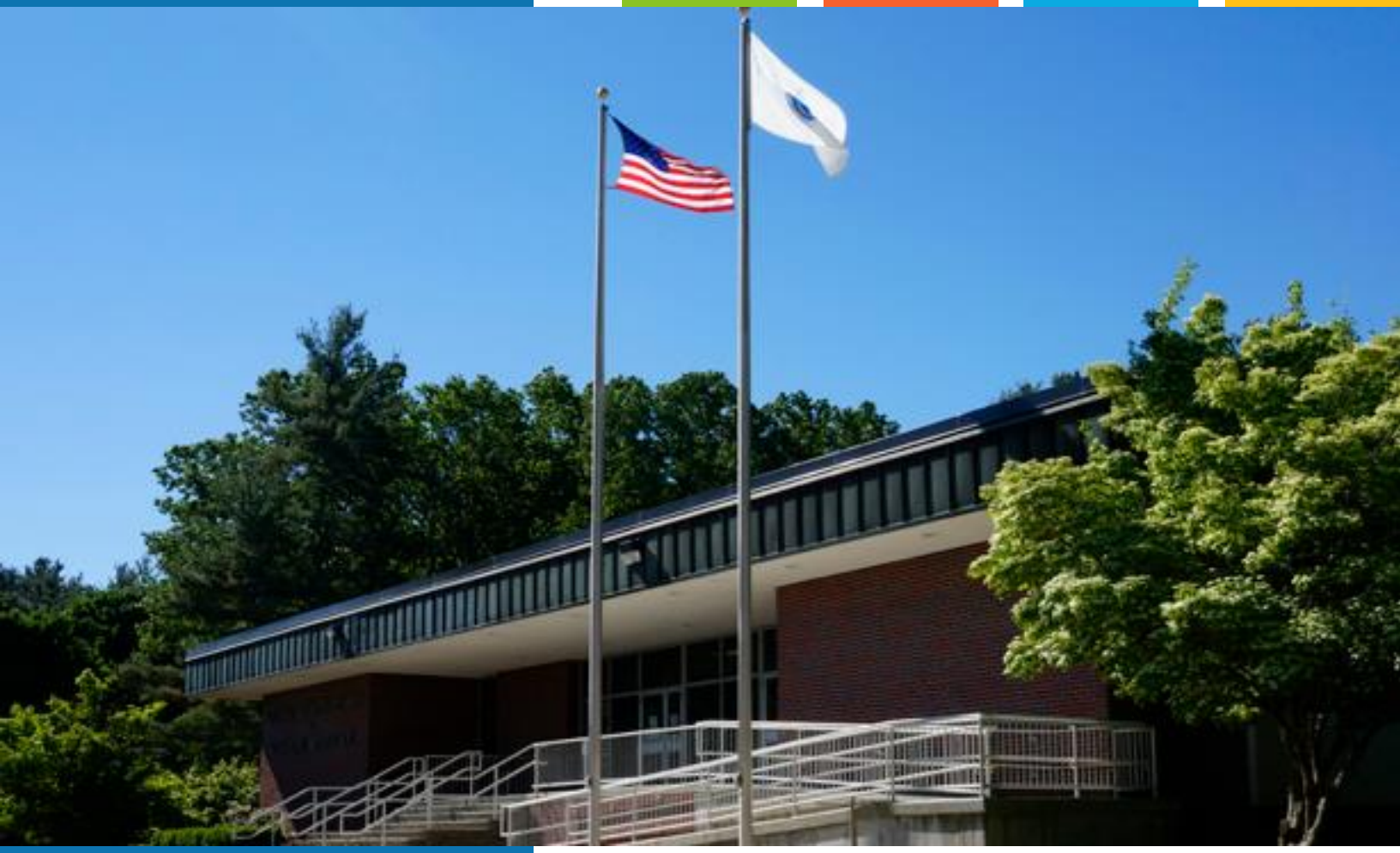

Uxbridge District Court
Uxbridge, MA

HVAC SYSTEM EVALUATIONS COVID-19

Office of Court Management

August 23, 2022

Tighe&Bond

100% Recyclable

Section 1
Existing Conditions & Site Observations

Tighe & Bond visited the Uxbridge District Courthouse on June 24, 2021. While on site we inspected the air handling equipment located in the mechanical rooms and toured the facility to determine if the spaces generally matched usages noted on the architectural plans. Tighe & Bond was provided with mechanical design plans from 1969 and 2006. Our analysis is based on these drawings and our one day on site.

Site Visit Attendees:

- *Office of Court Management:*
  - Tom Pedro, Courthouse Facilities Staff
- *Tighe & Bond*
  - Jason Urso, PE, Senior Mechanical Engineer
  - Tim Bill, Staff Mechanical Engineer

1.1 Existing Ventilation System

The Uxbridge District Courthouse was constructed in 1972 and is approximately 17,300 square feet in size. Five air handling units (AHU) and wall mounted packaged terminal air conditioning units (PTACs) located in the perimeter spaces serve the Courthouse. The air handling units provide ventilation air to the building. Air handlers AHU-4 and AHU-5 contain a supply fan, refrigerant (DX) cooling coils, electric heating coils, and 2" MERV 8 filters. AHU-1 thru AHU-3 contain the same components except they do not have an electric heating coil. These three systems contain duct mounted electric reheat coils for space heating.

AHU-1, AHU-2, and AHU-3 appear to be from the original 1972 construction and are in fair to poor condition. The dampers were not accessible while on site. The cooling coils were dirty. AHU-1 serves the main lobby, AHU-2 serves the main Courtroom (room 123), and AHU-3 serves the holding cells. Facilities staff indicated AHU-3 only operates during the winter.

AHU-4 and 5 and the PTACs were installed during a renovation in 2006. Facilities staff indicated that AHU-4, located above the staff lounge serving the first-floor corridors, may not have ever been operational. This unit was not running at the time of our visit. AHU-5 serves the interior office spaces in the basement. Facilities staff indicated that AHU-5 runs with very limited supply air reaching the diffusers. One potential cause of the lack of airflow may be from an operational issue with the bypass damper located in the mechanical room. Too much air may be bypassing back to the air handler instead of being directed to the building supply duct.

The PTAC units appear to be in good condition. Facility personnel indicted some units had been replaced since 2006. Each unit has a ¼" metal screen filter, which contains no MERV rating. The filters that were examined were very dirty, as well as the coils. According to facilities staff, the PTAC units only operate when there is a call for space heating or cooling. While on site, it was unclear if the PTAC units provide outdoor air, however the manufacturer did confirm that one of the unit models did come with a motorized outdoor air damper. Courtroom 117 is only served by two PTAC units. If all of the PTAC units do

provide outdoor air, then all perimeter spaces served by PTAC units are not mechanically ventilated if the space is not calling for heating or cooling.

The basement electrical room contains a desk and is being used as office space. This space is only being exhausted by a small fan. There is no direct supply of ventilation air being provided.

According to the drawings provided to Tighe & Bond, there are 13 exhaust fans serving the building, 7 of which serve toilet rooms. The toilet exhaust fans and the exhaust fan serving the holding cells were all running at the time of our site visit.

Table 1 summarizes the air handling units' designed airflow rates, the MERV rating of the installed filters, and the condition of the units.

