ARCHITECTURAL ASSESSMENT

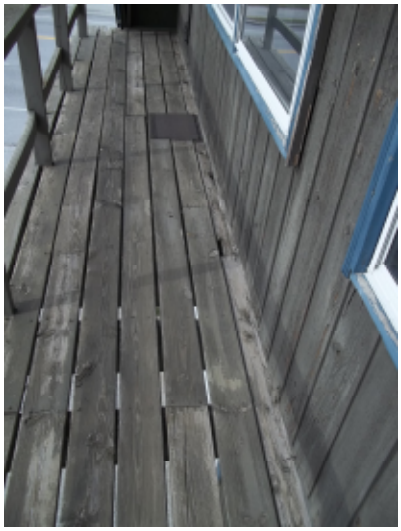
The current facility was constructed at three different times:

1974 – Original
1984 – Middle bays
1998 – Apparatus Bay for Tower

EXTERIOR ENVELOPE

1974 Original

- The first story is an 8 inch thick masonry concrete masonry units (CMU) with 2x4 wood strapping and stained wood siding. The second story is a 2X wood structure with gambrel shaped wood trusses.
- There appears to be very little batt insulation in the walls. Many areas especially in the gambrel roof are missing batt insulation. Approximate insulation value of R 5
- The balcony is in very bad shape and should be replaced
- Most of the exterior siding and trim needs to be painted



1984 Middle Bays

- The exterior consists of a two story 2 x 6 inch wood stud structure with stained wood siding and gambrel shaped wood trusses
- There is approximately 5 ½ inches of batt insulation but still some areas especially in the gambrel roof that are missing insulation. Approximate insulation value of R 10
- Most of the exterior siding and trim needs to be painted

1998 Apparatus Bay for Tower

- The exterior consists of a one story 2 x 6 inch wood stud structure with stained wood siding and a single sloped roof
- There is approximately 5 ½ inches of batt insulation. We were not able to see the condition of the roof insulation. Approximate insulation value of R 10

- Most of the exterior siding and trim needs to be painted

Roof:
The existing roof is metal roof panels and shingles.

- Shingles appear to be in decent shape. We do not know how much is left on the warranty
- The metal roof is not in very good shape and needs replacement and/or painting

Man Doors:

- The exterior man doors are not in very good shape.
- They are not commercial grade and may not be well insulated.
- Several man doors will take a lot of abuse by responders and should have commercial grade hardware.

Overhead Doors:

- They fairly new and have required safety sensors. They appear to operate properly.

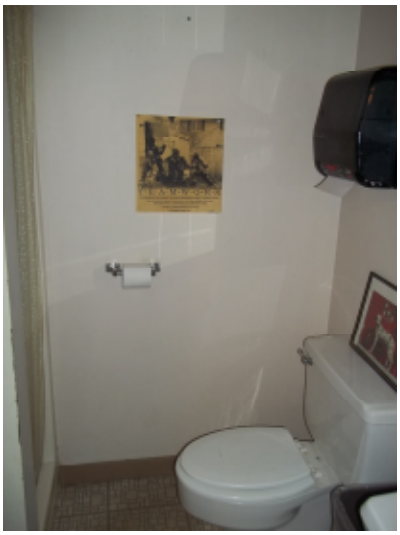
Windows:

- Most windows are single pane with triple track storm windows. They are not energy efficient.

INTERIOR – GENERAL COMMENTS

The station layout consists of the first floor primarily Apparatus Bays, Apparatus Support (i.e. Turn Out Gear Storage, Extractor, etc.) and a single toilet/shower. The Second floor is Offices, Kitchen, Day Room, Training Room and various storage rooms.

