FINAL REPORT

EVALUATION AND ASSESSMENT
SALEM TOWN OFFICES
33 GEREMONTY DRIVE
SALEM, NEW HAMPSHIRE

OCTOBER 11, 2017

The H.L. Turner Group Inc.

ARCHITECTS ▪ ENGINEERS ▪ BUILDING SCIENTISTS

Facility Assessment Report
Salem Town Office Building

On Wednesday, June 21, 2017, The H.L. Turner Group Inc. (TTG) visited the site of the Salem Town Offices at 33 Geremonty Drive in Salem, NH, to perform a facility assessment of the building and surrounding site. The purpose of this assessment was to identify any existing deficiencies in the building or site that the Town should plan to address. The report is divided into four main sections. The first section gives an overview of the architectural features of the building including the exterior façade, roof, and interior finishes. The second and third sections address the major electrical and mechanical equipment, and associated deficiencies respectively. The final section is an in-depth discussion of the surrounding site, including drainage issues.

Accurate and concise condition assessment data is essential for proper planning for maintenance, improvements, and capital improvements. This condition assessment is intended for use by the Town of Salem as a tool for budget planning for the allocation of resources on a priority basis. It is hoped that by determining the nature and extent of problems, and providing options for corrective action, items may be addressed before more serious damage or failure can occur. The purpose of this facility audit is to report conditions that are in need of repairs and upgrade, conditions that do not comply with current building and safety codes, and confirm that the facility operates as designed structurally, mechanically, and electrically.

Project Objectives

- To provide an accurate accounting of all items that may be classified as deferred maintenance or capital repair/improvements.

- To calculate opinions of cost for all identified maintenance and capital improvement items using an established method of construction and cost estimating data.

- To assemble a report and database that identifies a 10-year capital planning cycle to address all identified maintenance items.

It is the intention that the results of this facility audit will ultimately be used to identify a prioritization of capital repair and replacement projects for the Salem Town Offices.

LIMITATIONS: The H.L. Turner Group Inc. (TTG) has prepared this report for the Town of Salem, New Hampshire, based on visual observations only, and therefore it did not involve destructive demolition, scientific testing, or any other tests. The information/data in this report has been provided in general accordance with accepted Engineering/Architectural consulting practices. TTG makes no warranty, either expressed or implied, on the conclusions or cost estimates/opinions of cost provided.

Executive Summary

In general, the Salem Town Office building is definitely showing its age. Many of the finishes including walls, ceilings, and floors are worn and outdated. Exterior sealants and painted finishes need replacement or recoating. Insulation levels in the ceiling are insufficient. The mechanical and other systems and equipment have aged and many are at, or have exceeded, their useful life. There is a myriad of ductwork and various air handling units throughout the building that do not work well with the present configuration.

The following is a breakdown of costs for the repair, upgrade or replacement of materials, equipment, finishes and systems throughout the building. The Cost Summary is presented for Short Term, Mid-term and Long-Term repairs. Short Term is for materials and/or systems that should be repaired, upgraded or replaced within the next two to three years. Mid-Term is for materials and/or systems that should be repaired, upgraded or replaced within the next three to five years. Long Term is for materials and/or systems that should be repaired, upgraded or replaced within the next ten to twelve years.

Cost Summary Sheet for Repairs, Upgrades and Renovations

Discipline Category	Short-Term	Mid-Term	Long-Term
Architectural	$127,350	$119,200	$113,000
Mechanical	$348,500	$230,000	$310,000
Electrical	$72,000	$80,000	$102,000
Civil/Site	$228,400	$30,350	$35,000
TOTALS	**$776,250**	**$459,550**	**$560,000**

Introduction

The Salem Town Office building was constructed in 1967. The main entrance faces west toward Geremonty Drive. The two-story building is constructed of a concrete masonry foundation with wood framed walls, wood truss roof framing, and a brick facade. Several additions were added over the years, one in the late 1970's/early 1980's on the east side of the building, and a second addition was constructed in the early 1990's on the south side of the building to accommodate the NH Department of Motor Vehicles (DMV). The DMV vacated the building several years ago and the area is now used by community development. The total area of the building is 19,100 square feet with 12,200 square feet on the first or lower level and 6,900 square feet on the upper level.

