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CITY OF STAMFORD
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ADDENDUM NO. 2
(September 16, 2019)

Bid No. S-6722
Alterations at Westover Magnet Elementary School

Addendum No. 2 is being issued to all potential bidders to provide the items and attachments set forth herein which shall act to qualify, clarify, or otherwise modify the Contract Documents previously issued regarding the above referenced project. These items, whether of omission, addition, substitution, or clarification, shall be incorporated into the proposals submitted by all bidders, and receipt of this document and its attachments must be acknowledged, either in the space provided on the Bid Form or on the Contractor's Form of Proposal. Failure to do so may subject the Bidder to disqualification.

The items and references:

1. The Sign in Sheets from the Mandatory Site Walk Troughs of Sept. 5, & Sept. 6, 2019, (see Attachment "A").

2. The original Bid Price Form is hereby deleted and the (Attachment "B") **Revised Bid Price Form (9-16-19)** is substituted therefor.

3. The Bid Due Date and Time remains the same, namely: Sept. 25, 2019 at 11:00 AM.

4. There shall be an Addendum No. 3 issued by Friday, 9/20/19

SPECIFICATION MANUAL Changes:

Part 1 Division #00 & 01 Bidding and Contract Requirements

1. Table of Contents
   a. Add Section 23 09 01 Direct Digital Control Equipment under Division 23 - HVAC
   b. Section 32 18 16 Poured-In-Place Playground Surface – add to Division 32 Exterior Improvements
   c. Section 32 25 00 Sediment and Erosion Controls – change to Section 31 25 00 and place under Division 31 Earthwork
   d. Section 32 90 00 Landscaping - Add under Division 32 – Exterior Improvements

2. Section 01 91 13 General Commissioning Requirements
    a. Insert entire attached section

Part 2 Technical Changes, Architectural, Structural and Civil

3. Section 02 65 00 Underground Storage Tank and Piping Removal
4. Insert attached Page 1
5. Section 04 20 00 Unit Masonry
6. Part 2.1.B.3 Facing Brick: – after 'Type FBX" - Add "equal to Yankee Hill Commercial, Commercial – Light Red Velour and Glen-Gery – Golden Dawn (W27-28) in sizes to match existing. Provided by Casa Building Materials of Elmsford – John Blair
7. Section 12 24 13 Window Shades
8. Part 2.2 Shade Cloth shall read "Shade cloth shall be 1500 series ThermoVeil Dense Basket Weave, with 3% openness, color as selected by the Architect made by MechoShade or equal by other manufacturers noted herein."
9. Section 32 12 23 Sidewalks
10. Changed Section Title to read "Section 32 16 23"
11. Change footer to read "32 16 23 Sidewalks"
12. Section 32 18 16 Poured-In-Place Playground Surfaces
13. Part 2.1.B.3.c – changed to read Color: 50% Beige/50% Black Blend
14. Section 33 44 36 Inline Stormwater Check Valves
15. Delete section from Table of Contents

Part 3 Technical Changes, Plumbing, Mechanical and Electrical

16. Section 23 09 01 Direct Digital Control Equipment
17. Add entire section
18. Section 23 09 93 Sequence of Operation
19. Change footer to read "23 09 93"

DRAWING Changes:

1. Drawing Title Sheets Volume 1 and Volume 2
    a. Mechanical Sheets M501, M502 & M503 – delete "TO BE PROVIDED VIA ADDENDUM" These drawings are part of the original bid set.
2. Drawing C210 – Site Plan Enlargement
    a. Replace with attached drawing C210
3. Drawing C220 Layout Plan
    a. Replace with attached drawing C220
4. Drawing C610 – Site Details
    a. Add entire new drawing
5. Drawing C800 – Playgrounds South
    a. Replace with attached drawing C800
6. Drawing C810 – Playgrounds North
    a. Replace with attached drawing C810

Questions & Answers of the Potential Bidders

Q-1: Regarding Section27 41 16.62 audio Video specialty rooms

1. **Gym speakers are not depicted on plans to establish qty.**
2. **Projection screen in auditorium is listed on AV Drawings but not shown in AV specs. Is projection screen part of the AV Scope?**

A-1:

1. *Speakers are shown on Drawing T211*
2. *Yes, the model number and work requested is indicated on drawing T200 and T214*

Q-2: I saw the Westover Magnet School Project specifies Aiphone Video Entry Intercom. However, it specifies our older IS product solution, I highly recommend our IX Series 2.

A-2: *The "IS" series will work fine for this school building's needs. It is also what was just installed at the Strawberry Hill School. The "IX" series has many more features and supports over 5,000 doors … the Project does not need all the features the "IX" provides.*

Q-3: Please clarify if the City of Stamford pays for the Utility Usage, directly?
A-3: *YES, the current utility fees will be paid directly by the City for the same Gas, Electric and Water account numbers, as in the past. A separate invoice shall be made and sent to the General Contractor for their reimbursement to the City - of the total usage amounts of the previous month.*
For the GC's budget purposes below is a summary of the past two years of annual Utility Usage costs:
Electric
8/14/17-8/14/18: 940,320 kWh, $155,970.51
8/14/18-8/14/19: 645,120 kWh, $140,152.66
Gas Heat
7/31/17-7/31/18: 65,170 Ccf, $74,138.48
7/31/18-7/31/19: 73,210 Ccf, $80,554.83
Gas Non-heat (hot water and/or kitchen)
8/16/17-8/16/18: 2,702 Ccf, $3,540.75
8/16/18-8/16/19: 1,442 Ccf, $2,393.77
Water
7/6/17-7/3/18: 903 Ccf, $7,068.77
7/4/18-7/3/19: 293 Ccf, $5,191.39

Q-4: The project specs indicate that the contractor is to hire a QA/QC Certified Independent Testing Firm that has to be approved by the Owner. Contractor is responsible for all associated costs. Can you please indicate all the required testing, inspections and certifications that need to be performed by the QA/QC Certified Independent Testing Firm so this can be accurately price?
A-4: ***A Change in the Testing Requirements has been made.*** *Despite what is currently stated in several sections of the Contract Documents - The Owner shall hire and pay a State of CT Licensed QA/QC Firm(s). The GC shall schedule, coordinate, cooperate and provide access for the QA/QC Firm(s).*
Testing Results shall be sent to the GC, Owner and Architect directly. The Type of Tests and Frequency are listed in the Specifications Manual and Industry Standards, but must be of sufficient occurrences to assure the Owner, City of Stamford Building Department and the Design Engineer to sign – off on the Building's Certificate of Occupancy - Building Permit.
If the Owner "directs in writing" the GC to have a certain portion of the work tested and the results show the proper materials and workmanship were met, then those costs shall be paid by the Owner too, if the

test shows a failure to meet the Industry Standards, Project Specifications or the testing technician is delayed or cancelled, due to no fault of the Owner, then the General Contractor shall pay the costs incurred and reschedule another test when conditions permit.

Q-5: **Is the furring and drywall as shown on partition type MF4 typical to MF-6, MF-8, MF-10, MF 12?**

A-5:

Yes, the furring is expected to remain during demolition. If the existing furring is damaged during demolition, the GC is required to replace it in kind. The 5/8" thick mold and abuse resistant gypsum board is typical to all partition types – typical.

Q-6: Type E1 partition is indicated but several other numbers (E5 for example) are shown on the floor plans. What are those types?

A-6: *All partition types shown on the floor plans relate to the expected steel stud wall thickness. The gypsum board on either side of these other 'Type Ex' steel stud walls is the same, no matter the existing stud wall thickness.*

Q-7: Several rooms indicated with note 2 on demo plan (drywall removed to 6" below ceiling) seem to receive a new partition type that goes to deck. Please clarify.

A-7: *The existing wall structure is to remain. In reviewing the pdf prints, there are walls shown in both the 1st floor and 2nd floor indicating new walls.* ***This is a misprint****; there are no new stud walls, only existing walls to remain. See reissued floor plans in the A-100's, A-200's, A-500's and A-600's in this Addendum No. 2, showing their proper printing appearance.*

Q-8: Can you provide us with a window schedule which includes width and length as well as materials required for the shades?

A-8: *All the windows are existing; therefore, no window schedule is provided. Look at both the Building Elevations and Floor Plans for both quantity and size. Specification section 12 24 13 Window Shades – Part 2.2 shall read* ***"Shade cloth shall be 1500 series ThermoVeil Dense Basket Weave, with 3% openness, color as selected by the Architect made by MechoShade or equal by other manufacturers noted herein."***

Q-9: Was a pull test performed for Metal Roof Panels?

A-9: *A fastener pull test was not performed on the metal roof panels.*
DiSalvo Engineering confirmed that the existing "structural" Merchant & Evans Zip-Rib panels which are installed over purlins (without an underlying roof deck) can safely support the new roof. The Zip-Rib panels are formed of galvanized steel; We believe they are 22 gauge thick.

Q-10: Would plenum rated low voltage wire be acceptable above accessible ceilings?

A-10: *Plenum rated low voltage cable is acceptable above accessible ceilings.*

Q-11: Notice to Bidders, Section 5, "Time is of the Essence" states that the contractor is responsible "to pay the rent and all costs ancillary to the Owner's use of that space, etc" if substantial completion is not met. Please provide the following:

a. Please provide that daily rate.

b. Please confirm that this is in addition to the $5000.00 per day liquidated damaged?

A-11: *Please refer to ATTACHMENT "L" for a copy of the Contract signed with the Owner of: 1 Elmcroft (the facility that currently is being used for the Staff and Students. The Contract explains the costs that the Contractor will have to pay as "Direct damages" should the Completion Milestones are not*

met and the Lease has to be extended. There is also an additional amount of $5,000.00/day "Liquidated Damages" too.

Q-12: AIA A201 – 11.1.2.9 – Please confirm/provide the Builder's Risk Limits to be carried for the following:

a. Soft Costs

b. Completed Value – Is this intended to be the Contract Value?

A-12:

a. *The Builder's Risk Insurance shall include "Soft Costs".*
b. *The sample insurance certificate is just that, a sample. The "wording" as described on the AIA201-2017 Article 11* ***Insurance and Bonds*** *section 11.1.2 paragraph 9. Builder's Risk Property Coverage – Builder's Risk - describes the coverages required.*

Q-13: Due to the "Time is of the Essence" nature of this project and the substantial Liquidated Damages, what is the allotted response time from the Design Team with regards to:

a. RFIs?

b. Submittals?

c. Clarifications?

d. Discovered Conditions?

e. Requests for Field Direction?

A-13: *Regarding return time for submittals, we need to hold fast on 10 business days for return of submittals regardless of single/multiple consultant review. We plan on accelerating turn-around and will work with contractors on critical path items that need faster review. The best way to achieve an accelerated track is for the contractors to provide (and hold to) the submittal schedule and inform the consultant team in advance when key critical path submittal that are time sensitive are planned to be ready for review. Advanced warning eliminates the issue of the 'drop everything and review this emergency shop drawing' that occurs without communication and advanced planning.*
Also the specs require complete submittals including layout, materials, finishes, etc to be submitted together. Complete submittals shorten approval time and eliminate multiple submissions.
Regarding RFIs, clarifications, and field direction we commit to 5 days and will mostly be hours to 1-3 days for responses, but some items require field visits, engineering support, and analysis. The best way to ensure quicker responses is to bring issues to the attention of the design team one day prior to (or during) the weekly project meeting so that the design personnel are on site to review and provide direction quickly.

Q-14: Drawing A603 shows some linear ceilings but there are only specs for 2x4 tiles in the spec book. Please advise what we should carry in these areas.

A-14: *The areas that appear as linear ceilings are either chases, elevator shafts, or stairwell stair systems. There are not linear ceiling systems in the building.*

Q-15: Demo note 5 conflicts with the RCP – note 5 calls for remove & dispose ACT tile but the RCP on A601 shows ceilings existing to remain. Which is correct?

A-15: *The existing ceilings to remain are gypsum board ceilings and NOT ACT.*

Q-16: Does demo note 26 include the entire bathroom? This note does not point to a specific wall like demo notes 1 & 2 do

A-16: *The existing toilet rooms walls that abut the central corridors are existing CMU walls that are not being disturbed other than finish paint and cove base tile.*

Q-17: **Drawing A201 has a partition tags E5, E4, EM, E12, E14 & E15 – these are not shown on A901. Please advise what's included in these wall types**

A-17: *The wall nomenclature in question is there as a reference to the anticipated existing wall structure thickness. The thicker exterior walls are typical 6" steel stud with interior gypsum and the exterior of the wall varies depending on the exterior finishes. There are some exterior walls that are CMU core with brick veneer applied.*

Q-18: **We cannot find the specs for the walk off Mats. Please provide.**

A-18: *Section 09 68 13 Carpet Tiles*

a. Part 2.1 Products – add part 5 as follows:

i. WOM (Walk-off Mat) Pawling Corp EM-20 Berber Carpet Matting

1. Color: #38 Charcoal

2. Size: TBD using largest manufactured widths

3. Edging: optional manufacturer supplied reducers strips and recessed frames to accommodate existing conditions.

Q-19: **Does the Owner pay for or have an "Allowance" for Hazardous Soil and Building Materials that may be encountered in the course of the work?**

A-19: *The Contract Documents describe in detail what Our Consultants found and where they searched, so the Costs for removal from the Site of any Impacted Soil or Hazardous Building Materials encountered shall be included in the Lump Sum Price of the Project, If the Contractor is directed to disturb or remove materials not currently shown as part of the Scope of the Project, there is an Allowance "CC" for Soil.*

All other terms and conditions of **Bid No. S-6722** remain the same.

Erik Larson
Purchasing Agent

cc: Jeff Brown, Construction Manager
Purchasing Department File

ATTACHMENT "A"

CITY OF STAMFORD - ENGINEERING BUREAU

MANDATORY Pre-BID MEETING LOG

September 5th & September 6th, 2019 at 10:00AM

Alterations at Westover Magnet Elementary School

CPBM17 Bid No. S-6722

	NAME	ORGANIZATION - ADDRESS	TELEPHONE	EMAIL
1	Jeff Brown (Owner)	City of Stamford Engineering Bureau 888Washington Blvd. Stamford,CT 06901	203-627-6352 (cell)	jbrown2@stamfordct.gov
2	Lou Casolo (Owner)	City of Stamford Engineering Bureau 888Washington Blvd. Stamford,CT 06901	203-977-5796	lcasolo@stamfordct.gov
3	Rich Destefan (Abatement)	Alberca Construction 97 Tolland St. East Hartford, CT	860-869-8270	victor.alberca@albercaconstructioncollc.net
4	Victor Alberca (Abatement)	Alberca Construction 97 Tolland St. East Hartford, CT	860-869-8270	victor.alberca@albercaconstructioncollc.net
5	Hector Martinez (Abatement)	Brothes and Sons Construction LLC 18 George St. East Hartford, CT	860-904-5396	b_sconstructionllc@yahoo.com
6	Herman Vidal (Accoustic Ceilings)	HV Contractor Corp	203-820-7691	hervidal@hvcontractorcorp.com
7	Kurt Kieslich (Audio Visual)	Sound Stage Systems 385 Sackett Point Road North Haven, CT 06473	203-230-0226	kurt@soundstagesystems.com
8	Rich Burr (Building Automation)	Environmental Systems Corp. 18 Jansen Court West Hartford, CT	860-221-4331	r.burr@esccontrols.com
9	Carlos Espinoza (Construction Cleaning)	K & P 230 Ferry Road Old Saybrook, CT	845-206-3580	carlos@kandpcleaning.com
10	Mike Sullo (Controls)	CT Temperature Controls 500 Corporate Row Cromwell, CT	800-890-2022	msullo@cttempcontrols.com

	NAME	ORGANIZATION - ADDRESS	TELEPHONE	EMAIL
11	Will Vitelli (demolition & abatement)	New England Yankee Construction, LLC 34 High Street West Haven, CT	203-284-9972	m.picard@neycllc.com
12	Jean Darcelion (Demolition)	Vilure Deconstruction 135 Clarence St. Bridgeport, CT	203-360-9338	info@viluredeconstruction.com
13	Michael Ciarleglio Sr (Elec & Mech)	Furguson 112 Northwest Drive Plainville, CT 06062	860-480-9045 or 860-517-3221	mciarleglio@ferguson-ct.com
14	Ashley Sabia (Elect)	Sal Sabia Electric 83 Virgil St. Stamford, CT 06902	203-323-3321	frank.sabia@gmail.com
15	Frank Mastriano (Electric)	Holzner Construction 596 John St. Bridgeport, CT	203-335-4204	estimating@holznerconstruction.com
16	Dan Neagle (GC)	Lawrence Brunoli, Inc. 11 Eastview Dr. Farmington, CT	860-676-9900	bids@lbrunoli.com
17	Bryan Flynn (GC)	Banton Construction 339 Washington Ave. North Haven 06473	203-234-2353	soldman@bantonconsruction.com
18	Keith Ackerson (GC)	Worth Construction Co. Inc. 24 Taylor Ave. Bethel, CT	203-797-8788	ackersonk@worthconstruction.com
19	Vincent Parete (GC)	LaRosa Building Group 163 Research Parkway Meriden, CT	203-235-1770	vparete@larosabg.com
20	Tony Maunco (GC)	Piazza Inc. 3 West Stevens Ave. Hawthorne, NY 10532	914-741-4435	tony@pizzabrothers.com
21	Bubba Thomas (GC)	Bismark Construction 100 Bridgeport Ave. Milford CT	203-305-9393	rleonardo@bismarkconstruction.com
22	Milton Reddy (GC)	Seabreeze 24-30 47th Queens, NY	248-590-6522	estimating@seabreezeGC.com

	NAME	ORGANIZATION - ADDRESS	TELEPHONE	EMAIL
23	Jeff Rowe (GC)	Seabreeze 24-30 47th Queens, NY	718-721-9030	estimating@seabreezeGC.com
24	Mark Carroll (GC)	O & G Industries 112 Wall St. Torrington, CT	860-489-9261	markcorrol@ogind.com
25	Jesper Glysing-Jensen (GC)	Viking Construction Inc. 1387 Seaview Ave. Bridgeport, CT	203-353-0260	jesper.glysing@vikingconstruction.net
26	Anthony Gaglio (GC)	Viking Construction Inc. 1387 Seaview Ave. Bridgeport, CT	203-353-0260	anthony.gaglio@vikingconstruction.net
27	Christopher Petre (GC)	Viking Construction Inc. 1387 Seaview Ave. Bridgeport, CT	203-353-0260	christopher.petre@vikingconstruction.net
28	Evan Burchell (GC)	Wernent Construction 76 Valley Rd. Cos Cob, CT	203-869-1110	evan@wernert.com
29	Ollie D'Amario (GC)	FUSCO Corp. 555 Long Wharf Dr. New Haven, CT	203-777-7451	odamario@fusco.com
30	George Bretherton (GC)	Diversity Construction Group 531 Cortland Cir. Cheshire, CT 06410	203-699-8387	estimating@diversitycg.com
31	Roy Riachy (GC)	The Morganti Group, Inc. 100 Mill Plain Road 4th Floor Danbury, CT 06804	203-830-3349	rriachy@morganti.com
32	Marc Barbian (HVAC & Controls)	ENCON 1265 Woodend Rd. Stratford, CT	203-515-0790	mbarbian@goencon.com
33	Glenn Giustino (HVAC & Controls)	ENCON 1265 Woodend Rd. Stratford, CT	203375-5228	g.giustino@goencon.com
34	Will Benoit (Mechanical)	DiRienzo Mechanical 1299 Whalley Ave. New Haven, CT 06515	203-397-0367	will@dirienzomechanical.com

	NAME	ORGANIZATION - ADDRESS	TELEPHONE	EMAIL
35	Rip McGldownery (Mechanical)	Coastal Mechanical Services 40 Hathway Dr. Stratford, CT	203-953-3732	rip@coastal-mechanical.com
36	Larry Dominguez (Roof)	Armor-Tite Construction 114 Pearl St. Port Chester, NY 10573	914-937-7134	larry@armor-tite.com
37	Cornelio Soto (Roof)	Armor-Tite Construction 114 Pearl St. Port Chester, NY 10573	914-937-7134	soto@armor-tite.com
38	Chris Como (Roof)	Barrett Roofing 106 Mill Plain Rd. Danbury, CT	203-744-2780	ccomo@barrettroofing.com
39	Ed Mullen (Roof)	Commercial Roofing 340 Kennedy Drive Putnam, CT	860-928-9199	coz@comroofing.com
40	Tom Rodrigue (Roof)	The Imperial Company 261 Main Street Cromwell, CT	860-632-2258	tomr@theimperialco.com
41	Claude Watt (Roof)	Bay Restoration 550 New Haven Ave. Milford, CT 06460	203-693-2141	jfuton4bay@gmail.com or cwatt4bay@gmail.com
42	Leo Nebbia (Roofing Mtls.)	Sika Sarnafill	201-259-3397	nebbia.leo@us.sika.com
43	James Brenia (Sitework)	FGB Construction 158 Bouton St. Norwalk, CT	203-253-9739	james@fgbconstruction.com
44	Phil Brown (Voice & Data and Access Controls)	JKS Systems 1265 John Fitch Blvd South Windsor, CT	860-810-0993	pbrown@jks-systems.com
45	Stephano Nathan (Voice & Data Cabling and Security)	Mercury 300 Avon St. Stratford, CT 06615	203-526-4377	stephano.nathan@mercury-group.com

S-6722 BID PRICE FORM

Bidder shall complete the Work as specified in the Contract Documents for the following I. BASE BID lump sum and II. ALLOWANCES unit price items (use itemized table below).
Only the apparent Low Bidder shall be required to submit within 5 business days from the Bid opening; a Project Baseline Schedule showing their Plan to complete the Project by the required Scheduled Milestones and complete a Project Payment Form in which the pay items are broken down for **L&E = labor & equipment and M = materials** before the CONTRACT is signed.

Base Bid – ALTERATIONS at WESTOVER MAGNET ELEMENTARY SCHOOL Project

I. BASE BID CONTRACT PRICE:

Subtotal LUMP SUM Cost of Project: (including all scope items depicted on the Contract Plans and mentioned in the Contract Specifications Manual, excluding Allowances, local building permits fees and State of CT sales tax)

Numerical $ _____

Written _____

Show amount in both words and figures. In case of discrepancy, the amount shown in words will govern.

II. Schedule of ALLOWANCES: (Unit Prices) for items to be added or deleted to the price of the Work above

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
A	**Replacement of Ceiling Grid, as directed that was damaged before Contractor took over the jobsite and could not be cleaned or reused & not part of the Base Bid** for the Unit Price of : _____dollars and _____cents	SF	25,0000	$_____	$_____
B	**Replacement of Duct Insulation, as directed & not part of the Base Bid** for a Unit price of: _____dollars and _____cents	SF	5,000	$_____	$_____
C	**Replacement of Pipe Insulation below 2 inch dia., as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	LF	2,500	$_____	$_____
D	**Replacement of Pipe Insulation above 2 inch dia., as directed & not part of the Base Bid** for the Unit Price of: _____dollars and_____ cents	LF	2,500	$_____	$_____
E	**Replacement of Room Signage , as directed that was damaged before Contractor took over the jobsite and could not be cleaned and reused** for the Unit Price of: _____dollars and _____cents	EA	20	$_____	$_____
F	**Replacement, as directed Metal Roof Decking with 22 gauge galvanized steel, configuration to match existing & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	SF	200	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
G	**Replacement, as directed of deteriorated roof blocking, on a board foot Basis. New PT Wood blocking to be #2 or better Douglas Fir lumber or APA rated plywood configuration and thickness to match existing & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	BF	500	$_____	$_____
H	**Replacement, as directed of existing plumbing fixtures – lavs & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	10	$_____	$_____
I	**Replacement, as directed of existing plumbing fixtures – water closets & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	10	$_____	$_____
J	**Furnish & Install, as directed Building Monitoring System (DDC) Points & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	25	$_____	$_____
K	**Furnish & Install, as directed Condensate Pump for Unit Ventilator & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	5	$_____	$_____
L	**Furnish & Install Unit Ventilator Size UV-1, as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	3	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
M	**Furnish & Install Supply Diffuser 24x24 , as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	5	$_____	$_____
N	**Furnish & Install Return Register 12x12, as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	5	$_____	$_____
O	**Furnish & Install Fire Damper for 18 x 18 Duct, as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	5	$_____	$_____
P	**Furnish & Install Smoke Damper for 18 x 18 Duct, as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	5	$_____	$_____
Q	**Furnish & Install CFSD for 18 x 18 Duct, as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	5	$_____	$_____
R	**Furnish & Install Control Valve under 2 inch dia. , as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	5	$_____	$_____
S	**Furnish & Install Control Valve over 2 inch dia. , as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	5	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
T	**Furnish & Install Sprinkler Head + 10 ft of armover piping, as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	5	$_____	$_____
U	**Furnish & Install Sprinkler Cover Plates, as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	10	$_____	$_____
V	**Furnish & Install Temperature Sensor, as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	5	$_____	$_____
W	**Furnish & Install Tamperproof Duplex Receptacle with 75ft of circuitry, as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	10	$_____	$_____
X	**Furnish & Install Area Smoke Detectors, wiring programming and testing, as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	7	$_____	$_____
Y	**Furnish & Install Area Heat Detectors, wiring programming and testing, as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	4	$_____	$_____
Z	**Furnish & Install Duct Detectors, wiring programming and testing, as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	6	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
AA	**Furnish & Install Fire Alarm Audio Visual Device, wiring, programming and testing, as directed & not part of the Base Bid** for the Unit Price of: _____dollars and _____cents	EA	8	$_____	$_____
BB	**Removal of Rock and transport off site is covered in the Lump Sum Price stated in Section I. This Line covers areas, as directed beyond those currently depicted on the Plans & Specifications that can not be removed by the ripping force of a CAT235 or (equivalent machine)** for the Unit Price of: _____dollars and _____cents	CY	150	$_____	$_____
CC	**Removal, Transport and Disposal of Impacted & Hazardous Soil is covered in the Lump Sum Price stated in Section I. This Line covers areas, as directed beyond those currently depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	Tons	480	$_____	$_____
DD	**Removal, Transport, Disposal and Replacement of 2 layers of Asphalt Pavement is covered in the Lump Sum Price stated in Section I. This Line covers areas, as directed beyond those currently depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	SYD	125	$_____	$_____
EE	**Removal, Transport, Disposal and Replacement of Reinforced w/ WWF - 5 inch depth - Concrete sidewalk (broom finish) is covered in the Lump Sum Price stated in Section I. This Line covers areas, as directed beyond those currently depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	SYD	67	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
FF	**Furnish & Install "W", Wall Outlet, including up to 280ft Category 6, plenum cable, as directed beyond those currently depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	EA	12	$_____	$_____
GG	**Furnish & Install "1D", 1 Data Outlet, including up to 280ft Category 6, plenum cable, as directed beyond those currently depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	EA	12	$_____	$_____
HH	**Furnish & Install "2D", 2 Data Outlet, including up to 280ft Category 6, plenum cable, as directed beyond those currently depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	EA	12	$_____	$_____
II	**Furnish & Install "1V2D", 1 Voice – 2 Data Outlet, including up to 280ft Category 6, plenum cable, as directed beyond those currently depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	EA	12	$_____	$_____
JJ	**Furnish & Install "2V2D", 2 Voice – 2 Data Outlet, including up to 280ft Category 6, plenum cable, as directed beyond those currently depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	EA	12	$_____	$_____
KK	**Furnish & Install "AP", Wireless Access Point – Ceiling Mounted, including up to 280ft Category 6, plenum cable, as direct beyond those currently depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	EA	12	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
LL	**Furnish & Install "MON", Monitor location, including up to 280ft Category 6, plenum cable, as direct beyond those currently depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	EA	12	$_____	$_____
MM	**Furnish & Install Wireless Clock, as direct beyond those currently depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	EA	12	$_____	$_____
NN	**Removal and Disposal of Trees under 12 inch caliper, as direct beyond those currently depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	EA	6	$_____	$_____
OO	**Clearing, Grubbing and Disposal of Debris, as direct beyond those areas currently depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	SF	2,000	$_____	$_____
PP	**Relocate Furniture/Materials to be saved, as direct to one of the four areas depicted on the Plans & Specifications** for the Unit Price of: _____dollars and _____cents	Man Hrs.	200	$_____	$_____

I & II: Total Cost of Project: (excluding local building permits fees and State of CT sales tax, without awarding any Alternates)

Numerical $ _____

Written _____

Show amount in both words and figures. In case of discrepancy, the amount shown in words will govern.

Schedule of Bid Alternates: Prices for items to be added depending on Project Funding to the TOTAL COST of Project above.

ADD ALTERNATE 1: Shown on the Plans and Depicted in the Specifications Manual as "A" Boiler Replacement and Oil Tank Removal & all associated piping and equipment for the Lump Sum of:

Numerical $ _____

Written _____

Show amount in both words and figures. In case of discrepancy, the amount shown in words will govern.

ADD ALTERNATE 2: Shown on the Plans and Depicted in the Specifications Manual as "B" Auditorium AHU & Connections Replacement for the Lump Sum of:

Numerical $ _____

Written _____

Show amount in both words and figures. In case of discrepancy, the amount shown in words will govern.

ADD ALTERNATE 3: Shown on the Plans and Depicted in the Specifications Manual as "E" New Main Entry Security Vestibule with bullet /intrusion resistant film. Main Office Casework and Armotex transaction Window WM-TW-HM-SWW and Bullet Resistant Glass for the Lump Sum of:

Numerical $ _____

Written _____

Show amount in both words and figures. In case of discrepancy, the amount shown in words will govern.

<u>ADD ALTERNATE 4:</u> Shown on the Plans and Depicted in the Specifications Manual as "C" Stand By Generator, Pad and <u>ALL</u> Connections to Building Electrical and Control Systems for the Lump Sum of:

Numerical $ _____

Written _____

Show amount in both words and figures. In case of discrepancy, the amount shown in words will govern.

<u>ADD ALTERNATE 5:</u> Shown on the Plans and Depicted in the Specifications Manual as "G" Roof Warranty Upgrade – 30 year in lieu of 20 year for the Lump Sum of:

Numerical $ _____

Written _____

Show amount in both words and figures. In case of discrepancy, the amount shown in words will govern.

<u>ADD ALTERNATE 6:</u> Shown on the Plans and Depicted in the Specifications Manual as "D" 2nd Floor Rooms, Hallways, Stair towers (treads & risers and landing) including the moving/protection of stored furniture for the Lump Sum of:

Numerical $ _____

Written _____

Show amount in both words and figures. In case of discrepancy, the amount shown in words will govern.

Company_____

Address_____

Phone # (_____) _____ Fax # (_____)_____ Federal Tax I.D.#_____

– This is a Prevailing Wage Project.

This document, in order to be considered a valid bid, must be signed by a principal officer or owner of the company who is submitting the bid. Such signature will attest to the fact that all terms, conditions and specifications have been read, understood and accepted by the person(s) submitting this proposal.

Any entries on these pages other than those provided in the underlined blanks constitute invalid entries. They will not be considered by the City in making an award and, in the sole discretion of the City, may constitute grounds for disqualifying the Proposer.

Signify if all (**Give the Numbers**) _____addenda were received: YES / NO (circle one)

BY: _____(print name)

TITLE: _____

DATE: _____

SIGNITURE: _____

LEASE

This Lease (this "**Agreement**"), is made as of this 7th day of November, 2018, by and between ONE ELMCROFT STAMFORD LLC, a Connecticut limited liability company ("**Landlord**") and the CITY OF STAMFORD, a municipal corporation lying within the County of Fairfield and State of Connecticut ("**Tenant**").

WITNESSETH:

WHEREAS, Landlord is the owner of a certain building located at 1 Elmcroft Road a/k/a 126 Elmcroft Road, Stamford, Connecticut ("**Landlord's Property**");

WHEREAS, Tenant desires to occupy the entirety of the fourth (4th) floor of Landlord's Property consisting of approximately 108,807 rentable square feet (the "**Fourth Floor Premises**") and may desire to occupy a portion of the third (3rd) floor of Landlord's Property consisting of up to 24,193 rentable square feet (the "**Third Floor Premises**") as shown on the plan annexed hereto as Exhibit A together with the use of two hundred (200) unreserved and non-exclusive parking spaces at Landlord's Property; and

WHEREAS, Landlord and Tenant each covenant and agree to observe and perform all of the terms, provisions, conditions and covenants herein contained on its part to be observed and performed.

NOW, THEREFORE, in consideration of the mutual covenants hereinafter set forth, and of other good and valuable consideration, the receipt of which is hereby acknowledged, the parties agree as follows.

1. Grant of Lease:

(a) Subject to the terms and conditions set forth in this Agreement, Landlord hereby leases to Tenant and Tenant hereby hires from Landlord, the Fourth Floor Premises and, if the Expansion Option set forth below is exercised, the Third Floor Premises, for the Permitted Use (as defined below). For all purposes herein, the "**Premises**" shall mean the Fourth Floor Premises and any space that constitutes the Third Floor Space as a result of Tenant's exercise of the Expansion Option. Tenant shall have access to the Premises 24 hours a day, 7 days a week, 365 days a year and shall have reasonable rights of access through the common areas of Landlord's Property for the purpose of accessing and making use of the Premises.

(b) Tenant may increase the size of the Premises by up to approximately 24,193 rentable square feet of the Third Floor Premises, effective at midnight December 1, 2018 (the "**Expansion Option**"). The option to increase the size of the Premises as described above shall be exercisable by Tenant giving notice to Landlord not later than November 15, 2018. Except for the obligation of Landlord to provide Tenant with additional parking, the terms and conditions of this Agreement shall apply to the Third Floor Premises with the same force and effect as if such Third Floor Premises had originally been included in the Premises of this

Agreement; provided, all terms and conditions of this Agreement that are based upon the rentable square footage of the Premises will be appropriately modified.

2. Use:

(a) The Premises may be used by the Tenant for school purposes and all ancillary uses typically appurtenant thereto (the "**Permitted Use**") and for no other purpose. Tenant agrees to comply with the rules and regulations established for Landlord's Property and the Premises annexed hereto as Exhibit B. Tenant shall not alter or replace any lock on any base building door, or place any signs or notices on the doors, walls, or windows of the Premises, without the prior written consent of Landlord, which consent shall not be unreasonably withheld, conditioned or delayed.

(b) Tenant shall not use the Premises, or permit the Premises to be used, in any manner which (i) violates any applicable law, rule, or regulation; (ii) causes or is reasonably likely to cause damage to the Premises or the Landlord's Property; (iii) violates a requirement or condition of any fire and extended insurance policy covering the Premises or Landlord's Property, or increases the cost of such policy; or (iv) constitutes or is reasonably likely to constitute a nuisance, annoyance or inconvenience to neighbors, adjoining property owners, and/or other tenants or occupants of Landlord's Property, or to Landlord's Property.

(c) Tenant shall, at its sole cost and expense, maintain the Premises in a neat and clean condition. Tenant shall be responsible for, and upon demand by Landlord shall promptly reimburse Landlord for, any damage to any portion of Landlord's Property or the Premises caused by (a) Tenant's activities in Landlord's Property or the Premises; (b) the performance or existence of any alterations, additions or improvements made by Tenant in or to the Premises; (c) the installation, use, operation or movement of Tenant's property in or about the Landlord's Property or the Premises; or (d) any wrongful act or omission by Tenant or its officers, employees, agents, contractors or invitees including, without limitation, school administrators, teachers, students and parents. Notwithstanding the foregoing or anything to the contrary contained herein, Tenant shall not be obligated to perform any work on or about the Premises (x) which is structural in nature or which is Landlord's obligation under this Agreement (provided, Tenant shall reimburse Landlord for the cost of such work as provided in this Agreement when such work is caused by Tenant's acts or is requested by Tenant), and (y) to remove or otherwise dispose of hazardous materials (unless such hazardous materials are present at the Premises as a result of Tenant's actions).

3. Term:

(a) The term of the lease granted by this Agreement (the "**Term**") shall be for an initial term of approximately seven (7) and one-half (1/2) months beginning on November 13, 2018 (the "**Commencement Date**") and terminating on June 30, 2019 (the "**Expiration Date**"); provided, Landlord shall deliver to Tenant the Fourth Floor Premises on November 13, 2018 and shall deliver the Third Floor Premises to Tenant on December 1, 2018.

(b) On the respective delivery dates set forth above, Landlord shall deliver the applicable portion of Premises to Tenant broom-clean and Tenant shall be entitled to occupy the Premises, free and clear of any tenancies.

(c) Upon the expiration or earlier termination of this Agreement, the lease granted hereunder shall terminate and Tenant shall deliver possession of the Premises to Landlord in the same condition which exists on the Commencement Date, with normal wear and tear, and damage due to casualty not caused by Tenant, excepted.

4. Rent:

(a) Commencing on the Rent Commencement Date and until the Expiration Date, Tenant shall pay to Landlord as rental for the Premises the "**Base Rent**", as follows:

Lease Period	Base Rent For Period	Base Rent per Rentable Square Foot
11/15/18 – 11/30/18	$90,672.50	$20.00
12/1/18 – 12/31/18	$181,345.00	$20.00
1/1/19 – 1/31/19	$181,345.00	$20.00
2/1/19 – 2/28/19	$181,345.00	$20.00
3/1/19 – 3/31/19	$181,345.00	$20.00
4/1/19 – 4/30/19	$181,345.00	$20.00
5/1/19 – 5/31/19	$181,345.00	$20.00
6/1/19 – 6/30/19	$181,345.00	$20.00

(b) In addition to the Base Rent, beginning on the Commencement Date, until the Expiration Date, Tenant shall pay to Landlord the "**Additional Rent**", i.e., all sums as shall become due and payable by Tenant under this Agreement other than the Base Rent, including, but not limited to, the Electrical Factor due under Section 5. Except as otherwise expressly provided herein to the contrary, all items of Additional Rent shall be payable within thirty (30) days after written demand therefor. The Base Rent and Additional Rent are referred to herein, collectively, as the "**Rent**".

(c) The Base Rent (and the Electrical Factor due under Section 5), shall be payable in advance on the first day of each calendar month. If the Commencement Date is other than the first day of a calendar month, the prepaid Base Rent and the Electrical Factor for such partial month shall be prorated in the proportion that the number of days this Lease is in effect during such partial month bears to the total number of days in the calendar month. Except as otherwise expressly provided herein, Base Rent and Additional Rent, shall be paid to Landlord, without notice, demand, abatement, deduction or offset, in lawful money of the United States at Landlord's address set forth in this Agreement, or to such other person or at such other place as Landlord may designate from time to time by written notice given to Tenant. No payment by Tenant or receipt by Landlord of a lesser amount than the correct Rent due hereunder shall be deemed to be other than a payment on account; nor shall any endorsement or statement on any check or any letter accompanying any check or payment be deemed to effect or evidence an

accord and satisfaction; and Landlord may accept such check or payment without prejudice to Landlord's right to recover the balance or pursue any other remedy in this Lease or at law or in equity provided.

5. Utilities and Services:

(a) Landlord agrees to furnish or cause to be furnished to the Premises the following utilities and services, subject to the conditions and standards set forth herein:

(i) Landlord shall provide such air conditioning, heating and ventilation ("HVAC") as, in Landlord's reasonable judgment, are required for the comfortable use and occupancy of the Premises reasonably consistent with practices of owners of similar buildings in Stamford, Connecticut.

(ii) Landlord shall provide water for drinking and lavatory purposes on a seven (7) day per week, twenty-four (24) hours per day basis.

(iii) Landlord shall cause electricity to be made available to the Demised Premises for standard lighting fixtures, personal computers, telecommunications equipment and other equipment and accessories customary for commercial office use on a seven (7) day per week, 24 hour a day basis. Tenant shall pay to Landlord monthly, commencing on the Commencement Date, a sum equal to $2.75 per annum multiplied by the number of square feet in the Premises, in the form of Additional Rent (the "**Electrical Factor**"). Landlord shall not be liable in any way to Tenant for any failure or defect in the supply or character of electricity furnished to the Premises by reason of any requirement, act or omission of the public utility serving the Property with electricity or for any other reason not within the control of Landlord. Tenant shall replace all lighting tubes, lamps, bulbs (including incandescent and fluorescent), starters and ballasts required in the Premises, at Tenant's expense. Any amounts which Tenant is required to pay to Landlord pursuant to this Section 5(a)(iii) shall constitute Additional Rent.

(iv) Landlord shall arrange with and pay a waste management company to provide adequate dry trash and recycling services to the tenants and occupants of the Building.

(v) Landlord shall provide security services to Landlord's Property under such terms and scope as Landlord shall determine in its sole discretion. Any additional security desired by Tenant shall be at Tenant's sole cost and expense.

(vi) Landlord shall maintain the exterior of Landlord's Property, including without limitation landscaping services and snow removal as, in Landlord's reasonable judgment, are required for the reasonable use and occupancy of the Premises reasonably consistent with practices of owners of similar buildings in Stamford, Connecticut.

(vii) Landlord shall maintain in good condition and repair all passenger and freight elevators and the building's loading dock. Tenant shall have 24-hours per day,

365/366 days a year, non-exclusive use of those building passenger elevators serving the Premises. Access to the freight elevator and loading dock shall be coordinated with Landlord's property manager.

(viii) Landlord shall not be liable for any failure to furnish, stoppage of, or interruption in furnishing any of the services or utilities described in this Section 5, when such failure is caused by accident, breakage, repairs, strikes, lockouts, labor disputes, labor disturbances, governmental regulation, civil disturbances, acts of war, moratorium or other governmental action, or any other cause beyond Landlord's reasonable control, and, in such event, Tenant shall not be entitled to any damages nor shall any failure or interruption abate or suspend Tenant's obligation to pay Base Rent and Additional Rent required under this Agreement or constitute or be construed as a constructive or other eviction of Tenant.

(ix) Landlord, at its expense, agrees to maintain and make all necessary repairs to Landlord's Property as Landlord deems appropriate in Landlord's sole reasonable discretion and in accordance with applicable laws and sound management practices of comparable buildings.

(b) Landlord shall not be required to provide cleaning services at the Premises. The Premises shall be kept clean and in order by Tenant, at Tenant's expense, to the reasonable satisfaction of Landlord and by persons approved by Landlord.

(c) Notwithstanding anything in this Agreement to the contrary, if Tenant desires to obtain any service that Landlord does not provide to Tenant after Tenant has requested Landlord to provide such service, then Tenant may contract directly with any provider of such service (including, without limitation, telecommunications and data).

6. Indemnification: Unless caused by the negligence or by the willful misconduct of Landlord or any agent, representative, employee or contractor of Landlord or by the failure of Landlord to discharge its obligations under this Agreement, Tenant agrees to at all times protect, indemnify, and hold Landlord harmless from any claim, damage, liability or judgment of any nature or kind resulting from or as a consequence of any breach of this Agreement by Tenant or any action or omission taken or not performed by Tenant, including claims, damage, liability or judgment resulting from injury to persons or property arising in any way from Tenant's use of the Premises. Unless caused by the negligence or by the willful misconduct of Tenant or any agent, representative, employee or contractor of Tenant or by the failure of Tenant to discharge its obligations under this Agreement, Landlord agrees to at all times protect, indemnify, and hold Tenant harmless from any claim, damage, liability or judgment of any nature or kind resulting from or as a consequence of any breach of this Agreement by Landlord or any action or omission taken or not performed by Landlord, including claims, damage, liability or judgment resulting from injury to persons or property arising in any way from Landlord's lease to Tenant of the Premises.

7. Condition of Premises:

(a) Tenant has examined and is familiar with the present condition of the Premises and agrees to accept the Premises in its "As-Is" condition, except as otherwise expressly set forth herein. Landlord represents to Tenant that the electrical, plumbing, HVAC and elevator systems and equipment in or serving the Premises shall be in good operating order and condition on the date of delivery of each portion of the Premises to Tenant. The Premises are being furnished by Landlord without warranty of any sort whatsoever.

(b) Landlord agrees that it shall coordinate, at no cost to Tenant, improvements to the base building and base building systems serving the Premises and improvements to the Premises that Tenant reasonably requires to prepare the Premises for Tenant's use. All such improvements shall be at Tenant's sole cost and expense. Tenant and Landlord shall mutually agree as to the improvements to be made and Tenant shall pre-approve the costs thereof, and thereafter Landlord shall cause such improvements to be performed. Landlord shall deliver to Tenant, for review and payment, invoices for the actual cost of the work actually performed, and at Landlord's direction Tenant shall either reimburse Landlord for such actual costs as Additional Rent or pay the third-party providers directly for such actual costs. In no event shall Tenant incur, or shall Landlord agree to cause improvements to be performed that exceed, One Million ($1,000,000) Dollars.

8. Insurance:

(a) At all times during the Term, Tenant shall procure and maintain, at its sole expense, the following insurance including:

(i) (A) Commercial general liability insurance, including without limitation contractual liability, premises, operations, products/completed operations, including personal and advertising injury, in respect of the Premises and the conduct or operation of business therein, with limits of not less than One Million ($1,000,000) Dollars per occurrence, Two Million ($2,000,000) Dollars general aggregate for bodily injury and property damage, and (B) Umbrella liability coverage with limits of not less than Twenty Million ($20,000,000) Dollars per occurrence, subject to an annual aggregate of Twenty Million ($20,000,000) Dollars, provided such Umbrella liability coverage shall follow form of the general liability insurance described above and shall be in excess of general liability, automobile and worker's compensation coverage.

(ii) Where applicable and required by law, Workers' Compensation Insurance and Connecticut Disability Benefits Insurance in statutorily required amounts covering Tenant with respect to all persons employed by Tenant as required by laws of the State of Connecticut, and Employer's Liability insurance with a limit of not less than One Million ($1,000,000) Dollars bodily injury each accident, One Million ($1,000,000) Dollars bodily injury by disease each person, and One Million ($1,000,000) Dollars bodily injury per policy limit.

(iii) Property Coverage, including without limitation acts of terrorism coverage affording coverage at full replacement value for any property brought on the Premises as may be appropriate and as interest appears from time to time.

(iv) If Tenant maintains its own registered vehicles, business automobile liability coverage with minimum limits of One Million Dollars ($1,000,000) (combined single limit) for bodily injury and property damage.

(v) Sexual misconduct, abuse or molestation coverage with minimum limits of One Million Dollars ($1,000,000).

(vi) From the operator of any school bus serving Tenant at the Premises, automobile, general liability and worker's compensation coverage equivalent to the coverage to be provided by Tenant, and umbrella liability coverage in excess of general liability, automobile and worker's compensation coverage.

(vii) Any other insurance required by applicable legal requirements or as reasonably required by Landlord or any mortgagee of Landlord's Property.

(b) All insurance required to be maintained by Tenant shall be issued by insurance companies authorized to do insurance business in the State of Connecticut and rated not less than A-VII in Best's Insurance Guide. A certificate of insurance evidencing the insurance required under this Section 7 shall be delivered to Landlord on or before the Commencement Date. No such policy shall be subject to cancellation or modification without thirty (30) days prior written notice to Landlord. Tenant shall furnish Landlord with a replacement certificate with respect to any insurance not less than thirty (30) days prior to the expiration of the current policy. All such insurance shall be in effect as of the Commencement Date, and to the extent applicable shall list Landlord and Landlord's property manager, BLT Management, LLC, as additional insureds on a primary, non-contributory basis.

(c) Tenant hereby waives any right of recovery against Landlord for injury or loss due to hazards covered by insurance or required to be covered, to the extent of the injury or loss covered thereby. Any policy of insurance to be provided by Tenant pursuant to this Section 7 shall contain a clause denying the applicable insurance any rights of subrogation against Landlord. Landlord hereby waives any right of recovery against Tenant for injury or loss due to hazards covered by insurance, to the extent of the injury or loss covered thereby. Any policy of insurance to be maintained by Landlord shall contain a clause denying the applicable insurance any rights of subrogation against Landlord. Landlord shall maintain general liability insurance, in occurrence form, insuring Landlord against any and all liability for injury to or death of a person or persons, and for damage to or destruction of property, occasioned by or arising out of or in connection with the ownership or management of the Property, and including contractual liability coverage for Landlord's indemnity obligations under this Agreement, to afford protection with a minimum combined single limit of liability of at least Five Million ($5,000,000) Dollars, including excess liability coverage.

(d) If Tenant fails to maintain any insurance which Tenant is required to maintain pursuant to this Section 7, Tenant shall be liable to Landlord for any loss or cost directly resulting from such failure.

(e) Landlord is not obligated to carry insurance on Tenant's personal or business property. Unless caused by the negligence or by the willful misconduct of Landlord or any agent, representative, employee or contractor of Landlord, Landlord shall not be liable to the Tenant or any other person, for any damages on account of loss, damage or theft to any personal or business property of Tenant, its employees, agents or invitees.

(f) Tenant agrees that, unless caused by the negligent act or omission or willful misconduct of Landlord or any agent, representative, employee or contractor of Landlord, Landlord shall not be liable or responsible to Tenant or its invitees for any injury or damage or loss resulting from the acts or omissions of Landlord's employees, including but not limited to the failure or interruption or discontinuance of any communications or Internet access systems or services, if any, or any and all other services provided by Landlord; from the acts or omissions of persons occupying office space or using services from Landlord or their invitees; or other persons occupying any part of or employed by the Landlord's Property or their invitees, or for any injury or damage resulting to Tenant or its property from or for any failure of utilities provided, such as water, gas or electricity, or for any injury or damage to persons or property caused by any person except for such loss or damage arising from the willful or negligent misconduct of Landlord, or any of its representatives, agents, contractors or employees.

9. **Default:** If Tenant (i) defaults in the payment of any monetary obligation under this Agreement and remains in default with respect thereto for ten (10) days after notice, or (ii) defaults in the performance of any of Tenant's other obligations under this Agreement and remains in default with respect thereto for thirty (30) days after receipt of notice in writing of such default (or if such default is of such a nature that the same cannot be cured within thirty (30) days, Tenant shall not be deemed in default so long as Tenant commences the cure thereof with such thirty (30) days and diligently pursues the cure thereof, or (iii) if Tenant be declared bankrupt, or insolvent or file for protection from creditors, or if a receiver be appointed for Tenant, then in any such event:

(a) Landlord may give Tenant a ten (10) days' notice of termination of this Agreement and the lease granted hereunder and, in the event such notice is given, this Agreement, the lease and the Term shall terminate upon the expiration of said ten (10) days with the same effect as if the date of expiration of said ten (10) days were the Expiration Date of the Term, but Tenant shall remain liable for damages and all other sums payable pursuant to this Agreement, at law or in equity.

(b) Upon such termination (i) Tenant shall have no further right to avoid the termination of this Agreement by the payment of any sum due or by the performance of any condition, term or covenant contained herein and (ii) all charges, payments, costs and expenses incurred by Landlord as a result of such termination, including reasonable attorneys' fees, shall be immediately due and payable by Tenant to Landlord.

(c) Landlord may, without further notice, re-lease or lease the Premises as Landlord deems fit.

10. Remedies of Tenant: It is expressly understood and agreed by and between the parties hereto that: (i) the recourse of Tenant or its successors or assigns against Landlord arising out of Tenant's use of the Premises shall extend only to Landlord's interest in the Landlord's Property, which shall include the rents, issues and profits derived therefrom and not to any other assets of Landlord or its property manager, or any of their respective managers, members, directors, officers, employees, agents, constituent partners, beneficiaries, trustees or representatives, and (ii) except to the extent of Landlord's interest in the Landlord's Property, no personal liability or personal responsibility is assumed by, or shall at any time be asserted or enforceable against, Landlord, its property manager, or any of their respective managers, members, directors, officers, employees, agents, constituent partners, beneficiaries, trustees or representatives.

11. Improvements to the Premises and to Landlord's Property: Tenant shall not make or permit to be made any alterations, additions, or improvements in or to the Premises without the prior written consent of Landlord, which consent shall not be unreasonably withheld, conditioned or delayed; provided that, Tenant shall have the right to perform minor cosmetic decorating in the Premises without obtaining Landlord's prior consent provided that said work does not affect the structure or systems of the Landlord's Property. Tenant may, with the prior written consent of Landlord, which consent shall not be unreasonably withheld, conditioned or delayed, make reasonable improvements and alterations to the exterior of Tenant's Property and the land upon which it is situated to provide for play areas and access to the Premises.

12. Sublease and Assignment: Tenant shall have no right to sublease the Premises, or to assign this Agreement and the lease created hereunder, without the prior written consent of the Landlord, which consent may be withheld at Landlord's sole and absolute discretion.

13. Attorneys Fees: If either Landlord or Tenant shall commence any action or other proceeding against the other arising out of, or relating to, this Agreement or the Premises, the prevailing party shall be entitled to recover from the other party, in addition to any other relief, its actual and reasonable attorneys' fees.

14. Entry by Landlord: Landlord may, with reasonable prior notice (other than during an emergency), enter the Premises at any time to (i) inspect the same, (ii) exhibit the same to prospective purchasers, mortgagees or tenants, (iii) determine whether Tenant is complying with all of its obligations under this Agreement, and (iv) make repairs or improvements in or to the Premises. In the exercise the rights set forth in this Section 14, such access shall not deprive Tenant of access to the Premises or unreasonably interfere with the use of the Premises and Landlord shall take reasonable precautions for the continuation of Tenant's operations in the Premises and the protection of Tenant's property. Notwithstanding any of the foregoing, Landlord acknowledges that Tenant has security and confidentiality requirements such that the Premises shall not be available to Landlord during school hours unless accompanied by a duly authorized representative of Tenant, and Tenant agrees to make such duly authorized representative reasonably available to Landlord; provided, Landlord shall have the right to full access to the Premises in the case of an emergency.

15. Holdover by Tenant: If Tenant holds possession of the Premises after the expiration or earlier termination of the Term, Tenant shall pay to Landlord the sum of equal to two hundred

percent (200%) of the Rent payable for the month immediately preceding the Expiration Date for each month or partial month of such holdover; provided, Tenant shall have no right to hold over or extend the Term without Landlord's express written consent. Without limiting the foregoing, Tenant hereby agrees to indemnify, defend and hold harmless Landlord, its legal and beneficial owners, and their respective officers, directors, agents, contractors and employees, from and against any and all claims, liabilities, actions, losses, damages (including without limitation, direct, indirect, incidental and consequential) and expenses (including, without limitation, court costs and reasonable attorneys' fees) asserted against or sustained by any such party and arising from or by reason of such retention of possession, which obligations shall survive the expiration or termination of the Term.

16. Authority. The undersigned officer or agent of Tenant warrants and represents to Landlord that such officer or agent has been duly authorized to enter into this Agreement on Tenant's behalf by the Stamford Planning Board, the Stamford Board of Finance and the Stamford Board of Representatives.

17. Miscellaneous:

(a) This Agreement, which includes the recital clauses at the outset and the exhibits hereto, contains the entire Agreement between Landlord and Tenant.

(b) Any provisions of this Agreement which proves to be invalid or illegal will in no way affect any other provisions of this Agreement which will remain in full force.

(c) If this Agreement is terminated, there will be no further obligation on the part of Landlord hereunder.

(d) Landlord and Tenant represent and warrant to the other that neither party has dealt with any person or real estate broker in respect to this Agreement or the Premises. Each party shall protect, indemnify, hold harmless and defend the other party from any liability arising from any claim of any kind which arises out of the other's breach of the foregoing representation.

(e) This Agreement shall not be amended, changed or modified in any way unless in writing executed by Landlord and Tenant.

(f) Except as expressly provided herein, this Agreement and the obligations of Landlord and Tenant contained herein shall be binding upon and inure to the benefit of the successors and assigns of the parties hereto.

(g) Any obligations of either party hereto accruing prior to the expiration of this Agreement shall survive the expiration or earlier termination of the Term and each party shall promptly perform all such obligations whether or not this Agreement has expired or been terminated.

(h) TIME IS OF THE ESSENCE with respect to Tenant's and Landlord's performance of their respective obligations hereunder.

18. Notice, Demands: All notices or demands in this Agreement provided to be given, made or sent by either party hereto to the other shall be in writing and shall be deemed to have been fully given, made or sent when made by personal service or received or refused as evidenced by return receipt of deposited in the United States mail, certified or registered, return receipt requested and postage prepaid, or by overnight courier providing verification of delivery, and addressed as follows:

Landlord's address:
c/o BLT Management, LLC
1 Elmcroft Road, Suite 500
Stamford, CT 06902
Attention: Carl R. Kuehner

With a copy to:
c/o BLT Management, LLC
1 Elmcroft Road, Suite 500
Stamford, CT 06902
Attention: David Fite Waters, Esq.

Tenant's address:
City of Stamford
888 Washington Boulevard
Stamford, CT 06904
Attention: Mayor

With a copy to:
City of Stamford
888 Washington Boulevard
Stamford, CT 06904
Attention: Corporation Counsel

19. Governing Laws: This Agreement and the rights and obligations of the parties will be construed under and governed by the laws of the State of Connecticut without giving effect to conflicts of laws principles. All disputes arising under this Lease shall be submitted to the exclusive jurisdiction of the appropriate state and federal courts located in the State of Connecticut.

20. Untenantable: Notwithstanding anything contained in this Agreement to the contrary, if the Premises are rendered untenantable or inaccessible for a period of thirty (30) or more days for any reason other than due to the acts or omissions of Tenant, then in such event, Tenant shall be entitled to provide Landlord with a written notice terminating this Agreement at no cost to Tenant.

21. Parking: Landlord hereby grants to Tenant a license, at no additional charge, to use two hundred (200) unreserved and non-exclusive parking spaces in the parking area at Landlord's Property; provided, Landlord at Tenant's request shall, to the extent reasonably available, make available to Tenant additional parking spaces for special events occurring at the Premises. This license shall commence on the Commencement Date under the Agreement and shall continue until the earlier to occur of the Expiration Date under the Agreement, or termination of the Agreement.

22. Options to Extend:

(a) Tenant shall have the right, at its option, to renew the Term of this Agreement for up to three (3) additional terms (each, a "**Renewal Term**"), as follows:

Option Period	Base Rent per Rentable Square Foot	Notice Date
7/1/19 – 8/31/19	$20.00	4/15/19
9/1/19 – 2/28/20	$30.00	6/1/19
3/1/20 – 8/31/20	$30.00	12/1/19

Each Renewal Term shall commence on the day after the expiration of the prior Term and shall expire on the date set forth above as the end of such Option Period. This option to renew the Term as described above shall be exercisable by Tenant giving written notice to Landlord not later than the date set forth above as the Notice Date. TIME SHALL BE OF THE ESSENCE with respect to the date of exercising such option, any principle of law to the contrary notwithstanding. Except for the Base Rent, the terms and conditions of this Agreement shall apply to each Renewal Term with the same force and effect as if such Renewal Term had originally been included in the original Term of this Agreement. All Rent shall commence on the first day of the applicable Renewal Term. The right of Tenant to each Renewal Term shall be conditioned upon no Event of Default having occurred and remaining uncured as of the date on which Tenant delivers the renewal notice. Tenant shall have no further options to extend the Term beyond the expiration date of the last Renewal Term.

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IN WITNESS WHEREOF, the parties, intending to be legally bound, have caused this Lease Agreement to be duly executed on the year and day first written above.

LANDLORD:

ONE ELMCROFT STAMFORD LLC,
a Connecticut limited liability company

By:_____
Name: Carl R. Kuehner
Title: Authorized Signatory

TENANT:

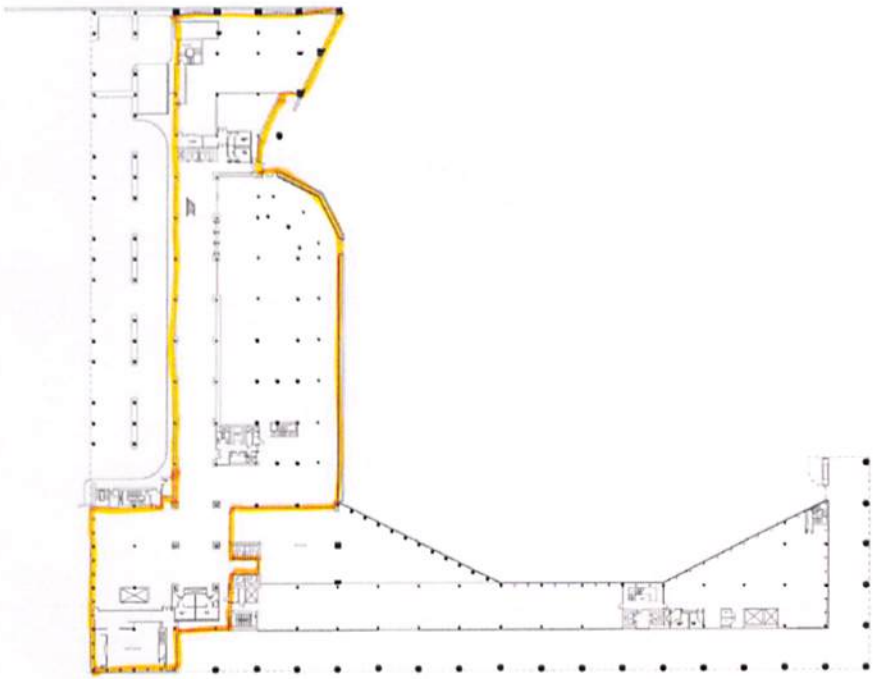
CITY OF STAMFORD
a municipal corporation

By:_____
Name: David R. Martin
Title: Mayor

EXHIBIT A

PREMISES

THIRD FLOOR PREMISES



FOURTH FLOOR PREMISES

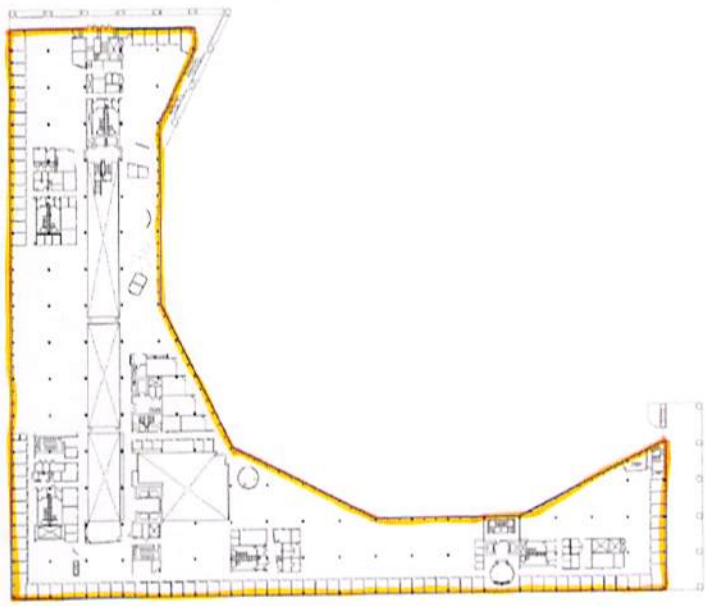


EXHIBIT B

RULES AND REGULATIONS

To the extent the provisions of these Rules and Regulations conflict with the provisions of the Lease, the provisions of the Lease shall control.

1. The sidewalks, driveways, entrances, passages, courts, lobby, esplanade areas, plaza, elevators, vestibules, stairways, corridors or halls shall not be obstructed or encumbered by any tenant or used for any purpose other than ingress and egress to and from the Premises, and Tenant shall not permit any of its employees, agents, or invitees to loiter in any of said areas (except for the outdoor plaza and esplanade areas as designated). No doormat of any kind whatsoever shall be placed or left in any public hall or outside any entry door of the Premises.

2. Except as provided in the Lease, no awnings or other projections shall be attached to the outside walls of the Building. No curtains, blinds, shades or screens that are visible from the exterior of the Premises or Building shall be attached to or hung in, or used in connection with, any window or door of the Premises without the prior written consent of Landlord (including the manner of hanging or attachment), such consent not to be withheld unreasonably and to be deemed given if not withheld, with reasonable explanation, within ten (10) days following request.

3. No sign, insignia, advertisement, object, notice or other lettering shall be exhibited, inscribed, painted or affixed by any tenant either (a) on any part of the outside of the Building, or (b) inside of the Common Areas, or (c) outside of the Premises, without in each such case the prior written consent of Landlord, such consent to be deemed given if not withheld within ten (10) days following request. In the event of the violation of the foregoing by any tenant, Landlord may remove the same without any liability, and may charge the expense incurred in such removal to the tenant or tenants violating this rule. Interior signs in Common Areas of the Building (if and when approved by Landlord), and lettering on doors and directory tablets shall be inscribed, painted or affixed for each tenant by Landlord at the reasonable expense of such tenant, and shall be of a size, color and style which matches Building standard or is otherwise reasonably acceptable to Landlord.

4. The sashes, sash doors, skylights, windows, and doors that reflect or admit light and air into the halls, passageways or other public places in the Building shall not be covered or obstructed by any tenant, nor shall any bottles, parcels, or other articles be placed on the window sills or on the peripheral heating loop enclosures.

5. No showcases or other articles shall be put in front of or affixed to any part of the exterior of the Building, nor placed in the halls, corridors or vestibules of the Common Areas.

6. The water and wash closets and other plumbing fixtures shall not be used for any purpose other than those for which they were designed or constructed, and no sweepings, rubbish,

rags, acids or other similar substances shall be thrown or deposited therein. Except as specified in Landlord's cleaning specifications, any cuspidors or containers or receptacles used as such in the Premises shall be emptied, cared for and cleaned by and at the expense of Tenant.

7. No tenant shall mark, paint, drill into, or in any way deface any part of the Common Areas or the Building. No borings or cuttings shall be permitted, except with the prior written consent of Landlord, and as Landlord may direct, except as provided in Tenant's Plans or in connection with approved (or deemed approved) Alterations. Subject to the foregoing, Tenant may install and hang normal office decorations and cabinetry in the Premises.

8. No bicycles, vehicles, birds or animals of any kind (except fish) shall be brought into or kept in or about the Premises. However, this prohibition shall not apply to service animals which are assisting impaired individuals or which may be utilized for detecting illegal drugs or explosives.

9. No noise, including, but not limited to, music or other playing of musical instruments, recordings, radio or television, which, in the reasonable judgment of Landlord, might disturb other tenants in the Building, shall be made or permitted by any tenant. Nothing shall be done or permitted in the Premises by any tenant which would materially impair or interfere with, as determined by reasonable standards, the use or enjoyment by any other tenant of any other space in the Building or on the outdoor plaza.

10. No tenant nor any of tenant's servants, employees, agents, visitors or licensees shall at any time bring or keep upon the Premises any inflammable, combustible or explosive fluid, chemical or substance, except in small quantities as may be required for the proper operation, maintenance and/or cleaning of customary office equipment, provided Tenant shall comply with any and all laws and regulations governing usage and disposal of same.

11. Each tenant shall, upon the termination of its tenancy, turn over to Landlord all security cards, Smartpass cards, all keys of stores, offices and toilet rooms, either furnished to, or otherwise procured by, such tenant, and in the event of the loss of any keys furnished by Landlord, such tenant shall pay to Landlord the standard fee charged by Landlord for the cost of replacement thereof. Any security card or Smartpass returned by a tenant when unneeded during the term of such tenant's lease shall thereafter be re-issued to such tenant as an "add back" without charge upon request.

12. The removal or delivery of furniture or extra-large or heavy items which may interfere with the use and occupancy of the Building by other tenants, or with their access to their respective leased premises, must take place during such hours and in such elevators as Landlord or its agent may reasonably determine from time to time. Landlord reserves the right to a cursory inspection of all objects and matter to be brought into the Building and to exclude from the Building all objects and matter which violate any of these Rules and Regulations or the Lease of which these Rules and Regulations are a part. Landlord may require any person leaving the Building with any package or other object or matter to

submit a pass, listing such package or object or matter is being removed, but the establishment and enforcement of such requirement shall not impose any additional responsibility on Landlord for the protection of any tenant against the removal of property from the premises of such tenant. Landlord shall in no way be liable to any tenant for damages or loss arising from the admission, exclusion or ejection of any person to or from the Premises of the Building under the provisions of this Rule 12 or Rule 16 hereof.

13. Tenant shall not occupy or permit any portion of the Premises to be occupied as an office for a public stenographer or public typist, or for the storage, manufacture, or sale of liquor, narcotics, tobacco in any form, or as a barber, beauty or manicure shop, or as a school, or as a hiring or employment agency. Tenant shall not use the Premises or any part thereof, or permit the Premises, or any part thereof to be used for manufacturing or for the sale at auction of merchandise, goods or tangible personal property of any kind.

14. No tenant shall obtain, purchase or accept for use in the Premises catering, ice, water cooler, towel service, barbering, boot blackening, special cleaning, floor polishing, or other similar services from any persons not expressly authorized by Landlord to furnish such service; provided, however, that such service may be furnished by an outside vendor or caterer in the event the vendors and/or caterers doing business at the Building fail to bid competitive prices or rates for such services. Notwithstanding the above, this prohibition shall not prevent Tenant from furnishing such services for its employees, guests, invitees and independent contractors, or prevent Tenant's employees from bringing in meal items and/or having coffee breaks. Notwithstanding the foregoing, Tenant shall have the right to utilize exterior vendors and/or caterers, provided that Tenant utilizes such vendors that maintain the Class A nature of the Building.

15. Landlord shall have the right to prohibit any advertising or identifying sign by any tenant which, in Landlord's judgment, tends to impair the reputation of the Building or its desirability as a building for offices and upon written notice from Landlord, such tenant shall refrain from or discontinue such advertising or identifying sign.

16. Intentionally omitted.

17. Tenant, before closing and leaving the Premises at any time, shall see that all operable windows are closed and all lights are turned out. All entrance doors in the Premises shall be left locked by Tenant when the Premises are not in use. Entrance doors on multi-tenant floors shall not be left open at any time.

18. Unless Landlord shall furnish electrical energy hereunder as a service included in the rent, Tenant shall, at Tenant's expense, provide artificial light and electrical energy for the employees of Landlord and/or Landlord's contractors while doing janitor service or other cleaning in the Premises and while making repairs or alterations in the Premises.

19. The Premises shall not be used for lodging or sleeping or for any immoral or illegal purpose.

20. The requirements of tenants will be attended to only upon notice of Landlord's managing agent and, if Landlord or its managing agent requests, upon execution and submission or written application or purchase order. Employees of Landlord shall not perform any work or do anything outside of their regular duties, unless under special instructions from Landlord.

21. Canvassing, soliciting and peddling in the Building are prohibited and each tenant shall reasonably cooperate to prevent the same.

22. There shall not be used in any space, or in the public halls of the Building, either by any tenant or by any others, in the moving or delivery or receipt of safes, freight, furniture, packages, boxes, crates, paper, office material, or any other matter of thing, any hand trucks except those equipped with rubber tires, side guards and such other safeguards as Landlord shall reasonably require.

23. Tenant shall not cause or permit any odors of cooking or other processes or any unusual or objectionable odors to emanate from the Premises in disturbance of other tenants or which creates a public or private nuisance. No cooking shall be done in the Premises except as is expressly permitted in the foregoing Lease or in the pantry area. Smoking shall only be permitted within designated areas of the Property, and in no event within the Building.

24. On notice to tenants, Landlord may rescind, alter or waive any rule or regulation at any time prescribed for the Building when, in its reasonable judgment, it deems it necessary or desirable for the reputation, safety, care or appearance of the Building, or the preservation of good order therein, or the operation or maintenance of the Building, or the equipment thereof, or the comfort of tenants or others in the Building. Rules will be applicable and enforced uniformly.

25. The parking areas servicing the Building shall not be used for storage of vehicles or long-term parking of vehicles; it being the intention that Tenant's use of said parking areas is to be directly related to Tenant's use of Premises as said use is permitted by the terms of its Lease. Landlord reserves the right to cause the removal, by towing, of vehicles in violation of this parking rule, it being understood and agreed by Tenant that Landlord's right to tow illegally parked vehicles is hereby noticed to Tenant and no notice of Landlord's right to tow illegally parking vehicles by signage need be posted on the Land or the Building. All costs of the towing of illegally parked cars owned by Tenant or Tenant Parties shall be borne by Tenant and shall be deemed to be Additional Rent.

26. The garage is to be used by tenants of the Building, their employees, visitors and guests.

27. The speed limit within the garage and on all internal roadways and driveways shall be 5 m.p.h. and is strictly enforced.

28. Overnight parking is prohibited. You should defer to your specific lease for an individual tenant's rights to park in the garage after hours.

29. Vehicles may not be parked in such a manner as to block access to: garages, fire hydrants, pedestrian crossing areas, designated fire lanes, or clear two lane passage by vehicles. Violators will be towed.

30. The following types of vehicles are prohibited in the parking areas or drives except for temporary loading or unloading: trucks and other commercial vehicles (carrying a sign advertising a business) and vehicles with more than four single-tired wheels.

31. All vehicles parked on the property will be licensed and in operating condition for safe travel on public roads.

32. The maximum height for vehicles accessing the garage is posted. You will be responsible for damages resulting from your vehicles exceeding this height requirement. Vehicles with roof racks shall enter at their own risk.

33. All persons will comply with Connecticut state laws and Department of Motor Vehicles regulations on the roads, drives and property.

34. Parking in the garage and in other parking areas is "at your own risk". Unless resulting from their willful misconduct, ownership and management shall not be held responsible for any damage to vehicles nor be responsible for any items left in vehicles.

35. Tenants and their employees may park only in those areas assigned to them.

36. All visitors must report to reception of the appropriate building entrance of which they are visiting.

Landlord acknowledges that Tenant shall not be responsible for compliance by Tenant Parties with the Rules and Regulations with respect to motor vehicles, but Tenant shall reasonably cooperate with, and support, Landlord's actions to enforce compliance with such Rules and Regulations by all Tenant Parties.

SECTION 019113 – GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Related Sections
   1. Division 7 (ALL SECTIONS)
   2. Division 8 (ALL SECTIONS)
   3. Division 23 (ALL SECTIONS)

1.2 SUMMARY

A. This section includes requirements for Commissioning during the pre-design phase, design phase, construction phase and the building turnover phase. This section includes general Commissioning requirements for all specified and associated systems, sub systems and equipment. The intent of this section is to specify the Commissioning responsibilities of the Construction Manager / General and their subcontractors (referred to herein as the Contractor, Heating, Ventilation and Air Conditioning (HVAC) Subcontractor, Testing, Adjusting and Balancing (TAB) Subcontractor, Automated Temperature Controls (ATC) Subcontractor, etc.). The Contractor will assure participation and cooperation of their Subcontractors as required throughout the duration of the Commissioning process.

1.3 DEFINITIONS

A. Architect: Includes Architect identified in the Contract for Construction between Owner and Contractor.

B. Automated Temperature Controls (ATC): This term is inclusive of any and all automated controls, building management systems, energy management systems and their various networks, software and components.

C. Basis of Design (BOD): A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

D. Commissioning Authority (CxA): The individual or group engaged under separate contract to the Owner responsible for executing the Commissioning requirements.

E. Commissioning Plan: An informational document that outlines the organization, schedule, allocation of resources, and documentation requirements of the Commissioning process.

F. Contractor: The prime contractor (Construction Manager or General Contractor) identified in the Contract for Construction between Owner and Contractor.

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G. Statement of Completion: A certifying document issued by the CxA that is to be signed and notarized, confirming compliance with Connecticut High Performance Building Standards.

H. Engineer of Record: Includes the design Engineer(s) identified in the Contract for Construction between Owner and Contractor, responsible for design of HVAC, electrical, communications, controls for HVAC systems and other related building systems.

I. Owner's Project Requirements (OPR): A document that details the program requirements of a project and the expectations of how it will be used and operated. These include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

1.2 ATC Point to Point Report: A complete list and verification report of all analog and digital inputs/outputs tied to the building automation system.

A. Pre-Functional Checklists: These checklists are tools to help the Subcontractors verify that the installation complies with the Contract Documents and is complete and ready for functional performance testing.

B. Subcontractor: Installing contractors responsible to the Contractor for installation of systems and equipment. This term is inclusive of all trades (HVAC, electrical, plumbing, etc.).

C. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

D. Systems and Energy Management Manual: Collective documentation prepared in the form of a manual to allow easy navigation of its contents. Contents of the manual are defined by the Owner with the help of the CxA, and assembled by the Contractor at project close-out. Manual contents may incorporate other close-out documents (e.g. O&M’s, emergency manuals, warranty documents, etc..).

E. Testing, Adjusting, and Balancing (TAB): Includes any and all testing, adjusting and balancing as performed by the TAB Subcontractor.

1.4 COMMISSIONING TEAM

A. Members Appointed by Contractor and Subcontractor(s): Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The Commissioning Team shall consist of, but not be limited to, representatives of the Contractor and of each Subcontractor, including project superintendents, installers, suppliers, and specialists deemed appropriate by the CxA.

B. Members Appointed by Owner:

1. The CxA: Owner has engaged the CxA under a separate contract.
2. Representatives of the Owner including facility users and operation and maintenance personnel.
3. Architect and Engineer of Record.
4. Sustainable Consultant

1.5 OWNER'S RESPONSIBILITIES

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A. Owner shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in commissioning process activities including, but not limited to, the following:

1. Training in operation and maintenance of systems, subsystems, and equipment.
2. Participate, as needed, in the post-occupancy system performance review 10 months into the 12-month warranty period.

1.6 DESIGN TEAM'S RESPONSIBILITIES

B. Design Team shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in commissioning process activities including, but not limited to, the following:

1. Participate in functional performance testing / deferred or opposite season testing of systems to be commissioned (where applicable based on complexity of system or uniqueness of design).
2. Resolve issues identified during commissioning. Provide responses to open issues within two weeks of being posted via online web-based tracking database (SES Commissioning Portal).
3. Participate, as needed, in the post-occupancy system performance review 10 months into the 12-month warranty period.
4. Provide, where applicable, any information and effort needed to support the development of the Systems and Energy Management Manual.

1.7 CONTRACTOR'S AND SUBCONTRACTOR’S RESPONSIBILITIES

A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
2. Provide the CxA with a detailed and accurate construction schedule. Coordinate scheduling of commissioning activities with the CxA and include them in the construction schedule.
3. Provide a submittal log, operation and maintenance data submittals, equipment start-up, and field quality reports.
4. Provide CxA with copies of all approved change orders, RFIs, ASIs or other modifications impacting construction when approved.
5. Participate in commissioning field observations.
6. Confirm accurate and successful completion of construction checkout documents (pre-functional checklists) for all systems to be commissioned prior to verification site visits and functional testing by the CxA.
7. Certify readiness of systems to be commissioned prior to functional performance testing.
8. Participate in functional performance testing of systems to be commissioned.
9. Provide field quality control testing and inspection reports for all systems including envelope systems where called for in individual sections.
10. Resolving issues identified during commissioning and coordinating correction of deficiencies. Provide responses to open issues within two weeks of being posted via online web-based tracking database (SES Commissioning Portal).
11. Participate in operation and maintenance planning and verification.

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12. Participate in final review at the 10-month post occupancy meeting.
13. Coordinate Subcontractor participation in commissioning activities.
14. Assemble Systems and Energy Management Manual at project close-out in accordance with the approved Systems and Energy Management Manual Outline. If required, convene meeting with Owner to understand requirements of manual assembly.
15. Assist in coordinating the Subcontractors, as needed, to perform testing of systems and equipment as it relates to project phasing.
16. Assist in coordinating the Subcontractors, as needed, to perform deferred or opposite seasonal testing of systems and equipment. Assist in coordinating the Subcontractors to resolve issues discovered as a result.
17. Coordinate the Subcontractors to resolve issues discovered during the system performance review 10 months into the 12-month warranty period.

B. Subcontractor(s) shall assign representatives with the expertise and the authority to act on behalf of the entity responsible for installation of systems to be commissioned who shall participate in and perform commissioning team activities including, but not limited to, the following:

1. Provide a submittal log, operation and maintenance data submittals, equipment start-up, and field quality reports.
2. Provide information to the CxA including, but not limited to:
    a. Schedule as mentioned above
    b. Equipment submittals
    c. Operation and maintenance information submittals
3. Confirm accurate and successful completion of construction checkout documents (pre-functional checklists) for all systems to be commissioned prior to verification site visits and functional testing by the CxA.
4. Certify readiness of systems to be commissioned prior to functional performance testing. Provide any available support documentation (start-up reports, pressure test reports, etc.).
5. Participate in functional performance testing of systems to be commissioned.
6. Participate in Commissioning meetings.
7. Provide technicians who are familiar with the construction and operation of the installed systems, are trained in the use of required testing instruments and procedures to participate in testing of installed systems, subsystems and equipment.
8. Resolving issues identified during commissioning and coordinating correction of deficiencies. Provide responses to open issues within two weeks of being posted via online web-based tracking database (SES Commissioning Portal).
9. Participate in training sessions for Owner’s operation and maintenance personnel.
10. Participate, as needed, in performing deferred or opposite seasonal testing of systems and equipment.
11. Participate, as needed, in resolving warranty related issues discovered during the system performance review 10 months into the 12-month warranty period.

