Fall River Probate & Family Courthouse
Fall River, MA

HVAC SYSTEM EVALUATIONS COVID-19

Office of Court Management

August 23, 2022

Tighe&Bond

100% Recyclable

Existing Conditions & Site Observations

Tighe & Bond visited the Fall River Probate & Family Courthouse on September 2, 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 and Bond was provided with mechanical design plans from 1992. Our analysis is based on these drawings and our one day on site.

Site Visit Attendees:

- *Office of Court Management:*
  - Marco Carvalho, Courthouse Facilities Staff
- *Tighe & Bond*
  - Ryan Ablondi, PE, Senior Mechanical Engineer
  - Timothy Bill, Staff Mechanical Engineer

1.1 Existing Ventilation System

The Fall River Probate & Family Courthouse was constructed in 1886, renovated in 1992 and is approximately 80,000 square feet in size. There are five air handling units (AHU) that are each dedicated to one of the five courtrooms. Two 100% outdoor air AHU's provide ventilation air to over 90 fan coil units (FCU) throughout the building, acting as dedicated outdoor air systems (DOAS).

The AHU's and FCU's were installed as part of the 1992 renovation and are in fair condition. Due to time and accessibility constraints, we limited our physical inspections to a few FCU's located in heavily occupied areas.

AHU 1-5 are constant volume units containing a supply fan, chilled water cooling coil, hot water heating coil, and 2" MERV 13 filters. A dedicated return fan serves each unit. All dampers and actuators appear to be in good condition considering their age. The hot and chilled water control valves and actuators are also in good condition.

AHU 6 & 7 are constant volume 100% outdoor air, DOAS units that contain a supply fan, chilled water cooling coil, hot water heating coil, and 2" MERV 13 filters.

The FCU's each contain a supply fan, a hot water and a chilled water coil and standard non-MERV rated filters.

According to the drawings provided to Tighe & Bond, there are 6 exhaust fans serving the building. The lockup area is served by an exhaust fan and FCU. The FCU provides ventilation in the corridor and there is an exhaust register in each cell. The bottom half of each cell door is open steel grating. The remaining exhaust fans serve toilet exhaust throughout the building. The toilet exhaust fans and lockup exhaust fan were all running at the time of our site visit.

A 3.6 million BTU/hr hot water boiler plant, consisting of three 1,200 MBH, gas fired, fire tube boilers, provides hot water to air handlers, fan coils and unit heaters. The boilers were installed as part of the 1992 renovation and appear to be in fair condition.

A water-cooled chiller located in the basement mechanical room provides chilled water to all air handlers and fan coils. Heat rejection for the chiller is provided by a 3,400 MBH single cell cooling tower located within the observatory dome on the roof. During the site visit, the chiller's compressor was very loud, and we suspect the chiller in general may be nearing the end of its useful life. We recommend that the condition of the chiller's compressor be reviewed by a manufacturer's authorized service provider. The Chiller was installed during the 1992 renovation and is in poor condition. While Tighe & Bond does not know the exact install date of the cooling tower, it appears to be about 5-10 years old and in good condition.

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	1,750	400	2" MERV 13	Fair
AHU-2	2,750	800	2" MERV 13	Fair
AHU-3	3,850	3,000	2" MERV 13	Fair
AHU-4	2,965	1,200	2" MERV 13	Fair
AHU-5	2,150	600	2" MERV 13	Fair
AHU-6	10,990	10,990	2" MERV 13	Fair
AHU-7	8,040	8,040	2" MERV 13	Fair

Photo 1 – Typical Courtroom Air Handler

Photo 2 – Typical 100% Outdoor Air Handling Unit

1.2 Existing Control System

The HVAC equipment is controlled by a Trane Building Management System (BMS) installed in 2013. Air handlers, fan coils, exhaust fans, boilers, chillers, and pumps are all tied into the system. AHU-1 thru 5 have an economizer mode that is enabled when the outdoor air temperature is below 65F and disabled when outdoor air temp reached 45°F. AHU-3 & 4 operate with a demand control ventilation control strategy.

Section 2 Recommendations

Below is a list of recommendations for the Fall River Probate & Family Courthouse. Please refer to the "Overview of Recommendations" report for further explanation and requirements of the stated recommendations.

2.1 Filtration Efficiency Recommendations

The filters in the air handlers were already upgraded with 2" MERV 13 filters. The use of 2" MERV 13 meets the minimum ASHRAE recommendations for filtration during the pandemic. We recommend that a testing and balancing contractor test and document the airflow and static pressure profile of all air handlers, as outlined in recommendation RF-1 in the Overview of Recommendations document. This will help determine if the equipment can accommodate the increase in system static pressure associated with the addition of the MERV 13 filters.

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

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

RF-3a: *Connect the pressure sensor to the BMS system and/or 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.

Alarm setpoints for each bank of filters should be reviewed, to ensure they are consistent with the filter manufacturer's recommendation.

2.2 Testing & Balancing Recommendations

The air handling units are approximately 30 years old and 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.

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	1,750	400	622	**625**
AHU-2	2,750	800	717	**800**
AHU-3	3,850	3,000	944	**3,000**
AHU-4	2,965	1,200	688	**1,200**
AHU-5	2,150	600	571	**600**
AHU-6	10,990	10,990	3,148	**10,990**
AHU-7	8,040	8,040	3,480	**8,040**

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.

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.

Where we recommend increasing the outdoor air beyond the original design, it appears the cooling and heating coils should be able to provide leaving air conditions similar to the original design under peak outdoor air conditions, assuming the coils are clean and their performance has not degraded significantly over time. Supply air temperatures during the heating and cooling season should be monitored to ensure the units are able to maintain design setpoints. If the supply air temperature does drop below design values, the outdoor airflow rate should be reduced, but not below the originally designed outdoor air flow rates.