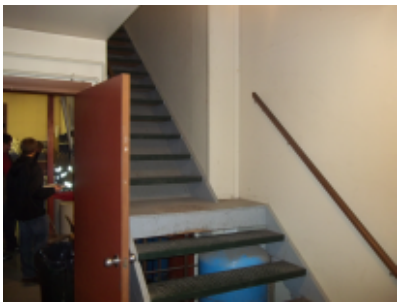
- Concrete floor finish is in bad shape and is spalling at the Original Apparatus Bays
- There is only one unisex toilet room and shower. There should be a male and female toilet to meet plumbing code
- There is no place to dry fire hoses. They currently dry them on the floor which could be a safety hazard
- Carpets are in bad shape



- Office sizes and space is limited. Both offices are shared spaces and lack adequate storage.
- The Training is reported to be adequate in size. There is not storage for tables and chairs. Closets off the room are full and inadequate.

ADA COMPLIANCE

Requirements for handicap accessibility were non-existent when the building was originally constructed. In 1990, the Americans with Disabilities Act (ADA) was enacted into law by the Federal Government to provide civil rights protections and nondiscrimination on the basis of disability. Since 1990, the original regulations have been updated and new requirements and clarifications have been added several times. Based on these regulations, we have found the following items to be in noncompliance or not accessible to the disabled:



- The single Toilet/ Shower Room is not ADA compliant.
- This toilet room is too small to allow for wheel chair turning radius
- Grab bars are not installed
- The Showers is too small and does not have grab bars and adjustable shower heads
- Many Corridors do not allow for wheelchair turn around
- Access to the door ways are too narrow
- Width of doors are too narrow

- The Kitchen should be ADA compliant with the required countertop height.
- There is no elevator to the second floor. Since this is a public Building paid for by public funds, it is a Title II building which requires the entire building to be handicap accessible. This means adding and elevator for access to the second floor.

Recommendations

- Each of the inaccessible features listed above has an impact on the ability of disabled members of the community to access various spaces independently if needed. Any renovation or new construction plans should incorporate the accessibility of these items to accommodate disabled people.

EGRESS AND LIFE SAFETY

- There is only a single stairway to the second floor. There should be two means of egress due to the occupant load.
- The stairway does not comply with current railing requirements
- Light levels seem low. Corridors do not have adequate egress signage
- Building is not sprinklered. If any additions are planned, the entire building should be sprinklered
- There are steps between Apparatus bays. These have not been constructed per building code and pose a safety hazard especially when responding to emergencies
- The Kitchen does not have a fire protected range hood. If anything is being fried at the station, the building code requires a fire suppression system over the range

Recommendations

- Remove all stored items from Corridors and Hallways
- Update lighting and exit signage.
- Provide a sprinkler system throughout the entire building.
- Provide ramps if possible between the different floor levels

STORAGE

- There is not enough general storage space.
- There is an outdoor storage container that stores salt, hoses and other misc. items

- Turn Out Gear Locker area appears to be inadequate in size for all the personnel
- There are no personnel lockers which is found in many fire stations
- Turn Out Gear Lockers should not be located within the Apparatus Bays due to accelerated degradation of the gear due to vehicle exhaust.

MISCELLANEOUS

- There is a 30,000 gal to 38,000 gal water storage tank located in the Middle Bays (under the Engine). It is reported that the drafting system and storage do not have any issues and seem to be functioning well. Any Addition to the Building will need to take this storage tank into consideration especially when it comes to the foundation and structure.

CIVIL ASSESSMENT

GENERAL SITE CONSIDERATIONS:

- There remains some question about the location of the property line to the south, based on testimony and exhibits that show a former road ROW in that location. While it has been understand that the southerly neighbor may be friendly to expansion in that direction, actual property lines should be confirmed before design of any additions or new structures on the site. It is recommended that a current topographic and boundary survey be conducted.
- Site circulation appears to function reasonably well, however the lack of striping and clear paths of circulation may be a challenge for visitors unfamiliar with the site. Exit from apparatus bays directly onto Killington Road may present somewhat of a sight distance and visibility challenge.
- The site and Killington Road slope down gently from south to north. This results in stepped slabs within the existing building and will likely require stepped slabs within a similarly configured new building, unless the building can be pulled back enough from Killington Road such that grade changes can be made up with an apron.
- Regarding flooding, there is no available FEMA FIRM map for this location, however data is likely available from FEMA and should be gathered before any redevelopment of the site is considered. Fire personnel have noted that the building has never flooded, but that flood waters have come into the rear parking area to within a foot or less in elevation of the fire station.
- The Fire Department Staff have indicated that the location of the station within Killington is desirable from a response time perspective.