1.8 COMMISSIONING DOCUMENTATION

A. Commissioning plan: An informational document, prepared by the CxA, that outlines the schedule, allocation of resources and documentation requirements of the commissioning process, including:

1. Plan for delivery and review of submittals, Systems and Energy Management Manual and other documents and reports. Identification of the relationship of these documents to other

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functions and a description of submittals that are required to support the commissioning processes.
2. Overview of the organization, layout and content of commissioning documentation and a description of documents to be provided along with identification of responsible parties.
3. Identification of systems and equipment to be commissioned.
4. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.
5. Description of responsibilities of commissioning team members.

B. Pre-functional Checklists: CxA shall develop pre-functional checklists for each system to be commissioned including all interfaces and interlocks. Separate entries will be provided for each item to be checked. Pre-functional checklists will be completed by the installing Subcontractor and verified by the Contractor and CxA. Space will be provided for sign off of installing Subcontractor, Contractor and CxA. The successful completion of the pre-functional checklists for systems and equipment is mandatory prior to any functional testing being performed. The successful completion of these checklists without outstanding issues indicates the equipment/systems full readiness for successful functional testing. **Falsely indicating successful completion of the checklists and resulting failures of functional testing will result in the responsible contractor being responsible for the cost of retesting.**

C. Field Observation Reports: The CxA will issues periodic field observation reports resulting from site visits made throughout construction. The reports will be submitted to the Owner and the Contractor for distribution to the Subcontractor and include, but are not limited to, the following:
1. Witnessing systems, assemblies, equipment, and component startup.
2. Cleanliness and proper storage of construction materials like duct work, refrigerant piping, etc.
3. Observed installation deficiencies and/or deviations from the Contract Documents.

D. Certificate of Readiness: Certificate of Readiness shall be signed by the Contractor, Subcontractor(s), and Installer(s) certifying that systems, subsystems, equipment, and associated controls are ready for functional performance testing and that all relevant information including submittals and installation data has been submitted. Completed pre-functional checklists signed by the responsible parties shall accompany this certificate. **Falsely indicating readiness and resulting failures of functional testing will result in the responsible contractor being responsible for the cost of retesting.**

E. Functional Performance Test Procedures: The CxA shall develop functional performance test sheets for each system to be commissioned including interfaces and interlocks. Separate entries will be provided for each item to be tested. CxA shall prepare separate tests for each mode of operation and provide space to indicate whether the mode under test responded as required. All information gathered will be documented by the CxA. Each test will include, but not limited to, the following:

1. Name and identification of each item being checked.
2. Date of test.
3. Indication of whether the record is for a first test or retest following correction of a problem or issue.
4. List of deficiencies.
5. Verifying the Calibration of sensors and sensor function.

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6. Testing conditions under which test was conducted, including (where applicable) ambient conditions, setpoints, override conditions, and status and operating conditions that impact the results of the test.
7. Control sequences for mechanical and electrical systems.
8. Verification of control signals for each setpoint at specified conditions.
9. Responses to control signal at specified conditions (where applicable).
10. Sequence of responses to control signals at specified conditions.
11. Electrical demand or power input at specified conditions (where applicable).
12. Expected performance of systems, subsystems and equipment at each step of the tests. Narrative description of observed performance of systems, subsystems and equipment. Notation to indicate whether the observed performance at each step meets the expected results.
13. Interaction with ancillary equipment.

F. Training Plans: To be prepared by the Contractor and Subcontractors and submitted to the CxA and the Owner for review and comment prior to finalizing training plans.

G. Systems & Energy Management Manual: To be prepared by the Contractor and shall incorporate the requirements listed in the Systems & Energy Management Manual Outline. The Systems & Energy Management Manual shall be easy to navigate with a Table of Contents for each volume, and may require other close-out documents to be incorporated (e.g., O&M's, training documentation, warranty contracts). Format for final delivery shall be electronic, unprotected, bookmarked and searchable.

H. Commissioning Issues Log: The CxA will document any and all deficiencies and corrective actions taken for systems and equipment that fail initial functional performance tests including required modifications to systems and equipment and revisions to functional performance test procedures. Re-tests and final results will also be documented.
1. Commissioning Notice: CxA prepares and maintains an issue log that describes design, installation and performance issues that are at variance with the OPR, BOD and Contract Documents. Identification and tracking of issues as they are encountered, documenting the status of unresolved and resolved issues. The issues log is shared with members of the Commissioning team via an interactive web-based portal which is maintained by the CxA.
    a. SES Commissioning Portal: The interactive web-based portal is an on-line database maintained by Sustainable Engineering Solutions, LLC. The portal is used by the CxA to track issues and assign responsibility for corrective action. All parties will use the SES online portal for reviewing, tracking and responding to all commissioning related issues.
    b. All members of the Commissioning Team will be given access to the portal as required to respond to issues or deficiencies.
    c. Issues status will begin as "Open" until the responsible Contractor or Subcontractor addresses the issue stating that corrective action has been performed.
    d. Once the Contractor / Subcontractor have addressed the issue stating that corrective action has been performed the issue status will be changed to "Pending Verification" as the issue awaits re-verification by the CxA.
    e. After the CxA has confirmed that the corrective action has taken place, as stated by the responsible Contractor or Subcontractor, the issue status will be indexed to "Closed" but remain visible for record purposes.

1.9 SUBMITTALS BY CONTRACTOR

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A. Information listed below shall be submitted with the product and system literature and shop drawing submittals for review and approval by the Owner, Architect, Engineer of Record and the CxA. This information will be used to confirm the product compliance with the Contract Documents and to establish detailed commissioning requirements and procedures. The information shall be specific to each system to be commissioned and shall be inclusive of all related systems, equipment and components.

B. Systems and Energy Management Manual

1. The Contractor shall coordinate with the CxA to develop the Systems and Energy Management Manual in accordance with the requirements identified in Divisions 01, the specific requirements identified in each Section.

2. The Systems and Energy Management Manual shall contain all required information under a single cover unless otherwise indicated and shall include, but not be limited to the following:

SYSTEMS & ENERGY MANAGEMENT MANUAL OUTLINE:

a. Executive Summary (Description of manual contents and intention)
b. Owner's Project Requirements (OPR, provided by Owner)
c. Basis of Design (BOD, provided by the Design Team)
d. Construction Record Documents (As-builts, TAB final report, ATC as-built, warranties, approved submittals)
e. Project Operations and Maintenance Manuals (as specified)

3. The Systems and Energy Management Manual documentation shall be provided in digital and hard copy format (at owner's discretion) and structured with a table of contents per the sections indicated above.

1.10 COORDINATION

A. Pretesting Meetings: The CxA shall conduct pretest meetings with the Commissioning Team prior to the start of the functional performance testing to review start-up reports, pretest verification results, testing procedures, testing personnel and instrumentation requirements and manufacturer's authorized service representative services for each system, subsystem, equipment and component to be tested.

B. Field Observations: The CxA shall conduct periodic field observations during construction. The Contractor must notify the CxA at least one week prior to completion of key milestones, assemblies and sub-system components installation and functional testing so that site visits can be coordinated while access is available to witness.

C. Coordination During Functional Performance Testing: The CxA shall coordinate sequence of testing activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and verification.

D. Testing and Project Schedule: The Contractor shall be responsible for coordinating with the CxA and incorporating the time needed for Cx functional testing into the overall project schedule. Adequate time shall be reserved to allow the completion of the functional testing prior to building

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occupancy. The CxA shall not be asked to test systems that are incomplete to maintain the project schedule. All functional testing pre-requisites as outlined in section 3.4 below, shall be complete, executed, and/or delivered to the CxA with adequate time for review prior to the start of functional testing. Cost associated with 2nd shift, weekend, or delayed/extended testing due to schedule delays is outside of the contract of the CxA and shall be the burden of the contractor.

E. Manufacturer's Field Services: The Subcontractor(s) shall be responsible for coordinating services from the manufacturer's representative, technicians or vendors as needed to assist in the functional performance testing. The CxA will coordinate when these services are required and notify the Subcontractor(s) at least one week prior to scheduled functional performance testing.

1.11 ENVELOPE COMMISSIONING

A. Intent: The CxA will work closely with the Owner, design team, and the installing contractors to help establish a level of quality for the envelope systems on the project.

B. The statement above is accomplished through a review of submittals, project details, manufacturer guidelines and contractor coordination meetings. Once that level of quality is established, the CxA will provide periodic observations of systems throughout construction to help assure ongoing quality. The CxA shall not be considered an inspector nor be responsible to observe every section or application of these systems.

C. Where deficiencies are observed and reported by the CxA, it is the responsibility of the contractor to not only correct the area of the system reported, but to assure these deficiencies are corrected throughout, prior to being enclosed with the exterior façade or interior finishes. The contractor is responsible for installing systems and materials in compliance with the project documents and with manufacturers practices.

D. If the CxA is not notified prior to final assembly then finished sections may have to be disassembled for review at no cost to the owner. Any costs associated with dissembling and re-assembling components shall be borne solely by the contractor.

E. See section 3.5 for testing requirements.

1.12 SYSTEMS TO BE COMMISSIONED

F. The following systems, subsystems, equipment and components will be commissioned and will be referred to collectively herein as the Systems to be Commissioned:

HVAC Systems & Equipment

1. Boiler system, Pumps, Glycol make-up, and associated automated controls (2 boilers)
2. Existing Chiller
3. Variable Volume RTU's (RTU's)
4. Exhaust Fans (18 fans)
5. Unit Ventilators (62 Units)
6. Pumps (5 new)
7. AC Split Systems (4 Units)
8. VAV boxes with re-heat (15 new)
9. Unit Heaters (2 new)
10. Existing Zone radiation (25% sample)
11. Existing CUH & UH (25% sampled)

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12. Existing hot water reheat coils (8 existing)
13. New building controls upgrades
14. New Thermostats
15. Kitchen Grease Interceptor
16. Kitchen outdoor condensing unit for Freezer & Refrigerator (2 new)
17. Duct Insulation
18. Piping Insulation

Electrical Systems
19. Emergency Generator & ATS

Envelope Systems
20. Brick Façade
21. Expansion joint repairs and resealing
22. Window, Storefront and door resealing
23. Roof expansion Joints
24. Slab sealing (ground floor)
25. Stud wall insulation (exterior walls)

PART 2 – PRODUCTS

2.1 TEST EQUIPMENT

A. All standard and non-standard testing equipment required to perform start-up, initial checkout and functional performance testing shall be provided by the Division contractor for the equipment being tested. This includes any equipment, such as ladders or man lifts, necessary to gain access to systems or equipment to be commissioned.

B. The ATC sub-contractors will be responsible for providing any available software to interface with the automated temperature control system for functional performance testing purposes. If necessary due to licensing restrictions the ATC contractor will be responsible for providing a computer as well to operate the software.

C. The ATC sub contractor will be responsible for securing access to any available networks (wireless or local) for use with web-based control systems. The ATC contractor will be responsible for providing user access to the web-based control system for the CxA to facilitate functional performance testing.

D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance within the tolerances specified in applicable Divisions. The Subcontractor's instrumentation shall meet the following standards:

1. Be of sufficient quality and accuracy to test and/or measure system performance within the tolerances required to determine adequate performance.
2. Be calibrated on the manufacturer's recommended intervals with calibration tags permanently affixed to the instrument being used.
3. Be maintained in good repair and operating condition throughout the duration of use on this project.

PART 3 - EXECUTION

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3.1 FUNCTIONAL PERFORMANCE TESTING REQUIREMENTS

A. The requirements identified in this section are applicable to the functional performance testing of all system and equipment to be commissioned.

B. The objective of functional performance testing is to demonstrate that each system is operating in accordance with the performance identified in the Contract Documents through systematic testing and documentation. The intent is to bring the systems from a state of substantial completion to full dynamic operation and documenting the performance. Additionally, during the functional performance testing process, areas of deficient performance are identified and corrected, improving the operation and function of the systems.

C. The CxA shall achieve this objective by developing individual systems testing procedures which, when executed systematically by the Subcontractor(s), will allow the CxA to observe operation, evaluate performance, identify deficiencies, recommend modifications, adjust, and document the systems and systems equipment performance over a range of load and functional levels.

D. In general, each system to be commissioned shall be made to operate through all modes of operation where there is a specified system response. Verifying each sequence identified in the Contract Documents is required. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no air or water flow, equipment general failure, etc. shall be tested.

3.2 COORDINATION AND SCHEDULING OF FUNCTIONAL PERFORMANCE TESTING

A. Scheduling of the Subcontractor(s) and personnel required to execute the functional performance testing is the responsibility of the Contractor.

1. Commissioning activities shall be scheduled by the CxA and forwarded to the Contractor for distribution to the Subcontractors.
2. The Contractor shall be responsible for integrating functional performance testing and commissioning requirements into the master activity schedule.

B. The Subcontractor(s) shall provide sufficient notice to the CxA regarding their completion schedule for the pre-functional checklists and system start-up of all equipment and systems to be commissioned.

1. Subcontractors are responsible for execution of all tests.

C. Functional performance testing is conducted after pre-functional checklists and start-up procedures have been satisfactorily completed and documentation has been submitted and approved.

D. The Contractor shall verify completeness of the exterior enclosure to facilitate the functional performance testing of the various systems and sub system assemblies.

E. The Contractor shall verify completeness of the building envelope, perimeter and interior items which affect proper operation and control of HVAC, Plumbing and Electrical equipment and systems.

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F. The testing, adjusting and balancing of both air and hydronic systems shall be completed and any noted issues addressed before functional performance testing of air and water related equipment or systems. A preliminary report of the TAB Subcontractor's findings shall be submitted prior to the start of functional performance testing.

3.3 SYSTEM START-UP

A. The Contractor shall confirm that all start-up procedures take place and are documented in accordance with the requirements identified in Divisions 1 and the specific requirements identified in each Section.

1. The Subcontractor(s) shall be responsible for submitting system start-up documentation in accordance with the requirements identified in Division 1 and the specific requirements identified in each Section.

2. The Contractor shall take corrective action on all system deficiencies noted in the start-up report and demonstrate to the CxA suitable system operation can be maintained.

3.4 PREREQUISITE FUNCTIONAL TESTING VERIFICATION

A. The Contractor shall certify that systems to be commissioned have been completed, calibrated and start-up procedures have been completed. The Contractor shall verify that the systems to be commissioned are operating according to the Contract Documents and the Certificates of Readiness are signed and submitted.

B. The Contractor shall certify that instrumentation and automated temperature controls associated with the systems to be commissioned have been completed and calibrated and are operating according to the Contract Documents and that preset set points have been recorded. A copy of the ATC point-to-point report and sequence verification documents, resulting from the ATC sub contractor start-up, shall be provided to the CxA for review.

C. The Contractor shall certify that the TAB procedures have been completed and that TAB preliminary reports have been submitted, discrepancies corrected and corrective work approved. The Contractor shall confirm that the equipment interface with monitoring and control system and TAB criteria, and where specified, the calibration of sensors and control devices is fully completed.

D. The Contractor shall certify that all safety cutouts, alarms and interlocks with smoke control and life safety systems during each mode of operation have been tested, discrepancies corrected and corrective work approved.

E. The Contractor shall confirm that all pre-functional check lists and accompanying documentation, including field quality testing reports, have been fully executed and delivered to the CxA for review prior to the start of functional testing.

3.5 FUNCTIONAL PERFORMANCE TESTING

A. The responsible Subcontractor will execute the functional performance testing under the direction of the CxA. The CxA shall observe the functional performance test procedures for all of the sub systems, equipment and components associated with the systems to be commissioned.

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B. Functional performance procedures may be executed by manual adjustment (i.e. manually manipulating the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's graphic trend log capabilities.

C. Functional performance test procedures shall be performed using design conditions whenever possible to confirm design performance.

1. If design conditions are not available then the functional performance test procedures shall be performed under conditions that simulate actual conditions to the closest practical approximation.

D. The Subcontractor executing the functional performance test procedure shall provide all necessary materials, system modifications, etc. to produce the flows, pressures, temperatures, etc. necessary to execute the test under specified conditions.

E. At completion of the functional performance testing, the Subcontractor executing the functional performance test procedure shall return all affected building equipment and systems to their normal operating condition. Contractor to release any overrides.

F. The functional test procedures are meant to allow the CxA to observe, evaluate, identify deficiencies, recommend modifications and document the systems and systems equipment performance over a range of load and functional levels. Below is a general list of support topics that may be requested of the contractor/subcontractor to support the Commissioning testing efforts. See section 1.12 for a list of systems to be commissioned, to better clarify expectations. During the construction phase of the project, the CxA will generate functional performance test sheets that will define actual testing measures and rigor of testing:

1. Air & Water Distribution and Exhaust Systems:
   a. The CxA will require the TAB contractor to spot check air and hydronic systems for reported accuracy and/or as relates to the CxA scope of systems. This may include, but will not be limited to readings at registers, diffusers, traverses, pumps, coils, lab systems, building/space pressures, fans, etc.
   b. The CxA may require the TAB contractor to confirm calibration of ATC/HVAC/Plumbing devices which may include, but will not be limited to; Air flow stations, water flow devices, static pressure devices, temperature sensors, pressure devices, fume hood face velocity monitors, etc.

2. Automated Temperature Controls (inclusive of all applicable systems):

   a. The ATC Subcontractor shall demonstrate the proper operation of the specified and/or approved temperature control sequences for each system, sub systems, equipment and components serving the systems to be commissioned.
   b. In addition to sequence verification, The ATC subcontractor shall demonstrate, but not limited to, the following:

      1) Proper display of all ATC graphics.
      2) Point-to-point verification and calibration of controls devices (flow stations, thermostats, glycol refractometers, etc.)
      3) Point-to-point verification of dampers, actuators, valves, etc.
      4) Demonstrate systems reaction and operation when operating on emergency power.

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3. Building Envelope Systems:
   a. The various trades that relate to the building envelope (may include but not limited to, division 3, division 7 & division 8) shall provide support as requested by the CxA to review and confirm proper installation of their materials or systems. Systems typically observed, but not limited to roofing, skylights, parapet assembly, air & vapor barrier systems, waterproofing, sealants, glazing, curtain walls, exterior doors, rain screens, flashing, etc.
   b. The CxA shall be notified for potential witness when system or material testing is specified in division sections is specified (ASTM, AAMA, etc.).

4. Emergency Generator:
   a. The electrical contractor shall provide full support of Cx testing of the generator and transfer switching system. The contractor shall be able to demonstrate power failure as required to witness the system reaction. The contractor shall also be able to demonstrate exercise schedules, time outs, and cooldown programs as requested by the CxA during testing.

5. Envelope Testing

   a. The various trades that relate to the building envelope (may include but not limited to, division 3, division 7 & division 8) shall provide support as requested by the CxA to review and confirm proper installation of their materials or systems.

   b. Testing requirements are outlined in individual sections by the design team, with the help of the CxA and the owner.

   c. All performance testing of the envelope systems is the responsibility of the division contractor unless otherwise specified. Testing procedures per specified standard (ASTM, AMAA, etc.) shall be presented to the CxA for review 2 weeks prior to testing being scheduled.

6. Problem Solving

   a. The CxA may recommend solutions to problems found, however the burden of responsibilities to solve, correct and retest problems rests with the Contractor, Subcontractor, Architect and Engineering of Record.

7. Trend Logs:

   a. ATC contractor to provide trend logs as requested by the CxA in any format we deem necessary.

3.6 OPPOSITE SEASON/DEFERRED FUNCTIONAL PERFORMANCE TESTING

A. The purpose of opposite seasonal functional testing is to evaluate the performance of selected equipment during design weather conditions that may not have been available during the initial functional testing. Ideally cooling equipment needs to be functionally tested under hot, humid summer conditions to review proper operation in accordance with design specifications. The same is true for heating hot water, steam system and humidification systems which require colder, drier, winter climates.

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B. The purpose of deferred functional performance testing is to evaluate the performance of a selected system that may have been partially complete during the initial functional performance testing of the system's components. Ideally systems need to be functionally tested once completed but, due to project phasing, may be completed at the component level before being completed at the system level.

C. The functional performance testing performed during seasonal/deferred testing will adhere to the guidelines listed above in section 3.5 in its entirety of this Section.

D. The documentation and resolution of any noted deficiencies will be performed in accordance with section 1.8 sub section H and section 3.7 in its entirety of this Section.

3.7 DOCUMENTATION OF COMPLIANCE AND NON-COMPLIANCE

A. Documentation:

1. The CxA will witness and document the results of the functional performance tests using the specific procedural forms (i.e. functional performance test sheets) developed for that purpose.
2. Recorded information will include measured performance data, visual observations and a comprehensive summary describing the operation of systems at the time of testing.
3. All functional performance test sheets, procedural forms, etc. used to document compliant and non-compliant performance will remain the property of the CxA until the end of the project at which point they will become the property of the Owner.

B. Compliance

1. The CxA will record the results of the functional performance testing on each specific procedural form. Tests found to be compliant with the testing criteria stated in the procedural form will be identified as such and submitted to the Owner for approval.
2. Where applicable, additional performance information may be recorded for future use or reference by the CxA when developing additional project documentation.

C. Non- Compliance

1. The CxA will record the results of the functional performance testing on each specific procedural form. Tests found to be non-compliant with the testing criteria stated in the procedural form will be identified as such.
2. Corrections of minor deficiencies identified may be made during the functional performance testing at the discretion of the CxA. In such cases the deficiency and resolution will be documented on the procedure form for record.
3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CxA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so at the request of the Owner.
4. Should a deficiency be identified that cannot be readily corrected during the functional performance testing the CxA will notify the installing Contractor or Subcontractor. If there is no dispute regarding the nature of said deficiency then the installing Contractor or Subcontractor accepts the responsibility to correct it.

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a. The CxA will document the deficiency, the Contractor or Subcontractor's response and their intentions and proceed to the next functional performance test.

5. If functional performance tests cannot be completed because of a deficiency outside the scope of the Contractor or Subcontractor responsible for installation of the system or equipment to be commissioned then the deficiency shall be documented and reported to the Owner.
    a. The CxA will document the deficiency, the responsible Contractor or Subcontractor's response and their intentions and proceed to the next functional performance test.
6. After completion of the functional performance testing the CxA will publish all deficiencies through the web-based interactive commissioning database. At this point the deficiencies will be assigned a tag, responsibility and status and be known as "commissioning issues".
7. If there is any dispute regarding a specific commissioning issue or issues in general; whether the assigned responsibility or the nature of the issue are being disputed then the dispute will be documented and a copy given to the Contractor, Design Team and Owner for evaluation and resolution.
8. The intent is to make resolutions at the lowest management level possible. Other parties are brought into the discussions as needed. The Owner maintains the final interpretive authority.
9. Once the interpretation and resolution have been agreed upon by all parties, the appropriate party addresses the commissioning issue and updates the web-based interactive commissioning database indicating corrective action has taken place. The CxA will reschedule the functional performance test and the test will be repeated until satisfactory performance is achieved.
10. If it is determined that the system is constructed according to the Contract Documents the Owner will decide whether modifications required to bring the performance of the system to the OPR and BOD documents shall be implemented or if the noted performance will be accepted as submitted. If additional work is performed outside of the original project scope then the Owner will decide if functional performance testing shall be repeated and a revised functional performance test sheet submitted.

D. Cost(s) of Re-testing Non-Compliant System or Equipment

1. The cost for the Contractor or Subcontractor to perform re-testing, if they are responsible for the deficiency preventing a successful initial functional performance test, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the Owner.
2. The cost associated with the time used by the CxA to direct any re-testing required because a specific pre-functional checklist, start-up or commissioning notice issue, reported to have been successfully completed, but determined during functional performance testing to be incomplete, will be back-charged to the Contractor, who may choose to recover costs from the party responsible.

E. Failure Due to Manufacturing Defect

1. If 10% or a total of three (3), whichever is greater, of pieces of equipment (size alone does not constitute a difference) fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted

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performance, all identical units may be considered unacceptable by the CxA. In such case, the responsible Contractor or Subcontractor shall provide the Owner with the following:

a. Within one week of original notification the Contractor or Subcontractor shall coordinate with the vendor and/or manufacturer's representative and shall examine all other identical units making a record of the findings.
b. Within two weeks of the original notification, the Contractor, Subcontractor vendor and manufacturer's representative shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals, training, warranty, etc.
c. The proposed solution shall significantly exceed the specified requirements of the original installation and meet or exceed the performance identified in the Contract Documents.
d. The Owner will determine whether a replacement of all identical units or a repair is acceptable.
e. Two (2) examples of the proposed solution will be provided by the Contractor or Subcontractor and all parties will be allowed to test and review the performance for up to one week, upon which the Owner will decide whether to accept the proposed solution.
f. Upon acceptance of the proposed solution by the Owner, the responsible party shall replace or repair all identical units, at their expense and extend the warranty accordingly, if the original equipment warranty had already begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when replacement parts or units can be obtained.

F. Cost(s) of Re-testing System or Equipment due to Manufacturing Defect

1. The cost for the Contractor or Subcontractor to perform re-testing, if they are responsible for providing the defective equipment, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the Owner.
2. The cost associated with the time used by the CxA to direct any re-testing required because of defective equipment, will be back-charged to the Contractor.

3.8 OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

A. The Contractor and Subcontractors shall be responsible for coordinating, scheduling and completing operations and maintenance training for the Owners designated personnel on all systems and equipment to be commissioned.
1. All training materials (agenda, hand-outs, etc.) shall be submitted to the CxA for review and approval at least three weeks in advance of scheduled training.
2. Equipment training shall be provided by a factory authorized technical representatives, experienced in training, operation and maintenance procedures for installed systems, subsystems and equipment.
3. Each Subcontractor responsible for training will submit a written training plan to the CxA for review and approval at least three weeks in advance of scheduled training. The plan will include field orientation during installation, classroom instruction and field training after the completion of installation and cover the following elements:
a. Equipment (to be included in training).
b. Intended audience
c. Location of training
d. Objectives

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e. Subjects to be covered (i.e. description, special methods, etc.)
f. Duration of training on each subject.
g. Instructor for each subject
h. Methods of instruction (i.e. classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)
i. Instructor and qualifications

4. Subcontractors shall provide all qualified personnel, including manufacturer representatives, vendors, technicians, installing personnel, etc. for equipment and system training.

B. The CxA will oversee the training of Owner personnel for systems to be commissioned.

1. Training rigor: to be established by Owner and CxA.
2. In addition to these general requirements, the specific training requirements for Owner personnel are specified in Divisions 1 and the specific requirements identified in each Section.

C. All training shall meet the requirements per the following outline as follows:

1. General familiarization and operating procedures for each of the building's system installations.
2. Routine maintenance procedures for equipment.
3. Specific operating and maintenance procedures for:
   a. Mechanical systems
   b. Electrical systems
   c. Plumbing systems
   d. Fire protection systems
   e. Direct digital control system
   f. Envelope systems
4. Maintenance Procedures: Include manufacturer's written recommendations and the following:
5. Inspection procedures.
6. Schedule for routine cleaning and maintenance.
7. Repair instructions.
8. Quantity of training: The maintenance personnel shall be trained on the various building systems in sessions of not less than (8) hours of training time. The training shall be of a sufficient extent to allow the trained staff, to train their peers and to demonstrate the training sessions were effective.

3.9 EXCLUSIONS

A. The CxA is not responsible for the following: facilitating construction means or methods, regulating job site safety or providing any other unrelated management function.

B. The CxA is not responsible for providing Design Engineering services.

C. The CxA is not responsible for providing installation technician services requiring tools or the use of tools to functionally test, adjust or otherwise bring equipment into a fully operational state. The CxA shall observe technicians as they complete testing and but shall not perform installation or technician services. The Contractor and/or appropriate Subcontractor are responsible for

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providing all installation technician, vendor or manufacturer representative services as needed to meet the CxA's needs.

END OF SECTION 019113

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SECTION 02 65 00

UNDERGROUND STORAGE TANK AND PIPING REMOVAL

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. General Requirements
2. Tank summary
3. Regulatory Requirements
4. Tank Removal Work Plan
5. Preparation
6. Purging and Inerting
7. Excavation
8. Removal of Piping Ancillary Equipment and Tank
9. Tank Cleaning
10. Transportation and Disposal Requirements
11. Confirmation Testing

B. Related Sections

1. Section 02 81 00 – Transportation of Contaminated Material
2. Section 31 00 00 – Excavation, Backfill, Compaction and Dewatering

1.02 REFERENCES

A. American Petroleum Institute Recommended Practice 1604, “Closure of Underground Petroleum Storage Tanks”

B. Connecticut State Fire Code

C. CTDEEP Policy, Section 22a-449(d)-106, “Underground Storage Tank Regulations” and Section 22a-133k, “Remediation Standard Regulations”

D. National Fire Protection Association (NFPA) Standard 30 – Flammable and Combustible Liquids Code

E. NFPA Standard 326 – Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning or Repair,” latest revision.

1.03 DEFINITIONS

SECTION 224216

PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Lavatories.

2. Water Coolers

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for lavatories.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: Include diagrams for power, signal, and control wiring of automatic faucets and water cooler.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For all fixtures to include in operation and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. Servicing and adjustments of water coolers.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Faucet Washers and O-Rings: Equal to **10** percent of amount of each type and size installed.
2. Faucet Cartridges and O-Rings: Equal to **5** percent of amount of each type and size installed.

PART 2 - PRODUCTS

2.1 LAVATORY

A. Lavatory P-1A: Classroom Sink: Rectangular, 304 Stainless Steel drop-in Sink + Faucet/Bubbler Kit.

1. Fixture: shall be based on Elkay Lustertone Classic Stainless Steel DRKAD282240RC, Single bowl, 18 gauge, bottom sound deadening pads.

a. Standard: ASME A112.19.1/CSA B45.4. Complies with ADA.
b. Type: Drop In Sink Kit.
c. Sink Dimensions: 28”X22”X4”
d. Drain: 3-1/2” Rear Center.
e. Finish: Lustrous Satin

2. Faucet: Elkay LKF413945RS, faucet with remote level handle restricted spout chrome faucet. Flow rate of 1.5 gpm – flow regulator installed. Material: Brass. Valve Type: ceramic disc. Deck mount. Spout reach: 8”. Spout swing rotation: 45 degrees. Complies with ADA & ICC A117.1, ASME A112.18.1/CSA B125.1, NSF 61, NSF 372 (lead free).

3. Bubble: Elkay LK1141A, Classroom Bubbler, 5-1/16” x 1-15/16” x 5-11/16”, made of chrome-plated brass. Deck mount installation, finish shall be Chrome. Push button valve bubbler, built-in adjustable water volume control with heavy chrome plated body with a ½” straight pipe thread connection. Complies with ADA & ICC A117.1, ASME A112.18.1/CSA B125.1, NSF 61, NSF 372 (lead free).

B. Lavatory P-1B: Health Clinic Sink: Rectangular, 304 Stainless Steel Top Mount Sink.

4. Fixture: shall be based on Elkay Lustertone Classic Stainless Steel DRKAD221755, Single bowl, 18 gauge, bottom sound deadening pads.

a. Standard: ASME A112.19.1/CSA B45.4. Complies with ADA.
b. Type: Top Mount.
c. Sink Dimensions: 22”X17”X5-1/2”
d. Drain: 3-1/2” Center.

e. Finish: Lustertone

5. Faucet: Elkay LKF413945RS, faucet with remote level handle restricted spout chrome faucet. Flow rate of 1.5 gpm – flow regulator installed. Material: Brass. Valve Type: ceramic disc. Deck mount. Spout reach: 8". Spout swing rotation: 45 degrees. Complies with ADA & ICC A117.1, ASME A112.18.1/CSA B125.1, NSF 61, NSF 372 (lead free).

C. Lavatory P-1C: Teacher's Room Sink: Rectangular, 304 Stainless Steel Drop-in ADA Sink.

6. Fixture: shall be based on Elkay Lustertone Classic Stainless Steel DRKAD252255L, Single bowl, 18 gauge, bottom sound deadening pads.

a. Standard: ASME A112.19.1/CSA B45.4. Complies with ADA.
b. Type: Drop-in.
c. Sink Dimensions: 25"X22"X5-1/2"
d. Drain: 3-1/2" Rear Center.
e. Finish: Lustertone

7. Faucet: Elkay LKF413945RS, faucet with remote level handle restricted spout chrome faucet. Flow rate of 1.5 gpm – flow regulator installed. Material: Brass. Valve Type: ceramic disc. Deck mount. Spout reach: 8". Spout swing rotation: 45 degrees. Complies with ADA & ICC A117.1, ASME A112.18.1/CSA B125.1, NSF 61, NSF 372 (lead free).

D. Lavatory P-1D: Sink: Rectangular, 304 Stainless Steel Drop-in ADA Sink.

1. Fixture: shall be based on Elkay Lustertone Classic Stainless Steel DRKAD252255R, Single bowl, 18 gauge, bottom sound deadening pads.

a. Standard: ASME A112.19.1/CSA B45.4. Complies with ADA.
b. Type: Drop-in.
c. Sink Dimensions: 25"X22"X5-1/2"
d. Drain: 3-1/2" Rear Center.
e. Finish: Lustrous Satin

2. Faucet: Elkay LKF413945RS, faucet with remote level handle restricted spout chrome faucet. Flow rate of 1.5 gpm – flow regulator installed. Material: Brass. Valve Type: ceramic disc. Deck mount. Spout reach: 8". Spout swing rotation: 45 degrees. Complies with ADA & ICC A117.1, ASME A112.18.1/CSA B125.1, NSF 61, NSF 372 (lead free).

2.2 WATER COOLER

A. Water Cooler, P-2: Wall Mount Water Cooler.

1. Cooler: shall be based on Elkay VRCGRN8, GreenSpec ADA, Vandal-resistant non-filtered 8 GPH

a. Standard: ADA & ICC A117.1, ASME A112.19.3/CSA 45.4, GreenSpec, NSF/ANSI 61 & 372 (lead free), UL 399, CAN/CSA C22.2 No. 120
b. Energy Savings
c. 115V/60Hz, FLA 4.5
d. Bubbler Style: Vandal Resistant StreamSaver.
e. Mechanical Front Bubbler Button
f. Wall Mount
g. Chiller Option: 8.0 GPH
h. Refrigerant: R-134a
i. Easily accessible enclosed adjustable thermostat.
j. Provide 1-1/1” trap at waste outlet. Waste outlet is 1-1/4” OD.
k. Connect to water supply with dielectric coupling.
l. 5 Year Limited Warranty on refrigeration system

B. Water Cooler, Located outside Women’s Room 140: Flush Recessed Mount Water Cooler.

1. Cooler: shall be based on Elkay EFRCM8CDK, ADA non-filtered, 8 GPH, Stainless.

a. Standard: ADA & ICC A117.1, ASME A112.19.3/CSA 45.4, NSF/ANSI 61 & 372 (lead free), UL 399, CAN/CSA C22.2 No. 120
b. Cup dispenser
c. 115V/60Hz, 325 Watts. Utilize GFCI, sized for 20 Amps.
d. Bubbler Style: FlexiGuard Safety Bubbler
e. Mechanical Top Bubbler Button. Continues to supply water in event of service disruptions.
f. Flush Recessed Mount
g. Chiller Option: 8.0 GPH
h. Refrigerant: R-134a
i. Easily accessible enclosed adjustable thermostat.
j. Provide 1-1/1” trap at waste outlet. Waste outlet is 1-1/4” OD.
k. Connect to water supply with dielectric coupling.
l. 5 Year Limited Warranty on refrigeration system

2.3 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF/ANSI 61 Annex G, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.

B. Standard: ASME A112.18.1/CSA B125.1.

C. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless-steel wall flange.

D. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.

2.4 WASTE FITTINGS

A. Standard: ASME A112.18.2/CSA B125.2.

B. Drain: Grid type with NPS 1-1/4 offset and straight tailpiece.

C. Trap: as per Plumbing drawings

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before lavatory installation.

B. Examine counters and walls for suitable conditions where lavatories will be installed.

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

3.2 INSTALLATION

A. Install lavatories level and plumb according to roughing-in drawings.

B. Install supports, affixed to building substrate, for wall-mounted lavatories.

C. Provide wall carriers for all fixtures.

D. Install accessible wall-mounted lavatories at handicapped/elderly mounting height for people with disabilities or the elderly, according to ICC/ANSI A117.1.

E. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

F. Seal joints between lavatories, counters, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

G. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

3.3 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Operate and adjust lavatories and controls. Replace damaged and malfunctioning lavatories, fittings, and controls.

B. Adjust water pressure at faucets to produce proper flow.

C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

A. After completing installation of lavatories, inspect and repair damaged finishes.

B. Clean lavatories, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

C. Provide protective covering for installed lavatories and fittings.

D. Do not allow use of lavatories for temporary facilities unless approved in writing by Owner.

END OF SECTION 224216

SECTION 23 09 01 – DIRECT DIGITAL CONTROL EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. The work of this Section consists of providing of all materials, labor and equipment and the like necessary and/or required for the complete execution of all mechanical for this project, as required by the contract documents.

1.2 Qualifications of Bidder

A. All bidders must be building automation contractors in the business of installing direct digital control building automation systems for a minimum of 5 years.

B. All bidders must have a service and installation office in the Stamford area.

C. All bidders must be authorized distributors or branch offices of the manufacturers specified.

D. All bidders must have a trained staff of application engineers, who have been certified by the manufacturer in the configuration, programming and service of the automation system.

E. Manufacturers: Subject to compliance with requirements, provide products by the following school district standard manufacture.

1.3 Scope of Work

A. Except as otherwise noted, the control system shall consist of all Ethernet Network Controllers, Standalone Digital Control Units, software, sensors, transducers, relays, valves, dampers, valve and damper operators, control panels, and other accessory equipment, along with a complete system of electrical interlocking wiring to fill the intent of the specification and provide for a complete and operable system. Unless otherwise specified, provide operators for equipment such as dampers and valves if the equipment manufacturer does not provide these. Coordinate requirements with the mechanical contractors.

B. The Building Automation System (BAS) contractor shall review and study all HVAC drawings and the entire specification to familiarize himself with the equipment and system operation, and to verify the quantities and types of dampers, operators, alarms, controllers etc. to be provided.

C. All interlocking, wiring and installation of control devices associated with the equipment listed below shall be provided under this Contract. When the BAS system is fully installed and operational, the BAS Contractor and representatives of the Owner will review and check out the system. At that time, the BAS contractor shall demonstrate

the operation of the system and prove that it complies with the intent of the drawings and specifications.

D. The Contractor shall furnish and install a complete building automation system including all necessary hardware, network wiring, all operating applications software, and all programming necessary to perform the control sequences of operation as called for in the specifications. The scope of work shall include control over and graphic representation all new mechanical and plumbing equipment installed as part of this project. At a minimum, provide controls for the following:
   1. Roof top air handling units
   2. Split system air handling units
   3. All coils and control valves
   4. All VAV boxes
   5. Toilet, general and kitchen exhaust, return, fan controls
   6. Dual Temperature water pumps primary and secondary
   7. Condensate pumps
   8. Boilers, Burners
   9. Frequency controllers, HOA's and starters
   10. Fin tube radiation, cabinet and units heart and convector control valves.
   11. Supplemental AC systems
   12. Power wiring to DDC devices and BAS panels.

E. Provide services and manpower necessary for commissioning of system in coordination with the HVAC Contractor, Balancing Contractor and Owner's representative.

F. All work performed under this section of the specifications will comply with all codes, laws and governing bodies. If this specification and associated drawings exceed governing code requirements, the specification will govern. The Contractor shall obtain and pay for all necessary construction permits and licenses.

G. Provide all labor and materials to perform all programming necessary at the School's new operator work station to be located in the as directed by the School and to graphically represent and control EACH AND EVERY PIECE OF EQUIPMENT IN THE LISTS ABOVE. This shall include, all input and output status points, and functional points.

1.4 System Description

A. The Building Automation System (BAS) shall consist of PC-based workstation and microcomputer controllers of modular design providing distributed processing capability, and allowing future expansion of 10 %, both input/output points and processing/control functions without having to add hardware, software or controllers. For this project the system shall consist of the following components:

B. Operator Workstations.

The BAS Contractor shall furnish (1) Operator Workstation Computer and (1) printer as described in Part 2 of the specification. This workstation must be running the standard workstation software developed and tested by the manufacturer of the network

controllers and the standalone controllers. No third party front-end workstation software will be acceptable. Provide all necessary software and licensing as required

C. Ethernet-based Network Controllers.

1. The BAS Contractor shall furnish Ethernet-based network controllers as described in Part 2 of the specification. These controllers will connect directly to the Operator Workstation over Ethernet, provide communication to the Standalone Digital Control Units and/or other Input/Output Modules and serve as a gateway to equipment furnished by others (if applicable).

D. Standalone Digital Control Units (SDCUs).

1. Provide the necessary quantity and types of SDCUs to meet the requirements of the project for mechanical equipment control including air handlers, control, and terminal unit control. Each SDCU will operate completely standalone, containing all of the I/O and programs to control its associated equipment.

1.5 Work by Others

A. The BAS Contractor shall coordinate with other trade contractors performing work on this project necessary to achieve a complete installation. To that end, the contractor shall consult the drawings and specifications for all other trades to determine the nature and extent of work by others.

B. The BAS Contractor shall furnish all control valves, sensor wells, flow meters and other similar equipment for installation by the Mechanical Contractor.

C. The BAS Contractor shall provide field supervision to the designated contractor for the installation of the following as required:

1. Automatic control dampers
2. Fire/smoke dampers

D. The Electrical Contractor shall provide:

1. All power wiring to motors, heat trace, junction boxes for power to BAS panels.
2. Furnish smoke detectors and wire to the building fire alarm system. HVAC Contractor to mount devices. BAS Contractor to hardwire to fan shut down. BAS contractor to coordinate this with the electrical contractor.

1.6 Code Compliance

A. Provide BAS components and ancillary equipment, which are UL-916 listed and labeled.

B. All equipment or piping used in conditioned air streams, spaces or return air plenums shall comply with NFPA 90A Flame/Smoke/Fuel contribution rating of 25/50/0 and all applicable building codes or requirements.

C. All wiring shall conform to the National Electrical Code.

D. All smoke dampers shall be rated in accordance with UL 555S.

E. Comply with FCC rules, Part 15 regarding Class A radiation for computing devices and low power communication equipment operating in commercial environments.

F. Comply with FCC, Part 68 rules for telephone modems and data sets.

1.7 Submittals

A. All shop drawings shall be prepared in AutoCAD software. In addition to the drawings, the Contractor shall furnish a diskette containing the identical information. Drawings shall be B size or larger.

B. Shop drawings shall include a riser diagram depicting locations of all controllers and workstations, with associated network wiring. Also included shall be individual schematics of each mechanical system showing all connected points with reference to their associated controller. Typical will be allowed where appropriate.

C. Submittal data shall contain manufacturer's data on all hardware and software products required by the specification. Valve, damper and air flow station schedules shall indicate size, configuration, capacity and location of all equipment.

D. Software submittals shall contain narrative descriptions of sequences of operation, program listings, point lists, and a complete description of the graphics, reports, alarms and configuration to be furnished with the workstation software. Information shall be bound or in a three ring binder with an index and tabs. All literature, descriptions, equipment spec sheets, sequences etc shall be on 8 1/2 x 11 or larger sized sheets. All details diagrams and schematics shall be on 11X17 sized sheets or larger.

E. Submit five (5) copies of submittal data and shop drawings to the Engineer for review prior to ordering or fabrication of the equipment. The Contractor prior to submitting shall check all documents for accuracy.

F. The Engineer will make corrections, if required, and return to the Contractor. The Contractor will then resubmit with the corrected or additional data. This procedure shall be repeated until all corrections are made to the satisfaction of the Engineer and the submittals are fully approved.

G. Submit a training class syllabus and training manual for review with the temperature controls submittal. The training manual shall be custom made for this project. Manufactures brochures, and installation manuals will not be acceptable for this purpose. Submit a type written overview and a written summary of each topic to be covered. The document shall be suitable for a system operator to use as a quick reference guide to basic system operation as applicable for this project. Refer to section 1.9 paragraph B, for the minimum requirement of training to be included.

1.8 System Startup & Commissioning

A. Each point in the system shall be tested for both hardware and software functionality. In addition, each mechanical and electrical system under control of the BAS will be tested against the appropriate sequence of operation specified herein. Successful

completion of the system test shall constitute the beginning of the warranty period. A written report will be submitted to the owner indicating that the installed system functions in accordance with the plans and specifications.

B. The BAS contractor shall commission and set in operating condition all major equipment and systems, such as the chilled water, hot water and all air handling systems, in the presence of the equipment manufacturer's representatives, as applicable, and the Owner and Architect's representatives.

C. The BAS Contractor shall provide all manpower and engineering services required to assist the HVAC Contractor and Balancing Contractor in testing, adjusting, and balancing all systems in the building. The BAS Contractor shall have a trained technician available on request during the balancing of the systems. The BAS Contractor shall coordinate all requirements to provide a complete air balance with the Balancing Contractor and shall include all labor and materials in his contract.

1.9 Training

A. The BAS Contractor shall provide both on-site training to the Owner's representative and maintenance personnel per the following description:

B. On-site training shall consist of a minimum of (3) separate 4 hour sessions of hands-on instruction geared at the operation and maintenance of the systems. The sessions shall be scheduled at the beginning of substantial completion and spaced out over the first year of owner use. The first session curriculum shall include

1. System Overview
2. System Software and Operation

    a. System access
    b. Software features overview
    c. Changing set-points and other attributes
    d. Scheduling
    e. Editing programmed variables
    f. Displaying color graphics
    g. Setting up reports
    h. Running reports
    i. Workstation maintenance
    j. Application programming

3. Operational sequences including start-up, shutdown, adjusting and changing system variables. These items shall be reviewed for all equipment installed under this project and or connected to the BMS under this project.
4. Equipment and hardware overview and maintenance. This shall include:

    a. Review of all hardware installed under this project
    b. Review of a system schematic.
    c. Review of where each controller is located in the building and what its function is. This shall include a walking, hands-on tour and demonstration of each and every controller.

1.10 Operating and Maintenance Manuals

A. The operation and maintenance manuals shall contain all information necessary for the operation, maintenance, replacement, installation, and parts procurement for the entire BAS. This documentation shall include specific part numbers and software versions and dates. A complete list of recommended spare parts shall be included with the lead-time and expected frequency of use of each part clearly identified.

B. Following project completion and testing, the BAS contractor will submit as-built drawings reflecting the exact installation of the system. The as-built documentation shall also include a copy of all application software both in written form and on diskette.

1.11 **Warranty**

A. The BAS contractor shall warrant the system for 12 months after system acceptance and beneficial use by the owner. During the warranty period, the BAS contractor shall be responsible for all necessary revisions to the software as required to provide a complete and workable system consistent with the letter and intent of the Sequence of Operation section of the specification.

B. Updates to the manufacturer's software shall be provided at no charge during the warranty period.

1.12 **Programming**

A. Sequence of operations: The controls contractor shall review the sequences of operation given in section 23 09 93 of this specification. "Canned", preprogrammed, or typical sequences by the manufacture may not be acceptable and shall only be used if accepted by the engineer. Otherwise the controls contractor shall be capable of and responsible for providing custom programming, hardware, software, and labor as required to achieve the sequences of operation as specified.

1.13 System Architecture

A. General

B. The Building Automation System (BAS) shall consist of all new Network Control Units (NCUs), a family of Standalone Digital Control Units (SDCUs), Input/Output Unit Modules (IOU Modules), Operator Workstations (OWs), and one File Server to support system configurations where more than one operator workstation is required. The BAS shall provide control, alarm detection, scheduling, reporting and information management for the entire class room building and all new and existing equipment in the building, and Wide Area Network (WAN) if applicable, from a single ODBC-compliant database

C. Level 1 Network Description

1. Level 1, the main backbone of the system, shall be an Ethernet LAN/WAN. Network Control Units, Operator Workstations, and the Central File Server shall connect directly to this network without the need for Gateway devices. The contractor shall visit the site and review the existing Andover temperature controls equipment installed in the building and in the physical plant. Certain of

these controllers may be suitable for reuse. The network shall be an extension of the existing in the building as required to achieve a complete system,

D. Level 2 Network Description
1. Level 2 of the system shall consist of one or more field buses managed by the Network Control Units. The Level 2 field buses may consist of one or both of the following types:
2. An RS485, token passing bus that supports up to 127 Standalone Digital Control Units (SDCUs) for operation of HVAC equipment and lighting, or
3. An RS485 field bus that supports up to 32 devices from a family of plug-in, IOU modules.
4. These IOU modules may be mounted within the NCU enclosure or remotely mounted via a single, twisted, shielded pair of wires.
5. The BAS shall be capable of being segmented, through software, into multiple local area networks (LANs) distributed over a wide area network (WAN), sharing a single file server. This enables workstations to manage a single LAN (or building), and/or the entire system with all devices being assured of being updated by and sharing the most current database. In the case of a single workstation system, the workstation shall contain the entire database – with no need for a separate file server.

E. Standard Network Support
1. All NCUs, Workstation(s) and File Server shall be capable of residing directly on the owner's Ethernet TCP/IP LAN/WAN with no required gateways. Furthermore, the NCU's, Workstation(s) and File Server shall be capable of using standard, commercially available, off-the-shelf Ethernet infrastructure components such as routers, switches and hubs. With this design the owner may utilize the investment of an existing or new enterprise network or structured cabling system. This also allows the option of the maintenance of the LAN/WAN to be performed by the owner's Information Systems Department as all devices utilize standard TCP/IP components.

F. Remote Communications
1. In addition to the above LAN/WAN architecture support, the same workstation software (front end) must be capable of managing remote systems via standard dial-up phone lines as a standard component of the software. Front-end "add-on" software modules to perform remote site communication shall not be acceptable.
2. The remote system architecture shall consist of two levels providing control, alarm detection, reporting and information management for the remote facility. Level 1 shall contain the Remote Site Control Unit, communicating to the remotely located, Operator Workstation(s) through the use of a modem and a standard dial-up phone line. Level 2 shall consist of one or more field buses controlled by the RSCU. The field buses may consist of one or both of two types:
3. 1) An RS485, token passing bus that supports up to 127 Standalone Digital Control Units (SDCUs) for operation of HVAC equipment and lighting, or
4. 2) An RS485 field bus that supports up to 32 devices from a family of plug-in, IOU modules that may be mounted within the RSCU enclosure or remotely mounted on a single, twisted, shielded pair of wires.

G. System Expansion

1. The BAS system shall be scalable and expandable at all levels of the system using the same software interface, and the same Level 1 and Level 2 controllers. Systems that require replacement of either the workstation software or field controllers in order to expand the system shall not be acceptable.
2. The BAS shall be expandable to include Security and Access Control functions at any time in the future with no additional workstations, front-end software or Level 1 controllers required. Standalone Digital Control Units or IOU modules shall be able to be added to the existing Level 1 controller's field bus(es), to perform security and card access applications. In this way, an owner's existing investment in wiring infrastructure may be leveraged and the cost and inconvenience of adding new field bus wiring will be minimized.
3. Additionally, an integrated video badging option must be able to be included with no additional workstations required. This photo ID option must share the same database as the BAS in order to eliminate the need for updating multiple databases.
4. The system shall use the same application programming language for all levels: Operator Workstation, Network Control Unit, Remote Site Control Unit and Standalone Digital Control Unit. Furthermore, this single programming language shall be used for all applications: environmental control, card access control, intrusion detection and security, lighting control, leak detection / underground storage tank monitoring, and digital data communication interfaces to third party microprocessor-based devices.

H. Support For Open Systems Protocols

The BAS design must include solutions for the integration of the following "open systems" protocols: BACnet, LonTalk™, and digital data communication to third party microprocessors such as chiller controllers, fire panels and variable frequency drives (VFDs).

I. The system shall also provide the ability to program custom ASCII communication drivers, that will reside in the NCU, for communication to third party systems and devices. These drivers will provide real time monitoring and control of the third party systems.

1.14 Network Control Units (NCUs)

A. Network Control Units shall be microprocessor based, multi-tasking, multi-user, and employ a real time operating system. Each NCU control panel shall consist of modular hardware including power supply, CPU board, and input/output modules. A sufficient number of NCUs shall be supplied to fully meet the requirements of this specification and the attached point list.NCUs for telephone dialup sites shall be of the same design as the Ethernet control units but without the plug-in Ethernet network interface card (NIC), i.e., NCUs, which include a NIC, shall be interchangeable whether used on a LAN/WAN or a dialup site.

B. Webserver Functionality
All NCUs on the Ethernet TCP/IP LAN/WAN shall be capable, out-of-the box, to be set up as a Web Server. The NCU shall have the ability to store HTML code and "serve" pages to a web browser. This provides the ability for any computing device utilizing a

TCP/IP Ethernet connection and capable of running a standard Internet browser (Microsoft Internet Explorer™, Netscape Navigator™, etc.) to access real-time data from the entire BAS via any NCUs.

Graphics and text-based web pages shall be constructed using standard HTML code. The interface shall allow the user to choose any of the standard text or graphics-based HTML editors for page creation. It shall also allow the operator to generate custom graphical pages and forms.

The WEB server interface shall be capable of password security, including validation of the requesting PC's IP address. The WEB server interface shall allow the sharing of data or information between any controller, or process or network interface (BACnet, LonTalk and TCP/IP) that the BMS has knowledge of, regardless of where the point is connected on the BAS network or where it is acquired from.

The BAS network controller must act directly as the WEB server. It must directly generate the HTML code to the requesting user (i.e. WEB browser), eliminating the need for and reliance on any PC-based WEB server hardware or software. To simplify graphic image space allocation, HTML graphic images, if desired, shall be stored on any shared network device. The BAS WEB server shall have the ability to acquire any necessary graphics using standard pathing syntax within the HTML code mounted within the BAS WEB server. External WEB server hardware and software are not acceptable.

C. Hardware Specifications

1. Memory:

   A minimum of 64MB of RAM shall be provided for NCUs with expansion up to 128 MB. The 64 MB versions shall include a floating-point math co-processor.

2. Communication Ports:

   Each NCU shall provide communication to both the Workstation(s) and the field buses. In addition, each NCU must have at least 3 other communications ports that support a telephone modem, portable service tool, serial printer and connection to third party controllers such as a chiller control panel. On a LAN/WAN system the NCU shall be provided with a 10Mbps plug-in Ethernet TCP/IP network interface card (NIC).

3. Input/Output (I/O):

   Each NCU shall support the addition of the following types of inputs and outputs:

   - Digital Inputs for status/alarm contacts
   - Counter Inputs for summing pulses from meters.
   - Thermistor inputs for measuring temperatures in space, ducts and thermowells.
   - Analog inputs for pressure, humidity, flow and position measurements.
   - Digital Outputs for on/off equipment control.
   - Analog Outputs for valve and damper position control, and capacity control of primary equipment including all air handler and fan coil control valves

4. Modular Expandability:

   The system shall employ a modular I/O design to allow easy expansion. Input and output capacity is to be provided through plug-in modules of various types or DIN-mountable IOU modules. It shall be possible to combine I/O modules as desired to meet the I/O requirements for individual control applications.

5. Hardware Override Switches:

   All digital output units shall include three position manual override switches to allow selection of the ON, OFF, or AUTO output state. These switches shall be built into the unit and shall provide feedback to the controller so that the position of the override switch can be obtained through software. In addition each analog output shall be equipped with an override potentiometer to allow manual adjustment of the analog output signal over its full range, when the 3 position manual override switch is placed in the ON position.

6. Local Status Indicator Lamps:

   Provide as a minimum LED indication of CPU status, Ethernet LAN status, and field bus status. For each output, provide LED indication of the value of the output (On/Off). For each output module provide an LED which gives a visual indication of whether any outputs on the module are manually overridden.

7. Real Time Clock (RTC):

   Each NCU shall include a battery-backed, real time clock, accurate to 10 seconds per day. The RTC shall provide the following: time of day, day, month, year, and day of week. In normal operation the system clock will be based on the frequency of the AC power. The system shall automatically correct for daylight savings time and leap years and be Year 2000 compliant.

8. Power Supply:

   The power supply for the NCUs shall be auto sensing, 120-220VAC, 60/50 Hz power, with a tolerance of +/- 20%. Line voltage below the operating range of the system shall be considered outages. The controller shall contain over voltage surge protection, and require no additional AC power signal conditioning. Optionally, if indicated on the drawings, the power supply shall accept an input voltage of (–48 VDC).

9. Automatic Restart After Power Failure:

   Upon restoration of power after an outage, the ECU shall automatically and without human intervention: update all monitored functions; resume operation based on current, synchronized time and status, and implement special start-up strategies as required.

10. Battery backup:

    Each NCU with the standard 120-220VAC power supply shall include a programmable DC power backup system rated for a minimum of 72 hours of battery backup to maintain all volatile memory or, a minimum of 2 hours of full UPS including modem power. This power backup system shall be configurable such that at the end of a settable timeframe (such as 1 hour) of running on full UPS, the unit will shut off full UPS and switch to memory retention-only mode for the remainder of the battery power. The system shall allow the simple addition of more batteries to extend the above minimum battery backup times.

D. Software Specifications

1. General.

   The NCU shall contain flash ROM as the resident operating system. Application software will be RAM resident. Application software will only be limited by the amount of RAM memory. There will be no restrictions placed on the type of application programs in the system. Each NCU shall be capable of parallel processing, executing all control programs simultaneously. Any program may affect the operation of any other program. Each program shall have the full access of all I/O facilities of the processor. This execution of control function shall not be interrupted due to normal user communications including interrogation, program entry, printout of the program for storage, etc.

2. User Programming Language:
   The application software shall be user programmable. This includes all strategies, sequences of operation, control algorithms, parameters, and setpoints. The source program shall be English language-based and programmable by the user. The language shall be structured to allow for the easy configuration of control programs, schedules, alarms, reports, telecommunications, local displays, mathematical calculations, passwords, and histories. The language shall be self-documenting. Users shall be able to place comments anywhere in the body of a program. Program listings shall be configurable by the user in logical groupings.

E. Control Software:

1. The NCU shall have the ability to perform the following pre-tested control algorithms:

   a. Proportional, Integral plus Derivative Control (PID)
   b. Self Tuning PID
   c. Two Position Control
   d. Digital Filter
   e. Ratio Calculator
   f. Equipment Cycling Protection

2. Mathematical Functions:

   a. Each controller shall be capable of performing basic mathematical functions (+, -, *, /), squares, square roots, exponential, logarithms, Boolean logic statements, or combinations of both. The controllers shall be capable of performing complex logical statements including operators such as >, <, =, and, or, exclusive or, etc. These must be able to be used in the same equations with the mathematical operators and nested up to five parentheses deep.

3. Energy Management Applications:

   a. NCUs shall have the ability to perform any or all of the following energy management routines:
   b. Time of Day Scheduling

c. Calendar Based Scheduling
d. Holiday Scheduling
e. Temporary Schedule Overrides
f. Optimal Start
g. Optimal Stop
h. Night Setback Control
i. Enthalpy Switchover (Economizer)
j. Peak Demand Limiting
k. Temperature Compensated Duty Cycling
l. CFM Tracking
m. Heating/Cooling Interlock
n. Free Cooling
o. Hot Water Reset
p. Chilled Water / HW water Reset
q. Chiller / boiler Sequencing

4. History Logging:
   a. Each controller shall be capable of logging any system variable over user defined time intervals ranging from 1 second to 1440 minutes. Any system variables (inputs, outputs, math calculations, flags, etc.) can be logged in history. A maximum of 32767 values can be stored in each log. Each log can record either the instantaneous, average, minimum or maximum value of the point. Logs can be automatic or manual. Logged data shall be downloadable to the Operator Workstation for long term archiving based upon user-defined time intervals, or manual command.

5. Alarm Management:

   a. For each system point, alarms can be created based on high/low limits or conditional expressions. All alarms will be tested each scan of the NCU and can result in the display of one or more alarm messages or reports. Up to 8 alarms can be configured for each point in the controller. Messages and reports can be sent to a local terminal, to the front-end workstation(s), or via modem to a remote-computing device. Alarms will be generated based on their priority. A minimum of 255 priority levels shall be provided. If communication with the Operator Workstation is temporarily interrupted, the alarm will be buffered in the NCU. When communications return, the alarm will be transmitted to the Operator Workstation if the point is still in the alarm condition.

6. Reporting.

   a. The NCU shall be able to generate user-definable reports to a locally connected printer or terminal. The reports shall contain any combination of text and system variables. Report templates shall be able to be created by users in a word processing environment. Reports can be displayed based on any logical condition or through a user command.

1.15 Standalone Digital Control Units (SDCUs)

A. General:

1. Standalone Digital Control Units shall provide control of HVAC and lighting. Each controller shall have its own control programs and will continue to operate in the event of a failure or communication loss to its associated NCU.

B. Memory:

1. Control programs shall be stored in battery backed-up RAM and EPROM. Each controller shall have a minimum of 32K bytes of user RAM memory and 128K bytes of EPROM.

C. Communication Ports:

1. SDCUs shall provide a communication port to the field bus. In addition, a port shall be provided for connection of a portable service tool to support local commissioning and parameter changes with or without the NCU online. It shall be possible from a service port on any SDCU to view, enable/disable, and modify values of any point or program on any controller on the local field bus, any NCU or any SDCU on a different field bus.

D. Input/Output:

1. Each SDCU shall support the addition of the following types of inputs and outputs:

   a. Digital Inputs for status/alarm contacts
   b. Counter Inputs for summing pulses from meters.
   c. Thermistor Inputs for measuring temperatures in space, ducts and thermowells.
   d. Analog inputs for pressure, humidity, flow and position measurements.
   e. Digital Outputs for on/off equipment control.
   f. Analog Outputs for valve and damper position control, and capacity control of primary equipment.

E. Expandability:

1. Input and output capacity shall be expandable through the use of plug-in modules. A minimum of two modules shall be added to the base SDCU before additional power is required.

F. Networking:

1. Each SDCU will be able to exchange information on a peer to peer basis with other Standalone Digital Control Units during each field bus scan. Each SDCU shall be capable of storing and referencing global variables (on the LAN) with or without any workstations online. Each SDCU shall be able to have its program viewed and/or enabled/disabled either locally through a portable service tool or through a workstation connected to an NCU.

G. Indicator Lamps:

1. SDCUs will have as a minimum, LED indication of CPU status, and field bus status.

H. Real Time Clock (RTC):

1. An SDCU shall have a real time clock in either hardware or software. The accuracy shall be within 10 seconds per day. The RTC shall provide the following information: time of day, day, month, year, and day of week. Each SDCU shall receive a signal, every hour, over the network from the NCU which synchronizes all SDCU real time clocks.

I. Automatic Restart After Power Failure:

1. Upon restoration of power, the SDCU shall automatically and without human intervention, update all monitored functions, resume operation based on current, synchronized time and status, and implement special start-up strategies as required.

J. Battery Back Up:

1. Each SDCU shall have at least 3 years of battery back up to maintain all volatile memory.

K. Alarm Management:

1. For each system point, alarms can be created based on high/low limits or conditional expressions. All alarms will be tested each scan of the SDCU and can result in the display of one or more alarm messages or reports. Up to 8 alarms can be configured for each point in the controller enabling the escalation of the alarm priority (urgency) based upon which alarm(s) is/are triggered. Alarm messages can be sent to a local terminal or modem connected to an NCU or to the Operator's Workstation(s). Alarms will be generated based on their priority. A minimum of 255 priority levels shall be provided. If communication with the NCU is temporarily interrupted, the alarm will be buffered in the SDCU. When communications return, the alarm will be transmitted to the NCU if the point is still in the alarm condition.

L. Air Handler Controllers

1. AHU Controllers shall be capable of meeting the requirements of the sequence of operation found in the Execution portion of this specification and for future expansion.
2. AHU Controllers shall support all the necessary point inputs and outputs as required by the sequence and operate in a standalone fashion.
3. AHU Controllers shall be fully user programmable to allow for modification of the application software.
4. An LCD display shall be optionally available for readout of point values and to allow operators to change setpoints and system parameters.

5. A manual override switch shall be provided for all digital and analog outputs on the AHU Controller. The position of the switch shall be monitored in software and available for operator displays and alarm notification.

M. VAV Terminal Unit Controllers

1. VAV Terminal Unit Controllers shall support, but not be limited to the control of the following configurations of VAV boxes to address current requirements as described in the Execution portion of this specification, and for future expansion:

   a. Single Duct Cooling Only
   b. Single Duct Cooling with Reheat (Electric or Hot Water)
   c. Fan Powered (Parallel or Series)
   d. Dual Duct (Constant or Variable Volume)
   e. Supply/Exhaust

2. VAV Controllers for single duct applications will come equipped with a built-in actuator for modulation of the air damper. The actuator shall have a minimum torque rating of 35 in.-lb., and contain an override mechanism for manual positioning of the damper during startup and service. VAV Controllers shall contain an integral velocity sensor accurate to +/- 5% of the full range of the box's CFM rating. Each controller shall perform the sequence of operation described in Part 3 of this specification, and have the capability for time of day scheduling, occupancy mode control, after hours operation, lighting control, alarming, and trending. VAV Controllers shall be able to communicate with any other Standalone Digital Control Unit on the same field bus with or without communication to the NCU managing the field bus. Systems that fail to provide this (true peer-to-peer) capability will be limited to a maximum of 32 VAV controllers per field bus.

3. Unitary Controllers

   a. Unitary Controllers shall support, but not be limited to, the control of the following systems as described in the Execution portion of this specification, and for future expansion:

      1) Cabinet heater and convectors
      2) Rooftop top air handling units
      3) Fan Coils
      4) Unit and cabinet heaters

   b. The I/O of each Unitary Controller shall contain the sufficient quantity and types as required to meet the sequence of operation found in the Execution portion of this specification. In addition, each controller shall have the capability for time of day scheduling, occupancy mode control, after hour operation, lighting control, alarming, and trending.

N. Lighting Controllers (Not Used)

1. Lighting controllers shall provide direct control of 20 Amp, 277 VAC lighting circuits using mechanically held, latching relays. Controllers will contain from 8 to 48 circuits per enclosure. Each controller shall also contain inputs for direct connection to light switches and motion detectors. Each controller shall have the capability for time of day scheduling, occupancy mode control, after hour operation, alarming, and trending.

O. Display Controllers

1. Display controllers are standalone, touch screen based operator interfaces. The controller shall be designed for flush mounting in a finished space, with a minimum display size of 9 x 9 inches. Software shall be user programmable allowing for custom graphical images that simulate floor plans, menus, equipment schematics along with associated real time point values coming from any NCU on the network. The touch screen display shall contain a minimum of 64 possible touch cells that permit user interaction for changing screens, modifying set-points or operating equipment. Systems that do not offer a display controller as specified must provide a panel mounted computer with touch screen capability as an alternative. All air handling units shall use display controllers.

1.16 Operator Workstation Requirements

A. General.

The BAS workstation software shall be configurable as a multi-workstation system where the database is located on a central file server in the physical plant. The client software on multi-workstation system shall access the file server database program via an Ethernet TCP/IP network running at either 10MBPS or 100MBPS. All Workstations shall be Pentium II based personal computers operating under the Microsoft NT operating system. The application software shall be capable of communication to all Network Control Units and Standalone Digital Control Units, feature high-resolution color graphics, alarming, reporting, and be user configurable for all data collection and data presentation functions.

For multi-workstation systems, a minimum of 256 workstations shall be allowed on the Ethernet network along with the central file server. In this client/server configuration, any changes or additions made from one workstation will automatically appear on all other workstations without the requirement for manual copying of files. Multi-workstation systems with no central database will not be acceptable. Multi-workstation systems with distributed/tiered file servers and a central (master) database will not be acceptable.

B. Workstation Requirements

The workstation shall consist of the following:

3.6 GHz Intel Core i7 processor with 64GB of RAM

Microsoft Windows operating system (latest version compatible with BMS software)

Serial port, parallel port

10/100MBPS Ethernet NIC

500 GB hard disk

CD-ROM drive

High resolution (minimum 1080 x 1920), 17" flat panel display
Mouse
Full function keyboard
Audio sound card and speakers
License agreement for all applicable software.

C. File Server Hardware Requirements.

The file server computer shall contain of the following:
3.6 GHz Intel Core 2 Duo processor with 64GB of RAM
Microsoft Windows operating system (latest version compatible with BMS software)
10/100MBPS Ethernet NIC
500 GB hard disk
CD-ROM drive
Mouse
Full function keyboard
License agreement for all applicable software.
Provide one Windows 2000-compatible 56 Kbaud modem.

D. Printer

Provide a Printer. Printer shall be a HP LaserJet.

E. Monitor;

1. The monitor shall be flat screen minimum of 17", LED type, 1920x1080 resolution, 16:9 aspect ratio, VGA.

F. Workstation Software

1. General Description

The software architecture must be object-oriented in design, a true 32-bit application suite utilizing Microsoft's OLE, COM, DCOM and ODBC technologies. These technologies make it easy to fully utilize the power of the operating system to share, among applications (and therefore to the users of those applications), the wealth of data available from the BAS.

The workstation functions shall include monitoring and programming of all DDC controllers. Monitoring consists of alarming, reporting, graphic displays, long term data storage, automatic data collection, and operator-initiated control actions such as schedule and setpoint adjustments.

Programming of controllers shall be capable of being done either off-line or on-line from any operator workstation. All information will be available in graphic or text displays. Graphic displays will feature animation effects to enhance the presentation of the data, to alert operators of problems, and to facilitate location of information throughout the DDC system. All operator functions shall be selectable through a mouse.

2. System Database

The files server database engine must be Microsoft SQL Server, or another ODBC-compliant, relational database program. This ODBC (Open Database Connectivity)-compliant database engine allows for an owner to utilize “their” choice of database and due to it’s “open” architecture, allows an owner to write custom applications and/or reports which communicate directly with the database avoiding data transfer routines to update other applications. The system database shall contain all point configurations and programs in each of the controllers that have been assigned to the network. In addition, the database will contain all workstation files including color graphic, alarm reports, text reports, historical data logs, schedules, and polling records.

3. User Interface

The BAS workstation software shall allow the creation of a custom, browser-style interface linked to the user that has logged into the workstation software. This interface shall support the creation of “hot-spots” that the user may link to view/edit any object in the system or run any object editor or configuration tool contained in the software. Furthermore, this interface must be able to be configured to become a user’s “PC Desktop” – with all the links that a user needs to run other applications. This, along with the Windows 10 user security capabilities, will enable a system administrator to setup workstation accounts that not only limit the capabilities of the user within the BAS software but may also limit what a user can do on the PC and/or LAN/WAN. This might be used to ensure, for example, that the user of an alarm monitoring workstation is unable to shutdown the active alarm viewer and/or unable to load software onto the PC.

4. User Security

The software shall be designed so that each user of the software can have a unique username and password. This username/password combination shall be linked to a set of capabilities within the software, set by and editable only by, a system administrator. The sets of capabilities shall range from View only, Acknowledge alarms, Enable/disable and change values, Program, and Administer. The system shall allow the above capabilities to be applied independently to each and every class of object in the system. The system must allow a minimum of 256 users to be configured per workstation. There shall be an inactivity timer adjustable in software that automatically logs off the current operator after the timer has expired.

5. Configuration Interface

The workstation software shall use a familiar Windows Explorer™-style interface for an operator or programmer to view and/or edit any object (controller, point, alarm, report, schedule, etc.) in the entire system. In addition, this interface shall present a “network map” of all controllers and their associated points, programs, graphics, alarms, and reports in an easy to understand structure. All object names shall be alphanumeric and use Windows long filename conventions. Object names shall not be required to be unique throughout the system. This allows consistency in point naming. For example, each fan coil unit controller can have an input called Space Temperature and a setpoint called CFM Setpoint. The FCU controller name shall be unique such as FCU for LAB101. Systems requiring unique object names throughout the system will not be acceptable.

The configuration interface shall also include support for template objects. These template objects shall be used as building blocks for the creation of the BAS

database. The types of template objects supported shall include all data point types (input, output, string variables, setpoints, etc.), alarm algorithms, alarm notification objects, reports, graphics displays, schedules, and programs. Groups of template object types shall be able to be set up as template subsystems and systems. The template system shall prompt for data entry if necessary. The template system shall maintain a link to all "child" objects created by each template. If a user wishes to make a change to a template object, the software shall ask the user if he/she wants to update all of child objects with the change. This template system shall facilitate configuration and programming consistency and afford the user a fast and simple method to make global changes to the BAS.

6. Color Graphic Displays

The system shall allow for the creation of user defined, color graphic displays for the viewing of mechanical and electrical systems, or building schematics. These graphics shall contain point information from the database including any attributes associated with the point (engineering units, etc.). In addition operators shall be able to command equipment or change setpoints from a graphic through the use of the mouse. Requirements of the color graphic subsystem include:

a. SVGA, bit-mapped displays. The user shall have the ability to import AutoCAD generated picture files as background displays.
b. A built-in library of animated objects such as dampers, fans, pumps, buttons, knobs, gauges, ad graphs which can be "dropped" on a graphic through the use of a software configuration "wizard". These objects shall enable operators to interact with the graphic displays in a manner that mimics their mechanical equivalents found on field installed control panels. Using the mouse, operators shall be able to adjust setpoints, start or stop equipment, modify PID loop parameters, or change schedules.
c. Status changes or alarm conditions must be able to be highlighted by objects changing screen location, size, color, text, blinking or changing from one display to another.
d. Graphic panel objects shall be able to be configured with multiple "tabbed" pages allowing an operator to quickly view individual graphics of equipment, which make up a subsystem or system.
e. Ability to link graphic displays through user defined objects, alarm testing, or the result of a mathematical expression. Operators must be able to change from one graphic to another by selecting an object with a mouse - no menus will be required.
f. Automatic monitoring

The software shall allow for the automatic collection of data and reports from any controller through either a hardwire or modem communication link. The frequency of data collection shall be completely user-configurable.

g. Alarm Management

The software shall be capable of accepting alarms directly from controllers, or generating alarms based on evaluation of data in controllers and comparing to limits or conditional equations configured through the software. Any alarm (regardless of its origination) will be integrated into the

overall alarm management system and will appear in all standard alarm reports, be available for operator acknowledgment, and have the option for displaying graphics, or reports.

Alarm management features shall include:

1) A minimum of 255 alarm notification levels. Each notification level will establish a unique set of parameters for controlling alarm display, acknowledgment, keyboard annunciation, alarm printout and record keeping.
2) Automatic logging in the database of the alarm message, point name, point value, connected controller, timestamp, username and time of acknowledgement, username and time of alarm silence (soft acknowledgement)
3) Automatic printing of the alarm information or alarm report to an alarm printer or report printer.
4) Playing an audible beep or audio (wav) file on alarm initiation or return to normal.
5) Sending an email or alphanumeric page to anyone listed in a workstation's email account address list on either the initial occurrence of an alarm and/or if the alarm is repeated because an operator has not acknowledged the alarm within a user-configurable timeframe. The ability to utilize email and alphanumeric paging of alarms shall be a standard feature of the software integrated with the operating system's mail application interface (MAPI). No special software interfaces shall be required.
6) Individual alarms shall be able to be re-routed to a workstation or workstations at user-specified times and dates. For example, a critical high temp alarm can be configured to be routed to a Facilities Dept. workstation during normal working hours (7am-6pm, Mon-Fri) and to a Central Alarming workstation at all other times.
7) An active alarm viewer shall be included which can be customized for each user or user type to hide or display any alarm attributes.
8) The font type and color, and background color for each alarm notification level as seen in the active alarm viewer shall be customizable to allow easy identification of certain alarm types or alarm states.
9) The active alarm viewer can be configured such that an operator must type in text in an alarm entry and/or pick from a drop-down list of user actions for certain alarms. This ensures accountability (audit trail) for the response to critical alarms.

h. Custom Report Generation

The software will contain a built-in custom report generator, featuring word processing tools for the creation of custom reports. These custom reports shall be able to be set up to automatically run or be generated on demand. Each workstation shall be able to associate reports with any word processing or spreadsheet program loaded on the machine. When the report is displayed, it will automatically spawn the associated report editor such as MS Word™.

1) Reports can be of any length and contain any point attributes from any controller on the network.
2) The report generator will have access to the user programming language in order to perform mathematical calculations inside the body of the report, control the display output of the report, or prompt the user for additional information needed by the report.
3) It shall be possible to run other executable programs whenever a report is initiated.
4) Report Generator activity can be tied to the alarm management system, so that any of the configured reports can be displayed in response to an alarm condition.
5) Standard reports shall include:

    a) Points in each controller.
    b) Points in alarm
    c) Disabled points
    d) Overridden points
    e) Operator activity report
    f) Alarm history log.
    g) Program listing by controller with status.
    h) Network status of each controller

i. Spreadsheet-style reports

The software shall allow the simple configuration of row/column (spreadsheet-style) reports on any class of object in the system. These reports shall be user-configurable and shall be able to extract live (controller) data and/or data from the database. The user shall be able to set up each report to display in any text font, color and background color. In addition the report shall be able to be configured to filter data, sort data and highlight data which meets user-defined criteria.

j. HTML Reporting

The above spreadsheet-style reports shall be able to be run to an HTML template file. This feature will create an HTML “results” file in the directory of the HTML template. This directory can be shared with other computer users, which will allow those users with access to the directory to “point” their web browser at the file and view the report.

k. Scheduling- It shall be possible to configure and download from the workstation schedules for any of the controllers on the network.

1) Time of day schedules shall be in a calendar style and shall be programmable for a minimum of one year in advance. Each standard day of the week and user-defined day types shall be able to be associated with a color so that when the schedule is viewed it is very easy, at-a-glance, to determine the schedule for a particular day even from the yearly view. To change the schedule for a particular day, a user shall simply click on the day and then click on the day type.
2) Each schedule will appear on the screen viewable as the entire year, monthly, week and day. A simple mouse click shall allow switching

between views. It shall also be possible to scroll from one month to the next and view or alter any of the schedule times.

3) Schedules will be assigned to specific controllers and stored in their local RAM memory. Any changes made at the workstation will be automatically updated to the corresponding schedule in the controller.

l. Programmer's Environment

The programmer's environment will include access to a superset of the same programming language supported in the controllers. Here the programmer will be able to configure application software off-line (if desired) for custom program development, write global control programs, system reports, wide area networking data collection routines, and custom alarm management software. On the same screen as the program editor, the programming environment shall include dockable debug and watch bars for program debugging and viewing updated values and point attributes during programming. In addition a wizard tool shall be available for loading programs from a library file in the program editor.

m. Saving/Reloading

The workstation software shall have an application to save and restore field controller memory files. This application shall not be limited to saving and reloading an entire controller – it must also be able to save/reload individual objects in the controller. This allows off-line debugging of control programs, for example, and then reloading of just the modified information.

n. Data Logging

The workstation software shall have the capability to easily configure groups of data points with trend logs and display the trend log data. A group of data points shall be created by drag-and-drop method of the points into a folder. The trend log data shall be displayed through a simply menu selection. This data shall be able to be saved to file and/or printed.

o. Audit Trail

The workstation software shall automatically log and timestamp every operation that a user performs at a workstation, from logging on and off a workstation to changing a point value, modifying a program, enabling/disabling an object, viewing a graphic display, running a report, modifying a schedule, etc.

p. Fault Tolerant File Server Operation

The system shall provide the option to provide fault tolerant operation in the event of the loss of the CPU, disk drives, or other hardware required to maintain the operational integrity of the system. Operational integrity includes all user interfaces, monitoring of alarm points and access points, and executing access control functions.

The switchover mechanism provided shall be automatic. Should the failure be caused by hardware, then the system shall immediately switch to the Backup computer. Should the system failure be caused by software (instruction or data), the system shall not pass the faulted code to the Backup computer, otherwise the Backup shall fail in the same manner of the Primary computer.

Switchover to the Backup computer shall be initiated and effective (complete) in a manner and time frame that precludes the loss of event data, and shall be

transparent to the system users, except for an advisory alarm message indicating that the switchover has occurred.

When the system fails-over from the Primary to the Backup computer, no alarm or other event shall be lost, and the Backup computer shall take control of all system functions.

A single component failure in the system shall not cause the entire system to fail. All system users shall be informed of any detectable component failure via an alarm event. System users shall not be logged off as a result of a system failure or switchover.

