
   8. AHU Return air temperature.
   9. AHU Mixed Air Temperature
   10. Dynamic temperatures on each side of the Energy Recovery Wheel section.
   11. CO2 level and alarm status.
   12. Outside air temperature, humidity and enthalpy.
   13. Fan operational status via current sensor.
   14. Commanded status of fan.
   15. Commanded status of compressor(s).
   16. Commanded status of hot-water valve(s).
   17. Commanded position of dampers.
   18. Diagram showing the layout of the unit with major components and dynamic temperatures shown where temperature sensors exist in the system.
   19. Diagram showing the layout of the unit with major components and dynamic temperatures shown where temperature sensors exist in the system.

3.06 SINGLE ZONE DX COOLING / HOT WATER HEATING SPLIT SYSTEM AIR HANDLING UNIT WITH OUTDOOR AIR ECONOMIZER, HOT GAS BYPASS AND CO2 CONTROLS

A. Each unit shall be controlled by an individual DDC Controller. The DDC Controller shall be wired to a space temperature sensor, the required temperature sensors noted, damper motors, control valve, condensing unit control relays, and a freeze stat.

B. Cooling Mode:
   1. During the programmed occupied mode, the supply fan shall run continuously with the outside air damper open to the minimum position (10% outdoor air unless otherwise shown on Schedule). The amount of outside air will be increased above the minimum setting on a rise in return air CO2 above the setpoint of 750 PPM (adjustable). On a return to setpoint the reverse occurs. Upon a rise in CO2 level above 1200 PPM, a high CO2 level will be displayed at the BAS workstation. Setpoints are adjustable at the BAS workstation. As the outdoor air damper adjusts, the return exhaust fan shall automatically

adjust it's speed to maintain a constant static pressure within the space (0.3" WC, adjustable)..

2. On a rise in temperature above the programmed cooling setpoint, the unit shall energize the first compressor in the associated condensing unit. The hot-gas bypass valve shall be modulated by the factory provided HGPB controls to provide part-load capacity. On a continued rise in space temperature (and where so equipped), the second compressor shall be energized. On a fall in temperature the compressor(s) shall de-energize in stages as they were energized.
3. For units equipped with an outdoor air economizer: The DDC Controller shall receive input from the Global Enthalpy Sensor. If the enthalpy of the outdoor air is lower than the defined minimum level (user adjustable) the mixing box economizer sequence shall be activated upon a call for cooling. The outside air damper shall never close past the minimum position during the occupied period.

C. Heating Mode:
1. During the programmed occupied mode, the supply fan shall run continuously with the outside air damper open to the minimum position (10% outdoor air unless otherwise shown on Schedule). The amount of outside air will be increased above the minimum setting on a rise in return air CO2 above the setpoint of 750 PPM (adjustable). On a return to setpoint the reverse occurs. Upon a rise in CO2 level above 1200 PPM, a high CO2 level will be displayed at the BAS workstation. Setpoints are adjustable at the BAS workstation. As the outdoor air damper adjusts, the return exhaust fan shall automatically adjust it's speed to maintain a constant static pressure within the space (0.3" WC, adjustable).
2. On a drop in temperature below the programmed heating setpoint, the modulating hot water control valve shall be modulated open towards the coil. On a rise in temperature the reverse shall occur.

D. Unoccupied Mode:
1. During the programmed un-occupied mode, the fan, hot water valve, DX compressors, and mixing box dampers shall be cycled / modulated to maintain the un-occupied setpoints. Unless required for economizer cycle, the outside air damper shall remain closed.

E. Provide a current sensor on one phase of power feeding the supply fan and each compressor for status indication at the Operator's Terminal.

F. If the discharge temperature fails to rise to a programmed minimum temperature during a call for heating; a low temperature alarm shall be activated at the Operator's Terminal. If the discharge temperature fails to fall to a programmed minimum temperature on a call for mechanical cooling, a high temperature alarm shall be activated at the Operator's Terminal.

G. A serpentine freeze stat shall be furnished, installed and wired in the unit by the BAS contractor. When tripped, the freeze stat shall function to de-energize the supply fan, mixing box damper actuators, and hot water control valve. When de-energized, the mixing box damper actuators shall spring return the outside and relief air dampers closed, the hot water or dual temperature water control valve shall spring return open to the coil, the freeze-protection pump associated with the unit shall be energized, and the isolation valve to the freeze-protection pump shall be opened (see detail on drawings). When the freeze stat trips, an alarm shall be generated at the Operator's Terminal.

