WOODSTOCK ACADEMY FACILITY ASSESSMENT
October 15, 2019

Juster Pope Frazier LLC
Architects

Shepherd Engineering Inc.
Electrical Engineers

VAV International Inc.
Mechanical Engineers

GNCB Inc.
Structural Engineers

Gregory Farmer
Historic Consultant

EXECUTIVE SUMMARY

Juster Pope Frazier (JPF) Architects was hired by the Academy in early Spring 2019 to provide facility assessment on the academic buildings at the North and South Campus. The scope of the assessment did not include roof investigations and hazardous materials investigations. JPF enlisted the assistance of the following consultants:

VAV International Inc.	Mechanical and Fire Protection Engineering
Shepherd Engineering Inc.	Electrical Engineering
Crabtree McGrath Inc.	Food Service Consultant
GNCB Engineers Inc.	Structural Engineering Consultant (Academy Building)
Gregory Farmer	Historic Preservation Consultant (Academy Building)

GOALS

Develop a ten year capitol improvements plan financed through a capital improvements fee.

PROCESS

In order to minimize disruptions, initial campus walkthroughs took place in April 2019. These were followed up with several additional site visits commencing after the Academy closed for the semester in June 2019.

Discussions were held with facilities administrative staff and senior administrative staff in order to understand existing challenges, priorities and aspirations. A first draft copy of the report was reviewed with senior staff in mid June 2019. A second draft was forwarded in mid July 2019. Based upon these visits and meetings a priority list of projects was developed.

INITIAL PRIORITIES

The following priority projects were developed based upon the site visits and discussions with senior staff.

1. Full restoration of Academy Building utilizing state of CT preservation funds and tax credits to help minimize costs of restoration.

2. Installation of fire protection sprinklers at residential facilities.

3. Renovate existing Bowen toilet areas integrating more substantial ventilation to improve indoor air quality. Monitor indoor air quality within Bowen to benchmark improvements and guide any further work relative to air quality.

4. Develop a plan to improve Bowen Dining Hall to increase efficiency in food preparation and increase dining areas.

5. Develop a plan to improve resident student and staff dining at South Campus which could include deassessing the Student Center building while consolidating dining onto the main area of South campus.

6. Improve toilets and common areas in residential dormitories

7. Remove and replace paving at North and South Campus.

8. Remove and replace primary HVAC equipment at Bowen and Fieldhouse due to age.

FINANCIAL VIABILITY ASSESSMENT

Based upon established priorities, a draft spreadsheet was reviewed with the Buildings and Grounds Committee of the Trustees in late August 2019. The spreadsheet included a ten year capital improvements plan based on a range of capital improvement fees ranging from $500 / student increase to $740 / student increase. In order to accomplish all of the primary objectives of the study, a $740 / student increase was necessary. The spreadsheet was then discussed with the Trustees Finance Committee in early September 2019. Based upon this meeting, it was determined that a maximum $500/student fee increase for capital improvements would be integrated initially followed eventually by an increase to $600/student fee increase. For planning purposes the spreadsheet assumes 1200 students throughout. Therefore a $500 per student fee translates into $600,000.00 year.

FINAL PRIORITIES

Integrating the viability of funding, the following capital projects are integrated into a ten year capital improvements plan. That plan follows on the next page.

1. Full restoration of Academy Building utilizing state of CT preservation grants and tax credits to help minimize costs of restoration.
2. Integration of ventilation improvements in Bowen through toilet renovations with monitoring of indoor air quality to develop benchmark for future ventilation improvements.
3. Integration of fire protection into the dormitories at South Campus.
4. Integration of new food prep, serving and dining areas at Bowen.
5. Integration of new primary HVAC equipment at Bowen and Fieldhouse due to age.

Woodstock Campus Ten Year Renovation and Restoration 2020 - 2029

Building	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Expenses										
Academy	-$475,000.00			-$2,100,000.00	-$1,725,000.00					
Bowen	-$125,000.00							-$950,000.00	-$950,000.00	-$450,000.00
Fieldhouse										-$750,000.00
Bicentennial										
North Campus										
Student Center										
Loos Center										
Gymnasium										
Westhaver						($256,000.00)				
Annhurst							($240,000.00)			
Warren							($455,000.00)			
South Campus						($325,000.00)				
Revenue										
Fundraising	$125,000.00	$125,000.00	$125,000.00	$125,000.00	$125,000.00	$125,000.00	$125,000.00	$125,000.00	$125,000.00	$125,000.00
C.I. FEE	$600,000.00	$600,000.00	$600,000.00	$720,000.00	$720,000.00	$720,000.00	$720,000.00	$720,000.00	$720,000.00	$720,000.00
CT Grants	$120,000.00			$100,000.00	$100,000.00					
CT Tax Credit					$500,000.00					
Net Sum	$245,000.00	$725,000.00	$725,000.00	-$1,155,000.00	-$280,000.00	$264,000.00	$150,000.00	-$105,000.00	-$105,000.00	-$355,000.00
Accrued Sum	$245,000.00	$970,000.00	$1,695,000.00	$540,000.00	$260,000.00	$524,000.00	$674,000.00	$569,000.00	$464,000.00	$109,000.00
Scope of Work										

Academy: Full Restoration (2020)+(2023-2024). **Bowen**: New Toilets + Exhaust (2020), Dining Expansion (2027-2028), HVAC (2029) **Fieldhouse**: HVAC (2029)
Westhaver: FP (2025) **Annhurst**: FP (2026) **Warren**: FP(2026). **South Campus**: FP (2025)

BOWEN BUILDING FACILITY ASSESSMENT
OCTOBER 15, 2019

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Designation Key for Phasing Recommendations

Phase 1 **(P1)**: Recommendations classified as “Phase 1” are considered to be the highest priority and should be addressed within the next year.
Phase 2 **(P2)**: Recommendations classified as “Phase 2” are considered to be the next highest priority (after Phase 1) and should be addressed within the next five years.
Phase 3 **(P3)**: Recommendations classified as “Phase 3” are considered to be the next highest priority (after Phase 1 and Phase 2) and should be addressed within the next ten years.

BOWEN BUILDING ARCHITECTURAL NOTES

Bowen is a masonry building, brick veneer on concrete block back up with a structural steel frame. The building has a ballasted membrane roof system, replaced in 2019. It is 66,500 gross square feet in area extending over two floors and a partial basement. The basement level houses mechanical, electrical and fire protection equipment and a small loading area. The basement boilers serve the North Campus heating loop extending from Bowen to Hyde and Academy Buildings. The boilers are fueled by a 10,000 gallon oil tank, replaced in 2019. The first and second floors house classrooms, administrative and faculty support spaces and food services.

EXTERIOR NOTES

The brick veneer appears to be in good shape. There is some repointing and cleaning of brick at the northeast corner of the building but other than that no work is required. The exterior windows, insulated glass with operable sliders, also appear to be in good shape. However, insulated glass systems have an expected lifespan of 25 to 30 years before failing. The Academy should be diligent in inspecting exterior windows on a yearly basis and establish a glazing replacement allowance within their yearly capital improvements budget. At this point, it does not appear that insulated glass units need immediate attention. Service doors at the northeast and the rooftop access door are in immediate need of painting. Brick below the dining hall glazing is stained and is showing some signs of mortar decay. This appears to be attributable to water flowing off the adjacent roof and windows. This area should be cleaned, repointed and a sill extension with drip should be installed at the windows to direct water beyond the brick below.

INTERIOR NOTES

In general, the building is in good shape. However, the dining hall, servery, kitchen and food storage areas are all dramatically undersized for a school serving 1200 students and 150 staff on a daily basis. Students and staff presently eat lunch in one of five 20 minute cycles. The servery very quickly backs up slowing down delivery of food to students and the dining hall is also very cramped for each lunch shift. As a result, students are spread out throughout the dining hall and adjacent corridors with very little time to eat. The Academy needs to address these deficiencies by studying the possibilities of extending dining into the nearby former band room (currently underutilized); reconfiguring and expanding the servery and food prep areas within existing spaces and through a possible addition onto the north side of the existing kitchen. Interior finishes are in good shape. Minor repairs of cracking VCT floors are necessary however these can be addressed through yearly maintenance. Classrooms are adequately sized and equipped to contemporary design standards. The faculty administrative area on the second floor appears to be a bit underutilized and could use some better attention to finishes. Programming studies on how to better utilize these spaces could be beneficial. Consideration should be given to reconfiguring or relocating the nurse's office in order to provide additional privacy.

RECOMMENDATIONS

The primary architectural issue at Bowen is the lack of suitable dining, serving and food prep areas for the current student population. The Academy should commission design studies addressing these issues and build out a viable solution within the next two to three years time. This issue has been noted in prior accreditation studies. **(P2)**

Reconfigure or relocate nurse's office. **(P1)**

Improve toilet ventilation and finishes, monitor indoor air quality for improvements. **(P1)**

BOWEN BUILDING ELECTRICAL NOTES

ELECTRICAL DISTRIBUTION SYSTEM

The secondary service originates from an exterior utility company pad-mount transformer located on the side of the building, near the main mechanical/boiler room. The utility primary lines run underground to the street utility pole structure. The secondary service feeders enter the electrical/mechanical room directly from the pad-mount utility company transformer and connect into an 1200 ampere, 120/208 volt, three phase, 4 wire main switchboard. The electrical distribution service supports the Bowen Building, and the Hyde Center/Field House Building. The building is secondary metered. The 120/208 volt distribution panelboards located throughout the building provide power to lighting, mechanical systems, elevators, major motor loads and miscellaneous loads. The sub-panels in the building are mostly original to the building. All panels appeared to be at capacity with no spare breakers. The main switchboard and the sub-panels are in most cases original to the building and appear to be in good operating condition.

INTERIOR LIGHTING

The lighting consists mostly of surface-mount 2-lamp and 3-lamp, surface and recessed mount acrylic lens, fluorescent light fixtures. They appear to be 32 watt - T8 lamps. With the exception of the areas renovated within the past several years, the fixtures throughout appear to be original to the building and are showing signs of deterioration. Local wall mounted switches are used for lighting control. There is no occupancy sensor control observed.

EXTERIOR LIGHTING

The exterior light poles have been upgraded to LED and appear adequate for the needs of the campus. The poles are sixteen feet in height and utilize LED lamps. The exterior light fixtures are controlled via time clocks.

EMERGENCY SYSTEMS

The building is currently supported by a 200kW/250kVA diesel generator manufactured by ONAN Company. The generator provides standby power to the stairwells, corridors and the boiler heating system of the Bowen Building and related lighting within the Hyde/Field House. The generator is fueled by a 10,000 gallon above ground fuel tank which also supports the boiler mechanical heating systems. It is unknown if the 20kW generator is at capacity. A more comprehensive survey of the emergency lighting and generator system is needed to properly assess what the generator powers during a power loss. Life safety circuits appear to be combined with the standby power circuits. The generator in its current configuration does not meet the requirement of NFPA 70-2017 for life safety systems.

It appears that the existing emergency lighting installed throughout is not connected to the normal lighting circuit protecting the immediate area. If the lighting circuit were to fail, the emergency lighting would not automatically come on. The emergency lighting would only operate if the building power were to fail or if the branch circuit to the emergency lighting panel were to fail. In accordance with Life Safety 101, the emergency branch circuit is to energize in the event of a normal lighting failure within the area of protection.

BOWEN BUILDING ELECTRICAL NOTES

FIRE PROTECTION SYSTEM

The fire alarm system, approximately ten years old, consists of an addressable system, manufactured by Simplex-Grinnell 4100 series. Central monitoring is connected through the security system. Pull stations are installed at most egress doors. The fire alarm device coverage is inadequate for a school classroom building and is not compliant with current codes for notification and carbon monoxide detection coverage. Non ADA compliant speaker/ strobe devices are on the walls in the corridors, and common areas. There are heat detectors installed in the mechanical rooms. The common hallways do not have smoke detectors installed every 30'-0" on center. The common hallway doors have magnetic door hold devices.

A 75 horse power fire pump installed within the mechanical room of the Bowen Building protects the Bowen, Academy and Hyde/Field house sprinkler systems. The system is properly monitored by the fire alarm system to indicate "phase loss"; "phase reversal: and "loss of power". The building was struck by lightning on April 15th damaging internal electronic components. The Academy should consider installation of lightning protection at all of the North Campus buildings due to the geographic location of the campus.

WIRING DEVICES

With the exception of prior renovation, the duplex receptacle and switching control devices are original to the building. The devices are properly grounded and appear to be in good operating condition. If renovations were to occur, then additional duplex receptacles for general power should be installed throughout to support the contemporary needs of the facility.

SECURITY SYSTEM

The intrusion detection system consists of door contacts on all exterior doors and select motion sensors. A keypad was located at the main entrance and the rear door to arm and disarm the system. The system is S2 series which supports both the north and south campus. The system is monitored by campus police.

The CCTV system consisted of cameras located throughout the facility monitoring the common areas and exterior egress doors.

TELECOMMUNICATIONS

The building has an IDF closet with full cabling throughout the facility. The system appears adequate to support the needs of the facility.

The sound-clock system is manufactured by Rauland Telecenter and appears to be in fair operating condition. Several classrooms have malfunctioning clock systems.

The building should be studied with the local fire department to ensure that emergency radio systems can communicate throughout the building and back to municipal emergency command centers. Installation of a bilateral amplification system may be necessary.

BOWEN BUILDING ELECTRICAL RECOMMENDATIONS

MAIN ELECTRICAL SERVICE

The existing electrical service rated for 1200 ampere at 120/208 volt, appears to have adequate capacity to support the needs of the building. Since the buildings electrical system is approximately 28-30 years old, it is not known whether or not the equipment has been maintained or tested over the years. The main distribution board, related breakers and all branch circuit panels should have an infrared scan performed to ensure that the components are not deteriorating and are still capable of operating in the manner in which they were designed. At a minimum, the breakers should be cleaned, and load tested for failure analysis. The grounds should be tested to ensure that they are still structurally sound. All connections should be tightened in accordance with manufacturer's recommendations. The feeders should be tested to ensure proper connections. A lightning protection system should be installed. **(P1)**

STANDBY GENERATOR SYSTEM

Further information is required to determine whether or not the existing generator has the capacity to support the needs of the facility. The generator rated for 200kW/250kVA at 120/208 volts, has an output capacity of 555 ampere. **(P2)**

INTERIOR LIGHTING SYSTEMS

Incorporate occupancy sensor control in all corridors. Replace light fixtures with energy efficient LED light fixtures to meet the energy conservation code, Ct State Building Code and the standards of the Illuminating Engineering Society (IES). Incorporate low voltage lighting system to the public space lighting circuits for optimum energy efficiency. Coordinate fixture selection to maximize utility rebates. **(P2)**

EMERGENCY LIGHTING SYSTEMS

Additional energy efficient lighting, conforming to IBC Section 1006 and NFPA 101 is proposed to properly illuminate the exterior egresses and related parking areas. Ensure that emergency lighting is powered for not less than 90 minutes utilizing self-contained storage batteries or an on-site generator. **(P2)**

Integrate interior emergency lighting systems into the generator in a manner that is code compliant. Install illuminated exit signs throughout the facility to properly indicate the means of egress. **(P2)**

FIRE ALARM SYSTEM

Install lightning protection on the incoming fiber-optic lines to protect the system from outside interference. Install smoke detectors in the common hallways, ADA compliant strobes in the conference rooms, toilets and waiting areas. Upgrade system to meet NFPA standards, National Electric Code, CT State Building Code and local fire department requirements. Install devices to meet ADA requirements and provide better coverage to support the needs of the facility. **(P2)**

TELECOMMUNICATIONS

Install new campus wide clock system. **(P3)**

BOWEN BUILDING MECHANICAL NOTES

HEATING, VENTILATION, AIR CONDITIONING

Two (2) Superior dual fuel, cast iron sectional hot water boilers are located in the Basement Mechanical Room. The boilers provide heat to all buildings on the North campus (with exception of the Bicentennial Building). The boilers are in good condition. ASHRAE life expectancy for the boilers is 30-35 years. Boilers will need replacement in 5-10 years.
Hot water piping runs in the Basement Mechanical Room and then underground to serve the other buildings. Four (4) base-mounted hot water pumps are in fair condition. The pumps are beyond their life expectancy and will need replacement within 5 years.

The fuel oil system consists of duplex floor mounted fuel oil pumps, fuel oil distribution piping and an underground 5,000 gallon oil tank. The fuel oil system is in good condition. The underground oil tank is scheduled to be replaced in Summer 2019 with a new 10,000 gallon above ground tank.

Multiple central station constant volume heating and ventilating (H&V) units and return air fans are located in the Basement Mechanical Room. All H&V units are common ducted to a large outside air intake wall louver. All return fans discharge to a common large exhaust air wall louver. The H&V units and return fans are in good condition.

Hot water coils are provided with 3-way ACVs. Dampers are provided with newer electronic actuators.

Cooling coils are not provided. The majority of Bowen Hall is not air conditioned. Supply ductwork is not insulated.

Classrooms are provided with operable windows and hot water finned tube radiation. Some classrooms are provided with small ceiling supply diffusers or small exhaust registers, however, most classrooms are not provided with mechanical ventilation.

The Second Floor Faculty Lounge area is served by an air handling unit in the Penthouse Level Mechanical Room. The AHU is provided with a DX cooling coil and hot water heating coil. The AHU is mated with an air-cooled condensing unit located on the roof.

Heating to the office areas is by hot water finned tube radiation. Controls are by JCI. All equipment is in good condition

Roof equipment consists of an air-cooled condensing unit for the Second Floor Faculty Lounge, a Captive-Aire propane gas-fired make-up air unit for the First Floor Culinary Kitchen, a kitchen exhaust fan for the First Floor Culinary and miscellaneous other equipment. Kitchen exhaust and make-up air ductwork runs vertically on the outside of the building. The intake hood for the make-up air unit is damaged. The other equipment is in good condition.

BOWEN BUILDING MECHANICAL NOTES

FIRE PROTECTION

The entire building is sprinkler protected. An electric fire pump is located in the Basement Level Fire Pump Room. Water is supplied from wells. A large horizontal water storage tank is located in the Basement Level Fire Pump Room.

PLUMBING

The building is provided with a triplex water booster pump located in the Basement Level Fire Pump Room and is in good condition.

A propane gas-fired domestic hot water heater is located in the Basement Level Mechanical Room. The heater is in good condition.

A 1,000 gallon above ground propane storage tank is located outside on grade. Propane is piped to the hot water boilers, hot water heater, Culinary Kitchen and rooftop make-up air unit.

Plumbing fixtures are in good condition and do not need replacement in the immediate future.

