Allied Engineering

Structural Mechanical Electrical Commissioning

South Windham Fire Station Conversion for Use as Community Kitchens

33 Main Street
Windham, ME.

June 28, 2018
AEI 18022

Prepared For:
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RE: SOUTH WIINDHAM FIRE STATION CONVERSION TO COMMUNITY KITCHEN, WINDHAM, ME.

Tom:

I. Project BACKGROUND AND UNDERSTANDING:

We borrowed the scope description for this project from the Maine Department of Agriculture Conservation Forestry Division of Quality Assurance and Regulation Inspection Report dated 23/2/2018.

- *The basic plan for the building is to have a retail area at the side entry with viewing window into processing area. The existing bathroom is located off the proposed retail area. The processing area would be entered via the retail door which would need to be self-closing.*

- *In the processing area there is water supply to a hose but there is no plumbed drainage other than floor drains. Sinks may be installed near the water supply. 2 or 3-bay ware-washing sink, vegetable prep sink, handwashing sink required. We discussed possibly installing 2 handwashing sinks, one at each end of the processing area, as the processing area is large. A dishwasher may be installed.*

- *A room opposite the retail entry door would be used as a "sensory" room for employees with special needs. This room may also be used as a break room where employees may eat. This room would require a self-closing door. The wall adjacent to the break room would be for dry goods and finished product storage.*

- *The front of the building consists of 4 garage doors. Only the one by the dry goods/finished product storage would be utilized for delivery/shipment. The other doors would need to be sealed to prevent entry of pests.*

- *A walk-in cooler would be installed to the back of the processing area at the entry to the office space. The floor in this area is currently unsealed particle board which would need to be covered with a flooring surface that is smooth and easily cleanable.*

- *The door to the office area would need to be self-closing.*

- *The floor in the processing area is currently cement with large floor drains. The floors/walls/ceilings all need to be made smooth and easily cleanable. A drop-ceiling may need to be installed as the heading system and vents are mounted to the ceiling. Ventilation in the*

processing area needs to be adequate to capture smoke/fumes from indoor grilling and steam produced from cooking product to prevent condensation accumulation.

With the above in mind, AEI would be performing analysis of the existing systems and offer recommendations to reuse or provide new systems to accommodate the above use descriptions.

- *Mechanical/Plumbing will evaluate and recommend what is needed to accommodate the proposed uses defined above. HVAC recommendations will be provided.*

- *Structural evaluation of the floor and rooftop in the areas where equipment may be provided will be discussed. Floor modifications for levelness, finish, floor drains, etc. will be discussed. AEI will review the condition of the roof surfaces and make recommendations relative to life expectancy and whether replacement is recommended.*

- *Electrical service requirements will be reviewed/discussed and recommendations offered for the above noted space uses.*

This letter is issued to document our preliminary design report for upgrades to the mechanical, plumbing, electrical, fire protection, structural, and roofing systems to support planned renovations. The scope for this report includes assessment for the existing Mechanical, Plumbing, Fire Protection, Structural, Roof, and Electrical systems, capacity for existing systems to support the proposed renovations, and establishes our recommended Basis of Design for the systems.

Our services include the following:

1. Meet with designated representatives of the facility to gain an understanding of the use and environmental requirements of each functional space.
2. Conduct field visits to assess the configuration and condition of existing systems, analyze existing building design documentation, become familiar with prior renovations and functional space changes throughout the facility, and interview occupants within each of the spaces to gain an understanding as to the adequacy of the current systems to maintain acceptable conditions based upon use and occupancy.
3. Develop a Basis of Design write-up, included herein, for upgrades and additions to the Mechanical, Plumbing, Fire Protection, Structural, and Electrical systems based upon information collected during the assessment phase.

The assessment incorporates the following items:

1. Visual assessment of systems condition and operation
2. Interview of designated facility personnel to gather information relative to space comfort, systems efficiency, maintainability, and other relevant information.
3. Review of system design documentation to analyze the ability for systems to meet current code requirements and industry standards for occupant comfort, indoor air quality, and efficiency of operations.
4. Report of recommendations for upgrades based upon current facility use and proposed renovations and upgrades.

II. Existing Conditions

A. Roofing/Flashing

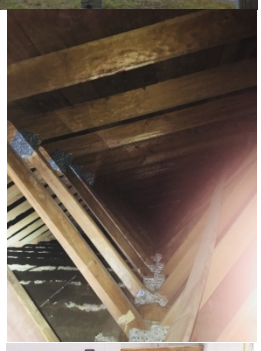
The roof system is an EPDM membrane roof with perimeter metal fascia along the rake and eaves. The roof is in good condition and should remain serviceable for another 8-10 years.

The rear addition roof is surfaced with asphalt shingles. These shingles are serviceable and should remain serviceable for another 5-7 years.

B. Structure

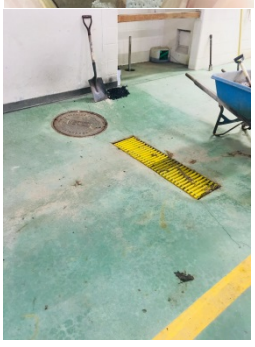
1. The existing structure is currently a 4-bay, single story building measuring approximately 45 ’wide x 69 ’long, with a rear 20’ x 30 addition. An office/reception area is located on the west end of the building. Two offices and storage areas are located in the rear addition. The floor framing and system is 4” above the main garage floor.

2. The overall main fire station building is a concrete masonry unit building with brick veneer. The rear addition is wood framed with vinyl clapboard siding and a vinyl skirt system. The fascia, rake and soffits are of wood trim. The floor system is wood joists on posts and set on what we believe is non-engineered, unreinforced concrete piers within the crawl space.



3. The roof is gable pitched with a center ridge line running parallel with the front of the building.

4. The roof structure consists of metal plated wood trusses, spanning approximately 38’-0” and spaced at approximately 2’-0. The Roof slope is approximately a 4.5:12. Loose cellulose insulation is spread throughout the cavity above the ceilings. Approximately 6 to 8 inches is present throughout.



5. The floor slabs in each of the garage bays are sloped to interior trench drains. In the bay nearest the main office area there is a sewer manhole as well as a trench drain line.

   From a condition survey report prepared by Oak Point Associates in March of 2013, the floor slab throughout the main building was described as being a one-way concrete reinforced system supported by steel reinforced grade beams, pile caps and ultimately on piles. No further information on this foundation was noted to exist.

C. Fire Protection: There is currently no sprinkler system. Architect needs to advise whether one will be required. We have assumed one is necessary in this current pricing exercise.

D. Mechanical Systems: None of the mechanical equipment that exists in the facility will be reused in the proposed reuse of the building.

E. Plumbing: With the exception of restroom fixture plumbing, we believe the water service throughout the building will be demolished and that a new water service will be provided.

F. Electrical

1. The building has a 100-Amp 208/120-Volt three-phase, four-wire overhead service from primary overhead utility lines. The service originates at a bank of three utility-owned pole mounted transformer (3-10 kva; total 30 kva) and terminates at the main circuit breaker (100 Amp) of the electrical service panel (Square D, 30 pole, circuit breaker type) located in the kitchen. The service is routed via an exterior mounted meter/meter socket and exterior manual transfer switch.

2. It appears the peak demand (as provided from a report with CMP information) was 16 kVA.

3. The building is not protected by a fire alarm system/control panel. There are battery powered single station type smoke detectors near the sleeping area.

4. The facility is equipped with a diesel-fueled 20kW generator and exterior mounted manual transfer switch to provide full stand-by power back up to the building. The generator is scheduled to be relocated to another facility.