H. A duct smoke detector shall be furnished, installed and wired to the fire alarm system as required by the electrical contractor. The duct smoke detector shall be provided with an auxiliary alarm contact which will be used by the BAS Contractor to de-energize the supply fan, mixing box damper actuators, chilled water, hot water control valve. When de-energized, the

mixing box damper actuators shall spring return the outside and relief air dampers closed, and an alarm shall be generated at the Operator's Terminal.

I. The following items shall be displayed at the Operator's Terminal:
   1. Space temperature.
   2. Space CO2 levels (ppm).
   3. Space temperature setpoint.
   4. Low Space temperature alarm
   5. High Space temperature alarm
   6. Discharge temperature.
   7. Outside air temperature, humidity and enthalpy.
   8. Return air temp sensor
   9. Freeze stat status.
   10. Smoke detector status.
   11. Fan operational status via current sensor.
   12. Energy recovery wheel status via current sensor.
   13. Commanded status of fan.
   14. Commanded status of compressor(s).
   15. Commanded status of energy recovery wheel.
   16. Commanded position of hot water control valves.
   17. Commanded position of mixing box dampers.
   18. Diagram showing the layout of the unit with major components and dynamic temperatures shown where temperature sensors exist in the system.

3.07 TWO-PIPE (HEATING ONLY) FAN COIL UNITS AND UNIT HEATERS

A. Each Fan Coil unit shall be controlled by an individual DDC Controller. The DDC Controller shall be wired to a space temperature sensor, discharge air temperature sensor, return air temperature sensor, damper motors, and control valve.

B. Heating Mode:
   1. During the programmed occupied mode, the supply fan shall run continuously. On a drop in temperature below the programmed heating setpoint, the modulating hot water control valve shall be modulated open towards the coil. On a rise in temperature the reverse shall occur.

C. Unoccupied Mode:
   1. During the programmed un-occupied mode, the fan and hot water valve shall be cycled / modulated to maintain the un-occupied setpoints. Unless required for economizer cycle, the outside air damper shall remain closed.

D. Provide a current sensor on one phase of power feeding the supply fan for status indication at the Operator's Terminal.

E. If the discharge temperature fails to rise to a programmed minimum temperature during a call for heating; a low temperature alarm shall be activated at the Operator's Terminal. If the discharge temperature fails to fall to a programmed minimum temperature on a call for mechanical cooling, a high temperature alarm shall be activated at the Operator's Terminal.

F. The following items shall be displayed at the Operator's Terminal:
   1. Space temperature.
   2. Space temperature setpoint.
   3. Low Space temperature alarm
   4. Discharge temperature.
   5. Return air temp sensor
   6. Fan operational status via current sensor.
   7. Commanded status of fan.

8. Commanded position of water control valves.
9. Commanded position of mixing box dampers or duct-mounted dampers.
10. Diagram showing the layout of the unit with major components and dynamic temperatures shown where temperature sensors exist in the system

3.08 WALL-HUNG DUCTLESS SPLIT SYSTEMS

A. Each unit mounted in an MDF room shall be controlled by the factory-provided manual controls and remote thermostat provided with the unit.

B. The space shall also be provided with a BAS supplied space temperature sensor that shall trigger an alarm if the space temperature in the MDF room rises above a designated setpoint (85 degrees, adjustable).

3.09 PACKAGED HEAT PUMP UNIT VENTILATORS WITH ENERGY RECOVERY WHEEL, HOT WATER BACK-UP HEATING, AND OUTDOOR AIR ECONOMIZER.

A. Each unit ventilator shall be controlled by an individual DDC Controller. The DDC Controller shall be wired to a space temperature sensor, discharge air temperature sensor, damper motors, and the contacts to the factory-mounted unit control system controlling the compressor, energy recovery wheel, and hot water heating valve packages.