BOWEN BUILDING MECHANICAL RECOMMENDATION

The biggest issue in Bowen Hall is that there is no mechanical ventilation to the classrooms. Further field investigation would be required to determine the extent of ventilation system upgrades and recommended solutions. Monitor existing air quality once toilet exhaust is upgraded. **(P2)**

Boilers are aging and will need to be replaced in 5-10 years. Sizing of the boilers should be done with consideration towards the possible removal of the Academy Building from the hot water loop. **(P2)**

Hot water pumps will need to be replaced within 5 years. New pumps will need to be provided with variable frequency drives to convert to a variable volume pumping system. In conjunction with the pump replacement, hot water coil 3-way ACVs will need to be replaced with 2-way ACVs. **(P2)**

The intake hood for the rooftop make up air unit needs to be repaired. **(P1)**

It is recommended that controls be upgraded to campus wide DDC (Direct Digital Control) to provide improved energy management control. **(P3)**

BOWEN BUILDING FOOD SERVICE NOTES

The North Campus kitchen in Bowen Hall is undersized. There are numerous workflow deficiencies and the majority of the equipment is worn but well maintained and in decent shape. However, because of the undersized kitchen condition many of the functions are too close together. For example, the pot and pan washing area is directly adjacent to the food preparation area and cooking. Proper kitchen design requires that these functions be separated so that the potential for cross contamination is minimized. There is no dedicated dry goods storage room and the kitchen is dependent upon frequent deliveries. Frequent deliveries often create internal logistical issues as well as higher delivery costs.

There is also the issue of the kitchen being very narrow. The narrow end of the kitchen is what presents to the serving and seating area making for a congested serving zone. Because the servery is narrow, the students stack up in long lines. A proper servery allows for student to access multiple serving points from more than one entrance and exit at a central cashier point. The seating area is undersized, and students are forced to sit on the floor or otherwise find wherever space is available. An undersized seating area also forces an extended meal period of five shifts. This means some students eat lunch too early and others eat lunch too late.

BOWEN BUILDING FOOD SERVICE RECOMMENDATIONS

Enlarge dining area to handle additional students. **(P2)**

Enlarge and reconfigure existing kitchen. **(P2)**

Enlarge and reconfigure servery to provide larger student capacity and better circulation. **(P2)**

BOWEN BUILDING IMPROVEMENTS

Capital Improvement Projects

1. Renovate toilet finishes and improve ventilation, monitor indoor air quality for improvement
2. Expand kitchen, serving and dining areas.
3. Replace existing mechanical equipment within next ten years time.

Ongoing Maintenance Projects

1. Flash under sloped glazing at dining with adequate drip to eliminate staining / erosion of brick below.
2. Clean brick under sloped glazing, repoint masonry joints damaged by erosion.
3. Paint exterior metal HVAC grilles and hollow metal frames.
4. Study emergency lighting circuitry and improve emergency lighting + signage on a yearly basis.
5. Replace hot water pumps and automatic control valves.
6. Repair hood on make up air rooftop unit.
7. Install lightning protection system to protect against future lightning strikes.

BICENTENNIAL BUILDING FACILITY ASSESSMENT
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BICENTENNIAL BUILDING ARCHITECTURAL NOTES

Bicentennial is a stand alone wood framed building with brick veneer and wood clapboards, wood truss roof framing. The building has an asphalt shingle roof system circa 2005. It is 6,500 gross square feet in area extending over two floors. The first and second floors house classrooms. It is notable that Bicentennial has no toilets and is not barrier free accessible, both of which were prerequisites for a building permit in 2005.

EXTERIOR NOTES

As would be expected of a fifteen year old building, Bicentennial is in good shape. We do not see any exterior work that would need to be done in the near future, however barrier free access may become a more substantial issue in the future.

INTERIOR NOTES

The building interiors are in good shape and do not need any significant work in the near future. Ongoing yearly maintenance of finishes and systems should continue.

RECOMMENDATIONS

A vestibule connecting both levels of Bicentennial and the adjacent field house should be built in order to correct barrier free accessibility and the lack of toilets in Bicentennial. Connecting the two will make Bicentennial an addition to the Fieldhouse from a building code point of view. It is our understanding that lack of barrier free access to Bicentennial was cited in the latest accreditation report. **(P3)**

BICENTENNIAL BUILDING ELECTRICAL NOTES

ELECTRICAL DISTRIBUTION SYSTEM

The secondary service originates from an exterior utility company pad-mount transformer located on the side of the building, near the main mechanical/boiler room. The utility primary lines run underground to the street utility pole structure. The secondary service feeders enter the electrical/mechanical room directly from the pad-mount utility company transformer and connect into an 1200 ampere, 120/208 volt, three phase, 4 wire main switchboard. The electrical distribution service supports the Bowen Building, and the Hyde Center/Field House Building. The building is secondary metered. The 120/208 volt distribution panelboards located throughout the building provide power to lighting, mechanical systems, elevators, major motor loads and miscellaneous loads. The sub-panels in the building are mostly original to the building. All panels appeared to be at capacity with no spare breakers. The main switchboard and the sub-panels are in most cases original to the building and appear to be in good operating condition.

INTERIOR LIGHTING

The lighting consists mostly of surface-mount 2-lamp and 3-lamp, surface and recessed mount acrylic lens, fluorescent light fixtures. They appear to be 32 watt - T8 lamps. With the exception of the areas renovated within the past several years, the fixtures throughout appear to be original to the building and are showing signs of deterioration. Local wall mounted switches are used for lighting control. There is no occupancy sensor control observed.

EXTERIOR LIGHTING

The exterior light poles have been upgraded to LED and appear adequate for the needs of the campus. The poles are sixteen feet in height and utilize LED lamps. The exterior light fixtures are controlled via time clocks.

EMERGENCY SYSTEMS

The building is currently supported by a 200kW/250kVA diesel generator manufactured by ONAN Company. The generator provides standby power to the stairwells, corridors and the boiler heating system of the Bowen Building and related lighting within the Hyde/Field House. The generator is fueled by a 10,000 gallon above ground fuel tank which also supports the boiler mechanical heating systems. It is unknown if the 20kW generator is at capacity. A more comprehensive survey of the emergency lighting and generator system is needed to properly assess what the generator powers during a power loss. Life safety circuits appear to be combined with the standby power circuits. The generator in its current configuration does not meet the requirement of NFPA 70-2017 for life safety systems.

It appears that the existing emergency lighting installed throughout is not connected to the normal lighting circuit protecting the immediate area. If the lighting circuit were to fail, the emergency lighting would not automatically come on. The emergency lighting would only operate if the building power were to fail or if the branch circuit to the emergency lighting panel were to fail. In accordance with Life Safety 101, the emergency branch circuit is to energize in the event of a normal lighting failure within the area of protection.

BICENTENNIAL BUILDING ELECTRICAL NOTES

FIRE PROTECTION SYSTEM

The fire alarm system, approximately ten years old, consists of an addressable system, manufactured by Simplex-Grinnell 4100 series. Central monitoring is connected through the security system. Pull stations are installed at most egress doors. The fire alarm device coverage is inadequate for a school classroom building and is not compliant with current codes for notification and carbon monoxide detection coverage. Non ADA compliant speaker/ strobe devices are on the walls in the corridors, and common areas. There are heat detectors installed in the mechanical rooms. The common hallways do not have smoke detectors installed every 30'-0" on center. The common hallway doors have magnetic door hold devices.

A 75 horse power fire pump installed within the mechanical room of the Bowen Building protects the Bowen, Academy and Hyde/Field house sprinkler systems. The system is properly monitored by the fire alarm system to indicated "phase loss"; "phase reversal: and "loss of power".

WIRING DEVICES

With the exception of prior renovation, the duplex receptacle and switching control devices are original to the building. The devices are properly grounded and appear to be in good operating condition. If renovations were to occur, then additional duplex receptacles for general power should be installed throughout to support the contemporary needs of the facility.

SECURITY SYSTEM

The intrusion detection system consists of door contacts on all exterior doors and select motion sensors. A keypad was located at the main entrance and the rear door to arm and disarm the system. The system is S2 sereis which supports both the north and south campus. The system is monitored by campus police.

The CCTV system consisted of cameras located throughout the facility monitoring the common areas and exterior egress doors.

TELECOMMUNICATIONS

The building has an IDF closet with full cabling throughout the facility. The system appears adequate to support the needs of the facility.

The sound-clock system is manufactured by Rauland Telecenter and appears to be in fair operating condition. Several classrooms have malfunctioning clock systems.

BICENTENNIAL BUILDING ELECTRICAL RECOMMENDATIONS

MAIN ELECTRICAL SERVICE

The existing electrical service rated for 1200 ampere at 120/208 volt, appears to have adequate capacity to support the needs of the building. Since the buildings electrical system is approximately 28-30 years old, it is not known whether or not the equipment has been maintained or tested over the years. The main distribution board, related breakers and all branch circuit panels should have an infrared scan performed to ensure that the components are not deteriorating and are still capable of operating in the manner in which they were designed. At a minimum, the breakers should be cleaned, and load tested for failure analysis. The grounds should be tested to ensure that they are still structurally sound. All connections should be tightened in accordance with manufacturer's recommendations. The feeders should be tested to ensure proper connections. A lightning protection system should be installed. **(P2)**

STANDBY GENERATOR SYSTEM

Further information is required to determine whether or not the existing generator has the capacity to support the needs of the facility. The generator rated for 200kW/250kVA at 120/208 volts, has an output capacity of 555 ampere. **(P2)**

INTERIOR LIGHTING SYSTEMS

Incorporate occupancy sensor control in all corridors. Replace light fixtures with energy efficient LED light fixtures to meet the energy conservation code, Ct State Building Code and the standards of the Illuminating Engineering Society (IES). Incorporate low voltage lighting system to the public space lighting circuits for optimum energy efficiency. Coordinate fixture selection to maximize utility rebates. **(P2)**

EMERGENCY LIGHTING SYSTEMS

Additional energy efficient lighting, conforming to IBC Section 1006 and NFPA 101 is proposed to properly illuminate the exterior egresses and related parking areas. Ensure that emergency lighting is powered for not less than 90 minutes utilizing self-contained storage batteries or an on-site generator. **(P3)**

Integrate interior emergency lighting systems into the generator in a manner that is code compliant. Install illuminated exit signs throughout the facility to properly indicate the means of egress. **(P1)**

FIRE ALARM SYSTEM

Install lightning protection on the incoming fiber-optic lines to protect the system from outside interference. Install smoke detectors in the common hallways, ADA compliant strobes in the conference rooms, toilets and waiting areas. Upgrade system to meet NFPA standards, National Electric Code, CT State Building Code and local fire department requirements. Install devices to meet ADA requirements and provide better coverage to support the needs of the facility. **(P1)**

TELECOMMUNICATIONS

Install new campus wide clock system. **(P3)**

BICENTENNIAL BUILDING MECHANICAL NOTES

HEATING, VENTILATION, AIR CONDITIONING

A small propane gas-fired hot water boiler is provided for space heating. The heating system is separated from the Bowen Hall central boiler plant and underground pipe loop.

The HVAC system consists of an indoor vertical air handling unit with hot water coil and DX cooling coil. The system is provided with an energy recovery ventilator. Two air-cooled condensing units are located outdoors on grade.

Classrooms are provided with hot water finned tube radiation

FIRE PROTECTION

The entire building is sprinkler protected. An electric fire pump is located in the Basement Level Fire Pump Room. Water is supplied from wells. A large horizontal water storage tank is located in the Basement Level Fire Pump Room.

PLUMBING

The building does not have any plumbing. Building code requires toilet facilities at stand alone buildings. This issue can be resolved by linking Bicentennial to the Fieldhouse adjacent.

BICENTENNIAL BUILDING MECHANICAL RECOMMENDATIONS

Install second redundant boiler to extend boiler lifespan and to provide heating when one boiler is down. Plan for boiler replacement in ten to fifteen years time. **(P3)**

It is recommended that controls be upgraded to campus wide DDC (Direct Digital Control) to provide
improved energy management control. **(P3)**

Resolve lack of toilets to satisfy building code requirements. **(P3)**

BICENTENNIAL BUILDING IMPROVEMENTS

Capital Improvement Projects

1. No capital improvement projects are anticipated over the next ten years, however barrier free access may become an accreditation issue at some point.

Ongoing Maintenance Projects

1. Install second back up boiler to provide heating redundancy.
2. Install emergency egress lighting and study configuration of emergency power.
3. Install lightning protection system.

FIELDHOUSE, LIBRARY, THEATER
FACILITY ASSESSMENT
October 15, 2019

Juster Pope Frazier LLC
Architects

Shepherd Engineering Inc.
Electrical Engineers

VAV International Inc.
Mechanical Engineers

Designation Key for Phasing Recommendations

Phase 1 **(P1)**: Recommendations classified as “Phase 1” are considered to be the highest priority and should be addressed within the next year.
Phase 2 **(P2)**: Recommendations classified as “Phase 2” are considered to be the next highest priority (after Phase 1) and should be addressed within the next five years.
Phase 3 **(P3)**: Recommendations classified as “Phase 3” are considered to be the next highest priority (after Phase 1 and Phase 2) and should be addressed within the next ten years.

FIELDHOUSE, LIBRARY, THEATER ARCHITECTURAL NOTES

These buildings is a masonry building, brick veneer on concrete block back up with a structural steel frame. The building has a ballasted membrane roof system, replaced in 2019. It is 66,500 gross square feet in area extending over two floors and a partial basement. The basement level houses mechanical, electrical and fire protection equipment and a small loading area. The basement boilers serve the North Campus heating loop extending from Bowen to Hyde and Academy Buildings. The boilers are fueled by a 10,000 gallon oil tank, replaced in 2019. The first and second floors house classrooms, administrative and faculty support spaces and food services.

EXTERIOR NOTES

The brick veneer appears to be in good shape. There is some repointing and cleaning of brick at the northeast corner of the building at the art studio / robotics lab. It appears that roof scuppers are shedding water onto the brick veneer causing staining and some mortar joint decay.The exterior windows, insulated glass with operable sliders, also appear to be in good shape. However, insulated glass systems have an expected lifespan of 25 to 30 years before failing. The Academy should be diligent in inspecting exterior windows on a yearly basis and establish a glazing replacement allowance within their yearly capital improvements budget. At this point, it does not appear that insulated glass units need immediate attention.

INTERIOR NOTES

In general, the building is in good shape. Locker rooms at the basement level require some tile repair/replacement as do some of the toilet partitions.

Interior finishes are in good shape. Minor repairs of cracking VCT floors are necessary however these can be addressed through yearly maintenance. Classrooms are adequately sized and equipped to contemporary design standards.

The Fieldhouse is completely barrier free with on grade site access at the main entry supplemented by a card access controlled elevator serving all floor levels. The primary entry to the library is not accessible but can be accessed through the lobby entry adjacent to the theater. The library is open to the general public so it may be advisable to make the primary library entry accessible to maintain security separations.

RECOMMENDATIONS

The primary architectural issue at the Fieldhouse / Library is the lack of suitable fresh air ventilation. Much like Bowen the complex relies heavily on operable windows for fresh air. The gymnasium / locker room areas in particular should have new ventilation installed. **(P3)**

FIELDHOUSE, LIBRARY, THEATER ELECTRICAL NOTES

ELECTRICAL DISTRIBUTION SYSTEM

The electrical distribution service originates from the main electrical distribution located within the electrical room of the Bowen Building. The electrical systems run through the mechanical space of the Bowen Building then underground the Hyde Center.

The 120/208 volt distribution panelboards located throughout the building provide power to lighting, mechanical systems, elevator, major motor loads and miscellaneous loads. The sub-panels in the building are mostly original to the building. All panels appeared to be at capacity with no spare breakers.

The sub-panels are in most cases original to the building and appear to be in good operating condition.

INTERIOR LIGHTING

The lighting consists mostly of surface-mount 2-lamp and 3-lamp, surface and recessed mount acrylic lens, fluorescent light fixtures. They appear to be 32 watt - T8 lamps. With the exception of the areas renovated within the past several years, the fixtures throughout appear to be original to the building and are showing signs of deterioration. Local wall mounted switches are used for lighting control. There is no occupancy sensor control observed.

The gymnasium light fixtures are LED which appear to adequately illuminate the area.

The library consists of mainly 200 and 400 watt metal halide pendant mounted fixtures which are showing signs of deterioration. Due to the age of the fixtures, the lamps and ballasts are failing.

EMERGENCY SYSTEMS

The building is currently supported by the 200kW/250kVA diesel generator manufactured by ONAN Company located outside of the Bowen Building. The generator provides standby power to the stairwells, corridors and related common areas. It does not appear that the main gymnasium is protected by the generator. Several battery units are installed throughout which do not afford proper illumination. A more comprehensive survey of the emergency lighting and generator system is needed to properly assess what the generator powers during a power loss. Life safety circuits appear to be combined with the standby power circuits. The generator in its current configuration does not meet the requirement of NFPA 70-2017 for life safety systems.

FIELDHOUSE, THEATER, LIBRARY ELECTRICAL NOTES

FIRE PROTECTION SYSTEM

The fire alarm system consists of an addressable system, manufactured by Simplex-Grinnell 4100 series installed within the electric room of the Bowen Building. Pull stations are installed at most egress doors. Non ADA compliant speaker/strobe devices are on the walls in the corridors, and common areas. The common hallways do not have smoke detectors installed every 30'-0" on center.

A 75 horsepower fire pump installed within the mechanical room of the Bowen Building Academy and Hyde/Field house sprinkler systems.

Fire alarm device coverage is inadequate for a school classroom building and is not compliant with current codes for notification and carbon monoxide detection coverage. If renovations are to occur, the system should be replaced or upgraded with any renovation.

WIRING DEVICES

With the exception of the areas of renovation, the duplex receptacle and switching control devices are original to the building. The devices are properly grounded and appear to be in good operating condition. If renovations were to occur, then additional duplex receptacles for general power should be installed throughout to support the needs of the facility.

The wood shop incorporated emergency stop buttons to automatically shunt the electrical power to the branch circuit panel protecting the space in the event of an emergency condition.

SECURITY SYSTEM

The intrusion detection system consists of door contacts on all exterior doors and select motion sensors. A keypad was located at the main entrance and the rear door to arm and disarm the system. The system is S2 series which supports both the north and south campus. The system is monitored by campus police.

The CCTV system consisted of cameras located throughout the facility monitoring the common areas and exterior egress doors..

TELECOMMUNICATIONS

The building has an IDF closet with full cabling throughout the facility. The system appears adequate to support the needs of the facility.

The sound-clock system is manufactured by Rauland Telecenter and appears to be in fair operating condition.