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. 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	***Courtrooms***	***Non-Courtroom Spaces***
Total Occupancy (People)	719	339	380
Total Supply Air (CFM/Person)	Unknown(1)	40	Unknown(1)
Outdoor Air (CFM/Person)	35	18	50 (1)

(1) For non-courtroom spaces served by fan coil units, total airflow from the FCU was not taken into account for this analysis, only OA from 100% OA AHUs serving non-courtroom spaces was accounted for so the total supply air is unknown.

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	41	1,520	37	1,000	24
Juvenile Courtroom 1	98	2,750	28	800	8
Juvenile Courtroom 2	85	1,750	21	650	8
Probate Courtroom 1	94	2,960	31	1,198	13
Probate Courtroom 2	78	2,150	28	600	8
Housing Courtroom	129	3,850	30	3,000	23

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	9	1,520	169	1,000	111
Juvenile Courtroom 1	13	2,750	212	800	62
Juvenile Courtroom 2	15	1,750	117	650	43
Probate Courtroom 1	14	2,960	211	1,198	86
Probate Courtroom 2	15	2,150	143	600	40
Housing Courtroom	28	3,850	138	3,000	107

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

RTB-2: *Rebalance system return air flow rate.*

We recommend testing and balancing the return fan airflow rate to ensure the correct quantity of return air is being delivered to the air handler.

RTB-3: *Increase outdoor air flow rate beyond minimum under non-peak conditions.*

Due to the age of the units, the ability for the coils to maintain the supply air temperature is uncertain. We recommend increasing the outdoor air flow rate by 10% to 30% beyond the recommend values in Table 2 during non-peak outdoor air conditions during the pandemic only. This may require additional controls to implement. We do not believe this would cause a threat of a potential coil to freeze given the amount of outdoor air as a percentage of total supply air, however cold spots on the coil may develop due to poor mixing. This may cause nuisance freeze stat trips via the existing freeze stat. If there is no existing freeze stat, we recommend installing one.

The return air to each air handler will also have to be adjusted to accommodate the additional outdoor air during the operation of this sequence.

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 holding cells, control room, Courtrooms, Jury Pool room, and other densely occupied areas as a minimum. These systems are very old and the airflow rate delivered to and returned from these spaces may not match the original design intent.

If specific areas within the Courthouse experiences regular cooling and heating comfort complaints this may be an indication of a lack of airflow to the space. We recommend testing and balancing the air inlets and outlets serving those spaces to the designed values. Prior to rebalancing the building, we recommend verifying the boiler and chilled water plants are maintaining the correct supply water temperature. Incorrect supply water temperature may be contributing to the temperature control complaints instead of a lack of airflow.

RTB-6: *Test and balance all air handler and fan coil unit chilled and hot water coils.*

Testing and balancing the air handler and FCU hot and chilled water coils will help ensure the coils are receiving the proper water flow rates. Due to the age of the coils, the coils may not perform as required to properly temper the supply air. Coils become fouled over time, which degrades the performance.

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 and fan coil unit HW and CHW coils and drain pans.*

RE-5: *Confirm the existing freeze stat is working correctly on each air handling unit.*

RE-7: *Test the existing air handler and fan coil control valves and actuators for proper operation.*

2.4 Control System Recommendations

We recommend the following for the control system:

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

RC-2: *Install controls required to introduce outdoor air beyond the minimum requirements.*

The existing BMS appears to be sophisticated enough to implement this type of sequence, however new control sequences must be defined.

RC-4: *Confirm the economizer control sequence is operational.*

RC-5: *Disable demand control ventilation sequences for AHU-3 & 4.*

We recommend temporarily disabling demand control ventilation systems.

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.

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 Convert Chilled and Hot Water Systems to Variable Flow

The hot and chilled water pumps are constant flow systems. Constant flow pumps circulate the same volume of water to air handling units regardless of whether the water is required or not. If air handlers do not require this water, the three-way valves serving the air handler coils bypass the coil, which allows the water to return back to the chiller or boiler plant. We recommend investigating the possibility of converting these systems to variable flow. The three-way air handler valves would have to be replaced with two-way valves, as well as any other three-way valves that are in the system. Variable frequency drives (VFD) may be able to be connected to the existing hot and chilled water pumps, allowing the pumps to vary the flow rate to match the demand. This recommendation is an energy saving measure and does not affect the indoor air quality of the building.

2.7.2 Chiller Maintenance

During the site visit, the chiller's compressor was very loud, and we suspect the chiller in general may be nearing the end of its useful life. We recommend that the condition of the chiller's compressor be reviewed by a manufacturer's authorized service provider.

2.7.3 Capital Planning for Replacement of Fan Coil Units

The existing FCUs serving the building are approx. 30 years old and likely approaching the end of their useful life. As far as we know all of the FCUs are functional and in fair condition however, the average life expectancy for FCUs is 25-30 years. While immediate replacement is not necessary at this time, we would recommend developing a capital plan to replace these units in ~5 years.

2.7.4 Capital Planning for Replacement of Air Handling Units

The existing AHUs in the penthouse mechanical room are approx. 30 years old and likely approaching the end of their useful life. As far as we know all the AHUs are functional and in fair condition however, the average life expectancy for AHUs is 25-35 years. While immediate replacement is not necessary at this time, we would recommend developing a capital plan to replace these units in ~5 years.

2.7.5 Capital Planning to Replace Boilers

Boilers have a life expectancy of 25 years. The boilers are approximately 30 years old and are in poor condition. Consider replacing these units in the next 5 years. Replacing the HW pumps should also occur in conjunction with the replacement of the boilers.

2.7.6 Capital Planning to Replace Chiller

Chillers have a life expectancy of 25 years. The chiller is approximately 30 years old and in poor condition. Consider replacing this unit in the next 5 years. Replacing the pumps should also occur in conjunction with the replacement of the chiller.

