

Southeast Housing Court New Bedford, MA

HVAC SYSTEM EVALUATIONS COVID-19

Office of Court Management

July 15, 2022

Tighe&Bond

100% Recyclable

Existing Conditions & Site Observations

Tighe & Bond visited the Southeast Housing Court in New Bedford on September 2, 2021. While on site we inspected the air handling equipment located on the roof and toured the facility to determine if the spaces generally matched usages noted on the architectural plans.

Tighe & Bond did not receive adequate mechanical drawings to be able to perform analysis of ventilation systems for this leased building. We did receive a TAB report from 2013 and based on the information provided in the report indicating which areas are served by each RTU, we were able to calculate the code required outside air for each unit. However, some RTUs have been replaced since this TAB report was produced so the design airflow information included in the report is not necessarily correct.

Site Visit Attendees:

- Andrew Bishins Building Owner
- John Corriea Building Maintenance Manager
- Tighe & Bond
 - Ryan Ablondi, PE, Senior Mechanical Engineer
 - Timothy Bill, Staff Mechanical Engineer

1.1 Existing Ventilation System

The Southeast Housing Courthouse is located in a shopping center built in 1960 and is approximately 10,500 square feet in size. Four rooftop air handling units (RTU) serve the courthouse.

Based on the date of manufacture on the units and discussions with the installing contractor while on site, we have determined the RTU's range from 5-10 years old. They all appear to be in good condition. Each unit contains a supply fan, 2" MERV 8 filters, natural gas heating section, and dx cooling coil. The coils and dampers all appear to be in good condition.

There are four exhaust fans serving the building. According the the TAB report, the exhaust fans serve the restrooms, the lounge area and the holding cells. One fan was not running at the time of the visit, we suspect this is the EF that used to serve a computer room that is no longer there.

The lockup area is served by an exhaust fan and RTU. The RTU supplies ventilation air to the corridor and there is an exhaust register in each cell. Each cell door has wire mesh screen in the bottom half allowing air to flow from the corridor into the cell.

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

Existing Air H	landling Units			
Unit	Original Design Airflow (CFM)	Original Design Min. O.A. (CFM)	Pre/Final Filters	Condition
RTU-1	Unknown	Unknown	2" MERV 8	Good
RTU-2	Unknown	Unknown	2" MERV 8	Good
RTU-3	Unknown	Unknown	2" MERV 8	Good
RTU-4	Unknown	Unknown	2" MERV 8	Good

TABLE 1



Photo 1 – Representative Air Handler

1.2 Existing Control System

Each of the four RTU is controlled locally by thermostats in the spaces served, there is no BMS at this courthouse. Based on the model numbers for these RTUs, it appears they may be equipped with an economizer, but there is no evidence of any demand control ventilation control strategy in use at this courthouse.

Section 2 Recommendations

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

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

Tighe & Bond received a TAB report for the four RTUs dated August 8, 2013. Some of the RTUs have been replaced since this TAB work was performed. 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.

Unit	Original Supply Airflow (CFM)	Original Design Min. O.A. (CFM)	Current Code Min. O.A. Requirements (CFM)	Recommended Minimum O.A. (CFM)
RTU-1	Unknown	Unknown	300	300
RTU-2	Unknown	Unknown	739	740
RTU-3	Unknown	Unknown	605	605
RTU-4	Unknown	Unknown	360	360

TABLE 2

Recommended Air Handler O.A. Flow Rates

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.