5. Receptacles appear to be located appropriately for the existing uses of spaces. Receptacles throughout appear to have proper grounding. Based on what can be seen from a simple walk-through of the facility, general wiring appears to be a mixture of building wire in conduit, and type NM nonmetallic sheathed cable (commonly referred to as “romex. Neither the kitchen nor the garage bays are utilizing GFCI receptacles.

6. Interior Lighting is provided by a mixture of recessed and surface mounted troffer style luminaires (2’x4’, 1’x4’,) that utilize linear T5 fluorescent lamps (in the garage bays) and, presumably, electronic ballasts. Emergency egress or exit sign lighting does not exist. The exterior lighting utilizes HID wall packs.

7. The building does not have any communication connection to it at this time (cable, telephone, data, etc.).

8. The building is not equipped with intrusion detection or access control systems.

III. Discussion

A. Roofing

1. There is no evidence of leakage through the existing roof system or with interior finishes. At such, with the proposed renovation, we do not see any upgrades necessary for the main roof surfaces at this time.

B. Insulation and Ceiling Vapor Barrier:

1. Per the IBC 2015 building code, the required R-value for the roof system on the proposed use of this building will be R-30 To achieve this without disrupting the roof surfacing and significantly changing the load applied to this roof system, we recommend the following:

    a. Main roof: Vacuum out the existing loose cellulose insulation and replacing with 24 inches of blown in loose fiberglass insulation.

    b. Rear Addition: Insulation requirements will need to be determined by the Architect of record for the project. For our efforts, we have assumed the following:

        i. Remove ceiling finished, remove insulation within the rafter cavities, and apply 6 inches of closed-cell spray foam insulation within the rafter cavities.

        ii. Remove roof asphalt shingle covering, install 1" polyisocyanurate, ½" cover board, and then EPDM membrane to match main roof surface. EPDM membrane would step up and over the transition between the roof elevations and by flashing in accordingly.

2. The proposed use of the main building spaces warrants the installation of a continuous vapor barrier to the underside of the main roof trusses which will require removal of the existing gypsum ceiling system. We recommend installation of a reinforced poly vapor barrier that would be continuous and sealed at all developed penetrations through the ceiling and would serve to support the blown in fiberglass above.

3. Your architect will need to determine whether the ceiling needs to be fire rated. Whether multiple layers of type "X" fire rated gypsum of strapping, a water resistant suspended ceiling system or a combination, thereof, needs to be determined. In our pricing, we assumed 2 layers of Type X on strapping applied to the underside of the truss bottom chord. A ceiling application made for wet kitchen environments is anticipated for walls and ceilings.

4. The proposed restrooms in the rear addition to this building pose a challenge with regard to insulation and protection of plumbing/piping, both domestic and waste. Protection of these lines is not currently provided for within the crawl space and insulation. Some form of frost protection for the perimeter of this space should be considered.

    This building is elevated on piers and an uninsulated skirt is constructed on the three exposed sides. Incorporating a plumbing system in this area will require that the floor beneath this area be insulated and that this area get heated.

    The 2013 Oak Point Associates study indicated that there was "some evidence of settlement of the wood framed addition". While there was some movement, it does not appear to be a progress process. However, as loading changes with the inclusion of a multipurpose/storage space to the rear, upgrades to the building foundation and floor system should be considered.

C. Concrete Floor Slabs:

1. As mentioned above, the 2013 Oak Point Associates study indicated the main floor system was a one-way reinforced structural slab spanning between provided foundation walls and grade beams, each of which is supported by a pile foundation system. This makes locating floor drains and underslab piping more difficult as cutting the slab reinforcement in the wrong direction influences its structural capabilities going forward

   Additionally, with the provided sloped floor and the proposed use as a wet environment, modification of the floor to a flat slab with area drains will be more complicated, careful consideration needs to be given to the application of a topping system and a quality seamless floor coating system.

   While the floor has capacity given its use as a fire apparatus garage, the designers need to be cognizant and creative in providing plumbing, removing decommissioning existing floor drainage lines, providing new floor drains, etc, so as to limit demolition of this slab-on-grade system.

2. Trench drains in all bays will be encapsulated/filled in and existing underslab pipes filled solid with grout.

D. Structure

1. Codes, Standards and Authorities Having Jurisdiction:

   a. International Building Code - 2015
   b. American Society of Civil Engineers – Minimum Design Loads For Buildings and Other Structures – AISC 7-10
   c. IBC 2015 Snow Live Load Design Capacity:
   The 2015 International Building Code, which is the most recent Building Code adopted by the Windham and the State of Maine, identifies requirements for design snow loads as follows:

Ground Snow: Windham, ME	P_g = 60 psf
Thermal Factor: w/ Insulation values of R>25 Thermal Factor	C_t = 1.1
Importance Factor: Category II	I = 1.0
Exposure Factor: Partially Exposed, B Terrain Exposed Structure	C_e = 1.0

   Adjusted Low Slope Roof Design Snow load:

   $P_{f=}$ $0.7*C_e*C_t*I*P_{g=}$ 0.7*1.0*1.0*1.1*60 psf = $P_{f=}$ 46 psf

2. Based upon the measurements we were able to take in the limited areas we had available to us in the field, and our assumption of the type of material used during the fabrication of the wood roof trusses was Douglas fir, it is our opinion that the roof trusses have the strength capacity to carry both dead and live loads, combined, at **58 psf.** Simply adding the discussed blown in fiberglass to this ceiling structure to achieve necessary R-values, is achievable.

3. Assuming the original design dead load of 10 psf, the available live load capacity of the wood rood trusses (for snow) would be limited to 48 psf which is within the tolerance we believe the trusses are capable of.

4. Mechanical equipment for the separate kitchen spaces is anticipated to be installed above the main roof surface. The trusses beneath these areas will require modification to accommodate these additional loads.

5. Given the existing 14' bay ceiling heights, it may be possible to construct an interstitial mechanical space over each of the kitchen areas for some of this equipment. The ceiling framing for the space would need to be sized to accommodate the equipment and the water resistant ceiling system for the kitchen spaces. These would be supported between the party walls developed for the individual kitchen spaces.

6. For the rear addition, it is our expectation that the floor framing will need to be sistered with like size framing to accommodate the proposed multipurpose /storage use. Installation fo a permanent perimeter foundation system should be considered for the 3 exterior walls of this building. The foundation can be either cast-in-place reinforced concrete or reinforced CMU walls on a perimeter footing.

   A foundation that extends to 2'-6" below perimeter grade and then additional 2" of rigid insulation extending away from the base of the footing approximately 3' from the bottom f footing should be considered. This will offer frost protection and allow for a tempered space to be maintained within this floor cavity.

E. Fire Protection

1. Currently there is no system of automatic sprinklers within the facility.
2. For purposes of this evaluation and until advised by a project architect what fire rating requirements exist for this use, we have assumed the need for an NFPA 13 compliant automatic sprinkler system.

F. Mechanical Systems: Current Mechanical Heating and Ventilation systems will be replaced in their entirety

G. Plumbing Systems: Current Plumbing systems will be replaced in their entirety

H. Electrical Systems

1. The service entrance does not have adequate capacity to support the proposed additional mechanical equipment or planned program (use).

   The existing branch-circuit panelboard is not suitable for re-use. It has exceeded its anticipated useful life. The project should plan on having a new electrical service sized for 200 Amp, 208V, 3 ph. 4W (minimum). Based on the HVAC and refrigeration equipment loads and just how much kitchen equipment loads will be sourced by gas versus electric; it may need to be higher. However, we expect no larger than a 400 Amp service for this facility based on the intended program.