2.8 Fall River Probate & Family Courthouse Recommendations Checklist

Recommended Immediate Actions

1. ☐ RTB-1: Test and balance air handling and fan coil unit airflow rates
2. ☐ RE-1: Test air handling system dampers and actuators for proper operation
3. ☐ RE-2: Clean air handler coils
4. ☐ RC-1: Implement and pre and post-occupancy flush sequence
5. ☐ RC-5: Disable demand control ventilation sequences
6. ☐ Perform Chiller Maintenance

Recommended Actions

7. ☐ RF-3: Install differential pressure sensor with a display across the filter bank.
8. ☐ RF-3a: Connect the pressure sensor to the BMS system and/or a local alarm.
9. ☐ RTB-2: Rebalance system return airflow rate.
10. ☐ RTB-3: Increase outdoor air beyond minimum under nonpeak conditions
11. ☐ RTB-6: Test and balance air handling units chilled and hot water coils
12. ☐ RE-5: Confirm the existing freeze stat is working correctly on each air handling unit.
13. ☐ RE-7: Test air handler coil control valves for proper operation
14. ☐ RC-2: Install controls required to introduce outdoor air beyond the minimum requirements.
15. ☐ RC-4: Confirm the economizer control sequence is operational
16. ☐ RFC-1: Install portable HEPA filters

Optional Actions

17. ☐ RTB-5: Test and balance air inlets and outlets
18. ☐ Convert Chilled and Hot Water Systems to Variable Flow
19. ☐ Capital Planning for Replacement of Fan Coil Units
20. ☐ Capital Planning for Replacement of Air Handling Units
21. ☐ Capital Planning to Replace Boilers
22. ☐ Capital Planning to Replace Chiller

Section 3
Testing & Balancing Results

Wings Testing & Balancing visited the Courthouse on July 1, 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. The balancing report also contains the water flow rate testing results of the air handler chilled water coils. The hot water system was not operational during the time of testing, therefore hot water coil flow rates were not tested.

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	1,750	625	1,125	1,653	617	1,036
AHU-2	2,750	800	1,950	2,986	755	2,231
AHU-3	3,850	3,000	850	3,521	2,977	544
AHU-4	2,965	1,200	1,765	2,826	1,304	1,522
AHU-5	2,150	600	1,550	2,085	624	1,461
AHU-6	10,990	10,990	0	12,108	12,108	0
AHU-7	8,040	8,040	0	8,266	8,266	0
FCU-12	630	300	330	500	104	396
FCU-18	625	60	565	610	107	503
FCU-23	400	160	240	449	253	196
FCU-26	1250	750	500	768	422	346
FCU-26A	760	0	760	763	0	756
FCU-27	1250	750	500	943	546	397
FCU-29	155	80	75	375	288	87

TABLE 6
Return Fan Testing & Balancing Results

Unit	Serving	Design Return/Exhaust Airflow (CFM)	Actual Return/Exhaust Airflow (CFM)
RF-1	AHU-1	1,710	1,695
RF-2	AHU-2	2,670	2,631
RF-3	AHU-3	3,550	2,636
RF-4	AHU-4	1,400	1,466
RF-5	AHU-5	2,150	2,300

TABLE
Air Handler Waterflow Testing & Balancing Results

	Design		Actual	
Unit	Chilled Water Flow Rate (GPM)	Hot Water Flow Rate (GPM)	Chilled Water Flow Rate (GPM)	Hot Water Flow Rate (GPM)
AHU-1	13.7	5.1	14.8	Not Tested
AHU-2	23.2	8.8	28.8	Not Tested
AHU-3	46.6	21.9	50.5	Not Tested
AHU-4	27.7	11.2	30.1	Not Tested
AHU-5	17.5	6.8	18.9	Not Tested
AHU-6	56.7	53.8	51.5	Not Tested
AHU-7	30.2	39.6	30.9	Not Tested
FCU-12	2.8	1.9	0	Not Tested
FCU-18	3.9	1.2	3.8	Not Tested
FCU-23	2.5	1.0	-	Not Tested
FCU-26A	6.0	1.5	5.3	Not Tested
FCU-27	7.0	2.0	6.8	Not Tested
FCU-29	1.7	0.5	2.1	Not Tested

TABLE
Exhaust Fan Testing & Balancing Results

Unit	Serving	Design Return/Exhaust Airflow (CFM)	Actual Return/Exhaust Airflow (CFM)
EF-1	Restrooms	5,750	5,332
EF-2	Restrooms	4,745	5,079
EF-4	Restrooms	4,110	3,744
EF-5	Restrooms	2,300	2,003

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. AHU-2 chilled water flow is 24% above design flow. We recommend the CHW coil be balanced to the design flow.
2. AHU-6 chilled water flow is 9% below design flow. We recommend the CHW coil be balanced to design flow.
3. The hot water loop was not operational at the time of the visit. We recommend that the TAB contractor returns to the site to test the hot water loop during the heating season.
4. FCU-12 is performing at 79% of the original design airflow. We recommend investigating the unit to determine the cause of low airflow. The TAB contractor noted that the chilled water control valve serving the unit is not functional and we recommend replacing the valve.
5. The TAB contractor noted that the chilled water control valve serving FCU-23 could not be opened at the time of the site visit because it is no longer functional. We recommend replacing the valve.
6. FCU-26 is operating at 61% of the design supply airflow. The unit is providing 50% of the design outdoor airflow. We recommend investigating the unit to determine the cause of the low airflow.
7. FCU-27 is performing at 75% of the design airflow. We recommend investigating the unit to determine the cause of the low airflow.
8. FCU-29 is supplying 240% of the design airflow and 360% of the outdoor airflow. We recommend balancing the unit to the design airflow to avoid over pressurization of the space served by the unit. The excess outdoor air can cause comfort issues if the heating and cooling coils cannot condition the added airflow.
9. RF-3 is operating at 74% of the original design airflow. The fan is operating at the maximum amperage and therefore cannot be sped up to reach the design airflow. A sheave change is not possible because the unit is at full load amps. We recommend replacing the unit to achieve the designed airflow.
10. EF-1, 2, 4 and 5 are all operating within the acceptable airflow range.

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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WING'S TESTING & BALANCING CO., INC.