FIELDHOUSE, THEATER, LIBRARY ELECTRICAL RECOMMENDATIONS

MAIN ELECTRICAL SERVICE

The existing electrical service rated for 1200 ampere at 120/208 volt, appears to have adequate capacity to support the needs of the building. Since the buildings electrical system is approximately 28-30 years old, it is not known whether or not the equipment has been maintained or tested over the years. The main distribution board, related breakers and all branch circuit panels should have an infrared scan performed to ensure that the components are not deteriorating and are still capable of operating in the manner in which they were designed. At a minimum, the breakers should be cleaned, and load tested for failure analysis. The grounds should be tested to ensure that they are still structurally sound. All connections should be tightened in accordance with manufacturer's recommendations. The feeders should be tested to ensure proper connections. A lightning protection system should be installed. **(P2)**

STANDBY GENERATOR SYSTEM

Further information is required to determine whether or not the existing generator has the capacity to support the needs of the facility. The generator rated for 200kW/250kVA at 120/208 volts, has an output capacity of 555 ampere. **(P2)**

INTERIOR LIGHTING SYSTEMS

Incorporate occupancy sensor control in all corridors. Replace light fixtures with energy efficient LED light fixtures to meet the energy conservation code, Ct State Building Code and the standards of the Illuminating Engineering Society (IES). Incorporate low voltage lighting system to the public space lighting circuits for optimum energy efficiency. Coordinate fixture selection to maximize utility rebates. **(P2)**

EMERGENCY LIGHTING SYSTEMS

Additional energy efficient lighting, conforming to IBC Section 1006 and NFPA 101 is proposed to properly illuminate the exterior egresses and related parking areas. Ensure that emergency lighting is powered for not less than 90 minutes utilizing self-contained storage batteries or an on-site generator. **(P2)**

Integrate interior emergency lighting systems into the generator in a manner that is fully code compliant. Install illuminated exit signs throughout the facility to properly indicate the means of egress. **(P2)**

FIRE ALARM SYSTEM

Install lightning protection on the incoming fiber-optic lines to protect the system from outside interference. Install smoke detectors in the common hallways, ADA compliant strobes in the conference rooms, toilets and waiting areas. Upgrade system to meet NFPA standards, National Electric Code, CT State Building Code and local fire department requirements. Install devices to meet ADA requirements and provide better coverage to support the needs of the facility. **(P2)**

TELECOMMUNICATIONS

Install new campus wide clock system. **(P2)**

FIELDHOUSE, THEATER, LIBRARY MECHANICAL NOTES

HEATING, VENTILATION, AIR CONDITIONING

A Penthouse Mechanical Room is located between the Theater and Library. Access is through the Theater Control Room. Two (2) Trane H&V units and two (2) return fans are located in the Mechanical Room and serve the Theater and Library. The H&V units are provided with hot water heating coils. There are no cooling coils. Supply ductwork is not insulated.

The Mechanical Room is very congested with limited access to equipment. Access to the H&V units is over the top of the units and down a step ladder.

The equipment is in good condition but very noisy due to fan vibration. The noise, however, does not transmit into the Theater.

The Library is served by a single exposed supply duct, supply registers and a large wall return register. Hot water finned tube radiation is provided along the perimeter. Two large propeller ceiling fans are hung from the roof structure.

The Theater is served by two exposed supply ducts, supply registers and a large wall return register.

The two hot water unit heaters located in the Lobby are very noisy.

The Fieldhouse is served by two (2) original vintage Trane Torrivent floor mounted H&V units located in two corners of the gym. The H&V units are provided with hot water heating coils, ducted outside air and short supply ducts discharging upward. Two exhaust fans are located on the roof. The H&V units and roof exhaust fans are beyond their life expectancy and are in need of replacement.

Classrooms are provided with operable windows and hot water finned tube radiation. A small exhaust register is provided in each Classroom, however, there is no ducted supply. The Robotics Lab, however, is provided with vertical unit ventilators having ducted outside air connections.

There is a small Mechanical Room located on the Second Floor which houses a small H&V unit with hot water coil. Equipment is in good condition, however, the return fan associated with the Second Floor H&V system is very noisy.

Each Locker Room is served by two horizontal Fan Coil units, each provided with a hot water coil and a ducted outside air connection. Air is exhausted via inline exhaust fans ducted to exhaust air wall louvers. Ventilation is adequate. Equipment is in good condition. Fan coil units and exhaust fans are at the end of their useful life and should be replaced in 5-10 years.

There is no building energy management system. Controls are standalone electronic

FIELDHOUSE, THEATER, LIBRARY MECHANICAL NOTES

FIRE PROTECTION

The building is fully sprinkler protected.

Handles have been removed from all Fire Dept valves throughout the building. It is assumed this was done due to vandalism, however, becomes a safety issue in case of fire

PLUMBING

Domestic hot water heating is via the Bowen boiler plant. Hot water piping runs underground and serves a 1,000 gallon storage tank with indirect heater. There is also an 80 gallon electric hot water heater for the summer. Domestic hot water capacity is inadequate when the boiler plant is off. Further investigation of the domestic hot water plant is required to provide recommendations.

Another DHW complaint is that it takes a long time for hot water to reach the fixtures. The system is provided with a hot water recirc pump and hot water recirc piping. Further investigation of the hot water recirc system is required to provide recommendations.

Plumbing fixtures are in good condition.

FIELDHOUSE, THEATER, LIBRARY MECHANICAL RECOMMENDATIONS

As at Bowen Hall, there is no mechanical ventilation to the majority of spaces. Further field investigation would be required to determine the extent of ventilation system upgrades and recommended solutions. **(P3)**

HVAC equipment for the Theater and Library is in good condition but noisy. Space in the Mechanical Room is very limited and equipment replacement would be a challenge. Adding cooling for the Theater would be difficult, requiring significant modifications to the systems. **(P3)**

The 2 noisy unit heaters in the Lobby are in need of replacement. **(P2)**

H&V units and roof exhaust fans in the Gymnasium are in need of replacement. **(P2)**

Locker Room fan coil units and exhaust fans should be replaced in 5-10 years. **(P3)**

In conjunction with the Bowen hot water pump replacement, replace hot water coil 3-way ACVs with 2-way ACVs. **(P2)**

Upgrade existing controls to DDC (Direct Digital Control) to provide improved energy management control. **(P3)**

Further investigation of the domestic hot water plant and hot water recirc system would be required to provide recommendations. **(P2)**

Install missing handles at Fire Dept valves. **(P1)**

FIELDHOUSE BUILDING IMPROVEMENTS

Capital Improvement Projects

1. The existing mechanical equipment will require replacement within ten years time. The current mechanical room (loft) is located over the theater lobby and will require some careful planning to allow for replacement since it is very dense in its layout.

Ongoing Maintenance Projects

1. Install barrier free entrance at main entrance to Library to mitigate public entry security conflict.
2. Install emergency egress lighting and study configuration of emergency power.
3. Install lightning protection system.
4. Install new heating units in lobby.
5. Install scupper at north edge of robotics roof to end draining down face of wall, clean, repoint wall.
6. Review existing emergency lighting circuitry and supplement egress lighting as renovations occur.

ACADEMY BUILDING FACILITY ASSESSMENT
October 15, 2019

Juster Pope Frazier LLC
Architects

Shepherd Engineering Inc.
Electrical Engineers

VAV International Inc.
Mechanical Engineers

GNCB Inc.
Structural Engineers

Gregory Farmer
Historic Consultant

Designation Key for Phasing Recommendations

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ACADEMY BUILDING ARCHITECTURAL NOTES

Academy is a wood framed building built in 1873 and renovated in 1992. It is 14,000 gross square feet in area extending over three floors and a full basement. The basement level houses mechanical, electrical and fire protection equipment. The first, second and third floors house classrooms with a central two story auditorium on the second floor. The attic level provides access into the central belltower on the roof. The building is on the National Register of Historic Places (1982). The Academy Building is the single most iconic building on the Woodstock campus. It shows significant wear and is in need of significant repairs, renovation and restoration within the next two to three years. The scope of this work may require phasing over several summers in order to keep the building functioning during the school year.

EXTERIOR NOTES

The 1992 renovation of Academy included replacement of all wood siding. Substrate and substrate preparation prior to the wood siding replacement is unknown. The existing wood trim appears to be original to the 1873 construction though many locations show replacement work. The siding appears to be in fair condition. There is a possibility that it may be showing issues due to interior vapor migration or moisture within the wall cavity. The running trim is in poor condition, though the dental work at the soffit / eave appears to be in decent shape. Prior to any further work on renovation, the existing exterior envelope should be examined extensively with consultation from an envelope consultant with historic building experience. Testing for lead paint should also be done for all elements of the exterior.

The existing historic single pane windows are showing considerable wear. These were not replaced in 1992 due to cost. Many of the windows have broken counterweight systems and loose or missing glazing compound. Many of the windows are loose and ill fitting within their frames. It is our opinion that the best course of action is to remove these frames and windows and replace them with new true divided lite windows replicating the originals.

The south facing entry stairs and railings need to be replaced as they are showing significant decay. The original porch roofs in these areas are missing finials and need significant repair as well. All existing running trim should be removed and replaced. The current trim is piecemeal in nature, shows signs of rot and general disrepair. The existing soffit and related dental work should be examined as part of the envelope consultation but does not appear that it needs to be replaced. Entry doors to the north side of the building should be replaced with painted wood doors matching those at the south. The north entry needs to integrate ramping to make the building accessible. There are indications that louvered wood shutters were original to the building. A historic restoration of the building should include replicas of these shutters at all windows. The existing siding is showing staining and cupping at the east, west and south elevations. This is usually an indication of moisture issues and needs to be investigated more thoroughly by opening up the envelope in select areas, inside to out.

Contemporary flood lights located around the building need to be removed to make the building conform to historic standards. Contemporary mechanical louvers infilling two window frames at the north elevation need to be removed and relocated to a more suitable location.

Roof drain downspouts at most locations have rotted out and are typically disconnected from the integral roof gutters. It is our understanding a new roof and integral gutter system is to be installed during the summer of 2019. The downspouts should be replaced and tied back into the gutter system at the same time that the roof work is being done. The belltower interior roofing system leaks into the attic below, the water making its way to the auditorium ceiling. The belltower enclosure should have a watertight membrane with drainage installed.

INTERIOR NOTES

When first built, Academy was configured with classrooms on the first floor and second floor classrooms flanking a two story auditorium. The third floor, separated by the upper reaches of the auditorium, was originally used only for staff residences. For that reason, the third floor had minimal egress with only one stair serving each side. At some point, fire escapes from the third floor made there way onto the west side of the building. Design of the 1992 renovations included removal of the fire escape. Egress across the open third floor stage area was constructed providing two means of egress from each side of the third floor. Unfortunately this renovation work destroyed the original configuration of the auditorium stage but provided classrooms on the third floor. Assuming historic restoration of the auditorium and stage, consideration should be given to eliminating access to the flanking third floor classrooms and using it as unoccupied space. This would allow the stage to be restored to its original two story height by eliminating the 1992 linking infill. It would also eliminate the need to make the third floor barrier free accessible, allowing the installation of a two story lift in lieu of a significantly more expensive and intrusive elevator.

As noted above, the building does not have any barrier free access. Integration of an interior elevator, necessary to maintain the historic exterior, would be problematic due to overrun heights and costs. Integration of a two story limited access lift would be the most suitable solution if the third was not occupied. The lack of accessibility throughout this building has been noted during prior accreditation visits.

Interior finishes are in poor to fair shape, though a number of first floor classrooms have been refinished over the years and are in good shape. First and second floor classrooms are adequately sized and equipped to contemporary design standards. Third floor classrooms are small and oddly configured but equipped to contemporary design standards.Third floor classroom and corridor finishes are in poor shape and should be replaced if this floor remains used for classrooms. Stairs to the third floor do not meet code requirements at second floor landings.

The second floor central auditorium space has been altered significantly by the third floor egress infill at the stage. The stage originally opened fully back to the north elevation of the building with two vertical windows centered. The stage is not presently barrier free accessible. The existing wood ceiling has significant water damage from what appears to be leaks at the belltower above and needs attention. The current lighting fixtures are inappropriate for a significant historic space and should be replaced. It is our belief that the auditorium should be restored to historic standards. Public access to the auditorium, corridors, stairs and toilets should also be restored to historic standards. In many cases this involves careful refinishing of existing finishes with some attention to removal of prior surface mounted conduit and equipment. The classroom spaces have been restored intermittently when funds have been made available. This is a logical and reasonable approach to restoration of the first and second floor classrooms.

Integration of code compliant ventilation will require some careful architectural work to enclose these systems in a manner which is appropriate to the historic character of the building. Integration of vertical and horizontal “pathway” for ductwork needs to be done in a manner that does not detract from the original spaces and finishes.

There are no toilets on the third floor and only one small toilet on the second floor level. The existing first floor toilets need to be refurbished with provisions for one barrier free toilet for each toilet room. The second floor toilet should also be made barrier free. Finishes at all toilets need to be replaced.

ARCHITECTURAL EXTERIOR RECOMMENDATIONS

Complete building renovation / restoration of the exteriors should be completed in the next two to three years to prevent further damage to the building. Roof and Tower repairs should be completed within the next year, as per the structural assessment. A construction phasing plan should be created to break out this work in logical "summer slammer" increments so that the building remains in use throughout the school year. This work should include the following architectural components.

Replace the leaking belltower interior roofing system to prevent leaking into attic below. **(P1)**
Install new historically accurate true divided windows and frames throughout. **(P2)**
Remove and replace all running trim. **(P2)**
Investigate the building envelope through selective demolition and repair. **(P1)**
Remove existing louvers at window infill and replace in a more suitable location. **(P2)**
Install new historically accurate louvered shutters at windows. **(P3)**
Remove contemporary exterior flood lighting from building. **(P2)**
Replace roof downspouts and tie into integral gutter system. **(P2)**
Paint all new windows historically appropriate color. **(P2)**
Install new, suitable, barrier free access to first floor level from grade. **(P2)**

ARCHITECTURAL INTERIOR RECOMMENDATIONS

Building renovation / restoration of the interior should be completed within two years of exterior repairs / restorations.Please note that barrier free access has been noted in prior accreditation visits. This work should include the following architectural components.

Restore the historic second floor auditorium, and public pathways to the auditorium. **(P2)**
Renovate first floor toilets with new finishes, create barrier free accessible stall. **(P2)**
Renovate second floor toilet with new finishes and barrier free components. **(P2)**
Install barrier free access from first floor to second floor. Third floor will be unoccupied. **(P2)**
Restore the auditorium stage to original two story configuration with local code approval. **(P2)**
Repair and restore the auditorium ceiling once the belltower leaks have been repaired. **(P2)**
Integrate new heating + ventilation systems in a manner which is historically appropriate. **(P2)**
Remove architecturally inappropriate light fixtures and install new. **(P2)**
Install new finishes at egress stair treads and risers. **(P2)**
Improve attic access with suitable guardrails and flooring. **(P1)**
Improve attic insulation levels with new insulation installation. **(P2)**
Improve basement / first floor insulation with new insulation installation. **(P2)**

FUNDING SOURCES

The Ct. State Historic Preservation Office provides tax credits of up to 25% of construction costs for restoration work on eligible historic properties. The grant is capped at $500,000.00 total. Work must be completed within five years and the tax credit is awarded once the project is certified by the state at the completion of construction. Once awarded the tax credits, the Academy would then sell these to realize the cash. Projects awarded these tax credits have a subsequent five year period where any further work on the building is subject to state review.

This same office also offers annual cash awards for projects, awarded annually with a maximum amount of $100,000.00 for each of three years with an aggregate maximum of $300,000.00 however this is subject to a ten year review for each grant. Applicants must apply yearly and there is no guarantee that funds are available each year. Assuming a maximum grant of $300,000.00 any later work on the building would be subject to state approval for 30 years.

ACADEMY BUILDING ELECTRICAL NOTES

ELECTRICAL DISTRIBUTION SYSTEM

The secondary service originates from a utility company pole mounted transformer fed underground to the basement main branch circuit panel. The secondary service feeders enter the basement and connect to a 200 ampere, 120/240 volt, single phase, three wire main load center panelboard. The building is secondary metered.

The 120/240 volt distribution panelboards located throughout the building provide power to lighting, mechanical systems, major motor loads and miscellaneous loads. (The building does not have an elevator). The sub-panels in the building are mostly original to the renovation. All panels appeared to be at capacity with no spare breakers.

INTERIOR LIGHTING

The lighting consists mostly of surface-mount T8 2-lamp and 3-lamp fluorescents with acrylic lens. The fixtures are in fair to poor condition. There are no occupancy sensors.

EXTERIOR LIGHTING

The exterior lights are wall mounted and are LED. The fixtures are in good operating condition. The exterior light fixtures are controlled via time clocks.

EMERGENCY SYSTEMS

The building is currently supported by self-contained emergency battery units. The emergency battery units provide standby power to the stairwells, restrooms, and corridors.

FIRE PROTECTION SYSTEM

The fire alarm device coverage is inadequate for a school classroom building and is not compliant with current codes for notification and carbon monoxide detection coverage.

WIRING DEVICES

The duplex receptacle and switching control devices are original to the renovations. The devices are properly grounded and appear to be in good operating condition.

SECURITY SYSTEM

The intrusion detection system consists of door contacts on all exterior doors and select motion sensors. Card readers are located at all exterior doors. Keypads are located at the north and south entry doors to arm and disarm the system. The system is S2 series monitored by campus security.

The CCTV system consisted of cameras located throughout the facility monitoring the common areas and exterior egress doors.

TELECOMMUNICATIONS

The building has an IDF closet with full cabling throughout the facility. The system appears adequate to support the needs of the facility.

The building utilizes a Simplex-Grinnell sound clock system which appears to be in good operating condition.