TABLE 1
Existing Air Handling Units

Unit	Original Design Airflow (CFM)	Original Design Min. O.A. (CFM)	Pre/Final Filters	Condition
AHU-1	1,400	210	2" MERV 8	Fair/Poor
AHU-2	2,000	1,000	2" MERV 8	Fair/Poor
AHU-3	600	600	2" MERV 8	Fair/Poor
AHU-4	800	120	2" MERV 8	Not Operational
AHU-5	1,850	400	2" MERV 8	Good
PTAC (Type 1)	600	Unknown	¼" Mesh	Good
PTAC (Type 2)	480	Unknown	¼" Mesh	Good

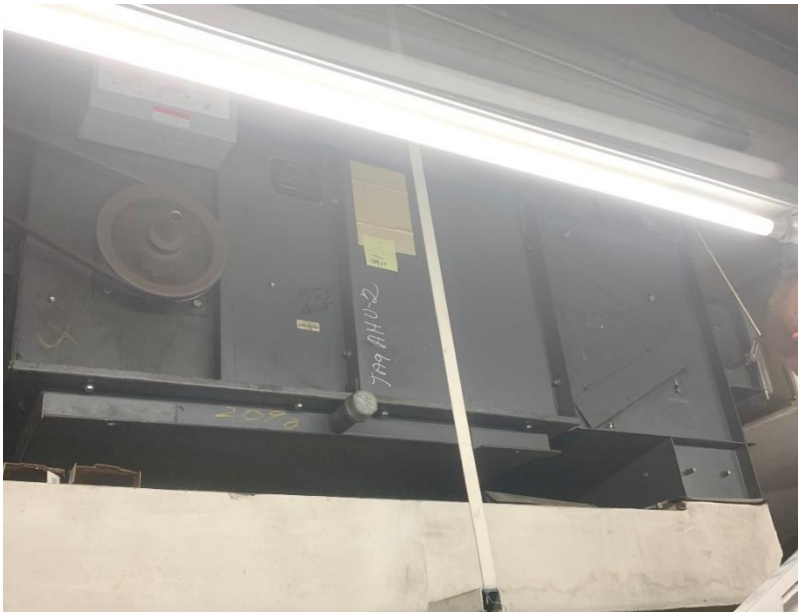

Photo 1 – Typical AHU

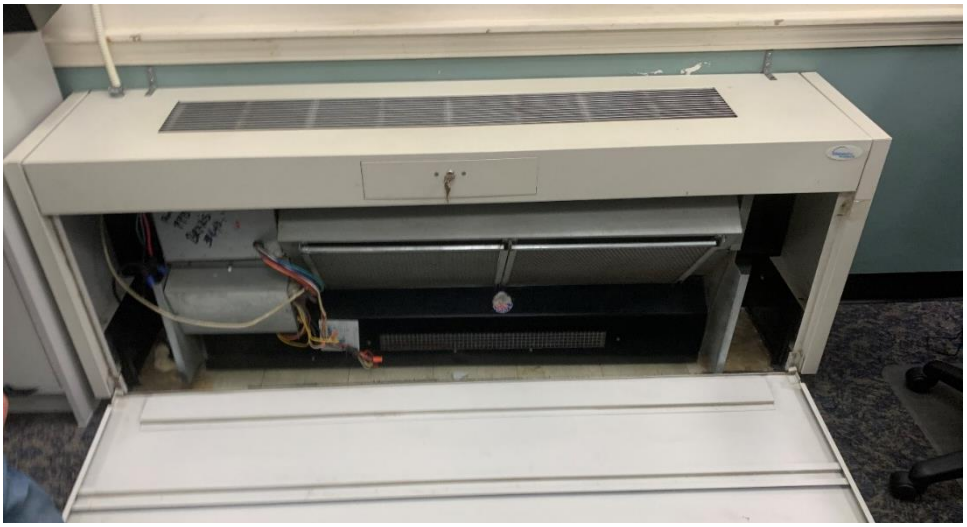

Photo 2 – Typical PTAC unit

1.2 Existing Control System

According to staff, local thermostats operate the air handling equipment. We did not see any evidence or components of a Building Management System (BMS) during our site visit. However, the 2006 design drawings indicate a BMS was to be installed to control all equipment. We are not aware of any demand control ventilation sequences in use at this courthouse. The original 1969 design drawings indicate AHU-1 and AHU-2 may operate on an occupied/unoccupied time schedule.

Section 2
Recommendations

Below is a list of recommendations for the Uxbridge District Courthouse. Please refer to the "Overview of Recommendations" report for further explanation and requirements of the stated recommendations.

Building areas without adequate ventilation and filtration significantly increase the risk of spreading viruses like Coronavirus (SARS-CoV-2), especially areas with high occupant density and where people occupy the same space for relatively long periods of time. Consider significantly reducing occupancy or relocating occupants to other areas with adequate ventilation.

2.1 Filtration Efficiency Recommendations

We recommend the following measures be implemented for the existing air handling units:

RF-1: *Replace filters with MERV-13 filters.*

The TAB Contractor and/or Engineer shall verify that the air handlers can accommodate a MERV-13 filter per Appendix A in the overview of recommendations report. Filter racks should be inspected and adjusted to ensure that filters fit tightly and that end spacers are in place to minimize filter bypass.

RF-3: *Install a differential pressure sensor with a display across the filter bank.*

RF-3a: *Connect the pressure sensor to a local alarm.*

Maximum differential pressure should be set per manufacturer's recommendation based on air velocity to ensure filters are within their service lives. Typically, this is not more than 1.0" w.g.

2.2 Testing & Balancing Recommendations

AHU-1 thru 3 are approximately 50 years old and AHU-4 & 5 are approximately 25 years old. It is unknown to Tighe & Bond when the last time the units were tested and balanced. Also, the code requirements to determine the outdoor air flow rates that were used to design the original system may be different than the 2015 International Mechanical Code (IMC) and current ASHRAE Standard 62.1 requirements.

We recommend the following testing and balancing measures be implemented:

RTB-1: *Test and balance air handling unit supply air and minimum outdoor air flow rates.*

We recommend testing and balancing the outdoor air flow rates for all air handling units to the recommended minimum O.A. rates listed in Table 2.

We also recommend verifying that all PTAC units do provide outdoor air and balancing them to the appropriate outdoor air flow rates.

TABLE 2
Recommended Air Handler O.A. Flow Rates

Unit	Original Supply Airflow (CFM)	Original Design Min. O.A. (CFM)	Current Code Min. O.A. Requirements (CFM)	Recommended Minimum O.A. (CFM)
AHU-1	1,000	210	125	**210**
AHU-2	2,000	1,000	725	**1,000**
AHU-3	600	600	150	**600**
AHU-4	800	120	60	**120**
AHU-5	1,850	400	250	**400**
PTAC (Type 1)	600	Unknown	50-150	**50-150**
PTAC (Type 2)	480	Unknown	25-125	**25-125**

Note: Although the ASHRAE Position Document on Infectious Aerosols recommends using the latest published standards and codes as a baseline for minimum ventilation, the mechanical code in effect at the time the HVAC systems were designed and constructed is what governs the required outdoor air flowrate for the HVAC equipment, if there have been no additions, renovations, alterations or changes in occupancy to the building. The 2015 International Mechanical Code does not prevent the continued use of existing systems.

During the pandemic, we recommend maintaining the outdoor airflows at the original designed values where they exceed the code minimums calculated by Tighe & Bond. Supplying more outdoor than required by code will provide better indoor air quality.

The average airflow rate per person is shown below in Table 3. These values are based on the original full design supply airflow rate and the recommended outdoor airflow rates shown in Table 2 for AHU-1 thru AHU-5. The airflow for the PTAC units were excluded, considering that it is unknown if these units provide outdoor air. The airflow rate per person assumes a diversity factor of 70%, meaning the maximum number of occupants assumed to be in all zones at all times equates to 70% of the code required occupancy.

TABLE 3
Average Airflow Rate per Person

	All Spaces	***Courtroom 123***	***Courtroom 117***	***Non-Courtroom Spaces[1]***
Total Occupancy (People)	105	97		8
Total Supply Air (CFM/Person)	63	21	Served by PTAC Unit	581
Outdoor Air (CFM/Person)	22	10		166

Note 1: Applies to spaces served by AHU-1, AHU-3, and AHU-5. Spaces served by PTAC units are excluded.

The airflow rate per person for each Courtroom and the Jury Pool Room is shown below in Table 4. These values are based on full occupancy without taking diversity into account, the original full design supply airflow rate, and the recommended outdoor airflow rate. The airflow rates per person assumes the full supply and code minimum outdoor airflows are being delivered to the room.