2. The existing standby generator is scheduled for relocation to another town facility.

   Given that this facility will be a kitchen and will likely include walk-in coolers or freezers; a small stand-by generator should be considered in order to support the power for the coolers and freezers would help prevent loss of completed product or stored perishable supplies.

3. Much of the general wiring within the building appears to be original to the building and has exceeded its anticipated useful life. The design should plan on complete new wiring to power and lighting loads.

4. The existing interior lighting fixtures are at or near the end of their anticipated useful lives and should be replaced as part of the renovations.

   The existing and interior lighting should utilize LED technology for improved energy consumption and lower maintenance costs.

5. New overhead communication service entrances (telephone/data) should be provided. A data patch panel should be located in a utility room with suitable infrastructure for accommodating network connectivity and to support the desired access control / security system (intrusion detection and cameras).

6. A simple addressable, hard-wired, fire alarm detection system should be considered although not required per code for this small business occupancy facility. At the very least consider adding hard-wired smoke detection devices the access control / security system.

IV. Basis of Design Recommendations

A. Roofing/Structure

1. Main roof trusses are capable of supporting current IBC 2015 design Snow Load conditions. Mechanical rooftop equipment placement will require supplemental truss framing modifications.

2. Vacuum out existing cellulose insulation and apply 18 inches of blown in fiberglass insulation throughout. Modify soffit ventilation and provide gravity roof top vents for the attic cavity near to ridge line. Flash in curbs to existing EPDM system.

3. Interstitial mechanical space is a consideration for the equipment above the kitchen areas.

4. Rear sloped roof structure to receive spray or batt insulation upgrade with a layer of 1”polyisocyanurate, HD cover board and EPDM roofing applied above the roof sheathing.

B. Foundation/slab

1. Main garage floor system:
   a. Cap and fill existing trench drains and piping lines solid with flowable fill or grout.

   b. Trench for new kitchen equipment drain lines. This will be difficult as the existing slab is reportedly a one-way reinforced structural slab spanning between rear and front walls of the building and we assume a center grade beam line. All grade beams and perimeter foundations are reportedly supported on piles.

      Trenches would need to be constructed front to rear and equipment plumbing aligned as much as possible to reduce the trench widths for these openings. Pipes would be extended through the front walls and diverted accordingly to a collective grease trap before discharging to public sewer lines. Same with proposed floor drains for these spaces.

   c. The floor will require leveling, which can be achieved by installing a self levelling flowable material with a mixture of 3/8" pea stone based on the depths to be filled. The existing slabs would be prepared and primed prior to application of the levelling/stone mixture.

2. Rear Addition:
   a. Provide perimeter foundation with bottom at 2'6" below grade. 2'6" wide by 8" deep with 3-#4 continuous 3" above base of footing.
   b. Provide either CMU or cast in place concrete foundation walls for all 3 exterior walls. Provide 2" of rigid insulation from top of wall down to the bottom of footing, following foundation contours on the exterior side of the wall. Extend insulation our 3' from base of footing to maintain frost protection for the footing.
   c. Provide 6 mil poly over exposed soils with ¾' stone cover for protection and to maintain poly position within the developed crawl space.
   d. The rear floor joists should be sistered with matching 2x framing. Unreinforced piers should be replaced with footings and P.T. wood posts with galvanized caps and base connections.

3. Interior partitions and finishes:
   a. Without a formal architectural concept plan with specified materials for finishes, equipment, etc…it is very difficult for us to create an accurate budget for these elements on this project.

C. Fire Protection

1. Codes, Standards and Authorities Having Jurisdiction:
   a. State of Maine Fire Marshal's Office
   b. Local Fire Department
   c. Owner's Insurance Agent
   d. International Building Code
   e. Maine Uniform Building Code
   f. NFPA 1 – Fire Prevention Code
   g. NFPA 13 – Standard for the Installation of Sprinkler Systems.
   h. NFPA 101 – Life Safety Code.

2. Recommendations:
   a. Add an NFPA 13 compliant automatic sprinkler system to serve the entire facility. Recent hydrant flow data will be required to ascertain whether an upgrade to the existing 4" water service will be required to satisfy the demand for flow.

D. Heating, Ventilating, and Air Conditioning

1. Codes, Standards and Authorities Having Jurisdiction:
   a. State of Maine Fire Marshal's Office
   b. Local Fire Department
   c. International Building Code
   d. Maine Uniform Building Code
   e. 2015 Uniform Plumbing Code
   f. NFPA 1 – Fire Prevention Code
   g. NFPA 54: National Fuel Gas Code
   h. NFPA 72: National Fire Alarm Code
   i. NFPA 90A: Standard for the Installation of Air-Conditioning and Ventilating Systems
   j. NFPA 101 – Life Safety Code.
   k. IECC-2015 (Energy Standard)
   l. ASHRAE 62.1-2010 Ventilation for Acceptable Indoor Air Quality
   m. ASHRAE 90.1-2010 Energy Standard for Buildings Except Low-Rise Residential Buildings

2. Design Conditions:
   a. Heating Outdoor DB / Indoor DB: -10°F / 68°F
   b. Cooling Outdoor DB, WB / Indoor DB: 87°F, 74°F / 74°F (no cooling in the Apparatus Bay)

Recommendations

3. Assumption: Kitchen equipment will be gas.
4. Add a second condensing gas fired boiler – 260,000 Btu/hr
5. Add NFPA 96 grease hoods for kitchen cooking equipment
6. Add condensate hoods for dishwashing
7. Add a gas fired makeup air unit with dx cooling for each kitchen exhaust hood.

8. Add gas electric package rooftop units for multi-purpose/gathering space.
9. Add gas/electric package rooftop unit for product display and personal spaces.
10. General exhaust fans for bathrooms
11. Commercial Hood for range in Maine Tex Personal Space

E. Plumbing

1. Assumption: "House" equipment will be used for domestic hot water and separate metering of use not required.
2. Add a system of underfloor grease waste and conventional waste piping to serve the commercial cooking areas. Grease waste shall be routed to an exterior 1000 gallon grease trap. Conventional waste to sanitary sewer.
3. Assume Upgrades the water entrance to 3". This needs to be verified once actual fixture selection is made for the kitchens. Existing 2" may be adequate.
4. Add scullery sinks at kitchens per kitchen layout requirements
5. Vitreous china lavs and water closets for restrooms.
6. Increase condensing boiler capacity and add indirect water heaters to accommodate the domestic hot water needs. At minimum, 120 gallon indirect tank, 199,000 BTU/hr. Maintain 140 degree water temp.
7. Install new master mixing valve to provide 120 degree water for domestic use.
8. Add a 140 degree water loop to serve pot sinks and dishwashers
9. Increase natural gas service for kitchen equipment, ventilation units, and added boiler.

F. Electrical

1. All electrical work under scope of this Contract shall comply fully with the following codes and standards:
   a. American Society for Testing and Materials (ASTM).
   b. Underwriters' Laboratories, Inc. (UL)
   c. Insulated Power Cable Engineers Association (IPCEA)
   d. National Electrical Manufacturers Association (NEMA).
   e. Institute of Electrical and Electronic Engineers (IEEE).
   f. American National Standards Institute (ANSI).
   g. National Fire Protection Association (NFPA).
   h. National Electrical Code (NEC).
   i. Occupational Safety and Health Act (Public) (OSHA).
   j. International Energy Conservation Code (IECC).
   k. Local Inspection Department.
   l. Local Fire Department.