The first floor includes a service area for residents, town clerk, tax collection, finance, IT, community development, records storage and a large meeting room where the select board meetings are held. The second floor has the Town Manager's office, assessor, planning, building inspector and engineering.

Roof Overview

The roof is covered with asphalt shingles. The shingles were replaced in 2007 and appear to be in good condition. The area over the old DMV section of the building was replaced in 2016 due to severe damage from winter conditions. There is staining on the roof surface from the chimney and in two areas from condensate that discharges from the mechanical units. The staining is somewhat unsightly and in time will wear the surface of the shingles.

The wood fascia, rake board, cornice, trim, soffit, and frieze board are peeling and require scraping and painting. Some wood repairs may be needed due to rot and decay. One section of rake board and trim were replaced, but never received any paint. Heat tape is installed along the lower edge of the west side of the roof to help minimize the formation of ice dams. We observed that many of the ceiling spaces have minimal insulation. In some areas it is only 3-½ inches thick. In other areas the insulation has been pushed aside for mechanical work and it was never put back in place. This has led to ice dams along the eaves and in the valleys, which has led to roof leaks. In the original 1967 section of the building, the roof framing consists of site built wood trusses spaced at 24 inches on center. The Kraft paper-faced insulation, although it is mostly 12 inches thick in this area, some of it was installed with the Kraft paper side facing up away from the heated space, as opposed to against the heated space. Much of the insulation has been moved around and displaced when mechanical work was done. The insulation is stuffed into the eaves thus preventing any air to move up through the eave vents into the attic space. Furthermore there is no ridge vent, only a small gable end vent on one side

of the building. We also observed some old mechanical units in the original 1967 attic section that have been abandoned in place. These old units should be removed and the area they occupied properly insulated.

In the addition on the east side there is also insufficient ceiling insulation. Some of the plumbing in the area over the bathrooms on the first level is wrapped in insulation. It was reported that in extremely cold winters the pipes in the ceiling will freeze. This has led to the installation of open honeycomb grids in the ceiling to replace the 2-foot square ceiling tiles. Although it helps to keep the pipes from freezing, it results in tremendous heat loss and the formation of ice dams along the east edge of the roof.

Ice dams at the northeast side of the building in the back, over the boiler room, and over the area where the main transformer is located, are particularly bad. It is not unusual that crews are called in every winter to chop ice to break-up the ice dams. The natural gas pipe that feeds the boiler room runs across the roof and down the wall in this same area. Reportedly the pipe often gets encased in ice as well. This is a definite safety issue and should be of highest priority to rectify this situation since the pipe could become broken and/or dislodged due to ice encasing it, or from ice chunks breaking loose and falling against the gas line.

The low slope or flat roof is an EPDM membrane roof. There are several mechanical units on this roof. The membrane itself is in good condition, but the metal flashing at the intersection of the EPDM and shingle roof is lifting. The seams of the metal flashing are separating and need splice cover plates. The condensate from the mechanical units is ponding at the intersection with the shingle roof. The thru-wall flashing at the building corners needs to be replaced. The previously mentioned natural gas pipe runs across the flat roof and is held up off the roof on rotted or deteriorating supports.

There is a flat membrane roof over the stair tower. It has been previously patched at the gravel stop and wood fascia. The gravel stop, wood fascia, and trim at this location need replacing.

The cupola has some rotted sections of wood trim, and in general, the entire cupola needs scraping and painting. The brick chimney which extends up through the roof has loose mortar joints and needs repointing in several areas.

Recommendations

- Scrape and paint the wood fascia, rake board, cornice, trim and soffits. Replace wood that has rotted.
- Remove the old abandoned air handling units in the attic space. Properly insulate the area occupied by the units.

