

Washington Primary School

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Indoor Air Quality (IAQ) Evaluation and HVAC Systems Assessment

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Washington Primary School

INDOOR AIR QUALITY (IAQ) EVALUATION AND HVAC SYSTEMS ASSESSMENTS

EXECUTIVE SUMMARY

The following Findings Report is an overview of the heating, ventilation, and air conditioning (HVAC) systems and operations that has an impact on building ventilation and indoor air quality to support a healthy learning environment in your school. The report's focus, however, relates to occupied areas indoor ventilation and the compliance or non-compliance of this school with current ASHRAE-62.1, (2010) guidelines regarding Ventilation for Acceptable Indoor Air Quality for Schools.

Building Overview

Washington Primary School is located in the countryside of Washington, Connecticut. Washington Primary School serves approximately 155 students in pre-kindergarten through fifth grade.

HVAC System Overview

The building HVAC systems that were evaluated for operational performance, determination of overall condition, and included in our ventilation Testing Adjusting and Balancing (TAB) services are referenced within the attached Appendices.

Additional Information Related to HVAC Systems

Aside from the HVAC units evaluated, the building ventilation system has in place exhaust fans for various purposes including, but not limited to, toilet exhaust, kitchen exhaust, mechanical / electrical space ventilation, etc.

Please note: the available equipment data and visual inspections indicate that all of the Air Handling Heating, Cooling, Ventilation Units and distribution equipment are of pre-1990 technology, all of which are in poor condition due to age.

van Zelm along with Wings Testing and Balancing performed the on-site inspections during the month of April 2024. The goal of this study is primarily focused towards addressing the operational conditions and outside air and outside air change rates of the occupied spaces. Although there are code exhaust air requirements for spaces like storage rooms, electrical rooms, mechanical rooms, etc., these spaces are often not directly ventilated with outside air, nor are they required to be since they typically have no occupancy. These non-occupied spaces typically do not affect building occupied areas as they are typically provided with some form of exhaust creating a negative pressure on the surrounding area. Unoccupied space exhaust may impact outside air infiltration into occupied areas; however, this would typically be limited and is not included in occupied spaces ventilation calculations. Should the School District pursue any Phase II activities for the building including recommissioning, balancing, and controls upgrades, these spaces could then be addressed as a component of that process.

Preliminary findings from the IAQ inspections and air-side Testing Adjusting and Balancing (TAB) to date found and documented issues that could be addressed immediately to improve building environmental control, reduce energy usage, and improve building ventilation compliance with the 2010 version of the ASHRAE-62.1, (2010) guidelines. Although there are very similar guidelines and regulations put forward by publications such as the International Mechanical Code that focuses on guidelines and directives to help achieve healthy well-ventilated buildings, the State program requires that ASHRAE-62.1, (2010) ventilation guidelines be used in this study calculations. It should be noted that

often suggested changes to HVAC systems to improve ventilation could increase energy costs; in some cases, this increase could be significant. Measures should be considered that offset this additional energy use with control upgrades that adjust ventilation systems based on use and measured values. The remainder of this report will address these concerns directly and provide a path forward for Washington Primary School.

EVALUATION

For the purposes of this study, our findings address identified deficiencies or concerns related to overall school building ventilation, inherent capability of systems to achieve needed ventilation and operational performance of the site HVAC systems. Based on our findings, we offer some beneficial insight and recommendations as follows:

AHSRAE-62.1, (2010) Compliance

Our field observations indicate, most if not all of the individual occupied spaces at this school do not comply with the applicable building codes or guidelines regarding indoor air quality and outdoor ventilation.

The ideal supply of outside air to interior occupied spaces should be based upon the 2018 Connecticut Building Code, which is based on the most currently adopted 2015 International Mechanical Code and coincides with ASHRAE-62.1, (2010) guidelines. These codes and guidelines prescribe the flow rate of outside air that must be supplied mechanically to occupied areas based on occupancy classifications. Depending on the type of use of a space, outdoor air flow rates in cubic feet per minute (CFM) per person are defined when the number of occupants within a space is known. When total occupants per space are unknown, the code defines occupant density for each classification type in number of occupants per space floor area. The final flow rate in CFM for every occupied space can thus be calculated. Please note that, although this is a school, the (CFM) per person requirements for some spaces such as an office may utilize the same occupancy classification ventilation rate of a commercial office space, as the rates are the same regardless on type of building. This applies to nearly every space that is not considered a space for traditional classroom activities including, but not limited to, nurse and healthcare offices, gymnasium, assembly halls, etc.

It shall be noted that this school does not currently utilize automatic space Carbon Dioxide (CO₂) Demand Controlled Ventilation (DCV) to increase or decrease outdoor ventilation air into areas based upon CO₂ levels within the spaces. There is an absolute correlation between CO₂ levels and cubic feet per minute (CFM) of ventilation air per person that could be controlled by the Building Automation System (BAS) to meet ASHRAE 62.1 (2016) indoor ventilation requirements for schools that should be understood! The accepted formula to calculate CFM/Person utilizes: Outdoor CO₂ level in ppm, Measured Indoor CO₂ level in ppm, and CO₂ Generation Rates (CFM) for different metabolic rates by age and activity level i.e., CO₂ generation by an individual for a classroom would be lower than within an art room. Active DCV control is an acceptable alternate method to determine if ventilation requirements are met and could supersede rooms that may fail otherwise using traditional measured data collection procedures prescribed by established ASHRAE guidelines!

As an alternative to providing outside air mechanically to occupied spaces, the code and guidelines also allows for outside air to enter occupied areas naturally through operable windows. If the area of operable windows for an occupied space is at least 4% of the space's floor area, mechanical ventilation for that space is not required by code. However, although spaces with sufficient operable window area may satisfy code requirements, this is not a realistic way of providing adequate ventilation during periods of cold or hot weather, and this often adversely affects the temperature and humidity levels within the building.

The amount of outside air supplied to occupied spaces is important for occupant comfort and health because contaminants generated by people and materials in the space must be removed or they will build up to undesirable or unhealthy levels. It should be noted that diluting interior air with outside air reduces the concentration of various airborne contaminants, including viral particles that carry the COVID-19 virus and other viral and bacterial contaminants.

Outside Air Flow and Air Change Rate Findings

By individual space area/volume measurements and ventilation air being delivered, it could then be determined if spaces conform to the requirements within codes / guidelines and the results are calculated based on individual space classification and category. Additionally, these readings should be based upon “worst case” scenario, whereby each space is considered fully occupied and the associated air handling units are operating with minimum outside air to satisfy the controlled parameters. The reason for using this method is to ensure that if a building can maintain required outside air flow in this minimum ventilation mode, it will maintain them when more outside air is introduced. It does not necessarily mean that the units will handle thermal or humidity regulation in maximum ventilation modes, which should be considered prior to any system modifications. As a caveat, it is important to understand that forcing the worst case is not necessarily typical building operation but is necessary to discover root issues behind the ventilation control of the building. It is possible that making changes regarding outside airflow may cause other issues to be revealed, which in turn may require additional analysis.

The data collected in this study will provide a quantitative conclusion about how well the building performs regarding ventilation if not using CO₂-based demand-controlled ventilation. For the occupied zones within this building, the total minimum required ventilation airflow will be calculated. The planned continuation TAB activity will attempt to determine the total delivered outside air for the best possible case by operating the units in 100% outside air mode to simulate the systems had the ability to function in this mode. Using this method along with room volumes and occupancy will reveal the potential amount of outside air is delivered to the spaces, and if it meets current ventilation codes. Note: In the case of this particular School, the current systems do not allow for this since the spaces only have exhaust systems and operable windows.

A common calculation used for measuring the amount of air that is exchanged through space every hour is the Air Change Rate (ACH), and for this analysis specifically we are concerned with the Outside Air Change Rate (OACH). At its core, this is a ratio of the volume of air that can theoretically completely fill the volume of each space and how many times it can do that every hour. For example, a 1000 ft² room with 10 ft ceilings will have a volume of 10,000 ft³. If 250 CFM is delivered to this space, that results in 15,000 ft³ of air. Every hour, the space will be flushed with that much air, resulting in an ACH of 1.5. This number on its own will not determine if a space satisfies code requirements and it does not mean that every molecule of the air in that space has been replaced after the hour, but it helps to give an idea into the type of performance that could be expected and there are guidelines for many spaces regarding the OACH. While general spaces like classrooms and offices are among the space categories that do not have outside air ACH requirements, these rates help to give some insight into overall performance. Current recommendations prescribe a total ACH of at least 3 throughout the building, without falling below the minimum outside air CFM.

Outside Air Flow Improvements

It is possible that based upon study findings some remedial action could be suggested to improve the HVAC systems’ operation and overall environmental control. These measures alone may help to ensure required outside ventilation air will be delivered to spaces that currently have a deficit and could improve overall building ventilation performance as a result. Due to the age of the building and changes over the years in occupancy, systems, and codes, considerations for HVAC redesign may be in order.

Aside from the above, since the emergence of the COVID-19 virus in December 2019, the specific requirements and precautions taken regarding outside air have become more stringent. For example, ASHRAE has been continuously investigating the transmission of COVID-19 through HVAC systems and has made recommendations on how to adapt existing HVAC systems to minimize transmission of COVID-19. Changes to building systems to address the virus also positively improve the performance of the ventilation systems with handling the filtration of other particulate that directly impacts building air quality. On April 14, 2020, ASHRAE released a document “ASHRAE Position Document on Infectious Aerosols”. ASHRAE also gave a presentation on June 16, 2020, regarding Recommendations and Activities for re-opening schools for the fall 2020 academic semester. These ASHRAE recommendations remain relevant as COVID and other contaminants that impact indoor air quality continue to remain a concern.