The Primary computer shall provide continual indication that the Backup computer is unavailable until such time that the fault has been purged.

1.17 **Portable Operator's Terminal**

A. Provide one 15" full screen, laptop portable operator terminal shall communicate directly to all controllers. The laptop software shall enable users to monitor both instantaneous and historical point data, modify control parameters, and enable/disable any point or program in any controller on the network.

1. The laptop computer will be a Intel Core 2 Duo-based portable computer with a minimum of 4GB of RAM memory, and a 160GB hard disk drive, running Windows ver 7 or Windows XP.
2. The laptop service tool will connect to any Ethernet controller or standalone controller via a dedicated service port. From this single connection, the user shall be able to communicate with any other controller on the LAN.
3. The laptop service tool will limit operator access by passwords. The service tool must support, at a minimum, the following password-protected user types: Administrator, Modify Parameters, View Only.
4. The laptop software shall include built-in menus for viewing points by controller, enabling, disabling and viewing programs, configuring controllers, and communicating to other controllers on the network.

1.18 DDC Sensors and Point Hardware

A. Temperature Sensors

1. All temperature devices shall use precision thermistors accurate to +/- 1 degree F over a range of –30 to 230 degrees F. Space temperature sensors shall be accurate to +/- .5 degrees F over a range of 40 to 100 degrees F.

2. Space sensors shall be have off white enclosure and shall be mounted on a standard electrical box. Space sensors shall use surface mounted finished cast electrical box for surface mounting with metal "wire-mold" to conceal wiring for all solid masonry partitions. For space sensors located on gypsum board partitions, wiring shall be concealed inside the walls with recessed flush mounted electrical boxes. In general, control wiring shall run from the ceiling plenum to the box which shall be wall mounted next to the door or as shown on plan.

3. The space temperature sensor housing shall utilize buttons for adjusting the space temperature set-point, as well as a push button for selecting after hours operation, fan speed and all and other operator selectable parameters. Operators shall be able to adjust set points directly from the sensor. All space sensors, (located in public location, office, class rooms), shall incorporate either an LED or LCD display for viewing the space temperature, set-point and other operator selectable parameters. Space sensors located in store rooms, MER, and unoccupied space are not required have LED or LCD display.

4. Duct temperature sensors shall incorporate a thermistor bead embedded at the tip of a stainless steel tube. Probe style duct sensors are useable in air handling applications where the coil or duct area is less than 14 square feet.
5. Averaging sensors shall be employed in ducts which are larger than 14 square feet. The averaging sensor tube must contain at least one thermistor for every 3 feet, with a minimum tube length of 12 feet.
6. Immersion sensors shall be employed for measurement of temperature in all chilled and hot water applications as well as refrigerant applications. Thermal wells shall be brass or stainless steel for non-corrosive fluids below 250 degrees F and 300 series stainless steel for all other applications.
7. A pneumatic signal shall not be allowed for sensing temperature.

B. Humidity Sensors

1. Humidity devices shall be accurate to +/- 5% at full scale for space and +/- 3% for duct and outside air applications. Suppliers shall be able to demonstrate that accuracy is NIST traceable.
2. Provide a hand held field calibration tool that both reads the output of the sensor and contains a reference sensor for ongoing calibration.

C. Pressure Sensors

1. Air pressure measurements in the range of 0 to 10” water column will be accurate to +/- 1% using a solid-state sensing element. Acceptable manufacturers include Modus Instruments and Mamac.
2. Differential pressure measurements of liquids or gases shall be accurate to =/- 0.5% of range. The housing shall be Nema 4 rated.

D. Current and KW Sensors

1. Current status switches shall be used to monitor fans, pumps, motors and electrical loads. Current switches shall be available in solid and split core models, and offer either a digital or an analog signal to the automation system. Acceptable manufacturer is Veris or approved equal.
2. Measurement of three phase power shall be accomplished with a kW/kWH transducer. This device shall utilize direct current transformer inputs to calculate the instantaneous value (kW) and a pulsed output proportional to the energy usage (kWH). Provide Veris Model 6000 Power Transducer or approved equal.

E. Flow Sensors

1. Provide an insertion vortex flowmeter for measurement of liquid, gas or steam flows in pipe sizes above 3 inches.
2. Install the flow meter on an isolation valve to permit removal without process shutdown.
3. Sensors shall be manufactured by EMCO or approved equal.

F. Electric/Pneumatic Transducers

1. Electric to pneumatic transducers shall operate from either a PWM or analog signal. E/P transducers shall be rated for 0 - 20 psi operation and accurate to 2% of full scale. E/P transducers shall have a maximum air consumption of 100 SCIM.
2. E/P transducers may be installed at the end device (damper or valve), or mounted separately in a field interface panel, or as part of the controller. All transducers will be calibrated. Panel mounted transducers shall be Sensycon or approved equal.

G. Electric/Pneumatic Solenoid Valves

Electric solenoid operated pneumatic valves (EP's) shall have a three port operation: common, normally open and normally closed. They shall be rated for 50 psig when used for 25 psig or less applications, or rated for 150 psig when used for 100 psig or less applications. The coils shall be equipped with transient suppression devices to limit transients to 150 percent of the rated coil voltage.

1.19 Control Valves

A. Provide automatic control valves suitable for the specified controlled media (steam, water or glycol). Provide valves which mate and match the material of the connected piping. Equip control valves with the actuators of required input power type and control signal type to accurately position the flow control element and provide sufficient force to achieve required leakage specification.

B. Control valves shall meet the heating and cooling loads specified, and close off against the differential pressure conditions within the application. Valves should be sized to operate accurately and with stability from 10 to 100% of the maximum design flow.

C. Trim material shall be stainless steel for steam and high differential pressure applications.

D. Electric actuation should be provided on all terminal unit reheat applications.

1.20 Dampers

A. Automatic dampers, furnished by the Building Automation Contractor shall be single or multiple blade as required. Dampers are to be installed by the HVAC Contractor under the supervision of the BAS Contractor. All blank-off plates and conversions necessary to install smaller than duct size dampers are the responsibility of the Sheet Metal Contractor.

B. Damper frames are to be constructed of 13 gauge galvanized sheet steel mechanically joined with linkage concealed in the side channel to eliminate noise as friction. Compressible spring stainless steel side seals, and acetal or bronze bearings shall also be provided.

C. Damper blade width shall not exceed eight inches. Seals and 3/8 inch square steel zinc plated pins are required. Blade rotation is to be parallel or opposed as shown on the schedules.

D. For high performance applications, control dampers will meet or exceed the UL Class I leakage rating.

E. Control and smoke dampers shall be Ruskin, or approved equal.

F. Provide opposed blade dampers for modulating applications and parallel blade for two position control.

1.21 Damper Actuators

A. Electronic Actuators – the actuator shall be direct coupled over the shaft, enabling it to be mounted directly to the damper shaft without the need for connecting linkage. The actuator shall have electronic overload circuitry to prevent damage. For power-failure/safety applications, an internal mechanical, spring return mechanism shall be built into the actuator housing. Non-spring return actuators shall have an external manual gear release to allow positioning of the damper when the actuator is not powered.

B. Pneumatic Actuators - shall be of the synthetic elastomer diaphragm piston type and shall be fully proportioning unless otherwise specified. They shall have full metal bodies and utilize replaceable diaphragms. Damper actuators on large sections of modulating dampers (>25 sq.ft.) or high face velocity applications (such as fan inlet vanes) shall be equipped with pilot positioners to provide repeatability and quick response. Also provide pilot positioners on steam valves requiring 1/3 – 2/3 operation. (Not used)

1.22 Smoke Detectors

A. Air duct smoke detectors shall be by Air Products & Controls or approved equal. The detectors shall operate at air velocities from 300 feet per minute to 4000 feet per minute.

B. The smoke detector shall utilize a photoelectric detector head.

C. The housing shall permit mechanical installation without removal of the detector cover.

D. The detectors shall be listed by Underwrites Laboratories and meet the requirements of UL 268A.

1.23 Airflow Measuring Stations

A. Provide a thermal anemometer using instrument grade self heated thermistor sensors with thermistor temperature sensors.

B. The flow station shall operate over a range of 0 to 5,000 feet/min with an accuracy of +/- 2% over 500 feet/min and +/- 10 ft/min for reading less than 500 feet/min.

C. The output signal shall be linear with field selectable ranges including 0-5 VDC, 0-10VDC and 4-20 mA.

D. Furnish Ebtron Series 3000 airflow stations or approved equal.

PART 2 - EXECUTION

2.1 Contractor Responsibilities

A. General

Installation of the building automation system shall be performed by the Contractor or a subcontractor. However, all installation shall be under the personal supervision of the Contractor. The Contractor shall certify all work as proper and complete. Under no circumstances shall the design, scheduling, coordination, programming, training, and warranty requirements for the project be delegated to a subcontractor.

B. Access to Site

1. Unless notified otherwise, entrance to building is restricted. No one will be permitted to enter the building unless their names have been cleared with the Owner or the Owner's Representative.

C. Code Compliance

1. All wiring shall be installed in accordance with all applicable electrical codes and will comply with equipment manufacturer's recommendations.

D. Cleanup

1. At the completion of the work, all equipment pertinent to this contract shall be checked and thoroughly cleaned, and all other areas shall be cleaned around equipment provided under this contract.

2.2 Wiring, Conduit, and Cable

A. All wire will be copper and meet the minimum wire size and insulation class listed below:

Wire Class	Wire Size	Isolation Class
Power	12 Gauge	600 Volt
Class One	14 Gauge Std.	600 Volt
Class Two	18 Gauge Std.	300 Volt
Class Three	18 Gauge Std.	300 volt
Communications	Per Mfr.	Per Mfr.

B. Power and Class One wiring may be run in the same conduit. Class Two and Three wiring and communications wiring may be run in the same conduit.

C. Where different wiring classes terminate within the same enclosure, maintain clearances and install barriers per the National Electric Code.

D. Where wiring is required to be installed in conduit, EMT shall be used. Conduit shall be minimum 1/2 inch galvanized EMT. Set screw fittings are acceptable for dry interior locations. Watertight compression fittings shall be used for exterior locations and interior locations subject to moisture. Provide conduit sealoff fitting where exterior conduits enter the building or between areas of high temperature/moisture differential.

E. Flexible metallic conduit (max. 3 feet) shall be used for connections to motors, actuators, controllers, and sensors mounted on vibration producing equipment. Liquid-tight flexible conduit shall be use in exterior locations and interior locations subject to moisture.

F. Junction boxes shall be provided at all cable splices, equipment termination, and transitions from EMT to flexible conduit. Interior dry location J-boxes shall be galvanized pressed steel, nominal four-inch square with blank cover. Exterior and damp location JH-boxes shall be cast alloy FS boxes with threaded hubs and gasketed covers.

G. Where the space above the ceiling is a supply or return air plenum, the wiring shall be plenum rated. Teflon wiring can be run without conduit above suspended ceilings. EXCEPTION: Any wire run in suspended ceilings that is used to control outside air dampers or to connect the system to the fire management system shall be in conduit.

H. Coaxial cable shall conform to RG62 or RG59 rating. Provide plenum rated coaxial cable when running in return air plenums.

I. Fiber optic cable shall include the following sizes; 50/125, 62.5/125 or 100/140.

J. Only glass fiber is acceptable, no plastic.

K. Fiber optic cable shall only be installed and terminated by an experienced contractor. The BAS contractor shall submit to the Engineer the name of the intended contractor of the fiber optic cable with his submittal documents.

L. Hardware Installation

2.3 Installation Practices for Wiring

A. All controllers are to be mounted vertically and per the manufacturer's installation documentation.

B. The 120VAC power wiring to each Ethernet or Remote Site controller shall be a dedicated run, with a separate breaker. Each run will include a separate hot, neutral and ground wire. The ground wire will terminate at the breaker panel ground. This circuit will not feed any other circuit or device.

C. A true earth ground must be available in the building. Do not use a corroded or galvanized pipe, or structural steel.

D. Wires are to be attached to the building proper at regular intervals such that wiring does not droop. Wires are not to be affixed to or supported by pipes, conduit, etc.

E. Conduit in finished areas, will be concealed in ceiling cavity spaces, plenums, furred spaces and wall construction. Exception; metallic surface raceway may be used in finished areas on masonry walls. All surface raceway in finished areas must be color matched to the existing finish within the limitations of standard manufactured colors.

F. Conduit, in non-finished areas where possible, will be concealed in ceiling cavity spaces, plenums, furred spaces, and wall construction. Exposed conduit will run parallel to or at right angles to the building structure.

G. Wires are to be kept a minimum of three (3) inches from hot water, steam, or condensate piping.

H. Where sensor wires leave the conduit system, they are to be protected by a plastic insert.

I. Wire will not be allowed to run across telephone equipment areas.

2.4 Installation Practices for Field Devices

A. Well-mounted sensors will include thermal conducting compound within the well to insure good heat transfer to the sensor.

B. Actuators will be firmly mounted to give positive movement and linkage will be adjusted to give smooth continuous movement throughout 100 percent of the stroke.

C. Relay outputs will include transient suppression across all coils. Suppression devices shall limit transients to 150% of the rated coil voltage.

D. Water line mounted sensors shall be removable without shutting down the system in which they are installed.

E. For duct static pressure sensors, the high pressure port shall be connected to a metal static pressure probe inserted into the duct pointing upstream. The low pressure port shall be left open to the plenum area at the point that the high pressure port is tapped into the ductwork.

F. For building static pressure sensors, the high pressure port shall be inserted into the space via a metal tube. Pipe the low pressure port to the outside of the building.

2.5 Enclosures

A. For all I/O requiring field interface devices, these devices where practical will be mounted in a field interface panel (FIP). The Contractor shall provide an enclosure which protects the device(s) from dust, moisture, conceals integral wiring and moving parts.

B. FIPs shall contain power supplies for sensors, interface relays and contactors, safety circuits, and I/P transducers.

C. The FIP enclosure shall be of steel construction with baked enamel finish, NEMA 1 rated with a hinged door and keyed lock. The enclosure will be sized for twenty percent spare mounting space. All locks will be keyed identically.

D. All wiring to and from the FIP will be to screw type terminals. Analog or communications wiring may use the FIP as a raceway without terminating. The use of wire nuts within the FIP is prohibited.

E. All outside mounted enclosures shall meet the NEMA-4 rating.

F. The wiring within all enclosures shall be run in plastic track. Wiring within controllers shall be wrapped and secured.

2.6 Identification

A. Identify all control wires with labeling tape or sleeves using either words, letters, or numbers that can be exactly cross-referenced with as-built drawings.

B. All field enclosures, other than controllers, shall be identified with a bakelite nameplate. The lettering shall be in white against a black or blue background.

C. Junction box covers will be marked to indicate that they are a part of the BAS system.

D. All I/O field devices (except space sensors) that are not mounted within FIP's shall be identified with name plates.

E. All I/O field devices inside FIP's shall be labeled.

2.7 Location

A. The location of sensors is per mechanical and architectural drawings.

B. Space humidity, CO or temperature sensors will be mounted away from machinery generating heat, direct light and diffuser air streams.

C. Outdoor air sensors will be mounted on the north building face directly in the outside air. Install these sensors such that the effects of heat radiated from the building or sunlight is minimized.

D. Field enclosures shall be located immediately adjacent to the controller panel(s) to which it is being interfaced.

2.8 **Software Installation**

A. General.

The Contractor shall provide all labor necessary to install, initialize, start-up and debug all system software as described in this section. This includes any operating system software or other third party software necessary for successful operation of the system.

B. Database Configuration.

The Contractor will provide all labor to configure those portions of the database that are required by the points list and sequence of operation.

C. Color Graphic Slides.

Unless otherwise directed by the owner, the Contractor will provide color graphic displays as depicted in the mechanical drawings for each system and floor plan. For each system or floor plan, the display shall contain the associated points identified in the point list and allow for setpoint changes as required by the owner. Graphically represent each and every piece of equipment in the class room building, new and existing, all input and put status point, and functional points. This shall include the new fans, chillers, and convectors, existing boilers, water, fuel, and ejection pumps, fan coil units, convectors, air handlers and fans.

D. Reports.

The Contractor will configure reports for all of the equipment listed in section 1.3D. report shall be configured for all input and output points monitored and controlled. As well as the following

Space Temperature Report

E. Documentation

As built software documentation will include the following:

1. Descriptive point lists
2. Application program listing
3. Application programs with comments.
4. Printouts of all reports.
5. Alarm list.
6. Printouts of all graphics

F. Commissioning and System Startup

G. Point to Point Checkout.

Each I/O device (both field mounted as well as those located in FIPs) shall be inspected and verified for proper installation and functionality. A checkout sheet itemizing each device shall be filled out, dated and approved by the Project Manager for submission to the owner or owner's representative.

H. Controller and Workstation Checkout.

A field checkout of all controllers and front end equipment (computers, printers, modems, etc.) shall be conducted to verify proper operation of both hardware and software. A checkout sheet itemizing each device and a description of the associated tests shall be prepared and submitted to the owner or owner's representative by the completion of the project.

I. System Acceptance Testing

All application software will be verified and compared against the sequences of operation. Control loops will be exercised by inducing a setpoint shift of at least 10%

and observing whether the system successfully returns the process variable to setpoint. Record all test results and attach to the Test Results Sheet.

J. Test each alarm in the system and validate that the system generates the appropriate alarm message, that the message appears at all prescribed destinations (workstations or printers), and that any other related actions occur as defined (i.e. graphic panels are invoked, reports are generated, etc.). Submit a Test Results Sheet to the owner.

K. Perform an operational test of each unique graphic display and report to verify that the item exists, that the appearance and content are correct, and that any special features work as intended. Submit a Test Results Sheet to the owner.

L. Perform an operational test of each third party interface that has been included as part of the automation system. Verify that all points are properly polled, that alarms have been configured, and that any associated graphics and reports have been completed. If the interface involves a file transfer over Ethernet, test any logic that controls the transmission of the file, and verify the content of the specified information.

END OF SECTION 23 09 01

SECTION 230993

SEQUENCE OF OPERATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sequence of operation:
1. Summer winter change over
2. Boiler Plant
3. Chiller Plant
4. Dual Temperature Variable Speed Pumping System Control
5. Packaged Rooftop Air Conditioning Units, HV Unit
6. VAV Boxes with and without Reheat
7. Cabinet Heaters and Unit Heaters
8. Fin Tube Radiation
9. Cabinet Convectors
10. Exhaust fans
11. Unit Ventilators and Relief Fans
12. Ductless split systems
13. Air Conditioning Condensate Pumps
14. Miscellaneous Plumbing Equipment
15. Kitchen Exhaust Fan and Make-up Air Unit

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.

B. Provide DDC based electronic controls, panels, wiring and all accessories required to achieve the specified control sequences and establish a complete independent system for all new equipment and existing equipment. In general the equipment shall be controlled through Standalone Digital Control Units (SDCUs).

BMS shall include status of all motorized valves, dampers, equipment, pumps such that operation and position of all equipment is visible at BMS front end.

Provide the necessary quantity and types of SDCUs to meet the requirements of the project for mechanical equipment control including air handlers, central plant control, and terminal unit control. Each SDCU will operate completely standalone, containing all of the I/O and programs to control its associated equipment.

Certain controls are specified to be furnished with the equipment. This contractor shall provide all components to communicate with factory furnished controls and connect them to the building automation control system. This contractor shall be responsible to review equipment submittals and review and review the controls provided with all packaged equipment to insure that the equipment is ordered with eh appropriate gateways and MPTP controllers for integration to the BMS (Building Management System) system. The contractor shall also provide all controls, wiring and auxiliaries required to operate equipment not furnished with factory controls. Work required includes, but is not limited to the following:

1. Control wiring between factory mounted unit panels and factory supplied remote panels.
2. Installation and wiring for factory supplied devices requiring field installation.
3. Panel mounted transformers and control power wiring for all controllers and control devices.
4. Control wiring to each remote device (room thermostats, outdoor air sensors, static pressure controllers, control actuators, control panels, etc.).
6. All control valves, motorized dampers thermostats, relays, sensors, etc. unless furnished as an integral part of the equipment.
7. All interlock control wiring (24 volt and 120 volt) between units, fans, etc.

C. All control and interlock wiring shall be run in EMT for indoor locations and in galvanized conduit for outdoor locations.

1.04 SUBMITTALS FOR REVIEW

A. Division 1 - Submittals: Procedures for submittals.

B. Shop Drawings: Indicate mechanical system controlled and control system components.

1. Label with settings, adjustable range of control and limits. Include written description of control sequence.
2. Include flow diagrams for each control system, graphically depicting control logic.
3. Include draft copies of graphic displays indicating mechanical system components, control system components, and controlled function status and value.
4. Submit a complete written sequence of operation for each and every controlled piece of equipment.

1.05 SUBMITTALS AT PROJECT CLOSEOUT

A. Operation and Maintenance Data.

B. Project Record Documents: Record actual locations of components and set-points of controls, including changes to sequences made after submission of shop drawings.

1.06 QUALITY ASSURANCE

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

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.01 Summer/Winter Change Over

The Building Management System (BMS) shall index the hot water heating system and chilled water cooling system into either summer or winter control based upon outdoor air temperature. Note system is a 2 pipe system. Owner shall index system via BMS to Winter or Summer Mode.

Winter Mode:
When indexed to Winter Mode, the air conditioning shall be disabled. During Winter Mode, Automatic Changeover valves shall operate such that Dual Temperature water does not pass thru the air cooled chiller. Sequence operation of the valves to prevent deadheading. Water shall not be allowed to cycle through the boilers until minimum hot water temperature (adjustable) is reached.

Summer Mode:
When indexed to Summer Mode, the hot water system shall disabled. During Summer Mode, Automatic Changeover valves shall operate such that Dual Temperature water does not pass thru the boilers. Sequence operation of the valves to prevent deadheading. Water shall not be allowed to cycle through the chiller until maximum water temperature (adjustable) for chiller is reached. Contractor shall note hot water terminal units and associated control valves must close during Summer Mode. Refer to Sequences below.

The system operator shall have capacity of over riding the system for manual forced change over. A minimum time delay, (adjustable), between summer/winter changes over shall prevent cycling between the 2 modes. During heating mode, the DX cooling (air cooled chiller) shall be locked out except for supplemental cooling systems.

Base Bid Valve Sequence for Summer/Winter Autochangeover:
Winter Mode:
When indexed to Winter Mode, new 2-way Automatic Hot Water Valves (typ for 2) shall open to allow operation of boilers. Boiler controls shall modulate boilers to maintain desired hot water temperature. New 2-way Automatic CHW Valves (typ for 2) shall close such that water shall not be diverted to chiller.

Summer Mode:
When indexed to Summer Mode, new 2-way Autocmatic CHW Valves (typ for 2) shall open to allow operation of chiller. Chiller controls shall modulate chiller to maintain desired chilled water temperature. New 2-way Automatic Hot Water Valves (typ for 2) shall close such that water shall not be diverted to boilers.

Alternate A New Boiler Plant Valve Sequence for Summer/Winter Autochangeover:
Provide (2) two-way automatic isolation valves on piping to the boiler and (2) two-way automatic isolation valves on piping to the chiller.

Winter Mode:
When indexed to Winter Mode, new 2-way automatic isolation valves on piping to boilers shall open to allow operation of boilers. Two 3-way motorized valves shall modulate to maintain desired dual temperature water setpoint. New 2-way isolation valves on piping to chiller shall close such that water does not flow to chillers. Pump(s) and Boiler(s) operation shall be as noted herein.

Summer Mode:
When indexed to Summer Mode, new 2-way automatic isolation valves on piping to chiller shall open to allow operation of chiller. Two 3-way motorized valves shall modulate to maintain desired dual temperature water setpoint. New 2-way isolation valves on piping to chiller shall close such that water does not flow to boilers. Pump(s) and Boiler(s) operation shall be as noted herein.

Control Points:
- Summer/Winter Status/Enable
- Valve(s) position, all
- Dual Temperature Water Supply Setpoint / Temperature
- Dual Temperature Water Return Setpoint / Temperature

Alarms:
- BMS status and alarms;
- Temperature out of bounds

Alarms and Graphics

Alarms

All of the inputs on this controller will be monitored by the front-end web server and will provide alarm notification upon detection of an alarm condition (via the alarm log, email and/or text). The controller will also verify the input status to the output control signals and provide alarm notification to the system upon detection of an alarm condition. This alarming should be understood throughout the system, even if they are not all specifically detailed within this sequence of operations.

Graphics

The front-end web-based system will include a complete graphical representation of this control system and all of its associated points, alarms, setpoints, schedules, sequences as detailed within this sequence and the HVAC Controls portion of the project plans, as well as what is required to make this system fully operational and user friendly.

3.02 Boiler Plant:

Depending if the Boiler Replacement Alternate is selected, boilers may be existing or may be new. Contractor to provide pricing for both base bid (boilers to remain) and the appropriate alternate (new boiler plant). Refer to Drawings for scope of work for Base Bid and Alternates.

The hot water (HW) system is made up of two condensing boilers (provided with factory controls), two variable speed system loop pumps, HW loop bypass valve, and loop pressure controls. The control system will monitor the boiler factory controls and provide setpoint adjustment via BACnet MS/TP network communications.

Base Bid: Boiler plant consists of the existing multiple boilers, new Automatic Changeover Valves/Piping and existing dual temperature water pumps. This Contract shall include new interface with boiler manufacturer unitary controller to allow for full control, status, operation and alarms from existing boilers to new BMS. Operation of Boiler Plant shall be via new BMS.

Alternate:
The hot water (HW) system is made up of two condensing boilers (provided with factory controls), two boiler pumps, two variable speed system dual temperature pumps, HW loop bypass valve, and pressure controls. The control system will monitor the boiler factory controls and provide setpoint adjustment via BACnet MS/TP network communications.

Boilers shall be operated through an application specific unitary controller that will sequence boilers, pumps dampers, valves and fans. Refer to Section 235216 for all safeties and combustion control sequences. The controller shall be microprocessor-based system engineered and programmed exclusively for the operation of multiple hot water boilers.

The communications protocol for the boiler controls shall be based on ASHRA/ANSI BACNET Standard 135-1995. Provide required modules to allow open communication, integration and interoperability with other DDC system. The BMS contractor and boiler manufacturer shall coordinate their work to insure compatibility prior to installation.

Base Bid and Alternate: The BMS system shall enable the hot water system when indexed to Winter Mode. The hot water primary, (HWP P-4 and P-5), circulation pumps shall be interlocked to run continuously when boilers are started. Furnish a flow switch in each of the primary supply water headers and the secondary loop arranged to prevent boiler operation if flow is not proved.

The BMS shall sequence the hot water boilers to maintain the secondary hot water loop temperature set-point. The set-point shall be reset by the outdoor air temperature sensor. Reset schedule (adjustable) to be 180 F to 120 F hot water supply temperature as outside air varies from 10 F to 55 F (adjustable). Lead boiler selection shall be made by the BMS according to a rotating seven-day schedule.

The glycol makeup pumps shall be arranged to automatically maintain hot water system pressure in the boiler system. The make up water pumps shall be arranged to alternate through the alternating pump controller.

Control Points:

- Hot Water System enable/disable
- Boiler Water Supply Setpoint / Temperature, each boiler
- Boiler Water Return Setpoint / Temperature, each boiler
- Boiler Run Status, each
- Make up water Flow Meter (gpm flow meter)
- Burner Shutdown, each
- Pump On/Off, Status, each pump
- VFD Speed Control, each
- Valve(s) position, all
- Flow Switch in Supply Line
- Outside Air Temperature and Humidity
- End Switch Position for Combustion Air Dampers
- Hot Water Supply Setpoint / Temperature
- Hot Water Return Setpoint / Temperature
- Pump Speed, VFD, Enable

Alarms:

- BMS status and alarms;
- Common failure alarm for each boiler.
- High temperature
- Low temperature
- Fuel oil pump failure
- Primary pump failure
- Secondary pump failure
- Make up pump failure
- Low water level
- High water level
- Temperature out of bounds

Boiler Room Manual Shutdown

A boiler room shutdown station will be located just outside each of the doors entering the Boiler Room. If this button is pushed, then the boilers and domestic HW heaters will be shut down.

Alarms and Graphics

Alarms

All of the inputs on this controller will be monitored by the front-end web server and will provide alarm notification upon detection of an alarm condition (via the alarm log, email and/or text). The controller will also verify the input status to the output control signals and provide alarm notification to the system upon detection of an alarm condition. This alarming should be understood throughout the system, even if they are not all specifically detailed within this sequence of operations.

Graphics

The front-end web-based system will include a complete graphical representation of this control system and all of its associated points, alarms, setpoints, schedules, sequences as detailed within this sequence and the HVAC Controls portion of the project plans, as well as what is required to make this system fully operational and user friendly.

3.03 Chiller Plant:

Chiller plant consists of the existing air cooled chiller and an existing chilled water pump. Alternate A includes a new chilled water pump. This Contract shall include new interface with existing chiller manufacturer unitary controls to allow for full control, status, operation and alarms from existing chiller to new BMS. For Base Bid and Alternate, provide controls such that chilled water pump shall operate when indexed to by the chiller when in summer mode and there is a call for cooling.

BMS shall enable the chiller when the system is in Summer Mode and any zone is in occupied mode.

Control Points:

- Chiller enable/disable
- Chilled Water Supply Setpoint / Temperature
- Chilled Water Return Setpoint / Temperature
- Pump On/Off, Status
- VFD Speed Control
- Valve(s) position
- Flow Switch in Return Line

Alarms:

- BMS status and alarms
- High temperature
- Low temperature

Alarms and Graphics

Alarms

All of the inputs on this controller will be monitored by the front-end web server and will provide alarm notification upon detection of an alarm condition (via the alarm log, email and/or text). The controller will also verify the input status to the output control signals and provide alarm notification to the system upon detection of an alarm condition. This alarming should be understood throughout the system, even if they are not all specifically detailed within this sequence of operations.

Graphics

The front-end web-based system will include a complete graphical representation of this control system and all of its associated points, alarms, setpoints, schedules, sequences as detailed within this sequence and the HVAC Controls portion of the project plans, as well as what is required to make this system fully operational and user friendly.

3.04 Dual Temperature Variable Speed Pumping System Control

The lead variable speed pump will be enabled to operate at its lowest speed setting, (35% of maximum flow). If the lead variable speed drive pump fails to operate the lag variable speed pump will start and an alarm will be generated at the pump control panel and the BMS. Furnish a flow switch in the header of each secondary pump with adjustable time delay. The ATC system shall rotate the lead and lag pumps for equal running time on a weekly or daily basis, (adjustable).

Differential pressure, shall be measured across the supply and return of the two-pipe secondary system using a five-point manifold differential pressure sensor. The differential pressure will be measured at the ends of the piping where indicated on the floor plans (generally located at the end of the piping loop on the first floor). The speed of the pump will be controlled to maintain the differential pressure at (28 psi adjustable). If the differential pressure drops below set point, the pump speed shall increase proportionately, if differential pressure rises above set point, the pump speed shall be decreased proportionately. The minimum speed set point shall be determined such that the speed corresponds to 30% of the maximum flow at 28 psi differential. The actual set point shall be determined in the field when all water balancing has been completed. DP set point shall be determined when design flow is achieved at the lowest available pump speed. Furnish and install a 2 1/2" differential by pass valve on the HW system in the boiler room arranged to open and allow minimum flow through the secondary pumps, if they slow to minimum speed and DP is still above 28psi setpoint.

Control Points:

- Differential Pressure Setpoint
- Differential Pressure
- Pump On/Off, Status
- Valve(s) position
- Pump Speed

Alarms:

- BMS status and alarms
- High temperature
- Low temperature

Alarms and Graphics

Alarms

All of the inputs on this controller will be monitored by the front-end web server and will provide alarm notification upon detection of an alarm condition (via the alarm log, email and/or text). The controller will also verify the input status to the output control signals and provide alarm notification to the system upon detection of an alarm condition. This alarming should be understood throughout the system, even if they are not all specifically detailed within this sequence of operations.

Graphics

The front-end web-based system will include a complete graphical representation of this control system and all of its associated points, alarms, setpoints, schedules, sequences as detailed within this sequence and the HVAC Controls portion of the project plans, as well as what is required to make this system fully operational and user friendly.

3.04 Packaged Rooftop and Air Conditioning Units

3.04.1 RTU-1: Media

RTU-1 is a constant air volume roof top unit with supply fan, power exhaust, full economizer dampers, and a DX cooling coil that supplies air to duct mounted heating coils. Space also has Finned Tube Radiation.

3.04.2 RTU-2: Auditorium (Review Alternate List – Alternate B)

RTU-2 is an existing constant air volume roof top unit with supply and return fans, full economizer dampers, energy recovery, hot water heating coil and a DX cooling coil.

3.04.3 RTU-3: Dance/Drama/Music

RTU-3 is a variable air volume roof top unit with supply fans, power exhaust, full economizer dampers, energy recovery and a DX cooling coil that supplies air to VAV boxes with heating coils. Space also has Finned Tube Radiation.

3.04.4 RTU-4: Administration Offices

RTU-4 is a variable air volume roof top unit with supply fan, power exhaust, full economizer dampers, and a DX cooling coil that supplies air to VAV boxes with heating coils. Space also has Finned Tube Radiation.

3.04.5 RTU-5: Hall

RTU-5 is a constant air volume roof top unit with supply fan, full economizer dampers, duct mounted heating coils and a DX cooling coil.

3.04.6 RTU-6: Cafeteria

RTU-6 is a constant air volume roof top unit with supply and return fans, energy recovery, full economizer dampers, hot water heating coil and a DX cooling coil.

3.04.7 RTU-7: Computer Room

RTU-7 is a constant air volume roof top unit with supply fan, full economizer dampers, duct mounted heating coil and a DX cooling coil.

3.04.8 RTU-8: Lobby

RTU-8 is a constant air volume roof top unit with supply fan, full economizer dampers, duct mounted heating coil and a DX cooling coil.

3.04.9 HV-1: Gymnasium

HV-1 is an existing to remain constant air volume unit mounted in Gym ceiling with supply fan and hot water coil.

Occupancy, Scheduling and Commands (Typical for all RTUs)

Scheduling

The RTU and the area(s) service by the unit will be assigned to a fully user adjustable occupancy schedule (schedule to be coordinated with the Owner).

Optimum Start

Optimum start prepares the space for occupancy in advance of the occupied period. By starting heating or cooling at the optimum time before the occupied period begins, the controller provides a comfortable space ready for occupancy without wasting energy. The system will maintain statistics comparing the outside temperature to the time required for the space to reach the occupied set points. The system uses these statistics to calculate the length of time required for optimum start. The user can enable or disable the optimum start feature by setting the user adjustable Optimum Start Option. The user can also limit the maximum time that the unit will start be for its occupied state by setting an adjustable Optimum Max Time to 60 minutes.

Whenever the RTU called to run during optimum start mode the controller will operate as if it was occupied but the minimum outside air ventilation will be disabled and free cooling will take place if the outside air enthalpy (OAE) is less than the return air enthalpy (RAE). If all the areas served by the RTU are satisfied 15 minutes before the occupied mode starts, then the RTU will go into a purge mode and the outside air damper will be set to a minimum of an adjustable Purge OA Damper Position of 30% open position. Note that the damper is allowed to be above this setpoint if the cooling demand is greater. Once the unit enters into the occupied state the controller will allow the dampers to return to normal operation as detailed below.

Local User Override

VAV boxes located in the Administration Area (served by RTU-4) will have smart wall sensors that can be configured to will allow the local user (someone in the space) to override their VAV box into an occupied mode. Whenever the RTU controller detects that one of the boxes has been overridden into an occupied mode then the RTU will switch into an occupied mode and operate as detailed below. Note that in all other areas this option will be disabled.

Unit Shutdown

Whenever the unit shuts down, the fans will cycle OFF, all the dampers will return to their failsafe position (outside and exhaust will close and return will open), DX cooling will be off, and the hot water (HW) valve will modulate to maintain its exiting coil duct air temperature to an adjustable HW Valve Unit OFF Setpoint of 50 DEG (F).

Staggered Unit Startup

Whenever the unit starts up (scheduled or after a power failure) the controller will wait for an adjustable Unit Start Delay Timer to count down before the controller will allow the startup sequence to begin. These timers will be set such that equipment throughout the facility will startup at staggered times to prevent pieces of lager equipment from starting up at the same time.

Emergency Shutdown

Unit controls will include hardwired safeties that will automatically force the RTU into a shutdown mode if any of them go into alarm. The hardwired safeties will also be monitored by the controller and will report the alarm condition to the front-end server. The emergency shutdown safeties would be as follows:

- Duct Smoke(s) Alarm
- Fire Alarm Emergency Shutdown Command
- Supply Fan High Pressure Cutout
- Supply Fan Low Pressure Cutout
- Return Fan High Pressure Cutout
- Return Fan Low Pressure Cutout
- Low Limit Freeze Stat Alarm

Note that many of these hardwired safeties will need to be manually reset in the field so to promote a physical inspection of the RTU equipment and controls before returning the unit back to normal operation.

User Selectable Command State

In addition to these hardwired safeties, the use can select to operate the RTU in one of the following four (4) states from the front-end:

Automatic (default): The RTU controller will operate based on its assigned schedule and as detailed throughout this sequence.

Occupied (24/7): When the user chooses to force the RTU controls into the occupied state the RTU will remain occupied 24/7 and operate as detailed throughout this sequence.

Unoccupied (24/7): When the user chooses to force the RTU controls into the unoccupied state the RTU will remain unoccupied 24/7 and operate as detailed throughout this sequence.

Shutdown (24/7): When the user chooses to force the RTU controls into a shutdown state the RTU will cycle OFF and remain shut down with all of its controls in their failsafe positions and/or modes.

Damper Control

Minimum OA Damper

Whenever the RTU is operating in an occupied state the controller will modulate the normally closed minimum outside air damper to maintain the minimum outside air flow to the adjustable OA Min CFM Setpoint (min OA noted on Drawings). When the unit is operating in an unoccupied state the controller will set the minimum outside air damper to the fully closed position. Note that this occupied setpoint will be adjusted and finalized with the balancer during the startup phase of the project.

Economizer Dampers

The economizer dampers are made up from the normally closed maximum outside air damper, the normally open return air damper, and the normally closed exhaust air (or relief) air damper.

Free Cooling: Whenever the outside air enthalpy (OAE) drops more than 1 BTU below the return air enthalpy (RAE) and there is a call for cooling then the Free Cooling PID loop will be enabled to modulate the and maintain the mixed air temperature to the active supply air temperature setpoint as detailed above.

On a call for cooling when outdoor air conditions permit, (56 deg adjustable), and below the enthalpy, controller shall modulate the outside air intake, exhaust and return air dampers, to maintain SA temp set point. Override DCV (if applicable) as required. Heating coil control valve shall be closed. Control action shall be that an increase in SA temperature will cause the outside air and exhaust air dampers to modulate towards the open position and the return air damper to modulate towards the closed position. A drop in below set point temperature will cause the reverse to take place. When the outdoor air damper reaches the fully open position a further call for cooling shall cause DX system to operate. When ambient conditions are no longer suitable for economizer operation the unit controls shall revert to normal summer operation. The power exhaust fan shall run continuously, if applicable.

HW Valve: System in Winter Mode

Whenever the RTU is running then the controller will modulate the hot water (HW) valve to maintain the active supply air temperature setpoint when there is no call for cooling (free cooling or DX). Whenever the unit is off or shutdown then the controller will modulate the HW valve to maintain the heat coil exiting temperature to and adjustable Heat Coil Air Temp Setpoint of 50 DEG (F) and the HW return temperature above an adjustable HWR Temperature Setpoint of 45 DEG (F). The freeze stat will be mounted on the discharge face of the HW coil and will be set to 35 DEG (F) (adjustable). During Summer Mode, automatic isolation hot water valves shall shut close to prevent chilled water from entering. This applies to all duct, unit and VAV hot water coils.

Filter Bank Monitoring

Dirty Filter Status

The controller will monitor the pressure across each filter bank and alarm the front-end whenever the pressure drop across the filters exceed an adjustable Dirty Filter Setpoint. Note that this setpoint will be adjusted and finalized with the balancer during the startup phase of the project.

Alarms and Graphics

Alarms

All of the inputs on this controller will be monitored by the front-end web server and will provide alarm notification upon detection of an alarm condition (via the alarm log, email and/or text). The controller will also verify the input status to the output control signals and provide alarm notification to the system upon detection of an alarm

condition. This alarming should be understood throughout the system, even if they are not all specifically detailed within this sequence of operations.

Graphics

The front-end web-based system will include a complete graphical representation of this control system and all of its associated points, alarms, setpoints, schedules, sequences as detailed within this sequence and the HVAC Controls portion of the project plans, as well as what is required to make this system fully operational and user friendly.

General:

The units shall be supplied with, and operated through a unit mounted DDC unitary control panel, capable of providing set-point adjustments and all programming control sequences.

The protocol shall be BacNet MSTP. Controls shall include all motorized dampers and valves, damper motors, motor starters, wiring, fans and sensors and all hardware accessories for a complete system. Furnish wall mounted room thermostats with automatic summer/winter change over, and temperature adjustments.

Summer Operation: Upon start up, the control circuits shall be energized. The supply fan, and power exhaust fan (RTU-2 only), energy recovery wheel (RTU-2, RTU-3 and RTU-6 only) shall run continuously. The outside air intake, and relief air dampers shall open to minimum position the return damper shall open to the maximum position. Bypass air dampers on energy recovery wheel shall close (RTU-2, RTU-3 and RTU-6). Refer to VAV Sequence below for Static Pressure Controls.

VAV systems RTU-3, RTU-4:

A temperature sensor in the unit discharge duct shall be reset by a return air temperature sensor, (master-sub-master), arranged to modulate the DX coil capacity to maintain a constant discharge air temperature. Set the discharge temperature at 56°F to 60°F range (adjustable). Refer to VAV Sequence below for Static Pressure Controls. Hot water heating coil control valve shall be closed. VAV boxes shall operate in the summer mode.

Single zone systems AC-1, AC-2, RTU -1, RTU-2, RTU-5, RTU-6, RTU-7 and RTU-8:

A temperature sensor in the unit discharge duct shall be reset by a return air temperature sensor, (master-sub-master), arranged to modulate the DX coil capacity to maintain a constant discharge air temperature. Set the discharge temperature at 56°F to 60°F range (adjustable). Hot water heating coil control valve shall be closed.

The fan speed shall be reset to modulate with space load based on a comparison of return temperature. Upon a drop-in space load, (either heating or cooling) the fan speed shall be reset be reset lower. Fan speed shall be reduced no lower than 75%, (or as limited by the manufacture).

Provide freeze stat on the cooling coil to over ride fan speed reduction.

Winter Operation: Upon start up, the control circuits shall be energized. The supply fan and power exhaust, energy recovery wheel (RTU-2, RTU-3 and RTU-6 only) and return fans, shall run continuously. The outside air intake, and relief air dampers shall open to minimum position the return damper shall open to the maximum position. Bypass air dampers on energy recovery wheel shall close (RTU-2, RTU-3 and RTU-6). The heating coil valve shall be arranged to maintain a discharge temperature at 75°F (adjustable). VAV boxes shall operate in the winter mode. Refer to VAV Sequence below for Static Pressure Controls.

Economizer Operation: On a call for cooling when outdoor conditions permit, the enthalpy based control shall modulate the outside air intake, exhaust, and return air dampers to maintain discharge air temperature. Control action shall be that an increase in discharge air temperature shall cause the outside air damper to modulate towards the open position and the return air damper to modulate towards the closed position. A drop in discharge temperature shall cause the reverse to occur. When the outdoor air damper reaches the full open position, a call for cooling shall enable the DX cooling. When ambient conditions are no longer suitable for economizer operation the unit controls shall revert to normal summer operation.

Exhaust or Return Fan: Provide a static pressure sensor in return air plenum of associated RTU. Exhaust or return fan speed shall modulate to maintain static pressure setpoint. (adjustable).

Unoccupied Operation: Unit supply/return fans and heating coils and DX cooling shall cycle on a call for cooling or heating. During this cycle the unit shall operate with 100% re-circulated air. Unit controls shall allow complete shutdown if desired. Set point shall be 65˚ in the heating season and 95 in the cooling season. The spill fan (power exhaust) shall be off, if applicable. Return fans shall run.

Limit Controls: Provide a High/low limit control(s) in the supply fan discharge arranged to override temperature controls and prevent discharge temperature from dropping below 50°F and rising above 110°F(adjustable). Provide limit control on fan speed for CV units to limit speed reduction to 75% of air flow.

Freezestat: Provide each air RTU with a manual reset type freezestat, (set at 35° adjustable),arranged to shut down the unit and sound an audio and visual alarm at the BMS operator station should the set point be reached. The freezestat element shall be the capillary type with lowest point temperature sensing. It shall be resettable from the BMS.

Energy Wheel Defrost (Energy Wheel Only): When return and outside air conditions promote frosting of energy wheel, reduce energy wheel speed such that exhaust air defrosts the energy wheel.

Static Pressure Controls VAV Units: RTU-3, RTU-4
Provide static pressure sensors in the supply ductwork for each ac unit located approximately two-thirds downstream of the unit. Sensors shall be arranged to vary the speed of the supply in response to supply duct static pressure. An increase in static pressure shall cause the fans to slow down a decrease shall cause the fans to

speed up. The outside air dampers shall be arranged to modulate open from the minimum position as fan speed decreases. Corresponding return or spill air fans in each RTU shall be arranged to maintain a positive pressure of .1" sp in their respective zones. On a drop-in zone pressure the fan shall be arranged to slow down, on a rise in SP above set point the fan shall be arranged to speed up. (open oa damper)

Demand Controlled Ventilation: (**AC-1, RTU-6)** Furnish combination space temperature/CO2 sensors for where shown on plans. Furnish one CO2 sensor located outdoors on the roof. The outdoor air CO2 sensor shall be used to establish a base line for outdoor CO2 levels, approximately 400 PPM. The CO2 sensors in each space shall have a set point no greater then 400 PPM above the base line, approximately 800 PPM. The air-handling unit's unitary control panel shall calculate outside air intake damper positioning in response to space CO2 levels. Control action shall be that when the space CO2 level rises to within 100 PPM of set point, the outside air intake and exhaust dampers shall modulate toward open and the RA damper shall modulate toward closed. Upon a drop in space CO2 levels below set point, the opposite shall take place. For VAV systems the zone with the highest demand shall control until satisfied.

The outside air intake dampers normal minimum positions shall be established based on the schedules contained on the plans. When operating in demand-controlled ventilation mode (normal occupied mode) the outside air damper minimum position may be reset according to the above with a lower minimum as per the schedule.

Hot Gas Reheat:
Provide hot gas reheat controls based on return air RH for VAV systems and based on space RH for single zone systems. RH set point shall be in the range of 50%-55%. If zone set point is met, and the RH is above set point, the units shall be arranged to provide sub cooling of SA and energize hot gas reheat to reheat the SA to maintain space set point.

Miscellaneous: Whenever units are shutdown the outside air intake, return air and exhaust air dampers shall be closed. The power exhaust fan shall be energized by a space static pressure sensor set at +.1". The fan shall be arranged to cycle when static pressure increases above set point.

- Low temperature detection (freezestat)
- Return/exhaust fan failure
- Supply fan failure (current relay or sail switch)
- Hi discharge air temperature (temperature sensor)
- Low discharge air temperature (temperature sensor)
- Dirty filter
- Smoke detection

Purge cycle (Energy Recovery Wheel): shall be initiated manually at the unitary controller panel. During this cycle the supply fan and exhaust fan shall operate at 100% capacity. The outside air and exhaust air dampers shall be fully opened. The return air damper shall be closed.

3.06 VAV Boxes with Reheat Coil:

Occupancy, Scheduling and Commands

Schedule:
The VAV box controller will be assigned to a fully user adjustable occupancy schedule (schedule to be coordinated with the customer).

VAV Box and Reheat Coil Control

Occupied
While occupied, the VAV box controller will modulate its primary air damper between an adjustable Cooling Minimum CFM and an adjustable Cooling Maximum CFM to maintain the space temperature at or below an adjustable Occ Space Cooling Setpoint of 75 DEG (F).

When the space temperature drops below an adjustable Occ Space Heating Setpoint of 70 DEG (F) then the controller will modulate its primary air damper to maintain an adjustable Heating Minimum CFM (set to the same value as the cooling minimum CFM). If additional heat is required then the reheat coil valve will be allowed to modulate to satisfy the heating demand, but limited to an adjustable Discharge Air High Limit of 85DEG (F). If the reheat valve moves to a fully open position or is at its discharge high limit and additional heat is still required then the primary air damper will index the active airflow setpoint up as needed, but will be limited to an adjustable Heating Maximum CFM.

During Summer Mode, automatic isolation hot water valves shall shut close to prevent chilled water from entering. This applies to all duct, unit and VAV hot water coils.

Unoccupied
While unoccupied, the VAV box controller shall operate as detailed above whenever the RTU serving the VAV box is running, however the minimum airflow setpoint will be 0 CFM (adjustable) and the space will be maintained between an adjustable Unocc Space Heating Setpoint of 60 DEG (F) and an adjustable Unocc Space Cooling Setpoint of 82 DEG (F). CO2 demand ventilation is disabled during the unoccupied state.

Duct-In Temperature

The VAV box controller will continually monitor the associated RTU supply air temperature as the “duct-in temperature” to ensure proper primary air damper control. If the duct-in temperature drops below the current space temperature then the controller will assume that the primary air can be used for cooling, heating via the reheat coil and demand ventilation. If for any reason the duct-in temperature moves above the current space temperature then the controller will assume that the primary air can only be used for heating and demand ventilation. During this condition the controller will remain at its minimum air flow setpoint even if there is a call for cooling. The intent is not to over heat the space with warm primary air in the case of mechanical or free cooling failure.

Alarms and Graphics

Alarms

All of the inputs on this controller will be monitored by the front-end web server and will provide alarm notification upon detection of an alarm condition (via the alarm log, email and/or text). The controller will also verify the input status to the output control signals and provide alarm notification to the system upon detection of an alarm condition. This alarming should be understood throughout the system, even if they are not all specifically detailed within this sequence of operations.

Graphics

The front-end web-based system will include a complete graphical representation of this control system and all of its associated points, alarms, setpoints, schedules, sequences as detailed within this sequence and the HVAC Controls portion of the project plans, as well as what is required to make this system fully operational and user friendly.

3.07 Cabinet Heaters and Unit heaters (hot water) Both noted as UH below:

Occupancy, Scheduling and Commands

Scheduling

The area related to the UH will be assigned to a fully user adjustable occupancy schedule (schedule to be coordinated with the customer).

Heater Operation

Occupied

While occupied if the space temperature drops below an adjustable Occ Space Heating Setpoint of 70 DEG (F) then the HW valve will be called to open (*or the electric heating element shall be energized in stages*). When the aquastat installed on the coil HWR line detects that there is HW in the system then the heater fan will cycle ON. When the space temperature moves above this setpoint then the valve will close (or electric heating element shall be deenergized in stages) and the fan will cycle OFF.

During Summer Mode, automatic isolation hot water valves shall shut close to prevent chilled water from entering. This applies to all duct, unit and VAV hot water coils.

Unoccupied

While unoccupied if the space temperature drops below an adjustable Unocc Space Heating Setpoint of 60 DEG (F) then the HW valve will be called to open (*or the electric heating element shall be energized in stages*). When the aquastat installed on the coil HWR line detects that there is HW in the system then the heater fan will cycle ON. When the space temperature moves above this setpoint then the valve will close (or electric heating element shall be deenergized in stages) and the fan will cycle OFF.

Alarms and Graphics

Alarms

All of the inputs on this controller will be monitored by the front-end web server and will provide alarm notification upon detection of an alarm condition (via the alarm log, email and/or text). The controller will also verify the input status to the output control signals and provide alarm notification to the system upon detection of an alarm condition. This alarming should be understood throughout the system, even if they are not all specifically detailed within this sequence of operations.

Graphics

The front-end web-based system will include a complete graphical representation of this control system and all of its associated points, alarms, setpoints, schedules, sequences as detailed within this sequence and the HVAC Controls portion of the project plans, as well as what is required to make this system fully operational and user friendly.

All control valves positions shall be monitored and indicated on the BMS. Hot water valves to cabinet heaters and Unit Heaters shall close during summer operation to prevent chilled water from entering equipment. Status of valves shall be indicated on BMS graphics.

3.08 Finned Tube Radiation:

General Notes

Fin tube radiation will be controlled by a modulating HW valve. The controller will be setup to modulation control.

Occupancy, Scheduling and Commands

Scheduling

The area related to the radiant heat will be assigned to a fully user adjustable occupancy schedule (schedule to be coordinated with the customer).

Operation

Occupied

While occupied the controller will modulate the radiant heat HW valve to maintain the space temperature to an adjustable Occ Space Heating Setpoint of 70 DEG (F). For those zones served by VAV boxes and FTR controls shall be arranged to operate the VAV box and FTR in sequence. FTR shall be primary source of heat. All control valves positions shall be monitored and indicated on the BMS.

Status of valves shall be indicated on BMS graphics.

During Summer Mode, automatic isolation hot water valves shall shut close to prevent chilled water from entering. This applies to all duct, unit and VAV hot water coils.

Unoccupied

While unoccupied the controller will modulate the radiant heat HW valve to maintain the space temperature to an adjustable Unocc Space Heating Setpoint of 60 DEG (F)

Alarms and Graphics

Alarms

All of the inputs on this controller will be monitored by the front-end web server and will provide alarm notification upon detection of an alarm condition (via the alarm log, email and/or text). The controller will also verify the input status to the output control signals and provide alarm notification to the system upon detection of an alarm condition. This alarming should be understood throughout the system, even if they are not all specifically detailed within this sequence of operations.

Graphics

The front-end web-based system will include a complete graphical representation of this control system and all of its associated points, alarms, setpoints, schedules, sequences as detailed within this sequence and the HVAC Controls portion of the project plans, as well as what is required to make this system fully operational and user friendly.

All control valves positions shall be monitored and indicated on the BMS. Hot water valves to Finned Tube Radiaion shall close during summer operation to prevent chilled water from entering equipment. Status of valves shall be indicated on BMS graphics.

3.09 Cabinet Convectors:

General Notes

Cabinet convectors will be controlled by a modulating HW valve. The controller will be setup to modulation control.

Occupancy, Scheduling and Commands

Scheduling

The area related to the cabinet convector will be assigned to a fully user adjustable occupancy schedule (schedule to be coordinated with the customer).

Operation

Occupied

While occupied the controller will modulate the convector HW valve to maintain the space temperature to an adjustable Occ Space Heating Setpoint of 70 DEG (F). For those zones served by VAV boxes and cabinet convectors, controls shall be arranged to operate the VAV box and cabinet convector in sequence. Cabinet convector shall be primary source of heat. All control valves positions shall be monitored and indicated on the BMS. Status of valves shall be indicated on BMS graphics.

During Summer Mode, automatic isolation hot water valves shall shut close to prevent chilled water from entering. This applies to all duct, unit and VAV hot water coils.

Unoccupied

While unoccupied the controller will modulate the radiant heat HW valve to maintain the space temperature to an adjustable Unocc Space Heating Setpoint of 60 DEG (F)

Alarms and Graphics

Alarms

All of the inputs on this controller will be monitored by the front-end web server and will provide alarm notification upon detection of an alarm condition (via the alarm log, email and/or text). The controller will also verify the input status to the output control signals and provide alarm notification to the system upon detection of an alarm condition. This alarming should be understood throughout the system, even if they are not all specifically detailed within this sequence of operations.

Graphics

The front-end web-based system will include a complete graphical representation of this control system and all of its associated points, alarms, setpoints, schedules, sequences as detailed within this sequence and the HVAC Controls portion of the project plans, as well as what is required to make this system fully operational and user friendly.

All control valves positions shall be monitored and indicated on the BMS. Hot water valves to Cabinet Convectors shall close during summer operation to prevent chilled water from entering equipment. Status of valves shall be indicated on BMS graphics.

3.10 Exhaust Fans:

General Notes

Exhaust fan with speed control signal and damper(s).

Occupancy, Scheduling and Commands

Scheduling

The area related to the exhaust fan will be assigned to a fully user adjustable occupancy schedule (schedule to be coordinated with the customer).

Exhaust Fan Operation

Occupied

While occupied the controller will open the exhaust fan isolation damper, wait for the damper end switch to verify that the damper is fully open, enable the exhaust fan to run. Note that the exhaust fan speed for each will be adjusted and finalized with the balancer during the startup phase of the project.

Additional controls:

Classroom Relief Air Fans, EXF-1 thru EXF-6: Fans shall operate during Occupied Mode continuously. If any area served by a Relief fan is changed to occupied, that relief fan shall operate.

EXF-7: Interlocked to operate with UV and dampers serving Green Room.

Kiln Room Fan: Existing kiln room fan shall be interlocked with Kiln controls such that damper open and fan operation must be proven prior to kiln operating. Alarms shall be sent to BMS if fan, motorized damper or kiln do not operate.

Unoccupied

While unoccupied the controller will cycle the exhaust fan OFF and close the isolation dampers.

Continuous Fan Operation:

EF-17: Provide thermostat in electric room. If room temperature rises above setpoint, motorized damper on gravity ventilator shall prove open and EF-17 shall cycle on. Upon a drop in temperature below setpoint, fan shall cycle off and damper shall close. Provide low and high temperature alarms to BMS.

Alarms and Graphics

Alarms

All of the inputs on this controller will be monitored by the front-end web server and will provide alarm notification upon detection of an alarm condition (via the alarm log, email and/or text). The controller will also verify the input status to the output control signals and provide alarm notification to the system upon detection of an alarm condition. This alarming should be understood throughout the system, even if they are not all specifically detailed within this sequence of operations.

Graphics

The front-end web-based system will include a complete graphical representation of this control system and all of its associated points, alarms, setpoints, schedules, sequences as detailed within this sequence and the HVAC Controls portion of the project plans, as well as what is required to make this system fully operational and user friendly.

3.11 Unit Ventilators and Relief Fans:

General Notes

Unit Ventilators (UV) are a constant air volume unit with supply fan, cooling coil, heating coil and outdoor air dampers.

Occupancy, Scheduling and Commands

Scheduling

The area related to this UV will be assigned to a fully user adjustable occupancy schedule (schedule to be coordinated with the customer).

Optimum Start

Optimum start prepares the space for occupancy in advance of the occupied period. By starting heating or cooling at the optimum time before the occupied period begins, the controller provides a comfortable space ready for occupancy without wasting energy. The system will maintain statistics comparing the outside temperature to the time required for the space to reach the occupied set points. The system uses these statistics to calculate the length of time required for optimum start. The user can enable or disable the optimum start feature by setting the user adjustable Optimum Start Option. The user can also limit the maximum time that the unit will start be for its occupied state by setting an adjustable Optimum Max Time to 60 minutes. Whenever the UV is called to run during optimum start mode the controller will operate as if it was occupied.

Local User Override

The associated wall thermostat will allow the local user (someone in the space) to override the UV into an occupied mode. Whenever the UV controller detects this override then the UV will switch into an occupied mode and operate as detailed below

Unit Shutdown

Whenever the unit shuts down the fan will cycle OFF, chilled water (CHW) coil valve will be closed, the hot water (HW) coil valve will modulate to maintain the active space heating setpoint as detailed below. If the condensate pan high water level goes into alarm then the controller will fully close the CHW valve, command the supply fan OFF, and report the alarm condition to the front-end.

Staggered Unit Startup

Whenever the unit starts up (scheduled or after a power failure) the controller will wait for an adjustable Unit Start Delay Timer to count down before the controller will allow the startup sequence to begin. These timers will be set such that equipment throughout the facility will startup at staggered times to prevent pieces of equipment from starting up at the same time.

Unit Ventilator Operation

Occupied:

UV outdoor air damper shall open to its minimum position. While occupied the controller will enable the supply fan to operate at its adjustable Supply Fan Minimum Speed of 50%. Note that the controller will also provide an adjustable Supply Fan Maximum Speed of 90% limits, which will be coordinated and set with the balancer during startup. The minimum and maximum speed setpoints are intended to limit fan airflow to the designed scheduled values. The BMS controller shall modulate the outdoor air dampers and the heating/coil valve beyond minimum setting to maintain desired space temperature.

Summer Mode:

Whenever the supply fan is running then the controller will modulate the CHW coil valve to maintain the space temperature to an adjustable Occ Space Cooling Setpoint of 74 DEG (F). If the CHW modulates up to a fully open position and cannot satisfy the cooling demand then the controller will modulate the supply fan speed between its minimum and maximum speeds as needed to satisfy the space temperature.

Winter Mode:

Whenever the supply fan is running then the controller will modulate the HW coil valve to maintain the space temperature to an adjustable Occ Space Heating Setpoint of 70 DEG (F). If the HW coil valve modulates up to a fully open position and cannot satisfy the heating demand then the controller will modulate the supply fan speed between its minimum and maximum speeds as needed to satisfy the space temperature.

Unoccupied
Winter Mode:

While unoccupied and if the space is satisfied the supply fan will cycle OFF, the CHW valve will close, and the heating valve(s) will modulate and maintain the space to unoccupied space heating setpoint.

Summer Mode:

If the space temperature moves above an adjustable Unocc Space Cooling Setpoint of 85 DEG (F) then the UV will cycle ON and run at its maximum speed and the CHW valve will move to a fully open position to cool the room quickly and minimize equipment runtime. When the space temperature drops 4 DEG (F) below this setpoint then the valve will close and the UV will cycle OFF.

Alarms and Graphics

Alarms

All of the inputs (AI & DI) on this controller will be monitored by the front-end web server and will provide alarm notification upon detection of an alarm condition (via the alarm log, email and/or text). The controller will also verify the input status to the output control signals and provide alarm notification to the system upon detection of an alarm condition. This alarming should be understood throughout the system, even if they are not all specifically detailed within this sequence of operations.

Graphics

The front-end web-based system will include a complete graphical representation of this control system and all of its associated points, alarms, setpoints, schedules, sequences as detailed within this sequence and the HVAC Controls portion of the project plans, as well as what is required to make this system fully operational and user friendly.

General:

All Unit Ventilators operate with hot water in Winter Mode and Chilled water in Summer Mode. Provide thermostat for each Unit Ventilator.

Provide low-limit thermostat (freezestat) which shall de-energize fan, shall open the heating valve, and close the outdoor air damper if the air temperature decreases to below 36F (adjustable). Alarm, visual and audible, shall indicate on BMS.

Relief Fans for Classrooms shall operate continuously when building is in occupied mode. Dampers shall open and fan shall energize during occupied mode. If system is in unoccupied mode and a classroom sensor is indexed to occupied, that associated relief fan’s dampers shall open and fan shall cycle on. During unoccupied mode, dampers shall shut and fans shall cycle off.

3.12 Ductless Split Systems:

General Notes:

Ductless split system AC units (AC Unit) will be provided with factory controls that will operate and maintain all aspects of this equipment (refer to the manufactures submittal package for all related details).

Shall be started and stopped through a space mounted electronic microcomputer-based room thermostat, by the equipment manufacture. The room thermostat (lockable cover) shall be capable of providing set-point adjustments and all programming control sequences. Each evaporator shall have a separate thermostat. Each evaporator's fan and compressors shall cycle to maintain room temperature set point 75˚ when indexed to the auto mode. All condenser, and compressor operations shall be controlled by the AC unit's built in unitary controller. Provide a separate room temperature sensor provide by the BMS contractor for each evaporator. The sensor shall be report status, room high and low temperatures and enable alarms at the BMS work station for unit failure, high and low temperatures, water detection.

As stated above, the manufacture supplied factory controls will operate and maintain all aspects of the equipment associated to each AC unit. We will provide all low voltage control and interlock wiring as well as the mounting and wiring of the associated factory supplied wall sensors.

The front-end web-based system will include a complete graphical representation of this control system and all of its associated points, alarms, setpoints, schedules, sequences as detailed within this sequence and the HVAC Controls portion of the project plans, as well as what is required to make this system fully operational and user friendly.

3.13 Air conditioning condensate pumps:

Provide connection to the overflow switch in each condensate pump tank arranged to annunciate an alarm at the BMS and shut down the respective RTU/AC unit if water is detected.

Provide a secondary high level float switch in each packaged roof top unit condensate pan and each split system air handling unit condensate pan arranged to annunciate an alarm at the BMS and shut down the respective RTU/AC unit if water is detected.

3.14 Miscellaneous Plumbing Equipment: Provide Control Points (status/setpoints/alarms) for items noted below in sequence.

Domestic Hot Water Heater: When the domestic hot water heater calls for heat, the combustion air dampers will open and the domestic hot water heater shall not operate until the dampers have been proven open via a damper end swtich.

Domestic hot water pump: The BMS system shall be arranged to operate the domestic hot water recirculation pump. The pump shall be operated based on return water temperature. When return water temperature drops below setpoint (110 deg F) the pump shall be started.

Domestic hot water mixing valves: Domestic hot water mixing valves shall be 3-way mixing valves arranged to maintain the maintain domestic water to the building at 120°F maximum. The actual setpoint shall be 110°F. The second 3-way mixing valve shall be at the kitchen. This shall be arranged to maintain the domestic water to the pot sinks at 140°F maximum. In both cases there shall be secondary aquastats on the respective hot water pipes arranged to close a solenoid valve in each of the hot water lines. Provide monitoring and set point adjustment at the BMS work station. Alarm high temperature at the BMS.

Elevator pit sump pumps: provide an interface to the sump pump control panel. The panel alarm output shall be monitored and annunciated at the BMS. The oil minder pump control panel has a discriminating alarm output for oil detection.

3.15 Kitchen Exhaust Fan and Make-up Air Unit

Kitchen Exhaust Fan and Make Up Air Unit are existing equipment to remain. Provide connection to controls for both. BMS shall monitor operation and alarms for both.

Kitchen Hood shall be interlocked such that operation shall not be permitted unless Exhasut Fan and Make Up Air unit are proven to be operational. Provide alarms at BMS should system vary from normal operating conditions.

Control Points:

- Kitchen Exhaust Fan Run Status/Speed
- Hood Switch
- Dishwasher Fan Run Status
- Space Temperature (provide new Thermostat)
- Make-up Air Unit Status
- Make-up Air Supply Setpoint / Temperature
- Make-up Air Return Setpoint / Temperature

Alarms:

- BMS status and alarms
- Fan Failure
- High temperature
- Low temperature

3.16 Miscellaneous

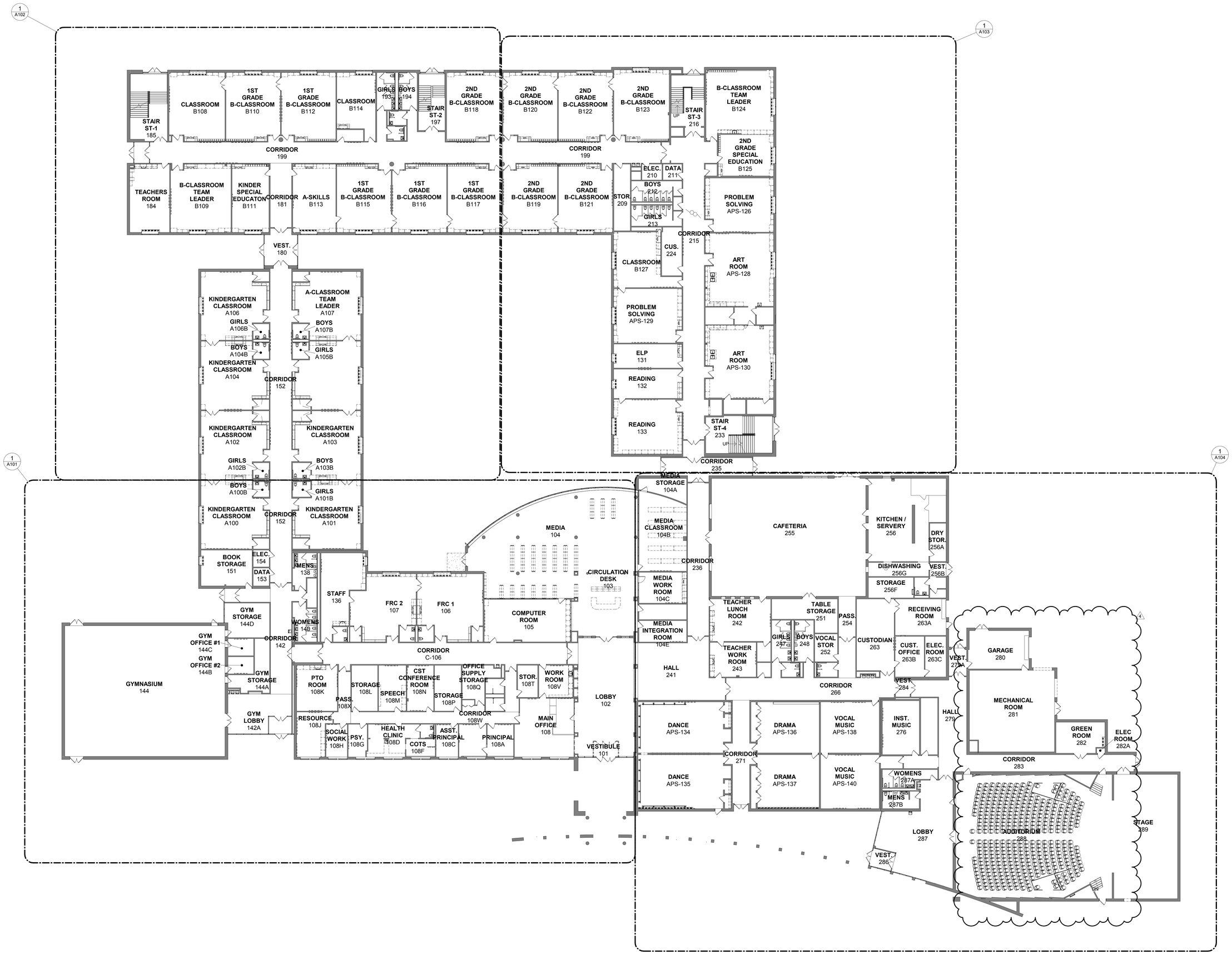
All safety devices shall be interlocked with “hand” and “Automatic” positions in series with motor controller holding coil circuit. Interlocking with other fans and equipment of system shall be through “Automatic” position “Hand” position shall be for maintenance only. Remote starting shall be from through “automatic” position only.

For all RTUs, UVs and HVs, low limit thermostats (freezestats) shall de-energize supply fan is supply air temperature decreases below 38 degrees F. This shall alarm at BMS.

All air handling units 2,000 cfm or greater shall have a duct mounted smoke detector arranged to stop the unit and position all dampers and valves in the “unit off” sequence as described in this section, upon detecting smoke.

All air handling units, unit ventilators, cabinet unit heaters, unit heaters, fans, and fan coil units, shall be interlocked to the building fire alarm system. Upon building fire alarm all units shall shut down and damper and valves shall go to “unit off” positions.

END OF SECTION



1 1ST FLOOR DEMO OVERALL PLAN
1/16" = 1'-0"

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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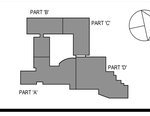

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3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

Sheet Title

OVERALL FIRST FLOOR DEMO PLAN

Job No.	Date
2019-1016	08/06/2019
Scale	Drawn / Checked
AS NOTED	Author Checker

Sheet Number

A100

DEMOLITION KEYNOTES

1 REMOVE & DISPOSE EXIST GYP BD FROM EXISTING EXTERIOR WALLS TO 6" BELOW EXIST CEILING GRID. PREP WALLS FOR INSTALLATON OF NEW GYP BD

2 REMOVE & DISPOSE EXIST GYP BD FROM BOTH SIDES OF EXISTING INTERIOR WALLS TO 6" BELOW EXIST CEILING GRID. PREP WALLS FOR INSTALLATON OF NEW GYP BD & SOUND ATTENUATING INSULATION CHECK & CLEAN FOR ANY PRESCENCE OF MOLD

3 EXIST UNIT VENT TO BE REMOVED BY MECH CONTRACTOR - REMOVE ANY ASSOCIATED WALL & FLOOR FINISH MATERIALS CONCEALED BEHIND & UNDER UNIT VENT - COORD W/ MEP DWGS

4 REMOVE & DISPOSE EXIST FLOOR FINISH & RELATED BASE- PREP FOR INSTALLATION OF NEW FLOOR FINISH MATERIALS - COORD W/ NEW CONSTRUCTION

5 REMOVE & DISPOSE EXIST ACT CEILING TILES - PROTECT EXIST LIGHT FIXTURES, MEP EQUIP & GRID SYSTEM TO REMAIN - EXIST CEILING GRID & LIGHT FIXTURES TO BE CLEANED W/ "SHOCKWAVE" BY FIBERLOCK- COORD W/ NEW CONSTRUCTION

6 REMOVE & DISPOSE EXIST PERIMETER CASEWORK - PREP EXIST WALLS & ADJACENT FLOOR FOR INSTALLATION OF NEW CASEWORK - COORD W/ NEW CONSTRUCTION

7 REMOVE & DISPOSE EXIST CARPET & RELATED BASE - PREP FOR INSTALLATON OF NEW FLOOR FINISH MATERIALS - COORD W/ NEW CONSTRUCTION

9 REMOVE EXIST WALL MTD MARKER BOARD, PROTECT, STORE & TRANSPORT OFF SITE TO A LOCATIOIN WITHIN THE CITY OF STAMFORD AS DETERMINED BY STAMFORD BOE - COORD W/ NEW CONSTRUCTION

11 REMOVE EXIST WALL MTD TACK BOARD, PROTECT, STORE & TRANSPORT OFF SITE TO A LOCATION WITHIN THE CITY OF STAMFORD AS DETERMINED BY STAMFORD BOE - COORD W/ NEW CONSTRUCTION

12 REMOVE EXIST LIBRARY CIRCULATION DESK, PROTECT, TRANSPORT & STORE OFF SITE IN THE CITY OF STAMFORD AS DETERMINED BY STAMFORD BOE. REINSTALL AFTER ALL FINISHES ARE COMPLETED- COORD W/ NEW CONSTRUCTION

13 EXIST PLUMBING TO BE REMOVED BY PLUMBING CONTRACTOR - REMOVE ANY ASSOCIATED CONNECTIONS NOT TO BE REUSED - COORD W/ MEP DWGS

14 REMOVE & DISPOSE EXIST WINDOW SILL SYSTEM - PREP FOR INSTALLATION OF NEW WINDOW SILL SYSTEM - COORD W/ NEW CONSTRUCTION

15 EXIST WATER FOUNTAINS TO BE REMOVED BY PLUMBING CONTRACTOR - COORD W/ NEW WATER FOUNTAIN INSTALLATION BY MEP - PATCH & MATCH EXIST WALLS TO ADJACENT SURFACES - REMOVE ANY ASSOCIATED CONNECTIONS NOT TO BE REUSED - COORD W/ MEP DWGS

16 REMOVE & DISPOSE EXIST CERAMIC TILE FLOOR & RELATED CERAMIC TILE PERIMETER BASE - PATCH & MATCH TO ADJACENT SURFACES - PREP FOR INSTALLATION OF NEW CERAMIC FLOOR SYSTEM & RELATED CERAMIC PERIMETER BASE - COORD W/ NEW CONSTRUCTION

18 EXIST PLUMBING FIXTURES & WALL MTD MIRROR TO BE REMOVED, STORED & REINSTALLED BY PC - PROTECT EXIST CERAMIC TILE FINISHES - COORD W/ NEW CONSTRUCTION

19 REMOVE EXIST WALL MTD GRAB BARS & RELATED HARDWARE, CLEAN & STORE FOR REINSTALLATION - COORD /W NEW CONSTRUCTION

20 REMOVE & DISPOSE EXIST GLASS BLOCK WINDOWS - PATCH & MATCH TO ADJACENT SURFACES - PREP OPENING FOR NEW WINDOW SYSTEM - COORD W/ NEW CONSTRUCTION

21 REMOVE MEDIA AREA DESKS & SHELVING SYSTEM, CLEAN PROTECT & STORE FOR REINSTALLATION - COORD W/ NEW CONSTRUCTION

22 REMOVE & DISPOSE EXIST CLOSET SHELVING SYSTEM - PATCH & MATCH TO ADJACENT SURFACES - COOR W/ NEW CONSTRUCTION

23 REMOVE & DISPOSE EXIST GYP BD FROM FURRED SIDE OF EXISTING INTERIOR MASONRY WALLS TO 6" BELOW EXIST CEILING GRID SYSTEM. PREP WALLS FOR INSTALLATON OF NEW GYP BD & SOUND ATTENUATING INSULATION

24 REMOVE & DISPOSE EXIST CEILING HUNG HOSPITAL CURTAIN SYSTEM - COORD EXIST BLOCKING W/ NEW HOSPITAL CURTAIN INSTALLATION

25 REMOVE & DISPOSE EXIST CONCRETE LANDING - PREP FOR INSTALLATION OF NEW CONCRETE PAD - COORD W/ CIVIL DRAWINGS

26 REMOVE & DISPOSE EXIST GYP BD FROM BOTH SIDES OF EXISTING INTERIOR WALLS TO 6" BELOW EXIST CEILING GRID. ON TOILET ROOM SIDE - REMOVE GYP BD & CERAMIC TILE COVE BASE - PREP WALLS FOR INSTALLATON OF NEW GYP BD, SOUND ATTENUATING INSULATION & NEW MATCHING CERAMIC TILE COVE BASE W/ MATCHING GROUT

29 REMOVE, CLEAN, STORE & REINSTALL EXIST METAL SHELVING SYSTEMS IN SAME CONFIGURATION AS EXIST

36 REMOVE EXIST CEILING GRID FOR DEMO OF EXIST MECH DUCTWOR - PROTECT EXIST LIGHT FIXTURES - PREP FOR INSTALLATION OF NEW CEILING GRID - COORD W/ MEP DWGS

DEMOLITION NOTES

1. ------- DENOTES EXISTING CONSTRUCTION TO BE DEMOLISHED (U.N.O.).MOST EXISTING INTERIOR CORRIDOR WALLS ARE OF MASONRY CONSTRUCTION
   - A. MOST EXISTING INTERIOR WALLS OTHER THAN CORRIDORS ARE STEEL STUD FRAMED
   - B. EXISTING EXTERIOR WALLS ARE A COMBINATION OF STEEL STUD W/ BRICK VENEER & BLOCK BACKUP W/ BRICK VENEER.
2. ======= DENOTES EXISTING WALL FRAMING TO REMAIN
3. ////// DENOTES AREAS OF CEILING GRID TO BE DEMOLISHED & REPLACED AFTER COMPLETION OF MEP WORK
4. PRIOR TO ANY DEMOLITION CONTRACTORS ARE REQUIRED TO BE FAMILIAR WITH EXISTING CONDITIONS. SHORING MAY BE NEEDED INCLUDING INSTALLATION OF LINTELS PRIOR TO THE REMOVAL OF ANY BUILDING ELEMENT.
5. COORDINATE ALL DEMOLITION w/ M.E.P. REMOVALS. NOTE: ALL WIRING, DEVICES & M.E.P. SYSTEMS NOT BEING REMOVED AS PART OF THE WORK, WHICH RUN THROUGH THE WORK AREA, SHALL BE TESTED, LABELED & PROTECTED FROM DISTURBANCE SO THEY REMAIN OPERATIONAL THROUGHOUT THE PROJECT.
6. EXISTING METAL WINDOW SHADES SHALL BE REMOVED FROM ALL WINDOWS THROUGHOUT ENTIRE BUILDING - PREP OPENINGS FOR INSTALLATION OF NEW WINDOW SHADES BY GC
7. G.C. RESPONSIBLE FOR REMOVAL & DISPOSAL OF ANY & ALL EXISTING MATERIALS & EQUIPMENT ABANDONED IN THE PROJECT SITE, INCLUDING, BUT NOT LIMITED TO FURNITURE, BOOKS, PAPER GOODS, FLOOR FINISHES, CEILING FINISHES, MARKER/TACK BOARDS, OFFICE ACCESSORIES, ETC. **EXCLUSIVE OF ALL MATERIALS & EQUIPMENT LOCATED IN THE EXISTING GYMNASIUM, CAFETERIA, & 2ND. FLOOR HALLWAY.**
8. ALL DEMO MATERIALS TO BE PLACED INTO OWNER PROVIDED DUMPSTERS. CITY TO REMOVE & REPLACE W CLEAN DUMPSTERS AS REQ. - G.C. TO COORD. W C.O.S. ENGINEERING DEPARTMENT.