ACADEMY BUILDING ELECTRICAL RECOMMENDATIONS

MAIN ELECTRICAL SERVICE

The existing electrical service rated for 200 ampere at 120/240 volt, single phase appears to have adequate capacity to support the current needs of the building. Since the building is approximately 28-30 years old, it is not known whether or not the equipment has not been maintained or tested over the years. The main distribution load center panel, related breakers and all branch circuit panels should have an infrared scan performed to ensure that the components are not deteriorating and are still capable of operating in the manner in which they were designed. At a minimum, the breakers should be cleaned, and load tested for failure analysis. The grounds should be tested to ensure that they are still structurally sound. All connections should be tightened in accordance with manufacturer's recommendations. The feeders should be tested to ensure proper connections. Further information is required to determine the current electrical demand on the building. **(P2)**

If a major renovation were to occur, and air conditioning as well as an elevator were to be installed within the facility, then the electrical systems should be increased to a minimum of a 600 ampere, 120/208 volt, three phase, four wire. **(P2)**

INTERIOR LIGHTING SYSTEMS

Incorporate occupancy sensor control in all corridors. Replace light fixtures with energy efficient LED light fixtures to meet the energy conservation code, Ct State Building Code and the standards of the Illuminating Engineering Society (IES). Incorporate low voltage lighting system to the public space lighting circuits for optimum energy efficiency. Coordinate fixture selection to maximize utility rebates. **(P2)**

EMERGENCY LIGHTING SYSTEMS

Upgrade emergency lighting system to meet current code regulations during building renovations. Consider integration into emergency generator in lieu of battery packs. **(P2)**

FIRE ALARM SYSTEM

Install lightning protection on the incoming fiber-optic lines to protect the system from outside interference. Install smoke detectors in the common hallways, ADA compliant strobes in the conference rooms, toilets and waiting areas. Upgrade system to meet NFPA standards, National Electric Code, CT State Building Code and local fire department requirements. Install devices to meet ADA requirements and provide better coverage to support the needs of the facility. **(P2)**

LIGHTNING PROTECTION

Given the building's construction, height and isolation at the adjacent quad, a lightning protection system should be installed on the building. **(P1)**

ACADEMY BUILDING MECHANICAL NOTES

HEATING, VENTILATION, AIR CONDITIONING

The building is heating by hot water fed underground from the Bowen Hall boiler plant. The building is located the furthest distance from the boiler plant and may not be receiving adequate water flow. The combination of inadequate water flow, plus original single pane drafty windows, results in inadequate heat to the spaces. During the winter, First Floor classrooms do not reach the legally mandated space temperature of 65 F and resulting in cancelling or re-scheduling classes.

On the contrary, space temperatures on the Third Floor are excessive. The entire building is served by three hot water heating zones.

Classrooms are provided with operable windows and hot water finned tube radiation. Some classrooms are provided with small ceiling supply diffusers or small exhaust registers, however, most classrooms are not provided with mechanical ventilation

Ventilation equipment serving the Second Floor and Third Floor is located in the Attic. The system consists of a small horizontal air handling unit with duct-mounted hot water coil and inline exhaust fans. Supply and exhaust ductwork distributes throughout the Attic. Two wall louvers are located on the Third Floor for exhaust air discharge and fresh air intake. The space was difficult to access as equipment and ductwork is located directly over Second Floor spaces.

Hot water piping runs throughout the unheated Attic and is subject to freezing.
The duct-mounted hot water coil is provided with a manual air vent which appears to be leaking. A bucket was placed beneath the air vent. At the time of the visit, the bucket was completely full of water and overflowing

Ventilation equipment serving the First Floor is located in the Basement Level. The system consists of inline exhaust fans and distribution ductwork to wall louvers.
The ventilation systems are inadequate and are in need of replacement.

PLUMBING

The plumbing fixtures are in good shape but barrier free accommodations are not provided.

FIRE PROTECTION

The building is fully sprinkler protected. Sprinkler heads are over 50 years old and will need to be replaced. NOTE: Sump pit in basement at fire tank has standing water in it.

The Attic is unheated and protected by a wet sprinkler system. It is recommended that the Attic wet sprinkler system be replaced with a new dry sprinkler system to prevent pipes from freezing.

Handles have been removed from all Fire Dept valves throughout the building. It is assumed this was done due to vandalism, however, this becomes a safety issue in case of fire.

ACADEMY BUILDING MECHANICAL RECOMMENDATIONS

Install 2 new boilers to provide hot water heating, removing Academy from the heating loop. **(P2)**

Replace existing slope top radiation and piping with new radiation and piping throughout. **(P2)**

Install new fresh air ventilation systems with all new equipment. Improve access to attic equipment. **(P2)**

Replace all sprinkler heads throughout the building. **(P2)**

Install new dry pipe sprinkler system throughout the attic. **(P1)**

Upgrade to campus wide DDC (Direct Digital Control) to improve energy management control. **(P2)**

Install missing handles at fire protection standpipes. **(P1)**

ACADEMY BUILDING STRUCTURAL ASSESSMENT

The Center Block of the Academy Building is framed at the first and second floors with north-to-south spanning joists supported on girders at the south side of the building and on the corridor walls at the north side of the building. There are timber trusses in the attic which support the roof framing at the Center Block, as well as hang the attic framing allowing the second floor Drama Room to be free of columns.

The East Wing and West Wing of the Academy Building are symmetrical. They are framed with east-to-west spanning joists which are supported at the exterior walls and corridor/stair walls. The bearing walls at these wings also partially support the roof framing.
The following provides a summary of observations and recommendations of the Building's structure:
The building has been generally well-maintained. It appears that there are some points of water entry at the exterior leading to staining at walls and ceilings. The staining indicates the possibility of deterioration in the structure. Areas of water staining should be further investigated by the Academy by removing areas of ceiling or trim to expose the structure. Partial repair or reinforcing may be needed.

The floors of the East and West Wings are generally bouncy indicating that the framing may not meet modern standards for classrooms. It is possible that their allowable live load capacity does not meet that required by the CT Building Code for new structures (40 psf) or that they do not meet serviceability requirements for floor stiffness and occupant comfort.
Based on observations made in the attic, it appears that the original ceilings are lath and plaster and that new gypsum ceilings were applied over the original ceilings. This is often done to conceal substantial cracking in historic plaster ceilings. As the plaster ceilings continue to deteriorate over time, the encapsulating modern ceilings will be required to support their weight. Modern ceiling systems are not designed to perform this way. Consideration should be given during future renovations to completely removing the existing ceiling systems, including the original deteriorate plaster and lath, and attaching new modern ceilings directly to the structure.

A structural analysis of the attic and roof framing should be performed to confirm the ability of the framing to support modern snow loads as required by the CT Building Code. Make-shift trusses and improperly connected members are currently present in the attic as attempts to transfer roof loads to the primary trusses in the Center Block. It is likely that reinforcing and proper connections are needed throughout the attic space.

Repairs are needed at the tower including repair or splicing of the primary corner posts, replacement of the outriggers at the belfry, reconfiguration of the x-bracing to properly anchor the tower to the roof structure, repair of secondary water-damaged members, replacement of roof sheathing and belfry roofing, and reinforcing of the attic girders supporting the tower assembly.

ACADEMY BUILDING STRUCTURAL RECOMMENDATIONS

Basement and First Floor Framing
Substantial improvements and structural reinforcing are present in the basement – it appears that this work was done during the 1990s renovations. Work includes rebuilding of the upper courses of the foundation with concrete masonry units, foundation underpinning, installation of steel reinforcing (channel beams and steel posts) at bearing lines, new spread footings at posts, and detailing of the reinforcing to support notched joists. All of this reinforcing appears to be in good condition and performing well. **No work at these components is recommended at this time**.

There are three of four chimneys remaining in the building and all three of the remaining chimneys are underpinned in the basement – the southwest chimney has been removed and the first floor framing infilled. The infill framing is supported with partial headers. The headers and trimmers around the infill framing should be doubled up with 2x12s and mechanical hangers installed. **(P3)**

There is a line of shoring near the mid-span of the west wing's first floor framing. This shoring consists of a timber girder and two lally columns which are not anchored to the slab. No structural failures are visible; this shoring may have been installed to stiffen the first floor. A structural analysis of the joist framing should be performed to determine if the framing meets modern standards for floor deflections. If the joists are too "bouncy" per these standards, reinforcing such as joist sisters or a new beam with posts should be installed to meet the CT Building Code with proper sizing and connections. **(P2)**

Two split floor joists were observed – one in the Center Block and one at the east wing. The joist splits appear to be propagating from the joists' notch connection to girders. Split joists should be sistered with one 2x12. **(P3)**

There is mortar missing at the fieldstone foundation wall at the southeast corner of the Center Block. It appears that there is some moisture entering the basement in this area. The walls should be repointed and the area monitored for on-going moisture infiltration. If the issue is on-going, new exterior moisture-proofing or a new exterior footing drain may be needed. **(P3)**.

First Floor and Second Floor Framing
There is water damage at the ceiling of the men's room. Further investigation is needed to see if any of the second floor framing is damaged due to moisture infiltration. If substantial moisture damage is present, the floor joists at the bathrooms may need to be sistered. **(P2)**

There is some water damage at the ceiling of the southwest corner of Classroom 104. It is possible some moisture is entering the building through the south wall. An exterior survey of the area should be performed up close to see if the exterior architectural trim in this area is deteriorated thus allowing moisture infiltration. Further investigation of the second floor framing is needed to see if any of the second floor framing is damaged due to moisture infiltration. If substantial moisture damage is present, the joists may need to be sistered. **(P3)**
Floor sloping was observed throughout the first floor. High points were noted at the three remaining chimneys and at bearing lines. This sloping was likely on-going during the building's lifespan due to creep (continuous downward movement of wood under its own weight), and possible deterioration of the first floor sills due to moisture or insect activity. It appears that the sloping was stabilized during the 1990s renovations which partially rebuilt the foundation walls and reinforced the supports for the bearing lines. **No work is recommended at this time.**

ACADEMY BUILDING STRUCTURAL RECOMMENDATIONS

Second Floor and Third Floor Framing
There is some water damage at the northwest corner trim of the
maintenance closet in the West Wing. An exterior survey of the area should be performed up close to see if the architectural trim in this area is deteriorated thus allowing moisture infiltration. If the wood stud bearing wall at this location is substantially deteriorated, sistering of individual studs may be necessary. **(P3)**

Floor sloping was observed throughout the second floor. High points were noted at the three remaining chimneys and at bearing lines. This sloping was likely on-going during the building's lifespan due to creep (continuous downward movement of wood under its own weight), and possible deterioration of the first floor sills due to moisture or insect activity. It appears that the sloping was stabilized during the 1990s renovations which partially rebuilt the foundation walls and reinforced the supports for the bearing lines. **No work is recommended at this time.**

Third Floor and Attic Framing
Floor sloping was observed throughout the third floor. High points were noted at the three remaining chimneys and at bearing lines. This sloping was likely on-going during the building's lifespan due to creep (continuous downward movement of wood under its own weight), and possible deterioration of the first floor sills due to moisture or insect activity. It appears that the sloping was stabilized during the 1990s renovations which partially rebuilt the foundation walls and reinforced the supports for the bearing lines. **No work is recommended at this time**.

Attic and Roof Framing
Water staining at the rafters and roof sheathing is present throughout the attic. It does staining appears to be superficial and does not require structure to be reinforced. During the present reroofing project, roof sheathing which is found to be substantially deteriorated should be removed and replaced in kind. The structure in the area of deteriorated sheathing should be assessed to determine if any local structural repairs are needed. **(P1)**

The primary structure of the Center Block consists of three trusses supported at the east and west walls of the Center Block. Figure 2 provides a schematic section of these trusses and the attic and roof structure they support. There are 2x members present at the mid-span of the roof hips and at the roof ridges (where the slope of the roof changes). The 2x members appear to be an attempt to transfer roof load down to the roof trusses. The 2x members are improperly connected and transfer roof loads to the trusses off of their panel points, introducing bending forces into the trusses. Trusses are intended to only support axial loads, thus allowing slender timbers to span long distances. A structural analysis of the attic and roof system should be performed to confirm the ability of the framing to support modern snow loads as required by the CT Building Code. It is likely that reinforcing is needed to properly transfer roof loads down to the panel points of the three trusses. **(P2)**

The secondary structure of the Center Block consists of 2x6 rafters in a mansard roof configuration. The rafters are supported at the east and west interior bearing walls and at the north and south exterior bearing walls. They are also supported at ridge beams which span between trusses. The joists are not anchored to any of their supports. Some of the joists are starting to split where they are notched around the ridge beam. A structural analysis of the roof framing should be performed to confirm the ability of the framing to support modern snow loads as required by the CT Building Code. At minimum, new mechanical connections should be installed from the rafters to the bearing walls and roof ridges to prevent future movement and splitting. **(P2)**

ACADEMY BUILDING STRUCTURAL RECOMMENDATIONS

The hipped roof structure of the East and West Wings consist of 2x6 rafters supported with single 2x ridge beams. Make-shift trusses of 2x and 1x members are present in the attic and appear to be an attempt to reduce the spans of the ridge beams and transfer roof load directly down to the third floor bearing walls. These make-shift trusses are improperly sized and have minimal connections. Some of the make- shift truss members have been removed at the West Wing to accommodate mechanical equipment. A structural analysis of the roof framing should be performed to confirm the ability of the framing to support modern snow loads as required by the CT Building Code. Legitimate mid-span supports for the roof framing may be needed. **(P2)**

The original plaster and lath third floor ceiling is visible at the southwest attic corner of the East Wing. The plaster keying is substantially deteriorated. The plaster and lath ceiling is not supported on wood firring, instead it is directly anchored to the attic joists. The ceilings throughout the building should be monitored and any bulging or cracking should be noted. As the plaster ceilings continue to deteriorate the encapsulating modern ceilings will be required to support their weight. Consideration should be given to completely removing the existing ceiling systems, including the original deteriorate plaster and lath, and attaching new modern ceilings directly to the structure. **(P3)**

Tower

Water staining is present at most of the roof framing at the south side of the tower. Additionally, the Academy has temporary measures in place to collect rainwater which is entering the area. The temporary measures are protecting the attic from moisture damage but are also adding load to the roof and attic framing. The collected rainwater in the attic should be removed as soon as possible. During the current re-roofing project, the roof decking should be exposed from the exterior so the full extent of water damage can be assessed. Some wood decking will need to be replaced. It is possible that the roof framing is deteriorating from the top – this should be assessed at the same time as the decking. Reinforcing or repair of the roof framing in the area of deteriorated decking may be necessary. **(P1)**

The Tower consists of an interior belfry level and an exterior cupola. There are 4 primary corner posts which extend from the attic framing, through the roof and belfry level, and project upwards to frame the cupola. There are four additional corner posts at the belfry, outside of the primary posts, which form the exterior “skin” of the tower and which sit on the main roof framing. Refer to Figure 3.The four primary corner posts sit on two 6 inch by 7 inch girders which span between the attic/roof trusses. These girders also support the center walkway in the attic by hanging perpendicular girders. The two attic girders are overloaded and are deflected under the long-term weight of the tower and walkway. A structural analysis of the attic framing should be performed to determine the extent of reinforcing needed for these girders. **(P2)**

The four primary corner posts supporting the tower structure are substantially deteriorated at the roof of the belfry level (within the cupola). The roofing of the belfry is also deteriorated. The four posts require repair by removing deteriorated segments above the belfry roof and splicing in new timber. The new splice should occur below the belfry roof to maintain the lateral performance of the tower. New roofing is required at the belfry. **(P1)**

The four secondary belfry posts appear to be in acceptable condition at the interior of the tower. At the exterior, there are two outriggers at each face of the belfry which hover above the main building roof. The purpose of these outriggers is to help stabilize the tower structure during wind events. The outriggers appear to be deteriorated due to moisture infiltration. The outriggers appear to require replacement in kind. Portions of the architectural trim should be removed at the base of the belfry to allow assessment of the outriggers and the secondary corner posts. **(P1)**

ACADEMY BUILDING STRUCTURAL RECOMMENDATIONS

All four railings at the cupola are substantially deteriorated. The railings should be replicated. **(P1)**

Two substantially deteriorated tower framing members were observed below the belfry roof. During the stabilization work discussed above, deteriorated framing members should be repaired in place by sistering or splicing individual members. **(P1)**

X-bracing was observed at the belfry level and at the cupola. The x- bracing at the cupola is connected to the primary corner posts and is starting to deteriorate from exposure to the elements. The x-bracing at the belfry level is not connected to the primary structure – instead it is anchored to the top of the secondary belfry posts and to blocking at the underside of the main roof sheathing. X-bracing is typically installed for towers to increase their lateral stability. In order to achieve this stability, the primary tower structure must be connected directly to framing at the main roof. This system described here does not adequately anchor the tower structure to the roof structure. During the tower stabilization work, the lateral stability system should be reviewed and modified to correctly anchor the tower structure directly to the roof structure. **(P1)**

ACADEMY BUILDING HISTORIC PRESERVATION ASSESSMENT

The 1873 Academy building, designed by architect Alexander S. Cutler of Norwich, Connecticut, is located at the north end of the Woodstock Hill common. The Academy building is individually listed on the State and National Registers of Historic Places (1984) and is also included in the Woodstock Hill National Register Historic District (1998). The exterior of the building is subject to municipal regulatory review by the Town of Woodstock as part of the Woodstock Hill Local Historic District

The classroom building is a three-story wood frame structure on a brick foundation. It is a symmetrical building with a projecting center pavilion and three-story end wings, enclosed under a complex hipped roof that is topped by a cupola (clock and bell tower) at the peak. The building represents an adaptation of the 19th century Italianate style with clapboard walls divided by pilasters into single bays. The roofline is ornamented with scrolled brackets and applied decoration. The existing windows are double hung (2/2) single-glazed wood sash with no exterior storm panels.

The classroom building was extensively restored and remodeled about twenty-five years ago. On the exterior, that project involved the replacement of virtually all the wood clapboards and piecemeal repair of pilasters and other exterior wood trim. The mortar joints in the brick foundation have now washed out in several areas, partly due to poor roof drainage. The new wood that was used for exterior cladding and for replacement trim is now warped, soft and rotted in several areas. The original wall sheathing under the clapboards and trim appears to be one-inch thick pine, but the condition of the sheathing and framing is unknown at this time.

The historic windows appear to have been deleaded, probably by a dipping process, as part of the previous restoration and have continued to deteriorate. Most of the sash are heavily worn and poorly fitted and have loose or broken elements. The window sills and frames are in perilously poor condition.

The existing asphalt shingle and membrane roof is also in very poor condition and is reportedly due for replacement this summer. It is unclear to me whether the roof project includes repair of the soffits, cornice, and downspouts. It's also unclear whether repair of the cupola is included in the roof project.

On the interior, the classrooms, corridors, and stairwells were all remodeled as part of the previous project and there is very little historic detailing still exposed. The high-ceilinged auditorium space at the center of the second floor is the only space that retains its historic character with paneled wainscoting and an elaborate paneled ceiling. Unfortunately, seepage from the roof has caused extensive water damage on the paneled ceiling. In some areas the ceiling boards are missing or warped. The varnished finish on others is severely deteriorated.

The priorities for repair should focus initially on the building envelope:

Roof and roof drainage (including repair of the cupola)
Exterior cladding and trim
Windows and doors
Masonry foundation

The existing clapboarding may need to be removed in whole or in part to evaluate the condition of the sheathing and framing in the exterior walls.