General Recommendations to Improve Schools Performance

Full Retro-commissioning of the building mechanical and control systems is usually recommended for energy savings and improved efficiency. Given the age of the equipment, this money would be better spent on HVAC upgrades.

Typical Equipment Upgrades

Generally, the more outside air that can be supplied to occupied areas, the better. Existing HVAC systems, where practical, should have outside air flow rates increased above current setpoints if determined required and have the ability. Even units that currently meet code requirements for ventilation flow rates could be increased if there is not a negative energy impact but should not be increased beyond the capacity of the unit to heat or cool the air. Total space air change rates (ACH) should also be increased to the extent possible along with increases in outside air flow to better remove contaminants from the air. If a unit at maximum fan speeds is still incapable of providing at least the minimum ventilation or ACH required, then the system should be evaluated further to determine the best solution such a total system modification, or the installation of a self-contained HEPA filtration unit in areas where increasing fresh air is limited.

Supplemental air cleaning technology, such as ultraviolet-C (UV-C) light or bi-polar ionization, is available but may not be viable for the existing HVAC system.

For the Washington Primary School HVAC units with some recirculation air, it could be suggested that the following recommendations would be beneficial with improving indoor air quality throughout the school if implemented:

- For units that may have, or planned to have dual series filter racks where the first has room for 2” filters and the second has room for 4” or greater filters, the 2” filters should be MERV 8 for pre-filtering, but the larger filters should remain MERV 11+.
- HVAC unit filter changes on high occupancy or dusty areas should be performed more frequently than general occupancy areas. Utilizing a low differential pressure gauge or transmitter would be suggested to determine filter loading and optimum replacement intervals.
- Consider in-room HEPA filtration units to improve and control air quality in underperforming rooms.
- Consider investigating the potential of increasing the ventilation air flow rate wherever possible without imposing too high loading capacity on equipment or impacting energy usage greatly.
- The following customary maintenance guidelines could improve indoor air quality and impact energy consumption. Some typical tasks that may include, but are not limited to:

- Cleaning HVAC coils on a yearly basis if deemed necessary: Cleaning the coils will improve airflow patterns through the coil, increasing coil effectiveness and preventing deterioration due to rust or corrosion.
- Damper cleaning, lubrication, and adjusting: All unit dampers operate more efficiently if cleaned, properly lubricated, and tested throughout their movement range from the system controller. As dampers age, lubrication and dirt builds up on linkages, blades and pivot points causing the actuator to need to push harder to move the damper into the required position. Too much build-up can result in control actuators failures or broken damper hardware, which would then need to be replaced. Missing or worn blade-to blade or damper end seals could impact ventilation control and energy use, and therefore inspection and performing any needed maintenance would be in order.
- General Unit Cleanliness: All unit's internals, ductwork, and grills should be inspected and cleaned as needed to remove any dirt or debris that has accumulated. Systems that are not maintained and cleaned frequently can become a breeding ground for bacteria and molds should those materials absorb moisture.

General Air Handling Unit Upgrade or Replacement

Most of the major HVAC systems in the School are roughly 34 years old. HVAC Systems typically have a lifespan of 20-25 years so the Facility Staff should be applauded for their diligence in keeping these units operating for all these years.

It would be an acceptable and beneficial consideration that a complete HVAC equipment evaluation be performed to consider upgrades and replacements to improve school ventilation and help ensure reliable and efficient operation for years to come.

Field Study Findings & General Comments

General Comments:

- All dampers and linkages should be cleaned and lubricated to allow free movement and reduce potential damage to actuators or linkages. Replace damper and damper seals where necessary.
- Check heating and cooling coils for cleanliness and integrity. Clean coils as required to increase heat transfer performance.
- Unit filters should be replaced with MERV 11 or higher and changed at intervals determined by area served and equipment operation.

Detailed in the attached appendix are our high-level observations of identified equipment unit information and overall operational notations.

CONCLUSIONS

The School District clearly has taken measures to maintain the aging equipment and should be commended for keeping these systems operating and maintained. Region 12 School District may want to consider unit replacement budgeting including measures for indoor air quality (IAQ) improvements such as adding CO2 DCV.

As the accompanying compliance spreadsheet results show, this ventilation study found that the Washington Primary School does not meet the current minimum ventilation requirements per ASHRAE-62.1, (2010).

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Appendix 1

Ventilation Data Calculations



Project Name:	Region 12-Washington Primary School
Project Number:	2024005.00
Scope	Ventilation Calculation by Building
Date	June 21, 2024



Zone Identification												AHSRAE-62.1, (2010) Ventilation Calculations								
Floor	Room#	Room Name	Occupancy Classification	Category	Total Airflow	Unit Actual OA %	BAS OA Damper Cond	Served By	Zone Area, Az, per space	Ceiling Height	Volume, per space	Zone Population, Pz, per space	People OA Rate in Breathing Zone, Rp	Area OA Rate in Breathing Zone, Ra	Default Occupant Density	Min. Required Ventilation Airflow	ACTUAL MEASURED VENTILATION AIR FLOW	Meets Current required airflow?	Ventilation ACH	DCV?
					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	Yes/No/N/A	(AC/hr)	Yes/No
1	1	Main Office	Offices	Office spaces	584 Supply	---		RTU-1	389	9.6	3734.4	2	5.0	0.06	5	33	0	No	0.000	No
1	2	Copy Room	Workrooms	Copy, printing rooms	231 Supply	---		RTU-1	81	9.2	745.2	1	5.0	0.06	4	10	0	No	0.000	No
1	3	CONFERENCE ROOM 103	Offices	Conference rooms	262 Supply	---		RTU-1	126	9.3	1171.8	2	5.0	0.06	50	18	0	No	0.000	No
1	4	Principle	Offices	Office spaces	410 Supply	---		RTU-1	233	10.5	2446.5	5	5.0	0.06	5	39	0	No	0.000	No
1	5	Boys	Public Spaces	Toilet rooms - public	0 Exhaust	---		EF	126	9.7	1222.2	6	0.0	0.00	0	0	0	N/A	0.000	No
1	6	READING 106	Education	Classroom (ages 5-8)	262 Sup. 0 Ret.	Pneumatic Pot.		Gym AHU	352	8	2816	8	10.0	0.12	25	122	34	No	0.724	No
1	7	MATH 105	Education	Classroom (ages 5-8)	338 Sup. 41 Ret.	Pneumatic Pot.		Gym AHU	360	8.4	3024	6	10.0	0.12	25	103	44	No	0.873	No
1	8a	STORAGE 101	Storage	Warehouses	0 Return	Pneumatic Pot.		Gym AHU - Return only	40	8.4	336	0	0.0	0.06	0	2	0	No	0.000	No
1	8b	Lav	Public Spaces	Toilet rooms - public	0 Exhaust	---		EF	30	87.8	2634	0	0.0	0.00	0	0	0	N/A	0.000	No
1	16A	Nurses Toilet	Public Spaces	Toilet rooms - public	292 Exhaust	---		EF			0	1	0.0	0.00	0	0	0	N/A		No
1	10	S1	Storage	Warehouses	35 Return	Pneumatic Pot.		Gym AHU	203	8.1	1644.3	0	0.0	0.06	0	12	0	No	0.000	No
1	12	102 THERAPY	Education	Multiuse assembly	92 Sup. 26 Ret.	Pneumatic Pot.		Gym AHU	244	8	1952	4	7.5	0.06	100	45	12	No	0.369	No
1	17A	Art Kiln Room	Education	Art Classroom	272 Exhaust	---		EF					10.0	0.18	20	0	0	N/A		No
1	13	MUSIC ROOM 103	Education	Music/theater/dance	400 Sup. 0 Ret.	Pneumatic Pot.		Gym AHU	424	8.3	3519.2	22	10.0	0.06	35	245	52	No	0.887	No
1	14	STAGE 102A, MP RM 104	Education	Music/theater/dance	13,469 Sup. TOTAL	Pneumatic Pot.		Gym AHU	8959	28	248624	80	10.0	0.06	35	1338	1751	Yes	0.423	No
1	15	Multi-Purpose Rm 104 is combined above with Stage		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	16	HEALTH 112	Education	Classroom (ages 5-8)	N/A	---		N/A	226	10	2260	2	10.0	0.12	25	47	0	No	0.000	No
1	17	ART 118 (S3)	Education	Art Classroom	N/A	---		N/A	897	10	8970	22	10.0	0.18	20	381	0	No	0.000	No
1	18	JANITOR 115	Storage	Warehouses	44 Exhaust	---		N/A	90	10	900	1	0.0	0.06	0	5	0	No	0.000	No
1	19	CUSTODIAL OFFICE	Offices	Office spaces	N/A	---		N/A	70	9.5	665	0	5.0	0.06	5	6	0	No	0.000	No
1	20	Corridor	Education	Corridors (see Public Spaces)	N/A	---		N/A	85	9.4	799	0	0.0	0.00	0	0	0	N/A	0.000	No
1	21	Occupational Therapy	Education	Multiuse assembly	0 Exhaust	---		EF	141	10	1410	5	7.5	0.06	100	46	0	No	0.000	No
1	22	Gallagher	Education	Classroom (ages 5-8)	39 Exhaust	---		EF	121	11	1331	4	10.0	0.12	25	55	0	No	0.000	No
1	23	Burnham	Education	Classroom (ages 5-8)	61 Exhaust	---		EF	130	11	1430	4	10.0	0.12	25	56	0	No	0.000	No
1	24	1ST GRADE 112	Education	Classroom (ages 5-8)	306 Exhaust	---		EF	732	11.0	8052	22	10.0	0.12	25	308	0	No	0.000	No
1	25	3RD GRADE 111	Education	Classroom (ages 5-8)	250 Exhaust	---		EF	661	11.9	7865.9	22	10.0	0.12	25	299	0	No	0.000	No
1	26	LITERACY 110	Education	Classroom (ages 5-8)	0 Exhaust	---		N/A	797	11.2	8926.4	22	10.0	0.12	25	316	0	No	0.000	No
1	27	MEDIA CENTER 108	Education	Multiuse assembly	N/A	---		N/A	1610	9.5	15295	22	7.5	0.06	100	262	0	No	0.000	No
1	27a	Maker Space 109	Education	Classroom (ages 5-8)	N/A	---		N/A	262	9.5	2489	15	10.0	0.12	25	181	0	No	0.000	No
1	28	COMPUTER CLASSROOM 107	Education	Classroom (ages 5-8)	N/A	---		N/A	539	10	5390	14	10.0	0.12	25	205	0	No	0.000	No
LL	29	Copy	Workrooms	Copy, printing rooms	173 Supply	Pneumatic Pot.		AHU-1	130	7.2	936	1	5.0	0.06	4	13	27	Yes	1.731	No
LL	31	TEACHERS LOUNGE 115	Education	Multiuse assembly	90 Supply	Pneumatic Pot.		AHU-1	378	7.2	2721.6	12	7.5	0.06	100	113	14	No	0.309	No