TABLE 4
Airflow Rate per Person (Full Occupancy)

		Total Air		*Outdoor Air*	
Courtroom	***Total People***	***Supply Airflow (CFM)***	***Airflow Rate (CFM/Person)***	***Outdoor Airflow (CFM)***	***Airflow Rate (CFM/Person)***
Jury Pool Room	27	900	33	195	7
Courtroom 117	49	1,200	24	Unknown	Unknown
Courtroom 123	97	2,000	21	1,000	10

Note: Courtroom occupant density is based on 70 people/1,000 square feet, per the 2015 International Mechanical Code

The airflow rate per person for each Courtroom and the Jury Pool Room, based on a reduced occupancy schedule determined by the Office of Court Management, is shown below in Table 4a. The airflow rate per person assumes the full supply airflow is being delivered to the room.

TABLE 4a
Airflow Rate per Person (Reduced Occupancy)

		Total Air		*Outdoor Air*	
Courtroom	***Total People***	***Supply Airflow (CFM)***	***Airflow Rate (CFM/Person)***	***Outdoor Airflow (CFM)***	***Airflow Rate (CFM/Person)***
Jury Pool Room	12	900	75	195	16
Courtroom 117	11	1,200	109	Unknown	Unknown
Courtroom 123	20	2,000	100	1,000	50

Note: If occupancy is further reduced, the airflow rate per person will increase, assuming full airflow is being delivered to the space.

RTB-5: *Test and balance all air inlets and outlets.*

If the airflow to each space has not been recently tested, we recommend testing the airflow rates in the occupied spaces served by all air handling units. These systems are very old, and the airflow rate delivered to and returned from these spaces may not match the original design intent.

RTB-6: *Ensure refrigerant coils are fully charged with refrigerant.*

Confirm that the air handler's refrigerant system is operating correctly to ensure the DX coil is receiving full refrigerant flow.

2.3 Equipment Maintenance & Upgrades

We recommend the following equipment maintenance and upgrades:

RE-1: *Test existing air handling system dampers and actuators for proper operation*.

Replace dampers and actuators that are not functioning properly.

RE-2: *Clean air handler coils and drain pans.*

2.4 Control System Recommendations

We recommend the following for the control system:

RC-1: *Implement a pre and post-occupancy flush sequence.*

We recommend providing controls to add a flush sequence for all air handlers. We recommend this for the PTAC units if they have OA dampers.

RC-5: *Disable demand control ventilation sequences.*

We recommend temporarily disabling demand control ventilation systems if they exist.

2.5 Additional Filtration and Air Cleaning

We recommend the installation of the following air cleaning devices:

RFC-1: *Install portable HEPA filters.*

If the Courthouse is to operate at a high capacity (i.e. 50% occupancy or greater), we recommend installing portable HEPA filters in high traffic areas, such as entrance lobbies. They should also be considered for courtrooms, depending on the occupancy of the room and how much noise is generated from the filters. The noise levels will vary depending on the manufacturer. Refer to the "Overview of Recommendations" document for further guidance on installing portable HEPA filters.

Due to the lack of ventilation in the areas listed below, we recommend the use of portable HEPA filters or similar air purification approaches if these areas are to be occupied in the near term, until adequate ventilation is provided. While all spaces benefit from additional air filtration, this measure is likely not necessary for single occupant offices.

- Conference Room 106
- Break Room 109
- Conference Room 120
- Conference Room 122

If it's discovered that the PTAC units do not provide ventilation air, we recommend the use of portable HEPA filters in these additional multi-occupant rooms:

- Conference Room G-05
- Juvenile Hearing Room G-03
- Juvenile Waiting Room G-02
- District Clerk Office 111
- Clerk's Office 107
- Probation Office 104
- Conference Room 121
- Courtroom 117
- Library 130

2.6 Humidity Control

Installing duct mounted or portable humidifiers can help maintain the relative humidity levels recommended by ASHRAE. The feasibility of adding active humidification is determined by the building envelope. Buildings that were not designed to operate with active humidification can potentially be damaged due to a lack of a vapor barrier, adequate insulation, and air tightness.

Duct mounted humidifiers must be engineered, integrated into the building control system, tested, and commissioned. They are available in many configurations but require substantial maintenance and additional controls. They also run the risk of adversely affecting IAQ from growing microorganisms, or leaking water through poorly sealed ductwork damaging insulation and ceilings. Portable humidifiers are easier to install and require less maintenance, but still have the potential to damage the building envelope.

While active humidification is not recommended as a whole building solution due to high installation costs, operational costs, potential to damage the building envelope and adversely affect poor IAQ, it may be warranted as a temporary solution in some areas.

2.7 Other Recommendations

2.7.1 Replace Air Handling Units AHU-1, AHU-2, & AHU-3

Indoor air handling units have a life expectancy of 35-45 years. Air handlers AHU-1, 2, and 3 are approximately 54 years old and are in fair to poor condition. Consider replacing these units in the next 2-5 years. Adding unventilated spaces to the new air handling equipment should be considered. Other than adding unventilated spaces to the air handling equipment, this recommendation is an equipment maintenance measure and does not increase the indoor air quality of the building.

2.7.2 Add Ventilation to Interior Occupied Areas

Several interior rooms are not mechanically ventilated. We recommend adding a ventilation system to serve these areas or connecting them to the existing systems when the air handlers are replaced, as described in recommendation 2.7.1.

2.7.3 Make AHU-4 Operational

We recommend hiring a mechanical contractor to determine why AHU-4 is not running and to make the unit operational, if possible.

2.7.4 Investigate Lack of AHU-5 Airflow

We recommend investigating the lack of airflow associated with AHU-5, including checking the bypass damper position and operation. The quantity of airflow passing through the bypass duct should be identified during the testing and balancing exercise.

2.7.5 Run AHU-3 Serving Holding Cells

As a temporary measure, we recommend running AHU-3 during occupied hours all year, not only during the winter. Since the unit does not contain a cooling coil, warm, humid air will be supplied during the summer. We recommend replacing this unit with an air handling system that is capable of providing conditioned air all year.

2.7.6 Investigate Controls

We recommend further investigation to determine how each air handling unit is controlled. If the units only run to satisfy space temperature, we recommend revising the controls to run the units at all times during occupied and purge periods. Note that this may cause comfort issues because supply air temperature can fluctuate as the heating and cooling are staged on and off, and the systems may not have been originally designed to operate in this manner.

We also recommend investigating how the exhaust fans are controlled. If necessary, add a time clock to run at least the toilet exhaust fans continuously during occupied hours.

2.8 Uxbridge District Court Recommendations Checklist

Recommended Immediate Actions

1. ☐ RF-1: Replace filters with MERV-13 filters
2. ☐ RTB-1: Test and balance air handling unit airflow rates
3. ☐ Determine if PTAC units provide outdoor air
4. ☐ RE-1: Test air handling system dampers and actuators for proper operation
5. ☐ RC-1: Implement and pre and post-occupancy flush sequence
6. ☐ Add ventilation to interior occupied areas
7. ☐ Make AHU-4 operational
8. ☐ Investigate lack of airflow from AHU-5
9. ☐ Run AHU-3 during all occupied hours

Recommended Actions

1. ☐ RF-3 & 3a: Install filter differential pressure sensor and connect to a local alarm
2. ☐ RE-2: Clean air handler and PTAC unit coils and drain pans
3. ☐ RFC-1: Install Portable HEPA filters
4. ☐ Replace AHU-1, AHU-2, and AHU-3
5. ☐ Investigate controls for air handlers and exhaust fans
6. ☐ (RTB-5) Test and balance air inlets and outlets

Optional Actions

7. ☐ (RTB-6) Test AHU refrigerant charge

Section 3
Testing & Balancing Results

Milharmer Associates visited the Uxbridge District Courthouse on May 18, 2022 to test the airflow rates of the air handling units and the exhaust fans. A summary of the tested airflow and water flow rates versus the design airflow rates are shown below in Tables 5 and 6. The full testing and balancing report is attached.