UTILITY CONSIDERATIONS:

- Utility services appear reasonably adequate for the existing building and level of use. Significant expansion of use or a new building on the same site will require further review to confirm adequacy.
- Municipal sewer is located in Killington Road, directly in front of the fire station.
- A drilled water well was permitted and installed in 2002 (WW-1-0945). It is understood from the staff that bottled water is used for drinking purposes.
- There is a dry hydrant intake from the Roaring Brook with a small pump house used to fill a water storage tank (roughly 35,000 gallons) below one of the apparatus bay slabs. If the existing building is replaced, this function will also need to be replaced in some similar manner.

STORMWATER, PERMITTING AND NATURAL FEATURES:

- There does not appear to be any stormwater management at the existing site. Water appears to sheet flow from the existing parking area in 3 locations towards the Roaring Brook in the rear. Since the parcel is less than 1 acre, an ANR Stormwater and CGP (erosion control permit) should not be required. However, the current stormwater drains into the Roaring Brook untreated in at least 3 locations. Any redevelopment of the site should consider at least some form of stormwater treatment prior to discharge.

- ANR has a riparian buffer policy that applies to projects that require an Act 250 permit. Since this is a municipal project that will disturb less than 10 acres (the parcel is less than 1 acre) an Act 250 permit is not likely required, so my understanding is that the riparian buffer policy will not apply. Any major renovation to the existing building, or new building, will require an ANR Wastewater permit, possibly an ANR Stormwater and Erosion Control permit and local Planning and Zoning permits.
- There are no mapped wetlands on the site, however a wetland biologist would need to perform a site visit to confirm if any wetlands are present along the Roaring Brook bank. If any do exist, Class III wetlands do not require a buffer while Class II wetlands require a 50ft buffer. They would be considered Class II wetlands if they are hydrologic ally connected to mapped Class II wetlands. The ANR Environmental Indicator map shows that there are Class II wetlands mapped just north of the Dean Hill road culvert.
- Any major renovation to the existing building, or new building, will require an ANR Wastewater permit, possibly an ANR Stormwater and Erosion Control permit (if an increased lot size and disturbance is more than 1 acre) and local Planning and Zoning permits.

At this point, pending results from the above items, the safest course of action would be to plan any concept redevelopment of the site to within the existing edge of paving, gravel or other previously disturbed areas.

STRUCTURAL ASSESSMENT

GENERAL STRUCTURAL REVIEW

The existing building consists of two phases of wood frame/stick built construction. Reuse and renovation of the existing building will require evaluation and upgrading to portions of the framing. A summary of anticipated modifications is as follows:

- Since the building is classified as an "Essential Facility" there will likely need to be some shear wall reinforcing done including adding sheathing or increasing nailing and the addition of wood to concrete hold-downs at wall/foundation interface.
- Second floor and roof wood framing will likely require some reinforcing depending on desired uses and corresponding loads. The second floor framing in the original building appears to have about half the capacity of the newer building.
- Reinforcing requirements for existing second floor framing will depend on desired use for the various spaces. Use for offices will require less reinforcing than for public assembly/meetings or storage.
- The steel columns in the original building are rusted near the bases and will likely require replacement.
- In the event all or portions of the existing building are proposed to be reused, additional documentation and evaluation will be necessary.

MECHANICAL SYSTEMS ASSESSMENT

FIRE DEPARTMENT EXISTING SYSTEMS

- The fire department is heated with propane gas furnaces. The furnaces appear to be original to the years they are installed (1974, 1984 and 1999). There are two (2) types of gas furnaces. The first is a wall mounted Empire Comfort Systems wall furnace. This type serves 2 of the engine bays and the upper level. The second furnace is a horizontal unit heater type and this model only serves the central engine bay.