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Zone Identification												AHSRAE-62.1, (2010) Ventilation Calculations								
Floor	Room#	Room Name	Occupancy Classification	Category	Total Airflow	Unit Actual OA %	BAS OA Damper Cond	Served By	Zone Area, Az, per space	Ceiling Height	Volume, per space	Zone Population, Pz, per space	People OA Rate in Breathing Zone, Rp	Area OA Rate in Breathing Zone, Ra	Default Occupant Density	Min. Required Ventilation Airflow	ACTUAL MEASURED VENTILATION AIR FLOW	Meets Current required airflow?	Ventilation ACH	DCV?
					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	Yes/No/N/A	(AC/hr)	Yes/No
LL	30	Staff Toilet	Public Spaces	Toilet rooms - public	123 Exhaust	---		EF	30	7.3	219	1	0.0	0.00	0	0	0	N/A	0.000	No
1	27b	IT Office 2	Offices	Office spaces	N/A	---		N/A	108	8.7	939.6	1	5.0	0.06	5	11	0	No	0.000	No
1	27c	IT Storage	Storage	Warehouses	N/A	---		N/A	112	12.1	1355.2	0	0.0	0.06	0	7	0	No	0.000	No
LL	32	Stor Closet	Storage	Warehouses	N/A	---		N/A				0	0.0	0.06	0	0	0	N/A		No
LL	33	Elect Closet	Storage	Warehouses	44 Exhaust	---		EF	53	6.7	355.1	0	0.0	0.06	0	3	0	No	0.000	No
LL	34	Boys Lav	Public Spaces	Toilet rooms - public	128 Sup. 264 Exh.	Pneumatic Pot.		AHU-1 & EF	145	7.3	1058.5	0	0.0	0.00	0	0	20	N/A	1.134	No
LL	35	Girls Lav	Public Spaces	Toilet rooms - public	77 Sup. 288 Exh.	Pneumatic Pot.		AHU-1 & EF	151	7.3	1102.3	0	0.0	0.00	0	0	12	N/A	0.653	No
LL	36	KINDERGARTEN 122	Education	Classroom (ages 5-8)	955 Supply	Pneumatic Pot.		AHU-1	726	10.4	7550.4	20	10.0	0.12	25	287	149	No	1.184	No
LL	36A	Coat Closet	Storage	Warehouses	N/A	---		FCU	487	10.5	5113.5	0	0.0	0.06	0	29	0	No	0.000	No
LL	37	1ST GRADE 121	Education	Classroom (ages 5-8)	583 Supply	Pneumatic Pot.		AHU-1	808	10.5	8484	20	10.0	0.12	25	297	91	No	0.644	No
LL	38	CAFETERIA 119	Food and beverage service	Cafeteria, fast food	750 Return	Pneumatic Pot.		AHU-1	2192	12	26304	22	7.5	0.18	100	560	232	No	0.529	No
LL	39	Storage	Storage	Warehouses	378 Supply	Pneumatic Pot.		AHU-1	141	13	1833	0	0.0	0.06	0	8	59	Yes	1.931	No
LL	40	KITCHEN 116A	Food and beverage service	Kitchens (cooking)	622 Supply	Pneumatic Pot.		AHU-1	317	9	2853	6	0.0	0.00	0	0	97	N/A	2.040	No
LL	40a	Dishwash	Food and beverage service	Kitchens (cooking)	213 Exhaust	---		EF	108	9.1	982.8	1	0.0	0.00	0	0	0	N/A	0.000	No
LL	41	Toilet	Public Spaces	Toilet rooms - public	83 Sup. 244 Exh.	Pneumatic Pot.		AHU-1 & EF	77	9.1	700.7	0	0.0	0.00	0	0	13	N/A	1.113	No
2	42	5TH GRADE 200	Education	Classroom (ages 5-8)	0 Exhaust	---		EF	779	11.6	9036.4	22	10.0	0.12	25	313	0	No	0.000	No
2	43	5TH GRADE 202	Education	Classroom (ages 5-8)	354 Exhaust	---		EF	672	11.6	7795.2	20	10.0	0.12	25	281	0	No	0.000	No
2	44	learning room 204	Education	Classroom (ages 5-8)	142 Exhaust	---		EF	391	11.4	4457.4	8	10.0	0.12	25	127	0	No	0.000	No
2	45	3RD GRADE 206	Education	Classroom (ages 5-8)	252 Exhaust	---		EF	629	121.6	76486.4	22	10.0	0.12	25	295	0	No	0.000	No
2	46	4TH GRADE 207	Education	Classroom (ages 5-8)	1011 Exhaust	---		EF	663	11.6	7690.8	22	10.0	0.12	25	300	0	No	0.000	No
2	47	TUTOR 205	Education	Classroom (ages 5-8)	N/A	---		N/A	175	12	2100	5	10.0	0.12	25	71	0	No	0.000	No
2	48	4TH GRADE 203	Education	Classroom (ages 5-8)	607 Exhaust	---		EF	770	11.6	8932	22	10.0	0.12	25	312	0	No	0.000	No
2	49	3RD GRADE 201	Education	Classroom (ages 5-8)	416 Exhaust	---		EF	592	11.7	6926.4	16	10.0	0.12	25	231	0	No	0.000	No

Appendix 2

TAB Airflow Survey Data





WING'S TESTING & BALANCING CO., INC.

Washington Primary School

Ventilation Verification Survey

* * * *

Van Zelm Heywood & Shadford, Inc.
Attn: Bill Donald
10 Talcott Notch Road
Farmington, CT 06032-1800

April 17, 2024



WING'S TESTING & BALANCING CO., INC.

April 17, 2024

Van Zelm Heywood & Shadford, Inc.
Attn: Bill Donald
10 Talcott Notch Road
Farmington, CT 06032-1800

RE: Washington Primary School Airflow & Ventilation Survey

Dear Bill,

Our survey of the above referenced location has been completed as noted on the attached data sheets. The following are our results:

- We tested all supply fans to determine total outside air ventilation for all units.
- It should be noted that RTU-1 serving the offices has no O.A. intake and is recirculation only. The unit has a sealed panel where O.A. intake louvers would be installed, but it's capped off. Due to this, all areas served by it have no fresh air ventilation.
- Centrally located classrooms on 1st and 2nd floor have no supply air ventilation and are served by exhaust only.
- We found areas that were not labeled on the prints provided and we added all these spaces onto the attached spreadsheet.
- As noted on attached spreadsheets, multiple exhaust fans aren't running and require further investigation.
- Due to poor ceiling access in many areas, we were not able to follow exhaust ductwork to determine which fans serve which areas.

The following pages are your record of current operating conditions. If you have any questions, or we can be of further service, please do not hesitate to call.

Very truly yours,

Wing's Testing & Balancing Co., Inc.