The average airflow rate per person is shown below in Table 3. These values are based on the recommended outdoor airflow rates shown in Table 2, total supply air is unknown. 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)	159	130	29
Total Supply Air (CFM/Person)	Unknown	Unknown	Unknown
Outdoor Air* (CFM/Person)	9	4	28

* Outdoor air data is based on code required Outdoor air and does not reflect actual airflow values

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, 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)

		Tota	al Air	Outdo	oor Air
Courtroom	Total People	Supply Airflow (CFM)	Airflow Rate (CFM/Person)	Outdoor Airflow (CFM)	Airflow Rate (CFM/Person)
Courtroom	131	Unknown	Unknown	571	4
Note: Courtroom occupant den	sity is based on	70 people/1,000 sq	uare feet, per the 201	5 International Mecha	nical Code

Southeast Housing Court - New Bedford HVAC System Evaluation COVID-19 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)

		Tota	al Air	Outdo	oor Air
Courtroom	Total People	Supply Airflow (CFM)	Airflow Rate (CFM/Person)	Outdoor Airflow (CFM)	Airflow Rate (CFM/Person)
Courtroom	19	Unknown	Unknown	571	30
		-			

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

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.*

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

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 Confirm RTU indoor fans run continuously to provide ventilation

Packaged RTUs often shut down the supply fan when calls for heating or cooling are satisfied. When the indoor fan shuts down during occupied hours, the building is not getting any ventilation. We recommend ensuring that the RTU indoor fans run continuously during occupied hours regardless of whether the space temperature is satisfied.

2.8 Southeast Housing Courthouse Recommendations Checklist

Recommended Immediate Actions

- 2. 🗌 RTB-1: Test and balance air handling unit airflow rates
- 3.
 □ RE-1: Test air handling system dampers and actuators for proper operation
- 4.
 □ RC-1: Implement and pre and post-occupancy flush sequence
- 5.
 Confirm RTU indoor fans run continuously to provide ventilation

Recommended Actions

- 6. \Box RF-3: Install a differential pressure sensor with a display across the filter bank
- 7. \Box RF-3a: Connect the pressure sensor to the BMS system and/or a local alarm.
- 8. 🗌 RE-2: Clean air handler coils
- 10. 🗆 RFC-1: Install portable HEPA filters

Section 3 Testing & Balancing Results

Wings Testing & Balancing visited the Southeast housing Courthouse on May 27, 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 along with a floor plan the balancer secured while on site.

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)
RTU-1	Unknown	Unknown	Unknown	1,711	315	1,396
RTU-2	Unknown	Unknown	Unknown	2,517	386	2,131
RTU-3	Unknown	Unknown	Unknown	1,250	0	1,250
RTU-4	Unknown	Unknown	Unknown	2,315	0	2,315

TABLE 6

Exhaust F	an Testing & E	salancing Results	
Unit	Serving	Design Return/Exhaust Airflow (CFM)	Actual Return/Exhaust Airflow (CFM)
EF-1*	Restroom	Unknown	N/A
EF-2*	Cells	Unknown	N/A
EF-3*	IT Room	Unknown	N/A
EF-4	Restroom	250	271

*Fans were not running at time of testing due to failed motors.

The typical balancing tolerance for air systems is $\pm 10\%$ of the design airflow. In reviewing the airflow report data, the following should be noted:

- 1. The TAB report notes that EF-1, 2, and 3 have burnt out motors and need to be replaced.
- The TAB report notes that the outside air damper on RTU-2 is open, but not operational. This damper and/or actuator should be replaced and possibly rewired.
- The TAB report notes that RTU-3 & 4 outside air dampers are closed and not operational. The dampers and/or actuators should be replaced to supply outdoor

air to the spaces served by the units. The OA actuator on RTU-3 may also need to be rewired.

4. The TAB report notes that the filters on RTU-1 are dirty and need to be replaced.

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.



Southeast Housing Court HVAC Fresh-Air Ventilation Survey

* * * *

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

May 27, 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



May 27, 2022

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

Re: Southeast Housing Court

Dear Jason,

We have completed our HVAC fresh-air ventilation survey for the above referenced site. While on site, we were able to secure a copy of the HVAC blueprint for the entire area. A copy will be sent with this report for reference. The cooling is DX and the heating is gas heat so no water readings were taken. Through our testing we found that:

- The outside air actuators are not functional on RTU's 2, 3, and 4.
- The MERV-13 filters on RTU-1 are dirty and need replacing.
- EFs 1, 2, and 3 all have burnt out motors that need replacing.