2. Upgrade the electrical service to 200 amps, 208/120 volts, 3-phase, 4-wire. The new service shall be underground and shall terminate in the new electrical room. Estimated cost includes and allowance of $5,000 for utility construction charges.

3. Provide branch-circuit panels located within the electric room and elsewhere as required to supply branch circuits for mechanical systems, kitchen areas, support areas and stock areas.
   a. Shall be circuit-breaker type construction with bolt-on type connections and shall be U.L. listed.

b. All circuit breakers shall be quick-make, quick-break, trip free U.L. listed.
c. All panelboard bussing shall be aluminum.
d. Panelboards shall be furnished with lockable doors all keyed for a master key.
e. Panelboards shall have 42 pole capacity and shall have mains rated at 100 amps minimum, single-phase, 3-wire with ground bus unless noted otherwise.

4. Provide a 20-kW, 208/120-volt, 3-phase, 4-wire propane generator set to serve as the alternate power source. Provide a weatherproof generator enclosure. Provide an automatic transfer switch and dedicated electrical sub panel for the emergency standby loads.

5. Provide a complete new general wiring system for the renovated facility.
   a. Wiring insulation shall be Type "THWN/THHN" (75 de+grees C. minimum) for all single conductors in conduit. All insulation shall be rated for 600 volts, A.C. and will be color coded in accordance with the NEC. Minimum branch circuit wiring size shall be No. 12 A.W.G. with separate neutrals, except motor control circuit wiring and building interior fire alarm wiring may be No. 14 A.W.G. minimum.
   b. All wiring and cable size 1/0 and smaller shall be copper. For conductors above 1/0 in copper size, aluminum may be used when proper de-rating is performed and confirmed with the engineer.
   c. Wiring buried in earth or fill shall be single conductor installed in schedule 40 PVC conduit except at penetration of building where it shall be adapted to intermediate metal conduit, or where otherwise noted. Panelboard feeders within building shall be single conductor installed in electrical metallic tubing.
   d. Interior branch circuit wiring shall be applied as follows:
      1) Branch-circuit wiring above hung or suspended ceilings, within furred spaces or metal partitions shall be Type MC, metal-clad cable with copper conductors and fully rated separate grounding conductor
   e. In areas with exposed structure ceilings, exposed wiring in conduit shall be permitted at the ceiling.
   f. Where subject to physical damage, conduit shall be type "IMC" intermediate metal conduit.
   g. Minimum size conduit shall be ½ in. unless noted otherwise.
   h. Low voltage wiring for lighting control shall be 18 A.W.G. minimum and be installed in accordance with the NEC standards for low voltage conductors.
   i. Wiring and raceways in finished areas shall be concealed in walls and above ceilings.

6. Provide receptacle outlets throughout the facility as required to meet program needs.
   a. All devices and switches shall be Specification grade and U.L. Listed.
   b. Receptacle devices in toilet rooms, kitchen, near sinks and building exterior shall be GFCI protected.
      1) Exterior receptacle shall have weatherproof covers. The weatherproof integrity shall not be affected when heavy duty specification or hospital grade attachment plug caps are inserted.
      2) Rooftop receptacles shall be located within 25 feet of mechanical units.
   c. Duplex receptacles will be provided in all areas in quantities suitable for space usage.
   d. Specialty receptacles shall be provided for specific equipment such as kitchen areas.
   e. Power to HVAC equipment
   f. Toggle switches shall be rated 20 amps.

g. Device plates shall be high-abuse nylon. Plates shall be of appropriate size and type.

7. Provide LED lighting with high-performance optics throughout the building. Provide full cut-off LED exterior lighting for all exterior areas.
   a. The lighting systems will be in compliance with the Illuminating Engineering Society (IES) recommendations for foot-candle levels.
   b. Luminaires shall utilize factory-installed LED light engines. Luminaires shall qualify for Efficiency Maine rebates to the greatest extent possible based upon programming requirements.
   c. Emergency egress lighting and Exit signs shall be provided to meet all code requirements (90 minutes battery backup power).
   d. Mechanical, storage and utilitarian spaces will be provided with LED lensed strip type fixtures.
   e. Control of exterior shall be auto-on/auto-off by an astronomical time clock or photocell.
   f. Ceiling mounted or switchbox type Occupancy sensors shall be utilized in areas subject to intermittent use. Areas 150 square feet and less shall utilize switch-box mounted occupancy sensors. Areas greater than 150 square feet shall be controlled by a power pack and a low voltage manual switch connected to a local occupancy sensor.
      1) Power pack shall be dual voltage and capable of loads rated 20 amps.
      2) Occupancy sensor shall be powered from the power pack and be dual technology capable (PIR and ultrasonic). The low voltage switch shall interface with the occupancy sensor to provide for manual-ON, occupancy sensor off. Sensor shall be capable of satisfying logic states using either or both technologies.
      3) Occupancy sensor shall be ceiling mounted for areas with recessed lighting and wall mounted for pendant lighting. Mounting height to match pendant height.

8. Telecommunications:
   a. Provide a new telecommunications overhead line to a telecommunications utility demarcation point in the new electrical room.
   b. Telecommunications work shall comply with BICSI and EIA/TIA standards.
   c. Horizontal cabling and terminations shall be Category 6.

9. Provide an automatic, addressable electrically supervised, low-voltage fire alarm system.
   a. Fire alarm systems shall generally comply with requirements of NFPA 72 for local building systems except as modified and supplemented by this specification.
   b. All units of equipment shall be listed by Underwriters Laboratories and shall consist of a battery-backed fire alarm control panel, heat detectors, smoke detectors, and pull stations.
   c. Occupant notification shall be audio/visual type with voice evacuation signals. Visual notification appliances shall be synchronized where multiple strobe flashes are visible.
   d. Wiring shall be in accordance with NEC Article 760, and as recommended by the manufacturer of the fire alarm system and AHJ.

e. Duct smoke detectors shall be provided in all supplies that are 2000cfm or greater and returns that are 15,000cfm or greater.
f. System shall be connected to and monitor status of sprinkler devices.

10. Provide Access control, intrusion detection, and a security camera system to suit program needs.
    a. The access control system shall consist of card readers, and associated hardware and software.
    b. Cameras will be power-over-ethernet (POE) type network.
    c. Intrusion detection shall be controlled by a separate control panel, which shall monitor motion detectors and door switches and shall be connected to interface with the access control system.

V. Estimate of Probable Construction Cost Budget

AEI, with the assistance of our estimator at Conestco, has put together an order of magnitude construction budget for modifications/upgrades require of the existing building system to accommodate your use as a community kitchen space.

VI. Closing

It is with pleasure that this report is submitted for your use and consideration.

Regards,
Allied Engineering, Inc.

William P. Faucher, P.E., SECB, LEED AP
Registered Roof Consultant
Principal

Appendices: Appendix A: Team Resumes
Appendix B: Estimate of Probable Construction Budget
Appendix C: Existing Project Photos

Allied Engineering
Structural Mechanical Electrical Commissioning

Appendix A

Team Resumes

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WILLIAM P. FAUCHER, P.E., SECB

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Structural Engineer/Principal
LEED AP, Registered Roof Consultant

William P. Faucher, P.E. has significant experience serving as Principal-in-Charge of Allied Engineering's significant Municipal projects. Bill has extensive experience analyzing and designing various structures utilizing a variety of construction techniques and materials including: reinforced masonry, pre-stressed concrete, stone, brick, braced steel and steel with moment connections, engineered wood systems, reinforced cast-in-place concrete, concrete masonry units, and cold-formed metal, both bearing and non-load bearing systems. Mr. Faucher's experience covers building analysis for renovations, seismic stress and wind and snow loading. He remains current with new building technology and techniques so each project is designed with the best options available to meet client needs.