Fall River Probate + Family Court
HVAC/ Ventilation Survey

* * * *

Tighe & Bond
Attn: Jason Urso
53 Southampton Road
Westfield, MA 01085

July 25, 2022

94 North Branford Road • Suite One • Branford, CT 06405
(203) 481-4988 • Fax (203) 488-5634 • wings@wingstesting.com
SM-1 License #6803
www.wingstesting.com

WING'S TESTING & BALANCING CO., INC.

July 25, 2022

Tighe & Bond
Attn: Jason Urso
53 Southampton Road
Westfield, MA 01085

Re: Fall River Probate + Family

Dear Jason,

We have completed our HVAC/ Fresh Air Ventilation testing for the above-mentioned site. The water readings were taken via ultrasound. Since there were no circuit setters, the method of taking readings was to close a unit, read the ultrasound total, then open that unit's control valve and document the difference. Through our testing we found that:

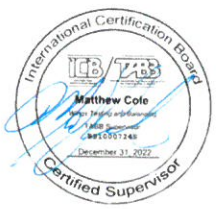
- RF-3 is below design but does not have enough amperage left to make design.
- There were 6 different types of FCU's. We tested one of each type. Chill water control valves couldn't be opened on every unit. Hot water loop was not operational at the time of testing.

Report has been updated to include information for AHU-7

The following pages are your record of current operating conditions. If you have any questions, or if 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:
TABB—Commissioning—Fire/Life Safety L1&L2—Sound & Vibration



Barry Stratos
Certified TABB Technician
CT SM-2 License 6386
MA SM-2 13595

SUPPLY FAN REPORT

PROJECT: Fall River Probate + Family | **DATE:** 06/27/22

AREA SERVED: | **TECH:** BS

FAN DATA

FAN NUMBER	AHU-1		AHU-2		AHU-3	
LOCATION	Attic		Attic		Attic	
AREA SERVED	Court Room #2		Court Room #3		Court Room #1	
MANUFACTURER	York		York		York	
MODEL OR SIZE	C532SVFC		C550SHFC		C574SHFC	
	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL
TOTAL CFM	1750	1653	2750	2986	3850	3521
RETURN AIR	1125	1036	1950	2231	850	544
OUTSIDE AIR	625	617	800	755	3000	2977
DISCH. STATIC	---	+0.38"	---	+0.21"	---	+0.30"
SUCTION STATIC	---	-1.55"	---	-2.09"	---	-2.42"
TOTAL STATIC	NA	1.93	NA	2.30	NA	2.72"
FAN RPM	NA	1812	NA	1763	NA	1498
PULLEY O.D.	4.5" x 1 7/16"		5.0" x 1 7/16"		4.75" x 1 7/16"	
ESP	1.27		0.94		1.27	
VFD SPEED	No VFD		No VFD		No VFD	
O.A.D.MIN POS	40%		30%		70%	

MOTOR DATA

MANUFACTURER	Baldor		Magnetek		Magnetek	
MODEL OR FR.	145-T		5182F		E184T	
HORSEPOWER	2	2	3	3	5	5
MOTOR RPM	1725	1725	1745	1745	1745	1745
VOLTAGE / PH.	460/3	460/3	460/3	460/3	460/3	460/3
AMPS LEG 1	3.2	3.0	3.9	3.6	5.9	4.3
AMPS LEG 2	---	3.0	---	3.4	---	4.2
AMPS LEG 3	---	3.0	---	3.6	---	4.3
SHEAVE O.D.	5.5" x 7/8"		4.75" x 1 1/8"		4.75" x 1 3/8"	
BELTS - QUANTITY / SIZE	1/B52		1/B60		1/B51	
SHEAVE POSITION	Fully Open		Fully Closed		1/2 Closed	
C to C	20.5		24.0		20.0	

REMARKS

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement

SUPPLY FAN REPORT

PROJECT: Fall River Probate + Family	**DATE:** 06/28/22
AREA SERVED:	**TECH:** BS

FAN DATA

	AHU-4		AHU-5		AHU-6	
FAN NUMBER						
LOCATION	Attic		Attic		Attic	
AREA SERVED	Court Room 4		Court Room 5		North Side	
MANUFACTURER	York		York		York	
MODEL OR SIZE	CS505HFC		CS32SHVC		CS217SHF	
	DESIGN	**ACTUAL**	**DESIGN**	**ACTUAL**	**DESIGN**	**ACTUAL**
TOTAL CFM	2965	2826	2150	2085	10990	12108
RETURN AIR	1765	1522	1550	1461	0	0
OUTSIDE AIR	1200	1304	600	624	10990	12108
DISCH. STATIC	---	+0.30"	---	+0.23"	---	+0.26"
SUCTION STATIC	---	-2.08"	---	-2.31"	---	-1.30"
TOTAL STATIC	NA	2.38"	NA	2.54"	NA	1.56"
FAN RPM	NA	1713	NA	2179	NA	801
PULLEY O.D.	4.25" x 1 5/16"		4.5" x 1 7/16"		12.5" x 1 11/16"	
ESP	1.26		1.07		1.07	
VFD SPEED	No VFD		No VFD		No VFD	
O.A.D.MIN POS	15%		40%		100%	

MOTOR DATA

MANUFACTURER	Magnetek		Magnetek		Magnetek	
MODEL OR FR.	5182T		5182T		NA	
HORSEPOWER	3	3	3	3	10.0	10.0
MOTOR RPM	1745	1745	1745	1745	1750	1750
VOLTAGE / PH.	460/3	460/3	460/3	460/3	460/3	460/3
AMPS LEG 1	3.9	3.6	3.9	3.4	12.2	10.4
AMPS LEG 2	---	3.4	---	3.5	---	10.5
AMPS LEG 3	---	3.5	---	3.6	---	10.6
SHEAVE O.D.	4.75" x 1 1/8"		6.0" x 1 1/8"		6.5" x 1 3/8"	
BELTS - QUANTITY / SIZE	1/A60		1/B52		1/B90	
SHEAVE POSITION	1/2 Open		1/2 Open		1/2 Open	
C to C	24.0		19.5		32.0	