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



voice is southeast nousing t	ourt				DATE: May 25	2022
REA SERVED:					TECH: BS	, 2022
	S. C. S. S. S. S. S.	FAN D	ATA			
FAN NUMBER	RT	U-1	RT	U-2	RTU-3	
LOCATION	Ro	oof	Ro	oof	Ro	oof
AREA SERVED	Loc	k-Up	Court	troom	Court	troom
MANUFACTURER	Car	rier	Car	rier	Car	rier
MODEL OR SIZE	48TCEI	D12A2A	48TCEI	D08A2A	48TCE/	A07A2A
	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL
TOTAL CFM	ND	1711	ND	2517	ND	1250
RETURN AIR	ND	1396	ND	2131	ND	1250
OUTSIDE AIR	300	315	240	386 (1)	605	0 (1)
DISCH. STATIC		+0.70		+1.15		+0.26
SUCTION STATIC		-0.95		-0.28		-0.42
	ND	1.65	ND	1.43	ND	0.68
FAN RPM	ND	862	ND	764	ND	788
PULLEY U.D.	7.0"	x 1"	8.0"	x 1"	7.0">	k 5/8"
	1.	27	1.	27	0.	49
	NO			No VFD		VFD
		MOTOR	DATA			
	Mara	athon	Mara	athon	Mara	thon
MANUFACTURER		1 11 4	-		E	
MANUFACTURER MODEL OR FR.	56	НҮ	50	62	50	52
MANUFACTURER MODEL OR FR. HORSEPOWER	56 NA	HY NA	50 NA	62 NA	NA	52 NA
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM	56 NA 1450	HY NA 1450	50 NA 1725	62 NA 1725	NA 1725	52 NA 1725
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH.	56 NA 1450 120/3	HY NA 1450 230/3	50 NA 1725 230/3	62 NA 1725 130/3	NA 1725 230/3	52 NA 1725 230/3
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS	56 NA 1450 120/3 11.0	HY NA 1450 230/3 7.4	50 NA 1725 230/3 8.4	62 NA 1725 130/3 4.6	NA 1725 230/3 8.4	52 NA 1725 230/3 4.3
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3	56 NA 1450 120/3 11.0	HY NA 1450 230/3 7.4 7.6 7.7	50 NA 1725 230/3 8.4	62 NA 1725 130/3 4.6 4.7	NA 1725 230/3 8.4 	52 NA 1725 230/3 4.3 4.4
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O D	56 NA 1450 120/3 11.0 4.1/2"	HY NA 1450 230/3 7.4 7.6 7.7 × 7/8"	50 NA 1725 230/3 8.4 	62 NA 1725 130/3 4.6 4.7 4.9	NA 1725 230/3 8.4 	52 NA 1725 230/3 4.3 4.4 4.5
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE	56 NA 1450 120/3 11.0 4 1/2" 1/A	HY NA 1450 230/3 7.4 7.6 7.7 x 7/8"	50 NA 1725 230/3 8.4 4 3/4"	62 NA 1725 130/3 4.6 4.7 4.9 x 7/8"	NA 1725 230/3 8.4 4 3/4"	52 NA 1725 230/3 4.3 4.4 4.5 x 7/8"
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION	56 NA 1450 120/3 11.0 4 1/2" 1/A Fully	HY NA 1450 230/3 7.4 7.6 7.7 x 7/8" X49 Open	50 NA 1725 230/3 8.4 4 3/4" 1/4	62 NA 1725 130/3 4.6 4.7 4.9 x 7/8" A52 Open	NA 1725 230/3 8.4 4 3/4" 1/A	52 NA 1725 230/3 4.3 4.4 4.5 x 7/8"
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C	56 NA 1450 120/3 11.0 4 1/2" 1/A Fully	HY NA 1450 230/3 7.4 7.6 7.7 x 7/8" X49 Open 7.0	50 NA 1725 230/3 8.4 4 3/4" 1// Fully	62 NA 1725 130/3 4.6 4.7 4.9 x 7/8" A52 Open	NA 1725 230/3 8.4 4 3/4" 1// Fully	52 NA 1725 230/3 4.3 4.4 4.5 x 7/8" A45 Open