TABLE 5
Air Handler Airflow Testing & Balancing Results

	Design			Actual		
Unit	**Total Supply Fan Airflow (CFM)**	**Recommended Outdoor Airflow (CFM)**	**Return Airflow (CFM)**	**Supply Fan Airflow (CFM)**	**Outdoor Airflow (CFM)**	**Return Airflow (CFM)**
AHU-1	1,000	210	790	Not Running	Not Running	Not Running
AHU-2	2,000	1,000	1,000	2,108	979	1,129
AHU-3	600	600	0	754	164	590
AHU-4	800	120	680	Not Running	Not Running	Not Running
AHU-5	1,850	400	1,450	1,355	431	924
PTAC G-1 (Outdoor Storage G-01)	480	40	440	-	-	-
PTAC G-2 (Juvenile Waiting G-02)	480	35	445	282	108*	174
PTAC G-3 (Juvenile Hearing G-03)	480	85	395	328	97*	231
PTAC G-4 (Juvenile Hearing G-03)	480	85	395	362	186*	176
PTAC G-5 (Chief Juvenile G-04)	480	25	455	356	186*	170
PTAC G-6 (Conference G-05)	480	65	415	293	161*	132
PTAC G-7 (Cell Bock Corridor)	480	35	445	232	112*	120

PTAC G-8 (Police Room G-29)	480	30	450	326	120*	206
PTAC G-9 (Lobby G-07)	480	40	440	265	99*	166
PTAC 1-1 (Prob. Office 102)	480	20	460	236	10*	226
PTAC 1-2 (Prob. Office 104)	600	80	520	611	80*	531
PTAC 1-3 (Clerk Office 107)	600	80	520	800	257*	543
PTAC 1-4 (Clerks Office 111)	480	25	455	249	11*	238
PTAC 1-5 (Lobby 116)	480	50	430	224	48*	176
PTAC 1-6 (Lobby 116)	480	50	430	198	40*	158
PTAC 1-7 (Lobby 116)	480	50	430	170	6*	164
PTAC 1-8 (Lobby 116)	480	50	430	232	8*	224
PTAC 1-9 (Courtroom 117)	600	150	450	568	5*	563
PTAC 1-10 (Courtroom 107)	600	150	450	864	278*	586
PTAC 1-11 (Judges Chamber 118)	480	30	450	229	50*	179
PTAC 1-12 (Conf. 121)	480	50	430	233	101*	132
PTAC 1-13 (Library 130)	480	50	430	162	15*	147
PTAC 1-14 (Judges Lobby 129)	480	25	455	249	74*	175
PTAC 1-15 (Judges Office 127)	480	30	450	218	41*	177
PTAC 1-16 (Employee Lounge 126)	480	80	400	362	226*	136

Note: PTAC unit outdoor airflow rates listed were calculated based on the tested supply and return airflow rates tested. Outdoor air flow rates were not tested directly.

TABLE 7
Exhaust Fan Testing & Balancing Results

Unit	Serving	Design Return/Exhaust Airflow (CFM)	Actual Return/Exhaust Airflow (CFM)
EF-1	Restroom	150	Not Tested
EF-2	Restroom	560	Not Tested
EF-4	Restroom	50	61
EF-5	Restroom	50	54
EF-6	Restroom	50	59
EF-7	Restroom	50	62
EF-12	Holding Cells	600	440
EF-G-1	Restroom	Unknown	Not Running

The typical balancing tolerance for air systems is ±10% of the design airflow.

In reviewing the airflow report data, the following should be noted:

1. EF-1 and EF-2 were not tested because the areas served by these fans could not be located.
2. EF-12 is operating at 77% of the design airflow. A sheave change would be required to increase the airflow.
3. EF-G-1 is not operational and needs to be repaired or replaced before it can be tested.
4. AHU-1 & 4 were not running while the TAB contractor was on site and were therefore not tested. We recommend getting these units operational and proceed with testing.
5. AHU-2 & 3 are operating within the acceptable airflow range, however AHU-3 is not providing the correct amount of outdoor air. The outdoor air damper for AHU-3 should be rebalanced to provide the correct amount of outdoor air.
6. AHU-5 is performing at 73% of the design airflow. A sheave change is required to increase the airflow.
7. PTAC-1-2, PTAC-1-3, and PTAC-1-9 are performing withing an acceptable airflow range. It is unclear whether or not the units are providing outdoor air to the spaces they serve.
8. All other PTAC units are operating below the design airflow. We recommend rebalancing the units to the design airflow and confirming whether or not each unit provides outdoor air to the spaces they serve.
9. PTAC G-1 is not installed.

Disclaimer

Tighe and Bond cannot in any way guarantee the effectiveness of the proposed recommendations to reduce the presence or transmission of viral infection. Our scope of work is intended to inform the Office of Court Management on recommendations for best practices based on the guidelines published by ASHRAE and the CDC. Please note that these recommendations are measures that may help reduce the risk of airborne exposure to COVID-19 but cannot eliminate the exposure or the threat of the virus. Implementing the proposed recommendations will not guarantee the safety of building occupants. Tighe & Bond will not be held responsible should building occupants contract the virus. The Office of Court Management should refer to other guidelines, published by the CDC and other governing entities, such as social distancing, wearing face masks, cleaning and disinfecting surfaces, etc. to help reduce the risk of exposure of COVID-19 to building occupants.

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MILHARMER ASSOCIATES, INC.
534 New State Highway, Route 44, Suite 3
Raynham, MA 02767
Tel.: 508-823-8500; Facsimile: 508-823-8600

TEST AND BALANCE REPORT

Project: **Uxbridge District Court**
261 Main St., Uxbridge, MA

Project No.: **22-186** **Project Date:** **5/18/2022**

MECHANICAL CONTRACTOR
Tighe & Bond

3384

A N.E.B.B. Certified Company

Project:	Uxbridge District Court		
Address:	261 Main St., Uxbridge, MA		
Date:	5/18/2022	**Project No.**	22-186

CERTIFICATION

Submitted & Certified by:

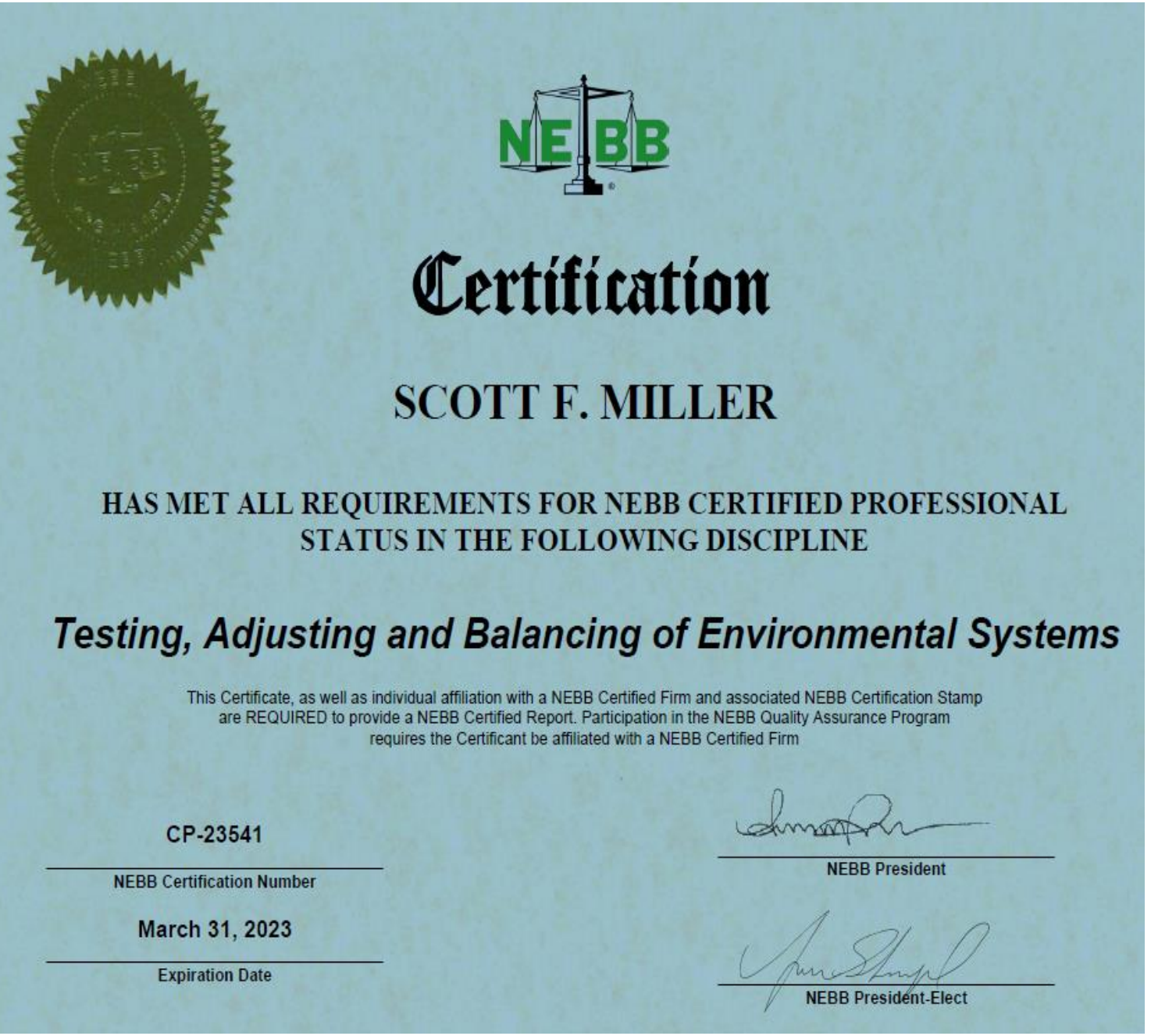
Milharmer Associates, Inc.