REMARKS

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement

SUPPLY FAN REPORT

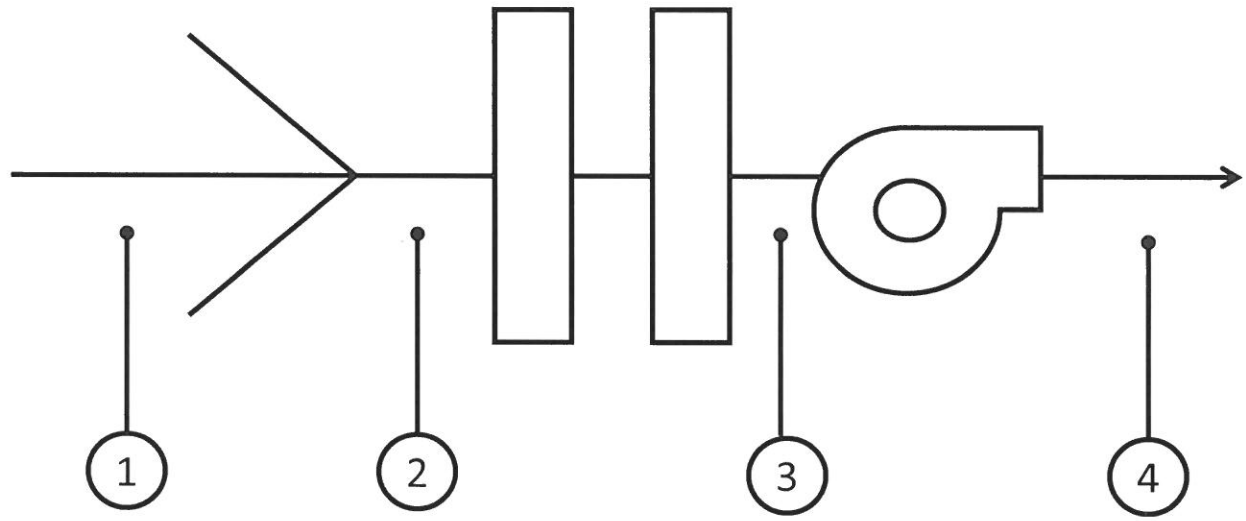
PROJECT: Fall River Probate + Family					**DATE:** 06/29/22	
AREA SERVED:					**TECH:** BS	
FAN DATA						
FAN NUMBER	AHU-7					
LOCATION	Attic					
AREA SERVED	South Side					
MANUFACTURER	York					
MODEL OR SIZE	CS156HFC					
	DESIGN	**ACTUAL**	**DESIGN**	**ACTUAL**	**DESIGN**	**ACTUAL**
TOTAL CFM	8040					
RETURN AIR	0					
OUTSIDE AIR	8040					
DISCH. STATIC	---		---		---	
SUCTION STATIC	---		---		---	
TOTAL STATIC	NA					
FAN RPM	NA					
PULLEY O.D.	11.5" x 1 5/16"					
ESP	0.62"					
VFD SPEED	No VFD					
O.A.D.MIN POS	100%					
MOTOR DATA						
MANUFACTURER	Century					
MODEL OR FR.	5213T					
HORSEPOWER	7.5	7.5				
MOTOR RPM	1750	1750				
VOLTAGE / PH.	460/3	460/3				
AMPS LEG 1	9.6	8.4				
AMPS LEG 2	---	8.5	---		---	
AMPS LEG 3	---	8.3	---		---	
SHEAVE O.D.	6.0" x 1 3/8"					
BELTS - QUANTITY / SIZE	1/B84					
SHEAVE POSITION	Fully Open					
C to C	29.51					

REMARKS

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement

SYSTEM STATIC PRESSURE PROFILE

PROJECT: Fall River Probate + Family	**DATE:** 07/01/22
SYSTEM/AREA SERV:	**TECH:** BS



STATIC PRESSURE READINGS "wc

POS. (+) / NEG.(-)	1	2	3	4	5	6	7	NOTES
AHU-1	-0.89"	-0.97"	-1.55	+0.38"				
AHU-2	-0.73"	-0.91"	-2.09"	+0.21"				
AHU-3	-0.97"	-1.24"	-2.42"	+0.30"				
AHU-4	-0.96"	-1.08"	-2.08"	30.30"				
AHU-5	-0.84"	-1.03"	-2.31"	+0.23"				
AHU-6	-0.62"	-0.83"	-1.30"	+0.26"				
AHU-7	-0.38"	-0.63"	-1.02"	+0.24"				

REMARKS

EXHAUST FAN REPORT

PROJECT: Fall River Probate + Court					**DATE:** 07/01/22	
AREA SERVED:					**TECH:** BS	
FAN DATA						
FAN NUMBER		RF-1	RF-2	RF-3	RF-4	RF-5
LOCATION		Attic	Attic	Attic	Attic	Attic
AREA SERVED		AHU-1	AHU-2	AHU-3	AHU-4	AHU-5
MANUFACTURER		NA	Cook	Cook	Cook	Cook
MODEL OR SIZE		NA	165-SQIB	180-SQIB	135SQIB	150SQIB
TOTAL CFM	DESIGN	1710	2670	3550	1400	2150
	ACTUAL	1695	2631	2636 (1)	1466	2300
FAN RPM	DESIGN	NA	NA	NA	NA	NA
	ACTUAL	NA	NA	NA	NA	NA
PULLEY	O.D.	NA	NA	NA	NA	NA
SERVICE		1.35	1.15	1.15	1.15	1.25
MOTOR DATA						
MANUFACTURER		Lesson	Lesson	Marathon	Marathon	Lesson
MODEL NUMBER		L556	E143T	184T-70	NA	R556
MOTOR HP	DESIGN	1/2	1	1 1/2	1 1/2	3/4
	ACTUAL	1/2	1	1 1/2	1 1/2	3/4
MOTOR RPM		1725	1740	1735	1735	1725
VOLTAGE/PHASE		460/3	460/3	460/3	460/3	460/3
MOTOR AMPS	DESIGN	2.2	1.9	2.4	2.4	1.5
	ACT. LEG 1	0.9	1.7	2.1	2.4	1.4
	ACT. LEG 2	0.9	1.7	2.1	2.4	1.4
	ACT. LEG 3	0.9	1.7	2.1	2.4	1.4
SHEAVE		NA	NA	3.75" x 7/8"	3.75" x 7/8"	NA
BELTS-QTY/SIZE		NA	NA	1/A48	1/A46	NA
SHEAVE POSITION		NA	NA	Fully Open	Fully Open	NA
C to C		NA	NA	19.5	20.0	NA

REMARKS

(1) There is not enough amperage left to be able to measure this fan to design.