ICB Certified Contractor for:

TAB—Cx—Indoor Air Quality—Sound & Vibration
Fire & Smoke Damper—Smoke Control Systems

Nicholas Carrano

CT SM-2 License 7484

TABB Technician- BB1160780T

Indoor Air Quality Technician- IAQ1160780T

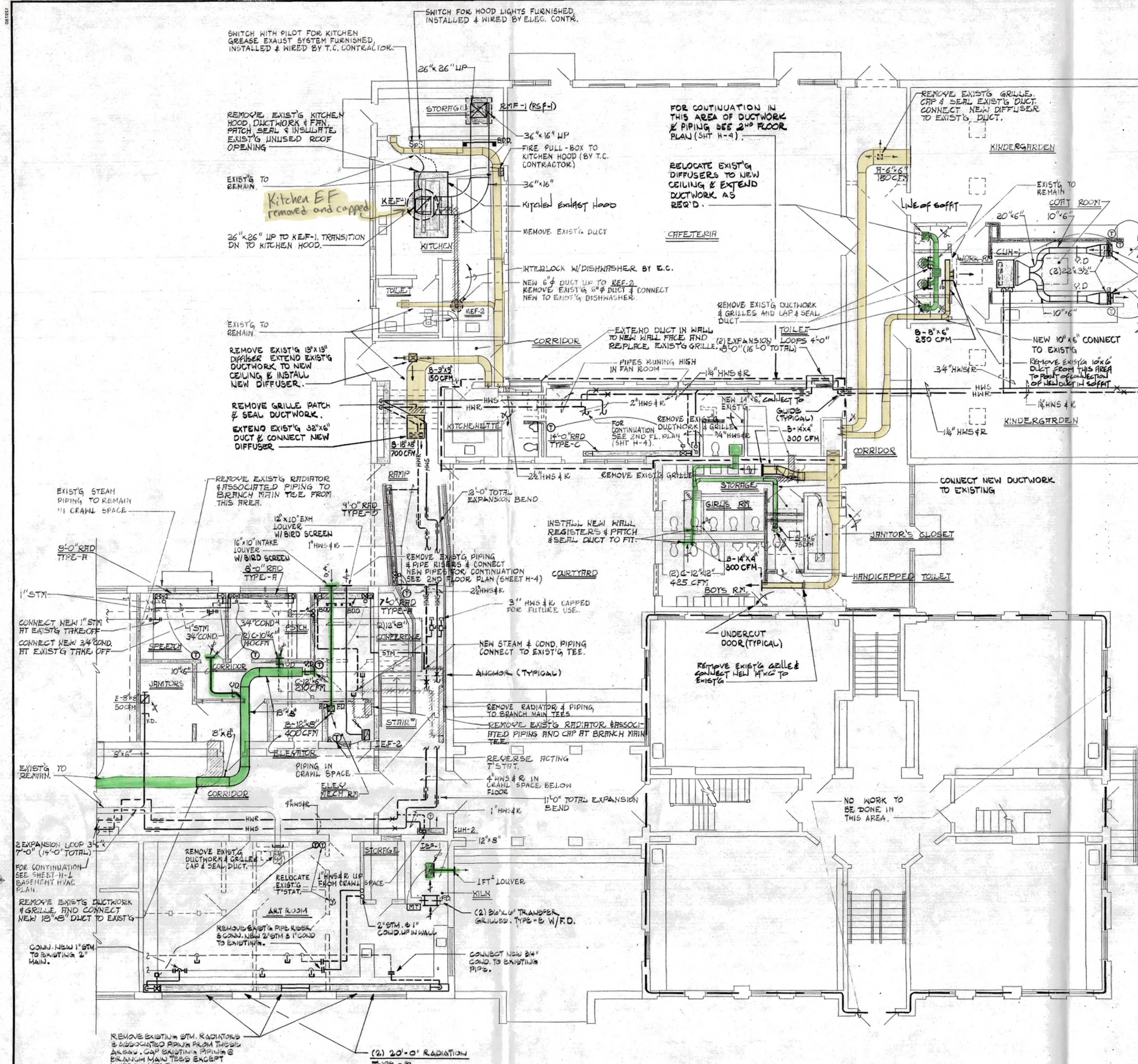


Project Name:		Region 12 School District		Washington Primary Elementary			
Project Number:		2024005.00					
Scope		TAB Data					
Date		April 10, 2024					
Zone Identification							
Floor	Room#	Room Name	MEASURED CFM	Calculated OA Flow (cfm)	OA Damper Position	Associated VAV & RTU/AHU Unit	Notes
1	1	Main Office	584 Supply	0	---	RTU-1	RTU-1 has no O.A. intake, fully recirculating
1	2	Copy Room	231 Supply	0	---	RTU-1	RTU-1 has no O.A. intake, fully recirculating
1	3	CONFERENCE ROOM 103	262 Supply	0	---	RTU-1	RTU-1 has no O.A. intake, fully recirculating
1	4	Principal	410 Supply	0	---	RTU-1	RTU-1 has no O.A. intake, fully recirculating
1	5	Boys	0 Exhaust	0	---	EF	EF not running
1	6	READING 106	262 Sup. 0 Ret.	34	Pneumatic Pot.	Gym AHU	Pneumatic Potentiometer did not move OA damper
1	7	MATH 105	338 Sup. 41 Ret.	44	Pneumatic Pot.	Gym AHU	Pneumatic Potentiometer did not move OA damper
1	8a	STORAGE 101	0 Return	0	Pneumatic Pot.	Gym AHU - Return only	Pneumatic Potentiometer did not move OA damper
1	8b	Lav	0 Exhaust	0	---	EF	EF not running
1	16A	Nurses Toilet	292 Exhaust	0	---	EF	
1	10	S1	35 Return	0	Pneumatic Pot.	Gym AHU	Pneumatic Potentiometer did not move OA damper
1	12	102 THERAPY	92 Sup. 26 Ret.	12	Pneumatic Pot.	Gym AHU	Pneumatic Potentiometer did not move OA damper
1	17A	Art Kiln Room	272 Exhaust	0	---	EF	
1	13	MUSIC ROOM 103	400 Sup. 0 Ret.	52	Pneumatic Pot.	Gym AHU	Pneumatic Potentiometer did not move OA damper
1	14	STAGE 102A	13,469 Sup. TOTAL	1751	Pneumatic Pot.	Gym AHU	Stage is open to gym, airflow total is for both areas. Recommend combining
1	15	MULTI-PURPOSE 104	10,061 Ret. TOTAL				
1	16	HEALTH 112	N/A	0	---	N/A	No Ventilation
1	17	ART 118 (S3)	N/A	0	---	N/A	No Ventilation, window A/C unit only
1	18	JANITOR 115	44 Exhaust	0	---	N/A	
1	19	CUSTODIAL OFFICE	N/A	0	---	N/A	No Ventilation
1	20	Corrodor	N/A	0	---	N/A	No Ventilation
1	21	Occupational Therapy	0 Exhaust	0	---	EF	
1	22	Gallagher	39 Exhaust	0	---	EF	
1	23	Burnham	61 Exhaust	0	---	EF	

Project Name:		Region 12 School District		Washington Primary Elementary			
Project Number:		2024005.00					
Scope		TAB Data					
Date		April 10, 2024					
Zone Identification							
Floor	Room#	Room Name	MEASURED CFM	Calculated OA Flow (cfm)	OA Damper Position	Associated VAV & RTU/AHU Unit	Notes
1	24	1ST GRADE 112	306 Exhaust	0	---	EF	
1	25	3RD GRADE 111	250 Exhaust	0	---	EF	
1	26	LITERACY 110	0 Exhaust	0	---	N/A	Exhaust only, fan not running
1	27	MEDIA CENTER 108	N/A	0	---	N/A	No Ventilation, window A/C unit only
1	27a	Maker Space 109	N/A	0	---	N/A	No ventilation
1	28	COMPUTER CLASSROOM 107	N/A	0	---	N/A	No Ventilation, window A/C unit only
LL	29	Copy	173 Supply	27	Pneumatic Pot.	AHU-1	
LL	31	TEACHERS LOUNGE 115	90 Supply	14	Pneumatic Pot.	AHU-1	
LL	30	Staff Toilet	123 Exhaust	0	---	EF	
1	27b	IT Office 2	N/A	0	---	N/A	No Ventilation
1	27c	IT Storage	N/A	0	---	N/A	No Ventilation
LL	32	Stor Closet	N/A	0	---	N/A	
LL	33	Elect Closet	44 Exhaust	0	---	EF	
LL	34	Boys Lav	128 Sup. 264 Exh.	20	Pneumatic Pot.	AHU-1 & EF	
LL	35	Girls Lav	77 Sup. 288 Exh.	12	Pneumatic Pot.	AHU-1 & EF	
LL	36	KINDERGARTEN 122	955 Supply	149	Pneumatic Pot.	AHU-1	
LL	36A	Coat Closet	N/A	0	---	FCU	No O.A. ventilation, recirculating FCU only
LL	37	1ST GRADE 121	583 Supply	91	Pneumatic Pot.	AHU-1	
LL	38	CAFETERIA 119	750 Return	232	Pneumatic Pot.	AHU-1	
LL	39	Storage	378 Supply	59	Pneumatic Pot.	AHU-1	
LL	40	KITCHEN 116A	622 Supply	97	Pneumatic Pot.	AHU-1	
LL	40a	Dishwash	213 Exhaust	0	---	EF	
LL	41	Toilet	83 Sup. 244 Exh.	13	Pneumatic Pot.	AHU-1 & EF	
2	42	5TH GRADE 200	0 Exhaust	0	---	EF	Exhaust fan not running, same fan serves 110 which also has no flow.