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C Filters	56 NA 1450 120/3 11.0 4 1/2" 1/A Fully 17 MERV	HY NA 1450 230/3 7.4 7.6 7.7 x 7/8" X49 Open 7.0 -13 (2)	50 NA 1725 230/3 8.4 4 3/4" 1/4 Fully 17 MER	62 NA 1725 130/3 4.6 4.7 4.9 x 7/8" A52 Open 7.0 V-13	NA 1725 230/3 8.4 43/4" 1// Fully 14	52 NA 1725 230/3 4.3 4.4 4.5 x 7/8" A45 Open 5.5
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C Filters	56 NA 1450 120/3 11.0 4 1/2" 1/A Fully 17 MERV	HY NA 1450 230/3 7.4 7.6 7.7 x 7/8" X49 Open 7.0 -13 (2)	50 NA 1725 230/3 8.4 4 3/4" 1// Fully 17 MER	62 NA 1725 130/3 4.6 4.7 4.9 x 7/8" X52 Open 7.0 V-13	NA 1725 230/3 8.4 4 3/4" 1// Fully 14 Mer	52 NA 1725 230/3 4.3 4.4 4.5 x 7/8" A45 Open 5.5 v-13
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C Filters	56 NA 1450 120/3 11.0 4 1/2" 1/A Fully 17 MERV	HY NA 1450 230/3 7.4 7.6 7.7 x 7/8" X49 Open 7.0 -13 (2)	50 NA 1725 230/3 8.4 4 3/4" 1// Fully 17 MER	62 NA 1725 130/3 4.6 4.7 4.9 x 7/8" A52 Open 7.0 V-13	NA 1725 230/3 8.4 4 3/4" 1/4 Fully 14 Mer	52 NA 1725 230/3 4.3 4.4 4.5 x 7/8" A45 Open 4.5 v-13
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C Filters	56 NA 1450 120/3 11.0 4 1/2" 1/A Fully 17 MERV	HY NA 1450 230/3 7.4 7.6 7.7 x 7/8" X49 Open 7.0 -13 (2) REMAI	50 NA 1725 230/3 8.4 4 3/4" 1/4 Fully 17 MER	62 NA 1725 130/3 4.6 4.7 4.9 x 7/8" A52 Open 7.0 V-13	NA 1725 230/3 8.4 4 3/4" 1/4 Fully 14	52 NA 1725 230/3 4.3 4.4 4.5 x 7/8" A45 Open 5.5 v-13
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C Filters 	56 NA 1450 120/3 11.0 4 1/2" 1/A Fully 17 MERV MERV	HY NA 1450 230/3 7.4 7.6 7.7 x 7/8" X49 Open 7.0 -13 (2) REMAI	50 NA 1725 230/3 8.4 4 3/4" 1// Fully 17 MER RKS	62 NA 1725 130/3 4.6 4.7 4.9 x 7/8" X52 Open 7.0 V-13	NA 1725 230/3 8.4 4 3/4" 1/A Fully 14	52 NA 1725 230/3 4.3 4.4 4.5 x 7/8" A45 Open 5 v-13
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C Filters O The outside air damper is no Dirty filters	56 NA 1450 120/3 11.0 4 1/2" 1/A Fully 17 MERV 0 wired and doe	HY NA 1450 230/3 7.4 7.6 7.7 x 7/8" X49 Open 7.0 -13 (2) REMAI es not modulat	50 NA 1725 230/3 8.4 4 3/4" 1/4 Fully 17 MER RKS	62 NA 1725 130/3 4.6 4.7 4.9 x 7/8" A52 Open 7.0 V-13	NA 1725 230/3 8.4 4 3/4" 1// Fully 14	52 NA 1725 230/3 4.3 4.4 4.5 x 7/8" A45 Open 5.5 v-13
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C Filters O The outside air damper is no Dirty filters	56 NA 1450 120/3 11.0 4 1/2" 1/A Fully 17 MERV MERV	HY NA 1450 230/3 7.4 7.6 7.7 x 7/8" X49 Open 7.0 -13 (2) REMAI	56 NA 1725 230/3 8.4 4 3/4" 1/4 Fully 17 MER RKS re	62 NA 1725 130/3 4.6 4.7 4.9 x 7/8" A52 Open 7.0 V-13	NA 1725 230/3 8.4 4 3/4" 1/A Fully 14 Mer	52 NA 1725 230/3 4.3 4.4 4.5 x 7/8" A45 Open 5 v-13