Empire Heating System Propane Heater

Horizontal Unit Propane Heater

- The fire department uses about 3,600 gallons of propane per year. There are two (2) 1,000 gallon underground storage tanks in the back.
- There is no central cooling. The only air conditioning is an LG window unit in the meeting room on the second floor. This unit is fairly new and is an energy efficient model (18,000 btu/hr, 10.7 EER).
- There is no central ventilation system. Carbon monoxide units are Air Vac 911 models. Several are installed in the three (3) engine bays.

Air Vac 911 for Carbon Monoxide

FIRE DEPARTMENT EXISTING PLUMBING SYSTEMS

- There is one lavatory on the first floor. It consists of a lavatory, water closet and shower. There are a couple of laundry sinks in the engine bays. Upstairs this is a kitchen sink.

Existing Bathroom

- A fairly new water heater is installed with a tempering valve, so it is meeting the current plumbing code requirements.

New Water Heater with Tempering Valve

- An air compressor is piped throughout the engine bays to pneumatic hose reels. This same compressor is used to fill the departments Scot Packs.

Air Compressor

FIRE DEPARTMENT EXISTING SPRINKER SYSTEMS

- There is no central sprinkler system in the fire department.

OBSERVATIONS, RECOMMENDATIONS AND CONCLUSIONS

FIRE DEPARTMENT MECHANICAL SYSTEMS

1. There appear to be no issues with the mechanical systems. Some of the gas heaters are getting old and have cosmetic damage, but appear to be heating the building. More energy efficient models are available and the units should be upgraded when the existing units fail or need to be replaced.

2. According to the staff, the Air Vac 911 systems appear to be in working order.

FIRE DEPARTMENT PLUMBING SYSTEMS

1. Replace existing plumbing fixtures with low water consumption models. The water closets can be reduced to 1.6 gpf and aerators can be installed on the lavatory faucets. This will reduce water consumption.

EXISTING ELECTRICAL SYSTEMS ASSESSMENT

POWER DISTRIBUTION EQUIPMENT

An overhead 3-phase, 200 amp, 120/208v service runs from a utility pole to a mast on the side of the 1998 apparatus bay addition. This service feeds the entire facility. This overhead service terminates at the utility meter socket and then runs underground to a Kohler, service-entrance rated transfer switch inside the 1998 addition. From the transfer switch, the service runs inside the building to a 200A, main circuit-breaker, 40-circuit Square D distribution panel that was installed in 1984 when the first apparatus bay addition was built. This panel is used to distribute power throughout the building.

This Square D main panel distributes power to a 100 amp subpanel in the 1998 addition, and a smaller 60 amp subpanel in the day-room upstairs. It also provides power to the small pump house near the brook. The panel also provides power to a 15 HP pump that is used to fill the trucks from the water reservoir under the apparatus bay. This panel and breakers are not well labeled and the accuracy of the panel schedule is suspect. The panel is completely full and there are (6) mini breakers used which indicates that the panel is under sized and potentially over-loaded. See Figure #1 on page E-2.

The main panel is located at the rear of the apparatus bay and does not have the code-required working clearances around it. Panels require a clear working clearance of 30” wide and 36” in front. The 15 HP pump and associated plumbing is blocking the clear access to the panel. See Figure #2 on page E-3.

There is no TVSS or surge suppressor in the main switchgear. A TVSS will protect against Utility surges and lightning strikes.

This main panel is in need of replacement and should be relocated. Electrical distribution equipment and wiring is expected to last ~40 years. This original panel, breakers, and distribution wiring are approaching this age. The existing equipment is at an age where failures are expected.

There is a small 60A sub-panel located upstairs in the day room. This is of the same age as the main panel, 1984 vintage. This panel is totally unlabeled and also contains “mini-breakers”. There have been many occurrences of breakers tripping upstairs when the air conditioners are running. This indicates that the upstairs panel and circuits are inadequate.

The 100 amp subpanel in the 1998 addition is in good condition and is well labeled. It provides power to the air compressor and lights and outlets in the addition. There is room for addition circuits in this panel.

In addition to being connected to the incoming Utility service, the Kohler transfer switch is also connected to an exterior Kohler, 60KW, LP-fired, 3-phase, back-up generator. This generator starts automatically when utility power is lost and provides power to the entire facility. The generator size corresponds to the building’s utility service size: 200 amps, 3-phase.