Project Name:	Region 12 School District	Washington Primary Elementary
Project Number:	2024005.00	
Scope	TAB Data	
Date	April 10, 2024	

Zone Identification							
Floor	Room#	Room Name	MEASURED CFM	Calculated OA Flow (cfm)	OA Damper Position	Associated VAV & RTU/AHU Unit	Notes
2	43	5TH GRADE 202	354 Exhaust	0	---	EF	
2	44	learning room 204	142 Exhaust	0	---	EF	
2	45	3RD GRADE 206	252 Exhaust	0	---	EF	
2	46	4TH GRADE 207	1011 Exhaust	0	---	EF	
2	47	TUTOR 205	N/A	0	---	N/A	No ventilation
2	48	4TH GRADE 203	607 Exhaust	0	---	EF	
2	49	3RD GRADE 201	416 Exhaust	0	---	EF	
LL	36B	NEXT TO 36A	365 Supply	57	Pneumatic Pot.	AHU-1	Area wasn't labeled on print
LL	36C	TOILET FOR 1st GRADE 121	0 Exhaust	0	---	EF	Toilet wasn't labeled on print, EF not running
LL	36D	TOILET FOR 1st GRADE 122	0 Exhasut	0	---	EF	Toilet wasn't labeled on print, EF not running
2	47A	TOILET NEXT TO 205	110 Exhaust	0	---	EF	Not labeled on print, next to Tutor 205
2	45A	GIRLS TOILET NEXT TO 206	670 Exhaust	0	---	EF	
2	45B	BOYS TOILET NEXT TO 206	72 Exhaust	0	---	EF	Face damper closed

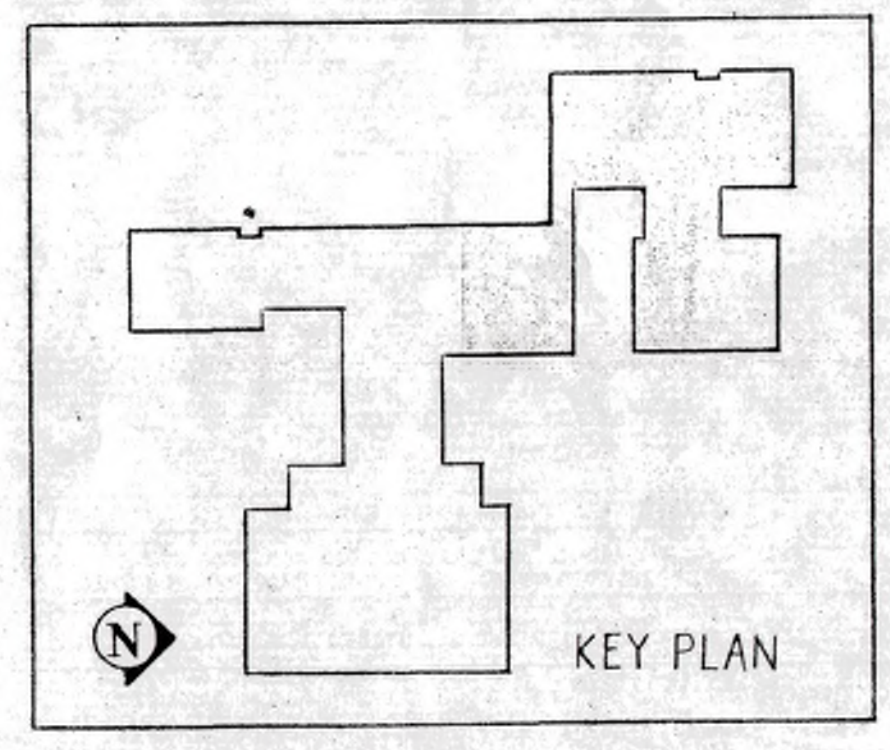


FIRST FLOOR HVAC PLAN - NORTHWEST

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

- GENERAL NOTES
1. This job is a renovation. Before submitting his Bid, the Contractor shall visit the site and become thoroughly familiar with all existing conditions under which his work will be installed. This Contract includes all modifications of existing systems required for the installation of new equipment. This Contract includes all necessary offsets, transitions, and modifications required to install all new equipment in existing spaces. All new and existing equipment and systems shall be fully operational under this Contract before the job is considered complete. The Contractor shall be held responsible for any assumptions he makes, any omissions or errors he makes as a result of his failure to become fully familiar with the existing conditions and the Contract Documents of all trades.
 2. All ductwork penetrations of floor slab, fire-rated wall or chase shall be protected with UL fire dampers (F.D.).
 3. The location of all diffusers, registers and grilles shall be coordinated with the Architectural Reflected Ceiling Plans.
 4. Provide insulated backplates for the thermostats located on exterior walls.
 5. All ductwork elbows are to be full radius or squared with turning vanes.
 6. The Contractor shall modify existing ductwork as required for the installation of fire dampers. Field measure ducts before ordering dampers.
 7. All existing steam traps, including traps not shown on these Plans, shall be replaced, including traps for radiators, coils, unit heaters and piping drips. The Contractor to visit school before bid to verify scope of work.
 8. All new steam and condensate piping, fittings and valves shall be insulated. Verify existing pipe sizes in field.
 9. The Contractor shall verify routing of new piping, prior to installing new piping, to verify clearance with existing equipment, piping or structural conditions.
 10. The Contractor shall furnish and install lockable access doors in walls to all inaccessible attic or ceiling spaces where piping is to be installed. See Specifications for type.
 11. Where piping is installed through floors or walls, the Contractor shall be required to re-route or off-set, risers and piping if location shown on Plans for risers and piping is in conflict with existing structural or architectural condition.
 12. Pitch steam and condensate piping one (1") inch per 20 feet. Provide drips and traps at low points.
 13. All existing piping, radiators, convectors and other material removed shall be disposed of as directed by Owner.
 14. The demolition drawing and notes are provided as a guide to the scope of demolition work. The work shall include, but not be limited to the scope of work shown and described on the Drawing and indicated in the Specifications. It is not the intent of the Drawing or notes to describe every demolition condition.

- Note #1. Remove existing steam condensate traps (including body) and replace with new Hoffman Thermotatic Traps, Model #17-C. Remove existing steam control valve (automatic or hand) and replace with new hand valve. Modify piping as required for proper installation. Contractor shall furnish five (5) new traps and hand valves in addition to those being installed (to be turned over to Owner). PAT traps to be equal to Hoffman Series 55 PAT traps.
- Note #2. Remove and replace end of main PAT steam traps, strainers and gate valves with new of required size and capacity. Majority of these assemblies are located in crawl space. Piping shall be modified as required for proper installation. Contractor shall furnish five (5) new of each PAT steam condensate traps, strainers and gate valves in addition to those being installed (to be turned over to Owner). PAT traps to be equal to Hoffman Series 55 PAT traps.
- Note #3. Remove and replace coil steam condensate PAT traps with new of required size and capacity. Piping shall be modified as required for proper installation. Contractor shall furnish two (2) new steam condensate PAT traps in addition to those being installed (to be turned over to Owner). PAT traps to be equal to Hoffman Series 55 PAT traps.



C. J. LAWLER ASSOCIATES
ARCHITECTS & PLANNERS
7 SOUTH MAIN STREET WEST HARTFORD, CT 06107 (203) 233-8526

BURTON & VAN HOUTEN ENGINEERS INC.
10 NORTH MAIN STREET WEST HARTFORD, CT 06107 (203) 447-1345
GIRARD & CO. ENGINEERS
40 WETHERFIELD AVENUE HARTFORD, CT 06111 (203) 644-1454

CONSULTANTS:
MECHANICAL & ELECTRICAL:
STRUCTURAL:

FIRST FLOOR HVAC PLAN - NORTHWEST
SCALE: 1/8" = 1'-0"
DATE: 2-1-88
DRAWN BY: DJH
REVISED:

WASHINGTON PRIMARY SCHOOL

WASHINGTON PRIMARY SCHOOL

C. J. LAWLER ASSOCIATES
ARCHITECTS & PLANNERS

7 SOUTH MAIN STREET WEST HARTFORD, CT. 06107 (203) 233-8526

BURTON & VAN HOUTEN ENGINEERS INC.

THE UNIVERSITY OF CHICAGO PRESS

GIRARD & CO. ENGINEERS

40 WETHERSFIELD AVENUE HARTFORD, CT. 06114 (203) 524-1594

CONSULTANTS :
MECHANICAL & ELECTRICAL :

STRUCTURAL :