B. Cooling Mode:
   1. During the programmed occupied mode, the supply fan shall run continuously with the outside air damper open to the minimum position. On a rise in temperature above the programmed cooling setpoint, the heat-pump compressor shall energize with the reversing-valve in the cooling position. On a fall in temperature the compressor shall de-energize.
   2. For units equipped with an outdoor air economizer: The DDC Controller shall receive input from the Global Enthalpy Sensor. If the enthalpy of the outdoor air is lower than the defined minimum level (user adjustable) the mixing box / ERV wheel economizer sequence shall be activated upon a call for cooling. The outside air damper shall never close past the minimum position during the occupied period.

C. Heating Mode:
   1. During the programmed occupied mode, the supply fan shall run continuously with the outside air damper open to the minimum position. On a drop in temperature below the programmed heating setpoint, the, the heat-pump compressor shall energize with the reversing-valve in the heating position. On a continued drop in space temperature, the compressor shall de-energize and the hot water control valve shall modulate towards the open position. On a rise in temperature the compressor shall de-energize, or the hot water control valve shall modulate towards the closed position.

D. Unoccupied Mode:
   1. During the programmed un-occupied mode, the fan, compressor, reversing valve, hot water control valve, and mixing box dampers shall be cycled / modulated to maintain the un-occupied setpoints. Unless required for economizer cycle, the outside air damper shall remain closed.

E. Provide a current sensor on one phase of power feeding the supply fan and compressor unit for status indication at the Operator's Terminal.

F. If the discharge temperature fails to rise to a programmed minimum temperature during a call for heating; a low temperature alarm shall be activated at the Operator's Terminal. If the discharge temperature fails to fall to a programmed minimum temperature on a call for mechanical cooling, a high temperature alarm shall be activated at the Operator's Terminal.

G. The following items shall be displayed at the Operator's Terminal:
   1. Space temperature.
   2. Space temperature setpoint.

3. Low Space temperature alarm
4. High Space temperature alarm
5. Discharge temperature.
6. Return air temperature.
7. Outside air temperature, humidity and enthalpy.
8. Fan operational status via current sensor.
9. Commanded status of fan.
10. Commanded status of compressor.
11. Commanded position of hot water control valve.
12. Commanded position of dampers.
13. Diagram showing the layout of the unit with major components and dynamic temperatures shown where temperature sensors exist in the system.

3.10 EXHAUST FANS

A. Exhaust Fans Serving Toilet Rooms or Locker Rooms
   1. Exhaust fans shall be scheduled for occupied and unoccupied cycles based on an operator adjustable time schedule. Fans may also be manually enabled and disabled at the operator workstation. Fan status shall be monitored by the BAS via the sensors capable of sensitivity adjustment.

3.11 SINGLE ZONE DX COOLING / HOT WATER HEATING PACKAGED AIR HANDLING UNIT WITH OUTDOOR AIR ECONOMIZER (EXISTING UNITS IN GYMNASIUM (2 UNITS TOTAL) AND LIBRARY (1 UNIT))

A. Each unit shall be controlled by an individual DDC Controller. The DDC Controller shall be wired to a space temperature sensor, the required temperature sensors noted, damper motors, control valve, condensing unit control relays, and a freeze stat.

B. Cooling Mode:
   1. During the programmed occupied mode, the supply fan shall run continuously with the outside air damper open to the minimum position (10% outdoor air unless otherwise shown on Schedule). The amount of outside air will be increased above the minimum setting on a rise in return air CO2 above the setpoint of 750 PPM (adjustable). On a return to setpoint the reverse occurs. Upon a rise in CO2 level above 1200 PPM, a high CO2 level will be displayed at the BAS workstation. Setpoints are adjustable at the BAS workstation. As the outdoor air damper adjusts, the return exhaust fan shall automatically adjust it's speed to maintain a constant static pressure within the space (0.3" WC, adjustable).
   2. On a rise in temperature above the programmed cooling setpoint, the unit shall energize the first compressor in the associated condensing unit. The hot-gas bypass valve shall be modulated by the factory provided HGPB controls to provide part-load capacity. On a continued rise in space temperature (and where so equipped), the second compressor shall be energized. On a fall in temperature the compressor(s) shall de-energize in stages as they were energized.
   3. For units equipped with an outdoor air economizer: The DDC Controller shall receive input from the Global Enthalpy Sensor. If the enthalpy of the outdoor air is lower than the defined minimum level (user adjustable) the mixing box economizer sequence shall be activated upon a call for cooling. The outside air damper shall never close past the minimum position during the occupied period.