- Upgrade all ceiling insulation to R-38 minimum, which is approximately 16 inches of fiberglass batt insulation. During this process, provide interior eave vents, such as Duro-Vent to allow air flow up through the soffits toward the ridge. Install ridge vents in the original 1967 roof and through roof vents at the upper portion of the shed roof additions, where no vents exist today. All existing insulation must be reinstalled such that the vapor barrier is toward the heated side of the assembly. All plumbing through the ceiling spaces should be adequately and thoroughly insulated.
- Relocate the natural gas line that runs across the roof, down the wall, and enters the boiler roof such that it is not susceptible to damage from ice build-up. If the gas line cannot be relocated, there are several improvements that can be made. For example, provide more supports across the flat roof, as the current supports appear inadequate. Protect the gas pipe in a heavy walled half pipe enclosure, both on the roof and as it goes over the roof edge, and down the wall into the boiler room.
- Replace the gravel stop and wood fascia around the flat membrane roof over the stair tower.
- Scrape and paint the cupola on the main roof. Replace any rotted wood.
- Repoint the brick chimney joints.

Building Façade

The brick veneer is in good condition. The veneer has been damaged at the southeast corner adjacent to the accessible parking space, presumably from snow plows. The exposed portion of the concrete foundation at the southeast corner of the first addition is cracking and is in need of repair. Similar cracking was observed at the southwest corner of the DMV addition. It should also be repaired.

Along the west side, the original Town Office building is constructed with a masonry block foundation. This type of construction is subject to water infiltration which has been occurring during heavy rains or during early spring when the snow melts. The records storage area in the lower level where many of the Town's oldest paper records are stored is subject to this infiltration. Recommendations concerning drainage and waterproofing the wall are discussed in more detail in the Site Evaluation section of the report.

Most of the control joints around the building are dried out, cracked, and have gaps and voids exposing the inner wall cavity to weather, air infiltration, and insects. All the control joints should be cleaned out and refilled with new sealant. There are some mechanical penetrations through the exterior brick wall which are open and expose the inner wall cavity. These openings need to be filled with expanding foam or sealant.

On the east side of the building at the exterior door that exits from the finance department, we observed exposed brick cores at the cut end. In addition, we noted the brick veneer below the sloped brick sill where the window was removed for a new door is unfinished on both sides of the door, and thus the inner wall cavity is exposed.

The concrete landing, stair, and retaining wall at the entrance to the mechanical/storage space on the northeast corner of the building is failing and needs to be replaced. At the same time a safety rail should be installed on each side. This is further discussed in the Site Evaluation Section of the report. The hollow metal door and frame into the mechanical space is rusted through in some areas. The door and frame should be replaced.

The wood on the gable ends is peeling and in need of scraping and painting.

The exterior doors on the original 1967 building are insulated, hollow metal doors, with insulated vision panels. At the east and south entrances, the exterior doors are made of aluminum. These doors appear to be in good condition. The door into the mechanical room at the northeast corner (at the stair tower) is rusted and should be replaced.

There are four canopy roofs over most of the entry doors around the building. At the east entry from the parking lot to the lower level, the canopy roof fascia, beam enclosure, and soffit are separating, and need repair and or replacement, and the entire canopy needs repainting. Furthermore, the concrete stairs, landing, and retaining walls are cracked and are starting to fail, needing replacement in the near future. The roof support columns need additional bearing onto the retaining walls and the metal railings on each side are rusting and need to be replaced.

The canopy roof at the exit from the finance department on the northeast corner of the building needs repainting. The ceiling is deteriorated and there are signs of rot. The ceiling needs replacement.

The exterior covered walkway at the southeast accessible entrance needs refinishing of the ceiling surface, as well as the steel brick support lintel. The downspout is dented and needs to be replaced, preferably with a thicker walled downspout or an alternative material.

At the south side entry into the engineering department the concrete sill at the exterior door is cracking. Joint sealant repairs have been made, but the sill needs replacement. The concrete landing should eventually be replaced as should the granite step. The nearby condenser pad is badly eroded, spalled, and should be replaced. This work is covered in the Site Evaluation section of the report.

There are replacement windows throughout the building. Although the windows themselves are generally in good condition, the perimeter sealant is drying out and is in poor condition.

New sealant is needed in the near future. The steel lintels over some of the windows are rusting and need repainting. The finish on many of the window shutters is loose, flaking, and washing off, staining the brick below.