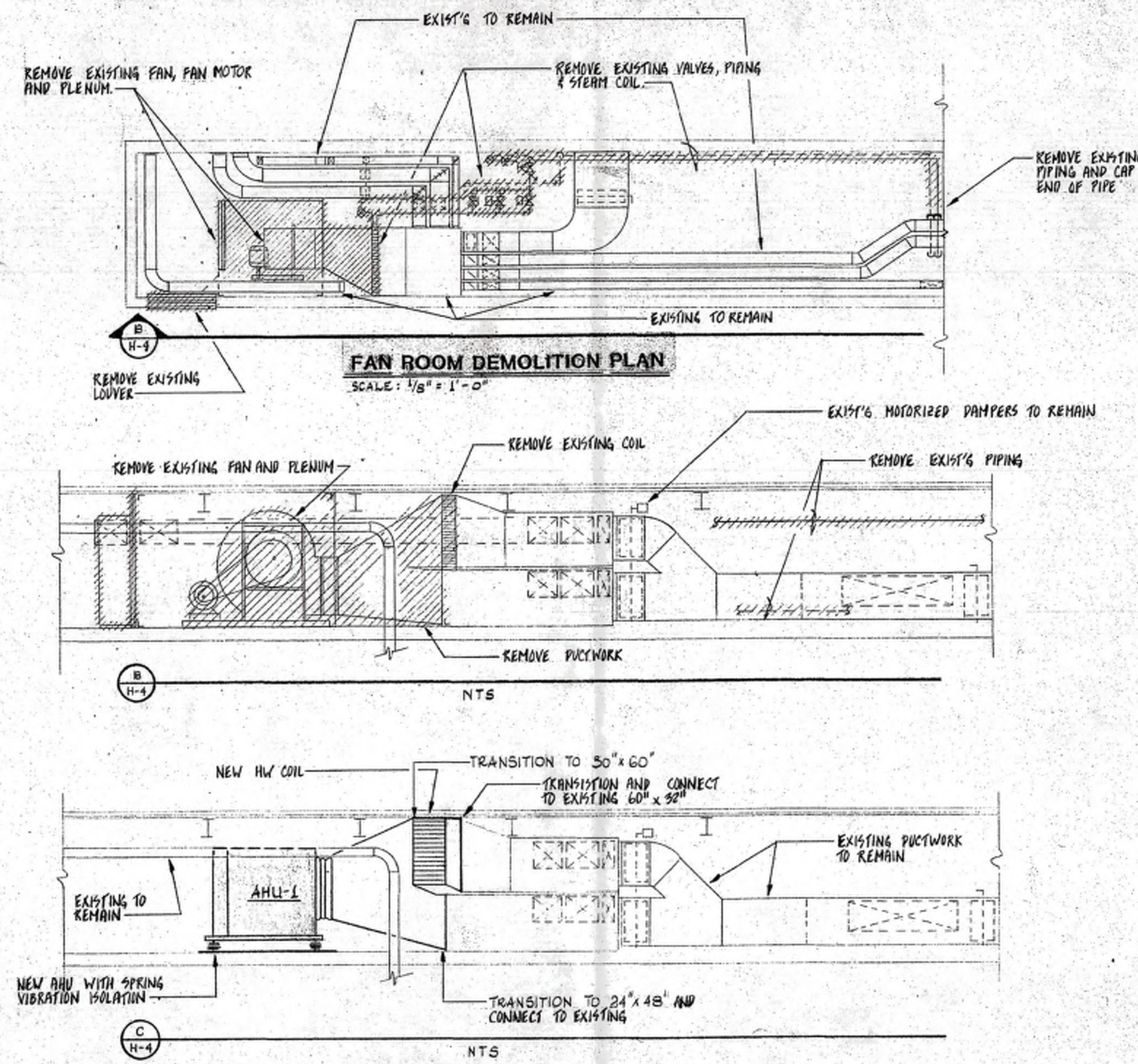
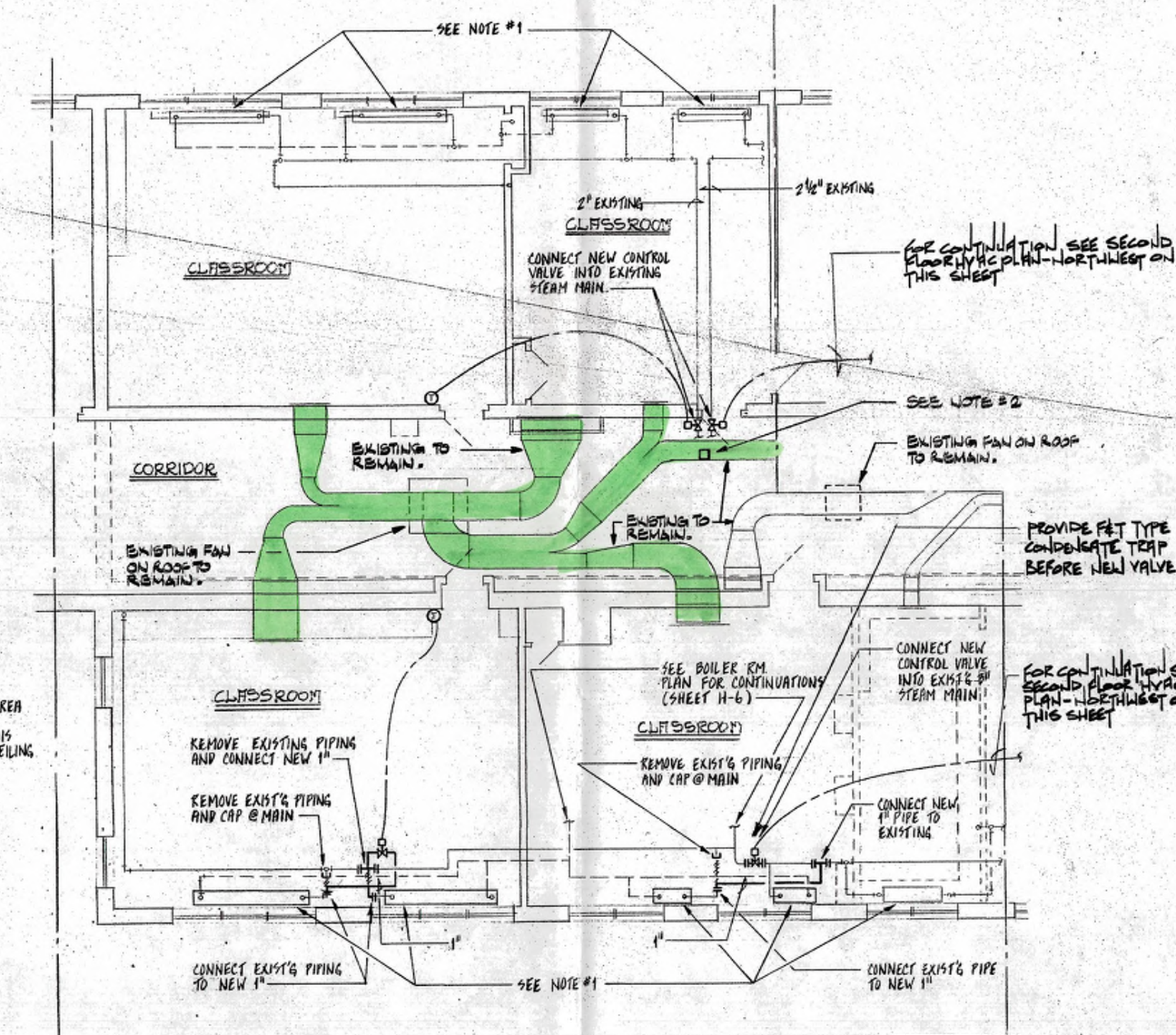
**SECOND FLOOR HVAC PLAN-
NORTHWEST/SOUTHEAST & FAN ROOM
DEMOLITION PLAN.**

SCALE: $1/8" = 1'-0"$ DRAWN BY: DJH

SCALE: $1/8" = 1'-0"$ DRAWN BY: DJH

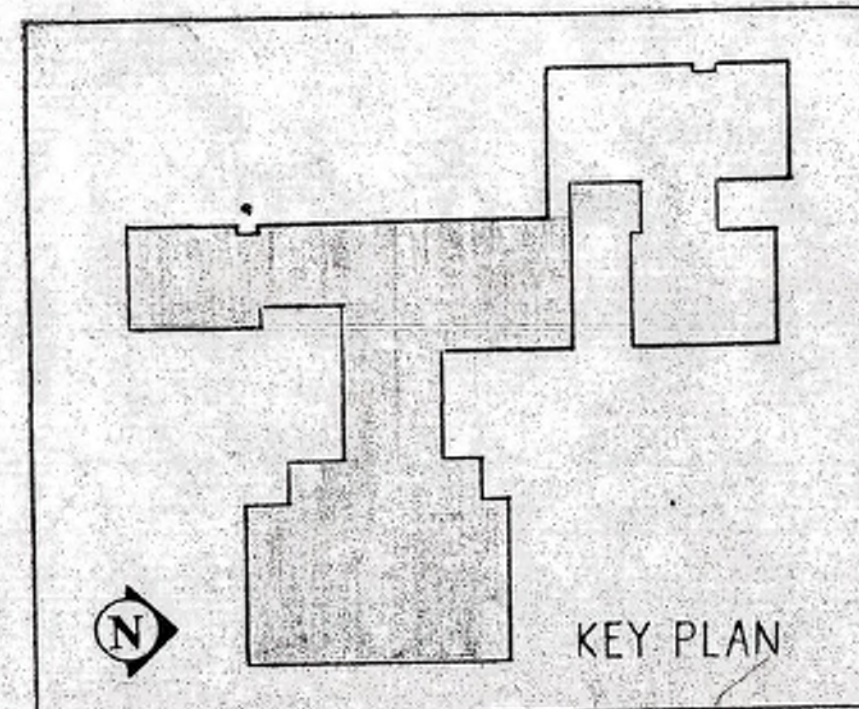
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#87-28



SECOND FLOOR HVAC PLAN-SOUTHEAST

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



KEY PLAN

DATE 2-1-89

SECOND FLOOR HVAC PLAN-NORTHWEST

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

GENERAL NOTES

1. This job is a renovation. Before submitting his bid, the Contractor shall visit the site and become thoroughly familiar with all existing conditions under which his work will be installed. This includes all modifications of existing systems required for the installation of new equipment. This contract includes all necessary offsets, transitions, and modifications required to install all new equipment in existing spaces. All new and existing equipment shall be fully operational under this Contract before the job is considered complete. The Contractor shall be held responsible for any assumptions he makes, and equipment shall be replaced at his expense if he fails to become fully familiar with the existing conditions and the Contractor documents of all trades.
2. All ductwork penetrations of Floor slab, fire-rated wall or chases shall be protected with UL fire dampers (F.D.).
3. The location of all diffusers, registers and grilles shall be coordinated with the Architectural Reflected Ceiling Plans.
4. Provide insulated backplates for the thermostats located on exterior walls.
5. All ductwork elbows are to be full radius or squared with turning vanes.
6. The Contractor shall modify existing ductwork as required for the installation of fire dampers. Field measure ducts before ordering dampers.
7. All existing steam traps, including traps not shown on these Plans, shall be replaced, school before bid to verify scope of work.
8. All new steam and condensate piping, fittings and valves shall be insulated. Verify existing pipe sizes in field.
9. The Contractor shall verify routing of new piping, prior to installing new piping, to verify clearance with existing equipment, piping or structure conditions.
10. The Contractor shall furnish and install lockable access doors in walls to all inaccessible attic or ceiling spaces where piping is to be installed. See Specifications for type.
11. Where piping is installed through floors or walls, the Contractor shall be required to re-route or off-set risers and piping if location shown on Plans for risers and piping is in conflict with existing structural or architectural conditions.
12. Pitch steam and condensate piping one (1") inch per 20 Feet. Provide drips and traps at low points.
13. All existing piping, radiators, convectors and other material removed shall be disposed of as directed by Owner.
14. The demolition drawing and notes are provided as a guide to the scope of demolition work. The work shall include, but not be limited to the scope of work shown and described on the Drawing and included in the Specifications. It is not the intent of the Drawing or notes to describe any demolition condition.