Certification No.: ***3384*** Certification Expiration Date: **3-31-23**

The data presented in this Report is a record of system measurements and final adjustments that have been obtained in accordance with the current edition of the ***N.E.B.B. Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems.*** Any variances from design quantities which exceed N.E.B.B. tolerances, are noted in the Test-Adjust-Balance Report Project Summary.

N.E.B.B. Qualified TAB Supervisor Name: **Scott F. Miller**

N.E.B.B. Qualified TAB Supervisor Signature:_____



Certification

SCOTT F. MILLER

HAS MET ALL REQUIREMENTS FOR NEBB CERTIFIED PROFESSIONAL STATUS IN THE FOLLOWING DISCIPLINE

Testing, Adjusting and Balancing of Environmental Systems

This Certificate, as well as individual affiliation with a NEBB Certified Firm and associated NEBB Certification Stamp are REQUIRED to provide a NEBB Certified Report. Participation in the NEBB Quality Assurance Program requires the Certificant be affiliated with a NEBB Certified Firm

CP-23541

NEBB Certification Number

March 31, 2023

Expiration Date

NEBB President

NEBB President-Elect

Firm Certification

MILHARMER ASSOCIATES, INC.

HAS MET ALL REQUIREMENTS FOR NEBB CERTIFIED STATUS IN THE FOLLOWING DISCIPLINE

Testing, Adjusting and Balancing of Environmental Systems

3384

NEBB Certification Number

March 31, 2023

Expiration Date

NEBB President

NEBB President-Elect

Project:	Uxbridge District Court		
Address:	261 Main St., Uxbridge, MA		
Date:	5/18/2022	**Project No.**	22-186

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Address:	261 Main St., Uxbridge, MA		
Date:	5/18/2022	**Project No.**	22-186

INSTRUMENT SHEET

The following is a list of Instruments owned and operated by Milharmer Associates, Inc. and used on this project.

Instrument ID Number	Instrument	Calibration Date	Calibration Due Date
1	ADM-870 Digital Multimeter	8-20-21	8-20-22
2	Shortridge Flow Hood	8-20-21	8-20-22
3	Ampmeter	8-20-21	8-20-22
4	Tachometer	8-20-21	8-20-22
5	Airflow Anemometer	8-20-21	8-20-22
6	Digital Thermometers	8-20-21	8-20-22
7	Shortridge Water Meter	8-20-21	8-20-22
8	Sound Meter	8-20-21	8-20-22
9	Vibration Meter	8-20-21	8-20-22

Please Note: Instruments are tested annually at the M.A.I. Lab. and sent back to the factory if deviation exceeds manufacturing tolerance.

Technician:

SYMBOL SHEET

AHU	Air Handling Unit	HEATER O.L.	Thermal Overload Protection For Motors Located at Starter Motor
AC or ACU	Air Conditioner Unit		
ACCU	Air Cooled Condensing Unit		
ADJ P.D.	Adjusted Pitch Diameter		
AMP	Amperage	HEPA	High Efficiency Particulate Arrestance
AVG	Average		
A.D.	Air Density	HOA	Hand/Off/Auto Switch
		H.P.	Horsepower
B.H.P.	Brake Horsepower	HPS	High Pressure Steam
		HRC	Heat (Recovery or Recliam) Coil
CFM	Cubic Feet Per Minute	HVAC	Heating, Ventilation and Air Conditioning
CH	Chiller		
CHWR	Chilled Water Return	HWR	Hot Water Return or Heating Water Return
CHW or CHWS	Chilled Water Supply		
CT	Cooling Tower	HWS	Hot Water Supply or Heating Water Supply
CWR	Condenser Water Return		
CW or CWS	Condenser Water Supply	HX	Heat Exchanger
DB	Dry Bulb	I.D.	Inside Diameter
D.D.	Direct Drive		
DIA	Diameter	LAT	Leaving Air Temperature
		L.D.	Linear Supply Diffuser
EAT	Entering Air Temperature	LPS	Low Pressure Steam
EDC	Electric Duct Coil	L.T.	Light Troffer
EDH	Electric Duct Heater	LWT	Leaving Water Temperature
EF	Exhaust Fan		
EMS	Energy Mgt System	MAU/MUA	Make Up Air Unit
EWT	Entering Water Temperature	MBH	1,000 BTU's per Hour
FCU	Fan Coil Unit	N.A.	Not Accessible
FH	Fume Hood	N/A	Not Applicable
F.L.A.	Full Load Amperage	N.I.	Not Installed
FPB	Fan Powered Box	N.L.	Not Listed
FPM	Feet Per Minute		
FT. HD.	Feet of Head		
GPM	Gallons Per Minute		

SYMBOL SHEET CONTINUED

O.D.	Outside Diameter	TAB	Testing, Adjusting, and Balancing
OA Min	Outside Air Minimum	TSP	Total Static Pressure
OAT	Outside Air Total	TP	Thermally Protected
PF	Power Factor	UH	Unit Heater
PHC	Preheat Coil		
PH	Phase(s)	V	Volts
PSI	Pounds Per Square Inch	VAV	Variable Air Volume
P.T.	Pitot Traverse	VD	Volume Damper
		VFD	Variable Frequency Drive
RA	Return Air	VP	Velocity Pressure
RF	Return Air Fan		
R.G.	Return Grille	W	Watts
RHC	Reheat Coil	WB	Wet Bulb
RPM	Revolutions per Minute	W.D.	Water Density
		W.G.	Water Guage
SA	Supply Air		
SAT	Supply Air Temperature	F	Degrees Fahrenheit
S.D.	Supply Diffuser		
SEF	Smoke Exhaust Fan	ΔP	Differential (Delta) Pressure or Pressure Drop
SF (AIR)	Supply Fan		
S.F.(Elect)	Service Factors		
SHC	Steam Heating Coil	ΔT	Differential (Delta) Temperature, Net Temperature Decrease or Increase
S.P. "W.C."	Static Pressure Measured in Inches of Water Column	#	PSI or Pounds Per Square Inch Decrease or Increase

Project:	Dedham District Court		
Address:	631 High St., Dedham, MA		
Date:	5/13/2022	**Project No.**	22-184

REPORT SUMMARY

The following is the report for the Uxbridge District Court with the following comments:

1. AHU-1 and AHU-4 would not running at the time of testing.

2. AHU-5 is 27% low on airflow and will require a sheave change to increase airflow to design.

3. EX-G-1 serving the Mens and Womens room would not run and needs to be serviced.

4. EF-12 is 27% low on airflow and will require a sheave change to increase airflow to design.

Project:	Dedham District Court		
Address:	631 High St., Dedham, MA		
Date:	5/13/2022	**Project No.**	22-184

REPORT SUMMARY

AIR HANDLING UNITS

UNIT	SUPPLY	RETURN	OUTSIDE AIR
AHU-2	2,108 CFM	1,129 CFM	979 CFM
AHU-3	754 CFM	590 CFM	164 CFM
AHU-5	1,355 CFM	924 CFM	431 CFM

UNIT	RETURN
EF-1	*1
EF-2	*1
EF-4	61 CFM
EF-5	54 CFM
EF-6	59 CFM
EF-7	62 CFM
EF-12	440 CFM
EX-G-1	NR

*1 Could not locate what these fans serve.