The LP tanks are buried adjacent to the generator.

The generator and transfer switch were installed in August 2005 and appear to be in very good

Figure #1
Main Panel full with mini-breakers and poor labelling

condition. The installation, labeling, grounding, and wiring all appear to code-compliant and in good condition. It is suggested that the outdoor generator be raised up 4”-6” above grade on a concrete house-keeping pad to avoid direct contact with the earth and grass and to offer some protection from ground water and snow. Currently it sits on a concrete pad that is at grade.

The electrical service seems marginal at the present size of 200 amps. It is recommended that a new, larger size service be installed and that the 1984 distribution and 1974 distribution systems be replaced and increased to allow for more circuits and spare capacity. The 1998 addition panel and generator equipment are adequate and could remain.

Figure #2
Main Panel with inadequate working clearances, Telephone entry location

LIGHTING

The existing interior lighting throughout the station consists of a mixture of fixtures. There are old fluorescent fixtures throughout that use magnetic ballasts and T-12 lamps. These are very inefficient and should all be replaced. There are many incandescent fixtures that all should be replaced. In addition to being very inefficient, the lighting in the 1984 and 1974 building is poor.

The lighting upstairs uses surface fluorescent fixtures with T-8 lamps. Occupancy sensors should be installed upstairs in all rooms to automatically turn the light off when the rooms are not occupied.

The lighting in the 1998 addition is using T-8 fluorescent lamps which are standard for interior lighting. The lighting in this space is good.

It is suggested that all fixtures in the 1974 and 1984 building be replaced with newer, more efficient, lighting fixtures with the use of some occupancy sensing controls. The lighting levels and lighting quality could be significantly improved, while using less power.

Currently, there is no emergency lighting or exit lights. While the size of the building does not make emergency and exit lighting required by code, thought should be given to providing emergency egress lighting and exit path indication.

There is limited exterior lighting. There is one flood light on the side and one in the rear. There are a few building mounted motion lights. These lights provide some exterior and security lighting, but not adequate in all locations.

The exterior flood lights are using halogen lamps and incandescent lamps which are also very inefficient. The flagpole flood lights are also incandescent.

It is suggested that all exterior lighting be replaced with new LED fixtures and that additional exterior lighting be considered.

ELECTRICAL DEVICES AND WIRING

There are a variety of wiring methods used throughout the building. There is surface EMT conduit, concealed wiring, and flexible armored cable. These are the most reliable types of wiring systems. There is also Romex wire used upstairs and exposed on some areas. There have been no major upgrades to the original wiring that was installed during the original construction and 1984 addition. The conduit, junction boxes, and wiring show many signs of age in the older portions of the building. There are a number of code violations related to the wiring methods.

All receptacles in all apparatus bays are required to be GFI protected. Currently the 1998 addition is the only location where some GFI outlets are present. The apparatus receptacles on the ceilings and walls

are also required to be GFI protected, none in the building currently are.

GFI protected outlets are required in the upstairs kitchen. All receptacles installed in kitchens are now required to be GFI protected.

There is exposed, surface Romex in the 1974 building. See figures #3 and #4. Romex is not allowed to be exposed in garages. Romex is also laying on the floor, subject to damage, in the storage closets on the second floor. See figure #5.