EXHAUST FAN REPORT

PROJECT: Fall River Probate + Family					**DATE:** 06/30/22	
AREA SERVED:					**TECH:** BS	
FAN DATA						
FAN NUMBER		EF-1	EF-2	EF-4	EF-5	
LOCATION		Attic	Attic	Attic	Attic	
AREA SERVED			Restrooms	Cells/ Restrooms	Restrooms	
MANUFACTURER		Cook	Cook	Cook	Cook	
MODEL OR SIZE		245SQIB	245SQIB	195SQIB	150SQIB	
TOTAL	DESIGN	5750	4745	4110	2300	
CFM	ACTUAL	5332	5079	3744	2003	
FAN	DESIGN	NA	NA	NA	NA	
RPM	ACTUAL	NA	NA	NA	NA	
PULLEY	O.D.	NA	NA	NA	NA	
SERVICE						
MOTOR DATA						
MANUFACTURER		Leeson	Leeson	Leeson	Marathon	
MODEL NUMBER		F145T	F145T	F145T	NA	
MOTOR	DESIGN	2	2	2	1	
HP	ACTUAL	2	2	2	1 1/2	
MOTOR RPM		1740	1740	1740	1725	
VOLTAGE/PHASE		460/3	460/3	460/3	460/3	
MOTOR AMPS	DESIGN	6.2	6.2	6.2	4.2	
	ACT. LEG 1	3.8	3.3	2.9	2.3	
	ACT. LEG 2	3.8	3.4	2.8	2.4	
	ACT. LEG 3	3.8	3.3	2.9	2.4	
SHEAVE		3.5" x 7/8"	3.5" x 7/8"	3.5" x 7/8"	NA	
BELTS-QTY/SIZE		1/A62	1/AP58	1/A51	NA	
SHEAVE POSITION		1/2 Open	1/2 Open	1/2 Open	NA	
C to C		NA	NA	NA	NA	
REMARKS						

VELOCITY PRESSURE READINGS

PROJECT: Fall River Probate + Family **DATE:** 06/30/22

AREA SERVED: **TECH:** BS

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN FPM	DESIGN CFM	CENT. STAT. PRESS."	TEST FPM	TEST CFM	NOTES
AHU-1 Total	20" x 14"	1.94		1750	+0.35"	850	1652	
AHU-1 OA	32" x 20"	4.44		625	-0.17"	139	617	
AHU-1 Return	---	---		1125	Calc	---	1035	
AHU-2 Total	32" x 14"	3.11		2,750	+0.29"	960	2986	
AHU-2 OA	32" x 20"	4.44		800	-0.68"	170	758	
AHU-2 Return	---	---		1950	Calc	---	2228	
AHU-3 Total	30" x 18"	3.75		3850	+0.27"	939	3521	
AHU-3 OA	26" x 18"	3.25		3000	-0.97"	916	2977	
AHU-3 Return	---	---		850	Calc	---	544	
AHU-4 Total	36" x 16"	2.92		2965	+0.26"	969	2826	
AHU-4 OA	22" x 22"	3.36		1200	-0.17"	388	1304	
AHU-4 Return	---	---		---	Calc	---	1522	
AHU-5 Total	28" x 12"	2.37		2150	+0.21"	895	2085	
AHU-5 OA	24" x 14"	2.33		600	-0.18"	268	624	
AHU-5 Return	---	---		---	Calc	---	1461	
AHU-6 Total	60" x 20"	8.37		10990	-0.37"	1453	12108	
AHU-7 Total	40" x 20"	5.55		8040	-0.44"	1506	8366	
EF-1 Total	34" x 24"	5.66		5750	-0.28"	941	5332	
EF-2 Total	26" x 26"	4.69		4745	+0.24"	1083	5079	
EF-4 Total	26" x 28"	5.00		4110	+0.17"	740	3744	
EF-5 Total	20" x 18"	2.5		2300	+0.07"	1001	2503	

REMARKS

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement

VELOCITY PRESSURE READINGS

PROJECT: Fall River Probate + Family **DATE:** 07/01/22

AREA SERVED: **TECH:** BS

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN		CENT. STAT. PRESS."	TEST		NOTES
			FPM	CFM		FPM	CFM	
RF-1 Total	18" x 12"	1.5		1750	+0.41"	1130	1695	
RF-2 Total	20" x 20"	2.77		2,750	+0.47"	943	2631	
RF-3 Total	28" x 20"	3.89		3000	-038"	678	2636	
RF-4 Total	30" x 14"	2.91		1460	-0.27"	504	1466	
RF-5 Total	30" x 12"	2.33		2150	-0.59"	987	2300	

REMARKS

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement

HYDRONIC FLOW ELEMENTS

PROJECT: Fall River Probate + Family | **DATE:** 07/01/22

AREA SERVED: | **TECH:** BS

LOCATION	NO.	ELEMENT	MFG.	SIZE	DESIGN GPM	TEST I POS.	TEST I PR.DIF	TEST I GPM	FINAL POS.	FINAL PR.DIF	FINAL GPM	NOTES
Chilled												(1)
	1	US	---	1.5	13.7	---	---	14.8				
	2	US	---	2	23.2	---	---	28.8				
	3	US	---	3	46.6	---	---	50.5				
	4	US	---	2	27.7	---	---	30.1				
	5	US	---	2	17.5	---	---	18.9				
	6	US	---	3	56.7	---	---	51.5				
	7	US	---	2	30.2	---	---	30.9				

REMARKS

(1) Chilled water DP setpoint is 25 PSI.