ECT: Southeast Housing	Court			DATE: May 25, 2
A SERVED:				TECH: BS
		FAN DA	ТА	
FAN NUMBER	RT	U-4		
LOCATION	Re	oof	-	
AREA SERVED	Waitin	g/Entry		
MANUFACTURER	Cai	rrier		
MODEL OR SIZE	48TCE	07A2A		
	DESIGN	ACTUAL		
	ND	2315		
RETURN AIR	ND	2315		
	360	0(1)		
DISCH. STATIC		+1.23		
		-1.68		
	ND	2.91		
	ND	16/4		
	4.0	26		
	2.	30 VED		
01/10/11/11/05		70		
		MOTOR D	ΔΤΛ	
MANUFACTURER	Mara	athon		
MANUFACTURER MODEL OR FR.	Mara 56	athon Hz		
MANUFACTURER MODEL OR FR. HORSEPOWER	Mara 56 NA	Hz NA		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM	Mara 56 NA 1725	Hz NA 1725		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH.	Mara 56 NA 1725 230/3	Athon Hz NA 1725 230/3		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1	Mara 56 NA 1725 230/3 8.4	athon A Hz NA 1725 230/3 8.6		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2	Mara 56 NA 1725 230/3 8.4 	athon Hz NA 1725 230/3 8.6 8.6		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3	Mara 56 NA 1725 230/3 8.4 	Athon Hz NA 1725 230/3 8.6 8.6 8.6 8.5		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D.	Mara 56 NA 1725 230/3 8.4 4 1/2"	Athon Hz NA 1725 230/3 8.6 8.6 8.5 x 7/8"		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE	Mara 56 NA 1725 230/3 8.4 4 1/2" 1//	Athon Hz NA 1725 230/3 8.6 8.6 8.6 8.5 x 7/8" A40		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION	Mara 56 NA 1725 230/3 8.4 4 1/2" 1// 50% (Athon Hz NA 1725 230/3 8.6 8.6 8.6 8.5 x 7/8" A40 Closed		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C	Mara 56 NA 1725 230/3 8.4 4 1/2" 1// 50% (15	athon Hz NA 1725 230/3 8.6 8.6 8.6 8.5 x 7/8" A40 Closed 5.0		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C Filters	Mara 56 NA 1725 230/3 8.4 4 1/2" 1// 50% (15 MER	Athon Athon Hz NA 1725 230/3 8.6 8.6 8.6 8.6 8.5 x 7/8" A40 Closed 5.0 XV-13		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C Filters	Mara 56 NA 1725 230/3 8.4 4 1/2" 1// 50% (15 MER	Athon Athon Hz NA 1725 230/3 8.6 8.6 8.6 8.6 8.5 x 7/8" A40 Closed 5.0 XV-13		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C Filters	Mara 56 NA 1725 230/3 8.4 4 1/2" 1// 50% (15 MER	athon Hz NA 1725 230/3 8.6 8.6 8.6 8.5 x 7/8" A40 Closed 5.0 V-13		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C Filters	Mara 56 NA 1725 230/3 8.4 4 1/2" 1// 50% (15 MER	Athon Hz NA 1725 230/3 8.6 8.6 8.6 8.5 x 7/8" A40 Closed 5.0 XV-13		
MANUFACTURER MODEL OR FR. HORSEPOWER MOTOR RPM VOLTAGE / PH. LEG 1 AMPS LEG 2 LEG 3 SHEAVE O.D. BELTS - QUANTITY / SIZE SHEAVE POSITION C to C Filters	Mara 56 NA 1725 230/3 8.4 4 1/2" 1// 50% (15 MER	athon Hz NA 1725 230/3 8.6 8.6 8.6 8.6 8.5 x 7/8" A40 Closed 5.0 XV-13		