Education, Registration, and Affiliation

University of Maine - B.S. in Civil Engineering Concentration - Structural - 1987
University of Wisconsin, Continuing Education in Foundation Design - 1989
Registered Professional Engineer - ME, NH, VT, MA, CT, RI, NY, NJ, VA, NC, SC, GA, FL
Structural Engineering Certification Board - (SECB)
Member – Past President (2000-2001) of Structural Engineers Association of Maine
Member - National Council of Examiners for Engineers and Surveyors (NCEES)
Member - Concrete Reinforcing Steel Institute (CRSI)
Member - Construction Specifications Institute (CSI)
Member - American Concrete Institute (ACI); ACI Concrete Flatwork Technician #912153
Member - Associated Constructors of Maine, Inc.
Member – RCI, Incorporated – Professional Association for Roofing, Water-Proofing, Exterior Wall Systems
Member - NRCA – National Roofing Contractors Association

Work Related Experience

Government/Municipal

- Goodwins Mills Fire & Rescue Addition – Lyman, Maine
- Poland Fire Station Study - Poland, Maine
- Cumberland County EMA Bunker Facility – Windham, Maine
- West Kennebunk Fire Station – Design/Build with PM Construction
- Town of Yarmouth Office
- Cumberland County Jail Roof and Masonry Evaluation - Portland, Maine
- Maine Correctional Center Kitchen - Windham, Maine
- Windham Public Works Facility, Windham, ME
- Maine BGS/MaineDOT Fleet Services Center - Augusta, ME
- Maine Department of Transportation – Vehicle Maintenance Facilities throughout Maine (8 total)
- Cumberland County Courthouse Projects – Portland, Maine
- Maine Department of Transportation – Vehicle Maintenance Facilities throughout Maine (8 total)

- Windham Public Works Facility, Windham, ME
- Cumberland County Courthouse Multiple Projects – Portland, Maine
- Center Conway Service Garage - Conway NH

LEED™ (Leadership in Energy and Environmental Design) Accredited Professional

Employment History

1994 - Present	**Allied Engineering**. – Principal in Charge, Structural Engineering
1990 - 1993	Criterium-Mooney Engineers - Director of Engineering
1989 - 1990	Sebago Technics, Inc. - Civil Engineer
1988 - 1989	Power Line Models, Inc. - Consulting Engineer
1987 - 1989	New England Power Service Company - Project Engineer

ANTHONY DAVIS, P.E.

Allied Engineering
Structural Mechanical Electrical Plumbing

Mechanical Engineer/Principal/LEED AP, EMP

Anthony Davis, P.E., Principal, is a mechanical engineer with experience in the assessment, design, and commissioning of mechanical systems. Tony has attained accreditation from the University of Wisconsin as a Total Building Commissioning Process Provider. He has completed many projects throughout the New England region. Tony is also a **LEED™** (Leadership in Energy and Environmental Design) Accredited Professional. Most recently, Tony has achieved certification as an Energy Management Professional through the Associated Air Balance Council Commissioning Group.

Education, Registration, and Affiliation

University of Maine - B.S. in Mechanical Engineering - 1988
Registered Professional Engineer – ME, NH, MA, CT and OH
Member - American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
Member - Maine Indoor Air Quality Council
LEED™ (Leadership in Energy and Environmental Design) Accredited Professional
Energy Management Professional (EMP) Energy Management Association
Member - National Fire Protection Association (NFPA)
Member – Building Commissioning Association (BCA)
Accredited Total Building Commissioning Process Provider, University of Wisconsin
Accredited Installer-International Ground Source Heat Pump Association
Certified Commissioning Authority-AABC Commissioning Group
Efficiency Maine Qualified Partner

Employment History

2000 – Present **Allied Engineering** - Mechanical Engineer, Principal
1999 – 2000 **Allied Engineering** - Chief Mechanical Engineer
1988 – 1999 **Allied Engineering** - Mechanical Engineer

Work Related Experience

- Windham Public Works Garage, Windham, ME
- South Portland Bus Garage, South Portland, ME
- Municipal Service Facility, Center Conway, New Hampshire
- Maine Turnpike Authority Gray Maintenance Facility - Gray, Maine
- MaineDOT/BGS Fleet Services Center - Augusta, Maine
- Acadia Gateway Center-Phase I-Maintenance Garage, Trenton, Maine
- Richmond Maintenance Garage-MDOT Richmond, Maine
- Bethel Maintenance Garage-MDOT, Bethel, Maine
- MDOT Visitor's Information Center, Fryeburg, Maine
- Cumberland County Courthouse – Portland, ME
- York Village Fire Station Heat Load Analysis - York ME
- Goodwins Mills Fire Rescue Addition - Lyman, ME

Commissioning Projects

BRIAN T. GARDNER, P.E., DGCP

Allied Engineering
Structural Mechanical Electrical Plumbing

Senior Electrical Engineer/Electrical Department Leader

Brian is a senior level electrical engineer with more than 25 years of design experience. Brian has been a department leader and project manager for many of those years and has worked on a wide range of projects. Areas of expertise include design specifications and guidelines, load calculations, emergency and stand-by power systems, alternate power systems, service entrance and power distribution systems, lighting, fire alarm, and related equipment selection. Brian is a graduate of Northeastern University holding his professional license in 16 states.

Education, Registration, and Affiliation

Northeastern University, Boston, MA – Bachelor of Science in Electrical Engineering- 1990
Registered Professional Electrical Engineer – ME, MA, NY, CT, NJ, DC, TX, NC, DE, OH, IL, FL, AZ, LA, GA, TN,
NCEES No. 33162
Institute of Electric and Electronics (IEEE)
Associate of Energy Engineers; Distributed Generation Certified Professional (DGCP #56757)

Project Experience

- Maine Medical Center – Level R2 Patient Care Renovation
- Central Maine Health Care – Ambulatory Care Site Feasibility Studies
- Greenlaw Building – State Lab Facility
- Midcoast Senior Health Care – Resident Wing Addition and Renovation

Experience prior to Allied Engineering

Higher Education/Schools

- MIT Bldg. NW12 through NW15; Power distribution system Upgrade Study
- MIT Bldg. NW12, B24 and E19 AT&T redundant power upgrade study and design
- MIT Bldg. W70 and W61 Fire Alarm Upgrade, Chiller replacement and Emergency Power Upgrade
- MIT University, Cambridge, MA – Lithography Lab
- Massasoit Community College Campus Power Distribution Upgrade
- Connecticut State Southern University – RFP development for new residential facility
- Springfield Technical Community College; Feasibility Study for Bio-mass Co-Gen Plant
- Merrimack Valley Transit Authority Bus Maintenance Facility
- Dexter Academy Science Classroom Addition, Brookline, MA
- Brown University, Providence, RI – Lithography Lab

Government

- RI Department of IT; Data Center, Warwick, RI
- Armed Forces Reserves Center; CSMS, OMS and Training Facility, Devens, MA
- Hanscom AFB; Building 1604, Bedford, MA
- Massport Logan Airport, Boston, MA – phased upgrade to central cooling / heating plant.