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement

SUPPLY FAN REPORT

PROJECT: Fall River Probate + Family | **DATE:** 06/30/22

AREA SERVED: FCU's | **TECH:** NC

FAN DATA

FAN NUMBER	FCU-26		FCU-26A		FCU-27	
LOCATION	Ceiling		Ceiling		Ceiling	
AREA SERVED	Waiting Court 2		Waiting Court 2		Waiting Court 2	
MANUFACTURER	York		York		York	
MODEL OR SIZE	SCD161B		SCD121B		SC161B	
	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL
TOTAL CFM	1250	768	760	763	1250	943
RETURN AIR	500	346	760	756	500	397
OUTSIDE AIR	750	422	---	---	750	546
DISCH. STATIC	---	NA	---	NA	---	NA
SUCTION STATIC	---	NA	---	NA	---	NA
TOTAL STATIC	ND	NA	ND	NA	ND	NA
FAN RPM	ND	NA	ND	NA	ND	NA
PULLEY O.D.	DD		DD		DD	
ESP	---		---		---	
VFD SPEED	---		---		---	
O.A.D.MIN POS	(1)		Recirc Only		(1)	

MOTOR DATA

MANUFACTURER	Century		Century		Century	
MODEL OR FR.	48Y		48Y		48Y	
HORSEPOWER	2 x 1/4 HP	2 x 1/4 HP	1/3 HP	1/4 HP	2 x 1/4 HP	2 x 1/4 HP
MOTOR RPM	1075	NA	1075	NA	1075	NA
VOLTAGE / PH.	115/1	115/1	115/1	115/1	115/1	115/1
AMPS LEG 1	(3.9)x2	3.8	3.9	2.1	(3.9)x2	4.2
AMPS LEG 2	---	---	---	---	---	---
AMPS LEG 3	---	---	---	---	---	---
SHEAVE O.D.	DD		DD		DD	
BELTS - QUANTITY / SIZE	DD		DD		DD	
SHEAVE POSITION	DD		DD		DD	

REMARKS

(1) OA set with manual volume damper, positioning cannot accurately be determined.

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement

SUPPLY FAN REPORT

PROJECT: Fall River Probate + Family | **DATE:** 06/30, 07/01/22

AREA SERVED: FCU's | **TECH:** NC

FAN DATA

FAN NUMBER	FCU-29		FCU-23		FCU-18	
LOCATION	Ceiling		Ceiling		Ceiling	
AREA SERVED	Conference Rm		2nd Floor Library		Facilities	
MANUFACTURER	York		York		York	
MODEL OR SIZE	TSC-041		TSC-061		SCD-081B	
	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL
TOTAL CFM	155	375	400	449	625	610
RETURN AIR	75	87	240	196	565	503
OUTSIDE AIR	80	288	160	253	60	107
DISCH. STATIC	---	NA	---	NA	---	NA
SUCTION STATIC	---	NA	---	NA	---	NA
TOTAL STATIC	ND	NA	ND	NA	ND	NA
FAN RPM	ND	NA	ND	NA	ND	NA
PULLEY O.D.	DD		DD		DD	
ESP	---		---		---	
VFD SPEED	---		---		---	
O.A.D.MIN POS	(1)		(1)		(1)	

MOTOR DATA

MANUFACTURER	Genteq		Genteq		AO Smith	
MODEL OR FR.	648OAS		NA		42Y	
HORSEPOWER	210w	1/8	265w	1/8	1/4	1/5HP
MOTOR RPM	1090	NA	1090	NA	900	NA
VOLTAGE / PH.	115/1	115/1	115/1	115/1	115/1	115/1
AMPS LEG 1	1.7	0.8	2.6	NA	3.5	3.3
AMPS LEG 2	---	---	---	---	---	---
AMPS LEG 3	---	---	---	---	---	---
SHEAVE O.D.	DD		DD		DD	
BELTS - QUANTITY / SIZE	DD		DD		DD	
SHEAVE POSITION	DD		DD		DD	

REMARKS

(1) OA is controlled by manual volume damper, positioning cannot accurately be determined.

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement

SUPPLY FAN REPORT

PROJECT: Fall River Probate + Family | **DATE:** 07/01/22

AREA SERVED: FCU's | **TECH:** NC

FAN DATA

FAN NUMBER	FCU-12					
LOCATION	Ceiling					
AREA SERVED	1st Floor Offices					
MANUFACTURER	York					
MODEL OR SIZE	TSC-101					
	DESIGN	**ACTUAL**	**DESIGN**	**ACTUAL**	**DESIGN**	**ACTUAL**
TOTAL CFM	630	500				
RETURN AIR	330	396				
OUTSIDE AIR	300	104				
DISCH. STATIC	---	NA	---		---	
SUCTION STATIC	---	NA	---		---	
TOTAL STATIC	ND	NA				
FAN RPM	ND	NA				
PULLEY O.D.	DD					
ESP	---					
VFD SPEED	---					
O.A.D.MIN POS	(1)					

MOTOR DATA

MANUFACTURER	NA (2)					
MODEL OR FR.	NA (2)					
HORSEPOWER	430w	NA (2)				
MOTOR RPM	ND	NA (2)				
VOLTAGE / PH.	120/1	NA (2)				
AMPS LEG 1	ND	NA (2)				
AMPS LEG 2	---	---	---		---	
AMPS LEG 3	---	---	---		---	
SHEAVE O.D.	DD					
BELTS - QUANTITY / SIZE	DD					
SHEAVE POSITION	DD					

REMARKS

(1) OA is controlled by manual volume damper, cannot accurately determine position

(2) Motor compartment located above light, no access.