		VELOCI	TY PRE	SSURE	READINGS			
PROJECT: Southeast Hou	using Court					DATE: May 26	5, 2022	
AREA SERVED:						TECH: BS		
TRAVERSE	DUCT	AREA	DE	SIGN	CENTERLINE	TE	ST	NOTES
LOCATIONS	SIZE	SQ.FT.	FPM	CFM	STATIC PRES."	FPM	CFM	
RTU-1 Total	28" x 14"	2.72		ND	+0.79"	629	1711	
RTU-1 OA	32" x 23"	5.43		ND	Velgrid	58	315	
RTU-1 Return				ND	Calc		1396	
BTIL-2 Total	20" v 16"	2.22			0.44			
BTU-2 OA	34" x 23"	5.33		ND	+0.44"	756	2517	
RTU-2 Return	54 x 25	5.45		ND	Cala	/1	386	
				ND			1231	
RTU-3 Total	18" x 14"	1.75		ND	+0.08"	715	1251	
RTU-3 OA	34" x 23"	5.43		ND	0.00	0	0	
RTU-3 Return				ND	Calc		1251	
RTU-4 Total	30" x 12"	2.5		ND	-0.33"	926	2315	
RTU-4 OA	43" x 23"	5.43		ND	0.00	0	0	
RTU-4 Return				ND	Calc		2315	
					10			
	L		R	EMARKS		L]		

		EXH	AUST FAN R	EPORT		
PROJECT: S	Southeast Housing	Court			DATE: May 27, 2022	
AREA SERV	/ED:				TECH: BS	
			FAN DATA		-4	
FAN NUME	BER	EF-1 (1)	EF-2 (1)	EF-3 (1)	EF-4	
LOCATION		Roof	Roof	Roof	Roof	
AREA SERV	'ED	Restroom	Cells/ Restrooms	Computer	Restroom	
MANUFAC	TURER	Greenheck	Greenheck	Greenheck	Greenheck	
MODEL OR	SIZE	G-085-DGEX	G-085-DGEX	G-085-DGEX	G-085-DGEX	
TOTAL	DESIGN	N/A	N/A	N/A	250	
CFM	ACTUAL	N/A	N/A	N/A	271	
FAN	DESIGN	DD	DD	DD	DD	
RPM	ACTUAL	DD	DD	DD	DD	
PULLEY	O.D.				1 1	
SERVICE						
			MOTOR DATA			
MANUFAC	TURER	McMillian	McMillian	McMillian	McMillian	
MODEL NU	IMBER					
MOTOR	DESIGN	1/8	1/8	1/8	1/8	
HP	ACTUAL	1/8	1/8	1/8	1/8	
MOTOR RP	M	1550	1550	1550	1500	
VOLTAGE/F	PHASE	115/1	115/1	115/1	115/1	
	DESIGN	2.6	2.6	2.6	2.6	
MOTOR	ACT. LEG 1	(1)	(1)	(1)		
AMPS	ACT. LEG 2	N/A	N/A	N/A	2.2	
	ACT. LEG 3	N/A	N/A	N/A		
SHEAVE		DD	DD	DD		
BELTS-QTY/	/SIZE	DD	DD	DD		
SHEAVE PO	SITION	DD	DD	DD	DD	
						-
		+				
			REMARKS			
(1) Motors	are burnt out on th	ese fans and need	renlacing			