Note #1. Remove existing steam condensate traps (including body) and replace with new Hoffman Thermostatic Traps, Model #17-C. Remove existing steam control valve (automatic or hand) and replace with new hand valve. Modify piping as required for proper installation. Contractor shall furnish five (5) new traps and hand valves in addition to those being installed to be turned over to Owner.

Note #2. Remove and replace end of main P&T steam traps, strainers and gate valves with new of required size and capacity. Majority of these assemblies are located in crawl space. Piping shall be modified as required for proper installation. Contractor shall furnish five (5) new of each P&T steam condensate traps, strainers and gate valves in addition to those being installed (to be turned over to Owner). P&T traps to be equal to Hoffman Series 55 P&T trap.

Note #3. Remove and replace coil steam condensate P&T traps with new of required size and capacity. Piping shall be modified as required for proper installation. Contractor shall furnish two (2) new steam condensate P&T traps in addition to those being installed to be turned over to Owner. P&T traps to be equal to Hoffman Series 55 P&T trap.

Appendix 3

Room Data Take-Off Sheet



Project Name:	Region 12		
Project Number:	2024005.00	Auditor : REA	
Scope	Room DataTake-Off		
Date	April 4, 2024		

Washington Primary School

Zone Identification									
Floor	Room#	Room Name	Area (SF)	Ceiling Height (FT)	Volume	People	Notes	Identified Deficiencies	Pictures
									Y /N
1	1	Main Office	389	9.6	3734.4	2			
1	2	Copy Room	81	9.2	745.2	1			
1	3	CONFERENCE ROOM 103	126	9.3	1171.8	2			
1	4	Principle	233	10.5	2446.5	5			
1	5	Boys	126	9.7	1222.2	6			
1	6	READING 106	352	8	2816	8	Ubaldi		
1	7	MATH 105	360	8.4	3024	6			
1	8a	STORAGE 101	40	8.4	336	0			
1	8b	Lav	30	87.8	2634	0			
1	16A	Nurses Toilet			0	1			
1	10	S1	203	8.1	1644.3	0	STORAGE		
1	12	102 THERAPY	244	8	1952	4	GEROWE	PADDED ROOM OCC ?	
1	17A	Art Kiln Room							
1	13	MUSIC ROOM 103	424	8.3	3519.2	22	DOIRON		
1	14	STAGE 102A	1114	26	28964				
1	15	MULTI-PURPOSE 104	7845	28	219660		MORGAN	WITH BLEACHERS	
1	16	HEALTH 112	226	10	2260	2			
1	17	ART 118 (S3)	897	10	8970	22	JANE MANLEY		
1	18	JANITOR 115	90	10	900	1			
1	19	CUSTODIAL OFFICE	70	9.5	665	0	Not really an office		
1	20	Corrodor	85	9.4	799	0	Entryway		

Project Name:	Region 12		
Project Number:	2024005.00	Auditor : REA	
Scope	Room DataTake-Off		
Date	April 4, 2024		

Washington Primary School

Zone Identification									
Floor	Room#	Room Name	Area (SF)	Ceiling Height (FT)	Volume	People	Notes	Identified Deficiencies	Pictures
									Y /N
1	21	Occupational Therapy	141	10	1410	5			
1	22	Gallagher	121	11	1331	4			
1	23	Burnham	130	11	1430	4			
1	24	1ST GRADE 112	732	11.0	8052	22	Moser		
1	25	3RD GRADE 111	661	11.9	7865.9	22	Horan		
1	26	LITERACY 110	797	11.2	8926.4	22	FEOLA	2 window A/C	
1	27	MEDIA CENTER 108	1610	9.5	15295	22			
1	27a	Maker Space 109	262	9.5	2489	15	Varity		
1	28	COMPUTER CLASSROOM 107	539	10	5390	14	Jon Cop	I	
LL	29	Copy	130	7.2	936	1			
LL	31	TEACHERS LOUNGE 115	378	7.2	2721.6	12			
LL	30	Staff Toilet	30	7.3	219	1			
1	27b	IT Office 2	108	8.7	939.6	1			
1	27c	IT Storage	112	12.1	1355.2	0	IT storage		
LL	32	Stor Closet				0	No Occupancy		
LL	33	Elect Closet	53	6.7	355.1	0	No Occupancy		
LL	34	Boys Lav	145	7.3	1058.5	0			
LL	35	Girls Lav	151	7.3	1102.3	0			
LL	36	KINDERGARTEN 122	726	10.4	7550.4	20	Wescott		
LL	36A	Coat Closet	487	10.5	5113.5	0	lav/closet/exit- one space		
LL	37	1ST GRADE 121	808	10.5	8484	20	Weymouth		

Appendix 4

Equipment Data Sheets



WASHINGTON PRIMARY SCHOOL REGION 12 EQUIPMENT DATA SHEET

Auditor: REA Date: 4-4-24	<u>Data Collected</u>	<u>Addition Details</u>
Unit ID:	No Label	
Location:	Roof	
Serving:	Office	
Manufacture	Trane	
Model #	TCD048 A300BA	
Serial #	-	
Manufacture Date	Original Equipment	
System CFM	1,600	
Min OA CFM	N/A	
Filter Data (Size, Qty)	(2) 16x25x1	
Filter Condition	Fair	
Utilize CO ₂ and/or DCV?:	N/A	
Heating Type	N/A	
Heating Coil Condition	N/A	
Cooling Type	DX	
Cooling Coil Condition	Poor	
Drain Pan Status	Poor	
Condensate trap broken/missing.		
<u>Description</u>	<u>Supporting Photos Taken (Check All That Applies)</u>	
Unit From Afar	x	
Unit Tag Info	x	
Heating Coil	N/A	
Cooling Coil		
Filters	x	
Additional	Condenser fan wiring skeptical	

WASHINGTON PRIMARY SCHOOL REGION 12 EQUIPMENT DATA SHEET

Auditor: REA Date: 4-4-24	<u>Data Collected</u>	<u>Addition Details</u>
Unit ID:	No Label	
Location:	Mezz	
Serving:	Cafeteria	
Manufacture	Trane	
Model #	CBDB14A0OAFAL02J	
Serial #	K89H25212	
Manufacture Date	-	
System CFM	-	
Min OA CFM	-	
Filter Data (Size, Qty)	(4) 20x20x2 (2) 20x25x2	
Filter Condition	CLEAN	
Utilize CO ₂ and/or DCV?:	NO	
Heating Type	HOT WATER REHEAT ZONE/ZONE DAMPER OPERATION UNKNOWN	
Heating Coil Condition	NEWER	
Cooling Type	N/A	
Cooling Coil Condition	N/A	
Drain Pan Status	N/A	

PLENUM RETURN, POOR PLENUM ENVIROMENT, INSULATED SUPPLY DUCTWORK FAILING

<u>Description</u>	<u>Supporting Photos Taken (Check All That Applies)</u>
Unit From Afar	x
Unit Tag Info	x
Heating Coil	N/A
Cooling Coil	N/A
Filters	x
Additional	

WASHINGTON PRIMARY SCHOOL REGION 12 EQUIPMENT DATA SHEET

Auditor: REA Date: 4-4-24	<u>Data Collected</u>	<u>Addition Details</u>
Unit ID:	No Label	
Location:	Basement	
Serving:	Gym	
Manufacture	Trane Centrifugal Fan	
Model #	21	
Serial #	PP47A3	
Manufacture Date	Original Equipment	
System CFM		
Min OA CFM		
Filter Data (Size, Qty)	(48) 20x20x2 V-Bank	
Filter Condition	OK	
Utilize CO ₂ and/or DCV?:	N/A	
Heating Type	Hot Water Zone Reheat coils	Newer water coils, no pre-heat
Heating Coil Condition	New Clean	
Cooling Type	N/A	
Cooling Coil Condition	N/A	
Drain Pan Status	N/A	
Other Conditional Notes: Does not appear to be any freeze protection within unit.		
<u>Description</u>	<u>Supporting Photos Taken (Check All That Applies)</u>	
Unit From Afar	x	
Unit Tag Info	x	
Heating Coil	x	
Cooling Coil		
Filters	x	
Blower	Size 44, Type BI, Model 21, Arrangement 3, Class-1	