GIRLS A102B
BOYS A103B
BOYS A100B
GIRLS A101B
KINDERGARTEN CLASSROOM A100
CORRIDOR 152
KINDERGARTEN CLASSROOM A101
STOR. A100A
STOR. A101A
ELEC. 154
BOOK STORAGE 151
DATA 153
ELECTRICAL PANELS REMOVED DURING DEMO & REINSTALLED AT TIME OF NEW CONSTRUCTION.
MENS 138
CUST. 139
VEST. 149
PASSAGE 150
REPLACE CEILING GRID IN THIS AREA.
STAFF 136
FRC 2 107
FRC 1 106
MEDIA 104
CIRCULATION DESK 103
COMPUTER ROOM 105
EXIST PERIMETER WOOD SHELVING SYSTEM TO REMAIN - PROTECT FROM DAMAGE DURING ALL PHASES OF CONSTRUCTION - REFER TO SPECS FOR MOLD CLEANING & REMEDIATION - TYP
EXIST DOOR SYSTEM TO REMAIN - TYP IN GYM AREA
EXIST DOOR SYSTEM TO REMAIN - TYP IN GYM AREA
GYM STORAGE 144D
WOMENS 140
STOR. 107A
BOYS 136A
GIRLS 107B
BOYS 106B
STOR. 106A
CORRIDOR 142
VESTIBULE 141
CORRIDOR C-106
REPLACE CEILING GRID IN THIS AREA. SEE NOTES ON A103.
GYM OFFICE #1 144C
GYM OFFICE #2 144B
GYM STORAGE 144A
EXIST OWNER STORED EQUIPMENT & MATERIALS TO BE PROTECTED DURING ALL PHASES OF CONSTRUCTION - RELOCATE AS REQ TO COMPLETE ALL WORK -TYP.
GYMNASIUM 144
EXIST FINISHES TO REMAIN - PROTECT DURING ALL CONSTRUCTION PHASES - TYP
EXIST DISPLAY CASE - PROTECT DURING ALL PHASES OF CONSTRUCTION - TYP
GYM LOBBY 142A
VESTIBULE 143
PTO ROOM 108K
PASS. 108X
STORAGE 108L
SPEECH 108M
CST CONFERENCE ROOM 108N
STORAGE 108P
OFFICE SUPPLY STORAGE 108Q
WOMENS 108R
STOR. 108T
PASS. 108U
WORK ROOM 108V
PRINC. TOILET 108S
COATS 114
CORRIDOR 108W
TOILET 108E
ASST PRINCIPAL 108C
HEALTH CLINIC 108D
COTS 108F
RESOURCE 108J
SOCIAL WORK 108H
PSY. 108G
CONFERENCE ROOM 108B
PRINCIPAL 108A
MAIN OFFICE 108
ADD/ALT 'E' NEW SECURITY VESTIBULE & MAIN OFFICE CASEWORK
NEW 1-1/4" THK SOLID SURFACE COUNTERTOPS W/ 1/8" EASED EDGES - TYP 1" OVERHANG @ EXIST CASEWORK - TYP
LOBBY 102
VESTIBULE 101
101R1S
101R2
AREA OF EXTERIOR MASONRY REPAIR - SEE 1/A301 FOR INFO
EXIST DOOR SYSTEM TO REMAIN - TYP IN GYM AREA
1 / A102
1 / A104
2 A206

1 1ST FLOOR DEMO - PART 'A'
1/8" = 1'-0"

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

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CONSTRUCTION DOCUMENTS

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PART 'A'

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3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

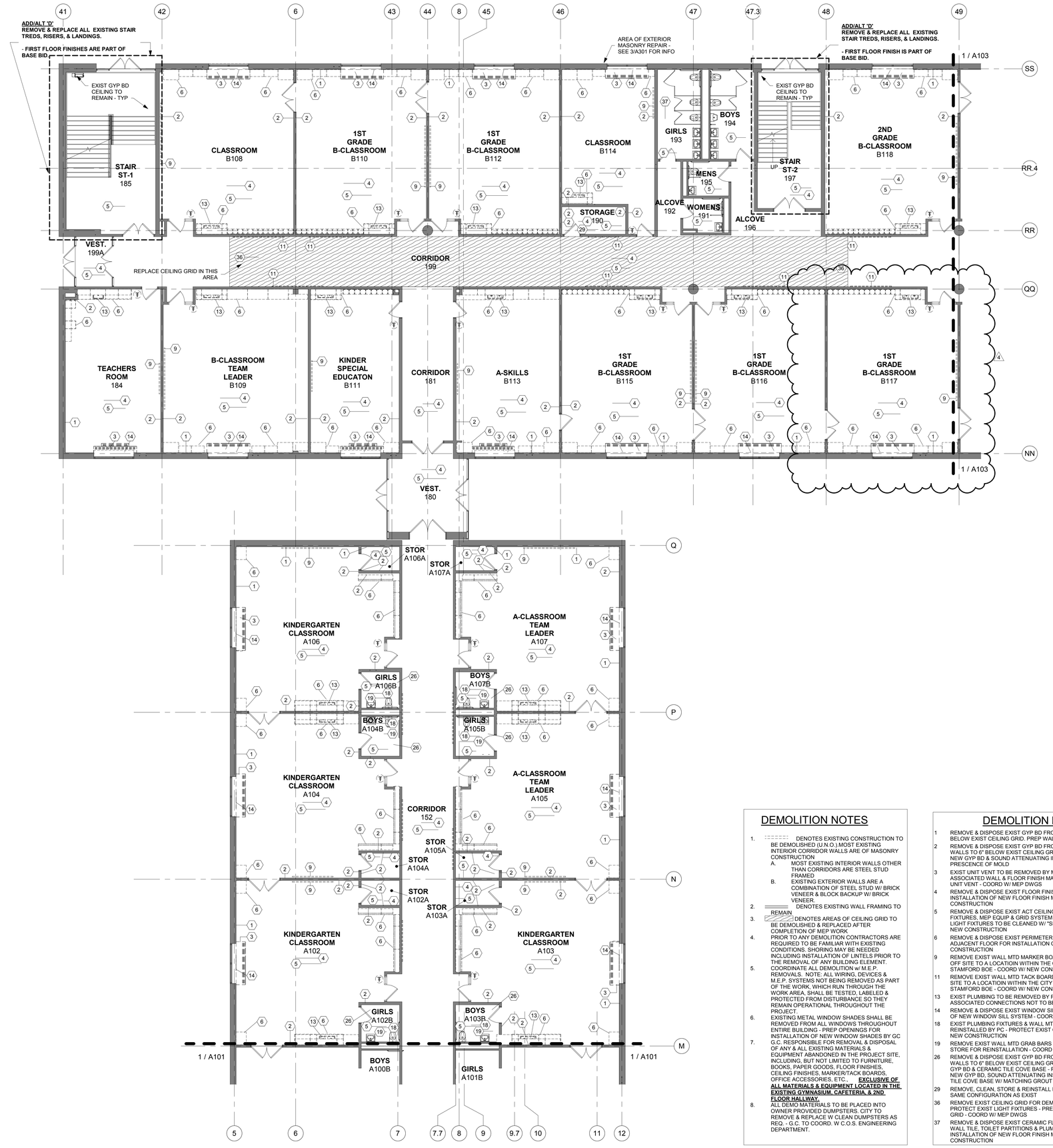
Sheet Title

1ST FLOOR DEMOLITION PLAN PART 'A'

Job No.	Date
2019-1016	08/06/2019
Scale	Drawn / Checked
AS NOTED	Author Checker

Sheet Number

A101



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2. ═══ DENOTES EXISTING WALL FRAMING TO REMAIN
3. ▨ DENOTES AREAS OF CEILING GRID TO BE DEMOLISHED & REPLACED AFTER COMPLETION OF MEP WORK
4. PRIOR TO ANY DEMOLITION CONTRACTORS ARE REQUIRED TO BE FAMILIAR WITH EXISTING CONDITIONS. SHORING MAY BE NEEDED INCLUDING INSTALLATION OF LINTELS PRIOR TO THE REMOVAL OF ANY BUILDING ELEMENT.
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6. EXISTING METAL WINDOW SHADES SHALL BE REMOVED FROM ALL WINDOWS THROUGHOUT ENTIRE BUILDING - PREP OPENINGS FOR INSTALLATION OF NEW WINDOW SHADES BY GC G.C. RESPONSIBLE FOR REMOVAL & DISPOSAL OF ANY & ALL EXISTING MATERIALS & EQUIPMENT ABANDONED IN THE PROJECT SITE, INCLUDING, BUT NOT LIMITED TO FURNITURE, BOOKS, PAPER GOODS, FLOOR FINISHES, CEILING FINISHES, MARKER/TACK BOARDS, OFFICE ACCESSORIES, ETC., **EXCLUSIVE OF ALL MATERIALS & EQUIPMENT LOCATED IN THE EXISTING GYMNASIUM, CAFETERIA, & 2ND FLOOR HALLWAY.**
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DEMOLITION KEYNOTES

1 REMOVE & DISPOSE EXIST GYP BD FROM EXISTING EXTERIOR WALLS TO 6" BELOW EXIST CEILING GRID. PREP WALLS FOR INSTALLATON OF NEW GYP BD

2 REMOVE & DISPOSE EXIST GYP BD FROM BOTH SIDES OF EXISTING INTERIOR WALLS TO 6" BELOW EXIST CEILING GRID. PREP WALLS FOR INSTALLATON OF NEW GYP BD & SOUND ATTENUATING INSULATION CHECK & CLEAN FOR ANY PRESCENCE OF MOLD

3 EXIST UNIT VENT TO BE REMOVED BY MECH CONTRACTOR - REMOVE ANY ASSOCIATED WALL & FLOOR FINISH MATERIALS CONCEALED BEHIND & UNDER UNIT VENT - COORD W/ MEP DWGS

4 REMOVE & DISPOSE EXIST FLOOR FINISH & RELATED BASE- PREP FOR INSTALLATION OF NEW FLOOR FINISH MATERIALS - COORD W/ NEW CONSTRUCTION

5 REMOVE & DISPOSE EXIST ACT CEILING TILES - PROTECT EXIST LIGHT FIXTURES, MEP EQUIP & GRID SYSTEM TO REMAIN - EXIST CEILING GRID & LIGHT FIXTURES TO BE CLEANED W/ "SHOCKWAVE" BY FIBERLOCK- COORD W/ NEW CONSTRUCTION

6 REMOVE & DISPOSE EXIST PERIMETER CASEWORK - PREP EXIST WALLS & ADJACENT FLOOR FOR INSTALLATION OF NEW CASEWORK - COORD W/ NEW CONSTRUCTION

9 REMOVE EXIST WALL MTD MARKER BOARD, PROTECT, STORE & TRANSPORT OFF SITE TO A LOCATION WITHIN THE CITY OF STAMFORD AS DETERMINED BY STAMFORD BOE - COORD W/ NEW CONSTRUCTION

11 REMOVE EXIST WALL MTD TACK BOARD, PROTECT, STORE & TRANSPORT OFF SITE TO A LOCATION WITHIN THE CITY OF STAMFORD AS DETERMINED BY STAMFORD BOE - COORD W/ NEW CONSTRUCTION

13 EXIST PLUMBING TO BE REMOVED BY PLUMBING CONTRACTOR - REMOVE ANY ASSOCIATED CONNECTIONS NOT TO BE REUSED - COORD W/ MEP DWGS

14 REMOVE & DISPOSE EXIST WINDOW SILL SYSTEM - PREP FOR INSTALLATION OF NEW WINDOW SILL SYSTEM - COORD W/ NEW CONSTRUCTION

18 EXIST PLUMBING FIXTURES & WALL MTD MIRROR TO BE REMOVED, STORED & REINSTALLED BY PC - PROTECT EXIST CERAMIC TILE FINISHES - COORD W/ NEW CONSTRUCTION

19 REMOVE EXIST WALL MTD GRAB BARS & RELATED HARDWARE, CLEAN & STORE FOR REINSTALLATION - COORD /W NEW CONSTRUCTION

26 REMOVE & DISPOSE EXIST GYP BD FROM BOTH SIDES OF EXISTING INTERIOR WALLS TO 6" BELOW EXIST CEILING GRID, ON TOILET ROOM SIDE - REMOVE GYP BD & CERAMIC TILE COVE BASE - PREP WALLS FOR INSTALLATON OF NEW GYP BD, SOUND ATTENUATING INSULATION & NEW MATCHING CERAMIC TILE COVE BASE W/ MATCHING GROUT

29 REMOVE, CLEAN, STORE & REINSTALL EXIST METAL SHELVING SYSTEMS IN SAME CONFIGURATION AS EXIST

36 REMOVE EXIST CEILING GRID FOR DEMO OF EXIST MECH DUCTWOR - PROTECT EXIST LIGHT FIXTURES - PREP FOR INSTALLATION OF NEW CEILING GRID - COORD W/ MEP DWGS

37 REMOVE & DISPOSE EXIST CERAMIC FLOOR & BASE FINISH - PROTECT EXIST WALL TILE, TOILET PARTITIONS & PLUMBING FIXTURES - PREP FOR INSTALLATION OF NEW FLOOR FINISH MATERIALS - COORD W/ NEW CONSTRUCTION

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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KG+D . ARCHITECTS PC
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CONSTRUCTION DOCUMENTS

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PART 'B'

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1	5/15/2019	ISSUED FOR PRICING

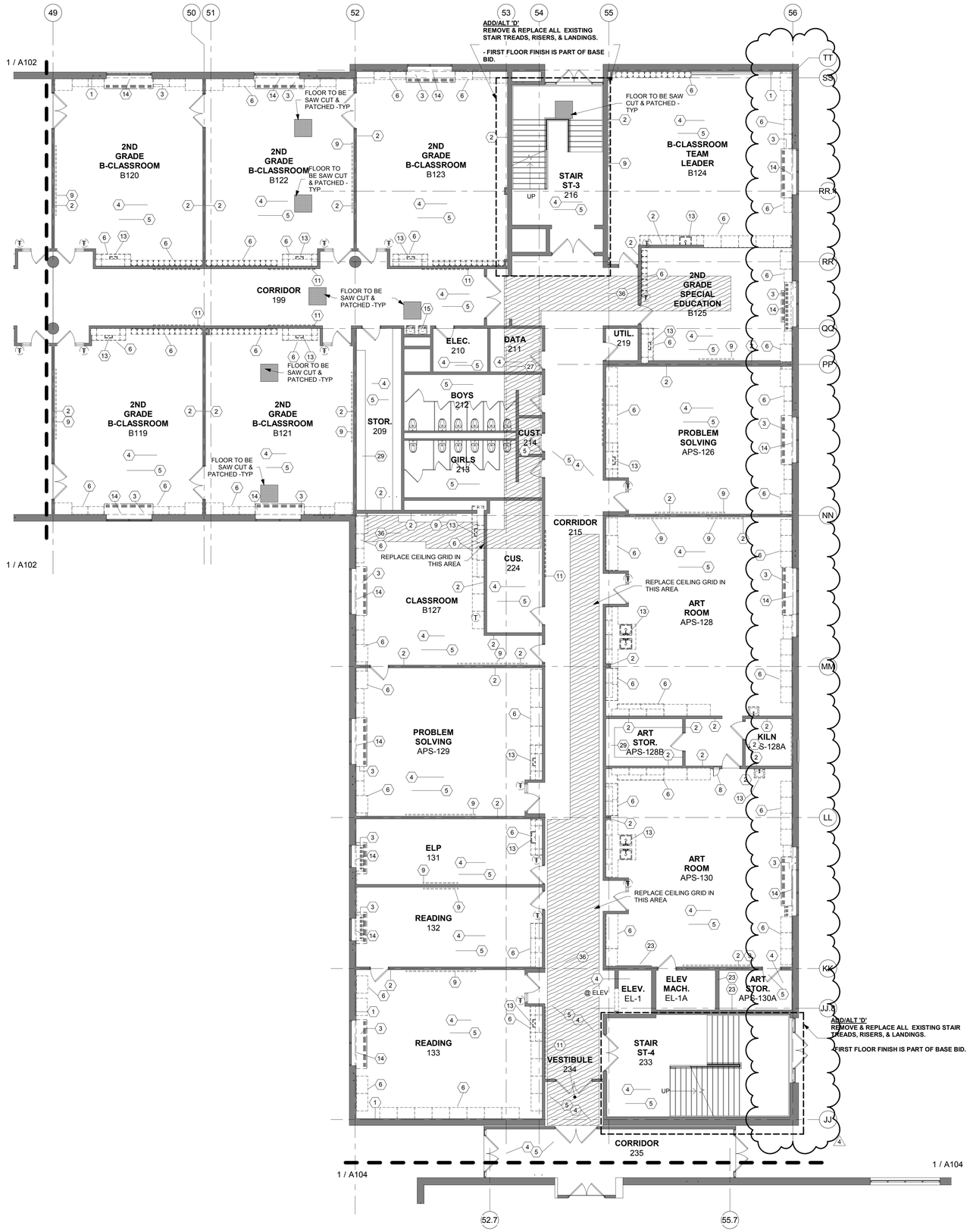
Sheet Title

1ST FLOOR DEMOLITION PLAN PART 'B'

Job No.	Date
2019-1016	08/06/2019
Scale: AS NOTED	Drawn / Checked: Author Checker

Sheet Number

A102



DEMOLITION NOTES

1. DENOTES EXISTING CONSTRUCTION TO BE DEMOLISHED (U.N.O.).MOST EXISTING INTERIOR CORRIDOR WALLS ARE OF MASONRY CONSTRUCTION
   A. MOST EXISTING INTERIOR WALLS OTHER THAN CORRIDORS ARE STEEL STUD FRAMED
   B. EXISTING EXTERIOR WALLS ARE A COMBINATION OF STEEL STUD W/ BRICK VENEER & BLOCK BACKUP W/ BRICK VENEER.
2. DENOTES EXISTING WALL FRAMING TO REMAIN
3. DENOTES AREAS OF CEILING GRID TO BE DEMOLISHED & REPLACED AFTER COMPLETION OF MEP WORK.
4. PRIOR TO ANY DEMOLITION CONTRACTORS ARE REQUIRED TO BE FAMILIAR WITH EXISTING CONDITIONS. SHORING MAY BE NEEDED INCLUDING INSTALLATION OF LINTELS PRIOR TO THE REMOVAL OF ANY BUILDING ELEMENT.
5. COORDINATE ALL DEMOLITION w/ M.E.P. REMOVALS. NOTE: ALL WIRING, DEVICES & M.E.P. SYSTEMS NOT BEING REMOVED AS PART OF THE WORK, WHICH RUN THROUGH THE WORK AREA, SHALL BE TESTED, LABELED & PROTECTED FROM DISTURBANCE SO THEY REMAIN OPERATIONAL THROUGHOUT THE PROJECT
6. EXISTING METAL WINDOW SHADES SHALL BE REMOVED FROM ALL WINDOWS THROUGHOUT ENTIRE BUILDING - PREP OPENINGS FOR INSTALLATION OF NEW WINDOW SHADES BY GC
7. G.C. RESPONSIBLE FOR REMOVAL & DISPOSAL OF ANY & ALL EXISTING MATERIALS & EQUIPMENT ABANDONED IN THE PROJECT SITE, INCLUDING, BUT NOT LIMITED TO FURNITURE, BOOKS, PAPER GOODS, FLOOR FINISHES, CEILING FINISHES, MARKER/TACK BOARDS, OFFICE ACCESSORIES, ETC., **EXCLUSIVE OF ALL MATERIALS & EQUIPMENT LOCATED IN THE EXISTING GYMNASIUM, CAFETERIA, & 2ND FLOOR HALLWAY.**
8. ALL DEMO MATERIALS TO BE PLACED INTO OWNER PROVIDED DUMPSTERS, CITY TO REMOVE & REPLACE W CLEAN DUMPSTERS AS REQ. - G.C. TO COORD. W C.O.S. ENGINEERING DEPARTMENT.

FLOOR INFILL NOTES

1. CUT ALL EXISTING FLOOR TEST PITS & FLOOR CORES TO MIN 4'-0" SQURE ALONG EACH EDGE AS CONDITIONS WARRANT - TYP
2. EPOXY EMBED #5 REBAR INTO EXISTING PERIMETER OF 5" CONCRETE SLAB @ 12" O.C. MAX - MIN EMBEDMENT 6"
3. PROVIDE 4000# CONCRETE W/ 6X6X#10 WWM IN CENTERED VERTICALLY IN NEW POUR
4. FINISH NEW CONCRETE FLUSH W/ ADJACENT SURFACES - SMOOTH TROWEL FINISH - TYP

DEMOLITION KEYNOTES

1 REMOVE & DISPOSE EXIST GYP BD FROM EXISTING EXTERIOR WALLS TO 6" BELOW EXIST CEILING GRID. PREP WALLS FOR INSTALLATON OF NEW GYP BD

2 REMOVE & DISPOSE EXIST GYP BD FROM BOTH SIDES OF EXISTING INTERIOR WALLS TO 6" BELOW EXIST CEILING GRID. PREP WALLS FOR INSTALLATON OF NEW GYP BD & SOUND ATTENUATING INSULATION CHECK & CLEAN FOR ANY PRESCENCE OF MOLD

3 EXIST UNIT VENT TO BE REMOVED BY MECH CONTRACTOR - REMOVE ANY ASSOCIATED WALL & FLOOR FINISH MATERIALS CONCEALED BEHIND & UNDER UNIT VENT - COORD W/ MEP DWGS

4 REMOVE & DISPOSE EXIST FLOOR FINISH & RELATED BASE- PREP FOR INSTALLATION OF NEW FLOOR FINISH MATERIALS - COORD W/ NEW CONSTRUCTION

5 REMOVE & DISPOSE EXIST ACT CEILING TILES - PROTECT EXIST LIGHT FIXTURES, MEP EQUIP & GRID SYSTEM TO REMAIN - EXIST CEILING GRID & LIGHT FIXTURES TO BE CLEANED W/ "SHOCKWAVE" BY FIBERLOCK- COORD W/ NEW CONSTRUCTION

6 REMOVE & DISPOSE EXIST PERIMETER CASEWORK - PREP EXIST WALLS & ADJACENT FLOOR FOR INSTALLATION OF NEW CASEWORK - COORD W/ NEW CONSTRUCTION

8 REMOVE FIRE EXTINGUISHER CABINET, CLEAN & STORE FOR REINSTALLATON - COORD W/ NEW CONSTRUCTION

9 REMOVE EXIST WALL MTD MARKER BOARD, PROTECT, STORE & TRANSPORT OFF SITE TO A LOCATION WITHIN THE CITY OF STAMFORD AS DETERMINED BY STAMFORD BOE - COORD W/ NEW CONSTRUCTION

11 REMOVE EXIST WALL MTD TACK BOARD, PROTECT, STORE & TRANSPORT OFF SITE TO A LOCATION WITHIN THE CITY OF STAMFORD AS DETERMINED BY STAMFORD BOE - COORD W/ NEW CONSTRUCTION

13 EXIST PLUMBING TO BE REMOVED BY PLUMBING CONTRACTOR - REMOVE ANY ASSOCIATED CONNECTIONS NOT TO BE REUSED - COORD W/ MEP DWGS

14 REMOVE & DISPOSE EXIST WINDOW SILL SYSTEM - PREP FOR INSTALLATION OF NEW WINDOW SILL SYSTEM - COORD W/ NEW CONSTRUCTION

15 EXIST WATER FOUNTAINS TO BE REMOVED BY PLUMBING CONTRACTOR - COORD W/ NEW WATER FOUNTAIN INSTALLATION BY MEP - PATCH & MATCH EXIST WALLS TO ADJACENT SURFACES - REMOVE ANY ASSOCIATED CONNECTIONS NOT TO BE REUSED - COORD W/ MEP DWGS

23 REMOVE & DISPOSE EXIST GYP BD FROM FURRED SIDE OF EXISTING INTERIOR MASONRY WALLS TO 6" BELOW EXIST CEILING GRID SYSTEM. PREP WALLS FOR INSTALLATON OF NEW GYP BD & SOUND ATTENUATING INSULATION

27 REMOVE & DISPOSE EXIST ACT CEILING TILES & GRID SYSTEM - PROTECT EXIST DATA & MEP EQUIP TO REMAIN - COORD W/ NEW CONSTRUCTION

29 REMOVE, CLEAN, STORE & REINSTALL EXIST METAL SHELVING SYSTEMS IN SAME CONFIGURATION AS EXIST

36 REMOVE EXIST CEILING GRID FOR DEMO OF EXIST MECH DUCTWOR - PROTECT EXIST LIGHT FIXTURES - PREP FOR INSTALLATION OF NEW CEILING GRID - COORD W/ MEP DWGS

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

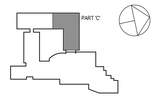
412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

KG+D . ARCHITECTS PC
285 MAIN STREET MOUNT KISCO . NEW YORK . 10549
P:914.666.5900 KGDARCHITECTS.COM

CONSTRUCTION DOCUMENTS

SPN 135-0278RR



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Sheet Title

1ST FLOOR DEMOLITION PLAN - PART 'C'

Job No.	Date
2019-1016	08/06/2019
Scale	Drawn / Checked
AS NOTED	Author Checker

Sheet Number

A103

DEMOLITION KEYNOTES

2 REMOVE & DISPOSE EXIST GYP BD FROM BOTH SIDES OF EXISTING INTERIOR WALLS TO 6" BELOW EXIST CEILING GRID. PREP WALLS FOR INSTALLATON OF NEW GYP BD & SOUND ATTENUATING INSULATION CHECK & CLEAN FOR ANY PRESCENCE OF MOLD

3 EXIST UNIT VENT TO BE REMOVED BY MECH CONTRACTOR - REMOVE ANY ASSOCIATED WALL & FLOOR FINISH MATERIALS CONCEALED BEHIND & UNDER UNIT VENT - COORD W/ MEP DWGS

4 REMOVE & DISPOSE EXIST FLOOR FINISH & RELATED BASE- PREP FOR INSTALLATION OF NEW FLOOR FINISH MATERIALS - COORD W/ NEW CONSTRUCTION

5 REMOVE & DISPOSE EXIST ACT CEILING TILES - PROTECT EXIST LIGHT FIXTURES, MEP EQUIP & GRID SYSTEM TO REMAIN - EXIST CEILING GRID & LIGHT FIXTURES TO BE CLEANED W/ "SHOCKWAVE" BY FIBERLOCK- COORD W/ NEW CONSTRUCTION

6 REMOVE & DISPOSE EXIST PERIMETER CASEWORK - PREP EXIST WALLS & ADJACENT FLOOR FOR INSTALLATION OF NEW CASEWORK - COORD W/ NEW CONSTRUCTION

7 REMOVE & DISPOSE EXIST CARPET & RELATED BASE - PREP FOR INSTALLATON OF NEW FLOOR FINISH MATERIALS - COORD W/ NEW CONSTRUCTION

9 REMOVE EXIST WALL MTD MARKER BOARD, PROTECT, STORE & TRANSPORT OFF SITE TO A LOCATIOIN WITHIN THE CITY OF STAMFORD AS DETERMINED BY STAMFORD BOE - COORD W/ NEW CONSTRUCTION

10 REMOVE & DISPOSE EXIST GYP BD CEILING TO CEILING FRAMING - CLEAN & PREP FOR NEW GYP BD CEILING INSTALLATION - COOR W/ NEW CONSTRUCTION

11 REMOVE EXIST WALL MTD TACK BOARD, PROTECT, STORE & TRANSPORT OFF SITE TO A LOCATIOIN WITHIN THE CITY OF STAMFORD AS DETERMINED BY STAMFORD BOE - COORD W/ NEW CONSTRUCTION

13 EXIST PLUMBING TO BE REMOVED BY PLUMBING CONTRACTOR - REMOVE ANY ASSOCIATED CONNECTIONS NOT TO BE REUSED - COORD W/ MEP DWGS

15 EXIST WATER FOUNTAINS TO BE REMOVED BY PLUMBING CONTRACTOR - COORD W/ NEW WATER FOUNTAIN INSTALLATION BY MEP - PATCH & MATCH EXIST WALLS TO ADJACENT SURFACES - REMOVE ANY ASSOCIATED CONNECTIONS NOT TO BE REUSED - COORD W/ MEP DWGS

16 REMOVE & DISPOSE EXIST CERAMIC TILE FLOOR & RELATED CERAMIC TILE PERIMETER BASE - PATCH & MATCH TO ADJACENT SURFACES - PREP FOR INSTALLATION OF NEW CERAMIC FLOOR SYSTEM & RELATED CERAMIC PERIMETER BASE - COORD W/ NEW CONSTRUCTION

17 REMOVE & DISPOSE EXIST SPRAY-ON ACCOUSTICAL CEILING FINISH - PREP & PATCH TO LEVEL 5 FINISH FOR NEW PAINT - COORD W/ NEW CONSTRUCTION

21 REMOVE MEDIA AREA DESKS & SHELVING SYSTEM, CLEAN PROTECT & STORE FOR REINSTALLATION - COORD W/ NEW CONSTRUCTION

22 REMOVE & DISPOSE EXIST CLOSET SHELVING SYSTEM - PATCH & MATCH TO ADJACENT SURFACES - COOR W/ NEW CONSTRUCTION

28 REMOVE, CLEAN, REINSTALL AND PROPERLY HANG ALL EXISTING STAGE CURTAINS AND STAGE FLY SYSTEM - COORD W/ NEW CONSTRUCTION - PROTECT EXIST HARDWOOD STAGE FLOOR DURING ALL PHASES OF CONSTRUCTION - TYP

29 REMOVE, CLEAN, STORE & REINSTALL EXIST METAL SHELVING SYSTEMS IN SAME CONFIGURATION AS EXIST

30 REMOVE EXIST DOOR AND ALL ASSOCIATED HARDWARE, EXIST JAMB TO REMAIN, PREP FOR NEW DOOR INSTALLATION - COORD. W/ NEW CONSTRUCTION

36 REMOVE EXIST CEILING GRID FOR DEMO OF EXIST MECH DUCTWOR - PROTECT EXIST LIGHT FIXTURES - PREP FOR INSTALLATION OF NEW CEILING GRID - COORD W/ MEP DWGS

DEMOLITION NOTES

1. DENOTES EXISTING CONSTRUCTION TO BE DEMOLISHED (U.N.O.),MOST EXISTING INTERIOR CORRIDOR WALLS ARE OF MASONRY CONSTRUCTION
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7. G.C. RESPONSIBLE FOR REMOVAL & DISPOSAL OF ANY & ALL EXISTING MATERIALS & EQUIPMENT ABANDONED IN THE PROJECT SITE, INCLUDING, BUT NOT LIMITED TO FURNITURE, BOOKS, PAPER GOODS, FLOOR FINISHES,, CEILING FINISHES, MARKER/TACK BOARDS, OFFICE ACCESSORIES, ETC.,. **EXCLUSIVE OF ALL MATERIALS & EQUIPMENT LOCATED IN THE EXISTING GYMNASIUM, CAFETERIA, & 2ND FLOOR HALLWAY.**
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ADD/ALT 'B'
AUDITORIUM AHU REPLACEMENT ON ROOF- COORD W/ MEP DWGS FOR SCOPE OF RTU WORK.

BASE BID
APPROXIMATE OUTLINE OF EXISTING GYP BD CEILING SYSTEM TO BE REMOVED, CLEANED & REPLACED TO ACCOMMODATE DUCT WORK REPLACEMENT. COORDINATE W/ MEP DWGS.

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PROJECT # S-6722

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Sheet Title

1ST FLOOR DEMOLITION PLAN PART 'D'

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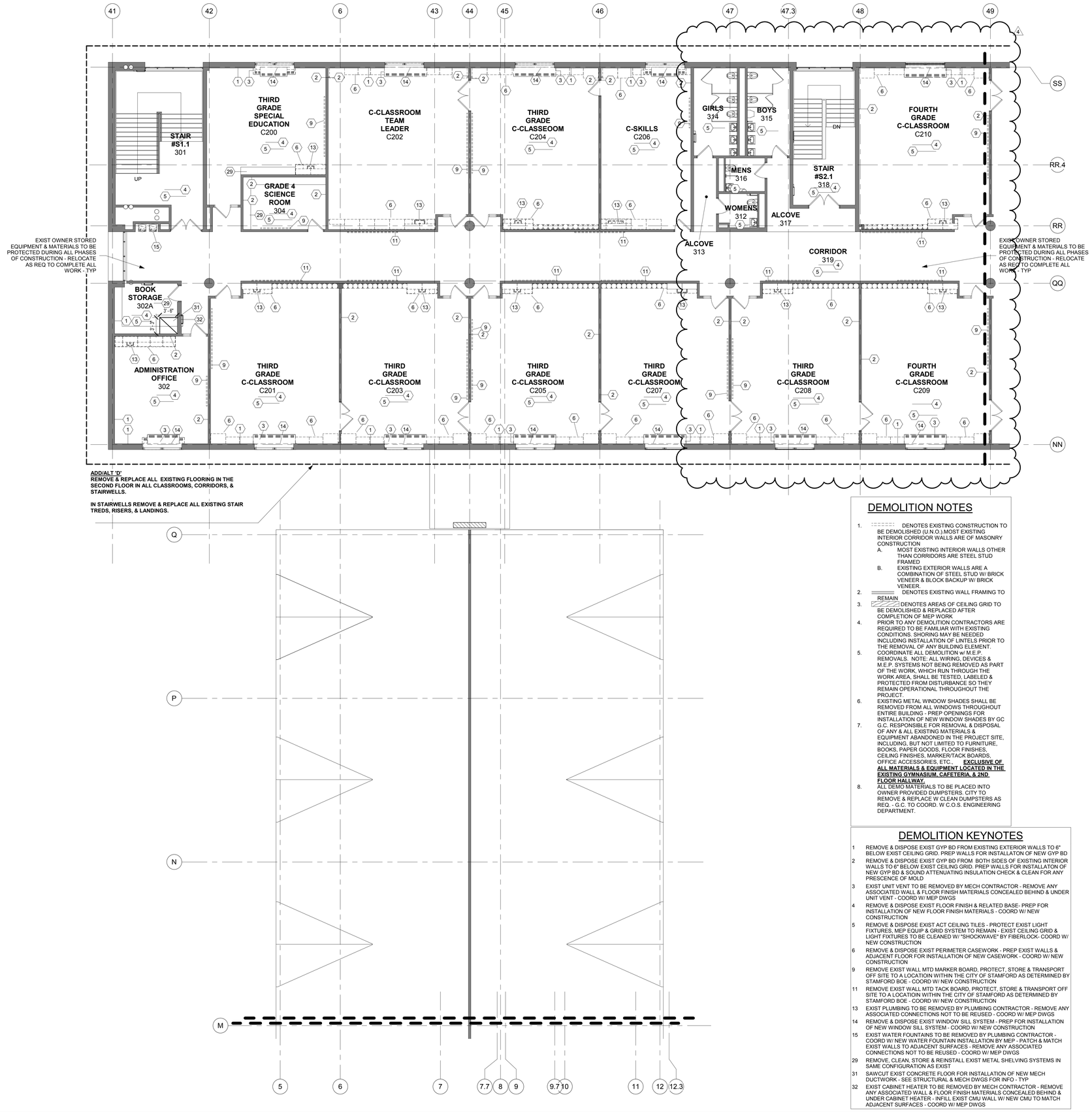

ADD/ALT 'D'
REMOVE & REPLACE ALL EXISTING FLOORING IN THE SECOND FLOOR IN ALL CLASSROOMS, CORRIDORS, & STAIRWELLS.

IN STAIRWELLS REMOVE & REPLACE ALL EXISTING STAIR TREDS, RISERS, & LANDINGS.

DEMOLITION NOTES

1. ..... DENOTES EXISTING CONSTRUCTION TO BE DEMOLISHED (U.N.O.).MOST EXISTING INTERIOR CORRIDOR WALLS ARE OF MASONRY CONSTRUCTION
   - A. MOST EXISTING INTERIOR WALLS OTHER THAN CORRIDORS ARE STEEL STUD FRAMED
   - B. EXISTING EXTERIOR WALLS ARE A COMBINATION OF STEEL STUD W/ BRICK VENEER & BLOCK BACKUP W/ BRICK VENEER.
2. ═══ DENOTES EXISTING WALL FRAMING TO REMAIN
3. ▨ DENOTES AREAS OF CEILING GRID TO BE DEMOLISHED & REPLACED AFTER COMPLETION OF MEP WORK
4. PRIOR TO ANY DEMOLITION CONTRACTORS ARE REQUIRED TO BE FAMILIAR WITH EXISTING CONDITIONS. SHORING MAY BE NEEDED INCLUDING INSTALLATION OF LINTELS PRIOR TO THE REMOVAL OF ANY BUILDING ELEMENT.
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6. EXISTING METAL WINDOW SHADES SHALL BE REMOVED FROM ALL WINDOWS THROUGHOUT ENTIRE BUILDING - PREP OPENINGS FOR INSTALLATION OF NEW WINDOW SHADES BY GC
7. G.C. RESPONSIBLE FOR REMOVAL & DISPOSAL OF ANY & ALL EXISTING MATERIALS & EQUIPMENT ABANDONED IN THE PROJECT SITE, INCLUDING, BUT NOT LIMITED TO FURNITURE, BOOKS, PAPER GOODS, FLOOR FINISHES, CEILING FINISHES, MARKER/TACK BOARDS, OFFICE ACCESSORIES, ETC., **EXCLUSIVE OF ALL MATERIALS & EQUIPMENT LOCATED IN THE EXISTING GYMNASIUM, CAFETERIA, & 2ND FLOOR HALLWAY.**
8. ALL DEMO MATERIALS TO BE PLACED INTO OWNER PROVIDED DUMPSTERS. CITY TO REMOVE & REPLACE W CLEAN DUMPSTERS AS REQ. - G.C. TO COORD. W C.O.S. ENGINEERING DEPARTMENT.

DEMOLITION KEYNOTES

1	REMOVE & DISPOSE EXIST GYP BD FROM EXISTING EXTERIOR WALLS TO 6" BELOW EXIST CEILING GRID. PREP WALLS FOR INSTALLATON OF NEW GYP BD
2	REMOVE & DISPOSE EXIST GYP BD FROM BOTH SIDES OF EXISTING INTERIOR WALLS TO 6" BELOW EXIST CEILING GRID. PREP WALLS FOR INSTALLATON OF NEW GYP BD & SOUND ATTENUATING INSULATION CHECK & CLEAN FOR ANY PRESCENCE OF MOLD
3	EXIST UNIT VENT TO BE REMOVED BY MECH CONTRACTOR - REMOVE ANY ASSOCIATED WALL & FLOOR FINISH MATERIALS CONCEALED BEHIND & UNDER UNIT VENT - COORD W/ MEP DWGS
4	REMOVE & DISPOSE EXIST FLOOR FINISH & RELATED BASE- PREP FOR INSTALLATION OF NEW FLOOR FINISH MATERIALS - COORD W/ NEW CONSTRUCTION
5	REMOVE & DISPOSE EXIST ACT CEILING TILES - PROTECT EXIST LIGHT FIXTURES, MEP EQUIP & GRID SYSTEM TO REMAIN - EXIST CEILING GRID & LIGHT FIXTURES TO BE CLEANED W/ "SHOCKWAVE" BY FIBERLOCK- COORD W/ NEW CONSTRUCTION
6	REMOVE & DISPOSE EXIST PERIMETER CASEWORK - PREP EXIST WALLS & ADJACENT FLOOR FOR INSTALLATION OF NEW CASEWORK - COORD W/ NEW CONSTRUCTION
9	REMOVE EXIST WALL MTD MARKER BOARD, PROTECT, STORE & TRANSPORT OFF SITE TO A LOCATION WITHIN THE CITY OF STAMFORD AS DETERMINED BY STAMFORD BOE - COORD W/ NEW CONSTRUCTION
11	REMOVE EXIST WALL MTD TACK BOARD, PROTECT, STORE & TRANSPORT OFF SITE TO A LOCATION WITHIN THE CITY OF STAMFORD AS DETERMINED BY STAMFORD BOE - COORD W/ NEW CONSTRUCTION
13	EXIST PLUMBING TO BE REMOVED BY PLUMBING CONTRACTOR - REMOVE ANY ASSOCIATED CONNECTIONS NOT TO BE REUSED - COORD W/ MEP DWGS
14	REMOVE & DISPOSE EXIST WINDOW SILL SYSTEM - PREP FOR INSTALLATION OF NEW WINDOW SILL SYSTEM - COORD W/ NEW CONSTRUCTION
15	EXIST WATER FOUNTAINS TO BE REMOVED BY PLUMBING CONTRACTOR - COORD W/ NEW WATER FOUNTAIN INSTALLATION BY MEP - PATCH & MATCH EXIST WALLS TO ADJACENT SURFACES - REMOVE ANY ASSOCIATED CONNECTIONS NOT TO BE REUSED - COORD W/ MEP DWGS
29	REMOVE, CLEAN, STORE & REINSTALL EXIST METAL SHELVING SYSTEMS IN SAME CONFIGURATION AS EXIST
31	SAWCUT EXIST CONCRETE FLOOR FOR INSTALLATION OF NEW MECH DUCTWORK - SEE STRUCTURAL & MECH DWGS FOR INFO - TYP
32	EXIST CABINET HEATER TO BE REMOVED BY MECH CONTRACTOR - REMOVE ANY ASSOCIATED WALL & FLOOR FINISH MATERIALS CONCEALED BEHIND & UNDER CABINET HEATER - INFILL EXIST CMU WALL W/ NEW CMU TO MATCH ADJACENT SURFACES - COORD W/ MEP DWGS

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PART 'B'

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Sheet Title

2ND FLOOR DEMOLITION PLAN PART 'B'

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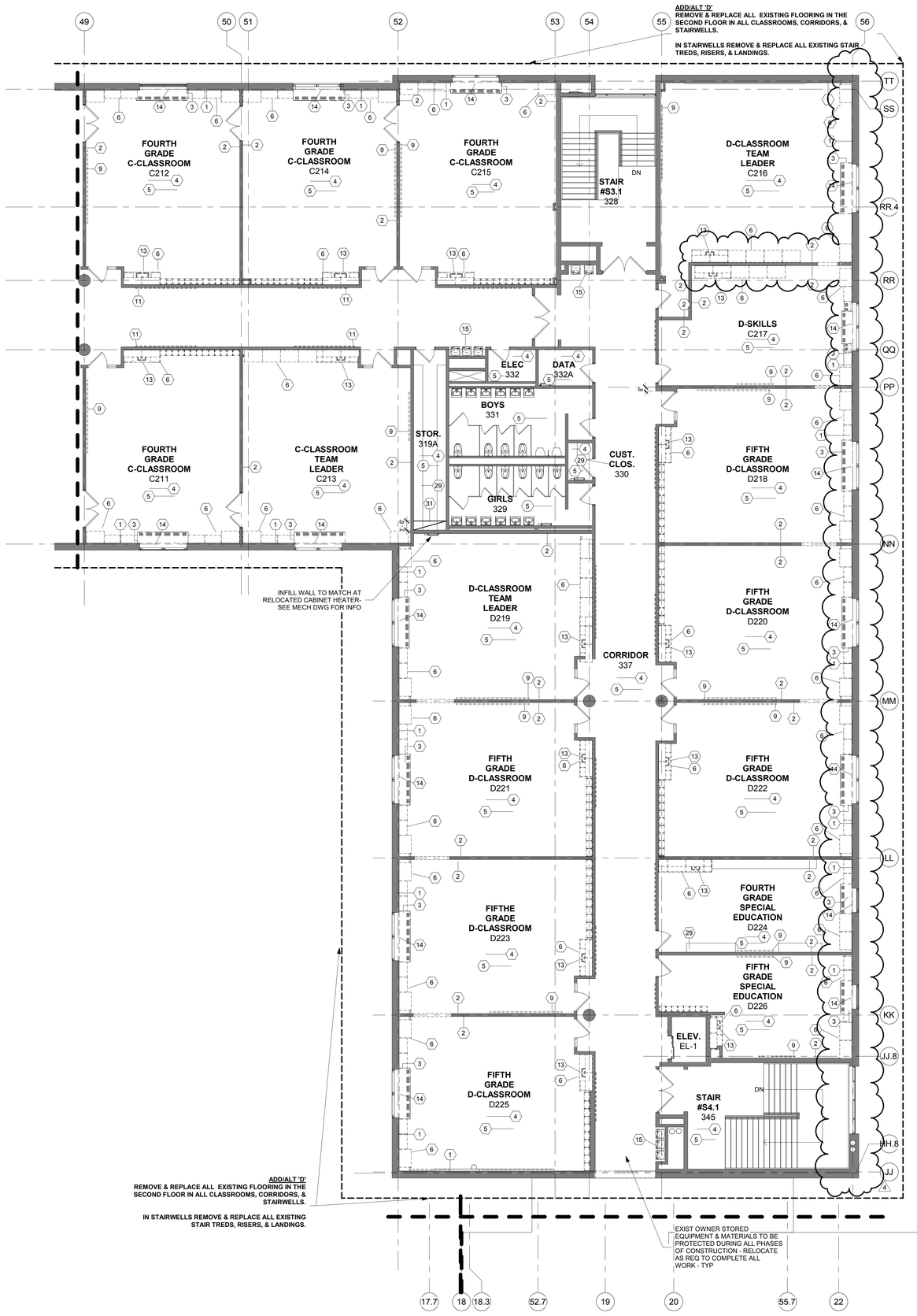

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8. ALL DEMO MATERIALS TO BE PLACED INTO OWNER PROVIDED DUMPSTERS. CITY TO REMOVE & REPLACE W CLEAN DUMPSTERS AS REQ. - G.C. TO COORD. W C.O.S. ENGINEERING DEPARTMENT.

DEMOLITION KEYNOTES

1	REMOVE & DISPOSE EXIST GYP BD FROM EXISTING EXTERIOR WALLS TO 6" BELOW EXIST CEILING GRID. PREP WALLS FOR INSTALLATON OF NEW GYP BD
2	REMOVE & DISPOSE EXIST GYP BD FROM BOTH SIDES OF EXISTING INTERIOR WALLS TO 6" BELOW EXIST CEILING GRID. PREP WALLS FOR INSTALLATON OF NEW GYP BD & SOUND ATTENUATING INSULATION CHECK & CLEAN FOR ANY PRESCENCE OF MOLD
3	EXIST UNIT VENT TO BE REMOVED BY MECH CONTRACTOR - REMOVE ANY ASSOCIATED WALL & FLOOR FINISH MATERIALS CONCEALED BEHIND & UNDER UNIT VENT - COORD W/ MEP DWGS
4	REMOVE & DISPOSE EXIST FLOOR FINISH & RELATED BASE- PREP FOR INSTALLATON OF NEW FLOOR FINISH MATERIALS - COORD W/ NEW CONSTRUCTION
5	REMOVE & DISPOSE EXIST ACT CEILING TILES - PROTECT EXIST LIGHT FIXTURES, MEP EQUIP & GRID SYSTEM TO REMAIN - EXIST CEILING GRID & LIGHT FIXTURES TO BE CLEANED W/ "SHOCKWAVE" BY FIBERLOCK- COORD W/ NEW CONSTRUCTION
6	REMOVE & DISPOSE EXIST PERIMETER CASEWORK - PREP EXIST WALLS & ADJACENT FLOOR FOR INSTALLATION OF NEW CASEWORK - COORD W/ NEW CONSTRUCTION
9	REMOVE EXIST WALL MTD MARKER BOARD, PROTECT, STORE & TRANSPORT OFF SITE TO A LOCATIOIN WITHIN THE CITY OF STAMFORD AS DETERMINED BY STAMFORD BOE - COORD W/ NEW CONSTRUCTION
11	REMOVE EXIST WALL MTD TACK BOARD, PROTECT, STORE & TRANSPORT OFF SITE TO A LOCATIOIN WITHIN THE CITY OF STAMFORD AS DETERMINED BY STAMFORD BOE - COORD W/ NEW CONSTRUCTION
13	EXIST PLUMBING TO BE REMOVED BY PLUMBING CONTRACTOR - REMOVE ANY ASSOCIATED CONNECTIONS NOT TO BE REUSED - COORD W/ MEP DWGS
14	REMOVE & DISPOSE EXIST WINDOW SILL SYSTEM - PREP FOR INSTALLATION OF NEW WINDOW SILL SYSTEM - COORD W/ NEW CONSTRUCTION
15	EXIST WATER FOUNTAINS TO BE REMOVED BY PLUMBING CONTRACTOR - COORD W/ NEW WATER FOUNTAIN INSTALLATION BY MEP - PATCH & MATCH EXIST WALLS TO ADJACENT SURFACES - REMOVE ANY ASSOCIATED CONNECTIONS NOT TO BE REUSED - COORD W/ MEP DWGS
29	REMOVE, CLEAN, STORE & REINSTALL EXIST METAL SHELVING SYSTEMS IN SAME CONFIGURATION AS EXIST
31	SAWCUT EXIST CONCRETE FLOOR FOR INSTALLATION OF NEW MECH DUCTWORK - SEE STRUCTURAL & MECH DWGS FOR INFO - TYP

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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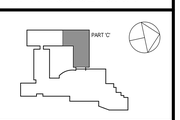
CONSTRUCTION DOCUMENTS

SPN 135-0278RR



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3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

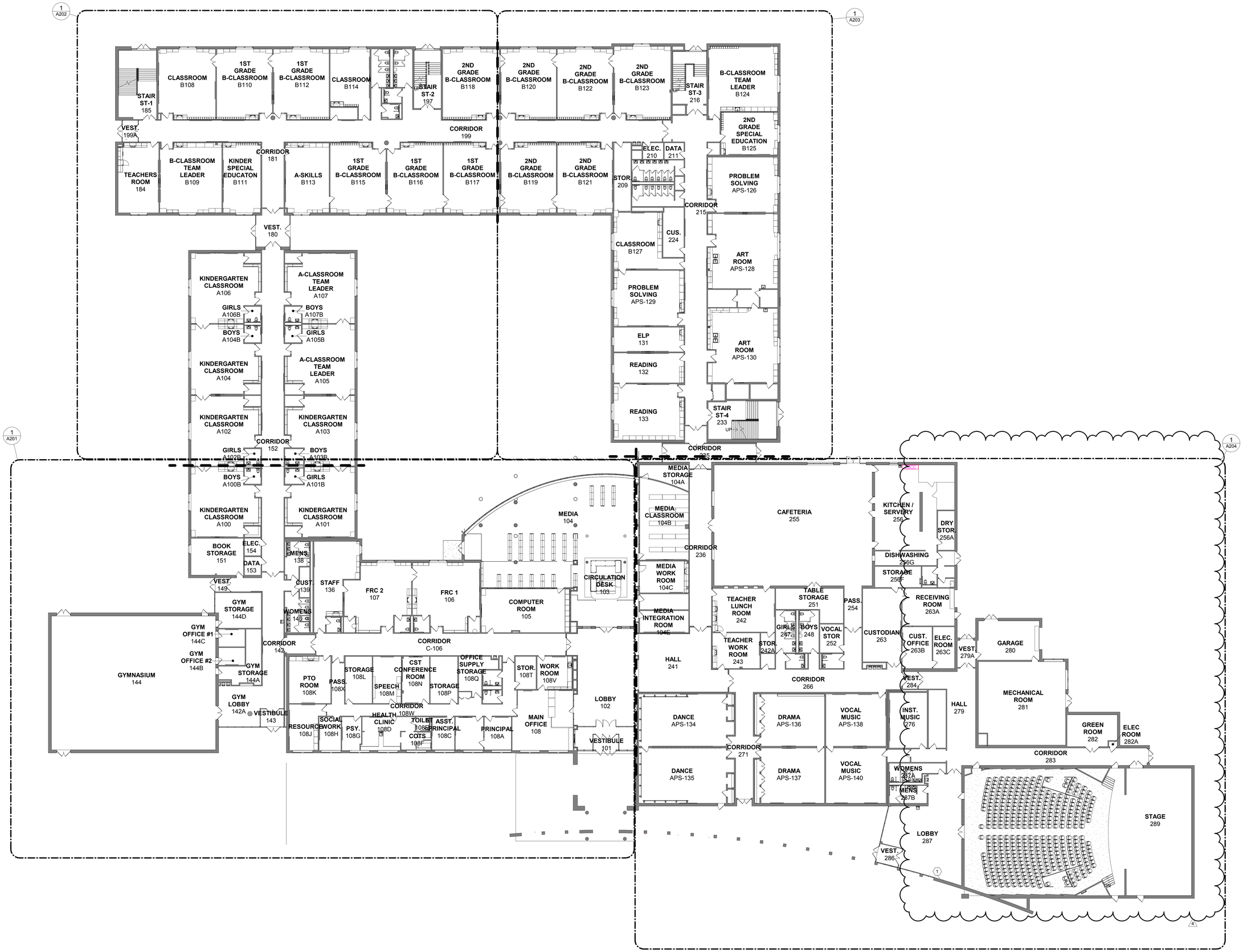
Sheet Title

2ND FLOOR DEMOLITION PLAN PART 'C'

Job No. 2019-1016	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

A106



1 1ST FLOOR OVERALL PLAN
1/16" = 1'-0"

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

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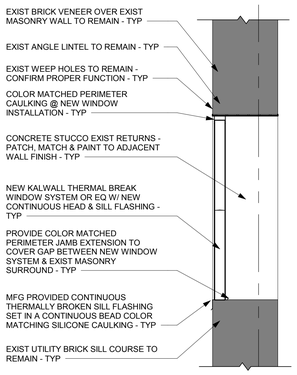
Sheet Title

OVERALL FIRST FLOOR PLAN

Job No.	Date
2019-1016	08/06/2019
Scale: AS NOTED	Drawn / Checked: Author Checker

Sheet Number

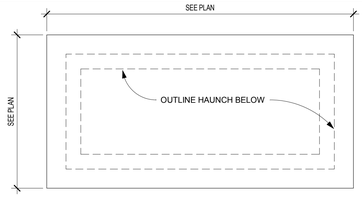
A200



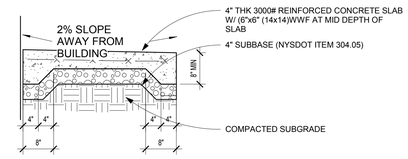
3 PARTIAL WALL SECTION @ GYM WINDOW SYSTEM
3/4" = 1'-0"

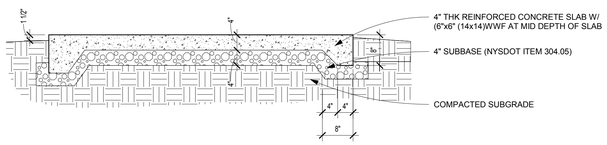
DOOR REPAIR LEGEND

ADJ	ADJUST DOOR FIT, HARDWARE & SWING SPEED TO MEET ADA REQUIREMENTS
WS	REMOVE EXISTING PERIMETER WEATHERSTRIPPING & REPLACE W/ NEW WEATHERSTRIPPING INCLUDING NEW DOOR SWEEP
RS	REMOVE & RESET EXIST ALUM SADDLE - PROVIDE (2) NEW CAULKING BEADS UNDER EXIST SADDLE PRIOR TO REINSTALLATION
PTD	SCRAPE, PATCH & REPAIR EXIST HOLLOW METAL DOOR SYSTEM - PRIME & REPAINT PER SPECS



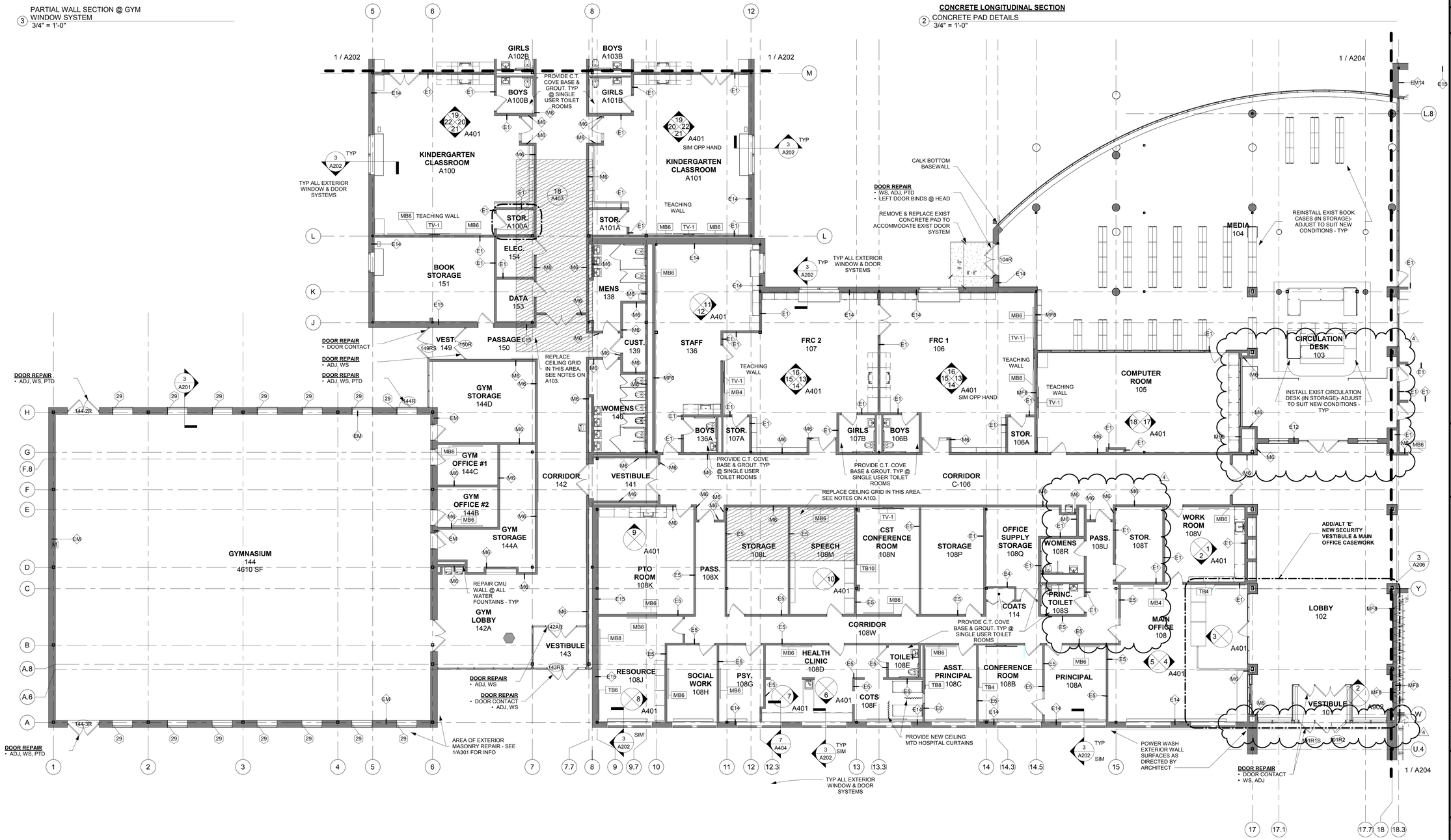
CONCRETE PAD PLAN





CONCRETE LONGITUDINAL SECTION

2 CONCRETE PAD DETAILS
3/4" = 1'-0"



1 1ST FLOOR - PART 'A'
1/8" = 1'-0"

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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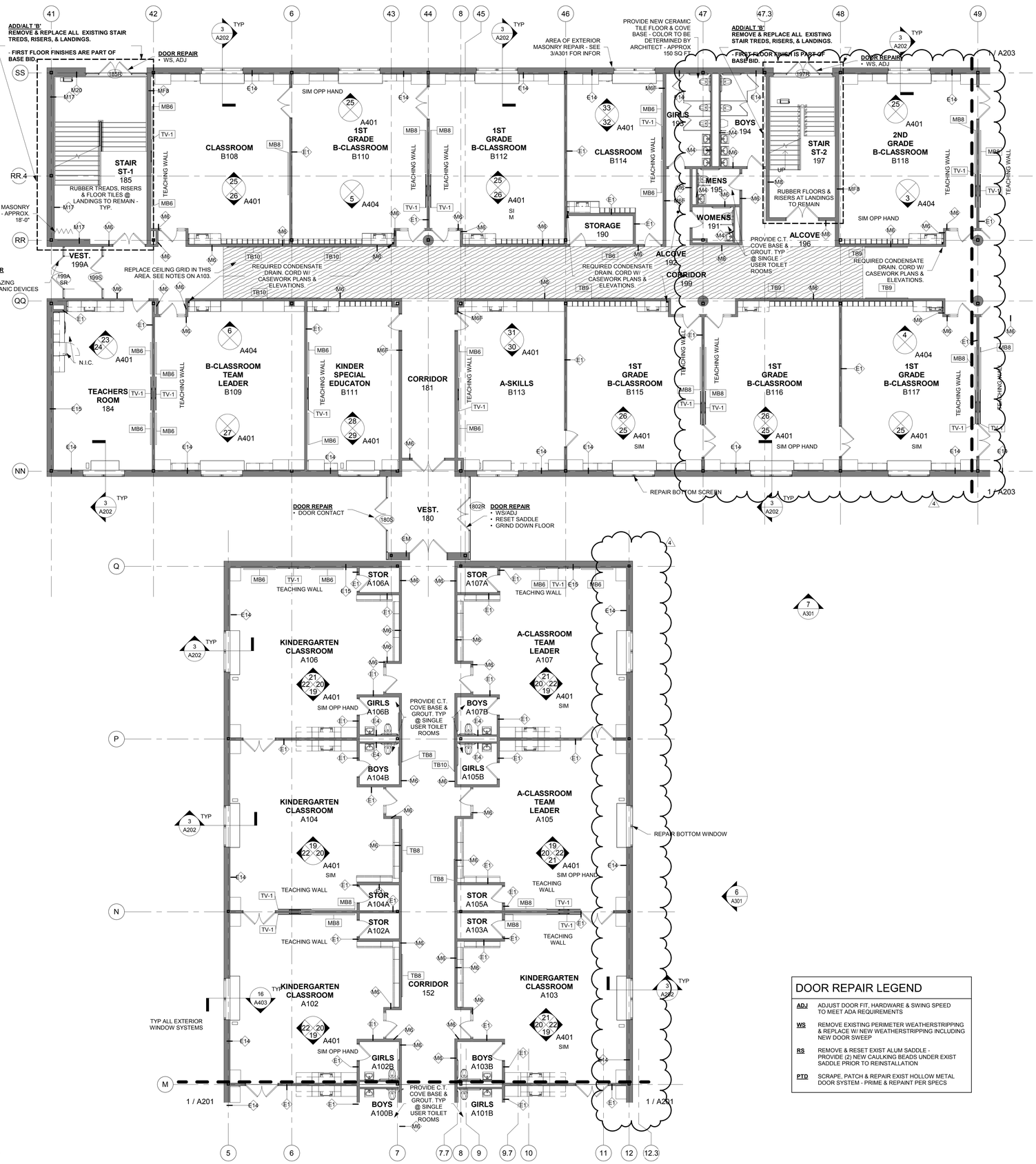
Sheet Title

1ST FLOOR PLAN PART 'A'

Job No. 2019-1016	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

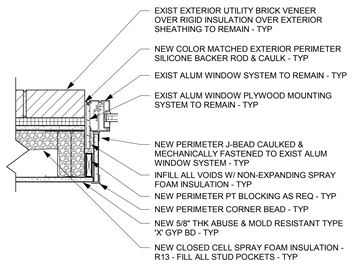
A201



MASONRY REPAIR

INDICATES APPROX. LOCATION OF FULL DEPTH MASONRY JOINT REPAIR IN EXISTING MASONRY WALL.

3 SECTION @ EXISTING WINDOW REPAIR
1 1/2" = 1'-0"



2 SECTION @ EXISTING WINDOW JAMB REPAIR
1 1/2" = 1'-0"

1 1ST FLOOR - PART 'B'
1/8" = 1'-0"

DOOR REPAIR LEGEND

ADJ	ADJUST DOOR FIT, HARDWARE & SWING SPEED TO MEET ADA REQUIREMENTS
WS	REMOVE EXISTING PERIMETER WEATHERSTRIPPING & REPLACE W/ NEW WEATHERSTRIPPING INCLUDING NEW DOOR SWEEP
RS	REMOVE & RESET EXIST ALUM SADDLE - PROVIDE (2) NEW CAULKING BEADS UNDER EXIST SADDLE PRIOR TO REINSTALLATION
PTD	SCRAPE, PATCH & REPAIR EXIST HOLLOW METAL DOOR SYSTEM - PRIME & REPAINT PER SPECS

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

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PART 'B'

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2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

Sheet Title

1ST FLOOR PLAN PART 'B'

Job No. 2019-1016	Date 08/06/2019
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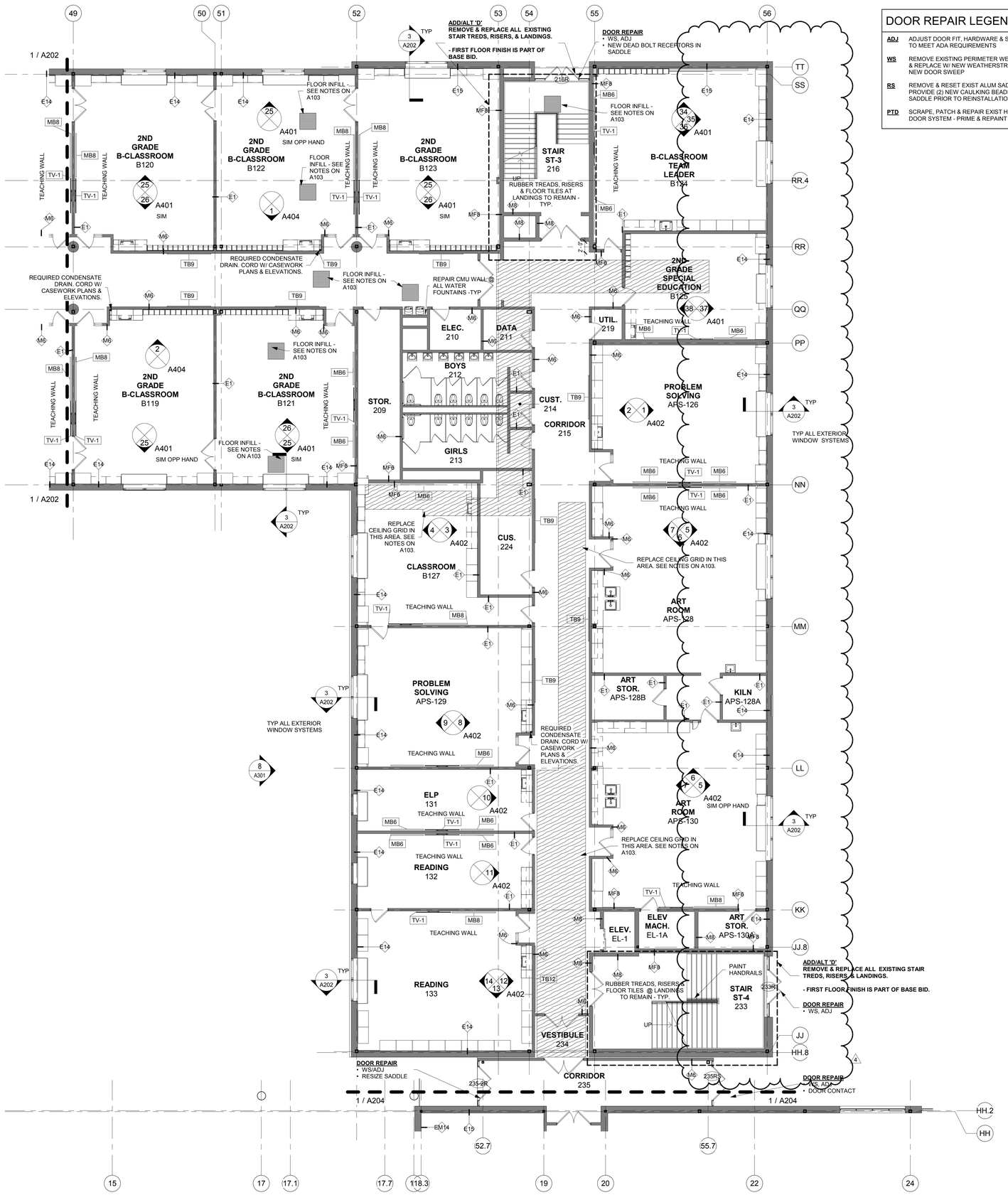
Sheet Number

A202



DOOR REPAIR LEGEND

ADJ	ADJUST DOOR FIT, HARDWARE & SWING SPEED TO MEET ADA REQUIREMENTS
WS	REMOVE EXISTING PERIMETER WEATHERSTRIPPING & REPLACE W/ NEW WEATHERSTRIPPING INCLUDING NEW DOOR SWEEP
RS	REMOVE & RESET EXIST ALUM SADDLE - PROVIDE (2) NEW CAULKING BEADS UNDER EXIST SADDLE PRIOR TO REINSTALLATION
PTD	SCRAPE, PATCH & REPAIR EXIST HOLLOW METAL DOOR SYSTEM - PRIME & REPAINT PER SPECS

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City of Stamford - Stamford Public Schools

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PART 'C'

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1	5/15/2019	ISSUED FOR PRICING

Sheet Title

1ST FLOOR PLAN PART 'C'

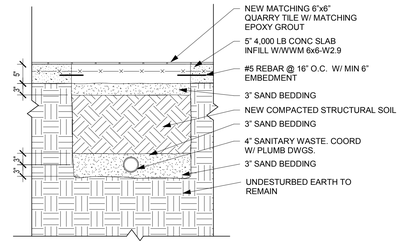
Job No. 2019-1016	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

A203

DOOR REPAIR LEGEND

ADJ	ADJUST DOOR FIT, HARDWARE & SWING SPEED TO MEET ADA REQUIREMENTS
WS	REMOVE EXISTING PERIMETER WEATHERSTRIPPING & REPLACE W/ NEW WEATHERSTRIPPING INCLUDING NEW DOOR SWEEP
RS	REMOVE & RESET EXIST ALUM SADDLE - PROVIDE (2) NEW CAULKING BEADS UNDER EXIST SADDLE PRIOR TO REINSTALLATION
PTD	SCRAPE, PATCH & REPAIR EXIST HOLLOW METAL DOOR SYSTEM - PRIME & REPAINT PER SPECS



2 KITCHEN DRAINAGE/TILE REPAIR
3/4" = 1'-0"

MASONRY REPAIR

INDICATES APPROX. LOCATION OF FULL DEPTH MASONRY JOINT REPAIR IN EXISTING MASONRY WALL.