Once the water penetration problems have been addressed, the paneled ceiling in the auditorium should be repaired. Missing boards and heavily damaged areas should be replaced in kind to match.

All work on the historic classroom building should comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 61) as a matter of good practice. The condition of the windows is a particular concern due to the amount of weathering, erosion and wear on the sash, frames, and sills.

So many of the existing windows are heavily damaged that replication rather than repair may be the best option to ensure a long functional life. New single-glazed wood windows that replicate the existing dimensions and profiles would be better fitted in the openings and easier to operate with no change in appearance. If the new windows were protected by a low-profile exterior storm panel, they could achieve performance comparable to that of modern double-glazed windows and have a much longer functional life.

Any modification of exterior features, including clapboards, trim, and windows and doors, will be subject to town review and approval by the Woodstock Historic District Commission. Preliminary discussions with the HDC may be helpful to the Academy and help to facilitate the regulatory review.

The Connecticut State Historic Preservation Office (SHPO) has two incentive programs that may help to defray the cost of major repair and restoration. The Historic Restoration Fund, while currently on hiatus due to short staff, offers 1:1 matching grants to municipalities and nonprofit organizations. The State Historic Rehabilitation Tax Credit offers a transferable tax credit equal to 25% of the eligible rehab costs. Both programs require application and approval prior to undertaking any work on the building.

ACADEMY BUILDING IMPROVEMENTS

Capital Improvement Projects

1. Given the scope of issues identified and the availability of supplemental grants / tax credits, we feel it is most economical to do a full historic restoration of Academy. Immediate attention should be given to stabilizing the belfry (completed August 2019) followed by replacement of the roofing, gutters and downspout systems in the next year.

Perimeter foundation rubble and CMU walls show moisture penetration, decay.

Insulation between basement and first floor is inconsistent. Perimeter foundation is uninsulated resulting in significant heat loss

Significant gaps in floor insulation throughout the first floor framing. Floor framing undersized for current code required loads.

Windows, window frames and trim need to be replaced. They are out of square and cannot be locked. Many cannot open or have broken counterweight. Windows are single pane. This In concert with the gaps and framing voids is creating significant heat loss.

The wood ceiling in the auditorium has water damage from leaks through the belfry above. Light fixtures are inappropriate and the former stage has been infilled in past renovations.

Ceiling in classrooms are showing signs of water damage from leaking roof and gutter assemblies.

Attic roof framing and sheathing are showing signs of water damage from roof leaks in the main roof and belfry. Water is also leaking from located mechanical equipment and fire protection piping located within the attic.

The belfry and clocktower have poor flashing and roof leaks resulting in significant damage to the original wood trim and leaks into the attic below.

Exterior siding shows signs of staining and cupping, trim is rotting and gutter / downspouts are no longer connected. These all indicate potential concealed framing damage from moistur infiltration at the roof, windows and roof eaves.

SITE ASSESSMENT
October 15, 2019

Juster Pope Frazier LLC
Architects

Shepherd Engineering Inc.
Electrical Engineers

VAV International Inc.
Mechanical Engineers

Designation Key for Phasing Recommendations

Phase 1 **(P1)**: Recommendations classified as “Phase 1” are considered to be the highest priority and should be addressed within the next year.
Phase 2 **(P2)**: Recommendations classified as “Phase 2” are considered to be the next highest priority (after Phase 1) and should be addressed within the next five years.
Phase 3 **(P3)**: Recommendations classified as “Phase 3” are considered to be the next highest priority (after Phase 1 and Phase 2) and should be addressed within the next ten years.

CAMPUS SITE PLAN NOTES

NORTH CAMPUS SITE PLAN NOTES

The North Campus presents a mixed impression to visitors to the Academy. Primary parking is in poor shape with cracking and some settling of subbase. The primary visitor entry adjacent to Bowen is undefined and undistinguished. Visitor and administrative parking at Brackett feels wholly unconsidered and adhoc.

BOWEN PARKING LOT
This is the primary parking lot for the campus. It is situated in a good location, away from campus center however the pavement is cracked and settling in some areas. The lot sheet drains onto adjacent Woodstock Academy and back into the street. Drainage does not appear to be problematic. We would recommend that the lot be reconstructed with new gravel subbase and bituminous asphalt. Drainage patterns should remain "as is". **(P2)**

BOWEN RECEIVING AND UTILITIES
The area adjacent to the basement receiving door presents a poor impression. Consideration should be given toward cleaning this area up and screening utilities including propane tank, generator, etc. This area will be impacted by design and construction of a larger kitchen / server area noted in the Bowen Building Assessment. **(P2)**

BOWEN CAMPUS ENTRY SIDEWALK
The entry on to campus from the Bowen lot is undefined and gets lost within the overall parking area. Consideration towards making a more substantially defined and designed entry "gateway" to the campus should be considered. **(P2)**

FIELDHOUSE SERVICE DRIVE
The driveway serving for deliveries to the woodshed and arts studio area is in poor shape and should be regraded and paved accordingly. The slope adjacent to this driveway, leading to the ropes course is also problemmatic. This driveway, formerly used for parking, should remain closed to parking until the slope is stabilized and proper guardrails installed. **(P3)**

BRACKETT VISITOR AND ADMINISTRATION PARKING
This area needs to be repaved with paving extending into the current dirt administrative parking area. This is a significant visitor and student entry to the North campus and it currently presents a poor first impression. **(P2)**

LIBRARY MAIN ENTRY
The primary entry to the library is not accessible due to a 6" step up from grade to the entry. This area should be reconstructed to allow for at grade access by regrading / rebuilding the current walk at that point. **(P2)**

ACADEMY BUILDING NORTH ENTRY
The Academy Building is currently not accessible. Barrier free ramping or sloping walks should be integrated to allow for access into the building as part of the restoration of Academy. Integration of the barrier free ramping to Academy should consider impact on existing pedestrian circulation and may offer an opportunity for outdoor gathering space. **(P2)**

NORTH CAMPUS WALKWAYS
The existing campus walkways should be repaved concurrent with repaving of the main Bowen lot and Brackett parking area. **(P2)**

STUDENT CENTER FACILITY ASSESSMENT
October 15, 2019

Juster Pope Frazier LLC
Architects

Shepherd Engineering Inc.
Electrical Engineers

VAV International Inc.
Mechanical Engineers

Designation Key for Phasing Recommendations

Phase 1 **(P1)**: Recommendations classified as “Phase 1” are considered to be the highest priority and should be addressed within the next one to two years.
Phase 2 **(P2)**: Recommendations classified as “Phase 2” are considered to be the next highest priority (after Phase 1) and should be addressed within the next five years.
Phase 3 **(P3)**: Recommendations classified as “Phase 3” are considered to be the next highest priority (after Phase 1 and Phase 2) and should be addressed within the next ten years.

STUDENT CENTER ARCHITECTURAL NOTES

The Student Center is a masonry building built 1963 to 1965 as part of the Annhurst College campus build out. It is the primary boys residence hall. It is 38,400 gross square feet in area extending over three floors and a full basement. The basement level houses mechanical, electrical and fire protection equipment, bookstore and classroom. The first, second and third floors house classrooms with a central two story dining (with related kitchen on the first floor). The building is similar to Westhaver in that the main entry is at mid landing between first floor and basement levels. This creates a somewhat awkward entry sequence. Access to the first floor is accomplished by a barrier free chair garravanta, running parallel with the stairs. It does not extend to upper levels of the building. As such, the building would be characterized as inaccessible. The building is largely unoccupied save for the first floor kitchen and dining hall which only serves weekday / weekend dinner and weekend brunch to resident students, faculty and staff. It should be noted that the student center is on the opposite side of route 169, isolated from the main body of south campus.

EXTERIOR NOTES

Like all of South Campus, the exterior masonry is in good shape. The exterior windows also appear to be in good shape. However, insulated glass systems have an expected lifespan of 25 to 30 years before failing. The Academy should be diligent in inspecting exterior windows on a yearly basis and establish a glazing replacement allowance within their yearly capital improvements budget.

INTERIOR NOTES

Interiors are generally in good shape and well maintained for their age. However, they appear a bit tired and dated. Student Centers and Residence Halls are both key components for recruiting new students, attention to updating the interior finishes and furniture should be considered. Food service also needs to be examined, contemporary food preparation and serving is more typically done on a station by station basis as opposed to the current cafeteria style.

STUDENT CENTER RECOMMENDATIONS

The building is largely empty, save for food service functions for resident evening meals. Given this, we recommend further design study at adding dining services at either Westhaver or Annhurst on the main campus side of route 169. The Academy has adequate classroom capacity presently and the use of the Student Center classrooms are not projected at any time in the future due to demographics and economics. It may prove more practical to build new rather than to maintain and upgrade an existing building that is now oversized and improperly located relative to the campus. Concurrently, the “recruiting” impression of the current student center is not positive. The building feels empty and dated, it does not convey a vibrant center of student life, rather, just the opposite. Costs to update the Student Center with new heating, ventilation, kitchen equipment, kitchen layout, elevator, emergency lighting and fire alarm will most likely approach costs for new construction / addition of a dining commons. Further design study is most certainly warranted. **(P2)**

STUDENT CENTER ELECTRICAL NOTES

ELECTRICAL DISTRIBUTION SYSTEM

The secondary service originates from utility company transformers located within an interior vault adjacent to the main mechanical/boiler room. The utility primary lines run underground from the manhole structures installed within the roadways to the street utility pole structure. The secondary service feeders enter the electrical/mechanical room directly from the pad-mount utility company transformer and connect into an 800 ampere, 120/208 volt, three phase, 4 wire main switchboard manufactured by Siemens Corporation. The building is secondary metered.The 120/208 volt distribution panelboards located throughout the building provide power to lighting, mechanical systems, accessible lift, major motor loads and miscellaneous loads. (The building does not have an elevator). The sub-panels in the building are mostly original to the building. All panels appeared to be at capacity with no spare breakers. The main switchboard and the sub-panels are in most cases original to the building and appear to be in good operating condition.

INTERIOR LIGHTING

The lighting consists mostly of surface-mount 2-lamp and 3-lamp, surface and recessed mount acrylic lens, fluorescent light fixtures within the hallways. They appear to be 32 watt - T8 lamps. The main dining areas consist of recessed incandescent style fixture. With the exception of the areas renovated within the past several years, the fixtures throughout appear to be original to the building and are showing signs of deterioration. Local wall mounted switches are used for lighting control. There is no occupancy sensor control observed.

EXTERIOR LIGHTING

The exterior light poles appear to be original to the site. The poles are fourteen feet in height and utilize retrofit fluorescent lamps as replacement for the original incandescent. The exterior soffit lights used to illuminate the main entrance are compact fluorescent which replaced the original incandescent lamps – the fixtures are in poor condition. The exterior light fixtures are controlled via time clocks.

EMERGENCY SYSTEMS

The building is currently supported by a 60 kW diesel generator manufactured by ONAN Company. The generator provides standby power to the stairwells, corridors, kitchen area and the boiler heating system. It is unknown if the 60kW generator is at capacity. A more comprehensive survey of the emergency lighting and generator system is needed to properly assess what the generator powers during a power loss. Life safety circuits appear to be combined with the standby power circuits. The generator in its current configuration does not meet the requirement of NFPA 70-2017 for life safety systems.

FIRE ALARM SYSTEM

The system consists of a conventional zoned system, manufactured by Simplex-Grinnell 4005 series. Pull stations are installed at most egress doors. In some locations, the height of devices do not meet ADA requirements. audio/strobe devices are on the walls in the corridors, and common areas. There are heat detectors installed in the mechanical rooms. The kitchen hood and related fire suppression controls are controlled via the fire alarm system.The system is connected via the security which notifies the U.L. approved central monitoring agency. The fire alarm device coverage is inadequate for an assembly/school classroom building and is not compliant with current codes for notification and carbon monoxide detection coverage. If renovations are to occur, the system should be replaced or upgraded with any renovation.

STUDENT CENTER ELECTRICAL NOTES

WIRING DEVICES
Duplex receptacle and switching control devices are original to the building. The devices are properly grounded and appear to be in good operating condition.

SECURITY SYSTEM
The intrusion detection system consists of door contacts on all exterior doors and select motion sensors. A keypad was located at the main entrance and the rear door to arm and disarm the system. The system is S2 series which supports both the north and south campus. The system is monitored by campus police. The CCTV system consisted of cameras located throughout the facility monitoring the common areas and exterior egress doors.

TELECOMMUNICATIONS
The building has an IDF closet with full cabling throughout the facility. The system appears adequate to support the needs of the facility.

STUDENT CENTER ELECTRICAL RECOMMENDATIONS

MAIN ELECTRICAL SERVICE
The existing electrical service rated for 800 ampere at 120/208 volt, appears to have adequate capacity to support the needs of the building. Since the building is approximately 56 years old, it is not known whether or not the equipment has not been maintained or tested over the years. The main distribution board, related breakers and all branch circuit panels should have an infrared scan performed to ensure that the components are not deteriorating and are still capable of operating in the manner in which they were designed. At a minimum, the breakers should be cleaned, and load tested for failure analysis. The grounds should be tested to ensure that they are still structurally sound. All connections should be tightened in accordance with manufacturer's recommendations. The feeders should be tested to ensure proper connections. Further information is required to determine the current electrical demand on the building. **(P2)**

INTERIOR LIGHTING SYSTEMS
Incorporate occupancy sensor control in all corridors. Replace light fixtures with energy efficient LED light fixtures to meet the energy conservation code, Ct State Building Code and the standards of the Illuminating Engineering Society (IES). Incorporate low voltage lighting system to the public space lighting circuits for optimum energy efficiency. Coordinate fixture selection to maximize utility rebates. **(P2)**

EMERGENCY LIGHTING SYSTEMS
It appears that the existing emergency lighting installed throughout is not connected to the normal lighting circuit protecting the immediate area. In accordance with Life Safety 101, the emergency branch circuit is to energize in the event of a normal lighting failure within the area of protection. As a matter of life safety, the emergency lighting should be upgraded to meet current code standards. Additionally, illuminated exit signs should be installed throughout the facility to properly indicate the means of egress. **(P2)**

FIRE ALARM SYSTEM
Replace the existing zoned fire alarm system with a code compliant addressable voice notification ADA system that meets NFPA standards, National Electric Code, CT State Building Code and local fire department requirements. Install devices to meet ADA requirements and provide better coverage to support the needs of the facility. **(P2)**

STUDENT CENTER MECHANICAL NOTES

HEATING, VENTILATION, AIR CONDITIONING

Two (2) Weil-McLain oil-fired hot water boilers are located in the Basement Level Mechanical Room and provide space and domestic hot water heating. The boilers are original to the building and now 54 years old.

The entire building is provided with air conditioning. A Trane water chiller is located in the Basement Level Mechanical Room.

Two (2) Bell & Gossett base-mounted dual temperature water pumps circulate water to a 2-pipe system. The pumps are in good condition.

An underground fuel oil storage tank is provided and serves the hot water boilers and oil- fired domestic hot water heater.

The boiler room was very hot during the visit.

The generator exhaust stack connects to the boiler breeching which is not Code compliant.

Vertical unit ventilators are provided in the Dining Hall. The associated outside air intake louvers have been blocked off. Two (2) roof-mounted exhaust fans for the Dining Hall ventilation system have been removed with the roof openings blocked off. There is no mechanical ventilation for the Dining Hall. The unit ventilators are original to the building and now 54 years old.

The Basement Level Culinary Classroom is provided with a kitchen exhaust hood over the gas cooking stoves, however, a make-up air system is not provided.

The main Cooking Kitchen is provided with multiple kitchen exhaust hoods, however, a make-up air system is not provided. The exhaust fan associated with the main kitchen exhaust hood is original to the building and now 54 years old.

PLUMBING

Domestic hot water heating is primarily by the space heating boilers.

A vertical domestic hot water storage tank is located in the Boiler Room.

An oil-fired domestic hot water heater is provided in the Boiler Room and used in the summer. The hot water heater is in fair condition.

A 1,000 gallon above ground propane storage tank is provided and serves the gas cooking appliances.

FIRE PROTECTION

The building is not sprinkler protected.

STUDENT CENTER MECHANICAL RECOMMENDATIONS

Boilers need to be replaced. New boilers to be high efficiency propane gas-fired. **(P2)**

Dual temperature water pumps will need replacement in 5-10 years. New pumps will be provided with variable frequency drives for variable volume pumping. In conjunction with the pump replacement, coil 3-way ACVs will need to be replaced with 2-way ACVs . **(P2)**

Unit ventilators need to be replaced. Replace all unit ventilators throughout the building with fan coil units and a separate mechanical ventilation system. **(P2)**

Dual temperature water piping is over 50 years old and past its useful life. Replace all dual temperature water piping throughout the building. **(P2)**

Replace antiquated Boiler Room pneumatic controls with new DDC controls. **(P2)**

Add general ventilation in the Boiler Room. **(P2)**

Provide a new propane gas-fired make-up air unit for the Commercial Kitchen. **(P2)**

Provide a new propane gas-fired make-up air unit for the Culinary Arts Classroom. **(P2)**

The main Kitchen hood exhaust fan is 54 years old and is in need of replacement. **(P2)**

Install a new ventilation system for the Dining Hall. **(P2)**

Existing oil-fired domestic hot water heater will need replacement within 5 years. New domestic hot water heater to be propane gas-fired. **(P2)**

Modify the generator exhaust stack to run separately from the boiler breeching. **(P2)**

Expand the existing propane gas system to the proposed new gas-fired boilers, domestic hot water heater and make-up air units. Proposed system will require multiple aboveground propane gas storage tanks and new piping. **(P2)**

Install a new automatic sprinkler system to serve the entire building. Since the water supply is from a well, a fire pump and fire water storage tank may be required. **(P2)**

STUDENT CENTER FOOD SERVICE NOTES

The south campus dining hall, located in the Student Center, serves breakfast and dinner to boarding students and faculty along with their families. The kitchen and storage capacities of the South campus are adequate, but the equipment is older and in worse condition than the north campus. In general, it's just much older and there is more wear and tear. Additionally, the building footprint is round so the space is not efficiently used and foodservice is spread out across many areas. For example, the walk-in cooler and some of the dry storage is located in the basement. Some of the walk-in coolers are in poor shape as well. There are two dumbwaiters used for vertical transportation, but one unit has been decommissioned and is being used for parts to service the remaining unit.

During our visit we learned that the South Campus was beginning to serve only dinner to boarding students and faculty. As a result, boarding students and faculty will need to travel to the North Campus during breakfast and lunch. This is being implemented to reduce operating cost and as of this report the efficacy of that change is unknown, but it will clearly place additional demand on the North Campus kitchen and servery.