Commercial/Industrial

- Dassault Systems; Data Center, Waltham, MA
- MWRA Delauri Pump Station Wind Turbine – RFP development and owners representative
- Columbia Construction PV Array Installations in MA; N. Reading (3), Lexington (1), Waltham (2), and Wakefield (2)
- 6.48 MW Borrego Solar Farm (EOR) , Plympton, MA
- Genuity Data Center, Mountain View, CA - 45,000 sq. ft. of raised floor supported by 2N redundant power distribution system.
- Fidelity Data Center Phase III, Merrimack, NH - 15,000 sq. ft. of raised floor addition.
- AMEX SROC Generator Replacement, Sunrise, FL – 6.0 MW standby power generation system replacement.
- DLJ Direct Harborside, Jersey City, NJ - 100,000 sq. ft. call center
- Hoffman La Roche, Nutley, NJ - fire alarm system design for high-rise laboratory research and multilevel manufacturing buildings.
- IBM Essex Junct. VT- Chiller Plant Upgrade and "Back End of Line" Clean Room

Healthcare

- Brigham and Women's Hospital, Boston, MA - Angiography Recovery and Brachio Therapy Suites

Employment History

2018 – Present	**Allied Engineering** –Senior Electrical Engineer
2007 – 2018	Symmes, Maini & McKee Associates, Inc. – Electrical Dept. Manager/Senior Associate
2001 - 2007	Harvard University, UOS – Engineering and Utilities, Cambridge, MA - Senior Engineer
1999 – 2001	Carlson Associates, Inc. – Electrical Department Production Manager
1998 – 1999	Carlson Associates, Inc. – Project Electrical Engineer
1997 – 1998	Vanderweil Engineers, Inc. – Project Electrical Engineer/Team Leader
1993 – 1997	Symmes, Maini & McKee Associates, Inc. – Project Electrical Engineer

Allied Engineering
Structural Mechanical Electrical Commissioning

Appendix B

Estimate of Probable Construction Budget

160 Veranda Street
Portland, ME 04103

T 207.221.2260
F 207.221.2266
Web: www.allied-eng.com

Facility: Windham Maine Ecenomic Development

S.W. Fire Station Conversion to Community Kitchen

Date: 6/28/2018

Allied Engineering
Structural Mechanical Electrical

Item	Description of Work	Quantity	unit	$/unit	Cost
Division 01	**General Conditions**				
1.0	Overhead	12.00%			$ 127,717
1.1	Profit	12.00%			$ 127,717
1.2	Bonds & Insurance	1.75%			$ 18,625
1.3	Bldg. Permits	0.50%			$ 5,322
1.4	O.& M. manuals	0.00%			$ -
1.5	Training	0.00%			$ -
1.4	Subtotal, % only	26.25%			-
	Subtotal Division 01			**$ 279,380**	
Division 02	**Existing Conditions**				
2.0	General Cutting and Patching & Dust Control	1	LS	$ 4,500	$ 4,500
2.1	Demolish/dismantel 3 of 4 existing garage door bays	1	LS	$ 1,200	$ 1,200
	Subtotal Division 02			**$ 5,700**	
Division 03	**Concrete**				
3.0	Concrete floor slab work	1	LS	$ 87,500	$ 87,500
	Subtotal Division 03			**$ 87,500**	
Division 04	**Masonry**				
4.0	N/A			**$ -**	$ -
	Subtotal Division 04			**$ -**	
Division 05	**Metals**				
5.0	Metal Framing System	1	LS	$ 10,000	$ 10,000
	Subtotal Division 05			**$ 10,000**	
Division 06	**Wood, Plastics and Composites**				
6.0	Wood framing elements	1	LS	$ 33,615	$ 33,615
	Subtotal Division 06			**$ 33,615**	
Division 07	**Thermal & Moisture Protection**				
7.0	Interior finish elements	1	LS	$ 55,000	$ 55,000
	Subtotal Division 07			**$ 55,000**	
Division 08	**Openings**				
8.0	doors & Windows	1	LS	$ 45,000	$ 45,000
					$ -
	Subtotal Division 08			**$ 45,000**	
Division 09	**Finishes**				
9.1	interior kitchen and standard wall/ceiling finishes	1	LS	$ 83,740	$ 83,740
	Subtotal Division 09			**$ 83,740**	

Facility: Windham Maine Ecenomic Development

S.W. Fire Station Conversion to Community Kitchen

Date: 6/28/2018

Allied Engineering
Structural Mechanical Electrical

Item	Description of Work	Quantity	unit	$/unit	Cost
Division 10	**Specialties**				
10.0	Kitchen Equipment (freezers,ovens, steam tables, prep spaces, micers, slicers, dishwash, fire supression hoods)	1	LS	$ 300,000	$ 300,000
	Subtotal Division 10			**$ 300,000**	
Division 11	**Equipment**				
11.0	None			$ -	$ -
	Subtotal Division 11			**$ -**	
Division 12	**Furnishings**				
12.0		0	LS		$ -
	Subtotal Division 12			**$ -**	
Division 13	**Special Construction**				
13.0	None			$ -	$ -
	Subtotal Division13			**$ -**	
Division 14	**Conveying Equipment**				
14.1	None			$ -	$ -
	Subtotal Division 14			**$ -**	
Division 21	**Fire Suppression**				
21.0	Replacement System	3750	SF	$ 3.00	$ 11,250
	Subtotal Division 21			**$ 11,250**	
Division 22	**Plumbing**				
22.0	Complete System per building use	1	LS	$ 75,000	$ 75,000
	Subtotal Division 22			**$ 75,000**	
Division 23	**Heating Ventilating and Air Conditioning**				
23.0	Complete System per building use	1	LS	$ 187,500	$ 187,500
	Subtotal Division 23			**$ 187,500**	
Division 25	**Integrated Automation**				
25.0	None			$ -	$ -
	Subtotal Division 25			**$ -**	
Division 26	**Electrical**				
26.0	Complete System per building use	1	LS	$ 90,000	$ 90,000
	Subtotal Division 26			**$ 90,000**	

Facility: Windham Maine Ecenomic Development

S.W. Fire Station Conversion to Community Kitchen

Date: 6/28/2018

Allied Engineering
Structural Mechanical Electrical

Item	Description of Work	Quantity	unit	$/unit	Cost
Division 27	**Communications**				
27.0	None			$ -	$ -
	Subtotal Division 27			**$ -**	
Division 28	**Electronic Safety and Security**				
28.0	None			$ -	$ -
	Subtotal Division 28			**$ -**	
Division 31	**Earthwork**				
31.0	None	1	LS	$ 50,000	$ 50,000
	Subtotal Division 31			**$ 50,000**	
Division 32	**Exterior Improvements**				
32.0	None			$ -	$ -
	Subtotal Division 32			**$ -**	
Division 33	**Utilities**				
33.0	Value Placeholder	1	LS	$ 30,000	$ 30,000
	Subtotal Division 33			**$ 30,000**	
	Division 02 to 22 - Subtotal				**$ 1,064,305**
	General Conditions Div 1				**$ 279,380**
Subtotal					
	Building				
	Total including general conditions				**$ 1,343,685**

Contingency	10%	$ 134,369
Construction Budget		$ 1,478,054
Maximum Design cost from BGS rate schedule (8.5%)	8.5%	$ 125,635
Total design and construction budget		$ 1,603,688
Square footage of roof	$ 3,750	
SF cost of construction with out contingency	$ 358.32	