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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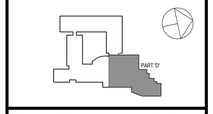

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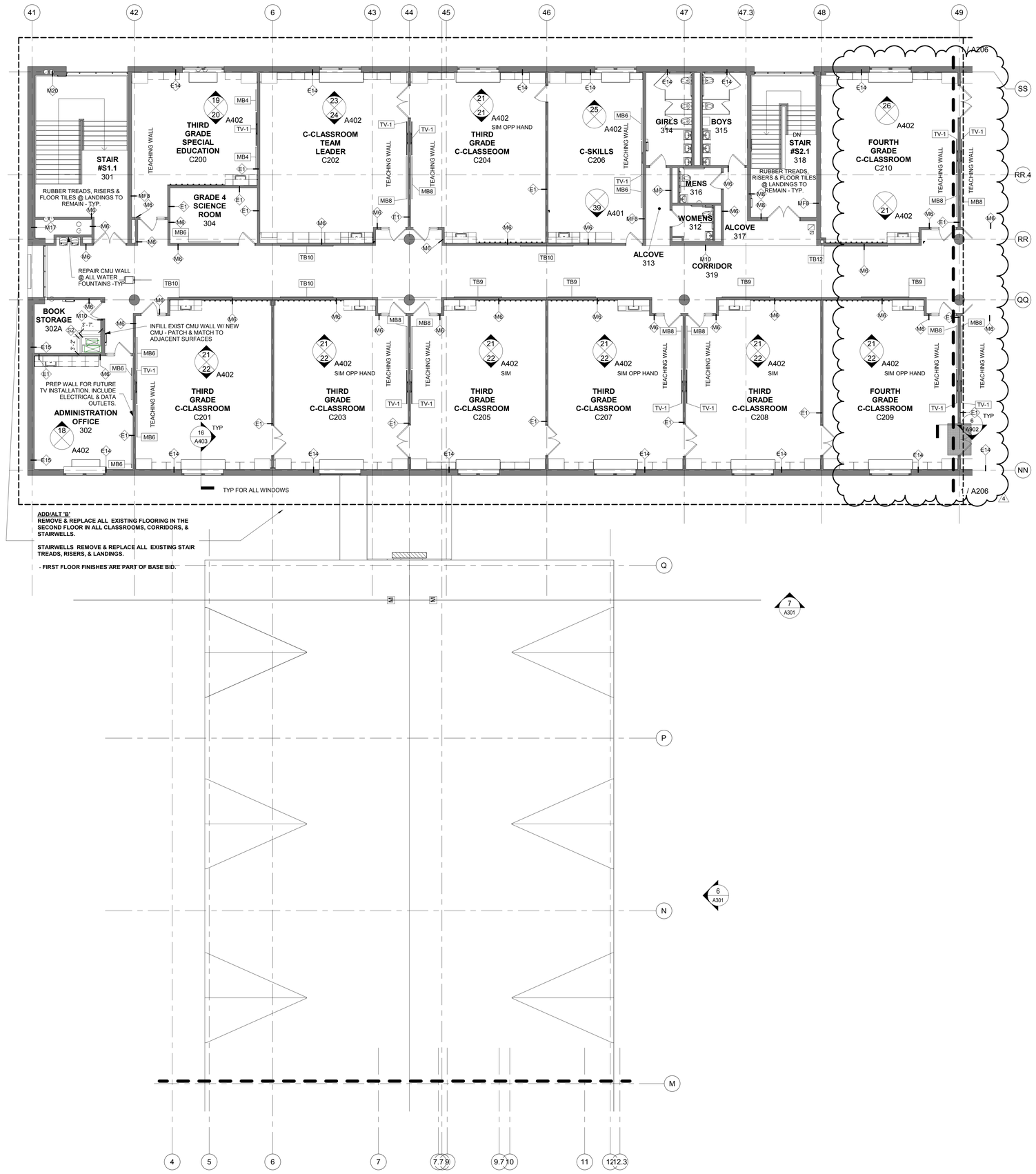
Sheet Title

1ST FLOOR PLAN PART 'D'

Job No. 2019-1016	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

A204



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PROJECT # S-6722

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PART 'B'

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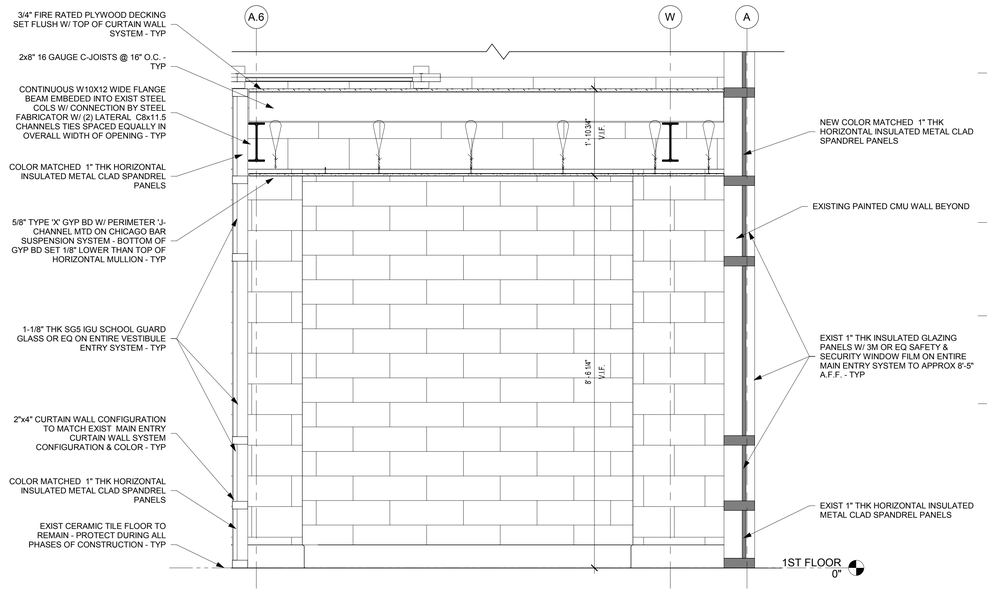
Sheet Title

2ND FLOOR PART 'B'

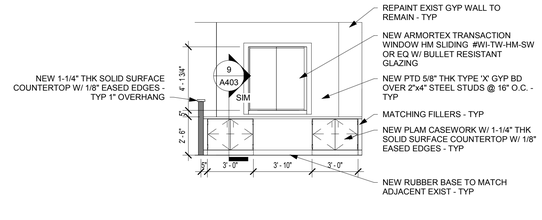
Job No. 2019-1016	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

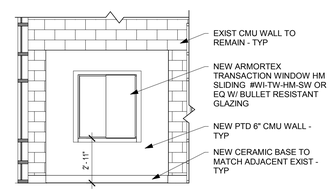
A205



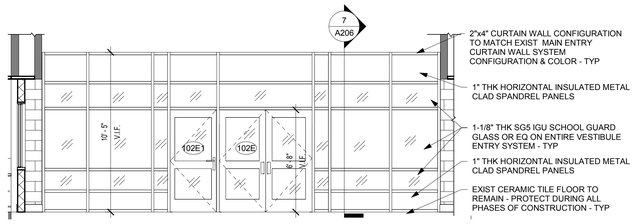
7 SECTION @ SECURITY VESTIBULE
ADD/ALT 'E'
3/4" = 1'-0"



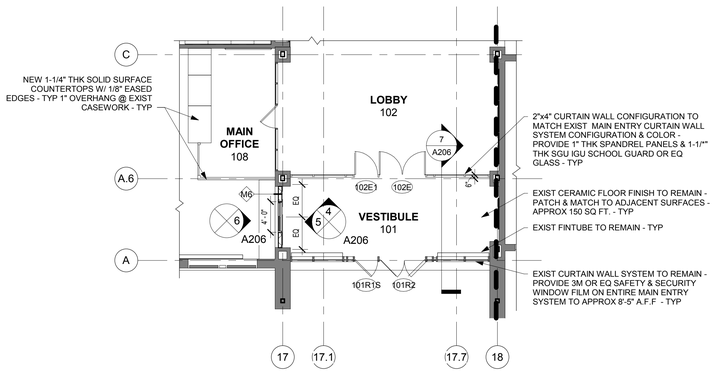
MAIN OFFICE SECURITY WINDOW ELEV
6 ADD/ALT 'E'
1/4" = 1'-0"



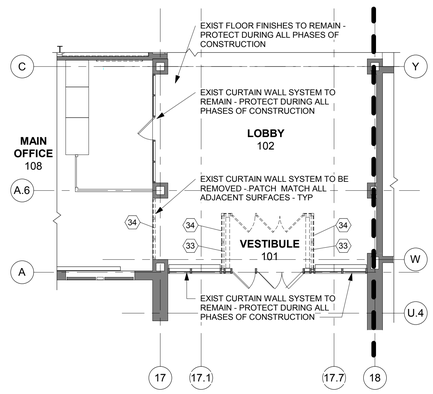
5 ADD/ALT 'E' SOUTH ELEVATION
1/4" = 1'-0"



4 ADD/ALT 'E' WEST ELEVATION
1/4" = 1'-0"



3 1ST FLOOR - ADD/ALT 'E' PLAN
1/8" = 1'-0"

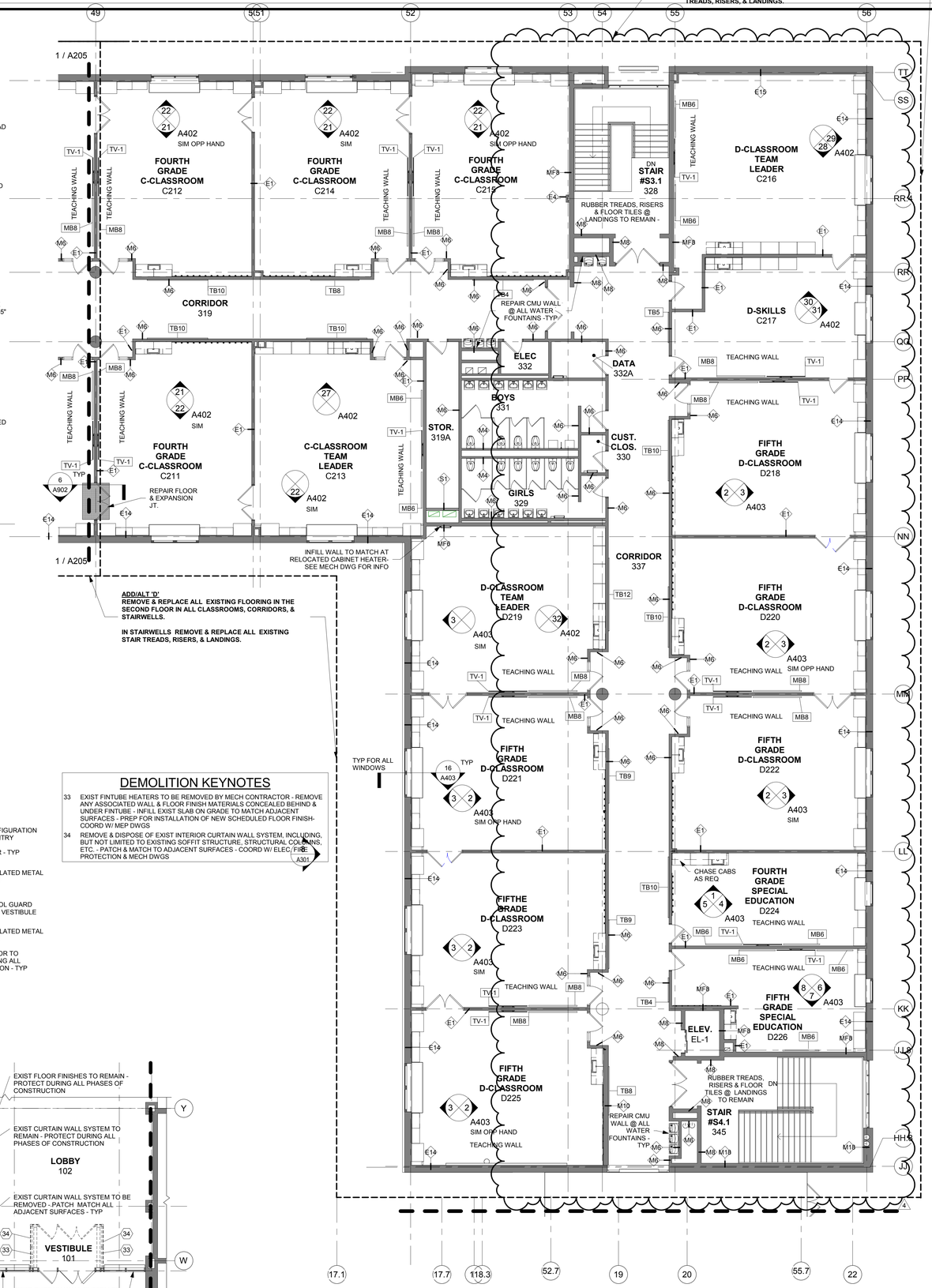


2 1ST FLOOR - ADD/ALT 'E' DEMO PLAN
1/8" = 1'-0"

DEMOLITION KEYNOTES

33 EXIST FINTUBE HEATERS TO BE REMOVED BY MECH CONTRACTOR - REMOVE ANY ASSOCIATED WALL & FLOOR FINISH MATERIALS CONCEALED BEHIND & UNDER FINTUBE - INFILL EXIST SLAB ON GRADE TO MATCH ADJACENT SURFACES - PREP FOR INSTALLATION OF NEW SCHEDULED FLOOR FINISH- COORD W/ MEP DWGS

34 REMOVE & DISPOSE OF EXIST INTERIOR CURTAIN WALL SYSTEM, INCLUDING, BUT NOT LIMITED TO EXISTING SOFFIT STRUCTURE, STRUCTURAL COLUMNS, ETC. - PATCH & MATCH TO ADJACENT SURFACES - COORD W/ ELEC, FIRE PROTECTION & MECH DWGS A301



1 2ND FLOOR - PART 'C'
1/8" = 1'-0"

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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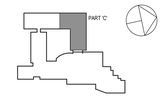

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3	8/6/2019	ISSUED FOR BID
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1	5/15/2019	ISSUED FOR PRICING

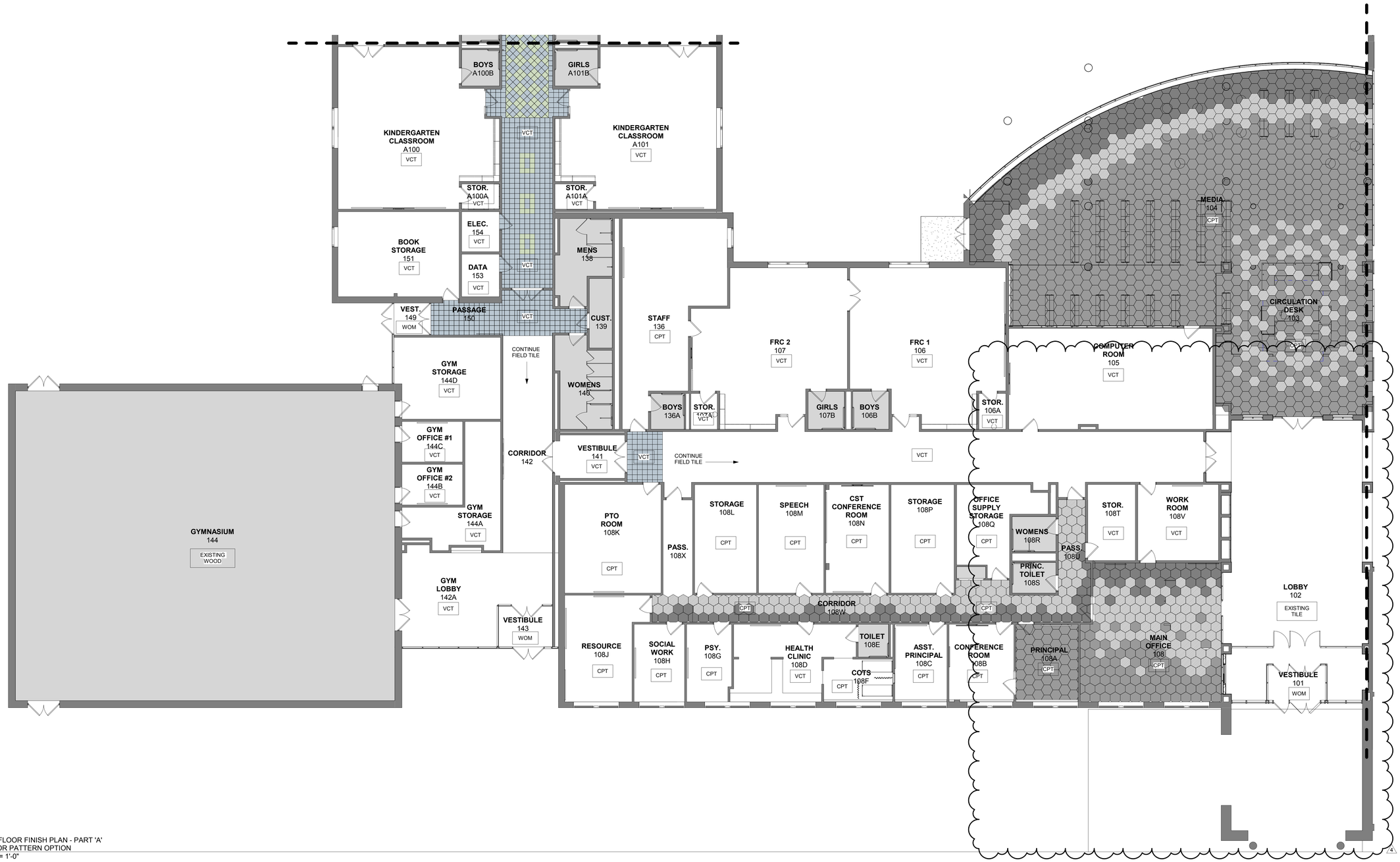
Sheet Title

2ND FLOOR PART 'C'

Job No. 2019-1016	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

A206



2 1ST FLOOR FINISH PLAN - PART 'A'
FLOOR PATTERN OPTION
1/8" = 1'-0"

FLOOR MATERIAL LEGEND

- CPT 1
- CPT3
- CPT4
- VCT1
- VCT2
- VCT4
- VCT5

SEE A502 FOR COLOR OPTIONS

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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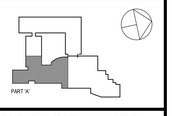

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1ST FLOOR FINISH PLAN PART 'A'

Job No. 2019-1016	Date 08/06/2019
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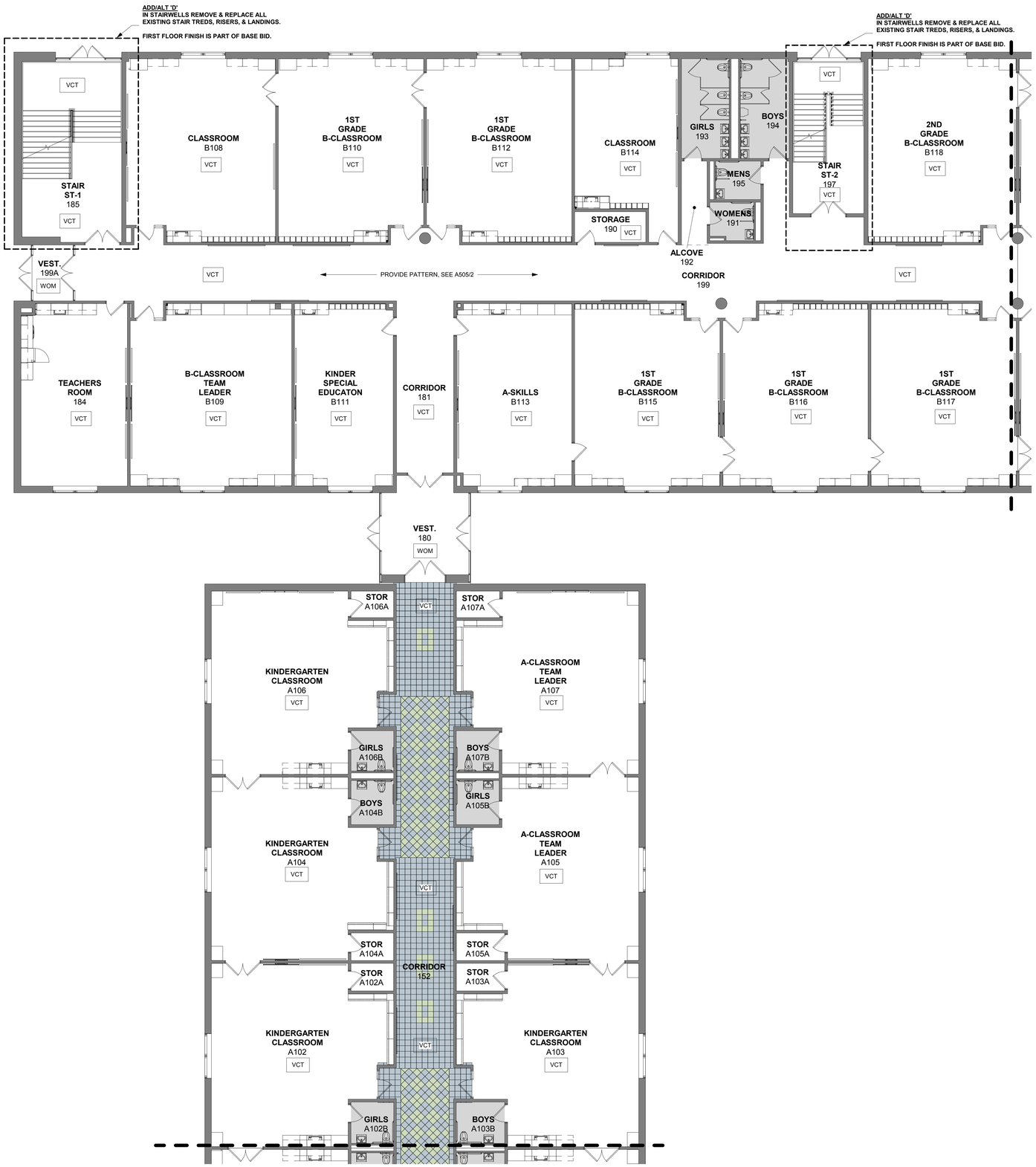
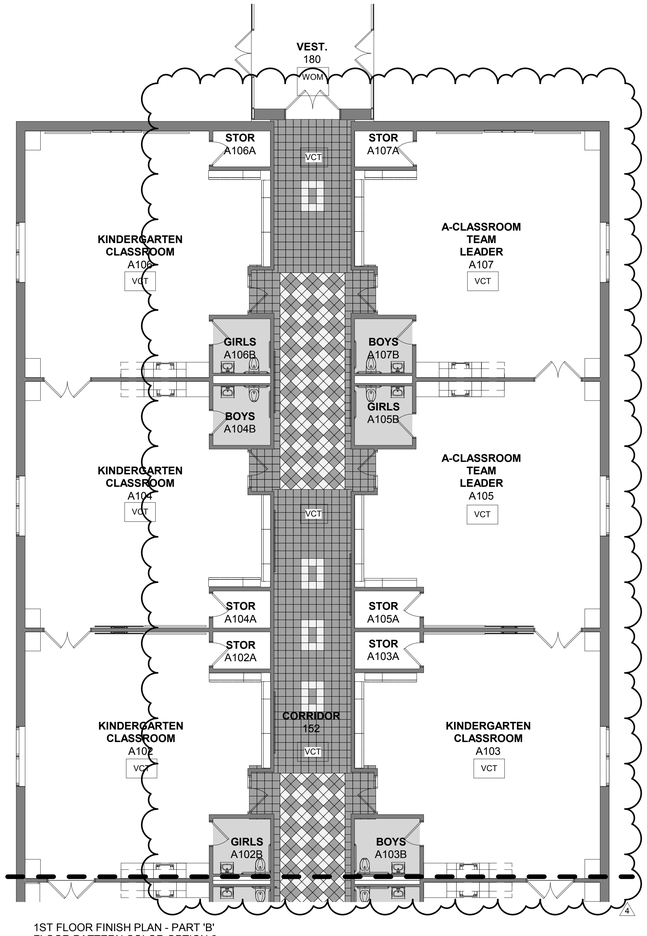
Sheet Number

A501



1 1ST FLOOR FINISH PLAN - PART 'B'
FLOOR PATTERN COLOR OPTION 1
1/8" = 1'-0"



2 1ST FLOOR FINISH PLAN - PART 'B'
FLOOR PATTERN COLOR OPTION 2
1/8" = 1'-0"

FLOOR MATERIAL LEGEND

CPT 1	VCT1
CPT3	VCT2
CPT4	VCT4
	VCT5

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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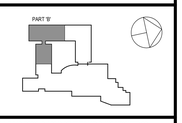

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Sheet Title

1ST FLOOR FINISH PLAN PART 'B'

Job No. 2019-1016	Date 08/06/2019
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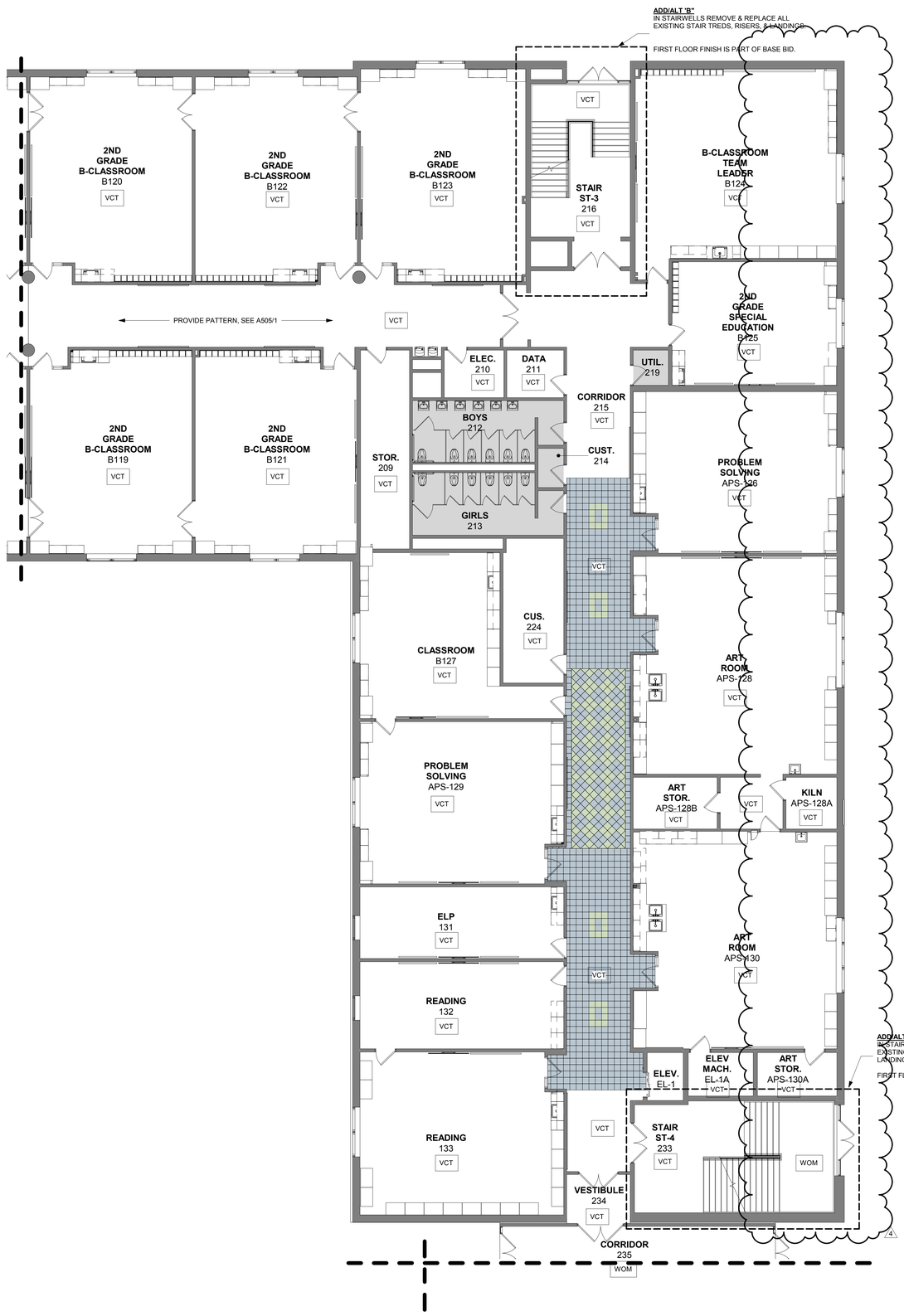
Sheet Number

A502



FLOOR MATERIAL LEGEND

- CPT 1
- CPT3
- CPT4
- VCT1
- VCT2
- VCT4
- VCT5

SEE A502 FOR COLOR OPTIONS

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

KG+D listen imagine build
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285 MAIN STREET MOUNT KISCO . NEW YORK . 10549
P:914.666.5900 KGDARCHITECTS.COM

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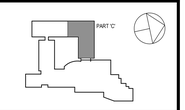

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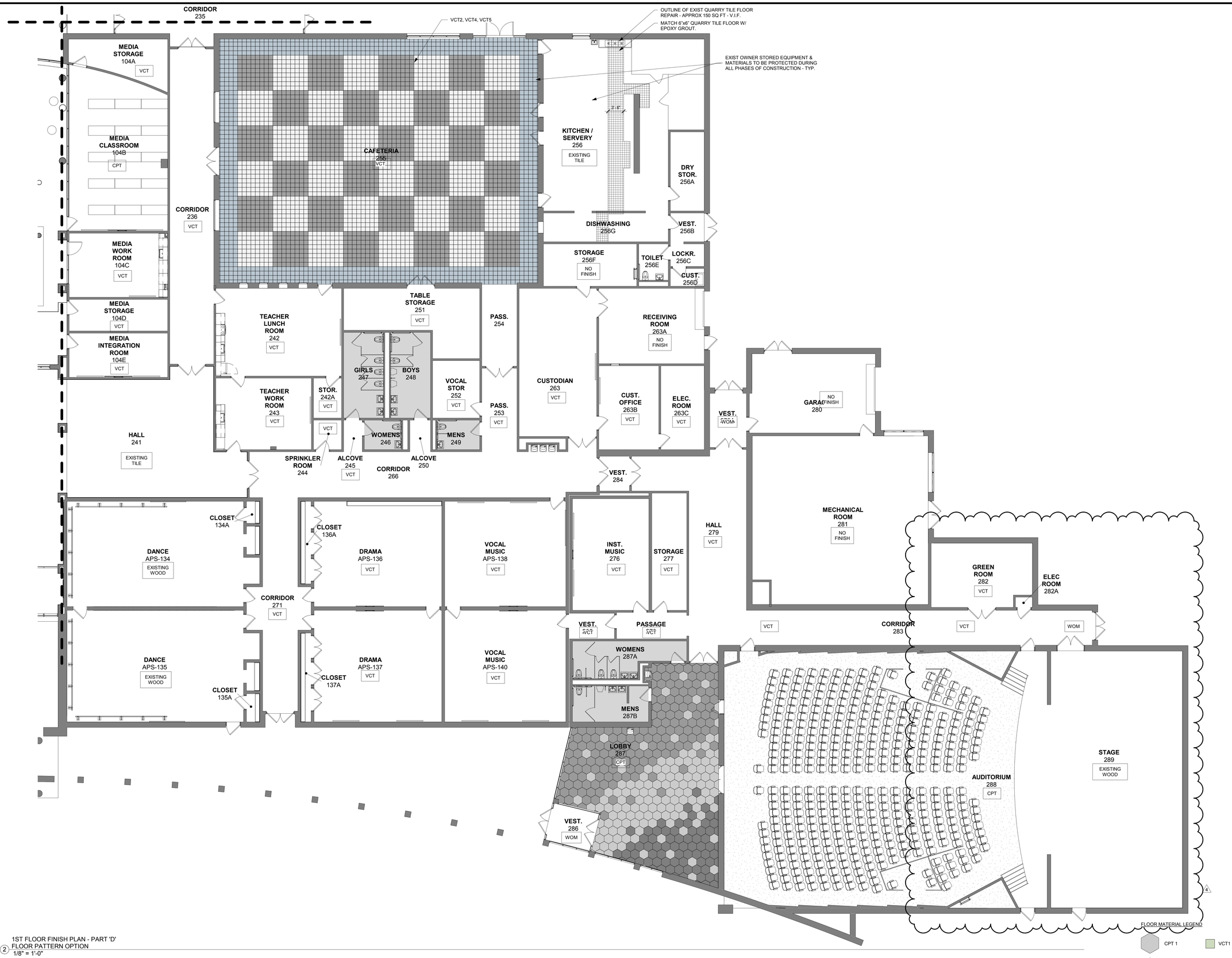
Sheet Title

1ST FLOOR FINISH PLAN PART C

Job No.	Date
2019-1016	08/06/2019
Scale: AS NOTED	Drawn / Checked: Author Checker

Sheet Number

A503



1ST FLOOR FINISH PLAN - PART 'D'
FLOOR PATTERN OPTION
1/8" = 1'-0"

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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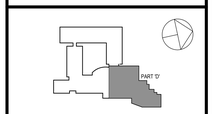

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Sheet Title

1ST FLOOR FINISH PLAN PART D

Job No.	Date
2019-1016	08/06/2019
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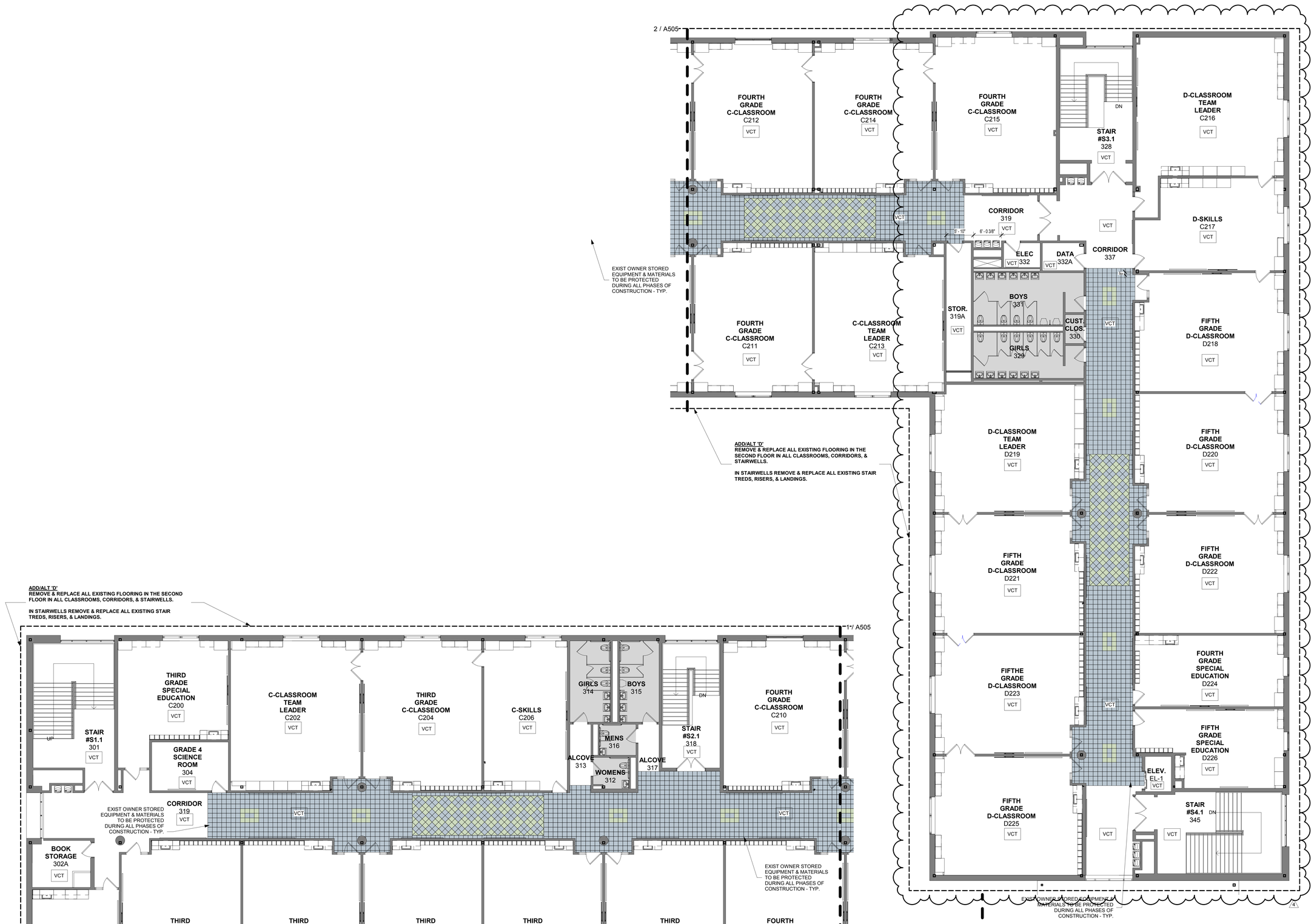
Sheet Number

A504



Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

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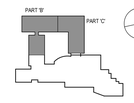

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Sheet Title

2ND FLOOR FINISH PLANS PARTS C & D

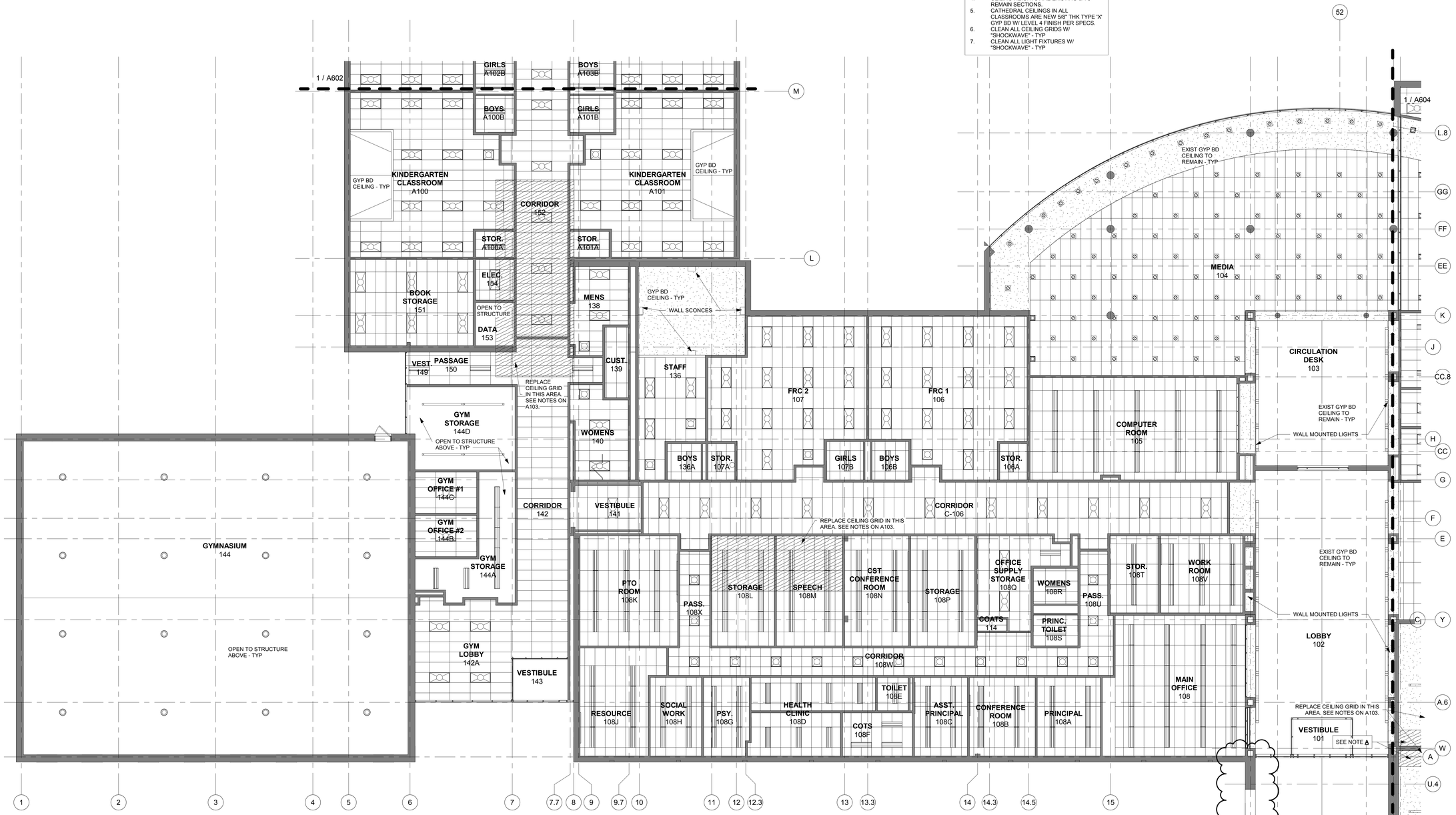
Job No.	Date
2019-1016	08/06/2019
Scale	Drawn / Checked
AS NOTED	Author Checker

Sheet Number

A505

CEILING NOTES

1. CEILINGS GRIDS & LIGHTING FIXTURES ARE TO REMAIN IN ALL ROOMS. ALL CEILING FIXTURES, INCLUDING EXIT SIGNS, HVAC REGISTERS, LIGHTING FIXTURES ARE TO BE CENTERED IN CEILING TILES.
2. SEE MEP DRAWINGS FOR ALL CEILING MOUNTED FIXTURES, LOCATIONS & SCHEDULES
3. SEE FINISH SCHEDULE - A510 - FOR 'ACT' CEILING TYPES & FINISHES
4. CEILING HEIGHTS ARE EXISTING & TO REMAIN SECTIONS.
5. CATHEDRAL CEILINGS IN ALL CLASSROOMS ARE NEW 5/8" THK TYPE 'X' GYP BD W/ LEVEL 4 FINISH PER SPECS.
6. CLEAN ALL CEILING GRIDS W/ "SHOCKWAVE" - TYP
7. CLEAN ALL LIGHT FIXTURES W/ "SHOCKWAVE" - TYP



CEILING SCHEDULE			
SYMBOL	TYPE	SYMBOL	TYPE
	BLTL		1'x1' TROFFER LIGHT
	INCANDESCENT 8" DOWNLIGHT		2'x4' TROFFER LIGHT
	RETROFIT LIGHT		2'x2' TROFFER LIGHT
	48" PENDENT LIGHT LINEAR		2'x4' ACT CEILING
	96" PENDENT LIGHT LINEAR		GWB CEILING
	LIGHTING PENDENT BATACALCO		

1 1ST FLOOR RCP - PART 'A'
1/8" = 1'-0"

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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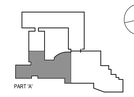

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Sheet Title
1ST FLOOR REFLECTED CEILING PLAN - PART 'A'

Job No. 2019-1016	Date 08/06/2019
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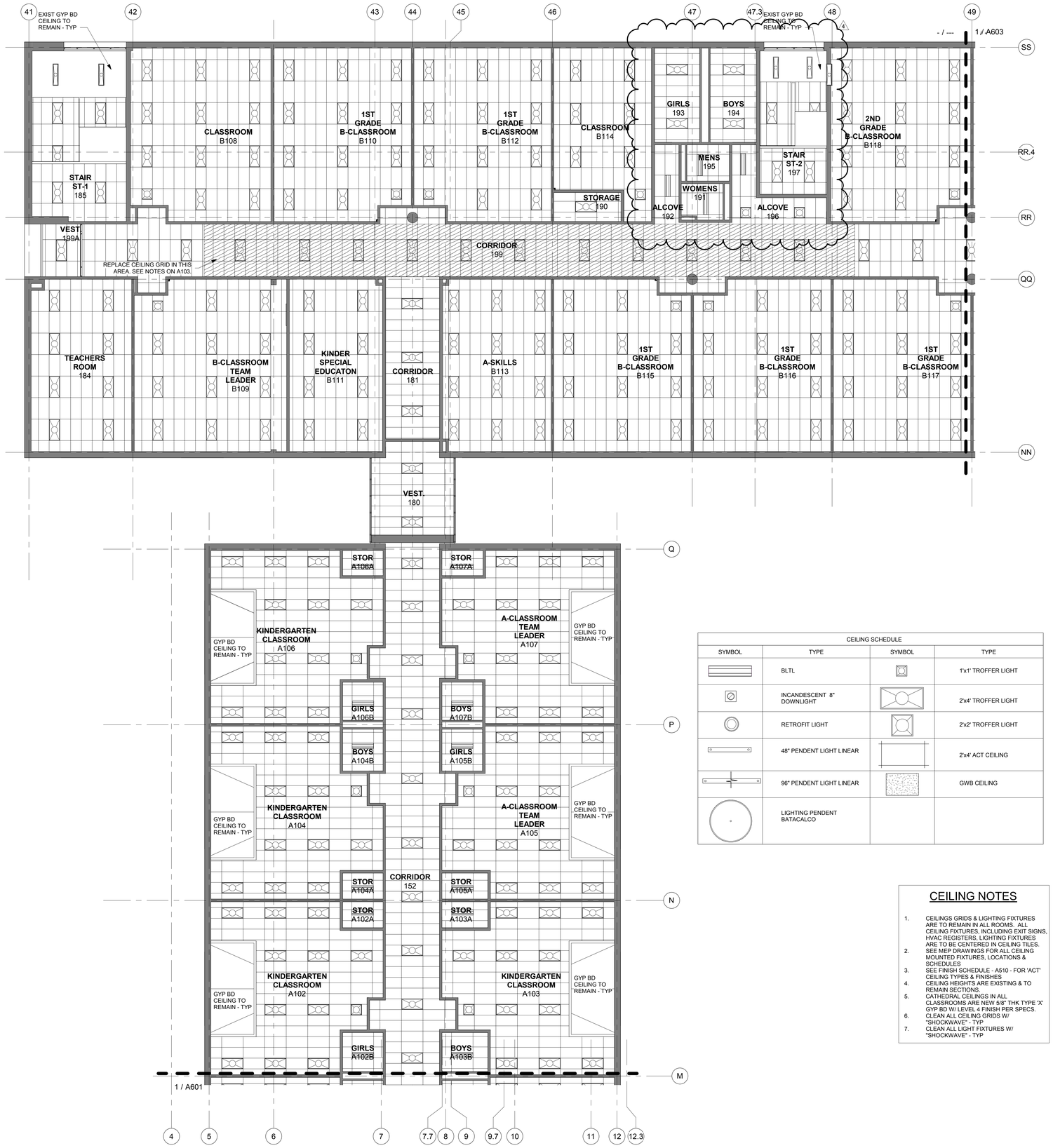
Sheet Number
A601



1 1ST FLOOR RCP - PART 'B'
1/8" = 1'-0"

CEILING SCHEDULE			
SYMBOL	TYPE	SYMBOL	TYPE
	BLTL		1'x1' TROFFER LIGHT
	INCANDESCENT 8" DOWNLIGHT		2'x4' TROFFER LIGHT
	RETROFIT LIGHT		2'x2' TROFFER LIGHT
	48" PENDENT LIGHT LINEAR		2'x4' ACT CEILING
	96" PENDENT LIGHT LINEAR		GWB CEILING
	LIGHTING PENDENT BATACALCO		

CEILING NOTES

1. CEILINGS GRIDS & LIGHTING FIXTURES ARE TO REMAIN IN ALL ROOMS. ALL CEILING FIXTURES, INCLUDING EXIT SIGNS, HVAC REGISTERS, LIGHTING FIXTURES ARE TO BE CENTERED IN CEILING TILES.
2. SEE MEP DRAWINGS FOR ALL CEILING MOUNTED FIXTURES, LOCATIONS & SCHEDULES
3. SEE FINISH SCHEDULE - A510 - FOR 'ACT' CEILING TYPES & FINISHES
4. CEILING HEIGHTS ARE EXISTING & TO REMAIN SECTIONS.
5. CATHEDRAL CEILINGS IN ALL CLASSROOMS ARE NEW 5/8" THK TYPE 'X' GYP BD W/ LEVEL 4 FINISH PER SPECS.
6. CLEAN ALL CEILING GRIDS W/ "SHOCKWAVE" - TYP
7. CLEAN ALL LIGHT FIXTURES W/ "SHOCKWAVE" - TYP

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

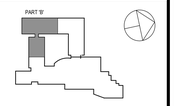
412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

KG+D listen imagine build
KG+D . ARCHITECTS PC
285 MAIN STREET MOUNT KISCO . NEW YORK . 10549
P:914.666.5900 KGDARCHITECTS.COM

CONSTRUCTION DOCUMENTS

SPN 135-0278RR



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No.	Date	Issue
4	9/12/2019	CORRECTED PRINTING ERRORS
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

Sheet Title

1ST FLOOR REFLECTED CEILING PLAN - PART 'B'

Job No. 2019-1016	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

A602

CEILING SCHEDULE			
SYMBOL	TYPE	SYMBOL	TYPE
	BLTL		1'x1' TROFFER LIGHT
	INCANDESCENT 8" DOWNLIGHT		2'x4' TROFFER LIGHT
	RETROFIT LIGHT		2'x2' TROFFER LIGHT
	48" PENDENT LIGHT LINEAR		2'x4' ACT CEILING
	96" PENDENT LIGHT LINEAR		GWB CEILING
	LIGHTING PENDENT BATACALCO		

CEILING NOTES

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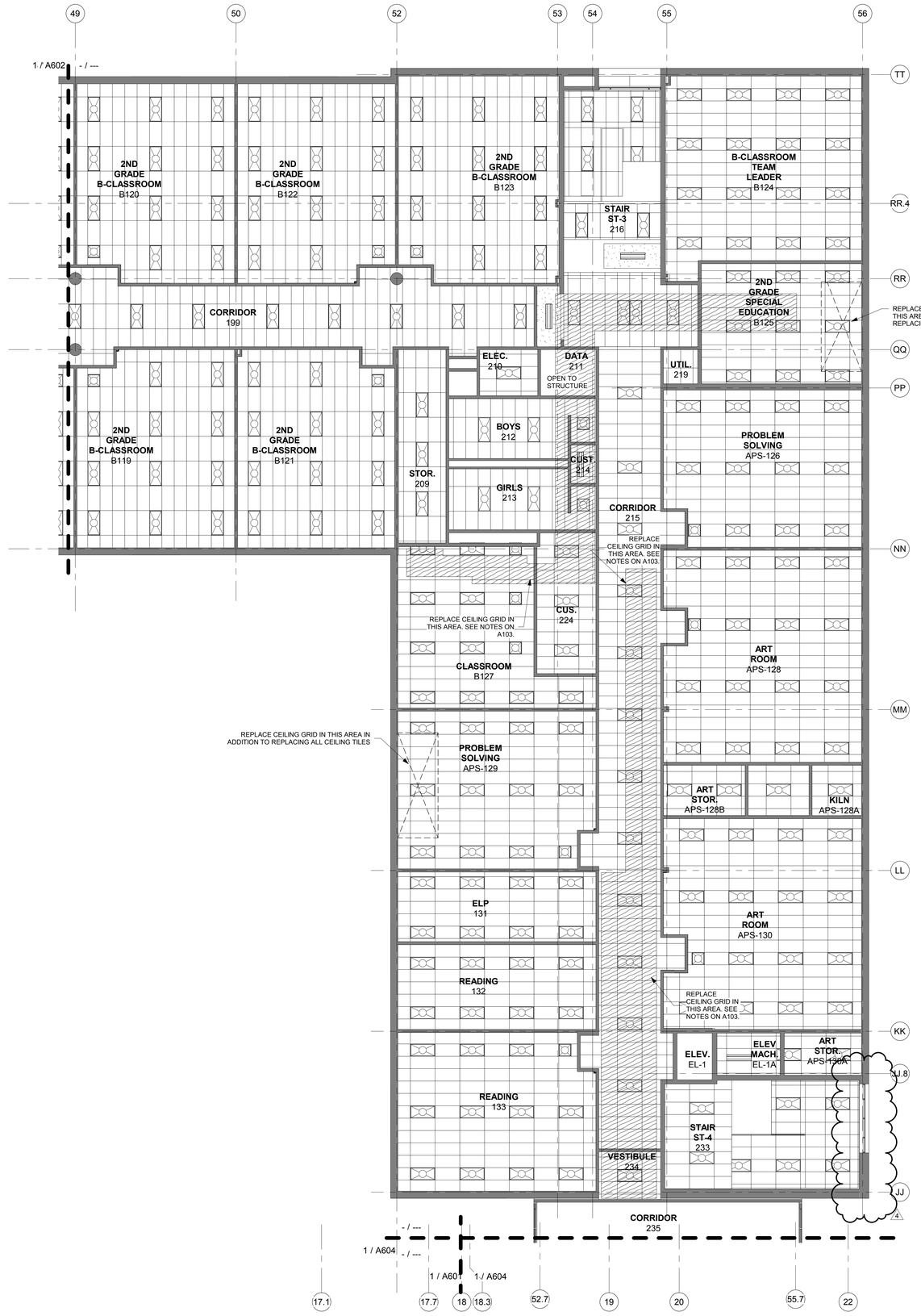
7. CLEAN ALL LIGHT FIXTURES W/ "SHOCKWAVE" - TYP



1 1ST FLOOR RCP - PART 'C'
1/8" = 1'-0"

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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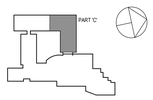
CONSTRUCTION DOCUMENTS

SPN 135-0278RR



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2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

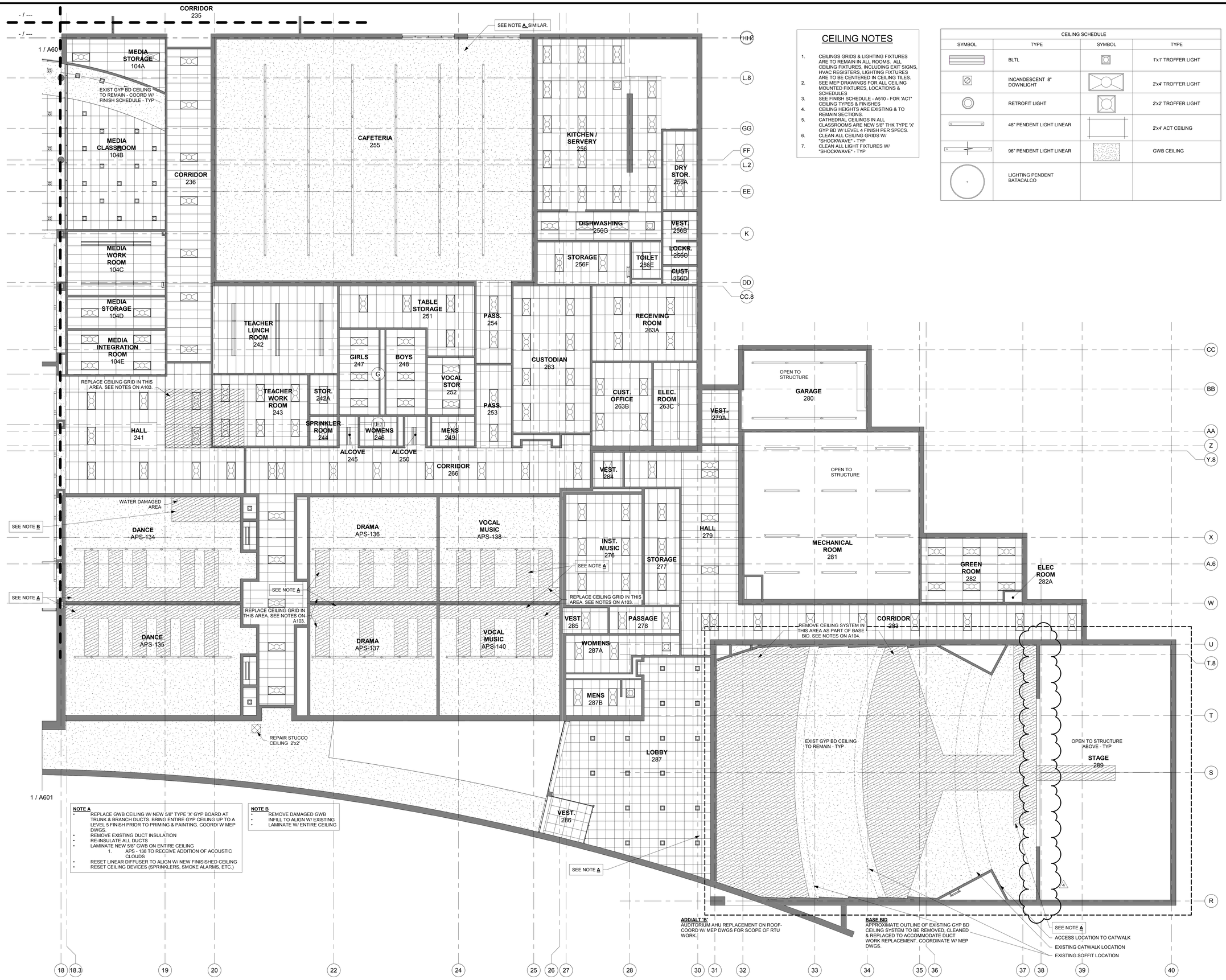
Sheet Title

1ST FLOOR REFLECTED CEILING PLAN PART 'C'

Job No.	Date
2019-1016	08/06/2019
Scale: AS NOTED	Drawn / Checked: Author Checker

Sheet Number

A603



CEILING NOTES

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5. CATHEDRAL CEILINGS IN ALL CLASSROOMS ARE NEW 5/8" THK TYPE 'X' GYP BD W/ LEVEL 4 FINISH PER SPECS.
6. CLEAN ALL CEILING GRIDS W/ "SHOCKWAVE" - TYP
7. CLEAN ALL LIGHT FIXTURES W/ "SHOCKWAVE" - TYP

CEILING SCHEDULE

SYMBOL	TYPE	SYMBOL	TYPE
	BLTL		1'x1' TROFFER LIGHT
	INCANDESCENT 8" DOWNLIGHT		2'x4' TROFFER LIGHT
	RETROFIT LIGHT		2'x2' TROFFER LIGHT
	48" PENDENT LIGHT LINEAR		2'x4' ACT CEILING
	96" PENDENT LIGHT LINEAR		GWB CEILING
	LIGHTING PENDENT BATACALCO		

NOTE A
- REPLACE GWB CEILING W/ NEW 5/8" TYPE 'X' GYP BOARD AT TRUNK & BRANCH DUCTS. BRING ENTIRE GYP CEILING UP TO A LEVEL 5 FINISH PRIOR TO PRIMING & PAINTING. COORD/ W MEP DWGS.
- REMOVE EXISTING DUCT INSULATION
- RE-INSULATE ALL DUCTS
- LAMINATE NEW 5/8" GWB ON ENTIRE CEILING
  1. APS - 138 TO RECEIVE ADDITION OF ACOUSTIC CLOUDS
- RESET LINEAR DIFFUSER TO ALIGN W/ NEW FINISISHED CEILING
- RESET CEILING DEVICES (SPRINKLERS, SMOKE ALARMS, ETC.)

NOTE B
- REMOVE DAMAGED GWB
- INFILL TO ALIGN W/ EXISTING
- LAMINATE W/ ENTIRE CEILING

1 1ST FLOOR RCP - PART 'D'
1/8" = 1'-0"

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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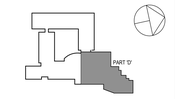

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4	9/12/2019	CORRECTED PRINTING ERRORS
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

Sheet Title

1ST FLOOR REFLECTED CEILING PLAN PART 'D'

Job No.	Date
2019-1016	08/06/2019
Scale: AS NOTED	Drawn / Checked: Author Checker

Sheet Number

A604

CEILING SCHEDULE			
SYMBOL	TYPE	SYMBOL	TYPE
	BLTL		1'x1' TROFFER LIGHT
	INCANDESCENT 8" DOWNLIGHT		2'x4' TROFFER LIGHT
	RETROFIT LIGHT		2'x2' TROFFER LIGHT
	48" PENDENT LIGHT LINEAR		2'x4' ACT CEILING
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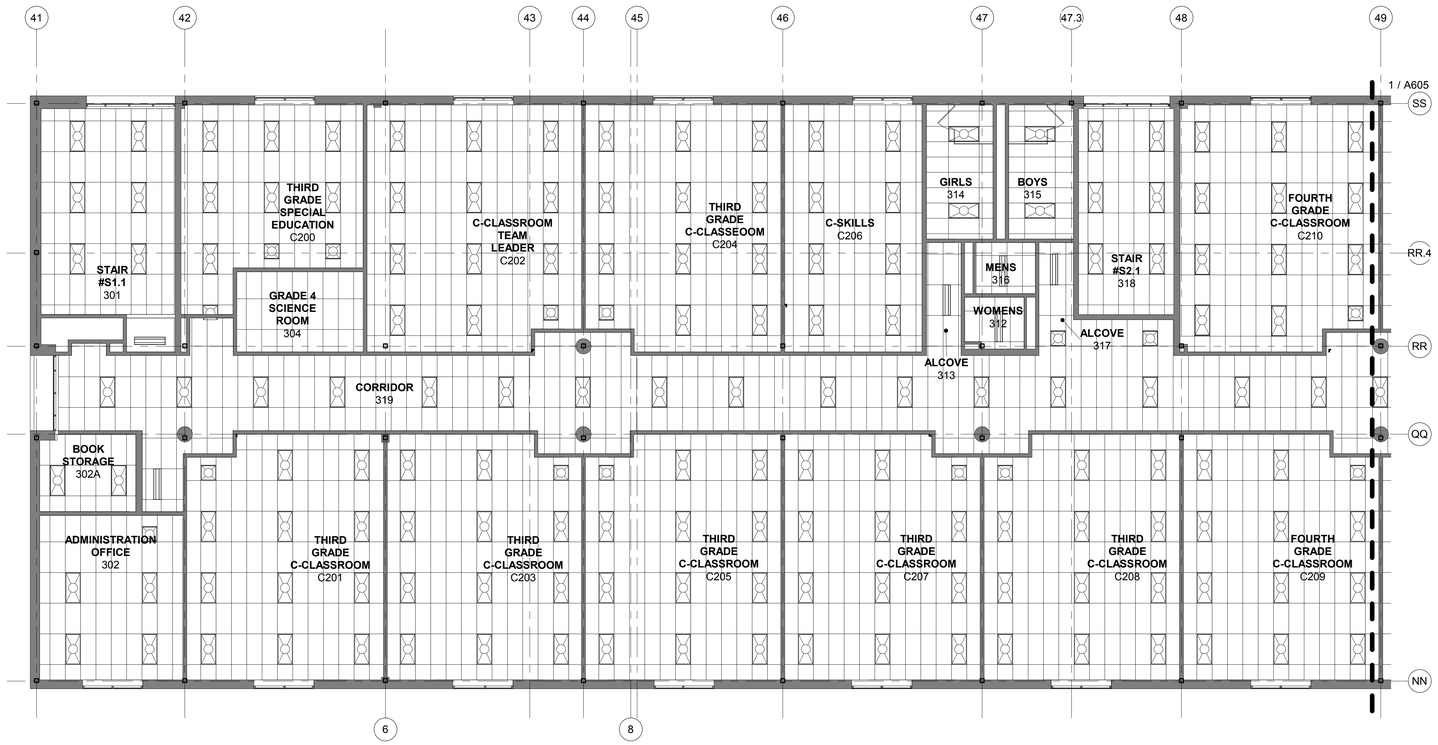
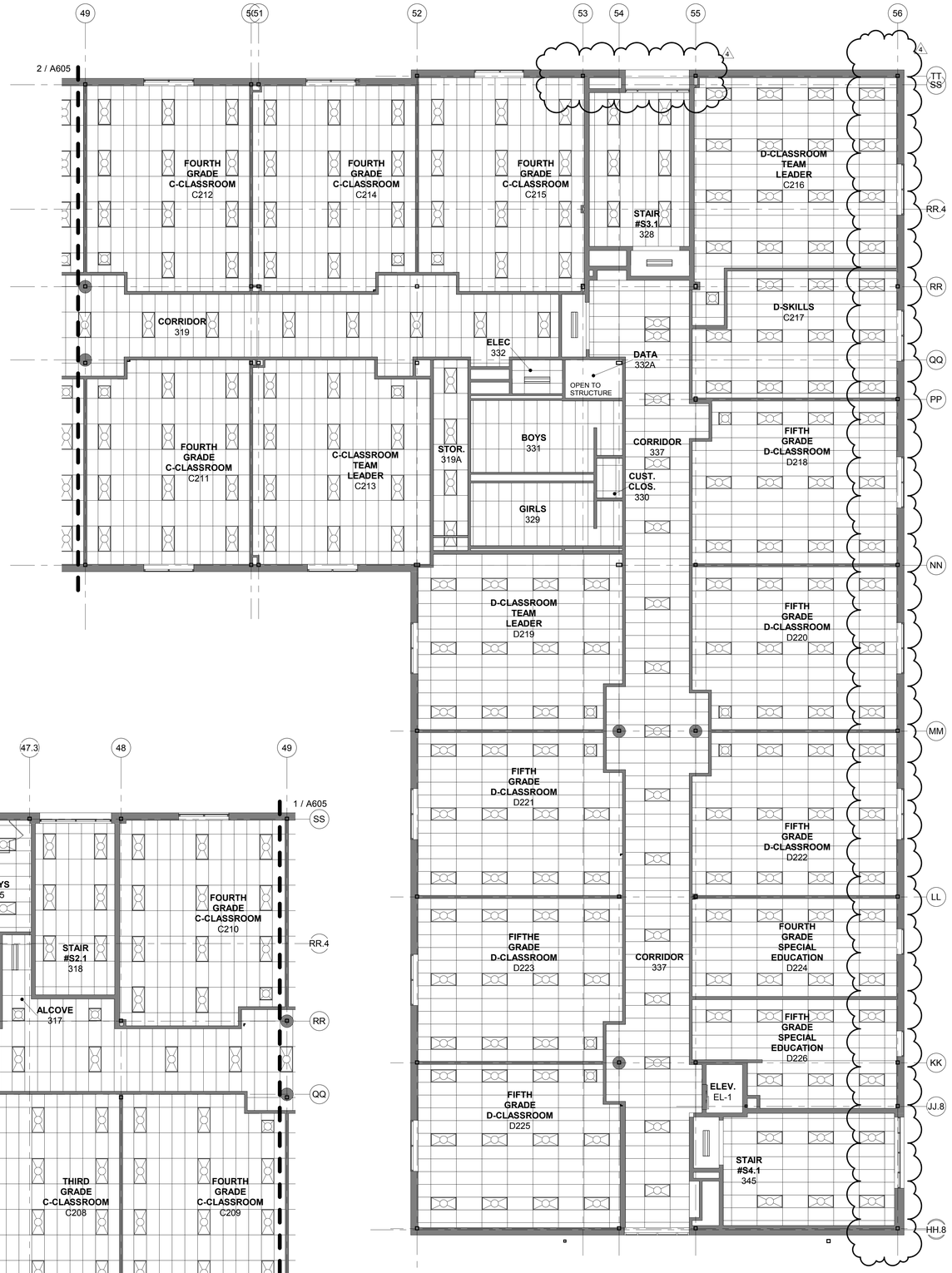


2 2ND FLOOR RCP - PART 'B'
1/8" = 1'-0"



1 2ND FLOOR RCP - PART 'C'
1/8" = 1'-0"

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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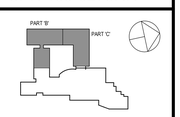
SPN 135-0278RR



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No.	Date	Issue
4	9/12/2019	CORRECTED PRINTING ERRORS
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

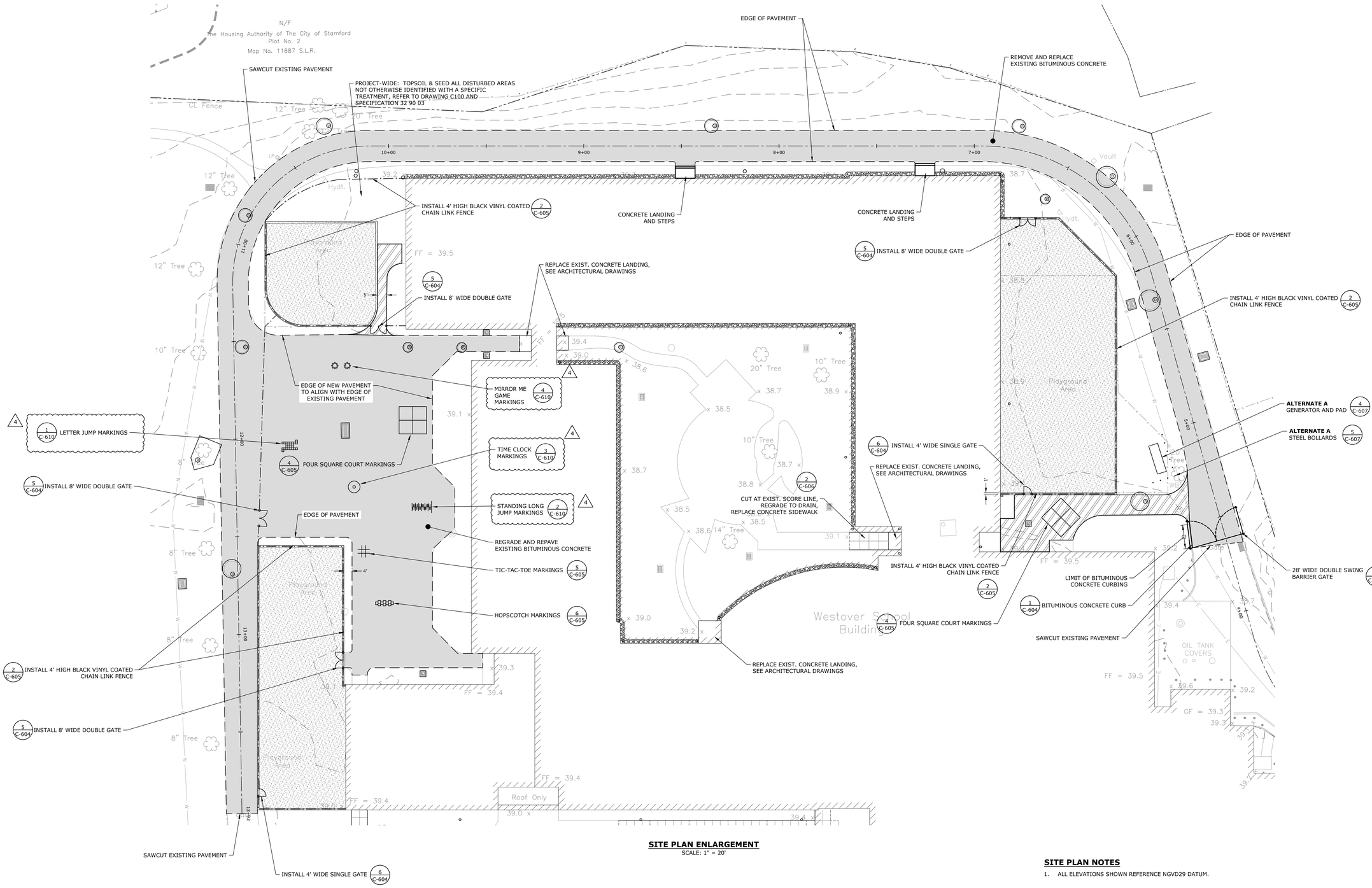
Sheet Title

2ND FLOOR REFLECTED CEILING PLANS PARTS A & 'B'

Job No.	Date
2019-1016	08/06/2019
Scale: AS NOTED	Drawn / Checked: Author Checker

Sheet Number

A605



SITE PLAN ENLARGEMENT
SCALE: 1" = 20'

SITE PLAN NOTES

1. ALL ELEVATIONS SHOWN REFERENCE NGVD29 DATUM.

LEGEND

- BITUMINOUS CONCRETE DRIVEWAY/PARKING LOT PAVEMENT — 8/C-604
- BITUMINOUS CONCRETE SIDEWALK PAVEMENT — 7/C-604
- RESILIENT SURFACE
- UNDERDRAIN GRAVEL AT SURFACE — 2/C-604

0 20' 40'
SCALE: 1" = 20'

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

KG+D listen imagine build

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Tighe&Bond
Engineers | Environmental Specialists
1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

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No.	Date	Issue
4	09/11/2019	ADDENDUM #1
3	08/06/2019	ISSUED FOR BID
2	06/05/2019	CLIENT REVIEW SET
1	05/15/2019	ISSUED FOR PRICING

Sheet Title

SITE PLAN ENLARGEMENT

Job No.	Date
S2087-036	04/17/2019
Scale: 1" = 20'	Drawn / Checked: MDS/JAC

Sheet Number

C-210

Last Saved: 9/4/2019
Plotted On:Sep 05, 2019 2:37pm By: Canas3
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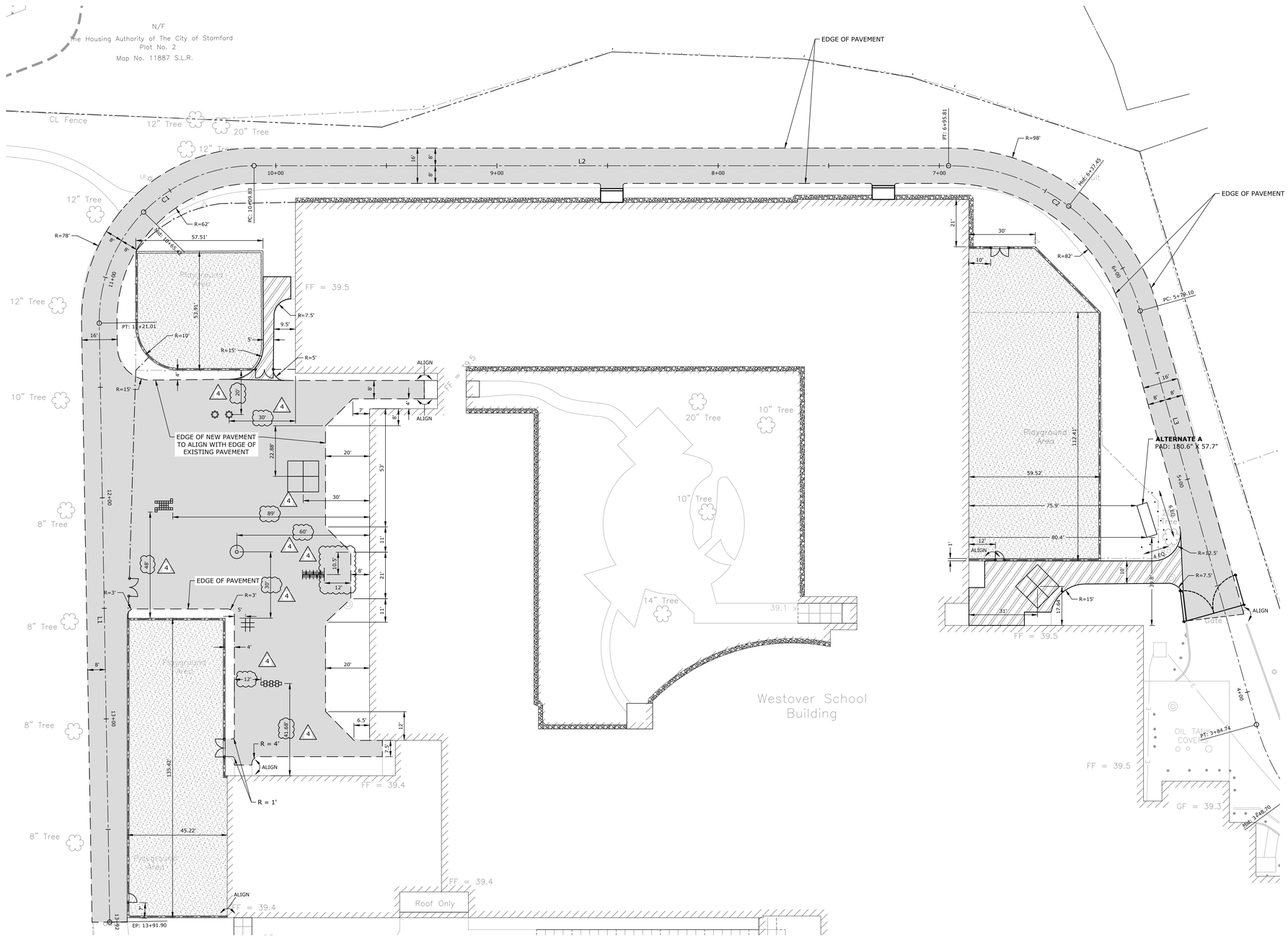

SITE PLAN ENLARGEMENT
SCALE: 1" = 20'

CURVE TABLE								
CURVE #		STATION	NORTHING	EASTING	DELTA (Δ)	TANGENT	LENGTH	RADIUS
C1	P.C. P.I. P.T.	10+09.83 - 11+21.01	N: 6,052.11 N: 5,981.78 N: 5,971.66	E: -9,484.99 E: -9,496.35 E: -9,425.83	91° 00' 19.5"	71.24'	111.18'	70.00'
C2	P.C. P.I. P.T.	5+79.10 - 6+95.81	N: 6,437.17 N: 6,429.43 N: 6,362.11	E: -9,356.29 E: -9,424.04 E: -9,434.92	74° 18' 33.6"	68.20'	116.72'	89.99'

LINE TABLE				
LINE #	LENGTH	DIRECTION	START POINT	END POINT
L1	270.89'	S81° 49' 49.51"E	N: 5971.66, E: -9425.83	N: 5933.17, E: -9157.69
L2	314.02'	S9° 10' 30.00"W	N: 6362.11, E: -9434.92	N: 6052.11, E: -9484.99
L3	194.35'	S83° 29' 03.56"W	N: 6459.23, E: -9163.19	N: 6437.17, E: -9356.29

0 20' 40'
SCALE: 1" = 20'

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

KG+D listen imagine build

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4	09/11/2019	ADDENDUM #1
3	08/06/2019	ISSUED FOR BID
2	06/05/2019	CLIENT REVIEW SET
1	05/15/2019	ISSUED FOR PRICING

Sheet Title

LAYOUT PLAN

Job No. S2087-036	Date 04/17/2019
Scale 1" = 20'	Drawn / Checked MDS/JAC

Sheet Number

C-220

Last Saved: 9/4/2019
Plotted On: Sep 05, 2019 - 2:40pm By: Canal
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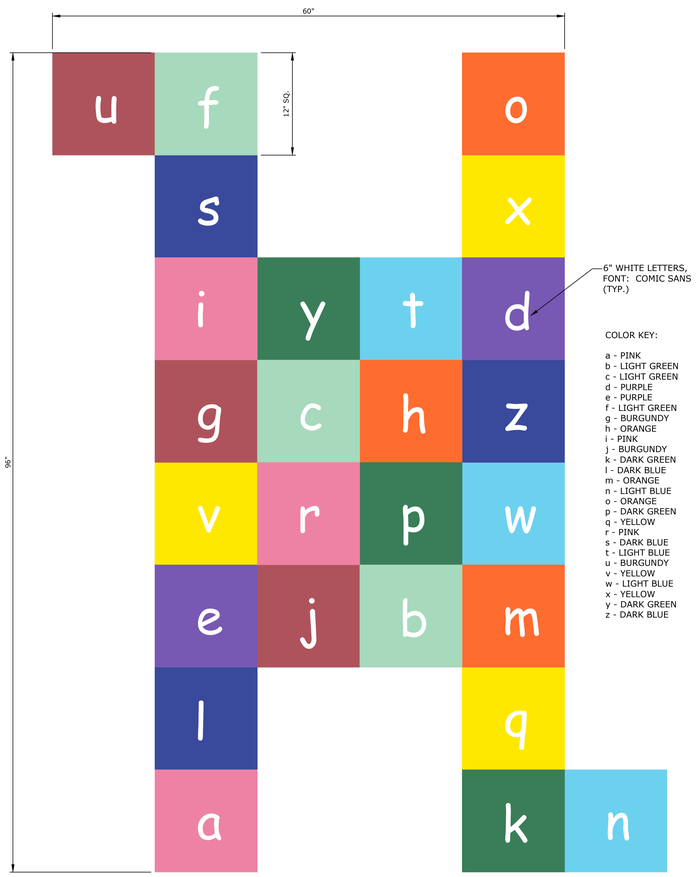
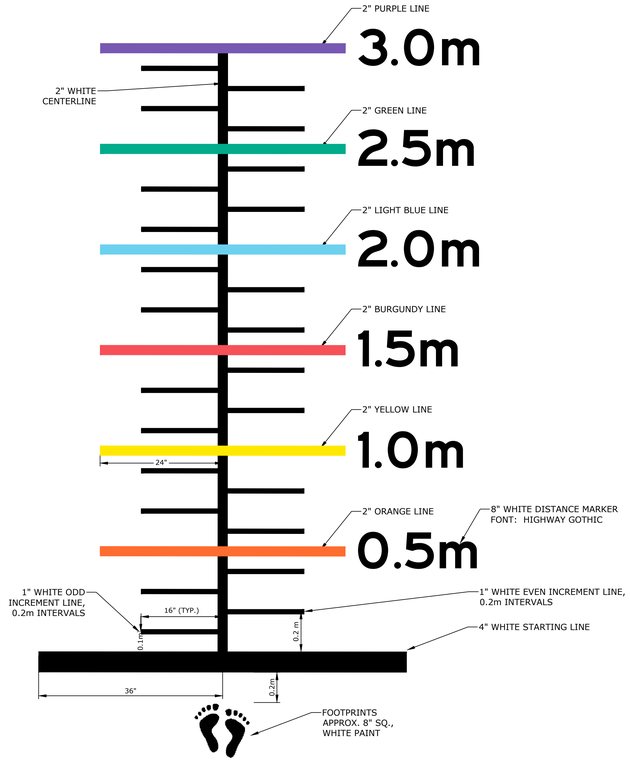


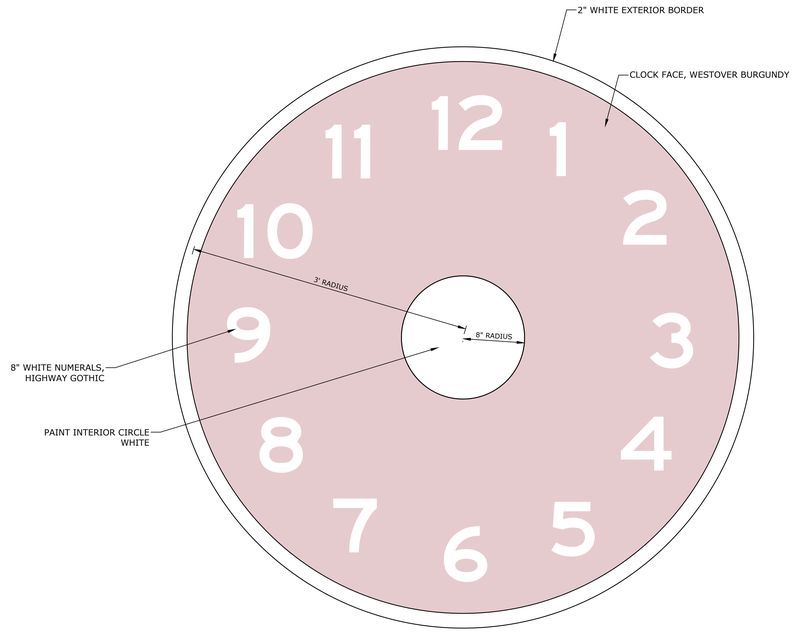
NOTE: PAINT PER SPECIFICATION 32 30 00

1 **LETTER JUMP MARKINGS**
NO SCALE



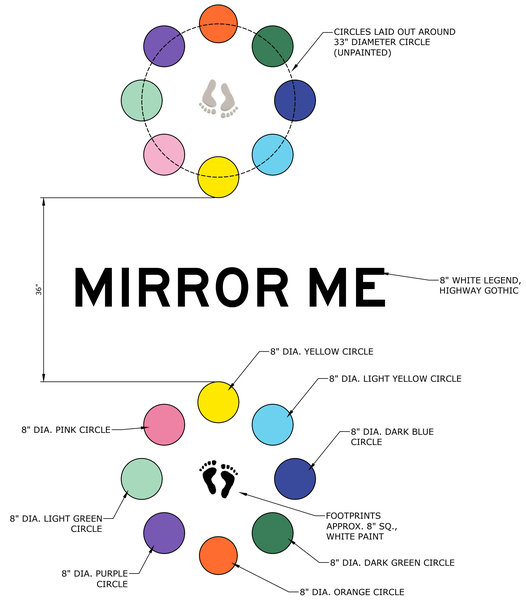
NOTE: PAINT PER SPECIFICATION 32 30 00

2 **STANDING LONG JUMP MARKINGS**
NO SCALE



NOTE: PAINT PER SPECIFICATION 32 30 00

3 **TIME CLOCK MARKINGS**
NO SCALE



NOTE: PAINT PER SPECIFICATION 32 30 00

4 **MIRROR ME GAME MARKINGS**
NO SCALE

Last Saved: 9/4/2019
Plotted On: Sep 05, 2019 9:2:45pm By: CanaJ
Xyne & Bond: J:\S\S2087 Stamford\035 Westover School Drainage\Drawings, Figures\AutoCAD\Sheet\S2079.36-C-600.06PEL.dwg

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

KG+D listen imagine build
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285 MAIN STREET MOUNT KISCO . NEW YORK . 10549
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CONSTRUCTION DOCUMENTS

SPN 135-0278RR

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Professional Seal

No.	Date	Issue

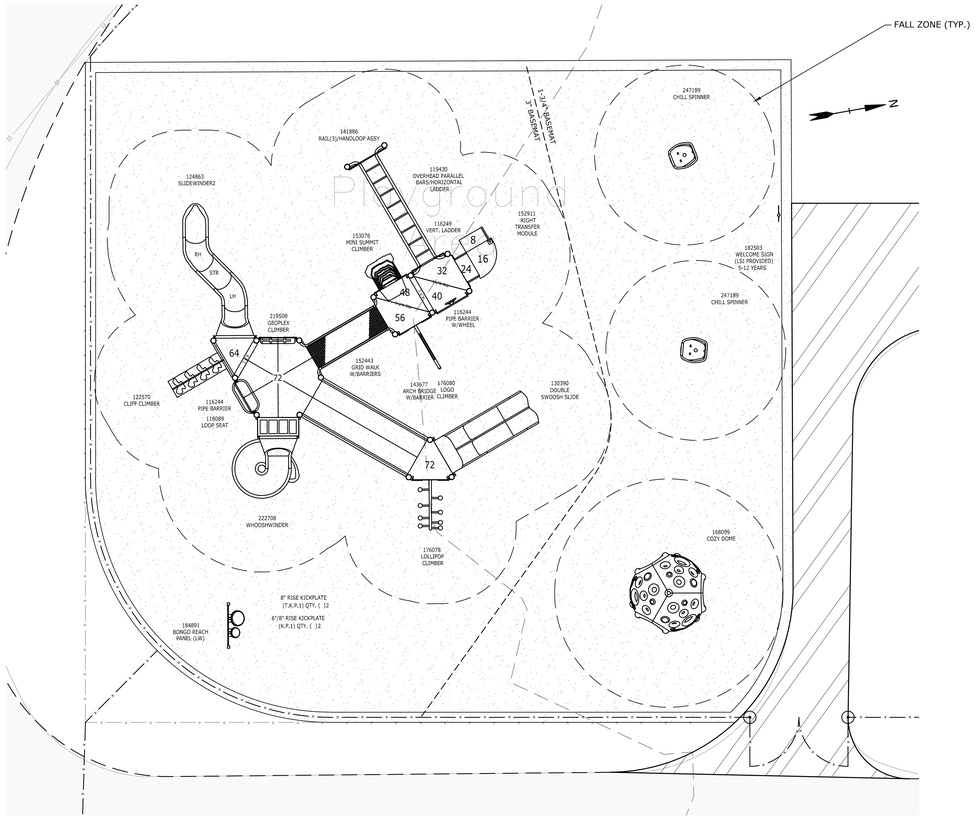
Sheet Title

SITE DETAILS

Job No.	Date
S2087-036	09/11/2019
Scale: NONE	Drawn / Checked: CAG/JAC

Sheet Number

C-610



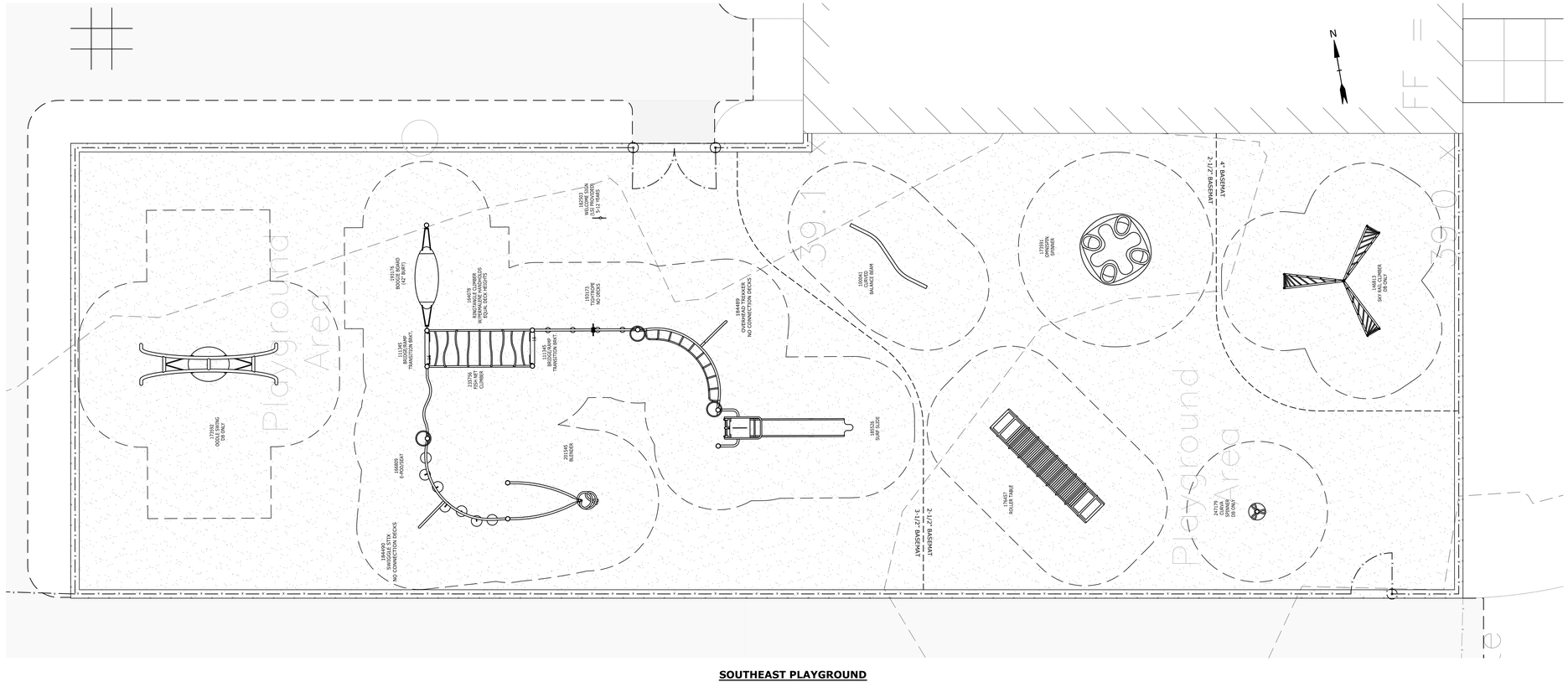
SOUTHWEST PLAYGROUND
SCALE: 1" = 5'

SOUTHEAST PLAYGROUND

TOTAL ELEVATED PLAY COMPONENTS	0		
TOTAL ELEVATED COMPONENTS ACCESSIBLE BY RAMP	0	REQUIRED	0
TOTAL ELEVATED COMPONENTS ACCESSIBLE BY TRANSFER	0	REQUIRED	0
TOTAL ACCESSIBLE GROUND LEVEL COMPONENTS SHOWN	15	REQUIRED	0
TOTAL DIFFERENT TYPES OF GROUND LEVEL COMPONENTS	8	REQUIRED	8

SOUTHWEST PLAYGROUND

TOTAL ELEVATED PLAY COMPONENTS	12		
TOTAL ELEVATED COMPONENTS ACCESSIBLE BY RAMP	0	REQUIRED	0
TOTAL ELEVATED COMPONENTS ACCESSIBLE BY TRANSFER	12	REQUIRED	6
TOTAL ACCESSIBLE GROUND LEVEL COMPONENTS SHOWN	5	REQUIRED	4
TOTAL DIFFERENT TYPES OF GROUND LEVEL COMPONENTS	4	REQUIRED	4



SOUTHEAST PLAYGROUND
SCALE: 1" = 5'

0 5' 10'
SCALE: 1" = 5'

NOTES

1. EQUIPMENT BY LANDSCAPE STRUCTURES, INC., DELANO, MINNESOTA, AND PROVIDED BY O'BRIEN & SONS, MEDFIELD, MASSACHUSETTS.
2. LAYOUT PREPARED BY O'BRIEN & SONS.
3. THIS PLAY AREA & PLAY EQUIPMENT IS DESIGNED FOR AGES YEARS 5-12 UNLESS OTHERWISE NOTED ON PLAN.
4. IT IS THE MANUFACTURERS OPINION THAT THIS PLAY AREA DOES CONFORM TO THE A.D.A. ACCESSIBILITY STANDARDS, ASSUMING AN ACCESSIBLE PROTECTIVE SURFACING IS PROVIDED, AS INDICATED, OR WITHIN THE ENTIRE USE ZONE.
5. VERIFY ALL DIMENSIONS OF PLAY AREA, SIZE, ORIENTATION, AND LOCATION OF ALL EXISTING UTILITIES, EQUIPMENT, AND SITE FURNISHINGS PRIOR TO ORDERING.
6. SLIDES SHOULD NOT FACE THE HOT AFTERNOON SUN.
7. IT IS THE MANUFACTURER'S OPINION AND INTENT THAT THE LAYOUT OF THESE COMPONENTS CONFORM WITH THE U.S. CONSUMER PRODUCT SAFETY COMMISSION'S (CPSC) "HANDBOOK FOR PUBLIC PLAYGROUND SAFETY". 4
8. RESILIENT SURFACE COLOR: 50% BEIGE / 50% BLACK BLEND.
9. BURGUNDY AND BLACK SHALL BE INCORPORATED INTO THE COLORS OF THE PLAY EQUIPMENT.