C. Heating Mode:
   1. During the programmed occupied mode, the supply fan shall run continuously with the outside air damper open to the minimum position (10% outdoor air unless otherwise shown on Schedule). The amount of outside air will be increased above the minimum setting on a rise in return air CO2 above the setpoint of 750 PPM (adjustable). On a return

to setpoint the reverse occurs. Upon a rise in CO2 level above 1200 PPM, a high CO2 level will be displayed at the BAS workstation. Setpoints are adjustable at the BAS workstation. As the outdoor air damper adjusts, the return exhaust fan shall automatically adjust it's speed to maintain a constant static pressure within the space (0.3" WC, adjustable).

2. On a drop in temperature below the programmed heating setpoint, the modulating hot water control valve shall be modulated open towards the coil. On a rise in temperature the reverse shall occur.

D. Unoccupied Mode:

E. Provide a current sensor on one phase of power feeding the supply fan and each compressor for status indication at the Operator's Terminal.

F. If the discharge temperature fails to rise to a programmed minimum temperature during a call for heating; a low temperature alarm shall be activated at the Operator's Terminal. If the discharge temperature fails to fall to a programmed minimum temperature on a call for mechanical cooling, a high temperature alarm shall be activated at the Operator's Terminal.

G. A serpentine freeze stat shall be furnished, installed and wired in the unit by the BAS contractor. When tripped, the freeze stat shall function to de-energize the supply fan, mixing box damper actuators, and hot water control valve. When de-energized, the mixing box damper actuators shall spring return the outside and relief air dampers closed, the hot water or dual temperature water control valve shall spring return open to the coil, the freeze-protection pump associated with the unit shall be energized, and the isolation valve to the freeze-protection pump shall be opened (see detail on drawings). When the freeze stat trips, an alarm shall be generated at the Operator's Terminal.

H. A duct smoke detector shall be furnished, installed and wired to the fire alarm system as required by the electrical contractor. The duct smoke detector shall be provided with an auxiliary alarm contact which will be used by the BAS Contractor to de-energize the supply fan, mixing box damper actuators, chilled water, hot water control valve. When de-energized, the mixing box damper actuators shall spring return the outside and relief air dampers closed, and an alarm shall be generated at the Operator's Terminal.

I. The following items shall be displayed at the Operator's Terminal:
   1. Space temperature.
   2. Space CO2 levels (ppm).
   3. Space temperature setpoint.
   4. Low Space temperature alarm
   5. High Space temperature alarm
   6. Discharge temperature.
   7. Outside air temperature, humidity and enthalpy.
   8. Return air temp sensor
   9. Freeze stat status.
   10. Smoke detector status.
   11. Fan operational status via current sensor.
   12. Energy recovery wheel status via current sensor.
   13. Commanded status of fan.
   14. Commanded status of compressor(s).
   15. Commanded status of energy recovery wheel.
   16. Commanded position of hot water control valves.
   17. Commanded position of mixing box dampers.
   18. Diagram showing the layout of the unit with major components and dynamic temperatures shown where temperature sensors exist in the system.

3.12 GLYCOL HEAT EXCHANGER CONTROL

A. The hot water to glycol heat exchanger in the boiler room shall be controlled by a two-way modulating control valve on the heating-water side of the exchanger. The control valve shall modulate to match the reset schedule defined for the boiler loop in the glycol loop.

B. The glycol loop pump shall be enabled whenever the boiler system is in heating mode. The pump shall be variable-flow, controlled by a differential pressure sensor on the glycol loop with feedback to the specified VFD.
   1. The glycol loop pump shall run continuously in heating mode, and be deactivated when heating mode is disabled on the system.

C. If the glycol temperature fails to rise to a programmed minimum temperature during a call for heating; a low temperature alarm shall be activated at the Operator's Terminal.

D. The following items shall be displayed at the Operator's Terminal:
   1. Glycol loop temperature.
   2. Low glycol loop temperature alarm
   3. Pump operational status and VFD operational point.
   4. Commanded status of pump.
   5. Commanded position of water control valves.
   6. Diagram showing the layout of the unit with major components and dynamic temperatures shown where temperature sensors exist in the system

END OF SECTION