The serving lines at the south campus are organized into two zones. There is a set of serving lines within the kitchen zone and a more recently added serving line within the dining area. The dirty dish return is accessed from the dining area, which is convenience, but it is not attached to the kitchen. As a result, labor is spread out and duplicated during certain times of the day. The equipment within the dish washroom is extremely inefficient.

The finishes in South Campus are also older and in worse shape than the North Campus. There are areas in the basement with failed ceiling systems, mold, and failed floors when looking at it from a public health perspective. Some of the existing walk-in coolers are abandoned in place and portions of the basement is being shared with other programs.

A general reorganization of the foodservices program is warranted. Consolidating the foodservice operation makes sense however careful study as to how and where the main kitchen and servery is located must be carefully considered.

LOOS CENTER FACILITY ASSESSMENT
October 15, 2019

Juster Pope Frazier LLC
Architects

Shepherd Engineering Inc.
Electrical Engineers

VAV International Inc.
Mechanical Engineers

High Output
Theater Consultant

Designation Key for Phasing Recommendations

Phase 1 **(P1)**: Recommendations classified as “Phase 1” are considered to be the highest priority and should be addressed within the next year.
Phase 2 **(P2)**: Recommendations classified as “Phase 2” are considered to be the next highest priority (after Phase 1) and should be addressed within the next five years.
Phase 3 **(P3)**: Recommendations classified as “Phase 3” are considered to be the next highest priority (after Phase 1 and Phase 2) and should be addressed within the next ten years

LOOS CENTER ARCHITECTURAL NOTES

Loos is a masonry building built 1963 to 1965 as part of the Annhurst College campus build out. It is Woodstock's primary boys performing arts venue. It is 33,620 gross square feet in area extending over a single floor and basement. The basement level houses mechanical, electrical and fire protection equipment, dressing rooms, lecture hall and classrooms. The first floor houses a 1200 seat performing arts theater, lobby, classrooms and art gallery. The theater is scheduled to integrate new theatrical and house lighting and a new motorized rigging system during Fall of 2019.

EXTERIOR NOTES

The exterior windows, insulated glass with operable sliders, also appear to be in good shape. However, insulated glass systems have an expected lifespan of 25 to 30 years before failing. The Academy should be diligent in inspecting exterior windows on a yearly basis and establish a glazing replacement allowance within their yearly capital improvements budget. Some minor work should be done on exterior stairs resetting those that have loosened over the years.

INTERIOR NOTES

The building floor plan is bisected by the theater lobby. The theater with basement mechanical and dressing rooms is located south of the lobby, the classroom / lecture hall wing to the north. The northern half of the plan is "split level" to the main lobby, ie. the entry is located at the stair landing between the basement and first floor. Present day building code requires that egress set up in this manner include a gated barrier to prevent occupants from winding down into the basement level instead of exiting at the main lobby. Egress signage also needs to be included within at the stair landing. The mid landing entry also makes the entire north wing inaccessible for barrier free. The classrooms at the north wing are repurposed science labs for the most part. Though there is a lot of perimeter casework associated with the former labs, it does not impact use of the classrooms.

The theater itself is quite dark, house lights, theater lighting and emergency egress lighting need to be improved significantly. Our theater consultant notes significant issues with the rigging system. It is understood that these improvements will occur during Fall 2019. The stage and lower level dressing rooms are not barrier free.

LOOS CENTER RECOMMENDATIONS

The basement and upper floor of the north wing are not accessible. The theater stage and basement dressing rooms are not accessible. The Academy needs to consider whether it is "reasonable" to make these spaces fully accessible. ADA makes note that spaces such as these should be made accessible if the client feels it is "reasonable" to do so. In this case providing such access would be fairly expensive as stand alone projects. The circular north wing layout would require integration of an elevator within the building itself as would the theater wing. Access to the stage could be accomplished with a self contained lift but integrating the lower level dressing rooms would be problemmatic. Presently the main lobby, toilets and theater are accessible. Small additions of a box office and possibly a coat check room may be practical off the main lobby, east side, similar to what was done with recent toilet additions.

LOOS CENTER ELECTRICAL NOTES

ELECTRICAL DISTRIBUTION SYSTEM

The secondary service originates from an exterior utility company pad-mount transformer located on the front of the building, near the main mechanical/boiler room. The utility primary lines run underground from the opposing street utility pole structure. The secondary service feeders enter the basement electrical/mechanical room directly from the pad-mount utility company transformer and connect into a 400 ampere, 120/208 volt, three phase, 4 wire main panelboard manufactured by Westinghouse. The building is secondary metered.

The 120/208 volt distribution panelboards located throughout the building provide power to lighting, mechanical systems, elevator, major motor loads and miscellaneous loads. The main switchgear and sub-panels in the 1966 building are mostly original to the building. All panels appeared to be at capacity with no spare breakers. They are in fair condition.

INTERIOR LIGHTING

The lighting consists mostly of surface-mount 2-lamp and 3-lamp, surface-mount acrylic lens, fluorescent light fixtures. They appear to be 32 watt - T8 lamps, original to the building and showing wear. Local wall mounted switches are used for lighting control. There is no occupancy sensor control observed. Recently renovated classrooms utilize 2x2 LED fixtures

EXTERIOR LIGHTING

The exterior light poles appear to be original to the site. The poles are eight feet in height and utilize retrofit fluorescent lamps as replacement for the original incandescent. The exterior soffit lights used to illuminate the main entrance are compact fluorescent which replaced the original incandescent lamps – the fixtures are in poor condition. The exterior light fixtures are controlled via time clocks.

EMERGENCY SYSTEMS

The building is currently supported by a 30 kW diesel generator manufactured by ONAN Company. The generator provides standby power to the stairwells, corridors and the boiler heating system. It is unknown if the 45kW generator is at capacity. A more comprehensive survey of the emergency lighting and generator system is needed to properly assess what the generator powers during a power loss. Life safety circuits appear to be combined with the standby power circuits. The generator in its current configuration does not meet the requirement of NFPA 70-2017 for life safety systems.

FIRE ALARM SYSTEM

The fire alarm system consists of an addressable system, manufactured by Simplex-Grinnell Co. 4010 series. The system appears to be fairly new. Pull stations are installed at most egress doors. In some locations, the height of devices do not meet ADA requirements. audio/ strobe devices are on the walls in the corridors, classrooms and common areas. There are heat detectors installed in the mechanical rooms. The common hallways have smoke detectors installed every 30’-0” on center with magnetic door holders installed on the intermediate corridor doors. The system is connected via the security which notifies the U.L. approved central monitoring agency. The fire alarm device coverage is inadequate for a school/ dormitory building and is not compliant with current codes for notification and carbon monoxide detection coverage.

LOOS CENTER ELECTRICAL NOTES

WIRING DEVICES

With the exception of the areas of renovation, the duplex receptacle and switching control devices are original to the building. The devices are properly grounded and appear to be in good operating condition. If renovations were to occur, then additional duplex recpetacles for general power should be installed throughout to support the needs of the facility.

SECURITY SYSTEM

The intrusion detection system consists of door contacts on all exterior doors and select motion sensors. A keypad was located at the main entrance and the rear door to arm and disarm the system. The system is S2 sereis which supports both the north and south campus. The system is monitored by campus police.

TELECOMMUNICATIONS

The building has an IDF closet with full cabling throughout the facility. The system appears adequate to support the needs of the facility.

LOOS CENTER ELECTRICAL RECOMMENDATIONS

MAIN ELECTRICAL SERVICE

The existing electrical service rated for 2000 ampere at 277/480 volt, appears to have more than adequate capacity to support the needs of the building. Since the building is approximately 28-30 years old, it is not known whether or not the equipment has not been maintained or tested over the years. The main distribution board, related breakers and all branch circuit panels should have an infrared scan performed to ensure that the components are not deteriorating and are still capable of operating in the manner in which they were designed. At a minimum, the breakers should be cleaned, and load tested for failure analysis. The grounds should be tested to ensure that they are still structurally sound. All connections should be tightened in accordance with manufacturer's recommendations. The feeders should be tested to ensure proper connections. **(P2)**

INTERIOR LIGHTING SYSTEMS

The lighting consists mostly of surface-mount 2-lamp and 3-lamp, surface-mount acrylic lens, fluorescent light fixtures. They appear to be 32 watt - T8 lamps. With the exception of the areas renovated within the past several years, the fixtures throughout appear to be original to the building, but in fair condition. Local wall mounted switches are used for lighting control. There is no occupancy sensor control observed with the exception of the renovated bathrooms adjacent to the main lobby. **(P2)**

The theatrical lighting system is supported by ETC which controls the theatrical lighting and house lights. The theatrical lights consist of a combination of incandescent and LED which are in good operating condition. The house lights were recently converted to LED utilizing LED lamp replacement kits. There a no aisle lights to illuminate the means of egress path when the house lights are off. **(SCHEDULED FOR REPLACEMENT FALL 2019)**

EMERGENCY LIGHTING SYSTEMS

The building is currently supported by a 45 kW diesel generator manufactured by ONAN Company. The generator provides standby power to the stairwells, theater, restrooms and selective corridors. It is unknown if the 45kW generator is at capacity. A more comprehensive survey of the emergency lighting and generator system is needed to properly assess what the generator powers during a power loss. Life safety circuits appear to be combined with the standby power circuits. The generator in its current configuration does not meet the requirement of NFPA 70-2017 for life safety systems. **(P2)**

FIRE ALARM SYSTEM

Replace the existing zoned fire alarm system with a code compliant addressable voice notification ADA system that meets NFPA standards, National Electric Code, CT State Building Code and local fire department requirements. Install devices to meet ADA requirements and provide better coverage to support the needs of the facility. **(ADDRESS IN 2019 RENOVATION)**

Further information is required to determine if the theatrical dimming and sound systems are controlled via the fire alarm to automatically bring the house lights up to 100% and turn the sound system off in the event of an alarm condition. **(ADDRESS IN 2019 RENOVATION)**

LOOS CENTER MECHANICAL NOTES

HEATING, VENTILATION, AIR CONDITIONING

The Auditorium is served by two large air handling units located in two separate Mechanical Rooms in the Basement Level. The air handling units are original to the building and now 51 years old. The air handling units are provided with DX cooling coils and electric heating coils and pneumatic controls.

Two air-cooled condensing units are located outside on grade. The units are original to the building and now 51 years old.

Outside air wall intake louvers are located on each side of the building, however, are only a few inches above grade. The intake louvers are blocked off in the winter to prevent snow from entering the building.

The air handling units are very noisy and have a significant fan vibration. The noise was not transferring up to the Auditorium above.

This is an all electrically heated building. There is no boiler or fuel oil storage tank.

The First Floor bathrooms were renovated 3 years ago and provided with air conditioning.

A chilled water plant is located in the Basement Level Mechanical Room and provides cooling to the Classrooms. The water chiller is located indoors in the Mechanical Room while the condenser is located outside on grade.

Chilled water pumps are in the Basement Level Mechanical Room. The chilled water pumps are in poor condition with rust all over them.

PLUMBING

The First Floor bathrooms were renovated 3 years ago and new fixtures were installed.

There is no propane gas service to the building.

A 52 gallon electric hot water heater is located in the Basement Level Mechanical Room.

FIRE PROTECTION

A 4" fire protection main runs underground from the Fire Pump building at the Gymnasium and enters the building at the East Mechanical Room in the Basement Level.

Fire protection is only provided in the Basement Level Mechanical Rooms and the Auditorium stage.

LOOS CENTER MECHANICAL RECOMMENDATIONS

Auditorium HVAC equipment is original (51 years old) and in need of replacement. **(P2)**

Replace Auditorium pneumatic controls with new DDC controls which are integrated into campus wide system of energy management and monitoring. **(P2)**

Re-configure Auditorium outside air intake openings to be minimum 24" above grade. **(P2)**

Replace electric heat throughout building with new hot water heaters. Install a new hot water boiler plant including a new outdoor propane gas tank and piping. **(P2)**

Extend fire protection to all areas of the building. **(P1)**

LOOS CENTER THEATER RECOMMENDATIONS

The existing house lights are in bad shape, and need to be addressed. The room is very dark. The house lights are still running thru the original Kliegl dimmers and control console. The replacement "free" dimmable LED lamps installed a few years ago are not working well. The school is no longer dimming them because they "blink" when dimmed.

Aisle Lights and Emergency Egress lighting must be addressed. The temporary aisle light solution provided by the school is not appropriate as a long-term solution. The (3) lights that come on as part of the emergency relay appear inadequate.

The existing counterweight rigging system is outdated and starting to become a significant safety issue. It should be upgraded to an all motorized solution.

The Proscenium Fire Safety Curtain is made of asbestos. It should be replaced with a modern version.

The theatrical dimming and control system should be addressed. (3) Strand CD80 dimmer packs were installed in 1999 as a temporary fix for the aging Kliegl dimmers. Those dimmers are now 20 years old, and starting to have problems of their own.

Acoustic improvements at the stage should be considered. These would include acoustic clouds integrated into the rigging system and a modular, portable, acoustic shell. These would improve the acoustic performance of the theater for choral and band.

NOTE: ALL THEATER COMMENTS ABOVE ARE SCHEDULED FOR FALL 2019 RENOVATION WORK

SOUTH GYMNASIUM FACILITY ASSESSMENT
October 15, 2019

Juster Pope Frazier LLC
Architects

Shepherd Engineering Inc.
Electrical Engineers

VAV International Inc.
Mechanical Engineers

Designation Key for Phasing Recommendations

Phase 1 **(P1)**: Recommendations classified as “Phase 1” are considered to be the highest priority and should be addressed within the one to two years.
Phase 2 **(P2)**: Recommendations classified as “Phase 2” are considered to be the next highest priority (after Phase 1) and should be addressed within the next five years.
Phase 3 **(P3)**: Recommendations classified as “Phase 3” are considered to be the next highest priority (after Phase 1 and Phase 2) and should be addressed within the next ten years.

Gymnasium

GYMNASIUM ARCHITECTURAL NOTES

The Gymnasium was built in 1999 as an addition to the Hyde School campus. It is a combination of masonry bearing walls, exterior metal panels and tilt up concrete panel construction. The building houses a large gymnasium, weight training room, locker facilities and athletics training room. It is 29,650 gross square feet in area.

EXTERIOR NOTES

The building exterior is in good shape and does not appear to require work of any significance. The Academy should establish a regular program of inspecting caulk joints between tilt up panels.

INTERIOR NOTES

The building interior is also in good shape and does not appear to require work of any significance. HVAC renovations of the locker rooms should be considered. The building has a clear simple floor plan and functions well for its needs. Recent renovations to the weight room and second floor training room have been done well. The boiler room is quite small and may need to be expanded (or relocated) in order to facilitate installation of redundant back up boiler.

GYMNASIUM RECOMMENDATIONS

The Academy should do yearly inspection of vertical caulk joints at the concrete panel construction to ensure that these remain water tight. **(P2)**

Regular inspection of the exterior windows should be undertaken in the next five to ten years as the building is now twenty years old. It is clear that the building is well maintained, such diligent attention to maintenance should continue. HVAC and Electrical recommendations follow below. The boiler room is quite small and may need to be expanded (or relocated) in order to facilitate installation of redundant back up boiler. **(P2)**

GYMNASIUM ELECTRICAL NOTES

ELECTRICAL DISTRIBUTION SYSTEM

The secondary service originates from an exterior utility company pad-mount transformer located on the side of the building, near the main mechanical/boiler room. The utility primary lines run underground from the manhole structures installed within the roadways to the street utility pole structure. The secondary service feeders enter the electrical/mechanical room directly from the pad-mount utility company transformer and connect into an 800 ampere, 120/208 volt, three phase, 4 wire main switchboard manufactured by Siemens Corporation. The building is secondary metered.

The 120/208 volt distribution panelboards located throughout the building provide power to lighting, mechanical systems, elevator, major motor loads and miscellaneous loads. The sub-panels in the building are mostly original to the building. All panels appeared to be at capacity with no spare breakers.

The main switchboard and the sub-panels are in most cases original to the building and appear to be in good operating condition

INTERIOR LIGHTING

The lighting consists mostly of surface-mount 2-lamp and 3-lamp, surface and recessed mount acrylic lens, fluorescent light fixtures. They appear to be 32 watt - T8 lamps. With the exception of the areas renovated within the past several years, the fixtures throughout appear to be original to the building and are showing signs of deterioration. Local wall mounted switches are used for lighting control. There is no occupancy sensor control observed.

EMERGENCY SYSTEMS

The building is currently supported by a self-contained emergency battery units. The emergency battery units provide standby power to the stairwells, gymnasium, restrooms, corridors and locker rooms

FIRE ALARM SYSTEM

The fire alarm system consists of a voice notification system, manufactured by Notifier Co. SFP-1024 series. The system appears to be fairly new. Pull stations are installed at most egress doors. In some locations. Speaker/strobe devices are on the walls in the gymnasium, corridors, locker rooms, and related spaces. There are heat detectors installed in the mechanical rooms. The system is connected via the security which notifies the U.L. approved central monitoring agency.

WIRING DEVICES

The duplex receptacle and switching control devices are original. The devices are properly grounded and appear to be in good operating condition.

GYMNASIUM ELECTRICAL NOTES

SECURITY SYSTEM

The intrusion detection system consists of door contacts on all exterior doors and select motion sensors. A keypad was located at the main entrance and the rear door to arm and disarm the system. The system is S2 series which supports both the north and south campus. The system is monitored by campus police.

The CCTV system consisted of cameras located throughout the facility monitoring the common areas and exterior egress doors.

TELECOMMUNICATIONS

The building has an IDF closet with full cabling throughout the facility. The system appears adequate to support the needs of the facility.