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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CONSTRUCTION DOCUMENTS

SPN 135-0278RR

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Professional Seal

No.	Date	Issue
4	09/11/2019	ADDENDUM #1
3	08/06/2019	ISSUED FOR BID
2	06/05/2019	CLIENT REVIEW SET
1	05/15/2019	ISSUED FOR PRICING

Sheet Title

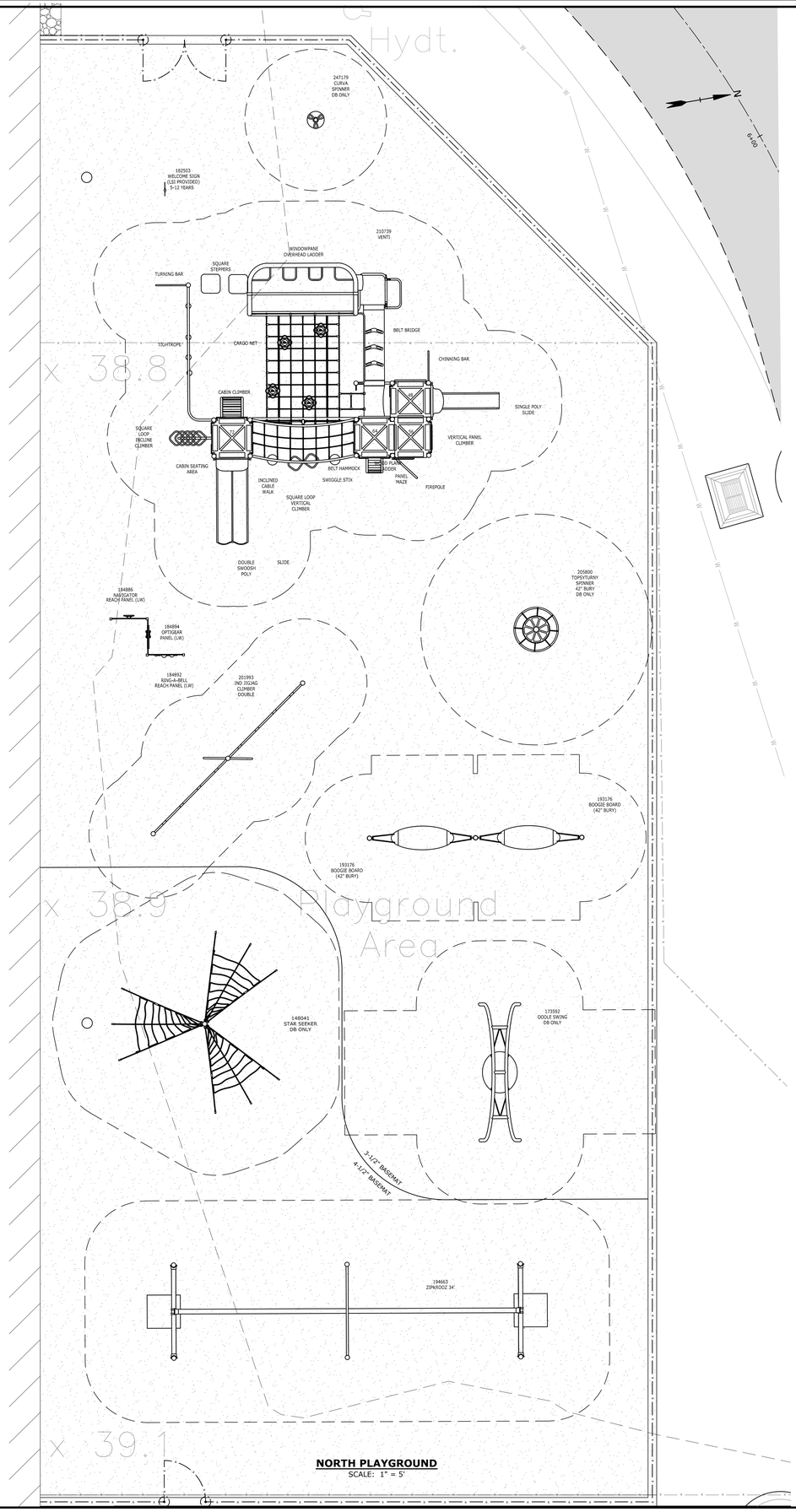
LAYOUT PLAN SOUTH PLAYGROUNDS

Job No.	Date
S2087-036	04/17/2019
Scale: 1" = 5'	Drawn / Checked: JAC

Sheet Number

C-800

Last Saved: 9/4/2019
Plotted On: Sep 05, 2019 2:50pm By: Canal
Tighe & Bond: J:\S\S2087 Stamford\036 Westover School Drainage\Drawings, Figures\AutoCAD\Sheet\S2078 36-C-800-PLAT.dwg



NORTH PLAYGROUND
SCALE: 1" = 5'

NORTH PLAYGROUND

TOTAL ELEVATED PLAY COMPONENTS	13			
TOTAL ELEVATED COMPONENTS ACCESSIBLE BY RAMP	0	REQUIRED	0	
TOTAL ELEVATED COMPONENTS ACCESSIBLE BY TRANSFER	8	REQUIRED	7	
TOTAL ACCESSIBLE GROUND LEVEL COMPONENTS SHOWN	17	REQUIRED	4	
TOTAL DIFFERENT TYPES OF GROUND LEVEL COMPONENTS	9	REQUIRED	9	

NOTES

1. EQUIPMENT BY LANDSCAPE STRUCTURES, INC., DELANO, MINNESOTA, AND PROVIDED BY O'BRIEN & SONS, MEDFIELD, MASSACHUSETTS.
2. LAYOUT PREPARED BY O'BRIEN & SONS.
3. THIS PLAY AREA & PLAY EQUIPMENT IS DESIGNED FOR AGES YEARS 5-12 UNLESS OTHERWISE NOTED ON PLAN.
4. IT IS THE MANUFACTURERS OPINION THAT THIS PLAY AREA DOES CONFORM TO THE A.D.A. ACCESSIBILITY STANDARDS, ASSUMING AN ACCESSIBLE PROTECTIVE SURFACING IS PROVIDED, AS INDICATED, OR WITHIN THE ENTIRE USE ZONE.
5. VERIFY ALL DIMENSIONS OF PLAY AREA, SIZE, ORIENTATION, AND LOCATION OF ALL EXISTING UTILITIES, EQUIPMENT, AND SITE FURNISHINGS PRIOR TO ORDERING.
6. SLIDES SHOULD NOT FACE THE HOT AFTERNOON SUN.
7. IT IS THE MANUFACTURER'S OPINION AND INTENT THAT THE LAYOUT OF THESE COMPONENTS CONFORM WITH THE U.S. CONSUMER PRODUCT SAFETY COMMISSION'S (CPSC) "HANDBOOK FOR PUBLIC PLAYGROUND SAFETY".
8. RESILIENT SURFACE COLOR: 50% BEIGE / 50% BLACK BLEND. (4)
9. BURGUNDY AND BLACK SHALL BE INCORPORATED INTO THE COLORS OF THE PLAY EQUIPMENT.

0 5' 10'
SCALE: 1" = 5'

Last Saved: 9/4/2019
Plotted On: Sep 05, 2019 2:51pm By: Canas
Tighe & Bond J:\S\S2087-Stamford\036 Westover School Drainage\Drawings, Figures\AutoCAD\Sheets\S2078 36-C 800-PLAY.dwg

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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CONSTRUCTION DOCUMENTS

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Professional Seal

No.	Date	Issue
4	09/11/2019	ADDENDUM #1
3	08/06/2019	ISSUED FOR BID
2	06/05/2019	CLIENT REVIEW SET
1	05/15/2019	ISSUED FOR PRICING

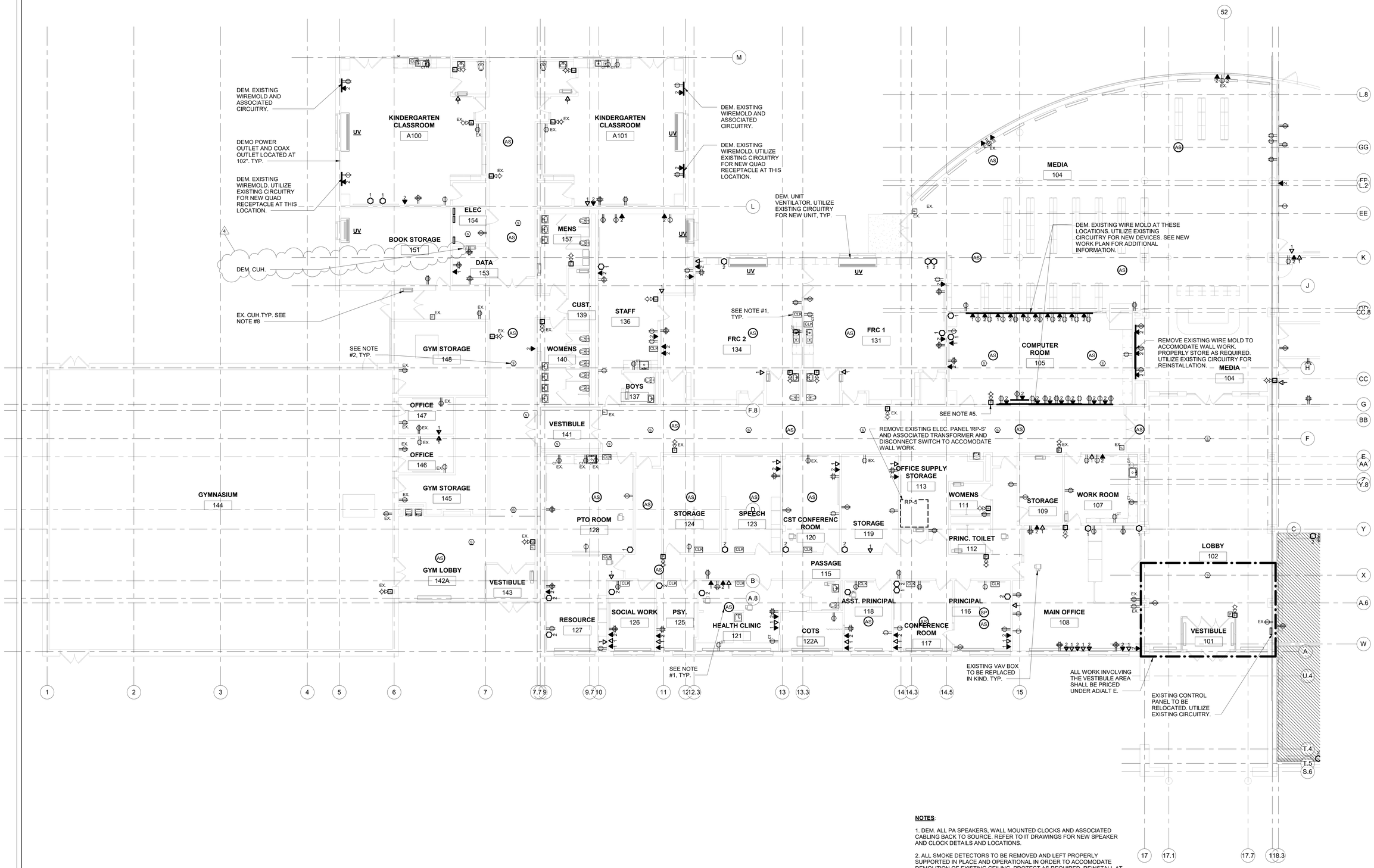
Sheet Title

LAYOUT PLAN
NORTH
PLAYGROUND

Job No.	Date
S2087-036	04/17/2019
Scale	Drawn / Checked
1" = 5'	JAC

Sheet Number

C-810



ELECTRICAL 1ST FLOOR PART 'A' DEMO PLAN

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

NORTH

NOTES:

1. DEM. ALL PA SPEAKERS, WALL MOUNTED CLOCKS AND ASSOCIATED CABLING BACK TO SOURCE. REFER TO IT DRAWINGS FOR NEW SPEAKER AND CLOCK DETAILS AND LOCATIONS.

2. ALL SMOKE DETECTORS TO BE REMOVED AND LEFT PROPERLY SUPPORTED IN PLACE AND OPERATIONAL IN ORDER TO ACCOMODATE DEMOLITION OF EXISTING CEILING. PROTECT AS REQUIRED. REINSTALL AT TIME OF NEW CONSTRUCTION.

3. SEE DRAWING E-201 FOR LIGHTING SCOPE OF WORK.

4. ALL WALL MOUNTED RECEPTACLES, DATA AND COAXIAL OUTLETS SHALL BE DEMOLISHED U.O.N. AS EXISTING TO REMAIN (EX.) LEAVE IN PLACE AND UTILIZE EXISTING RECEPTACLE BACK BOXES FOR NEW CONSTRUCTION. EXISTING RECEPTACLE CIRCUITRY SHALL BE UTILIZED FOR NEW CONSTRUCTION. REMOVE ALL LOW VOLTAGE CABLING ASSOCIATED WITH DATA AND COAXIAL OUTLETS. REFER TO IT DRAWINGS FOR ADDITIONAL DATA AND LOW VOLTAGE REQUIREMENTS.

5. ALL WALL MOUNTED FIRE ALARM DEVICES SHALL BE REMOVED, PROPERLY STORED AND REINSTALLED (RR) U.O.N. AS EXISTING TO REMAIN (EX).

6. ALL WALL SCONCES TO BE REMOVED AND REINSTALLED, WHETHER SHOWN ON PLANS OR NOT. VERIFY LOCATIONS IN FIELD. UTILIZE EXISTING CIRCUITRY.

7. REFER TO IT DRAWINGS FOR ADDITIONAL SCOPE OF WORK.

8. REFER TO DRAWING E302 FOR WORK RELATED TO EXISTING CUH.

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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CONSTRUCTION DOCUMENTS

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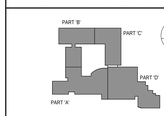

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No.	Date	Issue
4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

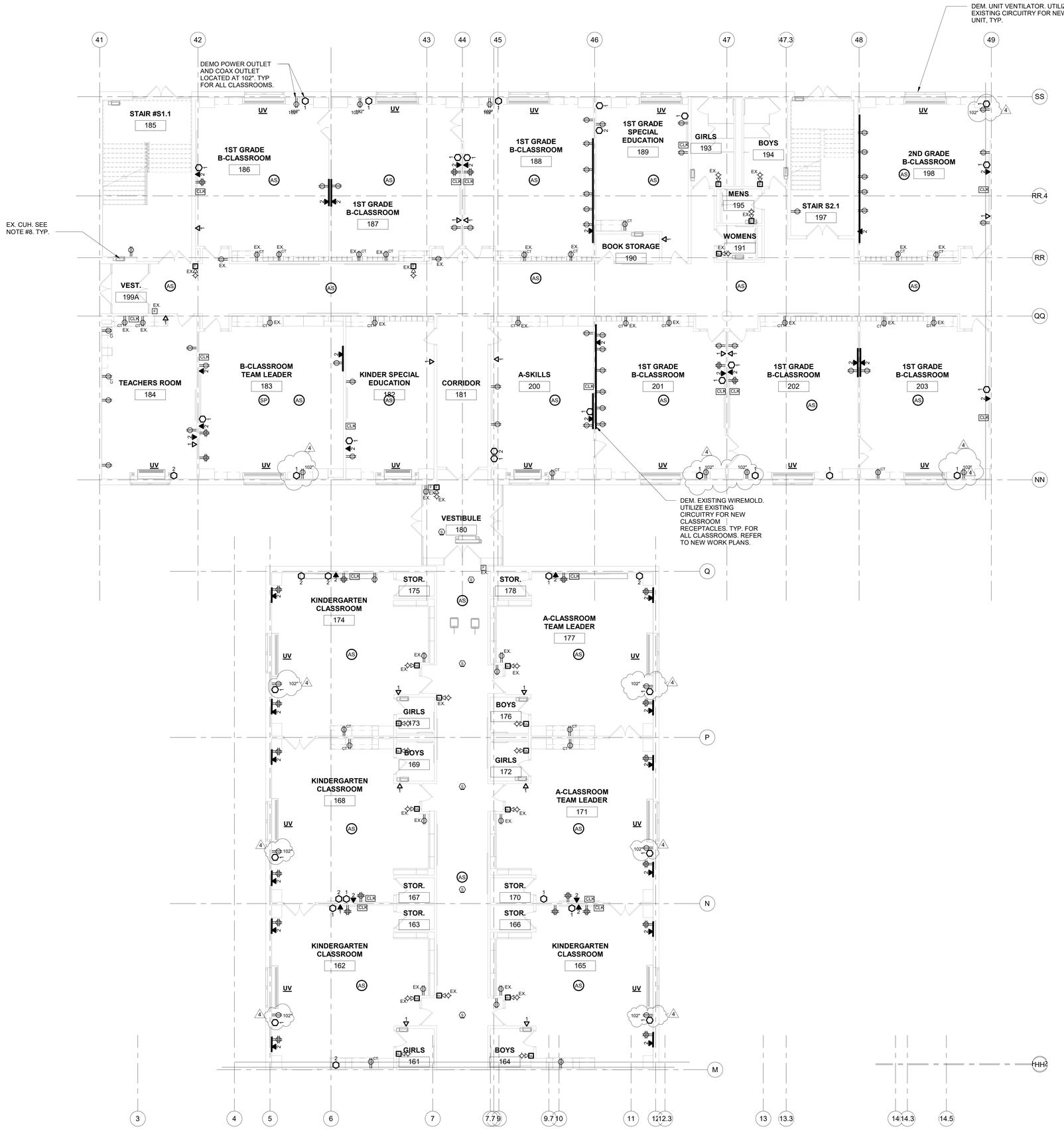
Sheet Title

ELECTRICAL 1ST FLOOR PART 'A' DEMO PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

E101



1 ELECTRICAL 1ST FLOOR PART 'B' DEMO PLAN

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

NORTH

NOTES:

1. DEM. ALL PA SPEAKERS, WALL MOUNTED CLOCKS AND ASSOCIATED CABLING BACK TO SOURCE. REFER TO IT DRAWINGS FOR NEW SPEAKER AND CLOCK DETAILS AND LOCATIONS.

2. ALL SMOKE DETECTORS TO BE REMOVED AND LEFT PROPERLY SUPPORTED IN PLACE AND OPERATIONAL IN ORDER TO ACCOMODATE DEMOLITION OF EXISTING CEILING. PROTECT AS REQUIRED. REINSTALL AT TIME OF NEW CONSTRUCTION.

3. SEE DRAWING E-202 FOR LIGHTING SCOPE OF WORK.

4. ALL WALL MOUNTED RECEPTACLES, DATA AND COAXIAL OUTLETS SHALL BE DEMOLISHED U.O.N. AS EXISTING TO REMAIN (EX.) LEAVE IN PLACE AND UTILIZE EXISTING RECEPTACLE BACK BOXES FOR NEW CONSTRUCTION. EXISTING RECEPTACLE CIRCUITRY SHALL BE UTILIZED FOR NEW CONSTRUCTION. REMOVE ALL LOW VOLTAGE CABLING ASSOCIATED WITH DATA AND COAXIAL OUTLETS. REFER TO IT DRAWINGS FOR ADDITIONAL DATA AND LOW VOLTAGE REQUIREMENTS.

5. ALL WALL MOUNTED FIRE ALARM DEVICES SHALL BE REMOVED, PROPERLY STORED AND REINSTALLED (RR) U.O.N. AS EXISTING TO REMAIN (EX).

6. ALL WALL SCONCES TO BE REMOVED AND REINSTALLED, WHETHER SHOWN ON PLANS OR NOT. VERIFY LOCATIONS IN FIELD. UTILIZE EXISTING CIRCUITRY.

7. REFER TO IT DRAWINGS FOR ADDITIONAL SCOPE OF WORK.

8. REFER TO DRAWING E303 FOR WORK RELATED TO EXISTING CUH.

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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CONSTRUCTION DOCUMENTS

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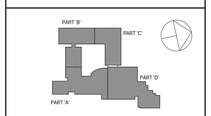

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No.	Date	Issue
4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

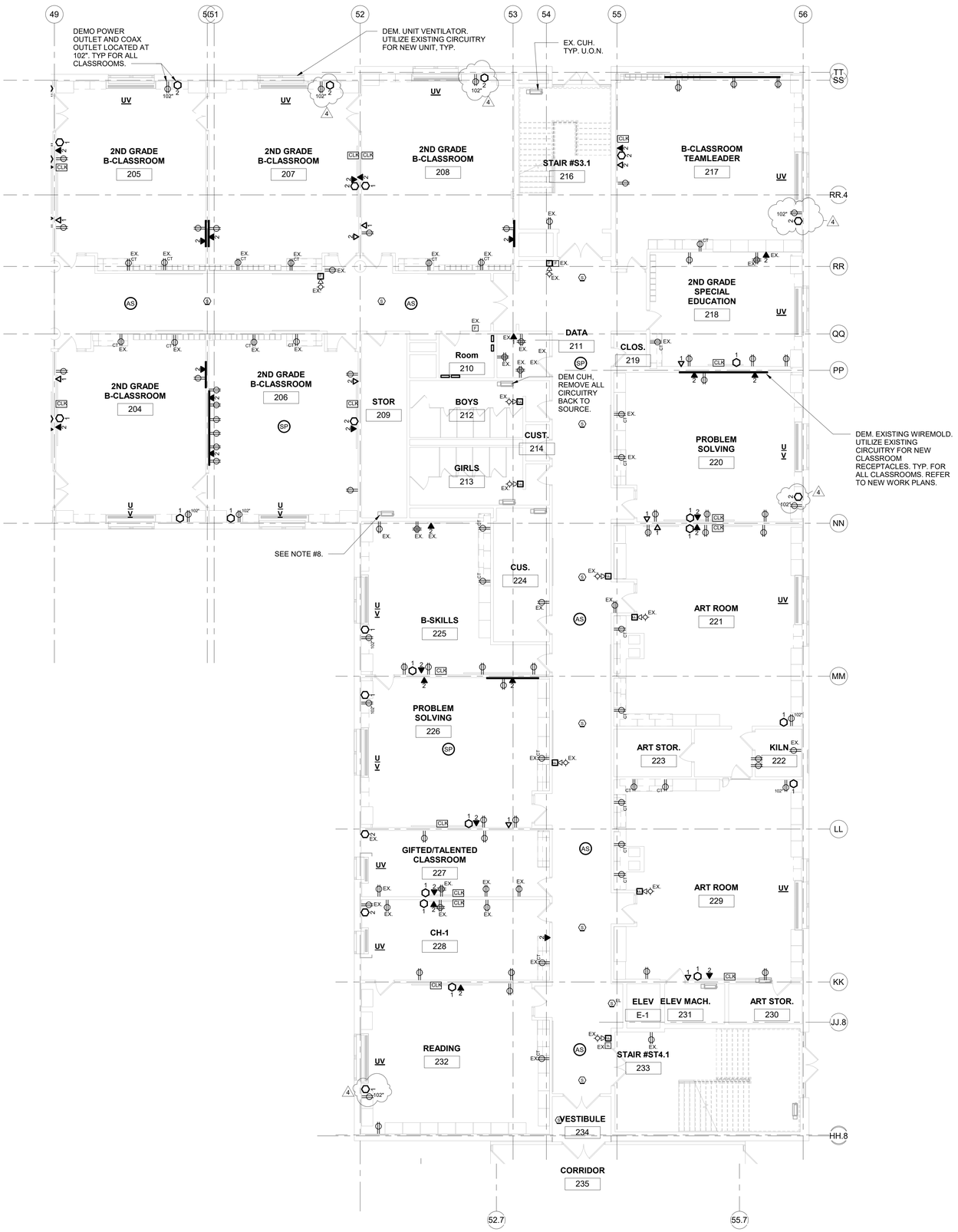
Sheet Title

ELECTRICAL 1ST FLOOR PART 'B' DEMO PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

E102



NORTH

1 ELECTRICAL 1ST FLOOR PART 'C' DEMO PLAN

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

NOTES:

1. DEM. ALL PA SPEAKERS, WALL MOUNTED CLOCKS AND ASSOCIATED CABLING BACK TO SOURCE. REFER TO IT DRAWINGS FOR NEW SPEAKER AND CLOCK DETAILS AND LOCATIONS.

2. ALL SMOKE DETECTORS TO BE REMOVED AND LEFT PROPERLY SUPPORTED IN PLACE AND OPERATIONAL IN ORDER TO ACCOMODATE DEMOLITION OF EXISTING CEILING. PROTECT AS REQUIRED. REINSTALL AT TIME OF NEW CONSTRUCTION.

3. SEE DRAWING E-203 FOR LIGHTING SCOPE OF WORK.

4. ALL WALL MOUNTED RECEPTACLES, DATA AND COAXIAL OUTLETS SHALL BE DEMOLISHED U.O.N. AS EXISTING TO REMAIN (EX.) LEAVE IN PLACE AND UTILIZE EXISTING RECEPTACLE BACK BOXES FOR NEW CONSTRUCTION. EXISTING RECEPTACLE CIRCUITRY SHALL BE UTILIZED FOR NEW CONSTRUCTION. REMOVE ALL LOW VOLTAGE CABLING ASSOCIATED WITH DATA AND COAXIAL OUTLETS. REFER TO IT DRAWINGS FOR ADDITIONAL DATA AND LOW VOLTAGE REQUIREMENTS.

5. ALL WALL MOUNTED FIRE ALARM DEVICES SHALL BE REMOVED, PROPERLY STORED AND REINSTALLED (RR) U.O.N. AS EXISTING TO REMAIN (EX.).

6. ALL WALL SCONCES TO BE REMOVED AND REINSTALLED, WHETHER SHOWN ON PLANS OR NOT. VERIFY LOCATIONS IN FIELD. UTILIZE EXISTING CIRCUITRY.

7. REFER TO IT DRAWINGS FOR ADDITIONAL SCOPE OF WORK.

8. REFER TO DRAWING E304 FOR WORK RELATED TO EXISTING CUH.

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

KG+D listen imagine build

KG+D . ARCHITECTS PC

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12 East 49th Street, 11th Flr. New York, NY 10017 646.849.4110

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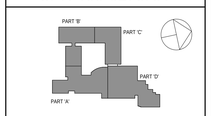
CONSTRUCTION DOCUMENTS

SPN 135-0278RR



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No.	Date	Issue
4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

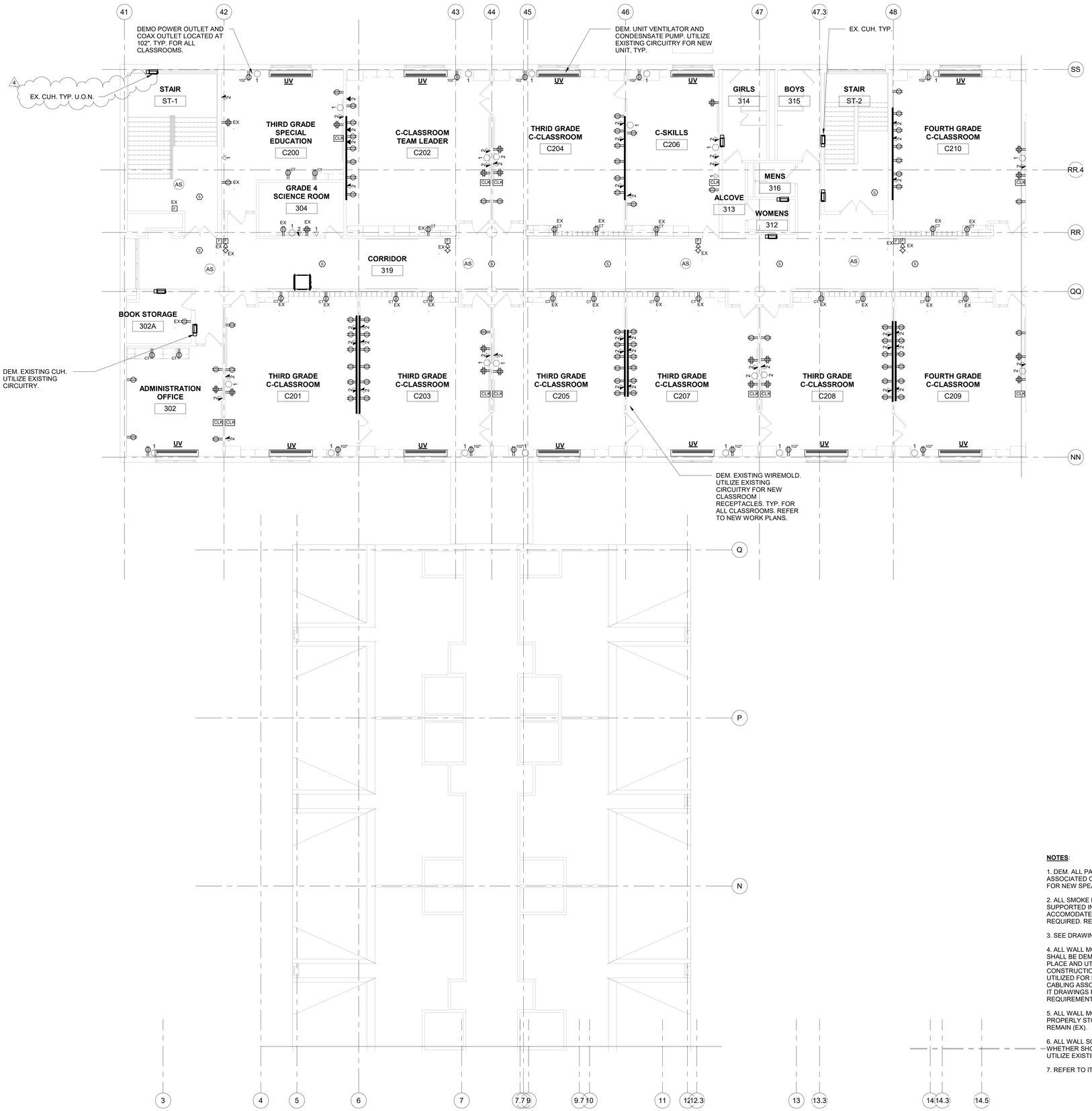
Sheet Title

ELECTRICAL 1ST FLOOR PART 'C' DEMO PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

E103



ELECTRICAL 2ND FLOOR PART 'B' DEMO PLAN

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

NORTH

NOTES:

1. DEM. ALL PA SPEAKERS, WALL MOUNTED CLOCKS AND ASSOCIATED CABLING BACK TO SOURCE. REFER TO IT DRAWINGS FOR NEW SPEAKER AND CLOCK DETAILS AND LOCATIONS.

2. ALL SMOKE DETECTORS TO BE REMOVED AND LEFT PROPERLY SUPPORTED IN PLACE AND OPERATIONAL IN ORDER TO ACCOMODATE DEMOLITION OF EXISTING CEILING. PROTECT AS REQUIRED. REINSTALL AT TIME OF NEW CONSTRUCTION.

3. SEE DRAWING E-205 FOR LIGHTING SCOPE OF WORK.

4. ALL WALL MOUNTED RECEPTACLES, DATA AND COAXIAL OUTLETS SHALL BE DEMOLISHED U.O.N. AS EXISTING TO REMAIN (EX.) LEAVE IN PLACE AND UTILIZE EXISTING RECEPTACLE BACK BOXES FOR NEW CONSTRUCTION. EXISTING RECEPTACLE CIRCUITRY SHALL BE UTILIZED FOR NEW CONSTRUCTION. REMOVE ALL LOW VOLTAGE CABLING ASSOCIATED WITH DATA AND COAXIAL OUTLETS. REFER TO IT DRAWINGS FOR ADDITIONAL DATA AND LOW VOLTAGE REQUIREMENTS.

5. ALL WALL MOUNTED FIRE ALARM DEVICES SHALL BE REMOVED, PROPERLY STORED AND REINSTALLED (RR) U.O.N. AS EXISTING TO REMAIN (EX).

6. ALL WALL SCONCES TO BE REMOVED AND REINSTALLED, WHETHER SHOWN ON PLANS OR NOT. VERIFY LOCATIONS IN FIELD. UTILIZE EXISTING CIRCUITRY.

7. REFER TO IT DRAWINGS FOR ADDITIONAL SCOPE OF WORK.

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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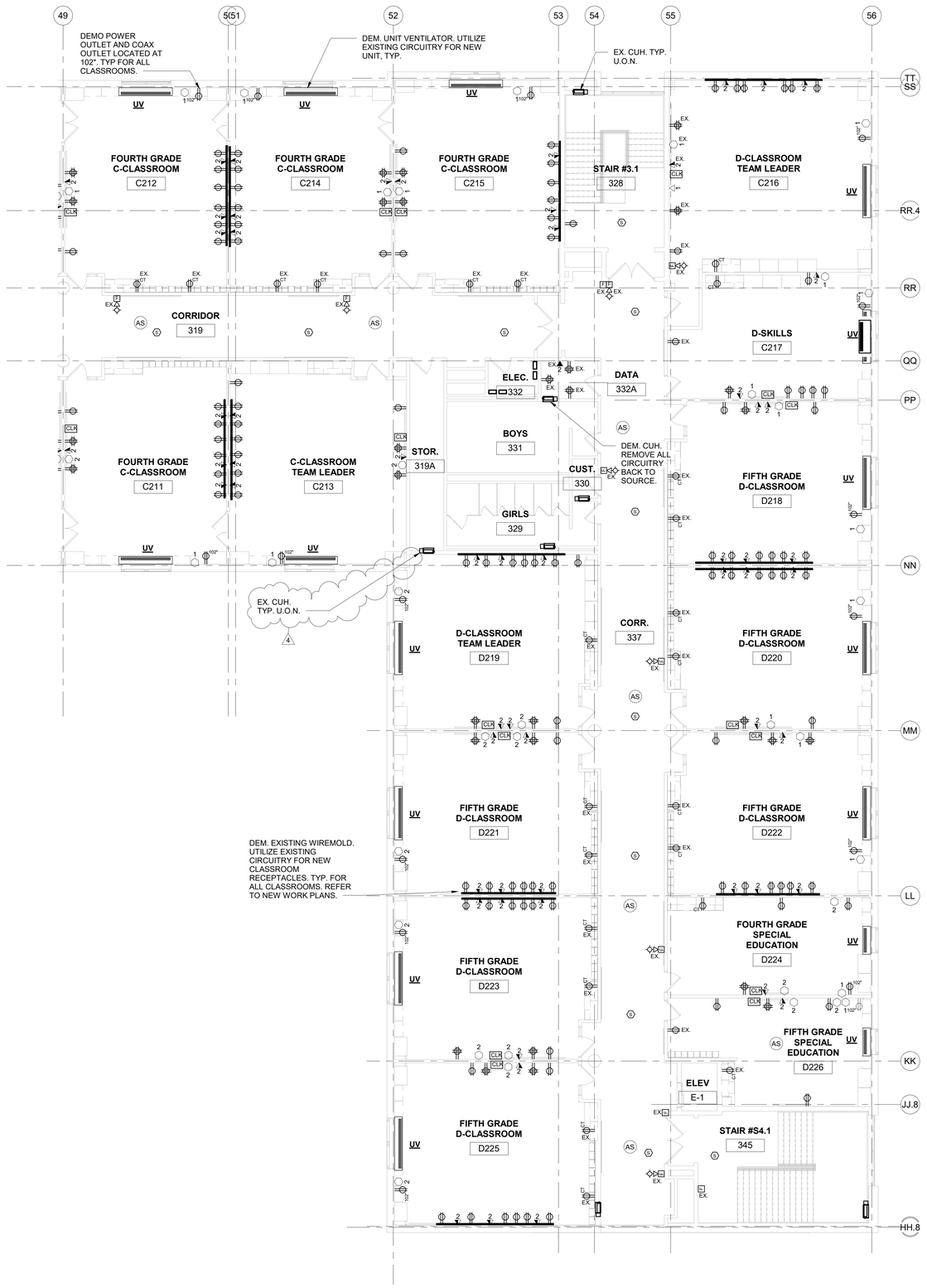
Sheet Title

ELECTRICAL 2ND FLOOR PART 'B' DEMO PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

E105



1 ELECTRICAL 2ND FLOOR PART 'C' DEMO PLAN

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

NORTH

NOTES:

1. DEM. ALL PA SPEAKERS, WALL MOUNTED CLOCKS AND ASSOCIATED CABLING BACK TO SOURCE. REFER TO IT DRAWINGS FOR NEW SPEAKER AND CLOCK DETAILS AND LOCATIONS.

2. ALL SMOKE DETECTORS TO BE REMOVED AND LEFT PROPERLY SUPPORTED IN PLACE AND OPERATIONAL IN ORDER TO ACCOMODATE DEMOLITION OF EXISTING CEILING. PROTECT AS REQUIRED. REINSTALL AT TIME OF NEW CONSTRUCTION.

3. SEE DRAWING E-206 FOR LIGHTING SCOPE OF WORK.

4. ALL WALL MOUNTED RECEPTACLES, DATA AND COAXIAL OUTLETS SHALL BE DEMOLISHED U.O.N. AS EXISTING TO REMAIN (EX.) LEAVE IN PLACE AND UTILIZE EXISTING RECEPTACLE BACK BOXES FOR NEW CONSTRUCTION. EXISTING RECEPTACLE CIRCUITRY SHALL BE UTILIZED FOR NEW CONSTRUCTION. REMOVE ALL LOW VOLTAGE CABLING ASSOCIATED WITH DATA AND COAXIAL OUTLETS. REFER TO IT DRAWINGS FOR ADDITIONAL DATA AND LOW VOLTAGE REQUIREMENTS.

5. ALL WALL MOUNTED FIRE ALARM DEVICES SHALL BE REMOVED, PROPERLY STORED AND REINSTALLED (RR) U.O.N. AS EXISTING TO REMAIN (EX).

6. ALL WALL SCONCES TO BE REMOVED AND REINSTALLED, WHETHER SHOWN ON PLANS OR NOT. VERIFY LOCATIONS IN FIELD. UTILIZE EXISTING CIRCUITRY.

7. REFER TO IT DRAWINGS FOR ADDITIONAL SCOPE OF WORK.

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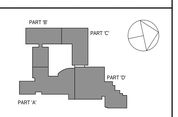

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3	8/6/2019	ISSUED FOR BID
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1	5/15/2019	ISSUED FOR PRICING

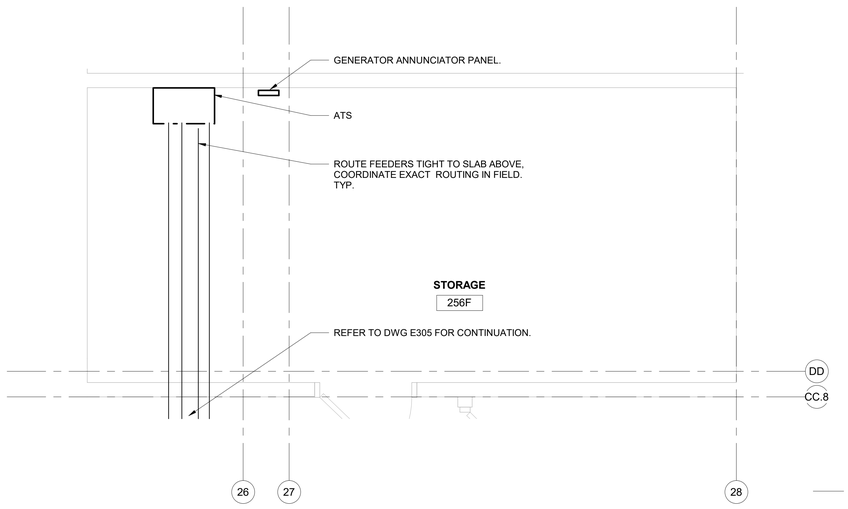
Sheet Title

ELECTRICAL 2ND FLOOR PART 'C' DEMO PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

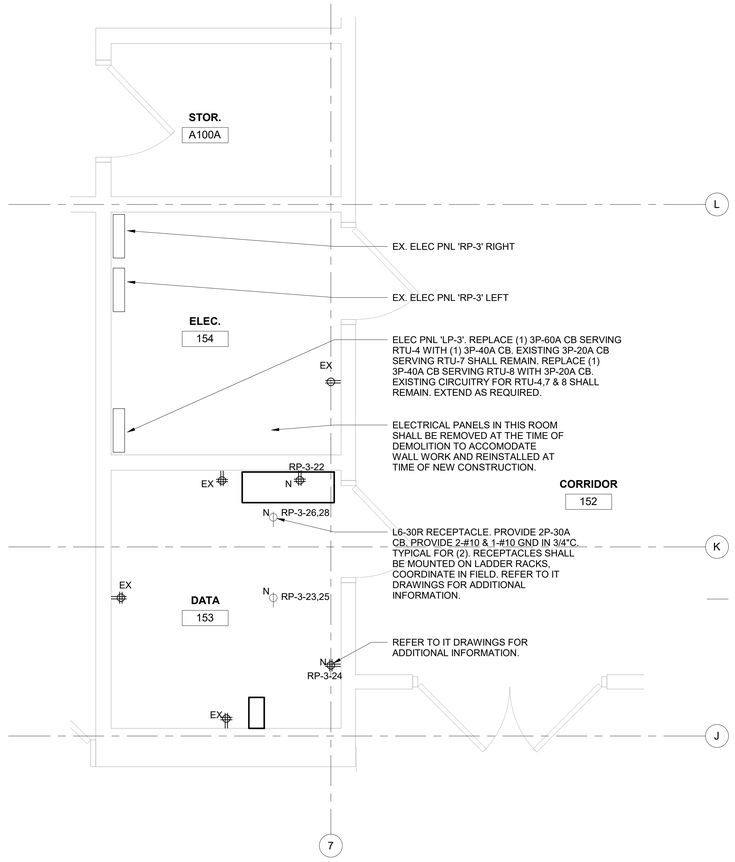
E106



7 ELECTRICAL 1ST FLOOR PART PLAN 4 - ATS ROOM

NORTH

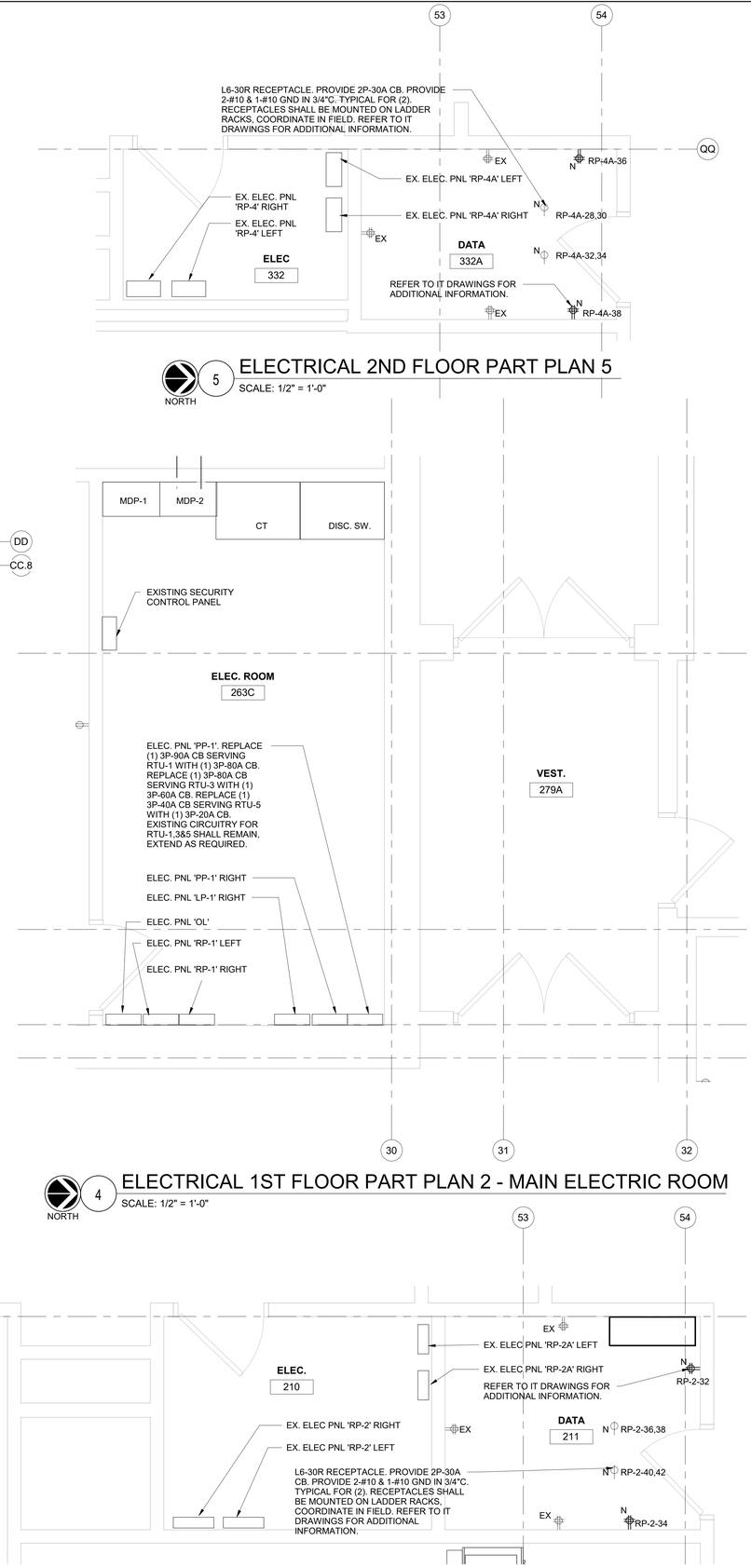
SCALE: 1/2" = 1'-0"



6 ELECTRICAL 1ST FLOOR PART PLAN 3

NORTH

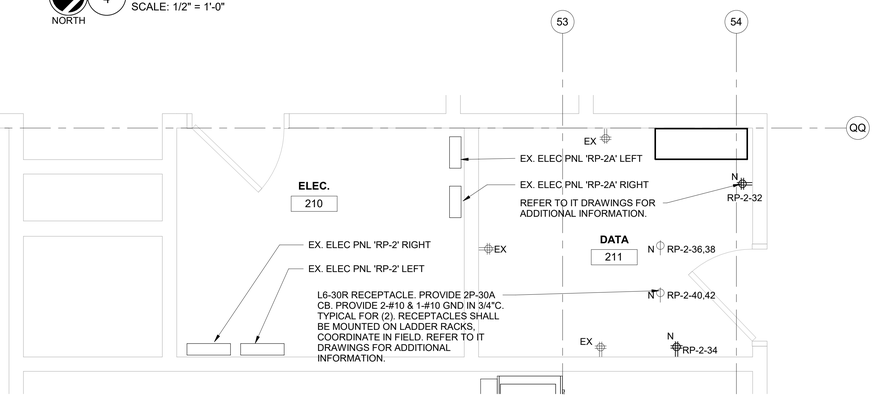
SCALE: 1/2" = 1'-0"



4 ELECTRICAL 1ST FLOOR PART PLAN 2 - MAIN ELECTRIC ROOM

NORTH

SCALE: 1/2" = 1'-0"



3 ELECTRICAL 1ST FLOOR PART PLAN 1

NORTH

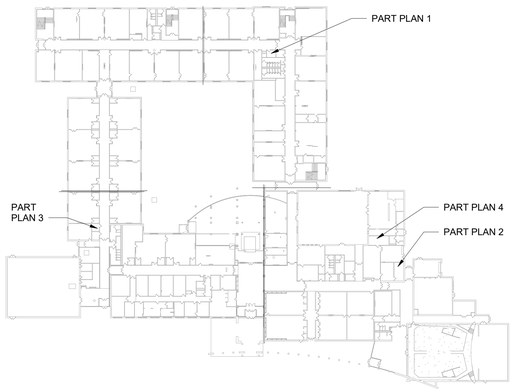
SCALE: 1/2" = 1'-0"

ELECTRICAL NOTES	
1	UNIT VENTILATORS ARE SERVED FROM EX. ELEC PANELS 'RP-2', 'RP-2A', 'RP-3', 'RP-4' & 'RP-4A'. REFER TO PART PLANS AND KEY PLANS FOR ELEC PNL LOCATIONS.
2	PROVIDE AS PART OF THE BASE CONTRACT (10) 1P-20A CIRCUITS ON THE FIRST FLOOR & (2) 1P-20A CIRCUITS ON THE SECOND FLOOR (150' LENGTH EACH) FOR BMS SYSTEM CONTROL PANELS. COORDINATE EXACT LOCATIONS WITH MECHANICAL.
3	SCOPE OF WORK INVOLVING THE GENERATOR AND ASSOCIATED EQUIPMENT SHALL BE PRICED UNDER ADD/ALT C.
4	PROVIDE 2-#12 &1-#12 GND IN 3/4"C AND 1P-20A CB IN EACH DATA CLOSET FOR AC UNIT CONDENSATE PUMPS. VERIFY CIRCUIT NUMBERS IN FIELD.
5	REPLACE (53) 1P-20 A CB'S SERVING UNIT VENTILATORS UV-1 & (14) 1P-20A CB'S SERVING UNIT VENTILATORS UV-2 WITH NEW 1P-15A CB'S.
6	ALL WORK SHOWN IN PART PLAN 7 SHALL BE PRICED UNDER AD/ALT C.
7	CONDENSATE PUMPS REQUIRED FOR ALL UNIT VENTILATORS LOCATED ON FIRST FLOOR. UTILIZE & EXTEND EXISTING UNIT VENTILATORS CIRCUITRY TO CONDENSATE PUMPS.

2 ELECTRICAL 2ND FLOOR KEYPLAN

NORTH

SCALE: 1/64" = 1'-0"



1 ELECTRICAL 1ST FLOOR KEYPLAN

NORTH

SCALE: 1/64" = 1'-0"

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

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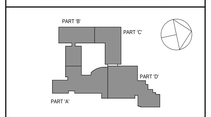

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4	9/13/2019	ADDENDUM 2
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1	5/15/2019	ISSUED FOR PRICING

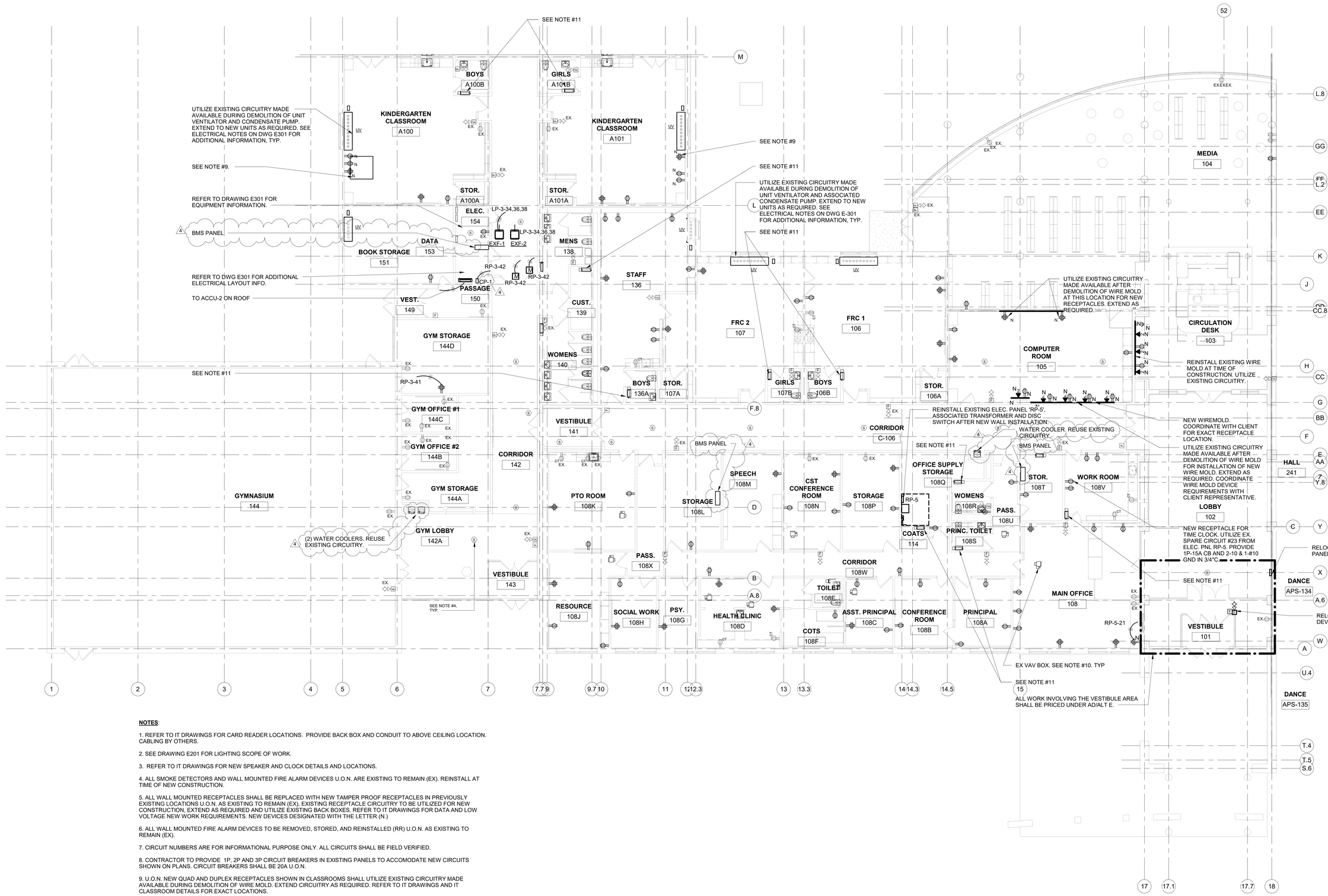
Sheet Title

ELECTRICAL 1ST & 2ND FLOOR PART PLANS

Job No.	Date
NKGD0206.00	08/06/2019
Scale: AS NOTED	Drawn / Checked: Author Checker

Sheet Number

E301



NOTES:

1. REFER TO IT DRAWINGS FOR CARD READER LOCATIONS. PROVIDE BACK BOX AND CONDUIT TO ABOVE CEILING LOCATION. CABLING BY OTHERS.

2. SEE DRAWING E201 FOR LIGHTING SCOPE OF WORK.

3. REFER TO IT DRAWINGS FOR NEW SPEAKER AND CLOCK DETAILS AND LOCATIONS.

4. ALL SMOKE DETECTORS AND WALL MOUNTED FIRE ALARM DEVICES U.O.N. ARE EXISTING TO REMAIN (EX). REINSTALL AT TIME OF NEW CONSTRUCTION.

5. ALL WALL MOUNTED RECEPTACLES SHALL BE REPLACED WITH NEW TAMPER PROOF RECEPTACLES IN PREVIOUSLY EXISTING LOCATIONS U.O.N. AS EXISTING TO REMAIN (EX), EXISTING RECEPTACLE CIRCUITRY TO BE UTILIZED FOR NEW CONSTRUCTION, EXTEND AS REQUIRED AND UTILIZE EXISTING BACK BOXES. REFER TO IT DRAWINGS FOR DATA AND LOW VOLTAGE NEW WORK REQUIREMENTS. NEW DEVICES DESIGNATED WITH THE LETTER (N.)

6. ALL WALL MOUNTED FIRE ALARM DEVICES TO BE REMOVED, STORED, AND REINSTALLED (RR) U.O.N. AS EXISTING TO REMAIN (EX).

7. CIRCUIT NUMBERS ARE FOR INFORMATIONAL PURPOSE ONLY. ALL CIRCUITS SHALL BE FIELD VERIFIED.

8. CONTRACTOR TO PROVIDE 1P, 2P AND 3P CIRCUIT BREAKERS IN EXISTING PANELS TO ACCOMODATE NEW CIRCUITS SHOWN ON PLANS. CIRCUIT BREAKERS SHALL BE 20A U.O.N.

9. U.O.N. NEW QUAD AND DUPLEX RECEPTACLES SHOWN IN CLASSROOMS SHALL UTILIZE EXISTING CIRCUITRY MADE AVAILABLE DURING DEMOLITION OF WIRE MOLD. EXTEND CIRCUITRY AS REQUIRED. REFER TO IT DRAWINGS AND IT CLASSROOM DETAILS FOR EXACT LOCATIONS.

10. CONTRACTOR TO DISCONNECT EXISTING VAV BOXES AND RECONNECT NEW VAV BOXES.

11. DISCONNECT UNIT HEATER TO ALLOW WORK IN THE ROOM/AREA AND RECONNECT IN SAME LOCATION.

12. PROVIDE 3P-15A CB IN CIRCUIT POSITION INDICATED FOR EXF-1 & EXF-2.

1 ELECTRICAL 1ST FLOOR PART 'A' NEW WORK PLAN

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

NORTH

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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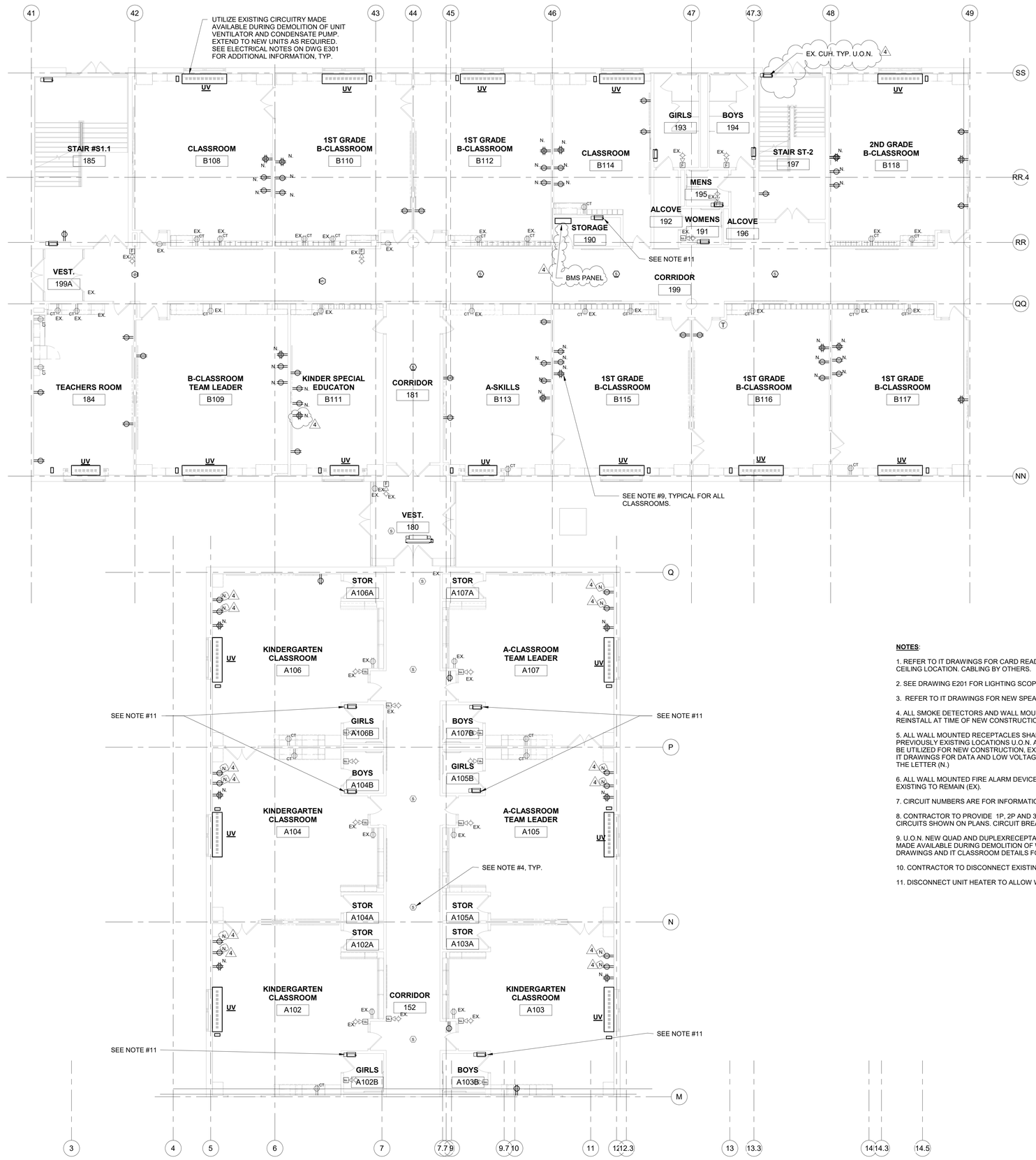
Sheet Title

ELECTRICAL 1ST FLOOR PART 'A' NEW WORK PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

E302



1 ELECTRICAL 1ST FLOOR PART 'B' NEW WORK PLAN
NORTH
SCALE: 1/8" = 1'-0"

NOTES:

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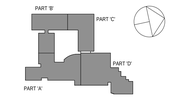

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No.	Date	Issue
4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

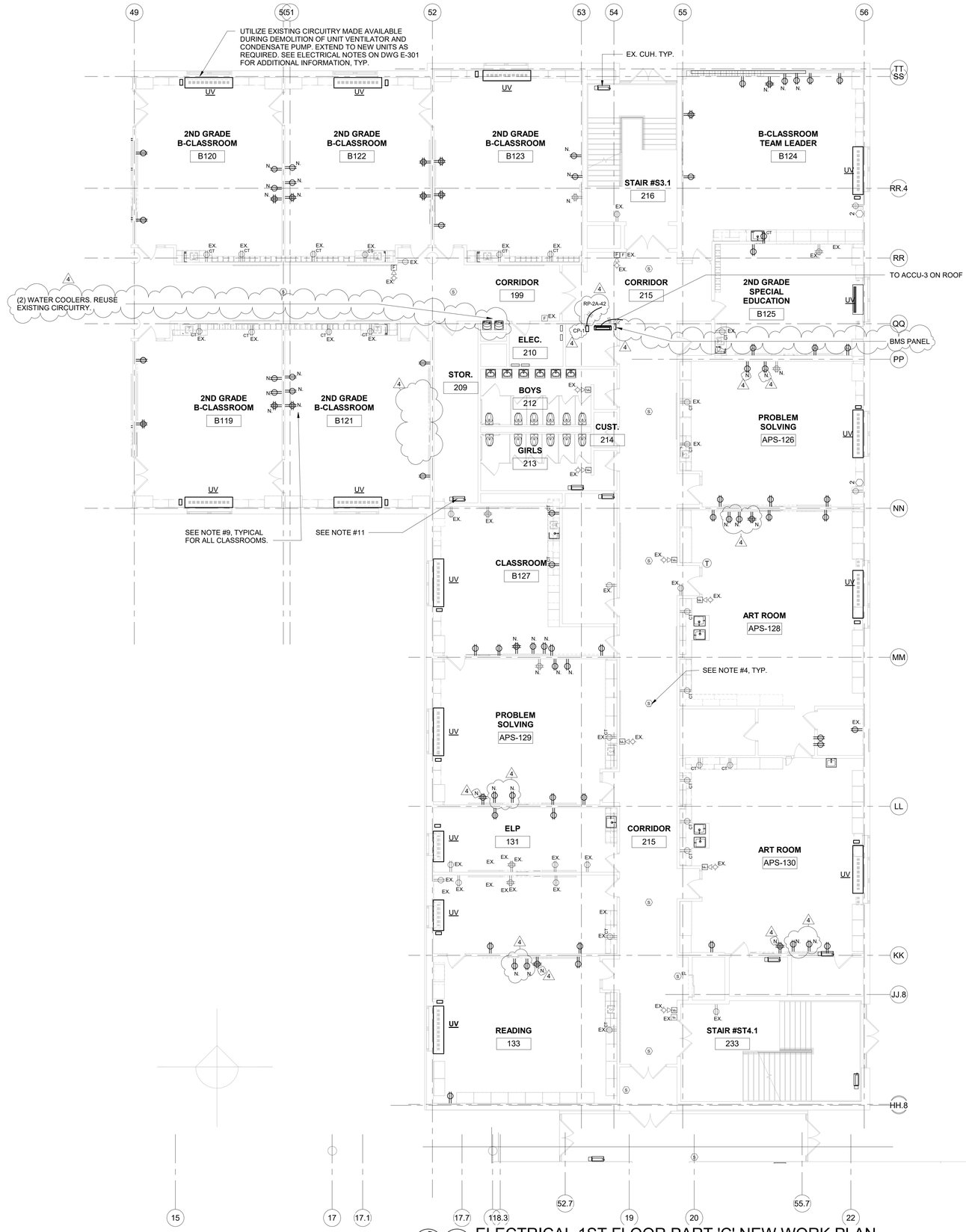
Sheet Title

ELECTRICAL 1ST FLOOR PART 'B' NEW WORK PLAN

Job No.	Date
NKGD0206.00	08/06/2019
Scale: AS NOTED	Drawn / Checked: Author Checker

Sheet Number

E303



NORTH

1 ELECTRICAL 1ST FLOOR PART 'C' NEW WORK PLAN

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

NOTES:

1. REFER TO IT DRAWINGS FOR CARD READER LOCATIONS. PROVIDE BACK BOX AND CONDUIT TO ABOVE CEILING LOCATION. CABLING BY OTHERS.

2. SEE DRAWING E201 FOR LIGHTING SCOPE OF WORK.

3. REFER TO IT DRAWINGS FOR NEW SPEAKER AND CLOCK DETAILS AND LOCATIONS.

4. ALL SMOKE DETECTORS AND WALL MOUNTED FIRE ALARM DEVICES U.O.N. ARE EXISTING TO REMAIN (EX). REINSTALL AT TIME OF NEW CONSTRUCTION.

5. ALL WALL MOUNTED RECEPTACLES SHALL BE REPLACED WITH NEW TAMPER PROOF RECEPTACLES IN PREVIOUSLY EXISTING LOCATIONS U.O.N. AS EXISTING TO REMAIN (EX). EXISTING RECEPTACLE CIRCUITRY TO BE UTILIZED FOR NEW CONSTRUCTION, EXTEND AS REQUIRED AND UTILIZE EXISTING BACK BOXES. REFER TO IT DRAWINGS FOR DATA AND LOW VOLTAGE NEW WORK REQUIREMENTS. NEW DEVICES DESIGNATED WITH THE LETTER (N.)

6. ALL WALL MOUNTED FIRE ALARM DEVICES TO BE REMOVED, STORED, AND REINSTALLED (RR) U.O.N. AS EXISTING TO REMAIN (EX).

7. CIRCUIT NUMBERS ARE FOR INFORMATIONAL PURPOSE ONLY. ALL CIRCUITS SHALL BE FIELD VERIFIED.

8. CONTRACTOR TO PROVIDE 1P, 2P AND 3P CIRCUIT BREAKERS IN EXISTING PANELS TO ACCOMODATE NEW CIRCUITS SHOWN ON PLANS. CIRCUIT BREAKERS SHALL BE 20A U.O.N.

9. U.O.N. NEW QUAD AND DUPLEX RECEPTACLES SHOWN IN CLASSROOMS SHALL UTILIZE EXISTING CIRCUITRY MADE AVAILABLE DURING DEMOLITION OF WIRE MOLD. EXTEND CIRCUITRY AS REQUIRED. REFER TO IT DRAWINGS AND IT CLASSROOM DETAILS FOR EXACT LOCATIONS.

10. CONTRACTOR TO DISCONNECT EXISTING VAV BOXES AND RECONNECT NEW VAV BOXES.

11. DISCONNECT UNIT HEATER TO ALLOW WORK IN THE ROOM/AREA AND RECONNECT IN SAME LOCATION.

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

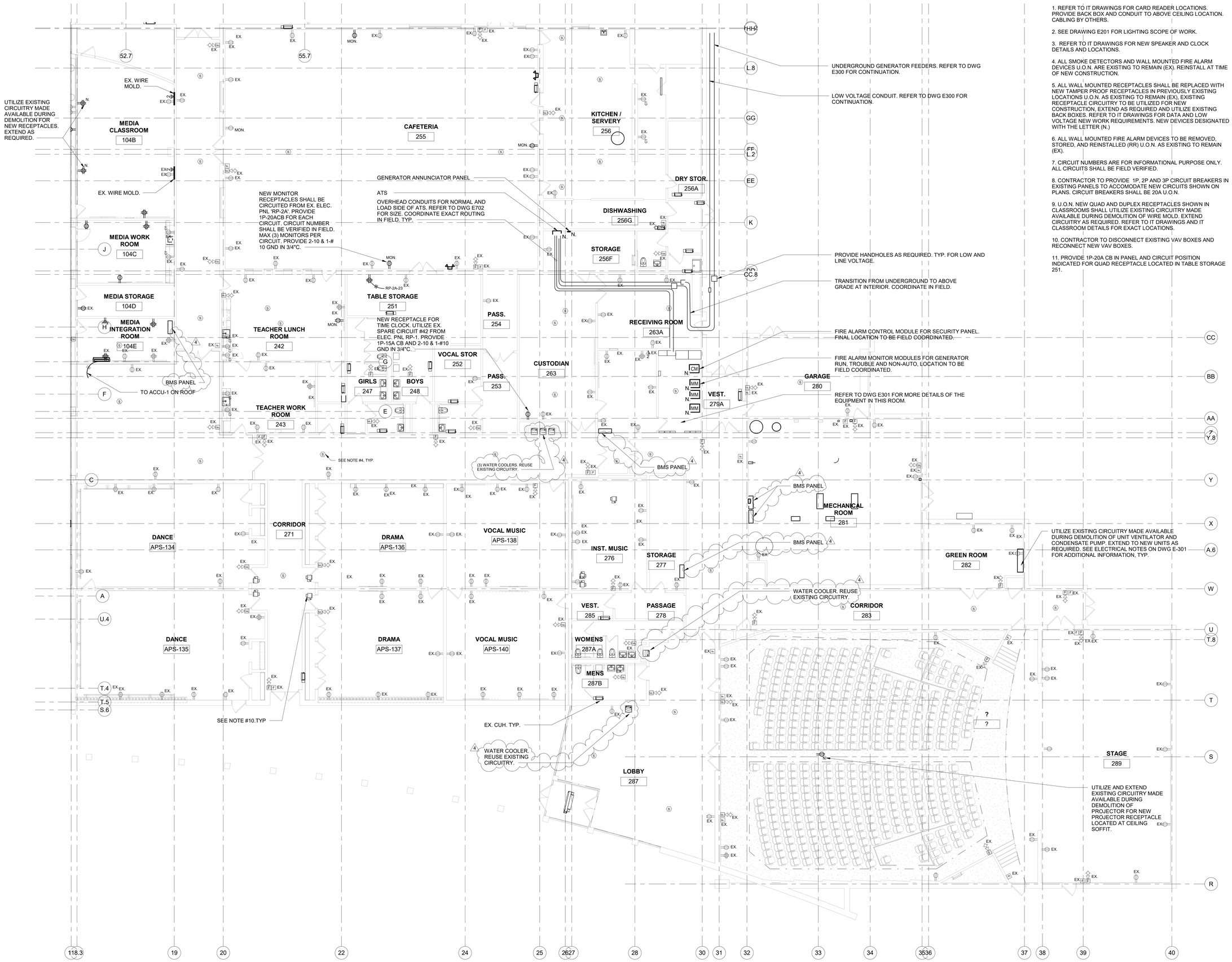
Sheet Title

ELECTRICAL 1ST FLOOR PART 'C' NEW WORK PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

E304



NOTES:

1. REFER TO IT DRAWINGS FOR CARD READER LOCATIONS. PROVIDE BACK BOX AND CONDUIT TO ABOVE CEILING LOCATION. CABLING BY OTHERS.
2. SEE DRAWING E201 FOR LIGHTING SCOPE OF WORK.
3. REFER TO IT DRAWINGS FOR NEW SPEAKER AND CLOCK DETAILS AND LOCATIONS.
4. ALL SMOKE DETECTORS AND WALL MOUNTED FIRE ALARM DEVICES U.O.N. ARE EXISTING TO REMAIN (EX). REINSTALL AT TIME OF NEW CONSTRUCTION.
5. ALL WALL MOUNTED RECEPTACLES SHALL BE REPLACED WITH NEW TAMPER PROOF RECEPTACLES IN PREVIOUSLY EXISTING LOCATIONS U.O.N. AS EXISTING TO REMAIN (EX). EXISTING RECEPTACLE CIRCUITRY TO BE UTILIZED FOR NEW CONSTRUCTION, EXTEND AS REQUIRED AND UTILIZE EXISTING BACK BOXES. REFER TO IT DRAWINGS FOR DATA AND LOW VOLTAGE NEW WORK REQUIREMENTS. NEW DEVICES DESIGNATED WITH THE LETTER (N.)
6. ALL WALL MOUNTED FIRE ALARM DEVICES TO BE REMOVED, STORED, AND REINSTALLED (RR) U.O.N. AS EXISTING TO REMAIN (EX).
7. CIRCUIT NUMBERS ARE FOR INFORMATIONAL PURPOSE ONLY. ALL CIRCUITS SHALL BE FIELD VERIFIED.
8. CONTRACTOR TO PROVIDE 1P, 2P AND 3P CIRCUIT BREAKERS IN EXISTING PANELS TO ACCOMODATE NEW CIRCUITS SHOWN ON PLANS. CIRCUIT BREAKERS SHALL BE 20A U.O.N.
9. U.O.N. NEW QUAD AND DUPLEX RECEPTACLES SHOWN IN CLASSROOMS SHALL UTILIZE EXISTING CIRCUITRY MADE AVAILABLE DURING DEMOLITION OF WIRE MOLD. EXTEND CIRCUITRY AS REQUIRED. REFER TO IT DRAWINGS AND IT CLASSROOM DETAILS FOR EXACT LOCATIONS.
10. CONTRACTOR TO DISCONNECT EXISTING VAV BOXES AND RECONNECT NEW VAV BOXES.
11. PROVIDE 1P-20A CB IN PANEL AND CIRCUIT POSITION INDICATED FOR QUAD RECEPTACLE LOCATED IN TABLE STORAGE 251.

NORTH

1 ELECTRICAL 1ST FLOOR PART 'D' NEW WORK PLAN

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

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

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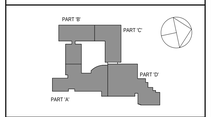

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No.	Date	Issue
4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

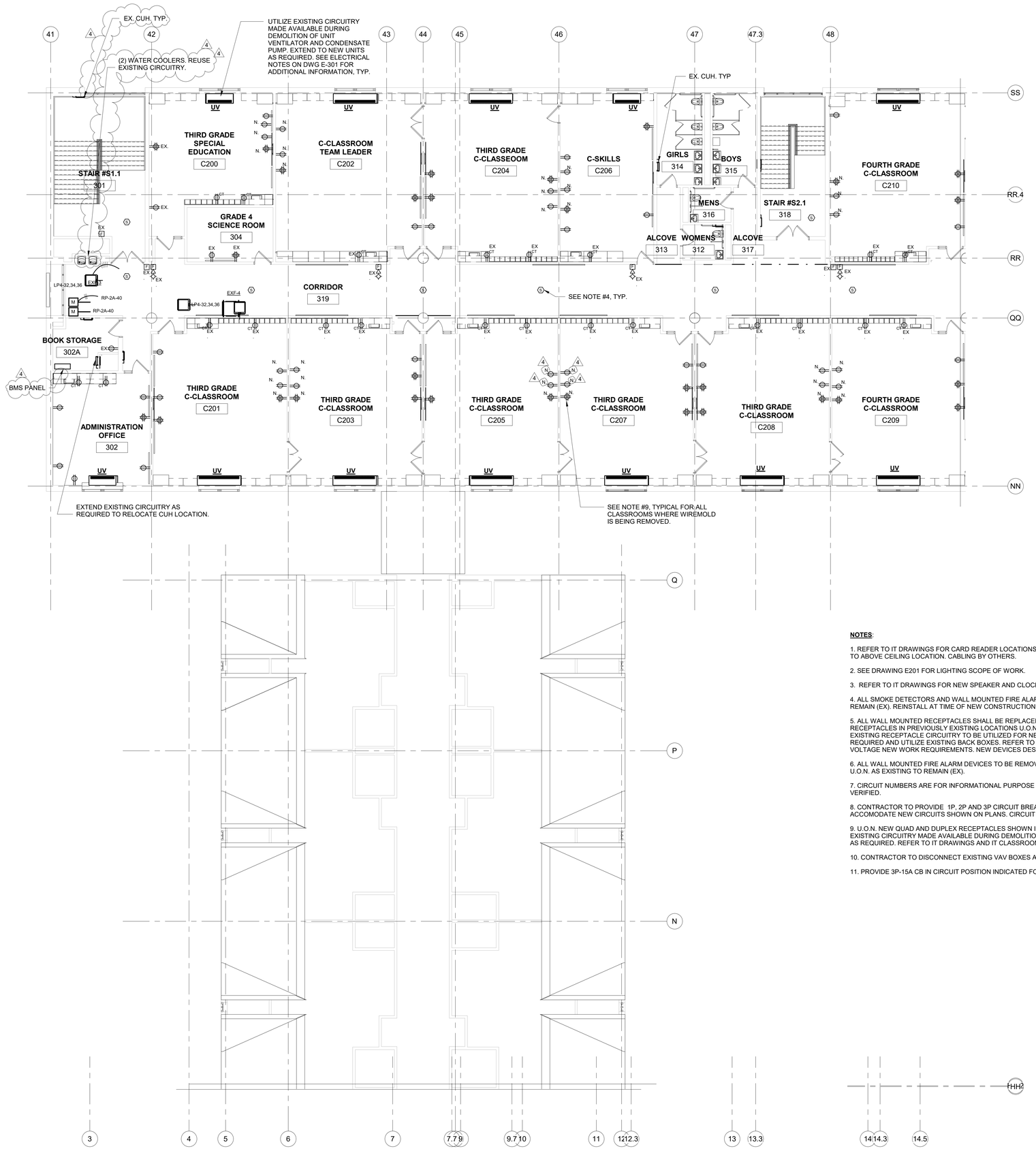
Sheet Title

ELECTRICAL 1ST FLOOR PART 'D' NEW WORK PLAN

Job No.	Date
NKGD0206.00	08/06/2019
Scale: AS NOTED	Drawn / Checked: Author Checker

Sheet Number

E305



ELECTRICAL 2ND FLOOR PART 'B' NEW WORK PLAN

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

NORTH

NOTES:

1. REFER TO IT DRAWINGS FOR CARD READER LOCATIONS. PROVIDE BACK BOX AND CONDUIT TO ABOVE CEILING LOCATION. CABLING BY OTHERS.