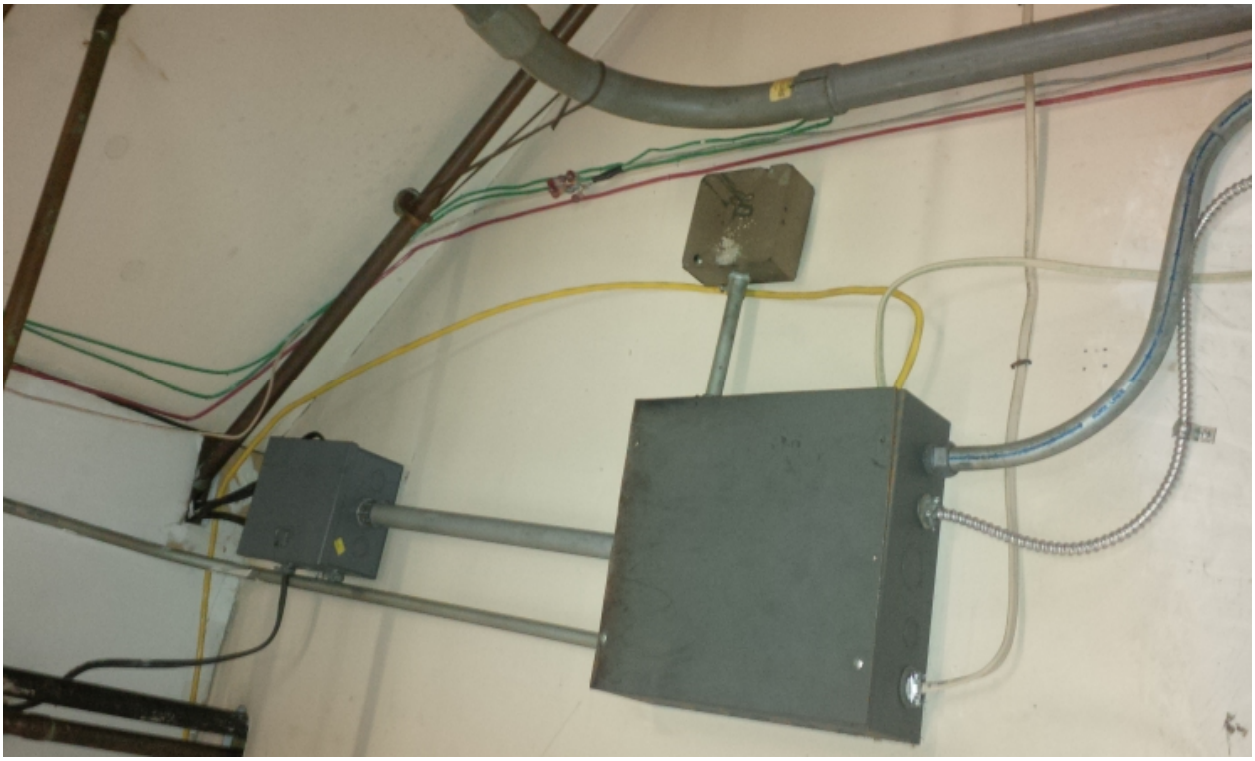


Figure #3 showing surface Romex and messy phone wiring

Figure #4 showing exposed Romex wiring and surface telephone wiring

Figure #5 showing Romex and Antenna wiring lying on the closet floor.

Most all the receptacles in the 1984 and 1974 building are broken. Refer to figure #6.

Figure #6 Showing typical a broken and worn-out receptacle

Most all junction boxes, devices, disconnects and similar devices are note labeled in the 1974 and 1984 buildings.

The cords feeding the trucks are not GFI protected. Many cords are in poor condition and strain-reliefs are not used to keep the cords from being pulled from the junction boxes. Refer to Figures #7 and #8.

Figure #7 showing no GFI or strain relief at the junction box

Figure #8 showing damaged cord connected to a truck

The outside power cord used for Christmas lighting and the Christmas lights are left in place all year and show signs of wear. These items are not rated for continuous outside exposure.

Another potentially dangerous situation occurs in the upstairs closets. Incandescent bare lamps are in very close proximity to uncovered insulation. All fixtures in closets are required to have protective lenses. Refer to Figure #9.

Figure #9

Considering the condition of the wiring and the various violations, all wiring in the 1974 and 1984 portions of the building should be completely replaced. The wiring in the 1998 addition is in good condition and can remain.

FIRE ALARM SYSTEM

The existing fire alarm system is an ESL 1550 Series conventionally zoned system. The fire alarm panel was installed in 2008, but the fire alarm system components were installed previous to 2008. This system serves the entire facility. This is a conventional zoned system with connection to a Security Company for monitoring. There is a dialer connected to the system that calls the monitoring company upon alarm. The entire fire alarm system is serviced and tested yearly. There are 3 current zones with a capacity for 2 additional zones. The existing zones are first floor, second floor, and attic.