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Fall River Probate + Family | **DATE:** 06/30/22

SYSTEM / AREA: FCU's/ Various | **TECH:** NC

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
FCU-26 SCD-161B										
Supply	1	42" x 6"	FH	---	625	---	416			
Supply	2	42" x 6"	FH	---	625	---	352			
					1250		768			
Return	R	24" x 12"	1.44	347	500	240	346			
FCU-26A SCD-121B										
Supply	1	42" x 6"	FH	---	760	---	763			
Return	R	24" x 24"	2.1	362	760	360	756			
FCU-27 SCD-161B										
Supply	1	42" x 6"	FH	---	625	---	289			
Supply	2	42" x 6"	FH	---	625	---	654			
					1250		943			
Return	R	24" X 12"	1.44	347	500	276	397			
FCU-29 TSC-041										
Supply	1	7' LD	FH	---	155	---	375			
Return	R	6" x 6"	FH	---	75	---	87			
FCU-23 TSC-061										
Supply	1	14" X 14"	FH	---	400	---	449			
Return	R	12" X 12"	FH	---	240	---	196			
FCU-18 TSC-101										
Supply	1	6" x 6"	FH	---	80	---	79			
Supply	2	12" x 12"	FH	---	260	---	269			
Supply	3	6" x 6"	FH	---	85	---	103			
Supply	4	12" x 12"	FH	---	200	---	159			
Return	R1	10" x 10"	FH	---	285	---	247			
Return	R2	8" x 8"	FH	---	80	---	85			
R	R3	10" x 10"	FH	---	200	---	171			

REMARKS

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Fall River Probate + Family | **DATE:** 07/01/22

SYSTEM / AREA: FCU's/ Various | **TECH:** NC

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
FCU-12 TSC-101										
Supply	1	12" x 12"	FH	---	230	---	153			
Supply	2	12" x 12"	FH	---	170	---	188			
Supply	3	12" x 12"	FH	---	230	---	159			
					630		500			
Return	R1	10" x 10"	FH	---	165	---	222			
Return	R2	10" x 10"	FH	---	165	---	174			
					330		396			

REMARKS

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement

HYDRONIC FLOW ELEMENTS

PROJECT: Fall River Probate + Family | **DATE:** 07/01/22

AREA SERVED: CHW for FCU's | **TECH:** NC

LOCATION	NO.	ELEMENT	MFG.	SIZE	DESIGN GPM	TEST I POS.	TEST I PR.DIF	TEST I GPM	FINAL POS.	FINAL PR.DIF	FINAL GPM	NOTES
FCU-26A	CHW-1	Venturi	Accusetter	075	6.0	Open	82"	5.3				
FCU-27	CHW-2	Venturi	Accusetter	100	7.0	Open	60.2"	6.8				
FCU-29	CHW-3	Venturi	Accusetter	075	1.7	Open	12.7"	2.1				
FCU-23	CHW-4	Venturi	Accusetter	075	2.5	Open	NA	NA				(1)
FCU-18	CHW-5	Venturi	Accusetter	075	3.9	Open	42.2"	3.8				
FCU-12	CHW-6	Venturi	Accusetter	075	2.8	Closed	NA	NA				(2)

REMARKS

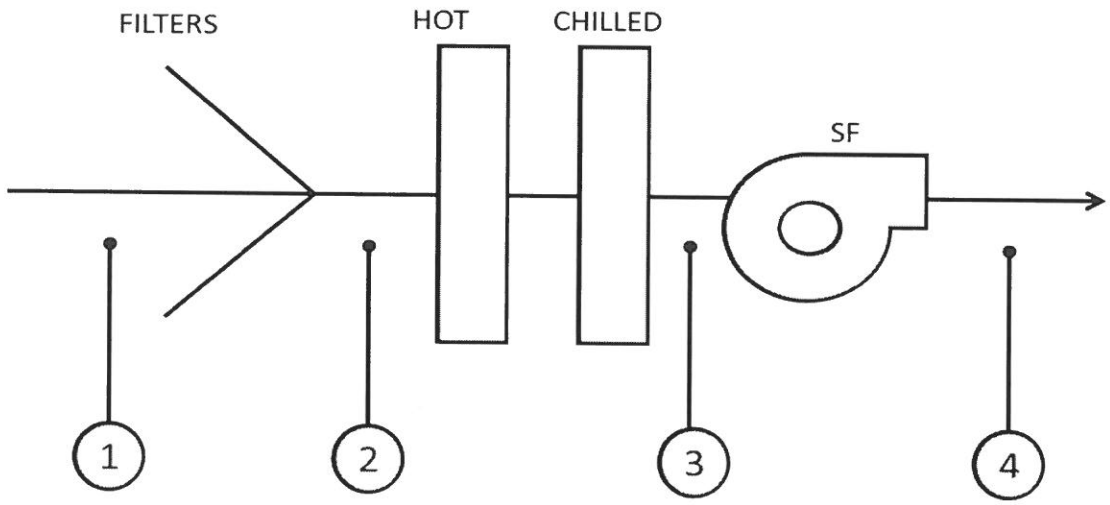
(1) Automatic Control Valve couldn't be opened at time of testing

(2) Valve found 100% closed. Accurate reading not possible, facilities didn't want it to be opened for a reading.

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement

SYSTEM STATIC PRESSURE PROFILE

PROJECT: Fall River Probate + Family	DATE: 7/25/22
SYSTEM/AREA SERV:	TECH: BS



STATIC PRESSURE READINGS "wc

POS. (+) / NEG.(-)	1	2	3	4	5	6	7	NOTES
AHU-7	-0.38"	-0.63"	-1.02"	+0.24"				

REMARKS

VELOCITY PRESSURE READINGS

PROJECT: Fall River Probate + Family **DATE:** 07/25/22

AREA SERVED: **TECH:** BS

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN		CENT. STAT. PRESS."	TEST		NOTES
			FPM	CFM		FPM	CFM	
AHU-7								
Total	40"x20"	5.55	1449	8040	-0.44"	1506	8266	

REMARKS

NA Not Available | **ND** No Design | **DD** Direct Drive | **N/R** No Requirement