GYMNASIUM ELECTRICAL RECOMMENDATIONS

MAIN ELECTRICAL SERVICE

The existing electrical service rated for 800 ampere at 120/208 volt, appears to have adequate capacity to support the needs of the building. Since the building is approximately 20 years old, and well maintained it is logical to assume that the electrical infrastructure is in good shape. As general maintenance, and while other older buildings on campus are having electrical work done, the breakers should be cleaned, and load tested for failure analysis. The grounds should be tested to ensure that they are still structurally sound. All connections should be tightened in accordance with manufacturer's recommendations. The feeders should be tested to ensure proper connections. Further information is required to determine the current electrical demand on the building. **(P2)**

INTERIOR LIGHTING SYSTEMS

Incorporate occupancy sensor control in all corridors. Replace light fixtures with energy efficient LED light fixtures to meet the energy conservation code, Ct State Building Code and the standards of the Illuminating Engineering Society (IES). Incorporate low voltage lighting system to the public space lighting circuits for optimum energy efficiency. Coordinate fixture selection to maximize utility rebates. **(P2)**

EMERGENCY LIGHTING SYSTEMS

It appears that the existing emergency lighting installed throughout is not connected to the normal lighting circuit protecting the immediate area. If the lighting circuit were to fail, the emergency lighting would not automatically come on. The emergency lighting would only operate if the building power were to fail or if the branch circuit to the emergency lighting panel were to fail. In accordance with Life Safety 101, the emergency branch circuit is to energize in the event of a normal lighting failure within the area of protection. Several methods are used to accomplish this – emergency self-contained battery units are installed throughout connected to the line side of the local lighting circuit. With the emergency standby generator, relays are used to control the lighting – a holding relay will control a normally off fixture which will energize in the event of a lighting failure in the immediate area. A bypass relay will be used in conjunction to operate a single fixture connected to both a normal and emergency branch circuit source. In the event of a power failure, the relay will revert to the emergency side of the branch circuit bypass the local lighting controls and stay illuminated until such time the normal power has been restores. As renovations and additions occur, the emergency lighting should be upgraded to meet current code standards. Additional illuminated exit signs should be installed throughout the facility to properly indicate the means of egress. **(P2)**

FIRE ALARM SYSTEM

Replace the existing zoned fire alarm system with a code compliant addressable voice notification ADA system that meets NFPA standards, National Electric Code, CT State Building Code and local fire department requirements. Install devices to meet ADA requirements and provide better coverage to support the needs of the facility. **(P2)**

GYMNASIUM MECHANICAL NOTES

HEATING, VENTILATION, AIR CONDITIONING

One cast iron sectional, oil-fired hot water boiler is provided for both space and domestic hot water heating. The boiler is located in a crammed Boiler Room. Two (2) cast iron sections were observed to be leaking and the boiler was under repair.

A wall louver is provided in the Boiler Room, however, the room was very hot.

Duplex hot water pumps are located in the Boiler Room.

Multiple pipe fittings were observed to have corrosion.

Two (2) indoor H&V units are provided for the Locker Rooms and Second Floor Weight Room.

Exhaust ductwork from the Locker Rooms recirculates air back to the H&V unit serving the Weight Room.

Air in the Locker Rooms was stagnant. A separate exhaust fan serving the Locker Room area was not operating during the visit.

PLUMBING

Domestic hot water heating is via the hot water boiler located in the Boiler Room. The boiler operates year-round to provide domestic hot water heating.

A vertical domestic hot water storage tank is located in the Boiler Room.

There are no bathrooms located on the Second Floor.

FIRE PROTECTION

The building is sprinkler protected. Fire protection is provided from a well system. A separate Fire Pump building is located adjacent to the Gymnasium. A diesel fire pump is provided and is located directly over a 35,000 gallon underground water storage tank.

A 2,500 gallon double wall, fiberglass underground fuel oil tank is provided to serve the fire pump.

The fire protection system serves the Gymnasium building and portions of the nearby Center for the Arts building.

An underground fire main runs between the Fire Pump building and the Center for the Arts building.

GYMNASIUM MECHANICAL RECOMMENDATIONS

The boiler was leaking at the time of visit and was being repaired. The boiler runs all year as it provides indirect domestic hot water heating. Installation of a new summer domestic hot water heater is recommended to reduce the wear on the boiler. Space in the Boiler Room is very limited. **(P2)**

Install a small propane gas tank to serve the proposed new propane gas-fired summer domestic hot water heater. **(P2)**

The boiler will need replacement within 5 years. Two boilers are recommended for redundancy, however, there is not enough room in the Boiler Room to fit 2 boilers. **(P2)**

Hot water pumps will need to be replaced within 5 years. New pumps will need to be provided with variable frequency drives to convert to a variable volume pumping system. In conjunction with the pump replacement, hot water coil 3-way ACVs will need to be replaced with 2-way ACVs. **(P2)**

Increase general ventilation to the Boiler Room. **(P2)**

Recirculating Locker Room air is a Code violation and will need to be corrected. The Locker Room ventilation systems will need to be upgraded to exhaust all Locker Room air to the outdoors and replace the existing H&V unit with a new make-up air unit sized for 100% outdoor air. **(P1)**

Water quality needs to be analyzed as pipe fittings in the Boiler Room have significant corrosion. **(P1)**

WESTHAVER BUILDING FACILITY ASSESSMENT
October 15, 2019

Juster Pope Frazier LLC
Architects

Shepherd Engineering Inc.
Electrical Engineers

VAV International Inc.
Mechanical Engineers

Designation Key for Phasing Recommendations

Phase 1 **(P1)**: Recommendations classified as “Phase 1” are considered to be the highest priority and should be addressed within the next year to two years.
Phase 2 **(P2)**: Recommendations classified as “Phase 2” are considered to be the next highest priority (after Phase 1) and should be addressed within the next five years.
Phase 3 **(P3)**: Recommendations classified as “Phase 3” are considered to be the next highest priority (after Phase 1 and Phase 2) and should be addressed within the next ten years.

WESTHAVER RESIDENCE HALL ARCHITECTURAL NOTES

Westhaver is a masonry building built 1963 to 1965 as part of the Annhurst College campus build out. It is the primary boys residence hall with ninety two beds and six faculty apartments. The building, 32,000 gross square feet in area, extending over three floors and a full basement. The basement level includes offices, south campus student lounge, bathroom, boiler and electric rooms, classrooms and faculty apartment. The upper floors consist of student rooms, faculty apartments, bathrooms and small common spaces. The building is served by a small elevator which is original to the building, however the primary entries to the building are not accessible. A ramp at the backside of the building, leading down to the basement level provides barrier free access into the building. The building has a flat roof and is very sturdily built with masonry bearing walls and concrete plank construction.

EXTERIOR NOTES

Like all of the south campus construction, the existing masonry bearing wall construction is in good shape and does not require immediate attention. The exterior windows appear to be in good shape. However, insulated glass systems have an expected lifespan of 25 to 30 years before failing. The Academy should be diligent in inspecting exterior windows on a yearly basis and establish a glazing replacement allowance within their yearly capital improvements budget.

INTERIOR NOTES

The floor plan is a classic double loaded corridor around service areas, bathrooms, mechanical at the center core. Like many of the South Campus buildings, the first floor level is one half story above grade, presenting access issues at each door other than the east lower level entry. This entry is accessed through a series of ramps down to the central student lounge. Bedrooms are fairly generous spaces and in good shape. Interior corridors are a bit relentless in their length and quite dark due to paint color and poor lighting. Bathrooms are dated but in good shape though there is a problem with floor drainage in some locations.

WESTHAVER RESIDENCE HALL EXTERIOR RECOMMENDATIONS

Depending upon a decision to deaccess the current student center, Westhaver is a logical candidate to review design options for new dining commons and kitchen. The existing student center already provides some usable space for dining (not enough) so locating dining /kitchen at the lower level would be a place to consider. Having said that, the scale of such addition into the quad would significantly impact existing utiities. Basement locations for dining are not optimal but this could be feasible. **(P1)** We do not see any further work on building exteriors at this time.

WESTHAVER RESIDENCE HALL INTERIOR RECOMMENDATIONS

We recommend that the existing toilets be fully renovated and updated with new finishes and fixtures. Concurrently, existing plumbing systems should be scoped. We have heard comments that the existing floor drains in some bathrooms back up frequently. **(P2)**

The study of additional and better commons space should also be considered. The current commons room are dark, ill proportioned and uninviting. **(P2)**

The corridors should be repainted in a lighter color scheme with new lighting. Some thought should be given to pilasters or other design device to help reduce the perceived length. **(P2)**

WESTHAVER RESIDENCE HALL ELECTRICAL NOTES

ELECTRICAL DISTRIBUTION SYSTEM

The secondary service originates from an exterior utility company pad-mount transformer located on the front of the building, near the main mechanical/boiler room. The utility primary lines run underground from the opposing street utility pole structure. The secondary service feeders enter the basement electrical/mechanical room directly from the pad-mount utility company transformer and connect into a 400 ampere, 120/208 volt, three phase, 4 wire main panelboard manufactured by Westinghouse. The building is secondary metered.

The 120/208 volt distribution panelboards located throughout the building provide power to lighting, mechanical systems, elevator, major motor loads and miscellaneous loads. The main switchgear and sub-panels in the 1966 building are mostly original to the building. All panels appeared to be at capacity with no spare breakers. They are in fair condition.

INTERIOR LIGHTING

The lighting consists mostly of surface-mount 2-lamp and 3-lamp, surface-mount acrylic lens, fluorescent light fixtures. They appear to be 32 watt - T8 lamps, original to the building and showing wear. Local wall mounted switches are used for lighting control. There is no occupancy sensor control observed. Recently renovated classrooms utilize 2x2 LED fixtures

EMERGENCY SYSTEMS

The building is currently supported by a 30 kW diesel generator manufactured by ONAN Company. The generator provides standby power to the stairwells, corridors and the boiler heating system. It is unknown if the 45kW generator is at capacity. A more comprehensive survey of the emergency lighting and generator system is needed to properly assess what the generator powers during a power loss. Life safety circuits appear to be combined with the standby power circuits. The generator in its current configuration does not meet the requirement of NFPA 70-2017 for life safety systems.

FIRE ALARM SYSTEM

The fire alarm system consists of an addressable system, manufactured by Simplex-Grinnell Co. 4010 series. The system appears to be fairly new. Pull stations are installed at most egress doors. In some locations, the height of devices do not meet ADA requirements. audio/ strobe devices are on the walls in the corridors, classrooms and common areas. There are heat detectors installed in the mechanical rooms. The common hallways have smoke detectors installed every 30’-0” on center with magnetic door holders installed on the intermediate corridor doors. The system is connected via the security which notifies the U.L. approved central monitoring agency. The fire alarm device coverage is inadequate for a school/ dormitory building and is not compliant with current codes for notification and carbon monoxide detection covers

WIRING DEVICES

The duplex receptacle and switching control devices are original to the renovations. The devices are properly grounded and appear to be in good operating condition.

WESTHAVER RESIDENCE HALL ELECTRICAL NOTES

SECURITY SYSTEM

The intrusion detection system consists of door contacts on all exterior doors and select motion sensors. Card readers at located at all exterior doors.The CCTV system consisted of cameras located throughout the facility monitoring the common areas and exterior egress doors.

TELECOMMUNICATIONS

The building has an IDF closet with full cabling throughout the facility. The system appears adequate to support the needs of the facility.

WESTHAVER RESIDENCE HALL ELECTRICAL RECOMMENDATIONS

MAIN ELECTRICAL SERVICE

The existing electrical service rated for 400 ampere at 120/208 volt, appears to have adequate capacity to support the needs of the building. Since the building is approximately 28-30 years old, it is not known whether or not the equipment has not been maintained or tested over the years. The main distribution board, related breakers and all branch circuit panels should have an infrared scan performed to ensure that the components are not deteriorating and are still capable of operating in the manner in which they were designed. At a minimum, the breakers should be cleaned, and load tested for failure analysis. The grounds should be tested to ensure that they are still structurally sound. All connections should be tightened in accordance with manufacturer's recommendations. The feeders should be tested to ensure proper connections. **(P2)**

Further information is required to determine the current electrical demand on the building. The existing electrical service rated for 400 ampere at 120/240 volt, single phase appears to have adequate capacity to support the current needs of the building. Since the building is approximately 54 years old, it is not known whether or not the equipment has been maintained or tested over the years. The main distribution load center panel, related breakers and all branch circuit panels should have an infrared scan performed to ensure that the components are not deteriorating and are still capable of operating in the manner in which they were designed. At a minimum, the breakers should be cleaned, and load tested for failure analysis. The grounds should be tested to ensure that they are still structurally sound. All connections should be tightened in accordance with manufacturer's recommendations. The feeders should be tested to ensure proper connections. Further information is required to determine the current electrical demand on the building. **(P2)**

If a major renovation were to occur, and air conditioning as well as a new elevator were to be installed within the facility, then the electrical systems should be increased to a minimum of a 600 ampere, 120/208 volt, three phase, four wire. **(P2)**

INTERIOR LIGHTING SYSTEMS

Incorporate occupancy sensor control in all corridors. Replace light fixtures with energy efficient LED light fixtures to meet the energy conservation code, Ct State Building Code and the standards of the Illuminating Engineering Society (IES). Incorporate low voltage lighting system to the public space lighting circuits for optimum energy efficiency. Coordinate fixture selection to maximize utility rebates. **(P2)**

EMERGENCY LIGHTING SYSTEMS

It appears that the existing emergency lighting installed throughout is not connected to the normal lighting circuit protecting the immediate area. If the lighting circuit were to fail, the emergency lighting would not automatically come on. The emergency lighting would only operate if the building power were to fail or if the branch circuit to the emergency lighting panel were to fail. In accordance with Life Safety 101, the emergency branch circuit is to energize in the event of a normal lighting failure within the area of protection. As renovations and additions occur, the emergency lighting should be upgraded to meet current code standards. **(P2)**

Additional illuminated exit signs should be installed throughout the facility to properly indicate the means of egress. **(P1)**

FIRE ALARM SYSTEM

Replace the audio-visual devices with low frequency style devices rated for 520 hertz to meet the requirements of NFPA 72-2013 Article 24 and related NFPA standards, National Electric Code, CT State Building Code and local fire department requirements. Install devices to meet ADA requirements and provide better coverage to support the needs of the facility. **(P1)**

WESTHAVER RESIDENCE HALL MECHANICAL NOTES

HEATING, VENTILATION, AIR CONDITIONING

Two (2) Weil-McLain oil-fired hot water boilers are located in the Basement Level Mechanical Room. The boilers are original to the building and now 50 years old.

An existing 5,000 gallon underground fuel oil storage tank will be replaced in 2019. The associated fuel oil level monitor doesn't work.

Two (2) hot water zone pumps and one back-up hot water pump are provided.

The air compressor has failed and the associated HVAC system pneumatic controls do not work. The heating plant is operated as one zone with the 2 zone pumps controlled by an outside air temperature sensor.

The boiler room was very hot during the visit. Boilers need to operate year-round as the domestic hot water heater is non-functional.

The heating plant is provided with a single fuel oil pump.

PLUMBING

The oil-fired domestic hot water heater is non-functional. The heater died in 2018 and is waiting to be replaced. The heating hot water boilers run year-round to provide domestic hot water.

A horizontal domestic hot water storage tank is located in the Mechanical Room.

Plumbing fixtures appear to be original to the building.

FIRE PROTECTION

Fire protection is a NFPA 13D system connected to the domestic water main and only serves the 6 Faculty apartments.

WESTHAVER RESIDENCE HALL MECHANICAL RECOMMENDATIONS

Boilers are 50 years old and in need of replacement. The underground fuel oil storage tank will be replaced in Summer 2019. New boilers will be oil-fired. **(P2)**

Hot water pumps will need replacement in 5-10 years. New pumps will need to be provided with variable frequency drives for variable volume pumping. **(P2)**

Hot water piping is 50 years old and past its useful life. Replace all hot water piping and finned tube radiation throughout the building. **(P2)**

Replace antiquated and non-functional Boiler Room pneumatic controls with new DDC controls. **(P2)**

Install space temperature controls throughout building (currently non-functional pneumatic controls in the Boiler Room). **(P2)**

Replace the single fuel oil pump with new duplex pump set. **(P2)**

Replace the non-functional oil-fired domestic hot water heater with a new propane gas- fired domestic hot water heater. **(P2)**

Install a new outdoor propane gas tank and piping to serve the proposed new propane gas-fired hot water heater. **(P2)**

Add general ventilation in the Boiler Room. **(P2)**

To add air conditioning, install new heating and cooling fan coil units in lieu of finned tube radiation in the dorm rooms. System to be a 2-pipe system with manual heating and cooling seasonal change-over. Install new air-cooled chiller outdoors on grade. **(P2)**

Upgrade the sprinkler system to serve the entire building. Since the water supply is from a well, a fire pump and fire water storage tank may be required. Consideration should be given to expanding and extending the existing fire pump system located adjacent to the Gymnasium building to serve all of the buildings on the South campus. **(P1)**

ANNHURST BUILDING FACILITY ASSESSMENT
October 15, 2019

Juster Pope Frazier LLC
Architects

Shepherd Engineering Inc.
Electrical Engineers

VAV International Inc.
Mechanical Engineers

Designation Key for Phasing Recommendations

Phase 1 **(P1)**: Recommendations classified as “Phase 1” are considered to be the highest priority and should be addressed within the next year.
Phase 2 **(P2)**: Recommendations classified as “Phase 2” are considered to be the next highest priority (after Phase 1) and should be addressed within the next five years.
Phase 3 **(P3)**: Recommendations classified as “Phase 3” are considered to be the next highest priority (after Phase 1 and Phase 2) and should be addressed within the next ten years.

ANNHURST HALL ARCHITECTURAL NOTES

Annhurst is a flat roof masonry building built 1963 to 1965 as part of the Annhurst College campus build out. The building is block bearing walls with concrete plank. It is a multiuse building housing academic functions and administrative functions on the first floor and a boys residence hall on the second floor. It is 30,420 gross square feet in area extending over two floors. Annhurst is an accessible building in that both floors are accessible however toilet facilities need to be renovated to provide accessible toilets for each gender.

EXTERIOR NOTES

The exterior masonry appears to be in very good shape and does not require any substantial work. The exterior windows also appear to be in good shape. However, insulated glass systems have an expected lifespan of 25 to 30 years before failing. The Academy should be diligent in inspecting exterior windows on a yearly basis and establish a glazing replacement allowance within their yearly capital improvements budget.

INTERIOR NOTES

The interiors of Annhurst are in largely good shape. However the interior finishes are somewhat dated and institutional in feeling. Design consideration should be given to improving the residential areas in particular, focusing on commons spaces, corridors and toilets. Bedrooms themselves are comparable in finish and quality to other prep schools we have worked with and do not require work other than lighting improvements.

ANNHURST HALL EXTERIOR RECOMMENDATIONS

We do not feel there are any pressing needs for exterior improvements. However, should the recommendation that the student center be deaccessioned, we feel an addition to Annhurst would be a logical and cost effective location for a new South Campus Dining Commons. Design studies should compare the pros and cons between locating a new dining facility at Annhurst versus at Westhaver.