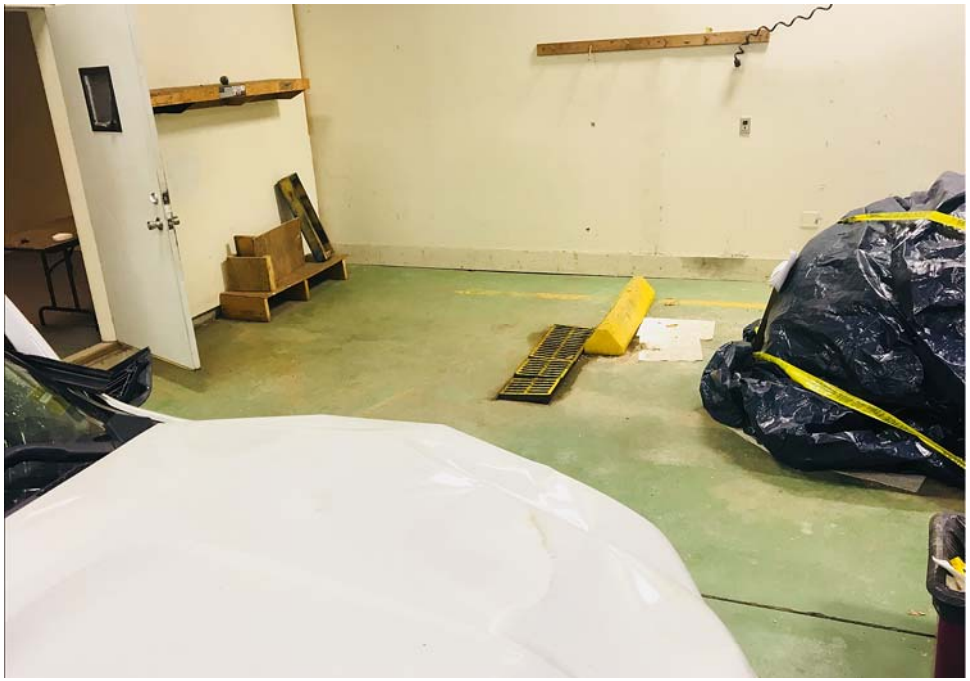
Allied Engineering
Structural Mechanical Electrical Commissioning

Appendix C

Existing Project Photos

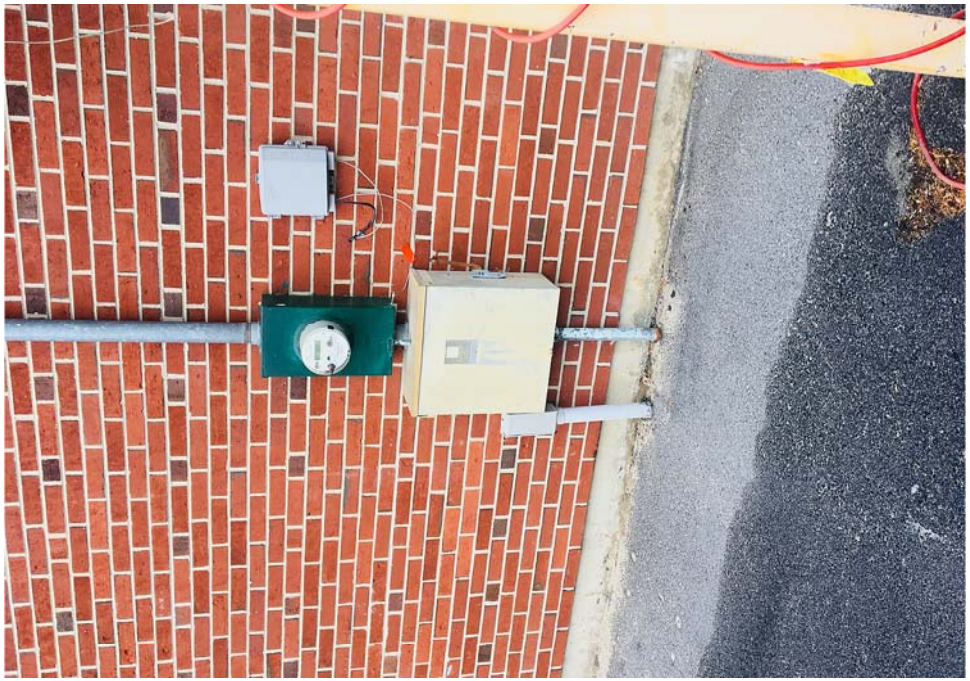
160 Veranda Street
Portland, ME 04103

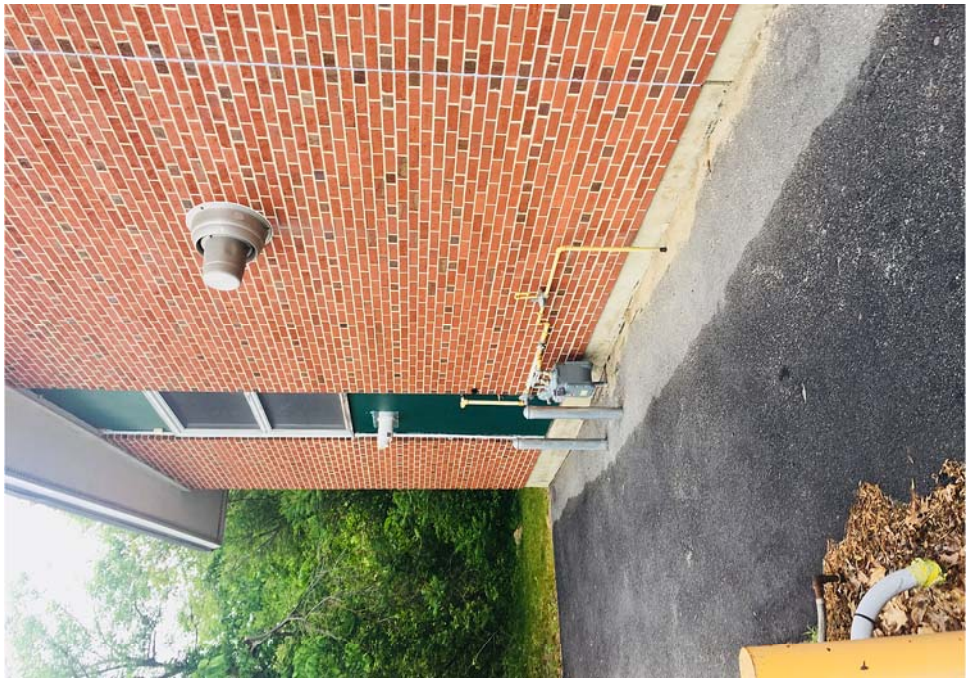
T 207.221.2260
F 207.221.2266
Web: www.allied-eng.com