2. SEE DRAWING E201 FOR LIGHTING SCOPE OF WORK.

3. REFER TO IT DRAWINGS FOR NEW SPEAKER AND CLOCK DETAILS AND LOCATIONS.

4. ALL SMOKE DETECTORS AND WALL MOUNTED FIRE ALARM DEVICES U.O.N. ARE EXISTING TO REMAIN (EX). REINSTALL AT TIME OF NEW CONSTRUCTION.

5. ALL WALL MOUNTED RECEPTACLES SHALL BE REPLACED WITH NEW TAMPER PROOF RECEPTACLES IN PREVIOUSLY EXISTING LOCATIONS U.O.N. AS EXISTING TO REMAIN (EX), EXISTING RECEPTACLE CIRCUITRY TO BE UTILIZED FOR NEW CONSTRUCTION, EXTEND AS REQUIRED AND UTILIZE EXISTING BACK BOXES. REFER TO IT DRAWINGS FOR DATA AND LOW VOLTAGE NEW WORK REQUIREMENTS. NEW DEVICES DESIGNATED WITH THE LETTER (N.)

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7. CIRCUIT NUMBERS ARE FOR INFORMATIONAL PURPOSE ONLY. ALL CIRCUITS SHALL BE FIELD VERIFIED.

8. CONTRACTOR TO PROVIDE 1P, 2P AND 3P CIRCUIT BREAKERS IN EXISTING PANELS TO ACCOMODATE NEW CIRCUITS SHOWN ON PLANS. CIRCUIT BREAKERS SHALL BE 20A U.O.N.

9. U.O.N. NEW QUAD AND DUPLEX RECEPTACLES SHOWN IN CLASSROOMS SHALL UTILIZE EXISTING CIRCUITRY MADE AVAILABLE DURING DEMOLITION OF WIRE MOLD. EXTEND CIRCUITRY AS REQUIRED. REFER TO IT DRAWINGS AND IT CLASSROOM DETAILS FOR EXACT LOCATIONS.

10. CONTRACTOR TO DISCONNECT EXISTING VAV BOXES AND RECONNECT NEW VAV BOXES.

11. PROVIDE 3P-15A CB IN CIRCUIT POSITION INDICATED FOR EXF-1 & EXF-2.

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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PART 'B' PART 'C' PART 'D' PART 'A'

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3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

Sheet Title

ELECTRICAL 2ND FLOOR PART 'B' NEW WORK PLAN

Job No.	Date
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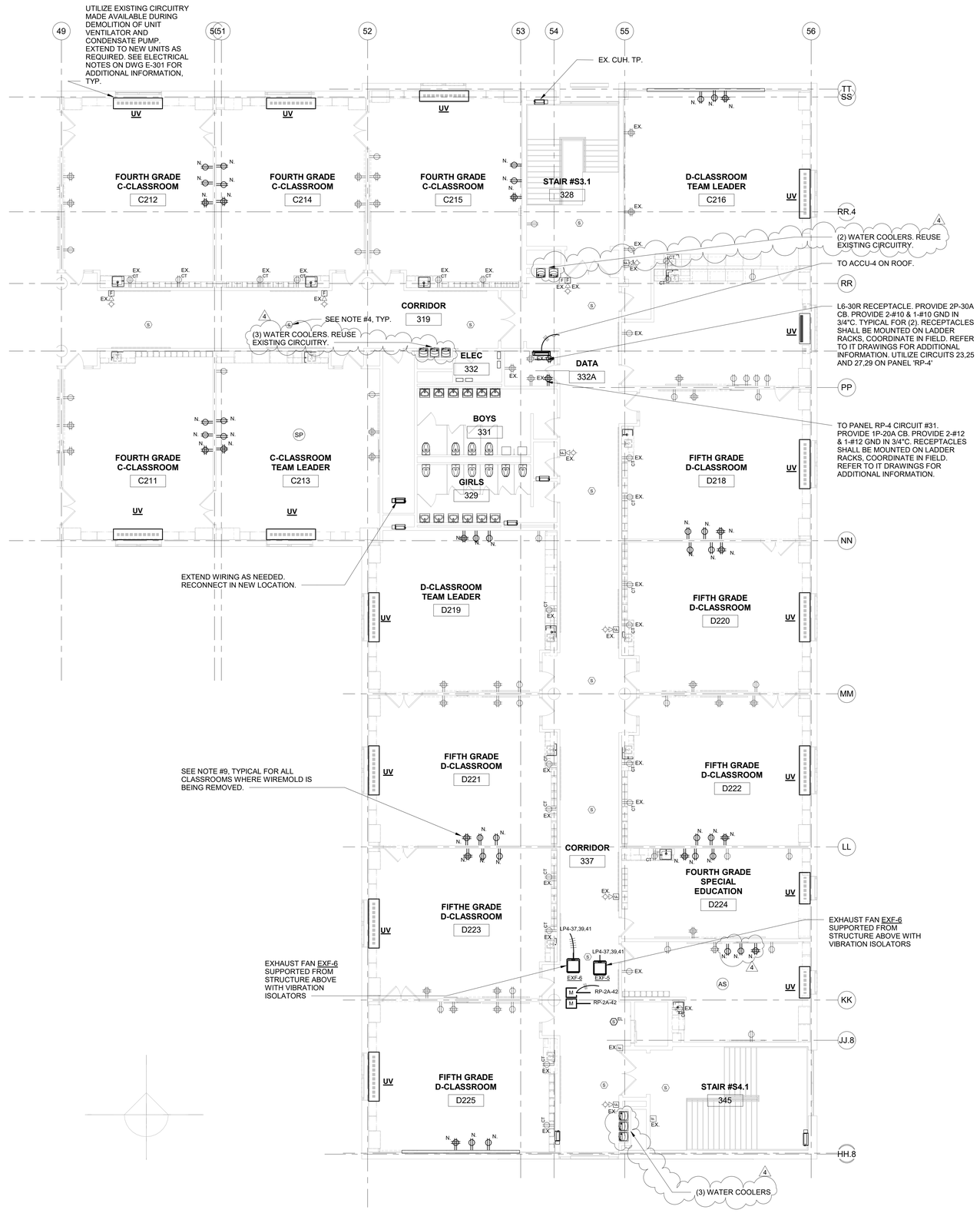
Scale: AS NOTED	Drawn / Checked: Author Checker

Sheet Number

E306



1 ELECTRICAL 2ND FLOOR PART 'C' NEW WORK PLAN

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

NORTH

NOTES:

1. REFER TO IT DRAWINGS FOR CARD READER LOCATIONS. PROVIDE BACK BOX AND CONDUIT TO ABOVE CEILING LOCATION. CABLING BY OTHERS.

2. SEE DRAWING E201 FOR LIGHTING SCOPE OF WORK.

3. REFER TO IT DRAWINGS FOR NEW SPEAKER AND CLOCK DETAILS AND LOCATIONS.

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8. CONTRACTOR TO PROVIDE 1P, 2P AND 3P CIRCUIT BREAKERS IN EXISTING PANELS TO ACCOMODATE NEW CIRCUITS SHOWN ON PLANS. CIRCUIT BREAKERS SHALL BE 20A U.O.N.

9. QUAD RECEPTACLES SHOWN IN CLASSROOMS SHALL UTILIZE EXISTING CIRCUITRY MADE AVAILABLE DURING DEMOLITION OF WIRE MOLD. EXTEND CIRCUITRY AS REQUIRED. REFER TO IT DRAWINGS AND IT CLASSROOM DETAILS FOR EXACT LOCATIONS.

10. CONTRACTOR TO DISCONNECT EXISTING VAV BOXES AND RECONNECT NEW VAV BOXES.

11. PROVIDE 3P-15A CB IN CIRCUIT POSITION INDICATED FOR EXF-1 & EXF-2.

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

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PROJECT # S-6722

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2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

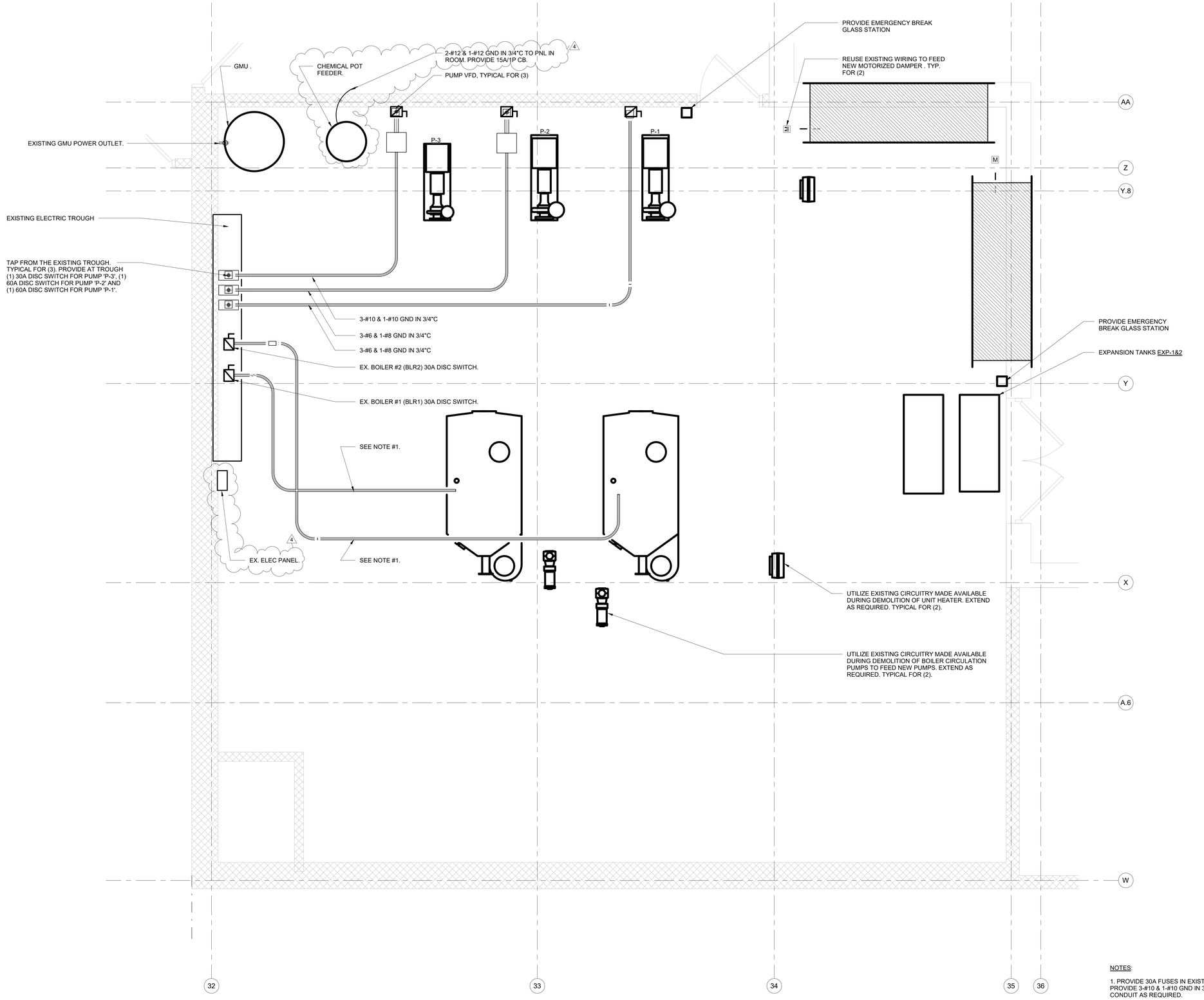
Sheet Title

ELECTRICAL 2ND FLOOR PART 'C' NEW WORK PLAN

Job No.	Date
NKGD0206.00	08/06/2019
Scale: AS NOTED	Drawn / Checked: Author Checker

Sheet Number

E307



1 ELECTRICAL BOILER ROOM NEW WORK PLAN - ALTERNATE A

SCALE: 1/2" = 1'-0"

NORTH

NOTES:

1. PROVIDE 30A FUSES IN EXISTING 30A DISC SWITCH FOR BOILER 'BLR1' AND 'BLR2'. PROVIDE 3-#10 & 1-#10 GND IN 3/4"C FOR EACH UNIT. UTILIZE AND EXTEND EXISTING CONDUIT AS REQUIRED.

2. REFER TO THE MECHANICAL DRAWING FOR EXACT LOCATION OF EQUIPMENT.

3. ALL CIRCUITRY AND CONDUIT ASSOCIATED WITH PUMPS 'P-1', 'P-2' AND 'P-3' SHALL BE FED FROM ELECTRICAL TROUGH.

4. ALL SCOPE OF WORK SHOWN ON THIS DRAWING SHALL BE PRICED UNDER AD/ALT A.

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

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PROJECT # S-6722

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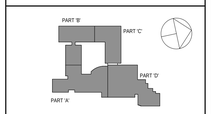

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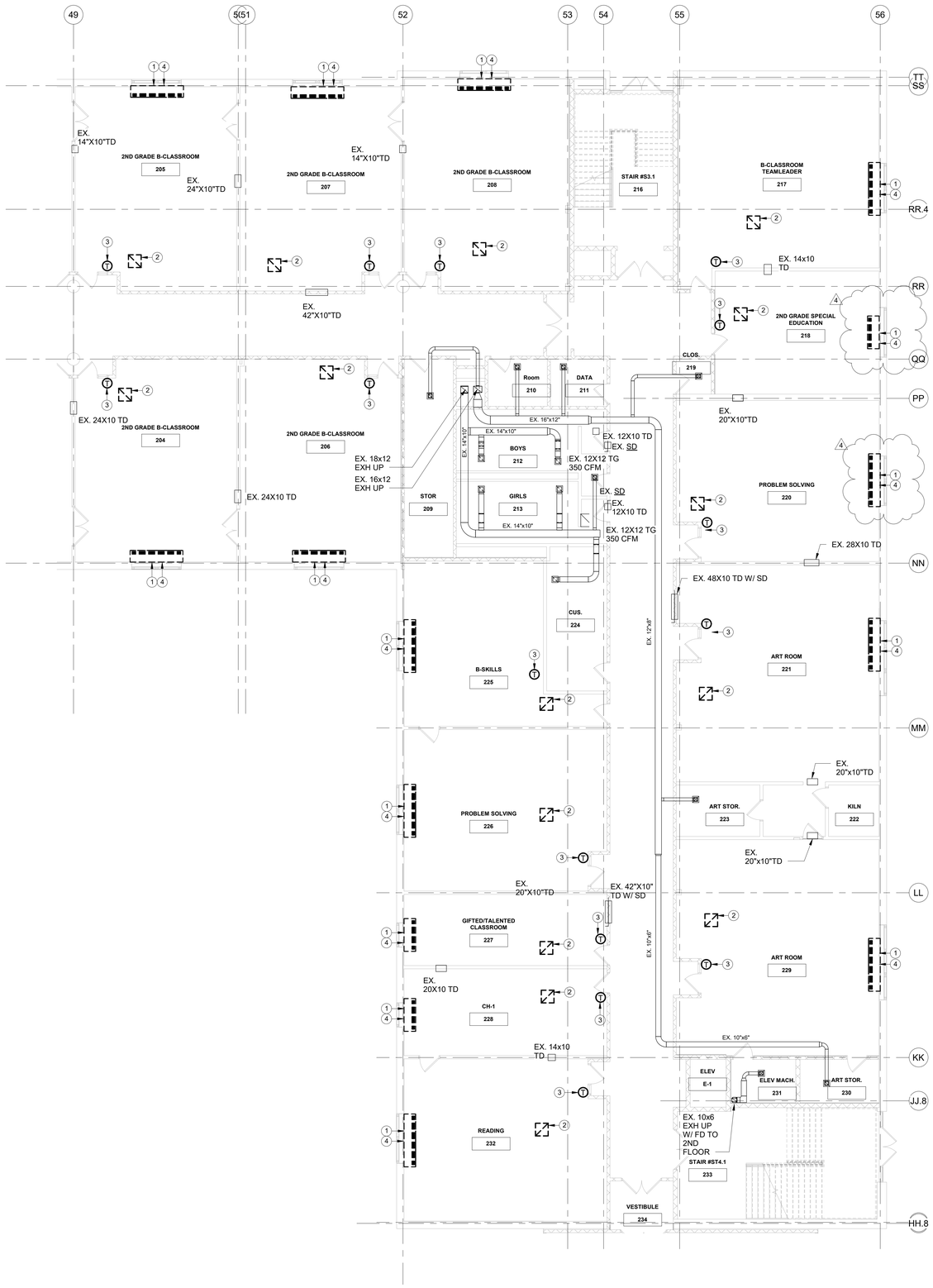
ELECTRICAL BOILER ROOM NEW WORK PLAN - ALTERNATE A

Job No.	Date
NKGD0206.00	08/06/2019
Scale: AS NOTED	Drawn / Checked: Author Checker

Sheet Number

E309



MECHANICAL 1ST FLOOR PART 'C' DUCTWORK DEMOLITION PLAN

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

NORTH

MECHANICAL DEMOLITION GENERAL NOTES	
1	DEMOLISH ALL DUCTWORK INSULATION ON ALL SUPPLY & RETURN DUCWORK COMPLETE UNLESS OTHERWISE NOTED
2	DEMOLISH ALL DUAL TEMPERATURE SUPPLY & RETURN PIPE INSULATION COMPLETE THROUGHOUT ENTIRE BUILDING

MECHANICAL DEMOLITION KEYNOTES	
1	DEMOLISH UNIT VENTILATOR COMPLETE INCLUDING ALL VALVES, STRAINERS, PRESSURE /TEMPERATURE PORTS, CONDENSATE DRAINS & CONTROLS WIRING. DEMOLISH ASSOCIATED DTS&R PIPING SUFFICIENT FOR RECONNECTION DURING NEW WORK PHASE.
2	DEMOLISH AIR OUTLETS / INLETS LOCATED IN ALL CEILINGS BEING DEMOLISHED. DISCONNECT FROM EXISTING BRANCH DUCTWORK SUFFICIENT FOR NEW WORK PHASE. COORDINATE WITH ARCHITECTURAL RCP.
3	DEMOLISH THERMOSTAT COMPLETE INCLUDING ALL ASSOCIATED CONTROLS WIRING
4	REPAIR EXTERIOR PENETRATION COMPLETE TO PROVIDE AIR AND WATERTIGHT SEAL. COORDINATE WITH ARCHITECTURAL DRAWINGS.
5	EXISTING CABINET UNIT HEATER TO REMAIN. DEMOLISH CONTROL VALVE AND ASSOCIATED CONTROLS WIRING COMPLETE. DEMOLISH HWS&R PIPING SUFFICIENT FOR NEW WORK.
6	EXISTING FIN TUBE RADIATOR TO REMAIN. DEMOLISH CONTROL VALVE AND ASSOCIATED CONTROLS WIRING COMPLETE. DEMOLISH HWS&R PIPING SUFFICIENT FOR NEW WORK.
7	DEMOLISH VAV WITH REHEAT COIL COMPLETE. DEMOLISH CONTROL VALVE AND ASSOCIATED CONTROLS WIRING COMPLETE
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Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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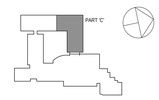

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No.	Date	Issue
4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

Sheet Title

MECHANICAL 1ST FLOOR PART 'C' DUCTWORK DEMOLITION PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

M103

MECHANICAL DEMOLITION GENERAL NOTES	
1	DEMOLISH ALL DUCTWORK INSULATION ON ALL SUPPLY & RETURN DUCWORK COMPLETE UNLESS OTHERWISE NOTED
2	DEMOLISH ALL DUAL TEMPERATURE SUPPLY & RETURN PIPE INSULATION COMPLETE THROUGHOUT ENTIRE BUILDING

MECHANICAL DEMOLITION KEYNOTES	
1	DEMOLISH UNIT VENTILATOR COMPLETE INCLUDING ALL VALVES, STRAINERS, PRESSURE /TEMPERATURE PORTS, CONDENSATE DRAINS & CONTROLS WIRING. DEMOLISH ASSOCIATED DTS&R PIPING SUFFICIENT FOR RECONNECTION DURING NEW WORK PHASE.
2	DEMOLISH AIR OUTLETS / INLETS LOCATED IN ALL CEILINGS BEING DEMOLISHED. DISCONNECT FROM EXISTING BRANCH DUCTWORK SUFFICIENT FOR NEW WORK PHASE. COORDINATE WITH ARCHITECTURAL RCP.
3	DEMOLISH THERMOSTAT COMPLETE INCLUDING ALL ASSOCIATED CONTROLS WIRING
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MECHANICAL 1ST FLOOR PART 'D' DUCTWORK DEMOLITION PLAN

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

NORTH

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

KG+D . ARCHITECTS PC

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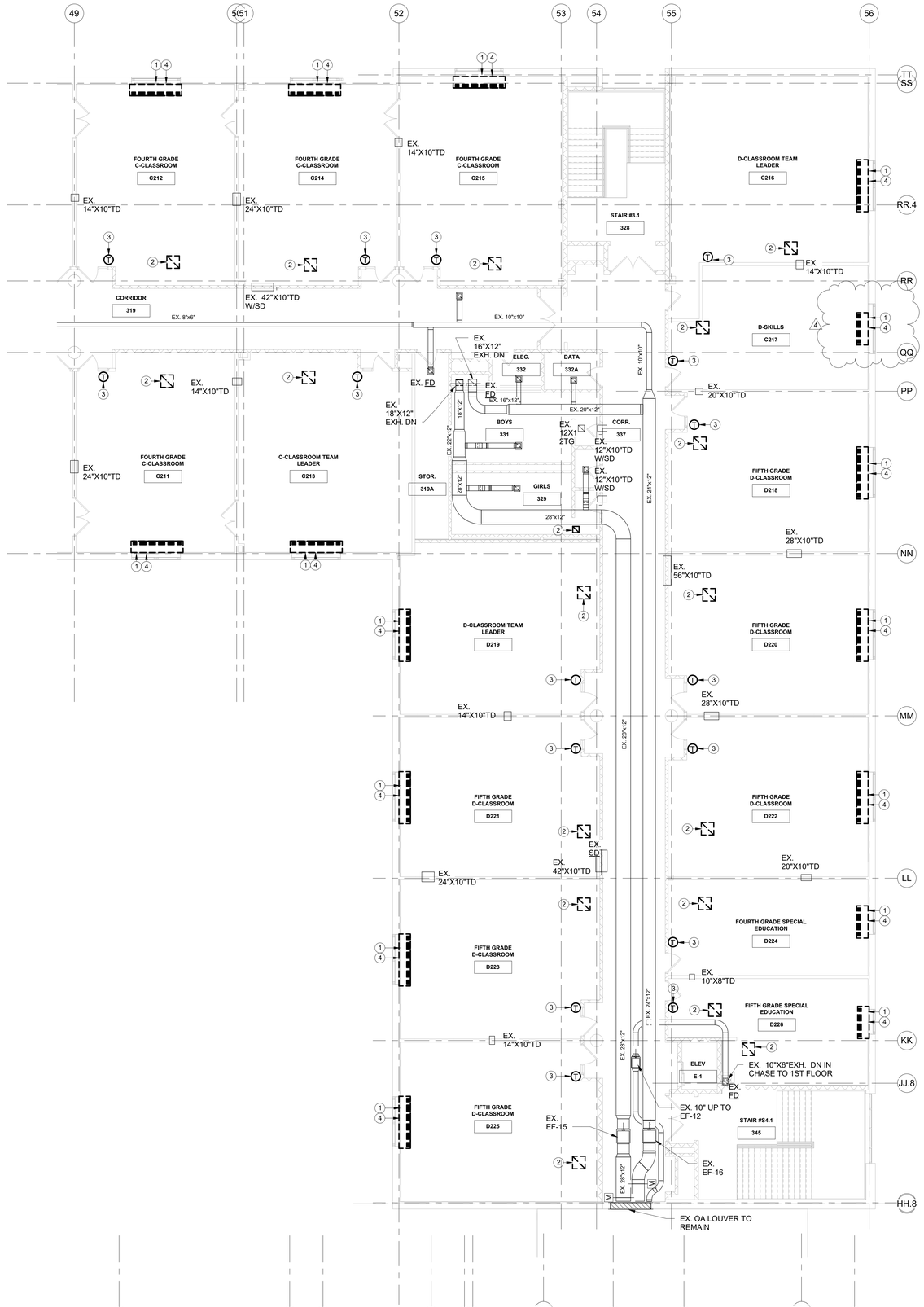
AS NOTED	Author Checker

Sheet Number

M104



1 MECHANICAL 2ND FLOOR PART 'C' DUCTWORK DEMOLITION PLAN

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

NORTH

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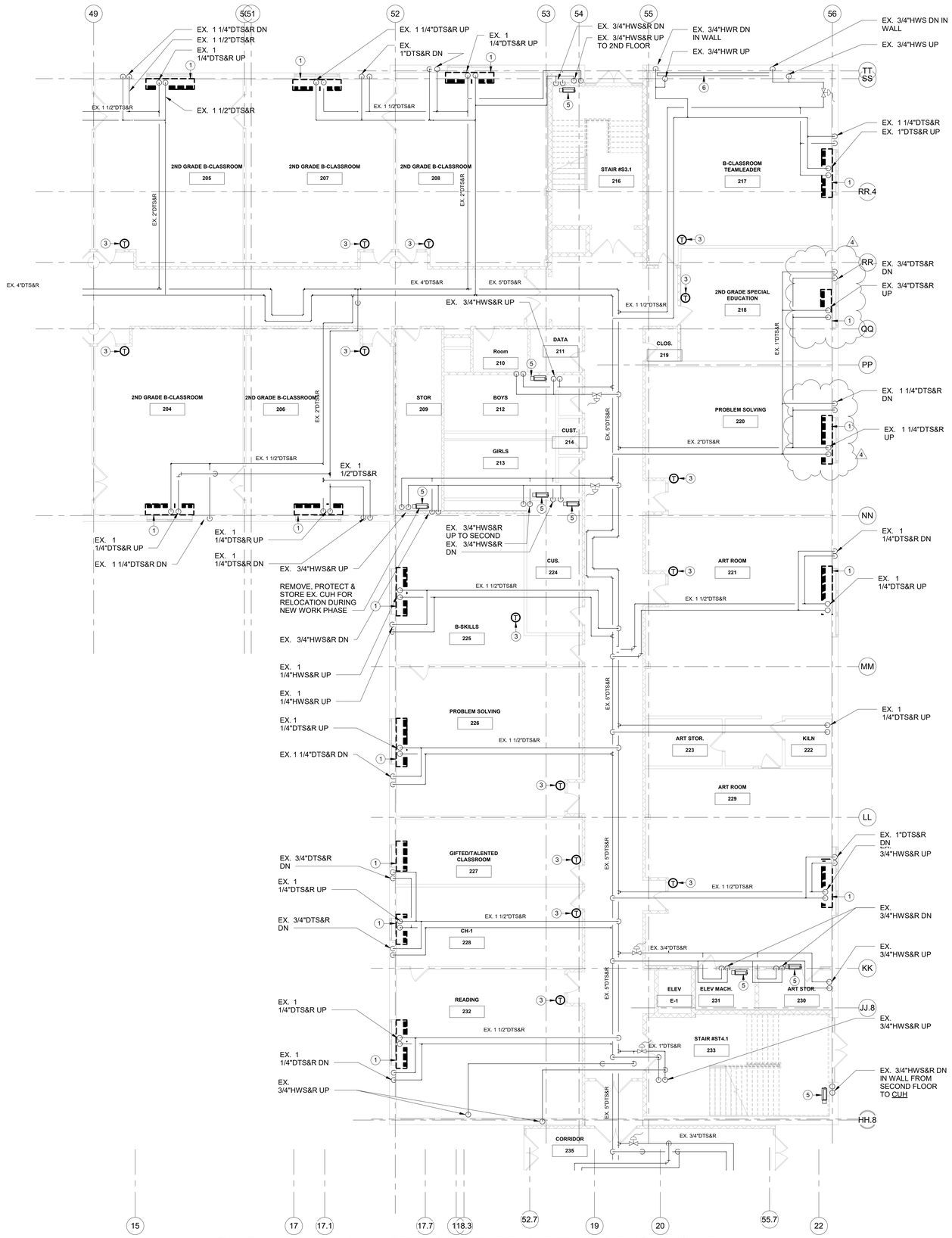
Sheet Title

MECHANICAL 2ND FLOOR PART 'C' DUCTWORK DEMOLITION PLAN

Job No.	Date
NKGD0206.00	08/06/2019
Scale	Drawn / Checked
AS NOTED	Author Checker

Sheet Number

M106



MECHANICAL 1ST FLOOR PART 'C' PIPING DEMOLITION PLAN

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

NORTH

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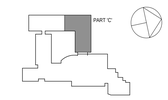

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A	9/13/2019	ADDENDUM 2
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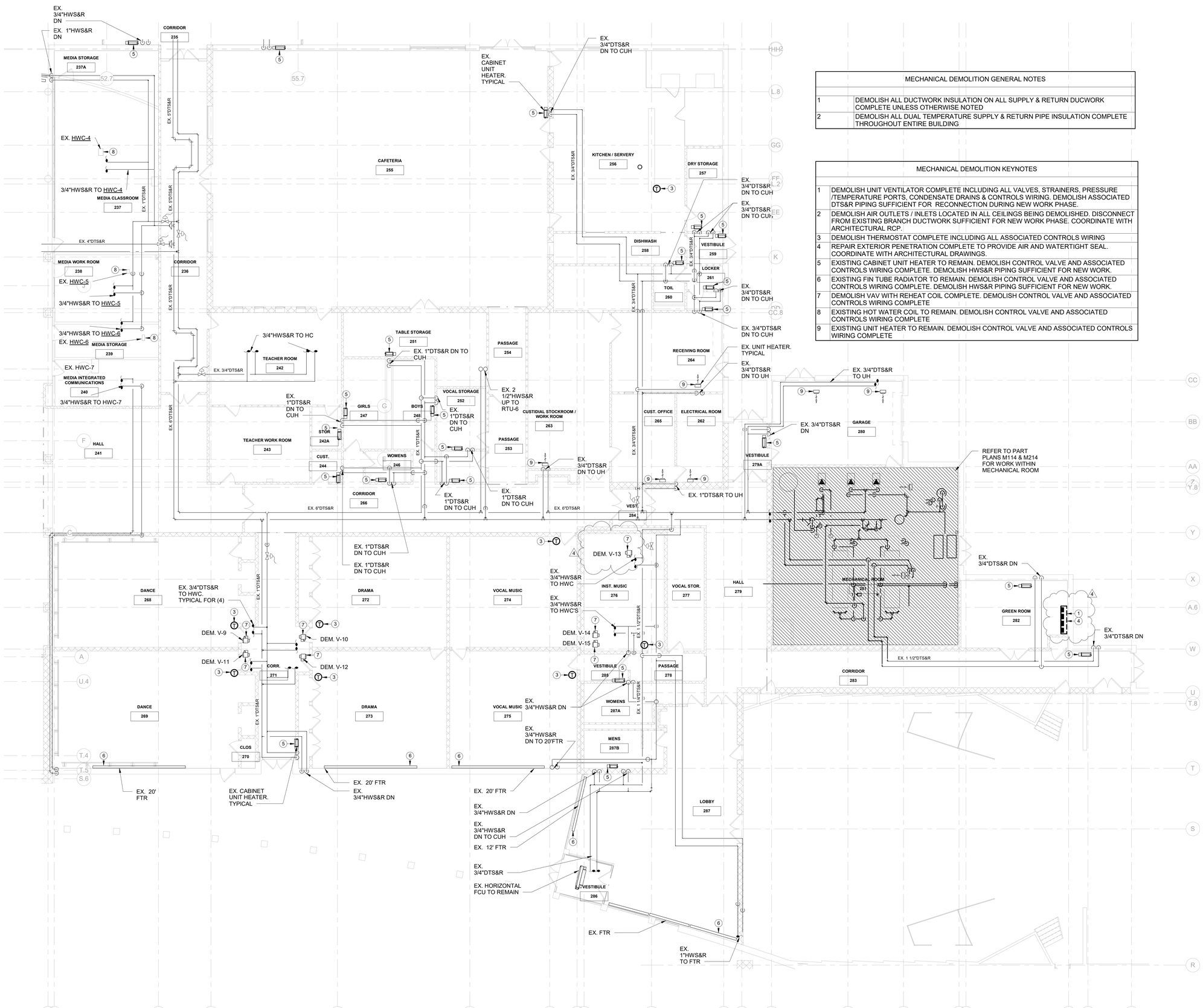
Sheet Title

MECHANICAL 1ST FLOOR PART 'C' PIPING DEMOLITION PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

M109


EX. 3/4"HWS&R DN
EX. 1"HWS&R DN
MEDIA STORAGE 237A
CORRIDOR 235
EX. HWC-4
3/4"HWS&R TO HWC-4
MEDIA CLASSROOM 237
EX. 4"DTS&R
MEDIA WORK ROOM 238
EX. HWC-5
3/4"HWS&R TO HWC-5
CORRIDOR 236
3/4"HWS&R TO HWC-6
EX. HWC-6
MEDIA STORAGE 239
EX. HWC-7
MEDIA INTEGRATED COMMUNICATIONS 240
3/4"HWS&R TO HWC-7
HALL 241
3/4"HWS&R TO HC
TEACHER ROOM 242
EX. 3/4"DTS&R
TEACHER WORK ROOM 243
CUST. 244
STOR 242A
GIRLS 247
BOYS 248
WOMENS 246
CORRIDOR 266
TABLE STORAGE 251
EX. 1"DTS&R DN TO CUH
VOCAL STORAGE 252
EX. 1"DTS&R DN TO CUH
EX. 2 1/2"HWS&R UP TO RTU-6
PASSAGE 254
PASSAGE 253
CUSTIDIAL STOCKROOM / WORK ROOM 263
EX. 1"DTS&R DN TO CUH
EX. 1"DTS&R DN TO CUH
EX. 1"DTS&R DN TO CUH
EX. 3/4"DTS&R DN TO UH
EX. 6"DTS&R
EX. 1"DTS&R
EX. 3/4"DTS&R
CAFETERIA 255
EX. CABINET UNIT HEATER. TYPICAL
EX. 3/4"DTS&R DN TO CUH
KITCHEN / SERVERY 256
DRY STORAGE 257
EX. 3/4"DTS&R DN TO CUH
EX. 3/4"DTS&R DN TO CUH
DISHWASH 258
VESTIBULE 259
LOCKER 261
TOIL 260
EX. 3/4"DTS&R DN TO CUH
EX. 3/4"DTS&R DN TO CUH
EX. UNIT HEATER. TYPICAL
RECEIVING ROOM 264
EX. 3/4"DTS&R DN TO UH
CUST. OFFICE 265
ELECTRICAL ROOM 262
EX. 3/4"DTS&R TO UH
EX. 3/4"DTS&R DN
GARAGE 280
VESTIBULE 279A
EX. 1"DTS&R TO UH
REFER TO PART PLANS M114 & M214 FOR WORK WITHIN MECHANICAL ROOM
VEST. 284
MECHANICAL ROOM 281
EX. 3/4"DTS&R DN
GREEN ROOM 282
EX. 3/4"DTS&R DN
EX. 1 1/2"DTS&R
CORRIDOR 283
DEM. V-13
EX. 3/4"HWS&R TO HWC
EX. 3/4"HWS&R TO HWC'S
INST. MUSIC 276
VOCAL STOR. 277
HALL 279
DEM. V-14
DEM. V-15
EX. 1 1/2"DTS&R
VESTIBULE 285
PASSAGE 278
WOMENS 287A
MENS 287B
EX. 3/4"HWS&R DN
EX. 3/4"HWS&R DN TO 20'FTR
LOBBY 287
EX. 20' FTR
EX. 3/4"HWS&R DN
EX. 3/4"HWS&R DN TO CUH
EX. 12' FTR
EX. 3/4"DTS&R
EX. HORIZONTAL FCU TO REMAIN
VESTIBULE 286
EX. FTR
EX. 1"HWS&R TO FTR
DANCE 268
EX. 3/4"DTS&R TO HWC. TYPICAL FOR (4)
DEM. V-9
DEM. V-10
DEM. V-11
DEM. V-12
CORR. 271
DANCE 269
CLOS 270
DRAMA 272
DRAMA 273
VOCAL MUSIC 274
VOCAL MUSIC 275
EX. 20' FTR
EX. 3/4"HWS&R DN
EX. CABINET UNIT HEATER. TYPICAL
EX. 1"DTS&R DN TO CUH
EX. 1"DTS&R DN TO CUH
EX. 1"DTS&R
EX. 5"DTS&R
EX. 4"DTS&R
EX. 6"DTS&R
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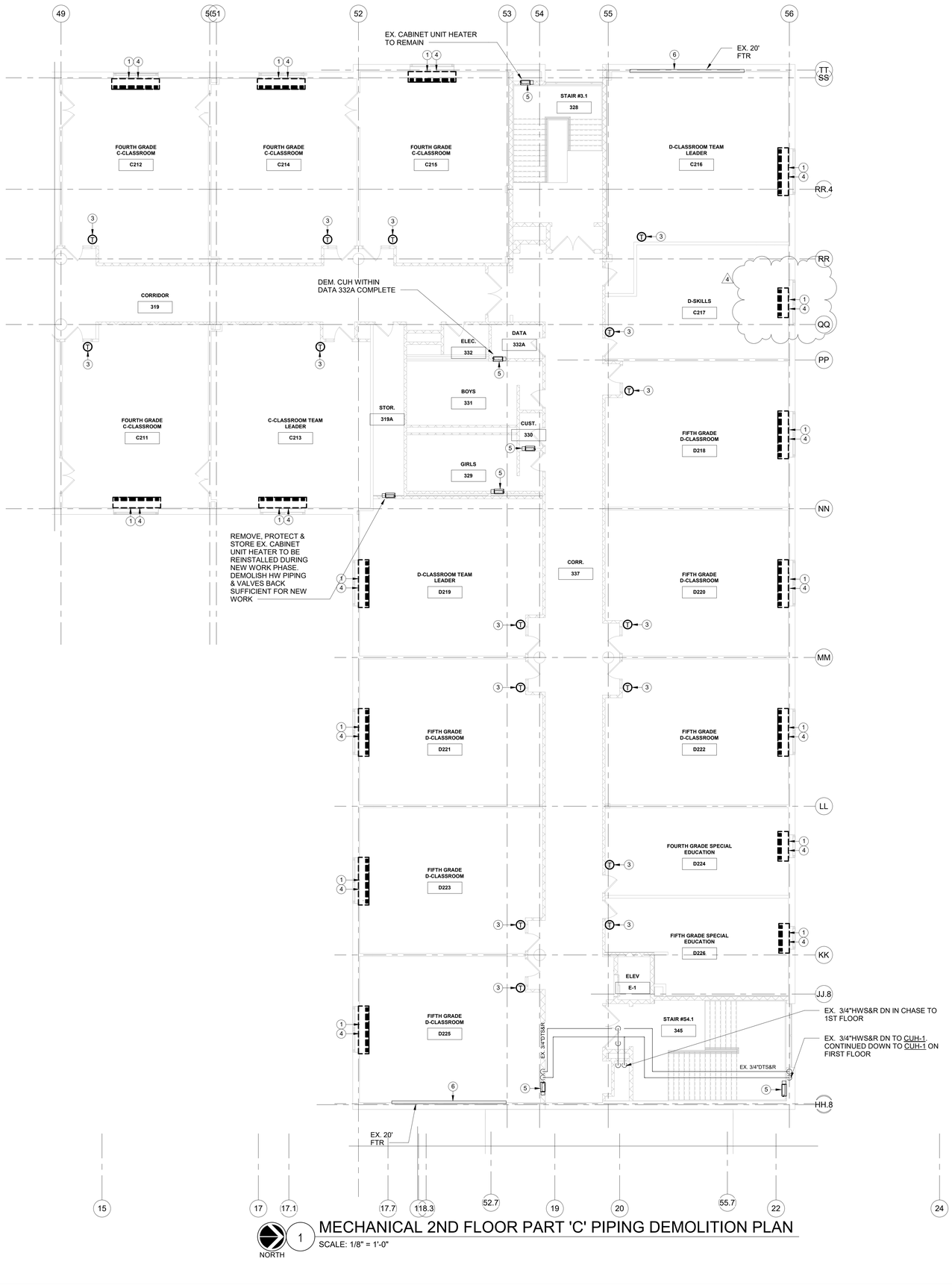
EX. 1"DTS&R
EX. 3/4"DTS&R
EX. 1



1 MECHANICAL 2ND FLOOR PART 'C' PIPING DEMOLITION PLAN

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

NORTH

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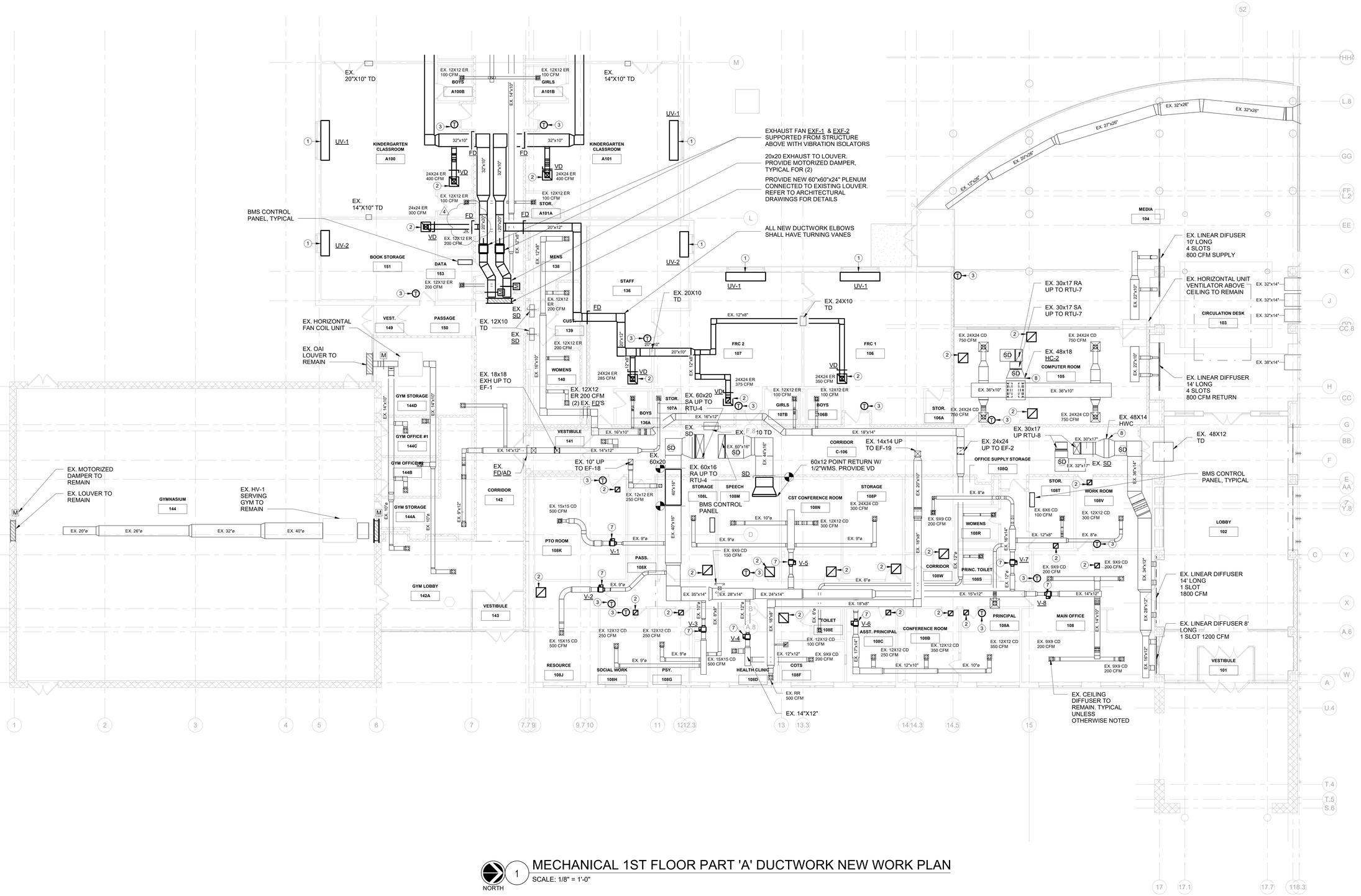
Sheet Number

M112



MECHANICAL 1ST FLOOR PART 'A' DUCTWORK NEW WORK PLAN

NORTH

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

MECHANICAL NEW WORK GENERAL NOTES	
1	PROVIDE NEW DUCTWORK INSULATION ON ALL SUPPLY & RETURN DUCTWORK THROUGHOUT ENTIRE BUILDING UNLESS OTHERWISE NOTED
2	PROVIDE NEW DUAL TEMPERATURE SUPPLY & RETURN PIPE INSULATION COMPLETE THROUGHOUT ENTIRE BUILDING
3	ALL EXISTING TO REMAIN AIR OUTLETS WITHIN CEILINGS BEING REPLACED SHALL BE REMOVED AND CLEANED AS PER SPECIFICATIONS. TYPICAL UNLESS OTHERWISE NOTED

MECHANICAL NEW WORK KEYNOTES	
1	PROVIDE NEW UNIT VENTILATOR IN LOCATION OF PREVIOUSLY DEMOLISHED UNIT. EXTEND NEW 1 1/4"DTS&R PIPING FROM EX. BRANCHES TO THE UNIT VENTILATOR. PROVIDE NEW PREMIUM PIPING PACKAGE INCLUDING CONTROL VALVE, SHUT-OFF VALVE, STRAINER, BALANCING VALVE & SPECIALTIES. REFER TO MECHANICAL DETAILS.
2	PROVIDE NEW AIR OUTLETS / INLETS AT LOCATION OF PREVIOUSLY DEMOLISHED AIR OUTLET/ INLET.
3	PROVIDE NEW THERMOSTAT COMPLETE WITH NEW CONTROLS WIRING TO BE INTEGRATED INTO NEW BMS
4	REPAIR EXTERIOR PENETRATION COMPLETE TO PROVIDE AIR AND WATERTIGHT SEAL. COORDINATE WITH ARCHITECTURAL DRAWINGS.
5	EXISTING CABINET UNIT HEATER TO REMAIN. PROVIDE NEW CONTROL VALVE AND ASSOCIATED CONTROLS WIRING FOR INTEGRATION INTO NEW BMS. REFER TO MECHANICAL DETAILS.
6	EXISTING FIN TUBE RADIATOR TO REMAIN. PROVIDE NEW CONTROL VALVE AND ASSOCIATED CONTROLS WIRING FOR INTEGRATION INTO NEW BMS. REFER TO MECHANICAL DETAILS.
7	PROVIDE NEW VAV WITH REHEAT COIL. PROVIDE NEW CONTROL VALVE AND ASSOCIATED CONTROLS WIRING FOR INTEGRATION INTO NEW BMS. PROVIDE 1" ACOUSTIC LINING DOWNSTREAM OF VAV BOXES. REFER TO MECHANICAL DETAILS
8	EXISTING HOTWATER COIL TO REMAIN. PROVIDE NEW CONTROL VALVE AND ASSOCIATED CONTROLS WIRING FOR INTEGRATION INTO NEW BMS. REFER TO MECHANICAL DETAILS.
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PART 'A'

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No.	Date	Issue
4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

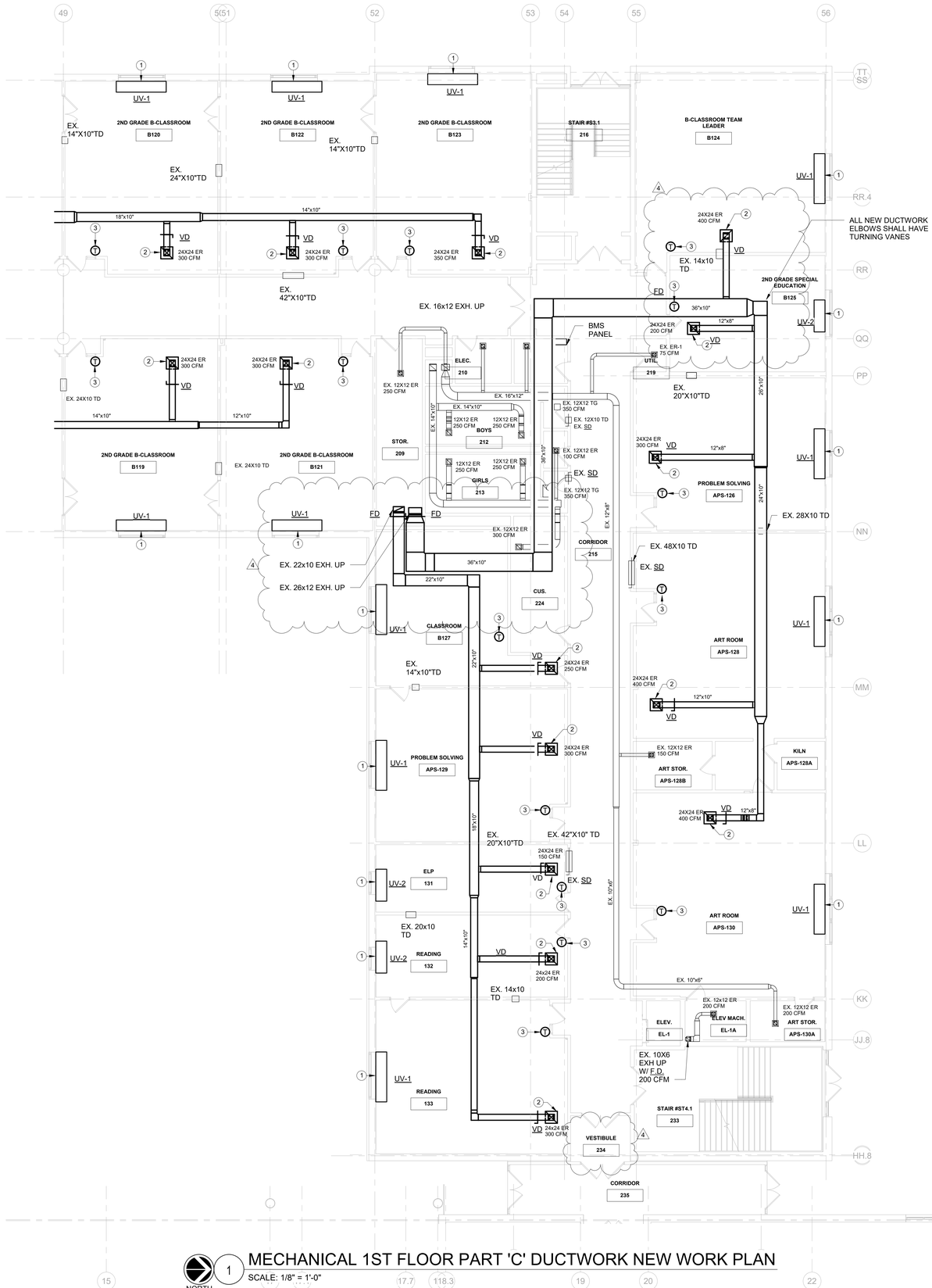
Sheet Title

MECHANICAL 1ST FLOOR PART 'A' DUCTWORK NEW WORK PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

M201



1 MECHANICAL 1ST FLOOR PART 'C' DUCTWORK NEW WORK PLAN

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

NORTH

MECHANICAL NEW WORK GENERAL NOTES	
1	PROVIDE NEW DUCTWORK INSULATION ON ALL SUPPLY & RETURN DUCTWORK THROUGHOUT ENTIRE BUILDING UNLESS OTHERWISE NOTED
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3	ALL EXISTING TO REMAIN AIR OUTLETS WITHIN CEILINGS BEING REPLACED SHALL BE REMOVED AND CLEANED AS PER SPECIFICATIONS. TYPICAL UNLESS OTHERWISE NOTED

MECHANICAL NEW WORK KEYNOTES	
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5	EXISTING CABINET UNIT HEATER TO REMAIN. PROVIDE NEW CONTROL VALVE AND ASSOCIATED CONTROLS WIRING FOR INTEGRATION INTO NEW BMS. REFER TO MECHANICAL DETAILS.
6	EXISTING FIN TUBE RADIATOR TO REMAIN. PROVIDE NEW CONTROL VALVE AND ASSOCIATED CONTROLS WIRING FOR INTEGRATION INTO NEW BMS. REFER TO MECHANICAL DETAILS.
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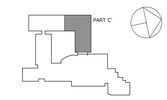

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No.	Date	Issue
4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

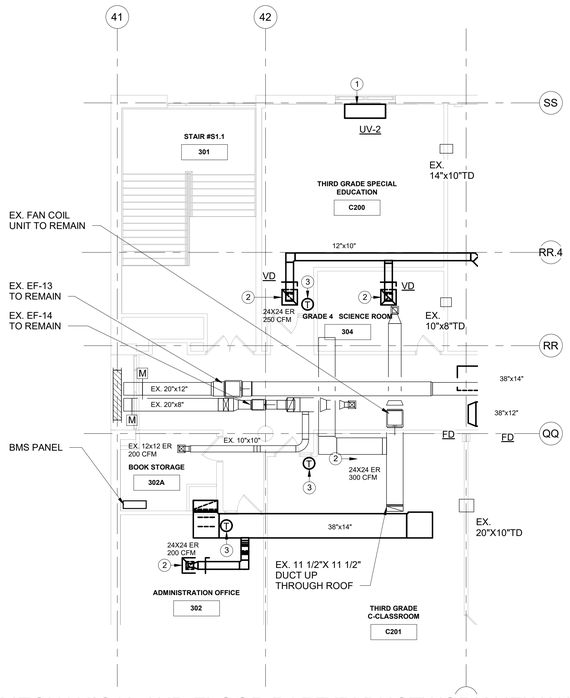
Sheet Title

MECHANICAL 1ST FLOOR PART 'C' DUCTWORK NEW WORK PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

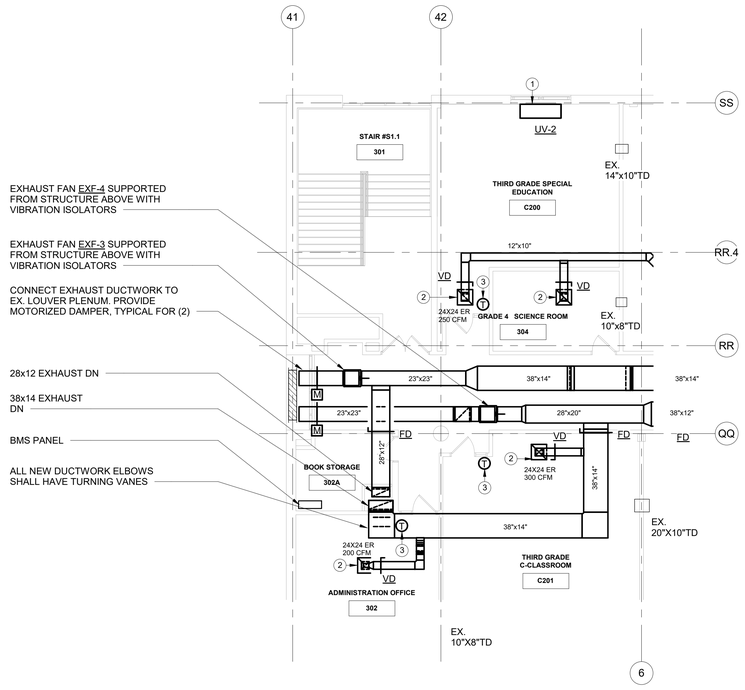
M203



MECHANICAL 2ND FLOOR PART 'B' DUCTWORK NEW WORK PART PLAN - LOWER

3 NORTH

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



MECHANICAL 2ND FLOOR PART 'B' DUCTWORK NEW WORK PART PLAN - UPPER

2 NORTH

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

MECHANICAL NEW WORK GENERAL NOTES	
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MECHANICAL 2ND FLOOR PART 'B' DUCTWORK NEW WORK PLAN

1 NORTH

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

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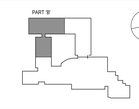

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4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
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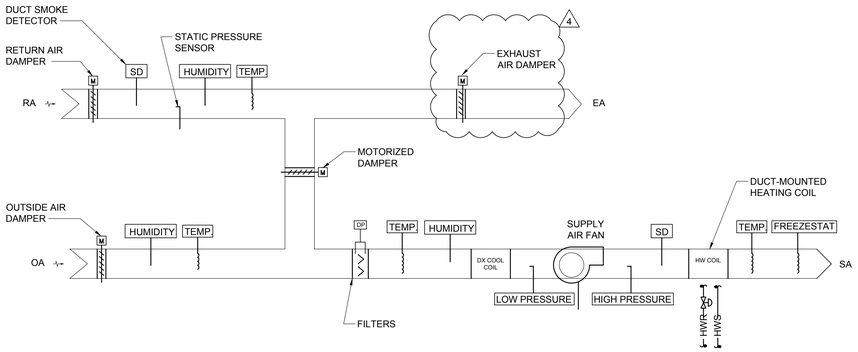
Sheet Title

MECHANICAL 2ND FLOOR PART 'B' DUCTWORK NEW WORK PLAN

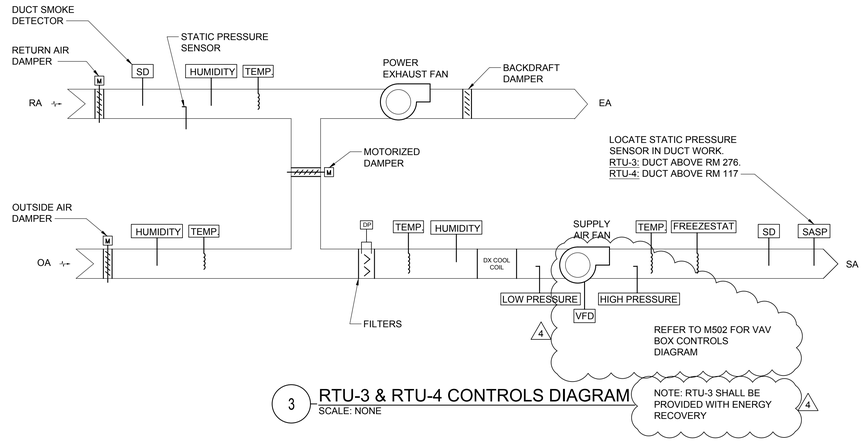
Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

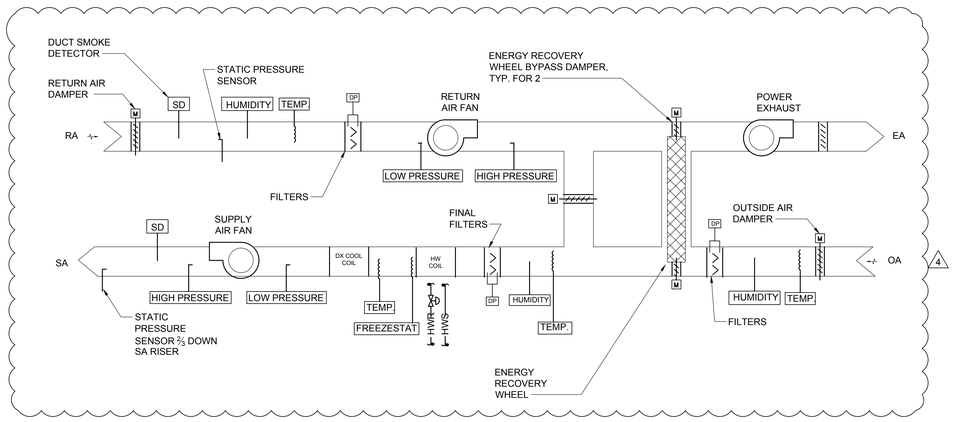
M205



6 RTU-7 AND RTU-8 CONTROLS DIAGRAM
SCALE: NONE

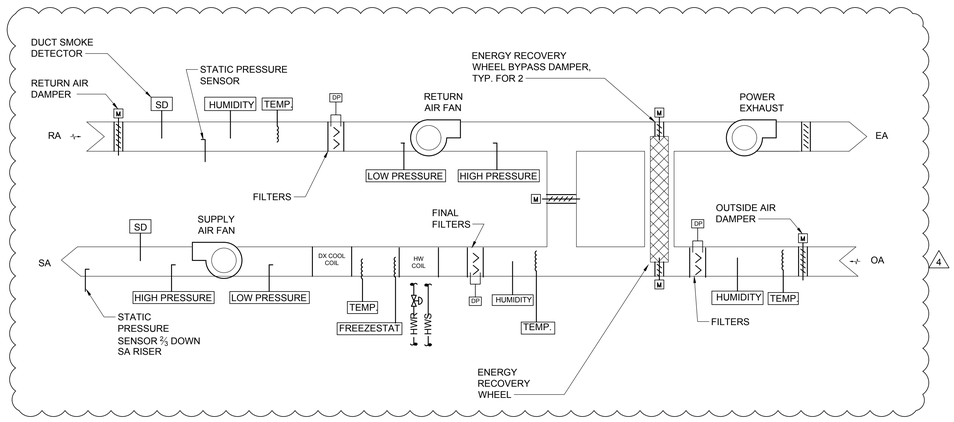


3 RTU-3 & RTU-4 CONTROLS DIAGRAM
SCALE: NONE



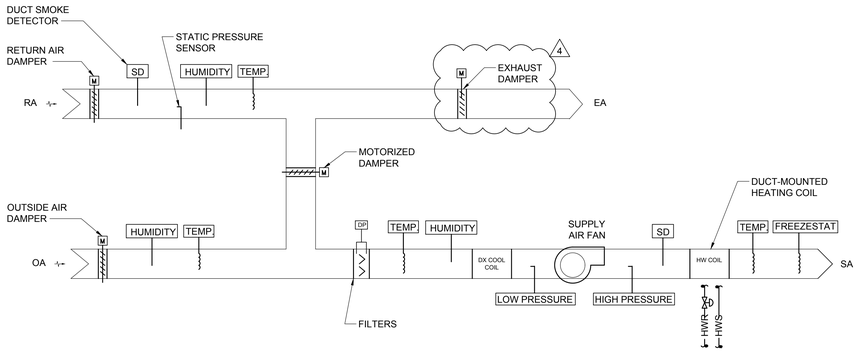
5 RTU-6 CONTROLS DIAGRAM
SCALE: NONE

NOTE: UNIT SHALL BE PROVIDED WITH ENERGY RECOVERY
4

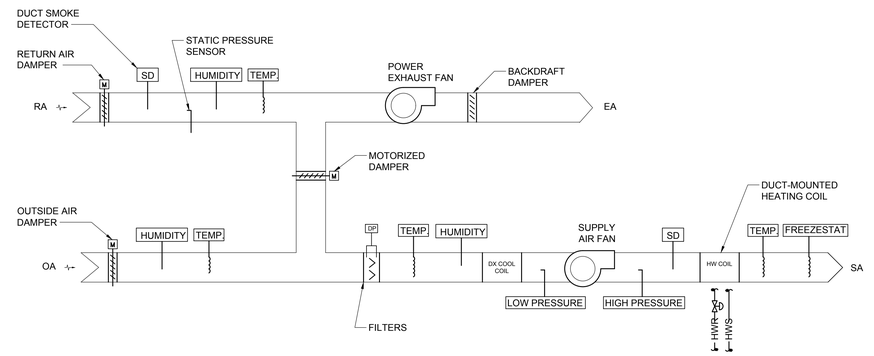


2 RTU-2 CONTROLS DIAGRAM
SCALE: NONE

NOTE: UNIT SHALL BE PROVIDED WITH ENERGY RECOVERY
4



4 RTU-5 CONTROLS DIAGRAM
SCALE: NONE



1 RTU-1 CONTROLS DIAGRAM
SCALE: NONE

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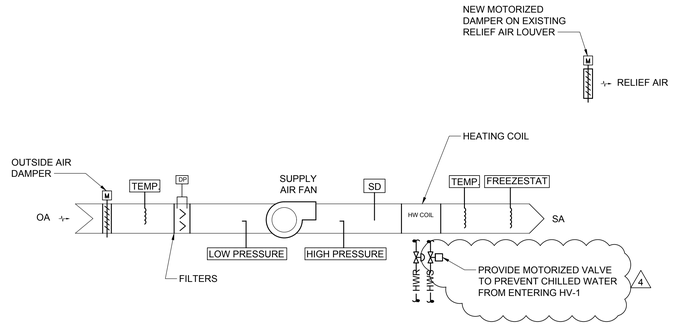
CONTROLS DIAGRAMS 1 OF 3

Job No.	Date
NKGD0206.00	08/6/2019
Scale: AS NOTED	Drawn / Checked

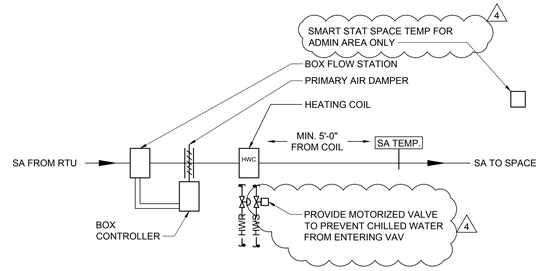
Sheet Number

M501



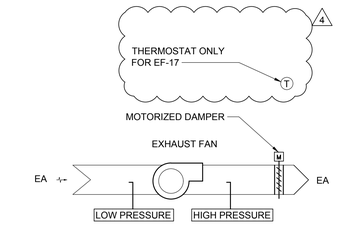
4 HV-1 CONTROLS DIAGRAM
SCALE: NONE

NOTE: REFER TO SEQUENCE OF OPERATIONS FOR HV-1 SEQUENCE 4



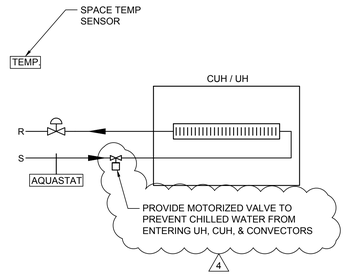
3 VAV BOX CONTROLS DIAGRAM
SCALE: NONE

NOTE: REFER TO SEQUENCE OF OPERATIONS FOR VAV SEQUENCE 4



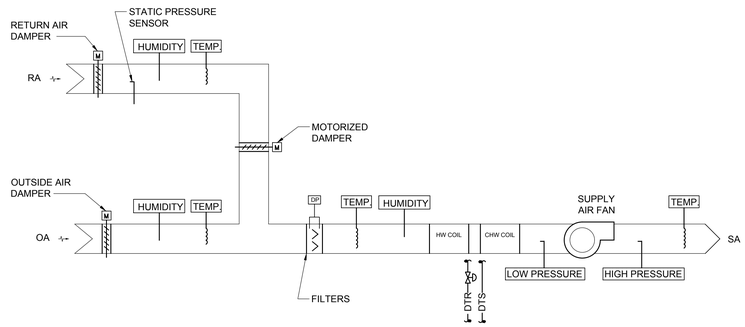
6 EXHAUST FAN CONTROLS DIAGRAM
SCALE: NONE

NOTE: REFER TO SEQUENCE OF OPERATIONS FOR SPECIFIC INFORMATION ON FANS & INTERLOCKS. 4



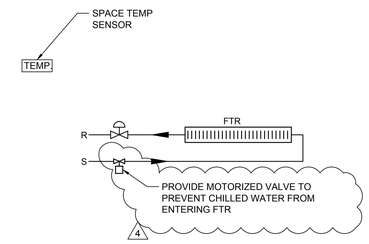
2 UH & CUH CONTROLS DIAGRAM
SCALE: NONE

NOTE: REFER TO SEQUENCE OF OPERATIONS FOR UH & CUH SEQUENCE 4



5 UNIT VENTILATOR CONTROLS DIAGRAM
SCALE: NONE

NOTE: REFER TO SEQUENCE OF OPERATIONS FOR UNIT VENTILATOR SEQUENCE. 4



1 FTR CONTROLS DIAGRAM
SCALE: NONE

NOTE: REFER TO SEQUENCE OF OPERATIONS FOR FTR SEQUENCE 4

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CONSTRUCTION DOCUMENTS

SPN 135-0278RR

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Professional Seal

No.	Date	Issue
4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

Sheet Title

CONTROLS DIAGRAMS 2 OF 3

Job No.	Date
NKGD0206.00	08/6/2019
Scale: AS NOTED	Drawn / Checked

Sheet Number

M502

PACKAGED ROOFTOP AC UNIT SCHEDULE

		TAG	RTU-1 (Media Center)	RTU-2 (Auditorium)	RTU-3 (Dance Room)	RTU-4 (Office Wing)	RTU-5 (North Lobby)	RTU-6 (Cafeteria)	RTU-7 (Computer Room)	RTU-8 (South Lobby)
Westover Elementary School		Weight(lbs)	3463	8845	3463	2409	2021	3576	2021	2021
		Qty	1	1	1	1	1	1	1	1
		Model	DPS020A	RPS042D	DPS018A	DPS015A	DPS007A	DPS020A	DPS007A	DPS007A
	Unit	Electrical – Voltage	460/60/3	460/60/3	460/60/3	460/60/3	460/60/3	460/60/3	460/60/3	460/60/3
		Electrical – MCA (A)	50.8	103.2	41.8	31.8	16.4	53.6	16.4	16.4
		Electrical – MROPD (A)	80	125	60	40	20	80	20	20
		Efficiency – EER / SEER	10.6	10.1	11.4	11.1	12.3	10.6	12.3	12.3
		Efficiency – IEER	19.7		20.2	18	20.3	19.7	20.3	20.3
		Supply Fan – Airflow (CFM)	8000	14000	7000	6000	3000	8000	3000	3000
		Supply Fan – ESP (inH$_2$O)	1.5	2	1.5	1.5	1.5	1.5	1.5	1.5
		Supply Fan – TSP (inH$_2$O)	2.36	4.52	2.25	2.53	1.77	2.88	1.77	1.77
		Supply Fan – Altitude (ft)	0	0	0	0	0	0	0	0
		Supply Fan – Motor Size (HP)	7.5	15	7.5	8	4	10	4	4
		Return Fan – Airflow (CFM)	N/A	8000	N/A	N/A	N/A	N/A	N/A	N/A
		Return Fan – ESP (inH$_2$O)	N/A	0.5	N/A	N/A	N/A	N/A	N/A	N/A
		Return Fan – Motor Size(HP)	N/A	5	N/A	N/A	N/A	N/A	N/A	N/A
		Filters – Face Area (ft²)	27	50	27	18	18	27	18	18
		Filters – Efficiency	2" MERV 8	MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8
	Cooling	EAT – EDB (°F)	79.6	82	82.1	78.3	76	84.7	77	76
		EAT – EWB (°F)	65.3	66.9	66.9	64.4	62.7	68.6	63.4	62.7
		LAT – LDB (°F)	54.8	56.9	57.7	54.7	52.6	58.3	53.4	52.6
		LAT – LWB (°F)	54.6	56.2	57.5	54.6	52.5	58.1	53.2	52.5
		Total	257675	467579	208627	174901	88248	273438	89403	88248
		Sensible	217510	384273	186733	155071	76671	230906	77567	76671
		Ambient – DB (°F)	95	95	95	95	95	95	95	95
		Compressor – Stages	Modulating	Modulating	Modulating	Modulating	Modulating	Modulating	Modulating	Modulating
		Compressor – Qty	1	3	1	2	2	1	2	2
		Compressor – Compressor Power (kW)	18	33	12.6	12.5	5.6	18	5.6	5.6
		Compressor – Refrigerant	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
	Hot Water Heating	Type		Hot Water				Hot Water		
		FPI		9				12		
		Rows		1				2		
		Total Capacity (Btu/hr)		382360				300369		
		EDB (°F)		70				70		
		LDB (°F)		95				104.3		

NOTES:
1. PROVIDE THE FOLLOWING OPTIONS FOR ALL UNITS:
• HIGH STATIC DRIVE MOTOR. COORDINATE LEFT/RIGHT HAND FAN DRIVE IN FIELD.
• UNITS SHALL BE HIGH EFFICIENCY.
• 100% MODULATING ECONOMIZER OPERATION WITH DIFFERENTIAL ENTHALPY CONTROL.
• FURNISH EXTRA DRIVE BELT AND EXTRA FILTER SET FOR EACH UNIT.
• UNIT SHALL BE MOUNTED ON 24" HIGH VIBRATION ISOLATION ROOF CURB. (HEIGHT INCLUDES BASE CURB AND VIBRATION ISOLATION RAILS.)
• POWERED CONVENIENCE OUTLET
2. PROVIDE THE FOLLOWING MOTOR CONTROL OPTIONS FOR ALL UNITS:
• UNITARY CONTROLLER BY AUTOMATIC TEMPERATURE CONTROLS MANUFACTURER, COMPATIBLE WITH THE BUILDING AUTOMATION SYSTEM.
• ALL MOTORS 1 HP OR GREATER SHALL BE PREMIUM EFFICIENCY. ALL MOTORS FURNISHED WITH VARIABLE FREQUENCY DRIVES SHALL BE INVERTER DUTY RATED & APPROVED FOR VARIABLE SPEED AND TORQUE APPLICATIONS.
• SINGLE POINT EXTERNAL POWER CONNECTION AT UNIT, UNIT-MOUNTED DISCONNECT SWITCH, AND FACTORY INSTALLED MOTOR STARTERS. VAV UNITS SHALL HAVE FACTORY MOUNTED VFD'S WITH H-O-A.
3. PROVIDE POWER EXHAUST FOR THE FOLLOWING UNITS: RTU-1, RTU-3, RTU-4
4. PROVIDE ENERGY RECOVERY FOR THE FOLLOWING UNITS: RTU-2, RTU-3, RTU-6

UNIT VENTILATOR SCHEDULE

DESIGNATION:	UV-1	UV-2
LOCATION	SEE PLAN	SEE PLAN
MANUFACTURER	DAIKIN	DAIKIN
MODEL	UAVS9H15	UAVS9H07
UNIT DIMENSIONS - WIDTH x HEIGHT x DEPTH (IN)	98.00 X 30.13 X 21.88	62.00 X 30.13 X 21.88
QUANTITY	53	15
WEIGHT (LBS)	600	370
HOT WATER COIL:		
NO. ROWS	5	5
E.W.T./L.W.T. (°F)	140/90.1	140/84.8
E.A.T/L.A.T. DB (°F)	48.9/108.6	39.9/107.9
FLUID TYPE	30% PROPYLENE GLYCOL	30% PROPYLENE GLYCOL
CAPACITY (MBH) (TOTAL)	93.5	55.2
GPM	3.75	2
W.P.D. (FT H$_2$O)	1.29	0.81
COOLING COIL:		
NO. ROWS	5	3
E.A.T. DB/WB (°F)	78.6/65.3	82.2/67.2
L.A.T. DB/WB (°F)	58.6/55.7	65.3/60.1
CAPACITY (MBH) (TOTAL/SENS.)	42.8/31.3	18.4/13.8
FLOW RATE (GPM)	11.84	4.52
WPD (FT H$_2$0)	15.66	3.89
SUPPLY FAN:		
CFM	1444	748
OAI CFM	-	-
FAN MOTOR HP	0.250	0.333
VOLTS/Ø/Hz	115/60/1	115/60/1
MCA/MFA	6.3/15	6.3/15

NOTES:
1. CONFIGURATION SHALL BE AS FOLLOWS:
• VERTICAL UNIT.
• TOP BAR GRILLE SUPPLY AIR OUTLET.
• REAR DUCT COLLAR OUTSIDE AIR INLET.
• FACTORY INSTALLED MOTORIZED DAMPERS FOR OAI & RA.
2. PROVIDE THE FOLLOWING FEATURES & OPTIONS FOR EACH UNIT:
• UNITARY CONTROLLER BY AUTOMATIC TEMPERATURE CONTROLS MANUFACTURER, COMPATIBLE WITH THE BUILDING AUTOMATION SYSTEM.
• COORDINATE RIGHT-HAND/LEFT-HAND COIL CONNECTIONS IN THE FIELD.
• OPTIONAL PIPE TUNNEL TO ALLOW PIPING ACROSS THE UNIT.
• KEY LOCK ACCESS DOORS.
• FURNISH 2-WAY MODULATING CONTROL VALVE FOR EACH COIL, WITH PIPING PACKAGE AS PER DETAIL. 5 PSI MAX AT CONTROL VALVE.
• FREEZE STAT ARRANGED TO OVERRIDE THE COIL CONTROL VALVE & SHUT DOWN UNIT AS PER THE SEQUENCE OF OPERATIONS
• WALL MOUNTED THERMOSTAT.
• FACTORY FURNISHED LOCAL DISCONNECT SWITCH.
• END COVERS.
• FULLY MODULATING ASHRAE CYCLE II RA&OA DAMPERS AND ACTUATORS.
• DISCONNECT SWITCH.
• 4" SUB-BASE.
• OPTIONAL 14 GAGE FRONT PANEL.
• UNITS SHALL BE UL LISTED.
• 100% OUTSIDE AIR ECONOMIZER, WITH DIFF. ENTHALPY CONTROL.
• (2) SETS OF SPARE FILTERS FOR EACH UNIT.
• FINISH SHALL BE CUSTOM ENAMEL – SUBMIT COLOR CHART FOR APPROVAL.
• FIELD MOUNTED RETURN AIR SMOKE DETECTOR.
• FACTORY PROVIDED OUTSIDE AIR LOUVER: HORIZONTAL TYPE WITH FLANGE FRAME, COORDINATE STYLE AND COLOR WITH ARCHITECT. WALL OPENINGS: 48½" LONG X 10⅜" HIGH FOR UV-A; 60½" LONG X 10⅜" HIGH FOR UV-B.