ANNHURST HALL INTERIOR RECOMMENDATIONS

Residence Halls are a primary factor in recruiting new resident students. As such we feel that the interiors of Annhurst could be improved significantly in common spaces such as bathrooms, corridors and common study / social rooms. The long corridors, combined with outdated lighting, makes for an unpleasant, “dark” experience. Effort to break up corridor lengths and improve lighting should be undertaken and could be accomplished quickly with minor costs. The existing bathroom finishes and fixtures also are dated and institutional in feeling and should be renovated fully including improvements in HVAC. Finally, effort needs to be made in developing “commons rooms” within the residential suite which support social interaction and group study work. These rooms need to be more substantial in scale and detailing. **(P2)**

ANNHURST HALL ELECTRICAL NOTES

ELECTRICAL DISTRIBUTION SYSTEM

The secondary service originates from an exterior utility company pad-mount transformer located on the side of the building, near the main mechanical/boiler room. The utility primary lines run underground from the manhole structures installed within the roadways to the street utility pole structure. The secondary service feeders enter the electrical/mechanical room directly from the pad-mount utility company transformer and connect into an 800 ampere, 120/208 volt, three phase, 4 wire main switchboard manufactured by Siemens Corporation. The building is secondary metered.

The 120/208 volt distribution panelboards located throughout the building provide power to lighting, mechanical systems, elevator, major motor loads and miscellaneous loads. The sub-panels in the building are mostly original to the building. All panels appeared to be at capacity with no spare breakers.

The main switchboard and the sub-panels are in most cases original to the building and appear to be in good operating condition

INTERIOR LIGHTING

The lighting consists mostly of surface-mount 2-lamp and 3-lamp, surface and recessed mount acrylic lens, fluorescent light fixtures. They appear to be 32 watt - T8 lamps. With the exception of the areas renovated within the past several years, the fixtures throughout appear to be original to the building and are showing signs of deterioration. Local wall mounted switches are used for lighting control. There is no occupancy sensor control observed.

EXTERIOR LIGHTING

The exterior light poles appear original to the site. They have been retrofitted with fluorescent lamps. The exterior soffit lighting, fluorescent cans, are in poor condition and should be replaced. All exterior fixtures are controlled by time clocks.

EMERGENCY SYSTEMS

The building is currently supported by a 45 kW propane generator manufactured by Kohler Company. The generator provides standby power to the stairwells, corridors and the boiler heating system. It is unknown if the 45kW generator is at capacity. A more comprehensive survey of the emergency lighting and generator system is needed to properly assess what the generator powers during a power loss. Life safety circuits appear to be combined with the standby power circuits. The generator in its current configuration does not meet the requirement of NFPA 70-2017 for life safety systems.

FIRE ALARM SYSTEM

The fire alarm system consists of an addressable system, manufactured by Silent Knight 6808 series. The system appears to be fairly new. Pull stations are installed at most egress doors. In some locations, the height of devices do not meet ADA requirements. audio/strobe devices are on the walls in the corridors, and common areas. There are heat detectors installed in the mechanical rooms. The common hallways have smoke detectors installed every 30’-0” on center.The system is connected via the security which notifies the U.L. approved central monitoring agency. The fire alarm device coverage is inadequate for a school classroom building and is not compliant with current codes for notification and carbon monoxide detection coverage. If renovations are to occur, the system should be replaced or upgraded with any renovation.

ANNHURST HALL ELECTRICAL NOTES

WIRING DEVICES

The duplex receptacle and switching control devices are original to the renovations. The devices are properly grounded and appear to be in good operating condition.

SECURITY SYSTEM

The intrusion detection system consists of door contacts on all exterior doors and select motion sensors. Card readers at located at all exterior doors.The CCTV system consisted of cameras located throughout the facility monitoring the common areas and exterior egress doors.

TELECOMMUNICATIONS

The building has an IDF closet with full cabling throughout the facility. The system appears adequate to support the needs of the facility.

ANNHURST HALL ELECTRICAL RECOMMENDATIONS

MAIN ELECTRICAL SERVICE

The existing electrical service rated for 800 ampere at 120/208 volt, appears to have adequate capacity to support the needs of the building. Since the building is nearly 60 years old, it is not known whether or not the equipment has not been maintained or tested over the years. The main distribution board, related breakers and all branch circuit panels should have an infrared scan performed to ensure that the components are not deteriorating and are still capable of operating in the manner in which they were designed. At a minimum, the breakers should be cleaned, and load tested for failure analysis. The grounds should be tested to ensure that they are still structurally sound. All connections should be tightened in accordance with manufacturer's recommendations. The feeders should be tested to ensure proper connections. Further information is required to determine the current electrical demand on the building. **(P2)**

INTERIOR LIGHTING SYSTEMS

Incorporate occupancy sensor control in all corridors. Replace light fixtures with energy efficient LED light fixtures to meet the energy conservation code, Ct State Building Code and the standards of the Illuminating Engineering Society (IES). Incorporate low voltage lighting system to the public space lighting circuits for optimum energy efficiency. Coordinate fixture selection to maximize utility rebates. **(P2)**

EMERGENCY LIGHTING SYSTEMS

It appears that the existing emergency lighting installed throughout is not connected to the normal lighting circuit protecting the immediate area. If the lighting circuit were to fail, the emergency lighting would not automatically come on. The emergency lighting would only operate if the building power were to fail or if the branch circuit to the emergency lighting panel were to fail. In accordance with Life Safety 101, the emergency branch circuit is to energize in the event of a normal lighting failure within the area of protection. Several methods are used to accomplish this – emergency self-contained battery units are installed throughout connected to the line side of the local lighting circuit. With the emergency standby generator, relays are used to control the lighting – a holding relay will control a normally off fixture which will energize in the event of a lighting failure in the immediate area. A bypass relay will be used in conjunction to operate a single fixture connected to both a normal and emergency branch circuit source. In the event of a power failure, the relay will revert to the emergency side of the branch circuit bypass the local lighting controls and stay illuminated until such time the normal power has been restores.

Standby generator, capacity of 150 amps, should be studied to ensure that it supports the needs of the facility. **(P2)**

Additional illuminated exit signs should be installed throughout the facility to properly indicate the means of egress. **(P1)**

FIRE ALARM SYSTEM

Replace the existing zoned fire alarm system with a code compliant addressable voice notification ADA system that meets NFPA standards, National Electric Code, CT State Building Code and local fire department requirements. Install devices to meet ADA requirements and provide better coverage to support the needs of the facility. **(P1)**

ANNHURST HALL MECHANICAL NOTES

HEATING, VENTILATION, AIR CONDITIONING

Three (3) oil-fired hot water boilers are located in the Boiler Room and provide space and domestic hot water heating. The boilers were installed in 2001 and are 18 years old.

Two (2) vertical inline hot water pumps are located in the Boiler Room. The pumps were installed in 2001 and are 18 years old.

An underground fuel oil storage tank will be replaced in 2019.

A single fuel oil pump is provided and pumps fuel oil to a small day tank located in the Boiler Room.

The Band Room and Fireplace Meeting Room are served by two (2) packaged rooftop units each equipped with a hot water heating coil. The hot water coils are located outdoors, however, there is no glycol in the hot water system.

The Chorus Room is not provided with mechanical ventilation. The space is provided with operable windows for natural ventilation and a Mitsubishi split type air conditioning unit.

Dorm rooms are provided with hot water finned tube radiation.

Air in the Dorm toilet rooms was stagnant. Each toilet room is served by a small 8x8 exhaust register.

PLUMBING

Domestic hot water heating is primarily by the space heating boilers.

A horizontal domestic hot water storage tank and heat exchanger are located in the Boiler Room.

An oil-fired domestic hot water heater is provided in the Boiler Room and used in the summer.

FIRE PROTECTION

The building is not sprinkler protected.

ANNHURST HALL MECHANICAL RECOMMENDATIONS

Boilers will need replacement in 5-10 years. The underground fuel oil storage tank will be replaced in Summer 2019. The new boilers will be oil-fired. **(P3)**

Hot water pumps will need replacement in 5-10 years. New pumps will be provided with variable frequency drives for variable volume pumping. In conjunction with the pump replacement, hot water coil 3-way ACVs will need to be replaced with 2-way ACVs. **(P3)**

Replace the single fuel oil pump with new duplex pump set. **(P2)**

Upgrade bathroom exhaust systems to improve ventilation. **(P2)**

Add general ventilation in the Boiler Room. **(P2)**

Create a new glycol hot water loop to prevent hot water coils and piping from freezing at the 2 rooftop units. **(P1)**

There is no mechanical ventilation to the Chorus Room. Further field investigation would be required to determine the extent of ventilation system upgrades and recommended solutions. **(P2)**

Upgrade existing controls to DDC (Direct Digital Control) to improve energy management control. **(P2)**

Install a new automatic sprinkler system. Since the water supply is from a well, a fire pump and fire water storage tank may be required. Consideration should be given to expanding and extending the existing fire pump system located adjacent to the Gymnasium building to serve all of the buildings on the South campus. **(P1)**

WARREN BUILDING FACILITY ASSESSMENT
October 15, 2019

Juster Pope Frazier LLC
Architects

Shepherd Engineering Inc.
Electrical Engineers

VAV International Inc.
Mechanical Engineers

Designation Key for Phasing Recommendations

Phase 1 **(P1)**: Recommendations classified as “Phase 1” are considered to be the highest priority and should be addressed within the next year.
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Phase 3 **(P3)**: Recommendations classified as “Phase 3” are considered to be the next highest priority (after Phase 1 and Phase 2) and should be addressed within the next ten years.

WARREN RESIDENCE HALL ARCHITECTURAL NOTES

Warren is a four story masonry building built 1963 to 1965 as part of the Annhurst College campus build out. It is the girls residence hall. It is 64,000 gross square feet in area extending over four floors without a basement. The plan is organized by four radiating wings around a central commons area.

EXTERIOR NOTES

Like the other building at South Campus, the construction is block bearing wall with concrete plank floor, flat roof.The exterior of the building is in good shape with little need for remedial work or repair. The windows also appear to be in good shape. However, insulated glass systems have an expected lifespan of 25 to 30 years before failing. The Academy should be diligent in inspecting exterior windows on a yearly basis and establish a glazing replacement allowance within their yearly capital improvements budget. **(P2)**

INTERIOR NOTES

Much like other buildings on the south campus, the residential areas are in good shape. Student rooms are of a decent size and configuration. The commons atrium areas are a bit dated in appearance and could use some attention to finishes and furniture. Student bathroom finishes and fixtures are largely original to the building. They should be upgraded with new finishes and fixtures and possibly reconfigured to some degree to help reduce the “institutional nature of their layout” **(P2)**

WARREN RESIDENCE HALL INTERIOR RECOMMENDATIONS

The Warren atrium common areas are quite large in their scale. Some thought to providing smaller group study rooms or smaller gathering spaces should be considered. In general, commons area finishes need to be refurbished. **(P2)**

WARREN RESIDENCE HALL ELECTRICAL NOTES

ELECTRICAL DISTRIBUTION SYSTEM

The secondary service originates from an exterior utility company pad-mount transformer located on the side of the building, near the main mechanical/boiler room. The utility primary lines run underground from the opposing street utility pole structure. The secondary service feeders enter the basement electrical/mechanical room directly from the pad-mount utility company transformer and connect into a 2000 ampere, 277/480Volt, three phase, 4 wire main switchboard with transformation down to 120/208 volt, 3 phase, 4 wire. The building is secondary metered.

The 277/480 volt distribution panelboards located throughout the building provide power to lighting, mechanical systems, two elevators, major motor loads, electric heat – 80% of the building, electric hot water heater and miscellaneous loads. The sub-panels in the 1998 building are mostly original to the building. The 120/208 volt distribution panelboards provide power to the general duplex receptacles located throughout the facility, as well as minor motor loads. All panels appeared to be at capacity with no spare breakers.

The main switchboard and the sub-panels are in most cases original to the building and appear to be in fair condition.

INTERIOR LIGHTING

The lighting consists mostly of surface-mount 2-lamp and 3-lamp, surface-mount acrylic lens, fluorescent light fixtures. They appear to be 32 watt - T8 lamps, original to the building and showing wear. Local wall mounted switches are used for lighting control. There is no occupancy sensor control observed.

EXTERIOR LIGHTING

The exterior light poles appear to be original to the site. The poles are eight feet in height and utilize retrofit fluorescent lamps as replacement for the original incandescent. The exterior soffit lights used to illuminate the main entrance are compact fluorescent which replaced the original incandescent lamps – the fixtures are in poor condition. The exterior light fixtures are controlled via time clocks.

EMERGENCY SYSTEMS

The building is currently supported by a 45 kW diesel generator manufactured by ONAN Company. The generator provides standby power to the stairwells, corridors and the boiler heating system. It is unknown if the 45kW generator is at capacity. A more comprehensive survey of the emergency lighting and generator system is needed to properly assess what the generator powers during a power loss. Life safety circuits appear to be combined with the standby power circuits. The generator in its current configuration does not meet the requirement of NFPA 70-2017 for life safety systems.

FIRE ALARM SYSTEM

The fire alarm system consists of an addressable system, manufactured by Silent Knight 5820 series. The system appears to be fairly new. Pull stations are installed at most egress doors. In some locations, the height of devices do not meet ADA requirements. audio/strobe devices are on the walls in the corridors, and common areas. There are heat detectors installed in the mechanical rooms. The common hallways have smoke detectors installed every 30'-0" on center with magnetic door holders installed on the intermediate corridor doors. The system is connected via the security which notifies the U.L. approved central monitoring agency. The fire alarm device coverage is inadequate for a school/dormitory building and is not compliant with current codes for notification and carbon monoxide detection coverage. If renovations are to occur, the system should be replaced or upgraded with any renovation.

WIRING DEVICES

With the exception of the areas of renovation, the duplex receptacle and switching control devices are original to the building. The devices are properly grounded and appear to be in good operating condition. If renovations were to occur, then additional duplex receptacles for general power should be installed throughout to support the needs of the facility.

SECURITY SYSTEM

The intrusion detection system consists of door contacts on all exterior doors and select motion sensors. A keypad was located at the main entrance and the rear door to arm and disarm the system. The system is S2 sereis which supports both the north and south campus. The system is monitored by campus police.

The CCTV system consisted of cameras located throughout the facility monitoring the common areas and exterior egress doors.

TELECOMMUNICATIONS

The building has an IDF closet with full cabling throughout the facility. The system appears adequate to support the needs of the facility.

WARREN RESIDENCE HALL ELECTRICAL RECOMMENDATIONS

MAIN ELECTRICAL SERVICE

The existing electrical service rated for 2000 ampere at 277/480 volt, appears to have adequate capacity to support the current needs of the building. The main distribution board, related breakers and all branch circuit panels should have an infrared scan performed to ensure that the components are not deteriorating and are still capable of operating in the manner in which they were designed. At a minimum, the breakers should be cleaned, and load tested for failure analysis. The grounds should be tested to ensure that they are still structurally sound. All connections should be tightened in accordance with manufacturer's recommendations. The feeders should be tested to ensure proper connections. Further information is required to determine the current electrical demand particularly if air conditioning is planned. **(P2)**

STANDBY GENERATOR SYSTEMS

Further information is required to determine whether or not the existing generator has the capacity to support the needs of the facility. The generator rated for 45kW at 120/208 volts, has an output capacity of 150 ampere. **(P2)**

INTERIOR LIGHTING SYSTEMS

Incorporate occupancy sensor control in all corridors. Replace light fixtures with energy efficient LED light fixtures to meet the energy conservation code, Ct State Building Code and the standards of the Illuminating Engineering Society (IES). Incorporate low voltage lighting system to the public space lighting circuits for optimum energy efficiency. Coordinate fixture selection to maximize utility rebates. **(P2)**

EMERGENCY LIGHTING SYSTEMS

It appears that the existing emergency lighting installed throughout is not connected to the normal lighting circuit protecting the immediate area. If the lighting circuit were to fail, the emergency lighting would not automatically come on. The emergency lighting would only operate if the building power were to fail or if the branch circuit to the emergency lighting panel were to fail. In accordance with Life Safety 101, the emergency branch circuit is to energize in the event of a normal lighting failure within the area of protection.As renovations and additions occur, the emergency lighting should be upgraded to meet current code standards. Additional illuminated exit signs should be installed throughout the facility to properly indicate the means of egress. **(P2)**

FIRE ALARM SYSTEM

Replace the audio-visual devices with low frequency style devices rated for 520 hertz to meet the requirements of NFPA 72-2013 Article 24 and related NFPA standards, National Electric Code, CT State Building Code and local fire department requirements. Install devices to meet ADA requirements and provide better coverage to support the needs of the facility. **(P2)**

WARREN RESIDENCE HALL MECHANICAL NOTES

HEATING, VENTILATION, AIR CONDITIONING

Warren Hall is an electrically heated building with a small oil-fired hot water boiler installed in 1996 to serve the 12 Faculty apartments and Health Center. The hot water boiler is provided with multiple hot water zone pumps.

Each apartment is provided with a Fan Coil Unit with DX cooling coil, hot water heating coil and outdoor air-cooled condensing unit.

Each dorm room is provided with an electric convector with individual line voltage thermostat.

Lounges are provided with vertical unit ventilators with DX cooling coil and electric heating coil. Wall intake louvers are provided for mechanical ventilation.

PLUMBING

Two (2) Bock oil-fired domestic hot water boilers are located in the Ground Level Mechanical Room. Two (2) horizontal domestic hot water storage tanks are located in a second adjacent Ground Level Mechanical Room. The hot water boilers were installed to replace electric heating coils at the storage tanks.

Multiple pipe fittings were observed to have corrosion.

Plumbing fixtures appear to be original to the building.

FIRE PROTECTION

Fire protection is a NFPA 13D system connected to the domestic water main and only serves the 12 Faculty apartments.

WARREN RESIDENCE HALL MECHANICAL RECOMMENDATIONS

Boiler serving the Faculty Apartment wing will need replacement in 5-10 years. **(P3)**

Replace electric baseboard heaters throughout the building with a new hot water heating plant including new propane gas-fired hot water boilers, hot water pumps and associated piping. The hot water boilers to be sized to also provide domestic hot water heating. **(P2)**

Upgrade existing controls to DDC (Direct Digital Control) to provide improved energy management control. **(P2)**

To add air conditioning, install new heating and cooling fan coil units in lieu of finned tube radiation in the dorm rooms. System to be a 2-pipe system with manual heating and cooling seasonal change-over. Install new air-cooled chiller outdoors on grade. **(P2)**

Install a new outdoor propane gas tank and piping to serve the proposed new propane gas-fired hot water heater. **(P2)**

The oil-fired domestic hot water heaters are proposed to operate in the summer. The hot water heaters will need replacement in 5-10 years with propane gas-fired heaters. **(P2)**

Water quality needs to be analyzed as pipe fittings in the Boiler Room have significant corrosion. **(P1)**

Upgrade the sprinkler system to serve the entire building. Since the water supply is from a well, a fire pump and fire water storage tank may be required. Consideration should be given to expanding and extending the existing fire pump system located adjacent to the Gymnasium building to serve all of the buildings on the South campus. **(P1)**