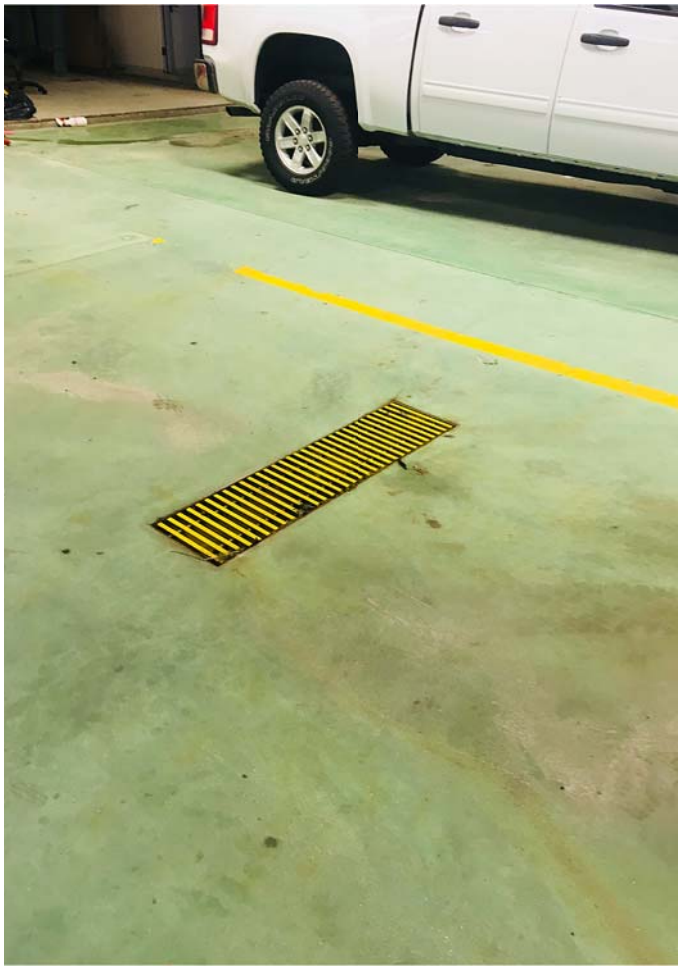



GOODYEAR
WRANGLER


GOODYEAR
WRANGLER





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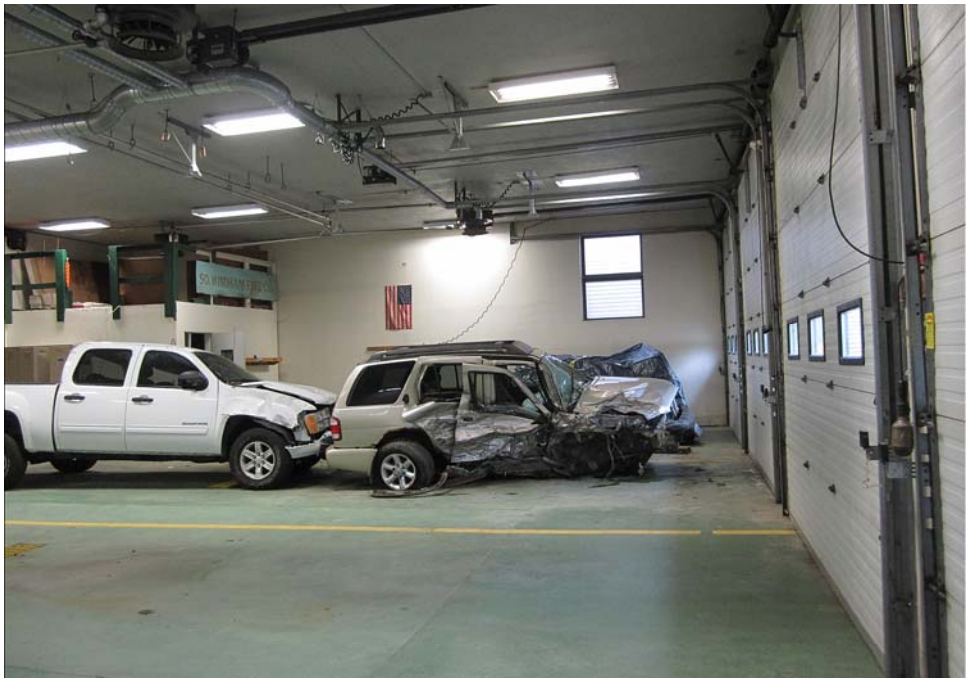

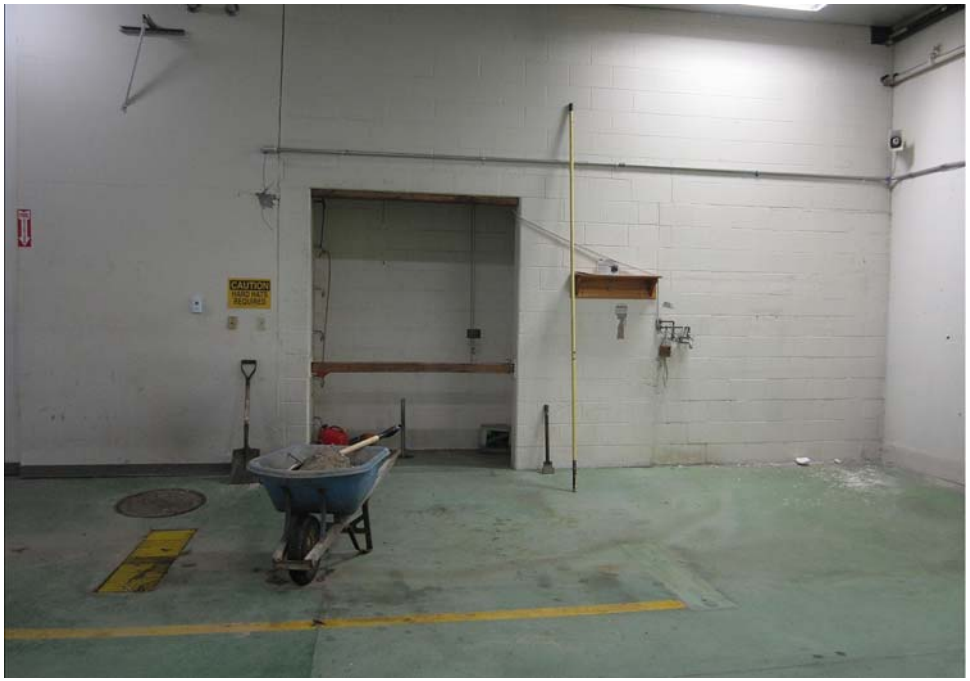
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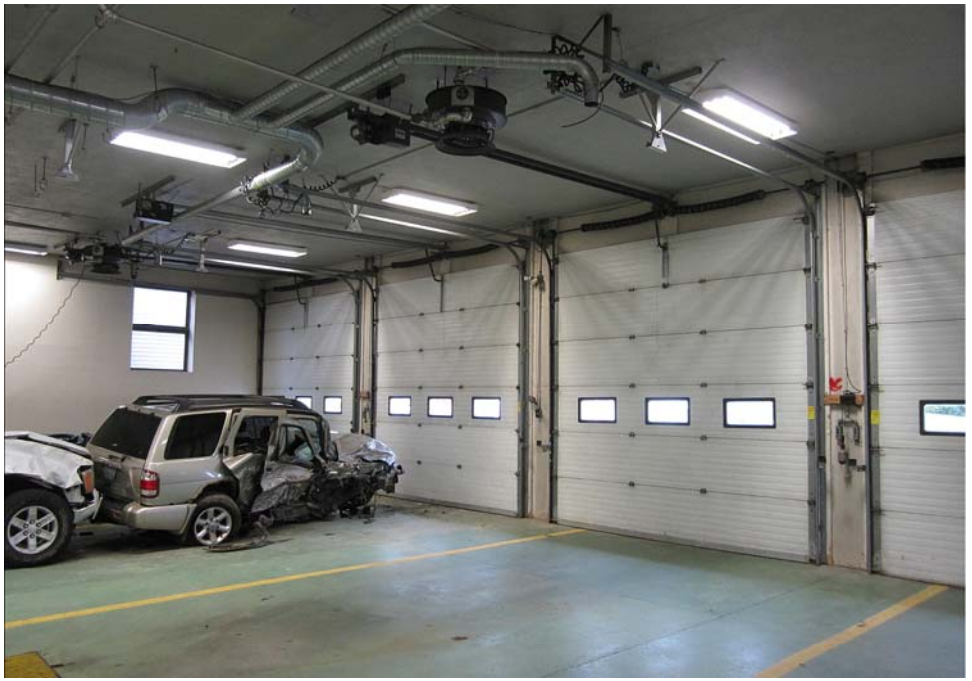


6 Main St


2065
4


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