Appendix 5

Floor Plans





CL~~O~~HESSY
HARRIS &
KAISER, LLC

GREYSTONE COURT WEST
573 HOPMEADOW STREET
PO BOX 95
SIMSBURY, CT 06070-0095
860-651-3777
Fax 860-651-7316
chk@chkarch.com

ARCHITECTURE • INTERIOR DESIGN • FACILITIES PLANNING

Consultants

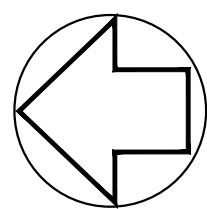
RSD 12 Washington Primary School Door Survey

11 School Street
Washington Depot, Connecticut

Revisions

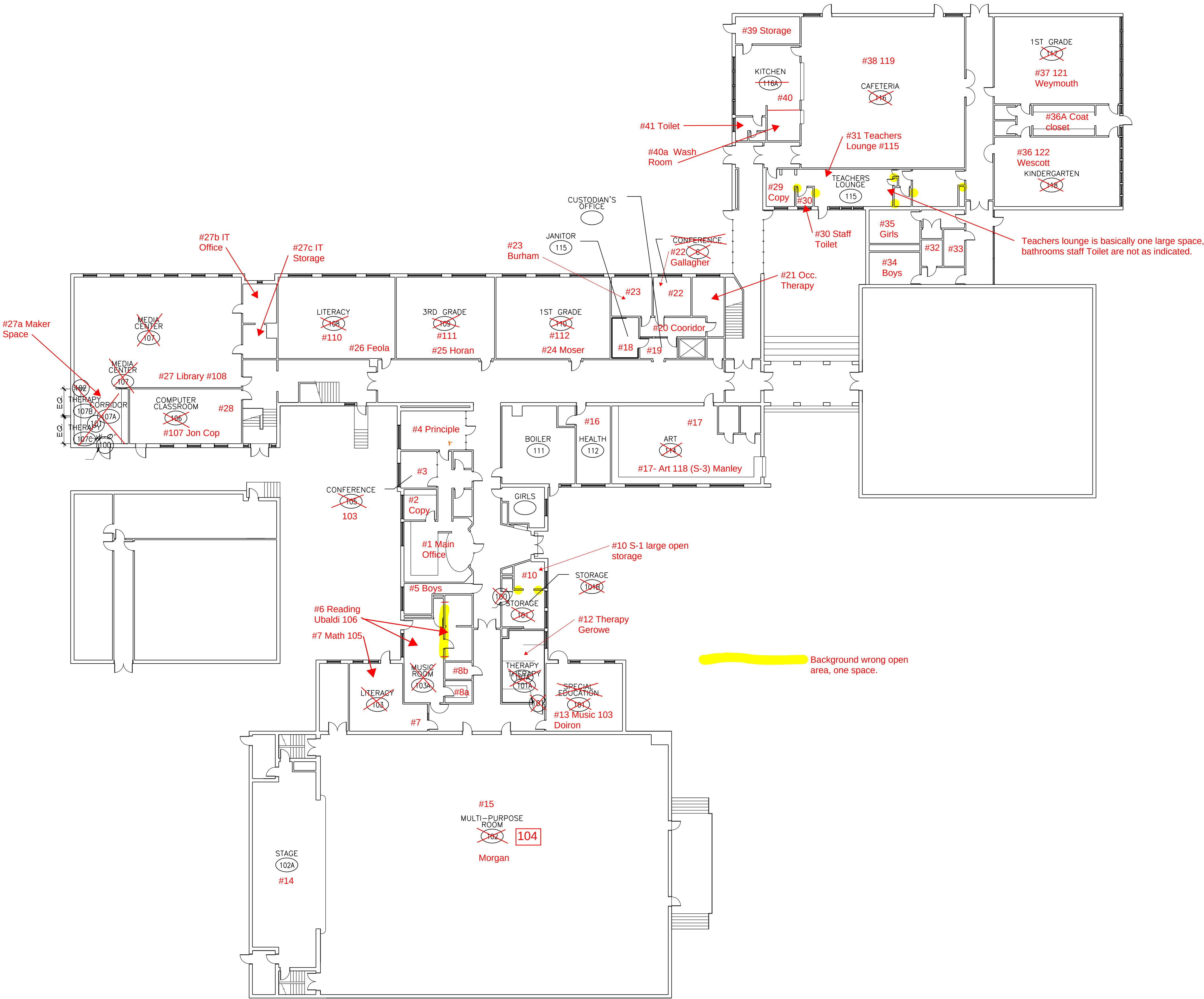
Date 1/11/2013
Scale 1/16"=1'-0"
Project Number 13005
Drawn By DTP

DOOR SURVEY



A101c

WASHINGTON PRIMARY SCHOOL FIRST FLOOR KEY PLAN
SCALE: 1/16"=1'-0"





CLOHESSEY
HARRIS &
KAISER, LLC

GREYSTONE COURT WEST
573 HOPMEADOW STREET
PO BOX 95
SIMSBURY, CT 06070-0095
860-651-3777
Fax 860-651-7316
chk@chkarch.com

ARCHITECTURE • INTERIOR DESIGN • FACILITIES PLANNING

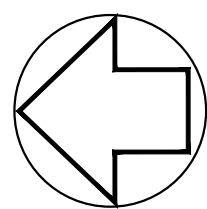
Consultants

RSD 12 Washington Primary School Door Survey

11 School Street
Washington Depot, Connecticut

Revisions

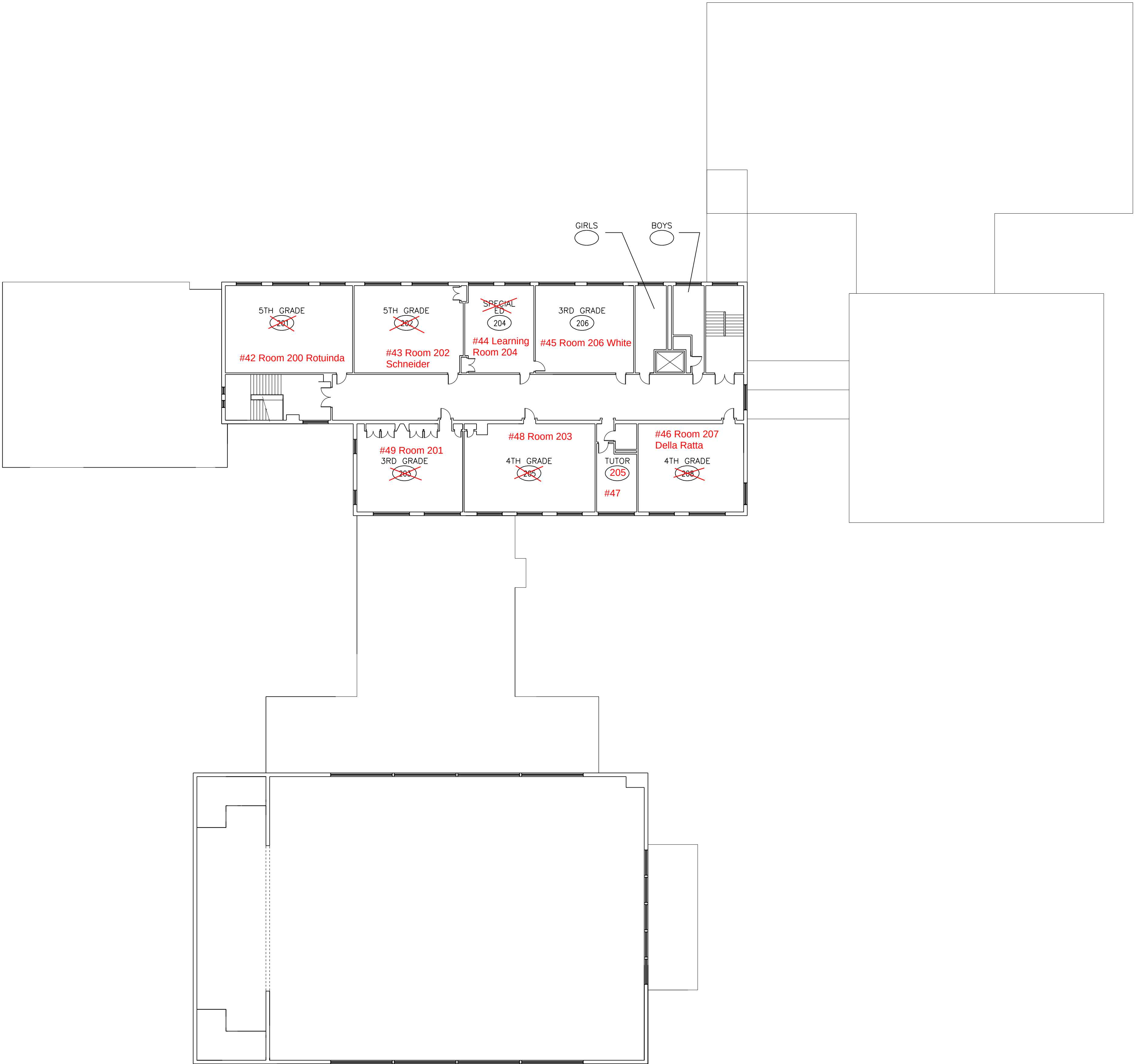
Date 1/11/2013
Scale 1/16"=1'-0"
Project Number 13005
Drawn By DTP



DOOR SURVEY

A101d

WASHINGTON PRIMARY SCHOOL SECOND FLOOR KEY PLAN
SCALE: 1/16"=1'-0"



Appendix 6

Photos