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

FAN DATA SHEET

	FAN NO. AHU-2		FAN NO. AHU-3	
Serves / Location:	Main Courtroom	Mechanical	Cell Blocks	Mechanical
Manufacturer:	Trane		Trane	
Model Number:	L-6		T-3	
Size:	NL		NL	
Serial Number:	K0A167433		K0A167880	
MOTOR	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Manufacturer:	NL	CENTURY	NL	MARATHON
Frame Number:	NL	S182T	NL	56
Horsepower:	1 1/2	3	1/6	3/4 - 1/4
Brake Horsepower:	NL	NA	NL	NA
Safety Factor:	NL	1.15	NL	1.25
Volts/Phase:	200-208	208	115	115
Motor Amperage:	10.4	10.29	9.0 / 6.4	6.03
Motor RPM:	1745	1727	1725 / 1140	1157
Speeds:	1	1	1	1
Heater Size:	NL	NA	NL	NA
Heater Amps.:	NL	NA	NL	NA
FAN	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Supply Air CFM:	2000	2108	600	754
Return Air CFM:	1000	1129	450	590
Exhaust Air CFM:				
Outside Air CFM:	1000	979	150	164
Suction Pressure:	NL	-0.6283	NL	-0.1663
Discharge Pressure:	NL	0.1067	NL	0.1135
Fan Static Pressure:	1.5	NA	0.5	NA
External Pressure:	NL	0.735	NL	0.2298
RPM	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Fan RPM:	NL	1225	NL	844
Motor Drive:	NL	1VP56	NL	4 1/4
Motor Size/Bore:	NL	1 1/8	NL	3/4
Fan Drive:	NL	8 7/8 OD	NL	4 3/4
Fan Size/Bore:	NL	7/8	NL	3/4
Belt Size / Number:	NL	B-53	NL	4L410R
Shafts C-C:	NL	17	NL	14
Turns Open:	NL	3	NL	0.3

Comments:

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

TRAVERSE DATA

SYSTEM: AHU-2 TRAVERSE NUMBER : T1
TRAVERSE LOCATION: Basement Hallway

DUCT SIZE (ROUND)		" DIAMETER			Sq Ft =	0.00
DUCT SIZE (RECT.)	25	" WIDTH x	13	" DEPTH	Sq Ft =	2.26

AIR DENSITY DATA

STATIC PRESS @ CL:	0.1067	InWg.	DESIGN CFM =	NL
DUCT AIR TEMP :	70	Deg F	ACTUAL CFM =	2108
BAROMETRIC PRESS :	29.92	In Hg.	SCFM=	**2110**

AIR DENSITY RATIO CORRECTION = 1.00
SCFM CORRECTION FACTOR 1.00
ACTUAL DENSITY 0.075

TEST HOLE	1	2	3	4	5	6	7
A	422	817	975	1139	1243		
B	483	684	965	1099	1278		
C	654	794	1110	1137	1213		
D							
E							
F							
G							
H							
I							

NO. OF READINGS = 15 AVERAGE FPM = 934

J							
K							
L							
M							
N							
O							
P							
Q							
R							

TECHNICIAN: Alanna Clark

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

AIR DISTRIBUTION

SYSTEM: AHU-3
SUPPLY [X] RETURN [ ] EXHAUST [ ]

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREAxK FACTOR	DESIGN FT/MIN	TEST FT/MIN	DESIGN CFM	TESTED CFM
Cell G-26	1	11X5	FH	NL	NA	NL	121
Cell G-25	2	11X5	FH	NL	NA	NL	109
Cell G-24	3	11X5	FH	NL	NA	NL	122
Cell G-23	4	23X7	FH	NL	NA	NL	233
Cell G-22	5	11X5	FH	NL	NA	NL	169
					TOTALS:	NL	754 *1

Comments:

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

FAN DATA SHEET

	FAN NO. AHU-5		FAN NO.	
Serves / Location:	Basement Core	Mechanical		
Manufacturer:	Trane			
Model Number:	TWE060C15FD0			
Size:	NL			
Serial Number:	5224L0R2V			
MOTOR	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Manufacturer:	NL	EMERSON		
Frame Number:	NL	NL		
Horsepower:	3/4	3/4		
Brake Horsepower:	NL	NA		
Safety Factor:	NL	1.15		
Volts/Phase:	230/1	230		
Motor Amperage:	5	*1		
Motor RPM:	1745	DIRECT DRIVE		
Speeds:	1	1		
Heater Size:	NL	CB		
Heater Amps.:	NL	CB		
FAN	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Supply Air CFM:	1850	1355		
Return Air CFM:	1450	924		
Exhaust Air CFM:				
Outside Air CFM:	400	431		
Suction Pressure:	NL	-0.262		
Discharge Pressure:	NL	0.238		
Fan Static Pressure:	NL	NA		
External Pressure:	0.65	0.5		
RPM	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Fan RPM:	NL	DIRECT DRIVE		
Motor Drive:	NL	DIRECT DRIVE		
Motor Size/Bore:	NL	DIRECT DRIVE		
Fan Drive:	NL	DIRECT DRIVE		
Fan Size/Bore:	NL	DIRECT DRIVE		
Belt Size / Number:	NL	DIRECT DRIVE		
Shafts C-C:	NL	DIRECT DRIVE		
Turns Open:	NL	DIRECT DRIVE		

Comments: ***1 No safe way to test AMP's**

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

AIR DISTRIBUTION

SYSTEM: AHU-5
SUPPLY [X] RETURN [X] EXHAUST [ ]

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREAxK FACTOR	DESIGN FT/MIN	TEST FT/MIN	DESIGN CFM	TESTED CFM
Office G-09	1	24X24	FH	NL	NA	NL	171
Office G-09	2	24X24	FH	NL	NA	NL	182
Office G-09A	4	24X24	FH	NL	NA	NL	107
Corridor	5	24X24	FH	NL	NA	NL	74
Office G-10A	6	24X24	FH	NL	NA	NL	93
Corridor G-17	7	24X24	FH	NL	NA	NL	70
Corridor G-17	8	24X24	FH	NL	NA	NL	63
Storage G-20	9	24X24	FH	NL	NA	NL	207
Storage G-20	10	24X24	FH	NL	NA	NL	211
Storage G-20	11	24X24	FH	NL	NA	NL	177
					TOTAL:	NL	1355 *1
Return							
Office G-09	1	24X24	FH	NL	NA	NL	233
Corridor	2	24X24	FH	NL	NA	NL	154
Office G-10A	3	24X24	FH	NL	NA	NL	85
Storage G-20	4	24X24	FH	NL	NA	NL	452
					TOTAL:	NL	924

Comments:

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

AIR DISTRIBUTION

SYSTEM: AHU-NA
SUPPLY [X] RETURN [ ] EXHAUST [ ]

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREAxK FACTOR	DESIGN FT/MIN	TEST FT/MIN	DESIGN CFM	TESTED CFM
Corridor 125	1	24X24	FH	NL	NA	NL	0
Corridor 125	2	24X24	FH	NL	NA	NL	0
Corridor 125	3	24X24	FH	NL	NA	NL	0
Lobby 116	4	10X10	FH	NL	NA	NL	142
Lobby 116	5	10X10	FH	NL	NA	NL	219
					TOTALS:	NL	361

Comments:

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

AIR DISTRIBUTION

SYSTEM: PTAC's, 1st Fl.
SUPPLY [X] RETURN [ ] EXHAUST [ ]