The fire alarm system does not meet current ADA requirements for notification (horns and strobes) in all areas. Currently, most areas and rooms have adequate horns and strobe coverage, but there are a few areas where there are not adequate horns and strobes. The code requires that all restrooms, break rooms, apparatus rooms, and meeting rooms have ADA approved strobe lights and adequate sound notification. In all rooms and areas where the general public can meet, horns and/or strobes are required.

Areas that do not currently have adequate devices are the bathroom and the day room.

Many of the existing horn/strobe units are original equipment and do not meet current ADA standards. The ADA standards have changed significantly in the last 20 years which has caused the design of the horns and strobes to change. The non-code compliant horns and strobes are easy to replace with new ADA-compliant devices. It is estimated that there are 5 non-compliant devices and an additional 4 devices are required to meet the current codes.

Heat detectors are the primary type of protection installed. Heat detectors provide property protection, but are not life-safety devices. Since there is no sprinkler system, fire alarm devices are required in all spaces and rooms.

System smoke detectors are installed in the meeting room and at the top of the stairs. Smoke detectors are life safety devices and should be installed in all egress areas, hallways, and public spaces.

A smoke detector is required by code to be installed over the main fire alarm panel. Currently there isn't one installed.

Overall, the fire alarm system is operational but not completely code compliant to today's standards. The building's fire alarm system can be brought up to code with the above-mentioned additions.

TELEPHONE/DATA SYSTEM

TELEPHONE

Phone and internet service is provided by VTel. The phone service enters the building next to the main

distribution panel. Refer Figure #2. The phone wiring runs up to an old AT&T Phone Spirit system in the radio room. From here, phone cables are run to all the phones. Most wiring is surface mounted and stapled to walls and strapped to conduits and other wiring. Refer to figures #3 and #4.

The ATT&T Spirit system is a widely used and popular system at a very inexpensive cost. The system provides 12 lines and is capable of handling dispatch in the adjacent towns in the event of an emergency.

The system is functional, but very dated. The wiring is in poor condition and should be updated to handle faster speeds for computer needs.

DATA SYSTEM

The data and network system is very minimal. It appears that there are three computers that are connected, with a common internet connection. There is no dedicated computer server or system.

SECURITY

There currently is no hard-wired security system in place. There currently are no security cameras installed.

RECOMMENDATIONS

POWER DISTRIBUTION EQUIPMENT

The size of the existing service should be increased to allow for future expansion and additional loads. New panels and subpanels should be installed in the 1984 and 1974 portions of the building.

Install a TVSS (transient voltage surge suppressor) with under voltage protection to protect the electrical equipment in the event of a power surge or utility under voltage situation.

The existing generator and transfer switch can be reused and integrated into the revised electrical service.

All circuits in all panels should be traced and properly labeled. Abandoned circuits and wiring should be removed.

LIGHTING

New lighting and controls should be installed to replace all exterior fixtures. All lighting in the 1974 and 1984 portions of the building should be removed and replaced. Lighting should meet ASHRAE/IES STANDARD 90.1 – 1989 and the 2012 Vermont Guidelines for Energy Efficient Commercial Construction for energy efficiency.

Add occupancy controls should be installed in all areas.

Consider adding emergency lighting and exit egress path lighting.

ELECTRICAL DEVICES AND WIRING

All wiring in the 1974 and 1984 portions of the building should be completely removed and replaced.

The code violations and conditions mentioned in this report should all be remedied.

FIRE ALARM SYSTEM

Horns and strobes should be added in areas where the coverage is not sufficient. Non ADA horns and strobes should be replaced with new devices.

SECURITY SYSTEM

An entry alarm security system and/or security camera should be considered, including a door contacts and at entry points and motion detectors on the second floor and hallways.

PHONE/DATA

Install a completely new tel/data system with a network hub with a dedicated area. Provide new Cat. 5e wiring to all phone and computer locations using a central hub and server with a Cat 5e patch panel and a connection to a high speed internet connection.

All abandoned wiring and systems should be completely removed.