PUMP SCHEDULE

DESIGNATION	P-1&2	P-3	P-4&5
LOCATION	BOILER ROOM	BOILER ROOM	BOILER ROOM
SYSTEM SERVED	DTS&R	DTS&R	BOILER
ARRANGEMENT	BASE MOUNTED	BASE MOUNTED	INLINE
MANUFACTURER	BELL & GOSSETT	BELL & GOSSETT	BELL & GOSSETT
MODEL	e-1510 4EB	e-1510 3BD	e-90 2AAC
TYPE	END SUCTION	END SUCTION	INLINE
IMPELLER DIA. (IN.)	11	9.5	5.25
GPM	750	610	70
TOTAL DYNAMIC HEAD (FT H$_2$O)	90	70	20
RPM	1800	1800	1800
NPSH (FT. H$_2$O)	10.9	9.28	5.61
MOTOR HP	25	15	0.75
VOLTAGE/ø/Hz	460/3/60	460/3/60	460/3/60
STARTER TYPE	VFD	VFD	-
STARTER LOCATION	MECHANICAL ROOM	MECHANICAL ROOM	MECHANICAL ROOM
INTERLOCK	-	ACC-1	BLR-1&2

NOTES:
1. ALL PUMPS SHALL BE CAST IRON BODY, BRONZE FITTED, BRONZE IMPELLER. REFER TO SPECIFICATION FOR PUMP CONSTRUCTION.
2. ALL MOTORS 1 HP OR GREATER SHALL BE PREMIUM EFFICIENCY.
3. ALL MOTORS FURNISHED WITH VARIABLE FREQUENCY DRIVES SHALL BE INVERTER DUTY RATED & APPROVED FOR VARIABLE SPEED AND TORQUE APPLICATIONS.
4. MOTOR STARTERS AND DISCONNECT SWITCHES SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

CEILING DIFFUSER SCHEDULE

DESIGNATION	CD-1			
MODEL	OMNI			
MAX CORE VEL (FT/MIN)	550			
MAX NC	25			
CONSTRUCTION	STEEL			
FRAME	LAY-IN			
DEFLECTION	4 WAY			
FACE SIZE	24x24 / 12x12			
	CFM RANGE	NECK SIZE Ø	CFM RANGE	NECK SIZE Ø
	0-100	6"	0-100	6"
	101-200	8"	101-200	8"
	201-350	10"	201-350	10"
	351-450	12"	351-450	12"
	451-600	14"	451-600	14"
	601-700	15"	601-700	15"

NOTES:
1. CEILING SUPPLY DIFFUSERS ARE BASED ON TITUS.
2. ALL DIFFUSERS SHALL BE EQUIPPED WITH AN OPPOSED BLADE VOLUME DAMPER.
3. COORDINATE COLOR SELECTION WITH ARCH PLANS.
4. SUPPLY DIFFUSERS SHALL HAVE FRAMES AND BORDERS SUITABLE FOR THE CONSTRUCTION IN WHICH THEY WILL BE INSTALLED, CONTRACTOR TO COORDINATE.
5. ALL LAY-IN DIFFUSERS SHALL HAVE A MODULE SIZE OF 24x24. FACE SIZES SHOWN IN SCHEDULE ARE FOR SURFACE MOUNT DIFFUSERS. NECK SIZES VARY ACCORDING TO THE SCHEDULE.
6. DIFFUSER BLOW PATTERN IS AS SHOWN ON DRAWINGS.

DUCTLESS SPLIT-SYSTEM AC UNIT SCHEDULE

INDOOR/OUTDOOR UNIT DESIGNATION	AC-1 / ACCU-1	AC-2 / ACCU-2	AC-3 / ACCU-3	AC-4 / ACCU-4
MANUFACTURER	MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI
NOMINAL COOLING CAPACITY (TONS)	2.5	1	1	1
COOLING CAPACITY (BTU/HR)	30,000	12,000	12,000	12,000
CFM (LO-MID-HI)	635-705-775	320-370-425	320-370-425	320-370-425
SEER	15.5	15.2	15.2	15.2
RS PIPE SIZE (IN)	⅝"	½"	½"	½"
RL PIPE SIZE (IN)	⅜"	¼"	¼"	¼"
CONDENSATE DRAIN PIPE SIZE (IN)	1"	1"	1"	1"
ELECTRICAL DATA:				
POWER INPUT - COOLING (WATTS)	4,130	1,190	1,190	1,190
VOLTS/Ø/Hz	208-230/1/60	208-230/1/60	208-230/1/60	208-230/1/60
BREAKER SIZE (AMPS) AT OUTDOOR UNIT	30A	15A	15A	15A
INDOOR EVAPORATOR UNIT DATA				
LOCATION	MEDIA INTEGRATION 104E	DATA 153	DATA 211	DATA 332A
MODEL	PKA-A30KA	PA-A12HA	PA-A12HA	PA-A12HA
HEIGHT x WIDTH x DEPTH (IN)	14.375x46x11.5	11.625x35.5x9.75	11.625x35.5x9.75	11.625x35.5x9.75
WEIGHT (LBS)	46	29	29	29
TYPE	WALL MOUNTED	WALL MOUNTED	WALL MOUNTED	WALL MOUNTED
OUTDOOR CONDENSING UNIT DATA:				
LOCATION	ROOF	ROOF	ROOF	ROOF
MODEL	PUY-A30NHA3	PUY-A12NHA3	PUY-A12NHA3	PUY-A12NHA3
HEIGHT x WIDTH x DEPTH (IN)	37.25x37.5x13.25	23.5x31.5x13.25	23.5x31.5x13.25	23.5x31.5x13.25
WEIGHT (LBS)	163	90	90	90
REFRIGERANT TYPE	R410A	R410A	R410A	R410A

NOTES:
1. PROVIDE THE FOLLOWING OPTIONS FOR EACH UNIT:
• 0° LOW AMBIENT CONTROLS.
• 7-DAY PROGRAMMABLE SYSTEM CONTROLLER.
2. FIELD SUPPLIED LOCAL DISCONNECT SWITCH AT EACH INDOOR UNIT SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR & INSTALLED BY THE ELECTRICAL CONTRACTOR.
3. FIELD SUPPLIED WEATHERPROOF LOCAL DISCONNECT SWITCH AT EACH OUTDOOR UNIT SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR & INSTALLED BY THE ELECTRICAL CONTRACTOR.
4. SINGLE POINT EXTERNAL POWER CONNECTION FOR EACH INDOOR/OUTDOOR SET OF UNITS SHALL BE AT THE OUTDOOR UNIT. THE ELECTRICAL CONTRACTOR SHALL PROVIDE POWER WIRING FROM THE OUTDOOR UNIT TO THE INDOOR UNIT.
5. THE AUTOMATIC TEMPERATURE CONTROLS CONTRACTOR SHALL PROVIDE CONTROL WIRING BETWEEN THE OUTDOOR UNIT AND INDOOR UNIT.
6. OUTDOOR UNIT SHALL BE INSTALLED ON 24" HIGH ROOF CURB

RETURN REGISTER / TRANSFER GRILLE SCHEDULE

DESIGNATION	RR / TG		-	
MODEL	3 FS			
MAX NK VEL (FT/MIN)	500			
MAX NC	25			
CONSTRUCTION	ALUMINUM			
BORDER/FRAME	SURFACE MOUNTED			
DEFLECTION	45° FIXED			
SPACING	¾"			
	CFM RANGE	NOMINAL NECK SIZE	CFM RANGE	NOMINAL NECK SIZE
	0-150	8x8		
	151-250	10x10		
	251-350	12x12		
	351-725	18x18		
	726-950	22x22		
	951-1100	24x24		
	1101-1400	24x30		

NOTES:
1. RETURN REGISTERS ARE BASED ON TITUS.
2. THE ABOVE SCHEDULE INDICATES NOMINAL REGISTER NECK SIZES. THE CONTRACTOR SHALL COORDINATE THE REGISTER SIZE IN THE FIELD ACCORDING TO THE ACTUAL DUCT DIMENSIONS AND MAINTAIN AN EQUIVALENT CORE AREA.
3. ALL REGISTERS SHALL BE EQUIPPED WITH AN OPPOSED BLADE VOLUME DAMPER.
4. SUBMIT COLOR CHART FOR REVIEW AND APPROVAL BY ARCHITECT.
5. RETURN REGISTERS SHALL HAVE FRAMES AND BORDERS SUITABLE FOR THE CONSTRUCTION IN WHICH THEY WILL BE INSTALLED. CONTRACTOR TO COORDINATE.

EQUIPMENT NOTES

1. PIPE PENETRATION ROOF CURBS: SHALL BE PATE MODEL PCA-5. PIPE CURB ASSEMBLY SHALL CONSIST OF 18 GAUGE GALVANIZED STEEL ROOF CURB, UNITARY CONSTRUCTION, WITH INTEGRAL BASE PLATE, 1-1/2" INSULATION, 2x2 TREATED WOOD NAILER, ACRYLIC CLAD THERMOPLASTIC COVER, FASTENING SCREWS, & GRADUATED STEP BOOTS WITH STAINLESS STEEL CLAMPS. CONTRACTOR TO SELECT CAP & BOOT PACKAGE BASED ON QUANTITY & SIZE OF PIPE PENETRATIONS. PROVIDE FLASHING AND COUNTER FLASHING FOR A WATERTIGHT SEAL. CURBS SHALL BE CUSTOM FABRICATED, SUCH THAT THE CAP IS MOUNTED LEVEL. CONTRACTOR TO VERIFY EXACT ROOF PITCH ANGLE IN FIELD.
2. DUCT SILENCERS: PROVIDE INLINE DUCT SILENCERS ON ALL PACKAGED ROOFTOP SA&RA DUCTWORK AND WHERE SHOWN ON PLAN. SILENCERS SHALL BE A MINIMUM OF 3' LONG. SIZE SHALL BE COORDINATED WITH DUCTWORK SO THAT THE FACE VELOCITY IS NO MORE THAN 750'/MIN. TRANSITION DUCTWORK SILENCER INLET & OUTLET AS REQUIRED. SILENCER SHALL BE VIBRO-ACOUSTICS MODEL RD-LV-F1
3. FIRE DAMPERS: SHALL BE RUSKIN MODEL DIBD-2, 1-1/2 HOUR UL555 RATED, SUITABLE FOR INSTALLATION IN WALL AND FLOOR PARTITIONS WITH FIRE RATINGS OF LESS THAN 3 HOURS. DAMPER SHALL BE A COMPLETE FACTORY PACKAGE INCLUDING U.L. APPROVED ANGLES, WALL SLEEVE, AND BREAKAWAY CONNECTIONS. DAMPER SHALL BE RATED FOR DYNAMIC AIRFLOW CONDITIONS OF 2,000 FPM AND 4.0" SP.
4. SMOKE DAMPERS: SHALL BE POTTORFF MODEL SD-141, CLASS 1 UL555S RATED, SUITABLE FOR INSTALLATION IN RATED WALL AND FLOOR PARTITIONS. DAMPER SHALL BE A COMPLETE FACTORY PACKAGE INCLUDING U.L. APPROVED ANGLES, WALL SLEEVE, AND BREAKAWAY CONNECTIONS. 120V POWER OPEN SPRING CLOSED ACTUATOR. PROVIDE CLOSURE DEVICE WITH MANUAL RESET (PROVIDE INDICATOR SWITCH PACKAGE). DAMPER SHALL BE RATED FOR DYNAMIC AIRFLOW CONDITIONS OF 2,000 FPM AND 4.0" SP. INSTALL DUCT SMOKE DETECTOR WITHIN 5' OF DAMPER. DUCT SMOKE DETECTOR SHALL BE PURCHASED BY THE ELECTRICAL CONTRACTOR AND INSTALLED BY THE MECHANICAL CONTRACTOR. DUCT SMOKE DETECTOR SHALL BE WIRED BY THE ELECTRICAL CONTRACTOR.
5. COMBINATION FIRE SMOKE DAMPERS: SHALL BE POTTORFF MODEL FSD-151, UL 555 CLASS I, WITH AIRFOIL BLADES. ACTUATOR AND CONTROLS SHALL BE SIDE MOUNT, 120V POWERED OPEN SPRING CLOSED, HORIZONTAL OR VERTICAL MOUNT, COORDINATE APPLICATION IN FIELD. OPTIONAL DRS-30 CLOSURE DEVICE WITH PI 50 INDICATOR SWITCH PACKAGE, OPTIONAL 18 GAGE SLEEVE COORDINATE LENGTH REQUIRED IN FIELD, (1) SIDE OR (2) SIDE RETAINING ANGLES. INSTALL DUCT SMOKE DETECTOR WITHIN 5' OF DAMPER. DUCT SMOKE DETECTOR SHALL BE PURCHASED BY THE ELECTRICAL CONTRACTOR AND INSTALLED BY THE MECHANICAL CONTRACTOR. DUCT SMOKE DETECTOR SHALL BE WIRED BY THE ELECTRICAL CONTRACTOR.
6. VOLUME CONTROL DAMPERS: FOR ALL ROUND & RECTANGULAR VOLUME CONTROL DAMPERS THAT ARE LOCATED ABOVE INACCESSIBLE CEILINGS, PROVIDE CABLE OPERATED DAMPERS. ROUND DAMPERS SHALL BE YOUNG BOWDEN MODEL 5020-CC. RECTANGULAR DAMPERS SHALL BE MODEL 830-CC2. CABLE CONTROLS SHALL BE MODEL 270-275 FOR CONCEALED LOCATIONS & MODEL 270-896C FOR LOCATIONS WHERE CABLES TERMINATE IN FINISHED SPACES. COORDINATE LOCATIONS IN THE FIELD.
7. MOTORIZED DAMPERS: SHALL BE RUSKIN MODEL CD40, 4" DEEP EXTRUDED ALUMINUM AIRFOIL DAMPER. DAMPER SHALL HAVE OPPOSED BLADES, MOTOR AND LINKAGE. DAMPERS SHALL BE 120V/1ϕ/60Hz, 3 AMPS MAX. FURNISH DISCONNECT SWITCH.
8. CONDENSATE PUMP (CP-1): SHALL BE LITTLE GIANT MODEL VCM-20ULS, RATED AT 25 GPH @ 15' HEAD, WITH 1/2 GALLON TANK, 3/8" DISCHARGE CONNECTION, & SHUT-OFF AT 20' HEAD. MOTOR SHALL 1/30 HP, 93 WATTS, 115V/1ϕ/60Hz, 1.5 AMPS. INCLUDE THE FOLLOWING OPTIONS: SAFETY SWITCH, 6' POWER CORD, THERMAL OVERLOAD PROTECTOR, NYLON SUMP PAN, POLYPROPYLENE CONTROL FLOAT, BUILT-IN CHECK VALVE, FILTER SCREEN, STAINLESS STEEL SHAFT.
9. LOUVERS: SHALL BE RUSKIN MODEL ELF375DX, 4" DEEP, WITH 54% FREE AREA, 6063T5 EXTRUDED ALUMINUM DRAINABLE BLADES AT 37.5° AND 5-3/32" SPACING, 4" DEEP 6063T5 EXTRUDED ALUMINUM FRAME. AND 1/2" GALVANIZED STEEL BIRD SCREEN. MINIMUM LOUVER SIZE 12"x12". ANODIZED CUSTOM COLOR TO BE SELECTED BY ARCHITECT. COORDINATE WITH ARCHITECTURAL PLANS.

   FURNISH ALL REQUIRED PIPE AND ENCLOSURE SUPPORTS, BRACKETS, AND FASTENERS ETC. FURNISH VALVE ACCESS DOORS AND KNOCK OUT FOR ELECTRICAL RECEPTACLES. FURNISH END CAPS AND CORNER ANGLES, RUN ENCLOSURES CONTINUOUS WALL TO WALL. FINISH SHALL BE BAKED ON ENAMEL, SUBMIT COLOR CHART FOR REVIEW AND APPROVAL.
10. EXPANSION TANKS EXP-1&2: TO BE AMTROL MODEL AX-120V, 68 GALLON TANK AND 34 GALLON ACCEPTANCE VOLUME, 48" HIGH, 24" DIAMETER AND WEIGH APPROXIMATELY 515 POUNDS AT FULL CAPACITY.
11. AIR SEPARATOR AS-1: SHALL BE BELL & GOSSETT MODEL R-5F, 700 GPM MAXIMUM CAPACITY, 5" FLANGED INLET AND OUTLET, CV OF 398, REMOVABLE GALVANIZED STEEL SYSTEM STRAINER, INTERNAL STAINLESS STEEL AIR COLLECTOR TUBE WITH NPT CONNECTION AND BLOWDOWN CONNECTION. THE AIR SEPARATOR MUST BE DESIGNED, CONSTRUCTED, AND STAMPED FOR 125 PSIG @ 350°F IN ACCORDANCE WITH SECTION VIII, DIVISION I OF THE ASME BOILER AND PRESSURE VESSEL CODE, AND REGISTERED WITH THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS. THE AIR SEPARATOR SHALL BE PAINTED WITH ONE SHOP COAT OF LIGHT GRAY AIR DRY ENAMEL.
12. GLYCOL MIXING TANK: GMU-1, SHALL BE WESSELS COMPANY MODEL GMPD-13050 WITH INDUSTRIAL GRADE GRADUATED POLYETHYLENE 50 GALLON TANK, OBSERVABLE FLUID LEVEL SCALE, & REMOVABLE LID. EQUIPPED WITH ONE (1) AUTOMATIC PUMPING ASSEMBLIES, RATED AT 1.8 GPM @ 70 PSI, 1/3 HP; FITTED WITH H-O-A CONTROLS, ADJUSTABLE PRV, PRESSURE GAUGE, HIGH LEVEL ALARM AND LOW-LEVEL ALARM WITH AUDIBLE AND VISUAL ALARMS. FURNISH DISCONNECT SWITCH FOR GMU PUMP FOR INSTALLATION BY THE ELECTRICAL CONTRACTOR. ELECTRICAL: 120/1/60. PROVIDE BMS PROTOCOL FOR CONNECTION/MONITORING TO BMS.
13. PROPYLENE GLYCOL: SHALL BE BASED ON DOW DOWFROST HD INHIBITED PROPYLENE GYLCOL-BASED HEAT TRANSFER FLUID. THE MECHANICAL CONTRACTOR SHALL PROVIDE PROPYLENE GLYCOL FOR DUAL TEMPERATURE WATER SYSTEM AS NOTED ON PLANS (30% CONCENTRATION).
14. BOILER VENT: SHALL BE BASED ON FASNSEAL W2 DOUBLE WALL GAS VENT SYSTEM. SUPER FERRITIC STAINLESS STEEL 0.16" INNER WALL & OUTER WALL. PROVIDE NECESSARY FITTINGS, IPS DRAIN FITTING, BIRD/INSECT SCREEN, WALL THIMBLE W/AVL, SUPPORT CLAMPS, TERMINATION CONE, STORM COLLAR, ETC. AS REQUIRED. REFER TO PLANS FOR VENT SIZES.
15. PIPE INSULATION JACKETING: SHALL BE WHITE ZESTON 2000 PVC COVERS FOR PIPING AND FITTINGS. JACKET ALL PIPING AND FITTING THAT ARE EXPOSED IN ANY ROOM.
16. PIPE LABELS: SHALL BE SETON ULTRA-MARK WEATHER RESISTANT FOR OUTDOOR APPLICATION AND OPTI-CODE FOR INDOOR APPLICATION. LETTERS AND ARROWS SHALL BE 2 1/2" HIGH AND SHALL BE WHITE ON A GREEN BACKGROUND AND SHALL CONFORM TO ANSI AND OSHA STANDARDS. APPLY OVER INSULATION ONLY.
17. ALL HVAC EQUIPMENT SHALL HAVE 3" HIGH BLACK LAMACOID NAME PLATES WITH WHITE ENGRAVED LETTERS PERMANENTLY FASTENED TO EQUIPMENT. TYPICAL FOR All BOILERS, PUMPS, AIR HANDLERS, AC UNITS AND CONDENSERS.
18. REFRIGERANT PIPE INSULATION: SHALL BE AP ARMAFLEX PIPE INSULATION. 1" THICK UNSLIT, TO BE INSTALLED BEFORE FINAL CONNECTION. FIELD FABRICATE FITTING INSULATION WITH MITER-CUTS. ALL BUTT JOINTS AND SEAMS ARE TO BE SEALED WITH ARMSTRONG 520 ADHESIVE. ALL INSULATION INSTALLED OUTDOORS SHALL BE COATED WITH ARMSTRONG ARMAFLEX FINISH, AS PER THE MANUFACTURERS RECOMMENDATIONS.
19. INTAKE VENTILATOR, IV-1: SHALL BE BASED ON GREENHECK MODEL FGI GRAVITY INTAKE VENTILATOR RATED FOR 600 CFM.

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3	8/6/2019	ISSUED FOR BID
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Sheet Title
MECHANICAL SCHEDULES

Job No.	Date
NKGD0206.00	08/6/2019
Scale: AS NOTED	Drawn / Checked

Sheet Number
M601

HOT WATER BOILER SCHEDULE

DESIGNATION	BLR-1	BLR-2
LOCATION	BOILER ROOM	BOILER ROOM
MODEL	FBN4001	FBN4001
GPM (MIN/MAX)	41 / 350	41 / 350
WATER PRESSURE DROP (FT HD)	10.9	10.9
EWT/LWT (°F)	120/140	120/140
OPERATING WEIGHT (LBS)	5,200	5,200
GAS BURNER:		
GAS INPUT (MBH)	4,000	4,000
OUTPUT (MBH)	3,843	3,843
GAS CONNECTION	2½"	2½"
GAS PRESSURE MIN/MAX ("WC)	4 / 14	4 / 14
ELECTRICAL DATA:		
VOLTS/Hz/Ø	480/60/3	480/60/3
FLA / MCA	6 / 7.5	6 / 7.5

NOTES:
1. BOILERS BASED ON LOCHINVAR.
2. PROVIDE BOILERS WITH 75 PSI ASME RELIEF VALVES, 3-1/4" PRESSURE AND TEMPERATURE GAUGES, AUTOMATIC RESET HIGH LIMIT AQUA-STAT, MANUAL RESET HIGH LIMIT AQUA-STAT, LOW WATER CUT OFF, AQUA-STAT FOR SUPPLY WATER TEMPERATURE CONTROL, & LOW-LOSS Y-STRAINER.
3. PROVIDE CONDENSATE DRAIN KIT W/ PH NEUTRALIZATION TANK.
4. FURNISH DISCONNECT SWITCH FOR INSTALLATION BY THE ELECTRICAL CONTRACTOR.
5. WATER FLOW SWITCH.
6. OUTDOOR RESET.
7. HOT WATER BASED ON 30% POLYPROPYLENE GLYCOL.
8. BMS PROTOCOL GATEWAY. COORDINATE WITH AUTOMATIC CONTROLS CONTRACTOR. PROVIDE LOCHINVAR "SMART SYSTEM" INTEGRATED CONTROLS.
8. CONTROLS SHALL BE CAPABLE ON CONTROLLING:
A. SEQUENCING OF BOILERS VIA 2-WIRE DAISY CHAIN CONNECTION BETWEEN THE UNIT CONTROLLERS. MANUFACTURER TO PROVIDE SUPPLY MAIN TEMPERATURE SENSOR, CONTRACTOR SHALL FIELD INSTALL.
B. CONTROL OF BOILER MOTORIZED ISOLATION VALVE OR PRIMARY PUMP: CONTRACTOR TO FIELD INSTALL VALVE AND WIRE TO BOILER.
C. BOILER LEAVING WATER RESET BASED ON OUTSIDE AIR TEMPERATURE. BOILER MANUFACTURER TO PROVIDE SENSOR; CONTRACTOR SHALL FIELD INSTALL AND WIRE.
D. PROVIDE NIGHT-TIME SET BACK.
E. PROVIDE COLOR GRAPHIC DISPLAY FOR CUSTOMER INTERFACE. DISPLAY SHALL PROVIDE ENGLISH INSTRUCTIONS FOR CUSTOMER CONTROL OF SET-POINTS.
F. DISPLAY SHALL BE PASSWORD PROTECTED.
G. BOILER SYSTEM PUMP RELAY TO PROVIDE SIGNAL FOR SYSTEM PUMP OPERATION. SYSTEM PUMP TO BE POWERED REMOTELY.

HOT WATER UNIT HEATER SCHEDULE

DESIGNATION	UH-1
LOCATION	RE: PLAN
MANUFACTURER	AIRTHERM
MODEL	HA-136A
FAN:	
CFM	850
RPM	1000
MOTOR HP	1/20
HOT WATER COIL:	
CAPACITY (MBH)	35,900
E.A.T./L.A.T. (°F)	60/102
E.W.T./L.W.T. (°F)	140/120
GPM	3.6
ELECTRICAL DATA:	
VOLTS/Ø/Hz	115/1/60
AMPS	1.4

NOTES:
1. UNITS BASED ON AIRTHERM.
2. PROVIDE THE FOLLOWING FOR EACH UNIT:
   - DISCONNECT SWITCH.
   - THERMOSTAT

VARIABLE AIR VOLUME BOX SCHEDULE

DESIGNATION	V-1	V-2	V-3	V-4	V-5	V-6	V-7	V-8	V-9	V-10	V-11	V-12	V-13	V-14	V-15
INLET SIZE	6"Ø	6"Ø	6"Ø	8"Ø	10"Ø	10"Ø	8"Ø	8"Ø	10"Ø	8"Ø	10"Ø	10"Ø	8"Ø	8"Ø	10"Ø
AVAILABLE RANGE (CFM)	80-500	80-500	80-500	145-900	230-1400	230-1400	145-900	145-900	230-1400	145-900	230-1400	230-1400	145-900	145-900	230-1400
DESIGN CFM	500	500	500	700	1250	1000	800	800	1000	800	1200	1000	700	800	1000
HEATING CAPACITY (MBH)	6.3	6.3	6.3	8	12	11	7.6	7.6	19	15.1	23	19	13.2	15.1	19
E.W.T./L.W.T. (°F)	140 / 120	140 / 120	140 / 120	140 / 120	140 / 120	140 / 120	140 / 120	140 / 120	140 / 120	140 / 120	140 / 120	140 / 120	140 / 120	140 / 120	140 / 120
E.A.T./L.A.T. (°F)	55 / 92	55 / 92	55 / 92	55 / 92	55 / 92	55 / 92	55 / 92	55 / 92	55 / 92	55 / 92	55 / 92	55 / 92	55 / 92	55 / 92	55 / 92
GPM	.6	.6	.6	.6	.6	.6	1	1	1.4	.9	2.1	1.4	1.2	.9	1.4
ASSOCIATED AHU	RTU-4	RTU-4	RTU-4	RTU-4	RTU-4	RTU-4	RTU-4	RTU-4	RTU-3	RTU-3	RTU-3	RTU-3	RTU-3	RTU-3	RTU-3

NOTES:
1. VAV BOXES BASED ON TITUS DESV.
2. VAV BOXES SHALL BE SINGLE DUCT, COOLING ONLY OR COOLING/HOT WATER HEATING AS INDICATED WITH DIGITAL ELECTRONIC PRESSURE INDEPENDENT CONTROLS SUPPLIED BY CONTROLS CONTRACTOR AND MOUNTED BY THE TERMINAL UNIT MANUFACTURER. CONTROL ENCLOSURE SHALL NOT EXCEED 10.25" HEIGHT FOR A LOW HEIGHT OPTION.
3. CONTROLS SHALL BE COMPATIBLE WITH PNEUMATIC INLET VELOCITY SENSORS SUPPLIED BY THE TERMINAL MANUFACTURER. THE SENSOR SHALL BE MULTI-POINT CENTER AVERAGING TYPE, WITH A MINIMUM OF FOUR MEASURING PORTS PARALLEL TO THE TAKE-OFF POINT FROM THE SENSOR. SENSORS WITH MEASURING PORTS IN SERIES ARE NOT ACCEPTABLE. THE SENSOR MUST PROVIDE A MINIMUM DIFFERENTIAL PRESSURE SIGNAL OF 0.03 INCH WG. AT AN INLET VELOCITY OF 500 FPM.
4. THE TERMINAL CASING SHALL BE MINIMUM 22-GAUGE GALVANIZED STEEL, INTERNALLY LINED WITH 1-INCH MATTE FACED, NATURAL FIBER INSULATION THAT COMPLIES WITH UL 181 AND NFPA 90A. THE LINER SHALL COMPLY WITH ASTM G21 AND G22 FOR FUNGI AND BACTERIAL RESISTANCE. FIBERGLASS SHALL NOT BE ACCEPTED.
5. 30% PROPYLENE GLYCOL PROVIDED TO HOT WATER COILS.
6. THE TERMINAL MANUFACTURER SHALL PROVIDE A CLASS II 24 VAC TRANSFORMER AND DISCONNECT SWITCH; BOX SHALL BE U.L. LISTED AND LABELED. ELECTRICAL CONTRACTOR SHALL INSTALL & PROVIDE POWER/CIRCUITRY TO DISCONNECT SWITCH AND TRANSFORMER.
7. AUTOMATIC TEMPERATURE CONTROLS CONTRACTOR SHALL FURNISH AND INSTALL ALL VAV BOX CONTROLS & CONTROL WIRING.
8. MAXIMUM RADIATED NC< 30, MAXIMUM DISCHARGE NC< 28.
9. COORDINATE RIGHT HAND / LEFT HAND CONNECTIONS AND CONTROL PANEL IN FIELD.

FAN SCHEDULE

DESIGNATION	EXF-1	EXF-2	EXF-3	EXF-4	EXF-5	EXF-6	EXF-7	EF-1	EF-2	EF-6	EF-7	EF-8	EF-9	EF-17	EF-18	EF-19
LOCATION	1ST FLOOR	1ST FLOOR	2ND FLOOR	2ND FLOOR	2ND FLOOR	2ND FLOOR	ROOF	ROOF	ROOF	ROOF	ROOF	ROOF	ROOF	ROOF	ROOF	ROOF
AREA SERVED	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	GREEN ROOM	PART 'A' STORAGE	PART 'A' STORAGE	PART 'D' TOILETS	PART 'D' STORAGE	PART 'D' TOILETS	PART 'D' TOILETS	ELECTRIC ROOM	PART 'A' STORAGE	NURSE
MANUFACTURER	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK
MODEL	EQB-9-10	EQB-9-10	EQP-18-30	EQP-18-30	EQB-16-20	EQB-15-15	GB-071	GB-141	GB-141	GB-141	GB-161	GB-101	GB-081	GB-081	CUBE-099	GB-081
WEIGHT (LBS)	156	156	263	263	212	202	60	86	86	86	88	61	60	60	58	60
FAN TYPE	INLINE	INLINE	INLINE	INLINE	INLINE	INLINE	ROOF DOWNBLAST	ROOF DOWNBLAST	ROOF DOWNBLAST	ROOF DOWNBLAST	ROOF DOWNBLAST	ROOF DOWNBLAST	ROOF DOWNBLAST	ROOF DOWNBLAST	ROOF UPBLAST	ROOF DOWNBLAST
DRIVE TYPE	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT
CFM	1900	2710	4850	4500	3500	2450	75	1600	1800	1500	3000	1000	500	600	300	500
HP	0.78	1.08	1.78	1.78	1.37	1.08	⅛	½	¾	½	¾	¼	⅛	¼	¼	⅛
RPM	2922	2922	1454	1454	1521	1630	1000	1265	1550	1140	1250	1555	1490	1725	1140	1490
SP (IN H_2O)	1.5	1.5	1.5	1.5	1.5	1.5	.375	.75	1	.5	.75	.5	.5	.5	.5	.5
VOLTS/Ø/Hz	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	120/1/60	120/1/60	120/1/60	120/1/60	460/3/60	120/1/60	120/1/60	120/1/60	120/1/60	120/1/60
STARTER TYPE	VFD	VFD	VFD	VFD	VFD	VFD										

NOTES:
1. ALL MOTORS 1 HP OR GREATER SHALL BE PREMIUM EFFICIENCY.
2. ALL MOTORS FURNISHED WITH VARIABLE FREQUENCY DRIVES SHALL BE INVERTER DUTY RATED & APPROVED FOR VARIABLE SPEED AND TORQUE APPLICATIONS.
3. FURNISH RUBBER IN SHEAR OR SPRING VIBRATION ISOLATORS AS PER THE SPECIFICATION.
4. FURNISH WALL MOUNTED SPEED CONTROLLER OR THERMOSTAT AS INDICATED ON PLAN.
5. FURNISH MOTOR AND BELT GUARDS FOR ALL EXTERNAL MOTOR DRIVES.
6. MOTOR STARTER AND DISCONNECT SWITCH FOR EACH FAN SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR. EACH ROOFTOP FAN SHALL BE FURNISHED WITH WEATHERPROOF UNIT-MOUNTED LOCAL DISCONNECT SWITCH.
7. PROVIDE MOTORIZED DAMPER INTERLOCKED WITH EACH FAN
8. PROVIDE 24" HIGH ROOF CURB FOR ALL ROOFTOP FANS

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Sheet Title

MECHANICAL SCHEDULES

Job No.	Date
NKGD0206.00	08/6/2019
Scale: AS NOTED	Drawn / Checked

Sheet Number

M602

PLUMBING FIXTURE SCHEDULE

TAG	SYMBOLS PLAN	SYMBOLS ELEVATION	FIXTURES	PLUMBING CONNECTIONS WASTE	VENT	COLD WATER	HOT WATER	
P-1A			CLASSROOM SINK/BUBBLER	1½"	1½"	¾"	¾"	SINK: ELKAY DRKAD2822RC FAUCET: ELKAY LKF413945RS BUBBLER: ELKAY MODEL LK1141A
P-1B			HEALTH CLINIC SINK	1½"	1½"	½"	½"	SINK: ELKAY MODEL DRKAD221755 FAUCET: ELKAY LKF413945RS
P-1C			TEACHERS ROOM SINK	1½"	1½"	½"	½"	SINK: ELKAY LR2522 FAUCET: LKF413945RS
P-1D			CLASSROOM SINK/BUBBLER	1½"	1½"	½"	½"	SINK: ELKAY DRKAD252255R FAUCET: ELKAY LKF413945RS
P-2			WATER COOLER	1¼"	1¼"	⅜"	-	HALLWAY WATER COOLER: ELKAY MODEL VRCGRN8
RD/OD			ROOF DRAIN / OVERFLOW DRAIN	AS NOTED	-	-	-	RD: JAY R SMITH NUMBER 1015; DUCO CAST IRON BODY AND FLASHING COLLAR, ADJUSTABLE NICKEL BRONZE VANDAL PROOF DOME. REFER TO ROOF PLANS FOR SIZE. OD: JAY R SMITH NUMBER 1080; DUCO CAST IRON BODY AND FLASHING CLAMP AND GRAVEL STOP WITH POLYETHYLENE DOME AND CAST IRON WATER DAM. REFER TO ROOF PLANS FOR SIZE.

4

SYMBOLS AND ABBREVIATIONS

SYMBOL	ABBREVIATION	DESCRIPTION
	AFF	ABOVE FINISHED FLOOR
	AHC	ABOVE HUNG CEILING
	BFP	BACK FLOW PREVENTOR
	-	BALL VALVE
	-	BASKET STRAINER
	-	BUTTERFLY VALVE
	-	CHECK VALVE
	-	CIRCUIT SETTER
	CODP	CLEAN OUT DECK PLATE
	CW	COLD WATER
	-	CONCENTRIC REDUCER
	DCV	DOUBLE CHECK VALVE - BFP
	-	ECCENTRIC REDUCER
	-	ELBOW DOWN
	-	ELBOW UP
	EX.	EXISTING TO REMAIN
	-	FLEXIBLE CONNECTION
	FCO	FLOOR CLEAN OUT
	FS	FLOOR SINK
	-	FLOW ARROW
	FAI	FRESH AIR INTAKE
G	G	GAS
	-	GATE VALVE
	-	GLOBE VALVE
HT	-	HEAT TRACE PIPING TAG
HTC	-	HEAT TRACE CONTROLLER TAG
	HW	HOT WATER
	HWC	HOT WATER RECIRCULATION
	CW	COLD WATER
	-	MANUAL AIR VENT
	NEW	NEW WORK
	-	OS&Y GATE VALVE
	OD	OVERFLOW STORM DRAIN
P-1		PLUMBING RISER TAG
	-	PLUG VALVE
	-	PIPE CAP
	-	PRESSURE GAGE
	-	PRESSURE REDUCING VALVE
	-	PUMP
	PD	PUMP DISCHARGE
	RPZ	REDUCED PRESSURE ZONE - BFP
	REL.	REMOVE AND RELOCATE
	S	SANITARY
	S	SANITARY UNDER SLAB
	-	SOLENOID VALVE
	-	STRAINER
	SD	STORM DRAINAGE
	SD	STORM DRAINAGE UNDER SLAB
	-	TEE DOWN
	-	TEE UP
	-	THERMOMETER
	TYP.	TYPICAL
	-	T&P RELIEF VALVE
	-	UNION
	V	VENT
	VTR	VENT THROUGH ROOF
	W	WASTE LINE
	-	2-WAY VALVE
	-	3-WAY VALVE

GENERAL NOTES

1. THE CONTRACT DRAWINGS INDICATE THE EXTENT AND GENERAL ARRANGEMENTS OF THE PLUMBING SYSTEMS. IF ANY DEPARTURES FROM THE DRAWINGS ARE DEEMED NECESSARY BY THE PLUMBING CONTRACTOR, DETAILS OF SUCH DEPARTURES AND THE REASONS THEREFORE SHALL BE SUBMITTED TO THE OWNER AND ENGINEER FOR APPROVAL. NO SUCH DEPARTURES SHALL BE MADE WITHOUT PRIOR WRITTEN APPROVAL OF THE OWNER AND ENGINEER. EQUIPMENT AND PIPING ARRANGEMENTS SHALL PROVIDE ADEQUATE AND ACCEPTABLE CLEARANCES FOR ENTRY, SERVICING, AND MAINTENANCE. ANY CHANGES TO PIPING AND EQUIPMENT LOCATIONS NECESSARY TO AVOID INTERFERENCE WITH OTHER TRADES SHALL BE MADE AT NO EXTRA COST.
2. THE PLUMBING WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE LATEST EDITION OF THE PREVAILING CONNECTICUT PLUMBING AND BUILDING CODES. IN CASE OF CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND A GOVERNING CODE OR ORDINANCE, THE MORE STRINGENT STANDARD SHALL APPLY.
3. THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND FOR PAYING RELATED FEES.
4. CONNECTIONS TO UTILITIES AND SERVICES ARE SHOWN ACCORDING TO THE BEST INFORMATION AVAILABLE. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS, INVERT ELEVATIONS, AND SIZES OF EXISTING PLUMBING SERVICES IN FIELD, AND SHALL CONNECT NEW PLUMBING SERVICES AS INDICATED ON DRAWINGS.
5. PRIOR TO FABRICATION, THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AND CONDITIONS ON JOB SITE, AND COORDINATE THIS WORK WITH THE WORK OF ALL OTHER TRADES.
6. ALL ACCESS PANELS SHALL BE BY GENERAL CONTRACTOR. THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THEIR LOCATION.
7. PROVIDE ALL PLUMBING FIXTURES, PIPING, VALVES AND ACCESSORY ITEMS AS SPECIFIED AND AS REQUIRED FOR A COMPLETE INSTALLATION. ROUGHING DIMENSIONS OF FIXTURES MUST BE COORDINATED WITH THE GENERAL CONTRACTOR.
8. PITCH ALL WASTE, SANITARY, AND STORM DRAIN PIPING AT MAXIMUM SLOPE POSSIBLE, BUT NOT LESS THAN 1/8" PER FOOT FOR PIPING ≥ 3" AND 1/4" PER FOOT FOR PIPING ≤ 2½".
9. NO PIPING SHALL RUN EXPOSED IN FINISHED AREAS.
10. PROVIDE DIELECTRIC FITTINGS OR COUPLINGS WHEREVER DISSIMILAR METALS ARE JOINED.
11. PROVIDE SHUTOFF VALVES AT ALL FIXTURES AND EQUIPMENT ON COLD WATER, HOT WATER, AND GAS PIPES.
12. ALL WORK SHALL BE PROPERLY TESTED, BALANCED, AND CLEANED AND DISINFECTED. PROVIDE A ONE YEAR WARRANTY FROM DATE OF FINAL INSPECTION ON ALL PARTS AND LABOR.
13. PROVIDE ALL PIPE OPENINGS THROUGH PARTITIONS WITH PIPE SLEEVES. FOR PIPES PENETRATING FIRE RATED PARTITIONS, THE SPACE BETWEEN THE PIPE AND THE SLEEVE SHALL BE SEALED WITH FIRE STOPPING MATERIAL. PENETRATIONS FOR PIPING SHALL BE MADE BY CORE DRILLING WHENEVER POSSIBLE.
14. PROVIDE TRAP SEAL PRIMERS FOR FLOOR DRAINS WHERE INDICATED. INSTALL THE PRIMER VALVE IN THE COLD WATER SERVICE, WITH THE TRAP CONNECTION PIPED TO THE FLOOR DRAIN TRAP. LOCATE THE VALVE IN AN ACCESSIBLE LOCATION.
15. THE PLUMBING CONTRACTOR SHALL PROVIDE ALL CUTTING, PATCHING, CORE DRILLING, PAINTING, ACCESS PANELS, AND FINAL RESTORATION REQUIRED TO FACILITATE THE INSTALLATION OF PLUMBING PIPING, INCLUDING ABOVE CEILINGS AND IN SHAFTS.
16. ALL MOTOR STARTERS AND DISCONNECT SWITCHES FOR PLUMBING EQUIPMENT SHALL BE FURNISHED BY THE PLUMBING CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR, UNLESS OTHERWISE NOTED. DISCONNECT SWITCHES FURNISHED BY THE PLUMBING CONTRACTOR FOR PLUMBING EQUIPMENT SHALL BE HEAVY DUTY TYPE.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY VENTILATION AND EXHAUST AIR WHEN WELDING OR SOLDERING OPERATIONS ARE PERFORMED, AS REQUIRED BY OSHA.
18. THE OWNER'S PERMANENT EQUIPMENT SHALL NOT BE USED FOR VENTILATION DURING CONSTRUCTION.

EQUIPMENT NOTES

1. KITCHEN SUB-SLAB GREASE INTERCEPTOR: SHALL BE THERMACO TRAPZILLA MODEL TZ-600, LINEAR LOW-DENSITY ROTATIONALLY MOLDED POLYETHYLENE GREASE INTERCEPTOR. SHALL BE ASME A112.14.3 RATED AT 75 GPM AND FACTORY RATED AT 150 GPM PEAK FLOW, 600 POUNDS OF GREASE STORAGE CAPACITY WITH A FLAT GREASE SEPARATION EFFICIENCY CURVE, CRUSH-RESISTANT CYLINDRICAL WALLS, TWIN INTEGRAL PORTALS FOR ACCESS FOR GREASE REMOVAL.

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No.	Date	Issue
4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

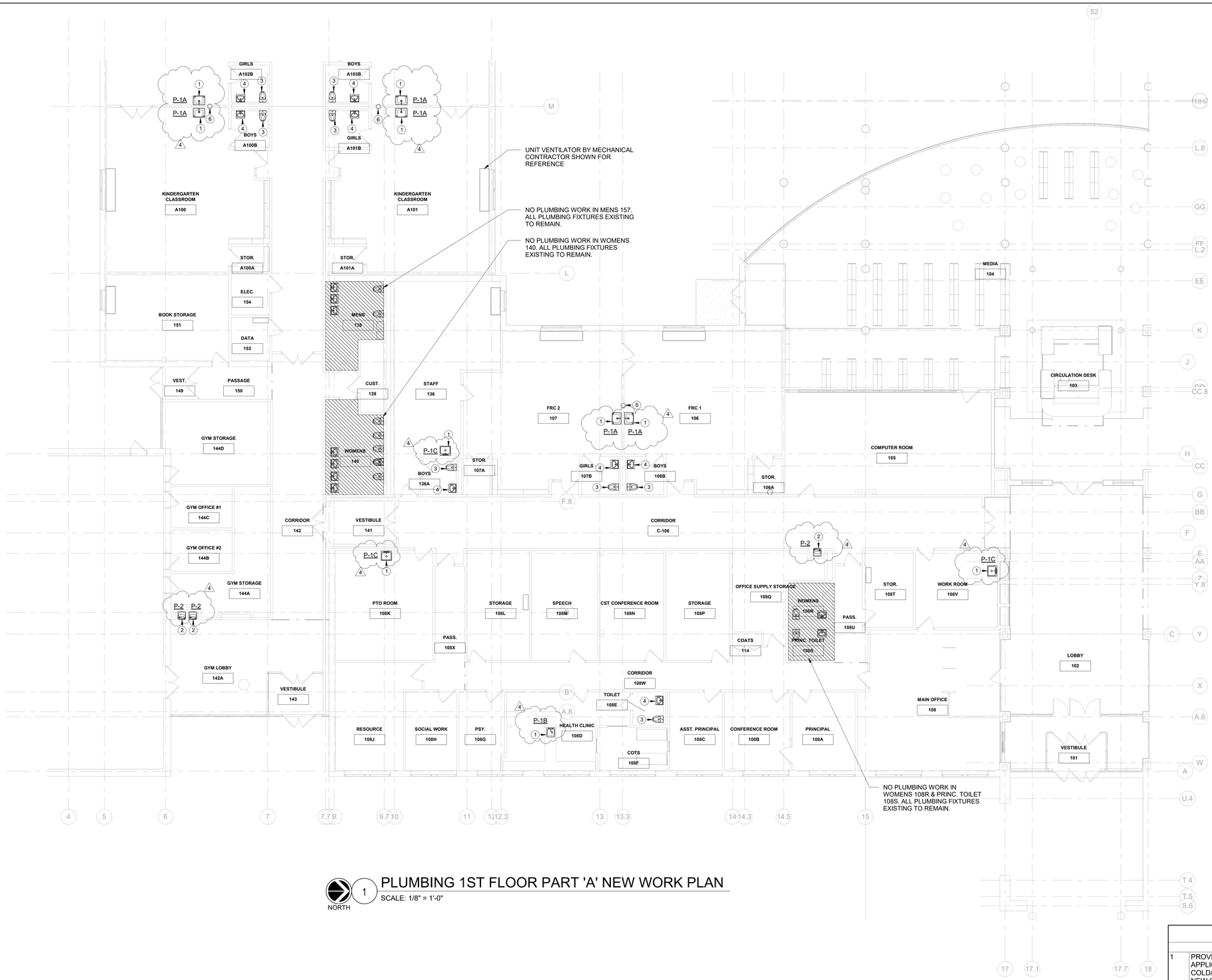
Sheet Title

PLUMBING SYMBOLS, ABBREVIATONS, AND NOTES

Job No. NKGD0206.00	Date 08/6/2019
Scale AS NOTED	Drawn / Checked

Sheet Number

P001



1 PLUMBING 1ST FLOOR PART 'A' NEW WORK PLAN

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

NORTH

PLUMBING NEW WORK NOTES	
1	PROVIDE NEW CLASSROOM SINK INCLUDING FAUCET & BUBBLER (IF APPLICABLE) IN LOCATION OF PREVIOUSLY DEMOLISHED FIXTURE. EXTEND COLD/HOT WATER, WASTE, AND VENT PIPING FROM EX. ROUGHING TO THE NEW CLASSROOM SINK. PROVIDE NEW COLD & HOT WATER SHUT-OFF VALVES. REFER TO PLUMBING FIXTURE SCHEDULE, SPECIFICATIONS AND ARCHITECTURAL DRAWINGS FOR FINAL QUANTITY & LOCATIONS.
2	PROVIDE NEW WATER COOLER P-2 IN LOCATION OF PREVIOUSLY DEMOLISHED EQUIPMENT. EXTEND COLD WATER, WASTE, AND VENT PIPING FROM EX. ROUGHING TO THE NEW WATER COOLER. PROVIDE NEW COLD WATER SHUT-OFF VALVE. REFER TO ARCHITECTURAL DRAWINGS FOR FINAL QUANTITY, LOCATIONS, & EQUIPMENT SPECIFICATIONS.
3	RE-INSTALL EXISTING TOILET. EXTEND COLD WATER, WASTE AND VENT PIPING FROM EX. ROUGHING TO TOILET AS REQUIRED.
4	RE-INSTALL EXISTING LAVATORY. EXTEND COLD/HOT WATER, WASTE & VENT PIPING FROM EX. ROUGHING TO LAVATORY.
5	COVER/PROTECT ALL EXISTING FLOOR DRAINS & CLEAN OUT DECK PLATES WITHIN FLOORS BEING DEMOLISHED
6	PROVIDE NEW FUNNEL DRAIN ABOVE CEILING. PROVIDE NEW 1 1/4" CONDENSATE DRAIN DN FROM FUNNEL DRAIN WITHIN EXISTING STUD WALL OR SURFACE MOUNTED ON CMU WALL AND CONNECT TO TAILPIECE OF TRAP BELOW SINK. REFER ARCHITECTURAL DRAWINGS FOR CHASE LOCATIONS. REFER TO PLUMBING DETAILS.
7	RE-INSULATE ALL PLUMBING PIPING THROUGHOUT ENTIRE BUILDING INCLUDING DOMESTIC COLD WATER, HOT WATER, & HOT WATER RECIRCULATION LINES

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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PART 'A'

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3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

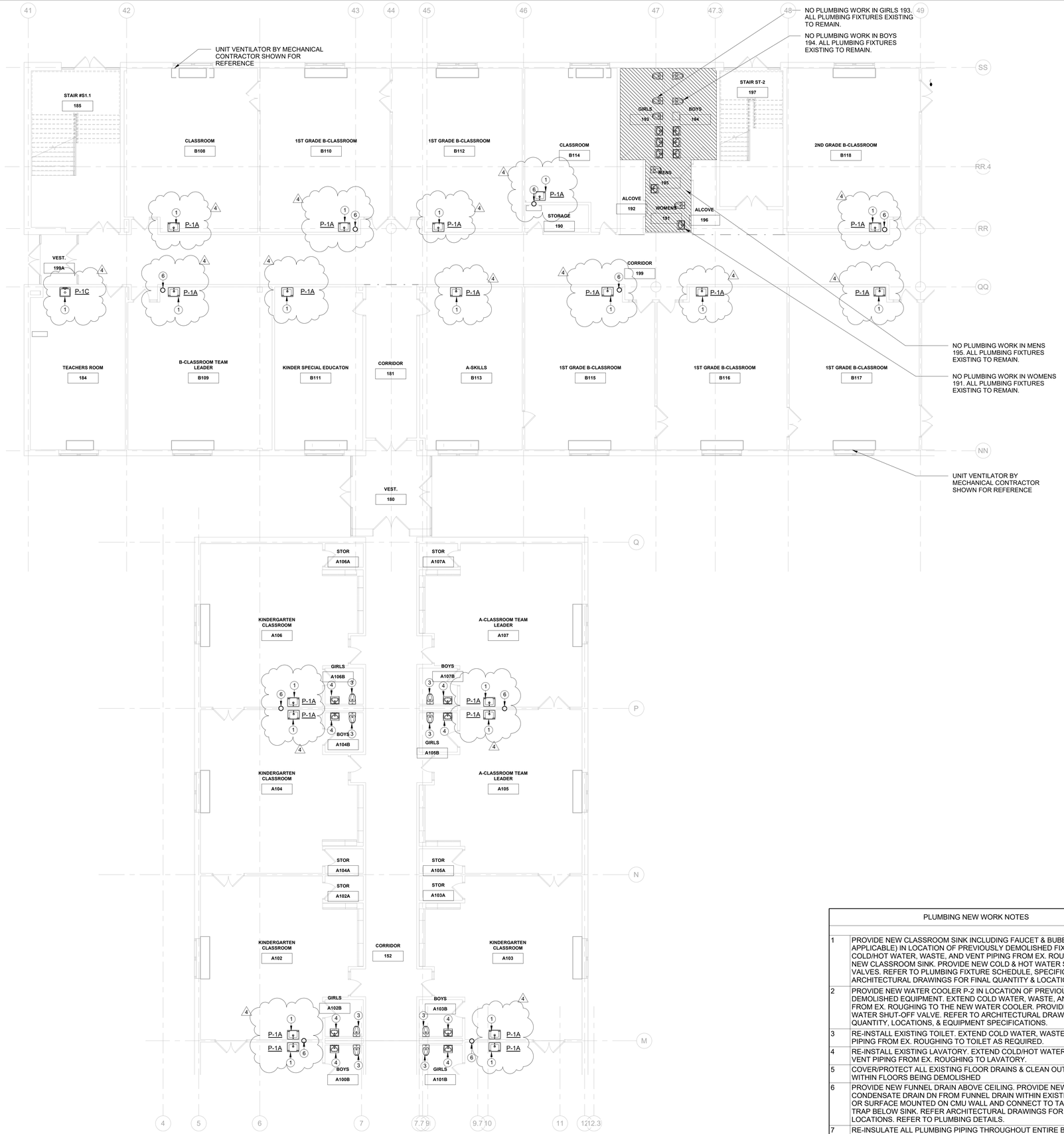
Sheet Title

PLUMBING 1ST FLOOR PART 'A' NEW WORK PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

P201



PLUMBING 1ST FLOOR PART 'B' NEW WORK PLAN

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

NORTH

PLUMBING NEW WORK NOTES	
1	PROVIDE NEW CLASSROOM SINK INCLUDING FAUCET & BUBBLER (IF APPLICABLE) IN LOCATION OF PREVIOUSLY DEMOLISHED FIXTURE. EXTEND COLD/HOT WATER, WASTE, AND VENT PIPING FROM EX. ROUGHING TO THE NEW CLASSROOM SINK. PROVIDE NEW COLD & HOT WATER SHUT-OFF VALVES. REFER TO PLUMBING FIXTURE SCHEDULE, SPECIFICATIONS AND ARCHITECTURAL DRAWINGS FOR FINAL QUANTITY & LOCATIONS.
2	PROVIDE NEW WATER COOLER P-2 IN LOCATION OF PREVIOUSLY DEMOLISHED EQUIPMENT. EXTEND COLD WATER, WASTE, AND VENT PIPING FROM EX. ROUGHING TO THE NEW WATER COOLER. PROVIDE NEW COLD WATER SHUT-OFF VALVE. REFER TO ARCHITECTURAL DRAWINGS FOR FINAL QUANTITY, LOCATIONS, & EQUIPMENT SPECIFICATIONS.
3	RE-INSTALL EXISTING TOILET. EXTEND COLD WATER, WASTE AND VENT PIPING FROM EX. ROUGHING TO TOILET AS REQUIRED.
4	RE-INSTALL EXISTING LAVATORY. EXTEND COLD/HOT WATER, WASTE & VENT PIPING FROM EX. ROUGHING TO LAVATORY.
5	COVER/PROTECT ALL EXISTING FLOOR DRAINS & CLEAN OUT DECK PLATES WITHIN FLOORS BEING DEMOLISHED
6	PROVIDE NEW FUNNEL DRAIN ABOVE CEILING. PROVIDE NEW 1 1/4" CONDENSATE DRAIN DN FROM FUNNEL DRAIN WITHIN EXISTING STUD WALL OR SURFACE MOUNTED ON CMU WALL AND CONNECT TO TAILPIECE OF TRAP BELOW SINK. REFER ARCHITECTURAL DRAWINGS FOR CHASE LOCATIONS. REFER TO PLUMBING DETAILS.
7	RE-INSULATE ALL PLUMBING PIPING THROUGHOUT ENTIRE BUILDING INCLUDING DOMESTIC COLD WATER, HOT WATER, & HOT WATER RECIRCULATION LINES

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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PART 'B'

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2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

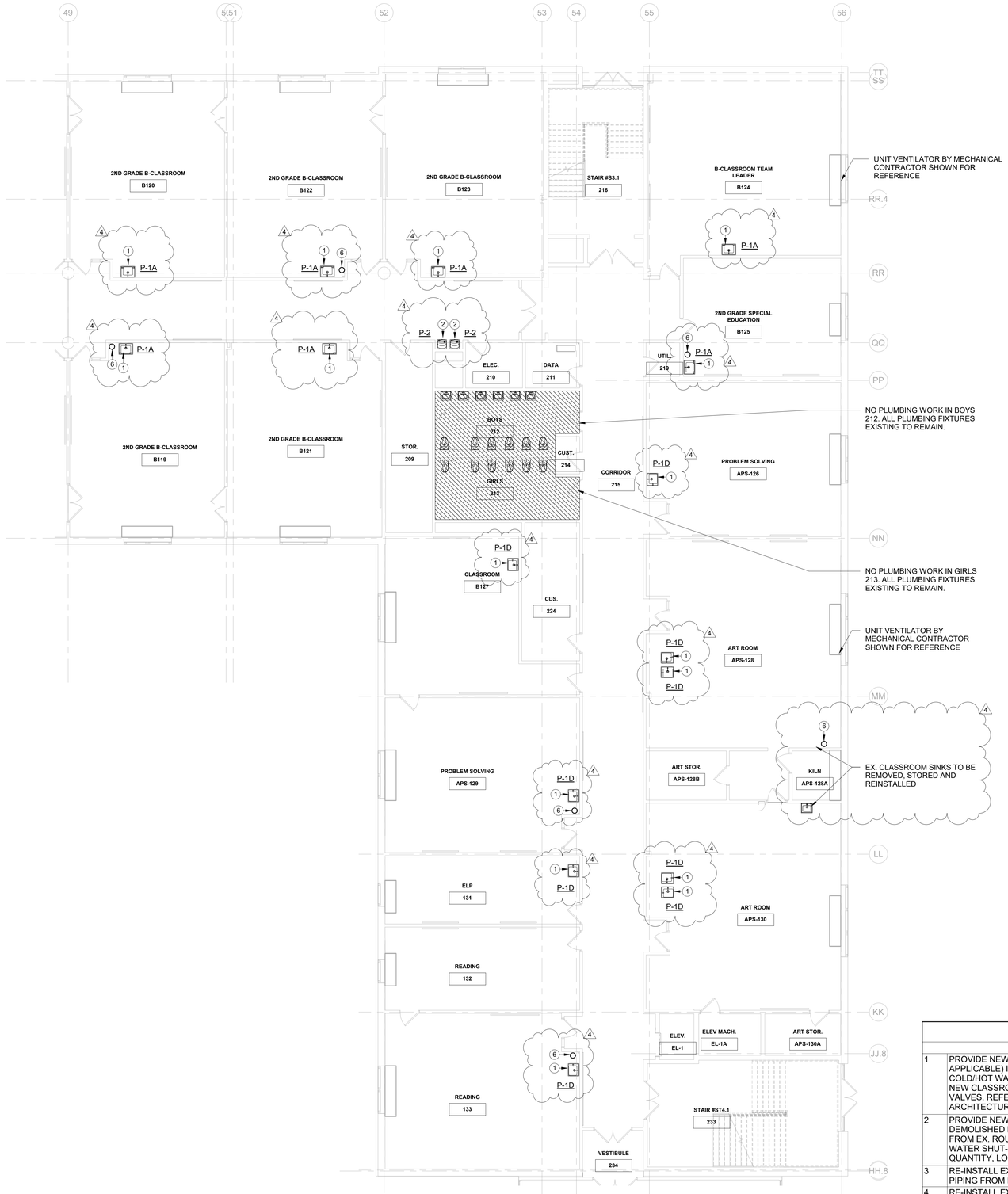
Sheet Title

PLUMBING 1ST FLOOR PART 'B' NEW WORK PLAN

Job No.	Date
NKGD0206.00	08/06/2019
Scale: AS NOTED	Drawn / Checked: Author Checker

Sheet Number

P202



NORTH

1 PLUMBING 1ST FLOOR PART 'C' NEW WORK PLAN

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

PLUMBING NEW WORK NOTES	
1	PROVIDE NEW CLASSROOM SINK INCLUDING FAUCET & BUBBLER (IF APPLICABLE) IN LOCATION OF PREVIOUSLY DEMOLISHED FIXTURE. EXTEND COLD/HOT WATER, WASTE, AND VENT PIPING FROM EX. ROUGHING TO THE NEW CLASSROOM SINK. PROVIDE NEW COLD & HOT WATER SHUT-OFF VALVES. REFER TO PLUMBING FIXTURE SCHEDULE, SPECIFICATIONS AND ARCHITECTURAL DRAWINGS FOR FINAL QUANTITY & LOCATIONS.
2	PROVIDE NEW WATER COOLER P-2 IN LOCATION OF PREVIOUSLY DEMOLISHED EQUIPMENT. EXTEND COLD WATER, WASTE, AND VENT PIPING FROM EX. ROUGHING TO THE NEW WATER COOLER. PROVIDE NEW COLD WATER SHUT-OFF VALVE. REFER TO ARCHITECTURAL DRAWINGS FOR FINAL QUANTITY, LOCATIONS, & EQUIPMENT SPECIFICATIONS.
3	RE-INSTALL EXISTING TOILET. EXTEND COLD WATER, WASTE AND VENT PIPING FROM EX. ROUGHING TO TOILET AS REQUIRED.
4	RE-INSTALL EXISTING LAVATORY. EXTEND COLD/HOT WATER, WASTE & VENT PIPING FROM EX. ROUGHING TO LAVATORY.
5	COVER/PROTECT ALL EXISTING FLOOR DRAINS & CLEAN OUT DECK PLATES WITHIN FLOORS BEING DEMOLISHED
6	PROVIDE NEW FUNNEL DRAIN ABOVE CEILING. PROVIDE NEW 1 1/4" CONDENSATE DRAIN DN FROM FUNNEL DRAIN WITHIN EXISTING STUD WALL OR SURFACE MOUNTED ON CMU WALL AND CONNECT TO TAILPIECE OF TRAP BELOW SINK. REFER ARCHITECTURAL DRAWINGS FOR CHASE LOCATIONS. REFER TO PLUMBING DETAILS.
7	RE-INSULATE ALL PLUMBING PIPING THROUGHOUT ENTIRE BUILDING INCLUDING DOMESTIC COLD WATER, HOT WATER, & HOT WATER RECIRCULATION LINES

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

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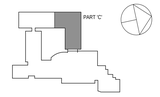

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No.	Date	Issue
4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

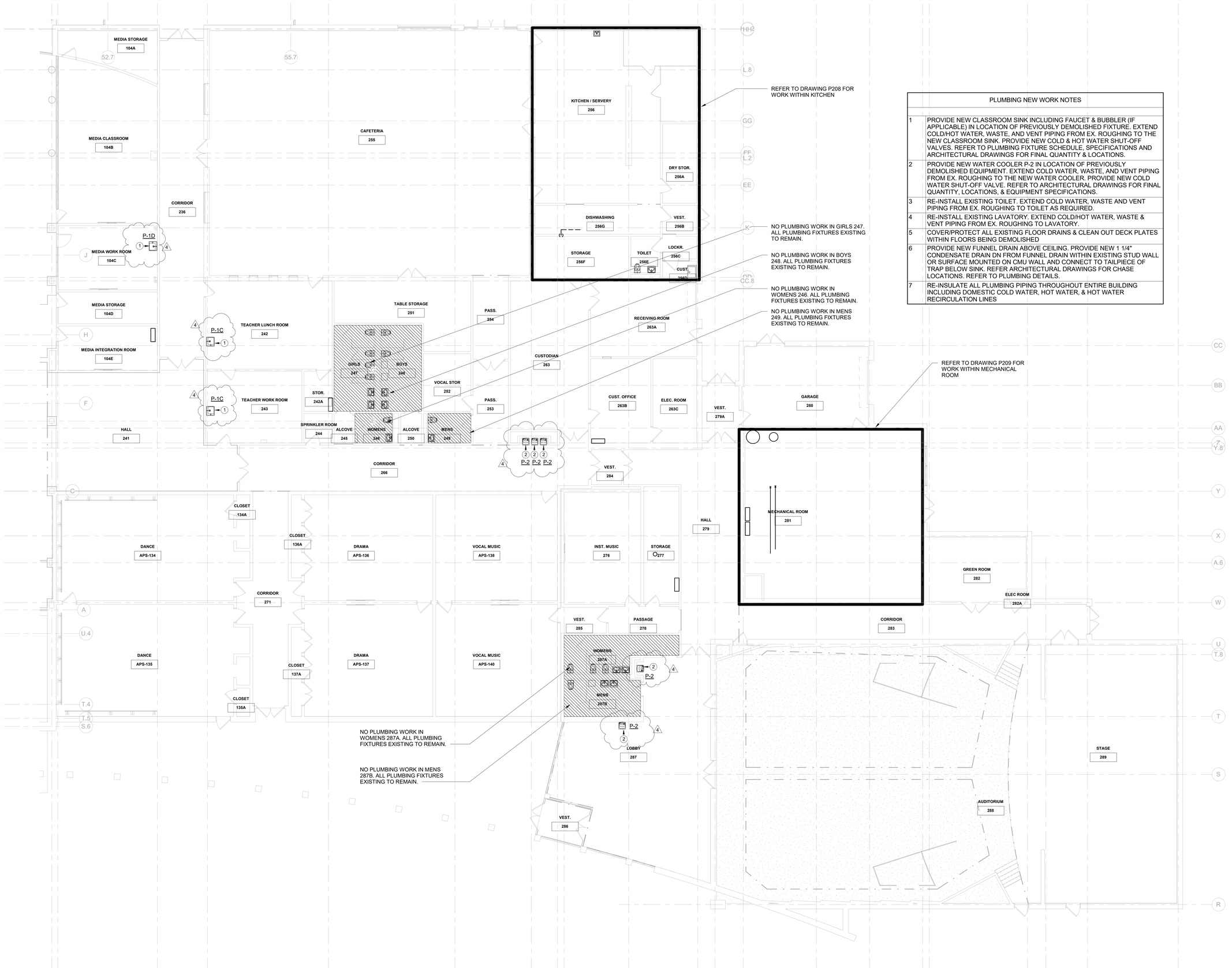
Sheet Title

PLUMBING 1ST FLOOR PART 'C' NEW WORK PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

P203



PLUMBING NEW WORK NOTES

1	PROVIDE NEW CLASSROOM SINK INCLUDING FAUCET & BUBBLER (IF APPLICABLE) IN LOCATION OF PREVIOUSLY DEMOLISHED FIXTURE. EXTEND COLD/HOT WATER, WASTE, AND VENT PIPING FROM EX. ROUGHING TO THE NEW CLASSROOM SINK. PROVIDE NEW COLD & HOT WATER SHUT-OFF VALVES. REFER TO PLUMBING FIXTURE SCHEDULE, SPECIFICATIONS AND ARCHITECTURAL DRAWINGS FOR FINAL QUANTITY & LOCATIONS.
2	PROVIDE NEW WATER COOLER P-2 IN LOCATION OF PREVIOUSLY DEMOLISHED EQUIPMENT. EXTEND COLD WATER, WASTE, AND VENT PIPING FROM EX. ROUGHING TO THE NEW WATER COOLER. PROVIDE NEW COLD WATER SHUT-OFF VALVE. REFER TO ARCHITECTURAL DRAWINGS FOR FINAL QUANTITY, LOCATIONS, & EQUIPMENT SPECIFICATIONS.
3	RE-INSTALL EXISTING TOILET. EXTEND COLD WATER, WASTE AND VENT PIPING FROM EX. ROUGHING TO TOILET AS REQUIRED.
4	RE-INSTALL EXISTING LAVATORY. EXTEND COLD/HOT WATER, WASTE & VENT PIPING FROM EX. ROUGHING TO LAVATORY.
5	COVER/PROTECT ALL EXISTING FLOOR DRAINS & CLEAN OUT DECK PLATES WITHIN FLOORS BEING DEMOLISHED
6	PROVIDE NEW FUNNEL DRAIN ABOVE CEILING. PROVIDE NEW 1 1/4" CONDENSATE DRAIN DN FROM FUNNEL DRAIN WITHIN EXISTING STUD WALL OR SURFACE MOUNTED ON CMU WALL AND CONNECT TO TAILPIECE OF TRAP BELOW SINK. REFER ARCHITECTURAL DRAWINGS FOR CHASE LOCATIONS. REFER TO PLUMBING DETAILS.
7	RE-INSULATE ALL PLUMBING PIPING THROUGHOUT ENTIRE BUILDING INCLUDING DOMESTIC COLD WATER, HOT WATER, & HOT WATER RECIRCULATION LINES

PLUMBING 1ST FLOOR PART 'D' NEW WORK PLAN

NORTH

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

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

412 Stillwater Ave, Stamford, CT. 06902

PROJECT # S-6722

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4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
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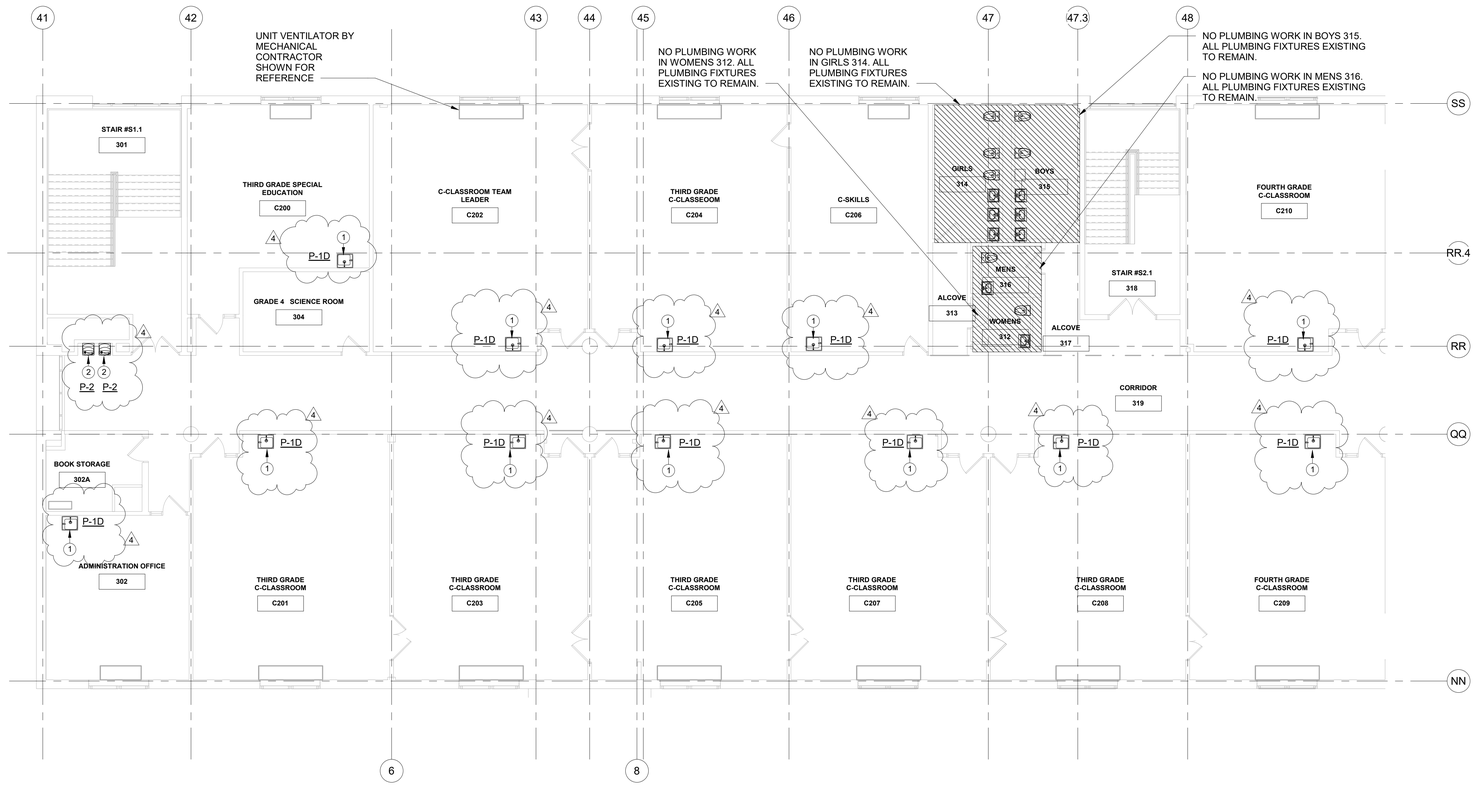
Sheet Title

PLUMBING 1ST FLOOR PART 'D' NEW WORK PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

P204



NORTH

1 PLUMBING 2ND FLOOR PART 'B' NEW WORK PLAN

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

PLUMBING NEW WORK NOTES	
1	PROVIDE NEW CLASSROOM SINK INCLUDING FAUCET & BUBBLER (IF APPLICABLE) IN LOCATION OF PREVIOUSLY DEMOLISHED FIXTURE. EXTEND COLD/HOT WATER, WASTE, AND VENT PIPING FROM EX. ROUGHING TO THE NEW CLASSROOM SINK. PROVIDE NEW COLD & HOT WATER SHUT-OFF VALVES. REFER TO PLUMBING FIXTURE SCHEDULE, SPECIFICATIONS AND ARCHITECTURAL DRAWINGS FOR FINAL QUANTITY & LOCATIONS.
2	PROVIDE NEW WATER COOLER P-2 IN LOCATION OF PREVIOUSLY DEMOLISHED EQUIPMENT. EXTEND COLD WATER, WASTE, AND VENT PIPING FROM EX. ROUGHING TO THE NEW WATER COOLER. PROVIDE NEW COLD WATER SHUT-OFF VALVE. REFER TO ARCHITECTURAL DRAWINGS FOR FINAL QUANTITY, LOCATIONS, & EQUIPMENT SPECIFICATIONS.
3	RE-INSTALL EXISTING TOILET. EXTEND COLD WATER, WASTE AND VENT PIPING FROM EX. ROUGHING TO TOILET AS REQUIRED.
4	RE-INSTALL EXISTING LAVATORY. EXTEND COLD/HOT WATER, WASTE & VENT PIPING FROM EX. ROUGHING TO LAVATORY.
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6	PROVIDE NEW FUNNEL DRAIN ABOVE CEILING. PROVIDE NEW 1 1/4" CONDENSATE DRAIN DN FROM FUNNEL DRAIN WITHIN EXISTING STUD WALL OR SURFACE MOUNTED ON CMU WALL AND CONNECT TO TAILPIECE OF TRAP BELOW SINK. REFER ARCHITECTURAL DRAWINGS FOR CHASE LOCATIONS. REFER TO PLUMBING DETAILS.
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Westover Magnet Elementary School

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PART 'B'

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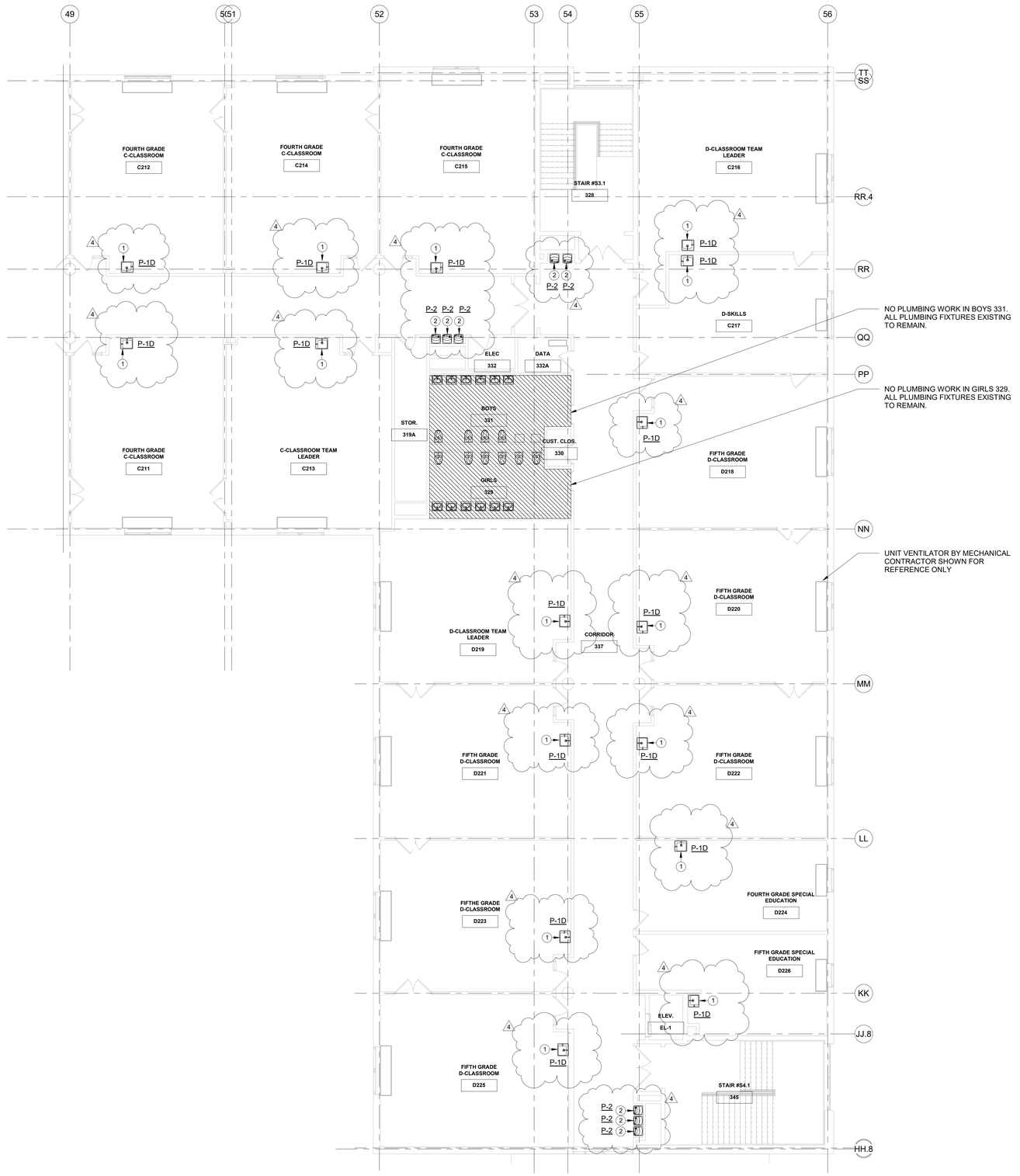
Sheet Title

PLUMBING 2ND FLOOR PART 'B' NEW WORK PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

P205



NORTH

1 PLUMBING 2ND FLOOR PART 'C' NEW WORK PLAN

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

PLUMBING NEW WORK NOTES	
1	PROVIDE NEW CLASSROOM SINK INCLUDING FAUCET & BUBBLER (IF APPLICABLE) IN LOCATION OF PREVIOUSLY DEMOLISHED FIXTURE. EXTEND COLD/HOT WATER, WASTE, AND VENT PIPING FROM EX. ROUGHING TO THE NEW CLASSROOM SINK. PROVIDE NEW COLD & HOT WATER SHUT-OFF VALVES. REFER TO PLUMBING FIXTURE SCHEDULE, SPECIFICATIONS AND ARCHITECTURAL DRAWINGS FOR FINAL QUANTITY & LOCATIONS.
2	PROVIDE NEW WATER COOLER P-2 IN LOCATION OF PREVIOUSLY DEMOLISHED EQUIPMENT. EXTEND COLD WATER, WASTE, AND VENT PIPING FROM EX. ROUGHING TO THE NEW WATER COOLER. PROVIDE NEW COLD WATER SHUT-OFF VALVE. REFER TO ARCHITECTURAL DRAWINGS FOR FINAL QUANTITY, LOCATIONS, & EQUIPMENT SPECIFICATIONS.
3	RE-INSTALL EXISTING TOILET. EXTEND COLD WATER, WASTE AND VENT PIPING FROM EX. ROUGHING TO TOILET AS REQUIRED.
4	RE-INSTALL EXISTING LAVATORY. EXTEND COLD/HOT WATER, WASTE & VENT PIPING FROM EX. ROUGHING TO LAVATORY.
5	COVER/PROTECT ALL EXISTING FLOOR DRAINS & CLEAN OUT DECK PLATES WITHIN FLOORS BEING DEMOLISHED
6	PROVIDE NEW FUNNEL DRAIN ABOVE CEILING. PROVIDE NEW 1 1/4" CONDENSATE DRAIN DN FROM FUNNEL DRAIN WITHIN EXISTING STUD WALL OR SURFACE MOUNTED ON CMU WALL AND CONNECT TO TAILPIECE OF TRAP BELOW SINK. REFER ARCHITECTURAL DRAWINGS FOR CHASE LOCATIONS. REFER TO PLUMBING DETAILS.
7	RE-INSULATE ALL PLUMBING PIPING THROUGHOUT ENTIRE BUILDING INCLUDING DOMESTIC COLD WATER, HOT WATER, & HOT WATER RECIRCULATION LINES

Westover Magnet Elementary School

City of Stamford - Stamford Public Schools

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PROJECT # S-6722

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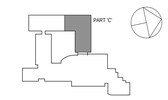
CONSTRUCTION DOCUMENTS

SPN 135-0278RR



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Professional Seal

No.	Date	Issue
4	9/13/2019	ADDENDUM 2
3	8/6/2019	ISSUED FOR BID
2	6/5/2019	CLIENT REVIEW SET
1	5/15/2019	ISSUED FOR PRICING

Sheet Title

PLUMBING 2ND FLOOR PART 'C' NEW WORK PLAN

Job No. NKGD0206.00	Date 08/06/2019
Scale AS NOTED	Drawn / Checked Author Checker

Sheet Number

P206