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREAxK FACTOR	DESIGN FT/MIN	TEST FT/MIN	DESIGN CFM	TESTED CFM
	PTAC-1-1						
Probation Office 102	1	29X5	1.01	NL	234	NL	236
	PTAC-1-2						
Probation Office 104	1	47X7	2.28	NL	233	NL	531
	PTAC-1-3						
Clerk Office 107	1	47X7	2.28	NL	238	NL	543
	PTAC-1-4						
Clerks Offce 111	1	30X5	1.04	NL	239	NL	249
	PTAC-1-5						
Lobby 116	1	48X6	2	NL	112	NL	224
	PTAC-1-6						
Lobby 116	1	48X6	2	NL	99	NL	198
	PTAC-1-7						
Lobby 116	1	48X6	2	NL	85	NL	170
	PTAC-1-8						
Lobby 116	1	48X6	2	NL	116	NL	232
	PTAC-1-9						
Courtroom 117	1	47X7	2.28	NL	249	NL	568
	PTAC-1-10						
Courtroom 117	1	47X7	2.28	NL	379	NL	864
Comments:					TOTALS:	NL	3815

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

AIR DISTRIBUTION

SYSTEM: PTAC's, 1st Fl.
SUPPLY [X] RETURN [ ] EXHAUST [ ]

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREAxK FACTOR	DESIGN FT/MIN	TEST FT/MIN	DESIGN CFM	TESTED CFM
	PTAC-1-11						
Judges Chamber 118	1	30X5	1.04	NL	220	NL	229
	PTAC-1-12						
Conf. 121	1	30X5	1.04	NL	224	NL	233
	PTAC-1-13						
Library 130	1	30X5	1.04	NL	141	NL	147
	PTAC-1-14						
Judges Lobby 129	1	30X5	1.04	NL	239	NL	249
	PTAC-1-15						
Judges Office 127	1	30X5	1.04	NL	210	NL	218
	PTAC-1-16						
Employees Lounge 126	1	30X5	1.04	NL	348	NL	362
Comments:					TOTALS:	NL	1438

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

AIR DISTRIBUTION

SYSTEM: PTAC's, 1st Fl.
SUPPLY [ ] RETURN [X] EXHAUST [ ]

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREAxK FACTOR	DESIGN FT/MIN	TEST FT/MIN	DESIGN CFM	TESTED CFM
	PTAC-1-1						
Probation Office 102	1	29X5	1.01	NL	224	NL	226
	PTAC-1-2						
Probation Office 104	1	47X7	2.28	NL	268	NL	611
	PTAC-1-3						
Clerk Office 107	1	47X7	2.28	NL	351	NL	800
	PTAC-1-4						
Clerks Offce 111	1	30X5	1.04	NL	229	NL	238
	PTAC-1-5						
Lobby 116	1	48X6	2	NL	88	NL	176
	PTAC-1-6						
Lobby 116	1	48X6	2	NL	79	NL	158
	PTAC-1-7						
Lobby 116	1	48X6	2	NL	82	NL	164
	PTAC-1-8						
Lobby 116	1	48X6	2	NL	112	NL	224
	PTAC-1-9						
Courtroom 117	1	47X7	2.28	NL	247	NL	563
	PTAC-1-10						
Courtroom 117	1	47X7	2.28	NL	257	NL	586
Comments:					TOTALS:	NL	3746

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

AIR DISTRIBUTION

SYSTEM: PTAC's, 1st Fl.
SUPPLY [X] RETURN [ ] EXHAUST [ ]

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREAxK FACTOR	DESIGN FT/MIN	TEST FT/MIN	DESIGN CFM	TESTED CFM
	PTAC-1-11						
Judges Chamber 118	1	30X5	1.04	NL	172	NL	179
	PTAC-1-12						
Conf. 121	1	30X5	1.04	NL	127	NL	132
	PTAC-1-13						
Library 130	1	30X5	1.04	NL	156	NL	162
	PTAC-1-14						
Judges Lobby 129	1	30X5	1.04	NL	168	NL	175
	PTAC-1-15						
Judges Office 127	1	30X5	1.04	NL	170	NL	177
	PTAC-1-16						
Employees Lounge 126	1	30X5	1.04	NL	131	NL	136
Comments:					TOTALS:	NL	961

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

AIR DISTRIBUTION

SYSTEM: PTAC's, Ground Floor
SUPPLY [X] RETURN [ ] EXHAUST [ ]

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREAxK FACTOR	DESIGN FT/MIN	TEST FT/MIN	DESIGN CFM	TESTED CFM
	PTAC-G-1						
Outdoor Storage G-01	1	NA	NA	NL	NA	NL	*1
	PTAC-G-2						
Juvenile Waiting G-02	1	29X5	1.01	NL	279	NL	282
	PTAC-G-3						
Juvenile Hearing G-03	1	29X5	1.01	NL	325	NL	328
	PTAC-G-4						
Juvenile Hearing G-03	1	29X5	1.01	NL	358	NL	362
	PTAC-G-5						
Chief Juvenile G-04	1	29X5	1.01	NL	352	NL	356
	PTAC-G-6						
Conference G-05	1	29X5	1.01	NL	290	NL	293
	PTAC-G-7						
Cell Block Corridor	1	29X5	1.01	NL	230	NL	232
	PTAC-G-8						
Police Room G-29	1	29X5	1.01	NL	323	NL	326
	PTAC-G-9						
Lobby G-07	1	29X5	1.01	NL	262	NL	265
Comments: *1 Unit not installed.					TOTALS:	NL	2444

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

AIR DISTRIBUTION

SYSTEM: PTAC's, Ground Floor

SUPPLY [ ] RETURN [X] EXHAUST [ ]

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREAxK FACTOR	DESIGN FT/MIN	TEST FT/MIN	DESIGN CFM	TESTED CFM
	PTAC-G-1						
Outdoor Storage G-01	1	NA	NA	NL	NA	NL	*1
	PTAC-G-2						
Juvenile Waiting G-02	1	29X5	1.01	NL	172	NL	174
	PTAC-G-3						
Juvenile Hearing G-03	1	29X5	1.01	NL	229	NL	231
	PTAC-G-4						
Juvenile Hearing G-03	1	29X5	1.01	NL	174	NL	176
	PTAC-G-5						
Chief Juvenile G-04	1	29X5	1.01	NL	168	NL	170
	PTAC-G-6						
Conference G-05	1	29X5	1.01	NL	131	NL	132
	PTAC-G-7						
Cell Block Corridor	1	29X5	1.01	NL	119	NL	120
	PTAC-G-8						
Police Room G-29	1	29X5	1.01	NL	204	NL	206
	PTAC-G-9						
Lobby G-07	1	29X5	1.01	NL	164	NL	166
Comments: *1 Unit not installed.					TOTALS:	NL	1375

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

AIR DISTRIBUTION

SYSTEM: 1st Fl.
SUPPLY [ ] RETURN [X] EXHAUST [ ]

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREAxK FACTOR	DESIGN FT/MIN	TEST FT/MIN	DESIGN CFM	TESTED CFM
	R-1-1						
Probation 104	1	14x6	FH	NL	NA	NL	208
	R-1-2						
Conf. 109	1	14x6	FH	NL	NA	NL	108
	R-1-3						
Lobby 116	1	35X14	3.4	NL	246	NL	837
	R-1-4						
Courtroom 123	1	15X35	FH	NL	NA	NL	673
	R-1-5						
Conf. 121	1	10X6	FH	NL	NA	NL	47
	R-1-6						
Conf. 122/123	1	10X6	FH	NL	NA	NL	54
	R-1-7						
Conf. 122/123	1	10X6	FH	NL	NA	NL	123
	R-1-8						
Corridor 125	1	10X6	FH	NL	NA	NL	63
Comments: *1 There is no ductwork floor plan available to separate the units and what rooms it serves for the report. Each reading of each room based on the floor plan.					TOTALS:	NL	2113

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

AIR DISTRIBUTION

SYSTEM: 1st Fl.

SUPPLY [ ] RETURN [ ] EXHAUST [X]

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREAxK FACTOR	DESIGN FT/MIN	TEST FT/MIN	DESIGN CFM	TESTED CFM
	EX-1-1						
Probation Toilet 101	1	8X6	FH	NL	NA	NL	52
	EX-1-2						
Men 114	1	5x5	FH	NL	NA	NL	0
	EX-1-3						
Women 115	1	5x5	FH	NL	NA	NL	0
					TOTALS:	NL	52

Comments: *1 There is no ductwork floor plan available to separate the units and what rooms it serves for the report. Each reading of each room based on the floor plan.