			AI	R DEVIC	CE REPC	жі				
OJECT: Southeast Hou	sing Court	t		******					DATE: N	1ay 26, 202
TEM/AREA SERV:			1. The state	DEC		TE	CT	FIA		TECH:
LOCATION	NO	SIZE	AK	EDM	CEM	EDM	CEM	FIN	CEM	NOTE
EF-1	1.0.	JILL		TEIVI	Crivi	TEINI	CFIVI	FFIVI	CFIVI	NOTE
IC 123	1	8x8	FH		120		0			
Womens 122	2	12x12	FH		260		0			
Mens 123	3	12x12	FH		260		0			
					440		0			
EF-2				11 - 10 - 13 (B.)						
Staff Toilet 126	1	8x8	FH		120		0			
Staff Toilet 127	2	8x8	FH		120		0			
Cell #1	3	10x10	FH		150		0			
Cell #1	2	10x10	FH		150		0			
				1.20.100	540		0			
EF-3	+									
Computer 112	1	8x8	FH		250		0			
EF-4										
Toilet 109	1	8x8	FH		100		110			
Lounge 111	2	10x10	FH		250		271			1
0					350		381			
		i nafit								
	+									
										<u> </u>
evel and a second s										
				DEM	ARKS		Substantia Charge			



61-5

4-6

68

69

.72

A

B

---(C)



O

9

CEILING TYPES (REFER TO MATERIAL SCHEDULE FOR LOCATONS.)

TYPE A.

- ACOUSTICAL TILE (SAT) CEILING SUSPENSION SYSTEM SHALL BE PRELUDE PLUS 2' x4' GRID SYSTEM AS MANUFACTURED BY ARMSTRONG WORLD INDUSTRIES, GRID SYSTEM SHALL BE INTERMEDIATE DUTY, NON FIRE RATED EXPOSED TEE COMPONENTS DIE CUT AND INTERLOCKING. CONFORMING TO REQUIREMENT OF ASTM C635. ACCESSORIES SHALL INCLUDE STABILIZER BARS, SPLICES EDGE MOLDINGS AND OTHER DEVICES REQUIRED FOR SUSPENDED GRID SYSTEM. SUPPORT CHANNELS AND HANGERS SHALL BE OF SIZE AND TYPE TO SUIT APPLICATION TO RIGIDLY SECURE ACOUSTIC CEILING SYSTEM INCLUDING INTERGRAL MECHANICAL AND ELECTRICAL COMPONENTS WITH MAXIMUM DEFLECTION OF 1/360.
- 2. ACOUSTICAL TILE PANELS SHALL BE CLASS A 24"x48"x 5/8" TRAVETONE FISSURED PANELS AS MANUFACTURED BY ARMSTRONG WORLD INDUSTRIES.

TYPE B.

1. TWO HOUR HORIZONTAL SHAFT WALL ASSEMBLY 6" C-H 20 GA STEEL STUDS AT 16" oc.1" SHAFTLINER, 2 LAYERS 1/2" TYPE "X" GWB

TYPE C

 CELLLINE SOLID 14 GAUGE SOLID METAL PLANK CEILING AS MANUFACTURED BY ENVIRONMENTAL INTERIORS INC. COMPLETE WITH ALL CONCEALED AND VANDAL PROOF FASTENING.

TYPE D.

1. 5/8" GYPSUM WALL BOARD ON 20 GAUGE STEEL JOISTS AT 16" oc

TYPE E

1. 5/8" TYPE "X" GWB ON 3/4" FIRE RETARDENT PLYWOOD SHEATHING ON 2"x6" FIRE RETARDENT WOOD JOISTS AT 12" OC.

VEW BEDFORD HOUR ED D TENANT FIT UP FOR TH S.B. REALTY LIMITE REFLECTED CEILING PLAN SED PROGRESS PRINTS REVISIONS PP 03/14/01 ISSUED FOR BIDDING & PERMITTING 04/06/01 CALLED NORTH AS NOTED SCALE DRAWN PROJECT NO 2024 DATE A-1.3 SHEET

2024_A1.2CAD