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

FAN DATA SHEET

	FAN NO. EF-1		FAN NO. EF-2	
Serves / Location:	*1		*1	
Manufacturer:	Greenheck		Centri Master	
Model Number:	6-060-D-X		P10D1	
Size:	NL		NL	
Serial Number:	05F21615		CT8645	
MOTOR	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Manufacturer:	NL	VARI SPEED	NL	DAYTON
Frame Number:	NL	48Z	NL	48Z
Horsepower:	1/6	1/6	1/6	1/6
Brake Horsepower:	NL	NA	NL	NA
Safety Factor:	NL	1.35	NL	1.35
Volts/Phase:	115/1	115/1	115/1	115
Motor Amperage:	3.6	2.39	3.6	2.42
Motor RPM:	NL	DIRECT DRIVE	1725	1689
Speeds:	NL	1	NL	NA
Heater Size:	NL	CB	NL	CB
Heater Amps.:	NL	CB	NL	CB
FAN	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Supply Air CFM:				
Return Air CFM:				
Exhaust Air CFM:	NL	*1	NL	*1
Outside Air CFM:				
Suction Pressure:				
Discharge Pressure:				
Fan Static Pressure:				
External Pressure:				
RPM	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Fan RPM:	NL	DIRECT DRIVE	NL	1055
Motor Drive:	NL	DIRECT DRIVE	NL	6" OD
Motor Size/Bore:	NL	DIRECT DRIVE	NL	5/8"
Fan Drive:	NL	DIRECT DRIVE	NL	2 5/8
Fan Size/Bore:	NL	DIRECT DRIVE	NL	1/2"
Belt Size / Number:	NL	DIRECT DRIVE	NL	3L 230
Shafts C-C:	NL	DIRECT DRIVE	NL	4 3/4
Turns Open:	NL	DIRECT DRIVE	NL	0

Comments: ***1 Cannot locate where fans serve on available plans.**

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

FAN DATA SHEET

	FAN NO. EF-4		FAN NO. EF-5	
Serves / Location:	*1		*1	
Manufacturer:	Centri Master		Centri Master	
Model Number:	P10D1		P12D1	
Size:	NL		NL	
Serial Number:	CT8646		CT8643	
MOTOR	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Manufacturer:	NL	DAYTON	NL	DAYTON
Frame Number:	NL	48Z	NL	48Z
Horsepower:	NL	1/6	NL	1/6
Brake Horsepower:	NL	NA	NL	NA
Safety Factor:	NL	1.35	NL	1.35
Volts/Phase:	115/1	115	115/1	115
Motor Amperage:	3.6	2.48	3.6	2.39
Motor RPM:	1725	1670	1725	1627
Speeds:	NL	NA	NL	NA
Heater Size:	NL	NA	NL	NA
Heater Amps.:	NL	NA	NL	NA
FAN	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Supply Air CFM:				
Return Air CFM:				
Exhaust Air CFM:	50	61	50	54
Outside Air CFM:				
Suction Pressure:				
Discharge Pressure:				
Fan Static Pressure:				
External Pressure:				
RPM	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Fan RPM:	NL	1037	NL	1010
Motor Drive:	NL	6" OD	NL	6" OD
Motor Size/Bore:	NL	5/8"	NL	5/8"
Fan Drive:	NL	2 5/8	NL	2 5/8
Fan Size/Bore:	NL	1/2"	NL	1/2"
Belt Size / Number:	NL	3L 230	NL	3L 210
Shafts C-C:	NL	4 3/4	NL	4 3/4
Turns Open:	NL	2	NL	2

Comments:

Project: Uxbridge District Court
Address: 261 Main St., Uxbridge, MA
Date: 5/18/2022 **Project No.** 22-186

FAN DATA SHEET

	FAN NO. EF-6		FAN NO. EF-7	
Serves / Location:	*1		*1	
Manufacturer:	Greenheck		Greenheck	
Model Number:	P12D1		P12D1	
Size:	NL		NL	
Serial Number:	CT8644		CT8645	
MOTOR	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Manufacturer:	NL	DAYTON	NL	Dayton
Frame Number:	NL	48Z	NL	48Z
Horsepower:	1/6	1/6	1/6	1/6
Brake Horsepower:	NL	NA	NL	NA
Safety Factor:	NL	1.35	NL	1.35
Volts/Phase:	115/1	115	115/1	115/1
Motor Amperage:	3.6	2.43	3.6	2.2
Motor RPM:	1725	1644	1725	1709
Speeds:	NL	1	NL	1
Heater Size:	NL	CB	NL	CB
Heater Amps.:	NL	CB	NL	CB
FAN	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Supply Air CFM:				
Return Air CFM:				
Exhaust Air CFM:	50	59	50	62
Outside Air CFM:				
Suction Pressure:				
Discharge Pressure:				
Fan Static Pressure:				
External Pressure:				
RPM	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Fan RPM:	NL	1023	NL	1033
Motor Drive:	NL	6" OD	NL	6"
Motor Size/Bore:	NL	5/8"	NL	5/8"
Fan Drive:	NL	2 5/8"	NL	2 5/8"
Fan Size/Bore:	NL	1/2"	NL	1/2"
Belt Size / Number:	NL	3L 210	NL	3L210
Shafts C-C:	NL	4 3/4	NL	4 3/4"
Turns Open:	NL	2	NL	2

Comments:

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FAN DATA SHEET

	FAN NO.		FAN NO. EF-12	
Serves / Location:			Cell Block	Mechanical
Manufacturer:			Trane	
Model Number:			U10F2-FC	
Size:			NL	
Serial Number:			OA169284	
MOTOR	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Manufacturer:			NL	A.O. SMITH
Frame Number:			NL	48
Horsepower:			NL	1/3
Brake Horsepower:			NL	NA
Safety Factor:			NL	1.35
Volts/Phase:			115	115
Motor Amperage:			5.9	3.9
Motor RPM:			1725	1187
Speeds:			NL	NA
Heater Size:			NL	NA
Heater Amps.:			NL	NA
FAN	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Supply Air CFM:				
Return Air CFM:				
Exhaust Air CFM:			600	440
Outside Air CFM:				
Suction Pressure:			NL	-0.0803
Discharge Pressure:			NL	NA
Fan Static Pressure:			NL	NA
External Pressure:			NL	NA
RPM	**DESIGN**	**TESTED**	**DESIGN**	**TESTED**
Fan RPM:			NL	448
Motor Drive:			NL	3 1/4
Motor Size/Bore:			NL	1/4
Fan Drive:			NL	6 7/8
Fan Size/Bore:			NL	7/8
Belt Size / Number:			NL	4L 320H
Shafts C-C:			NL	9
Turns Open:			NL	3

Comments:

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AIR DISTRIBUTION

SYSTEM: EF-12
SUPPLY [ ] RETURN [ ] EXHAUST [X]

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREAxK FACTOR	DESIGN FT/MIN	TEST FT/MIN	DESIGN CFM	TESTED CFM
Cell G-26	1	11X5	FH	NA	NA	NL	42
Cell G-25	2	11X5	FH	NA	NA	NL	45
Cell G-24	3	11X5	FH	NA	NA	NL	75
Cell G-23	4	23X7	FH	NA	NA	NL	163
Cell G-22	5	11X5	FH	NA	NA	NL	115
					TOTALS:	NL	440 *1

Comments: *1 There is no ductwork floor plan available to separate the units and what rooms it serves for the report. Each reading of each room based on the floor plan.

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AIR DISTRIBUTION

SYSTEM: EX-G-1

SUPPLY [ ] RETURN [ ] EXHAUST [X]

ROOM OR LOCATION	UNIT NUMBER	UNIT SIZE	AREAxK FACTOR	DESIGN FT/MIN	TEST FT/MIN	DESIGN CFM	TESTED CFM
Mens G-14	1	5X5	FH	NA	NA	NL	*2
G-13	2	5X3	FH	NA	NA	NL	*2
Womens G-15	3	5X5	FH	NA	NA	NL	*2
					TOTALS:	NL	*1

Comments:

*2 Unit is not operating.