Recommendations

- Repair the cracked concrete foundation at the southeast corner of the building, as well as the southwest corner of the DMV addition. The cracks may lead to large areas of concrete spalling off the foundation wall if left unattended.
- Replace all existing control joints around the building with new, one-part polyurethane, elastomeric sealant, such as Sikaflex -1a or equivalent.
- Repair the area around the entry door into the finance area at the northeast corner of the building. Fill all exposed brick openings and fill in the gaps between the veneer and door frame.
- The wood on the gable end is peeling and needs scraping and repainting.
- At the east entry from the lower parking lot, repair the roof fascia, beam enclosure, and soffit. Repaint the entire canopy. Provide adequate support for the roof columns on the foundation wall and upgrade the handrails.
- Canopy roof at the finance department entry door needs repainting and the ceiling requires replacement.
- Repaint the ceiling and steel brick support lintel at the southeast accessible entry. Replace the damaged gutter downspout.
- Replace the perimeter sealant around the windows.
- Repaint the steel lintels over the windows.
- Repaint the window shutters.
- Replace the metal door and frame for the mechanical room at the northeast corner.

Interior

Most of the finishes throughout the building are worn and need upgrade or replacement. The flooring is a combination of carpet, vinyl tile, sheet vinyl and wood strip flooring. The carpet is well worn with rippling, curling and splitting. It needs to be replaced in the near future. Some of the curled areas need to be taped down as it is a tripping hazard. While the vinyl tile is in fair to good condition, the sheet vinyl in the lower level break room is worn with splits and separating seams. This too needs to be replaced in the near future. The wood strip floors are in good condition. We observed some cracks in the concrete floor in the vestibule, just inside the entry, down from the parking lot on the east side of the building. The cracks should be routed out and filled with crack filler and sealed.

The ceiling throughout the building has significant staining and discoloration from a variety of causes, from roof leaks to pipe leaks to condensation.

Some specific areas or rooms of note include the IT room which has a number of vinyl floor tiles missing and more significantly the ceiling assembly is non-fire rated. It should have a minimum 2-hour fire rating for an IT room. The walls do extend up to the metal floor deck above and we presume the walls are fire rated. The door to the IT room is cut such that there is a large space along the bottom which compromises the fire rating of the door. The firestopping used for pipe and conduit penetrations through the wall is not a fire rated sealant. As mentioned earlier, the records storage room has experienced moisture intrusion through the CMU masonry wall.

In the main meeting room on the first floor, we observed the heavy suspended fabric wall covering is concealing the thermostat on the wall, as well as the light switches and outlets. In the community development area, which originally served the DMV, the space appears to be under-utilized. The ceiling is water stained in several areas and we observed damage to the wallboard near the door that exits to the hallway vestibule just inside the accessible entrance. The leaks are the result of ice dams in the roof valley causing water to back-up into the building. We also observed, above the ceiling tiles, a section of the original roof gutter that was attached to the eave of the roof. It was never removed when the DMV addition was constructed. On occasion the roof will leak and find its way to the old gutter where it empties through the downspout opening onto the ceiling, and down the wall around the area of a light switch and fire alarm.

The communicating stairway between the first floor and the second floor has insufficient clearance between the handrail and the wall. The State fire code requires 2-¼" and we only measured 1-½" clearance. Furthermore, the railing is not continuous. The elevator and elevator equipment is in good condition and has an updated inspection certificate on display.

The accessible bathrooms have a variety of issues including an incomplete installation of the required grab bars, such as missing rear grab bars and missing vertical grab bars. In some cases the toilet tissue dispenser is located on the wall opposite the toilet, the urinal heights are not compliant with ADA since at least one urinal in a bathroom must be located 17 inches above the finish floor, and all lavatories and sinks are required to have the supply and waste pipes shielded or insulated from contact, which is not the case based on what we observed. Finally, ADA requires that all toilet room accessories are to be installed with the operating mechanism no greater than 48 inches above the finish floor. That is not met in all cases. At the lower level, the women's bathroom on the west side of the building has an issue with the floor drain trap. As water evaporates in the trap, odor permeates up into the room. Since there is no trap primer, water must be added to the floor drain every few days to prevent the odor from backing-up into the room. Sure Seal makes a floor drain trap seal that can be retrofitted into the trap. It is a

one-way flap to let water flow down the drain line, but blocks the emission of noxious gases from backing-up without the need for a trap primer.

With respect to drinking fountains in the building, only single level drinking fountains are provided throughout the building. Per ADA guidelines, drinking fountains are to be dual height for wheelchair accessibility and standing use.

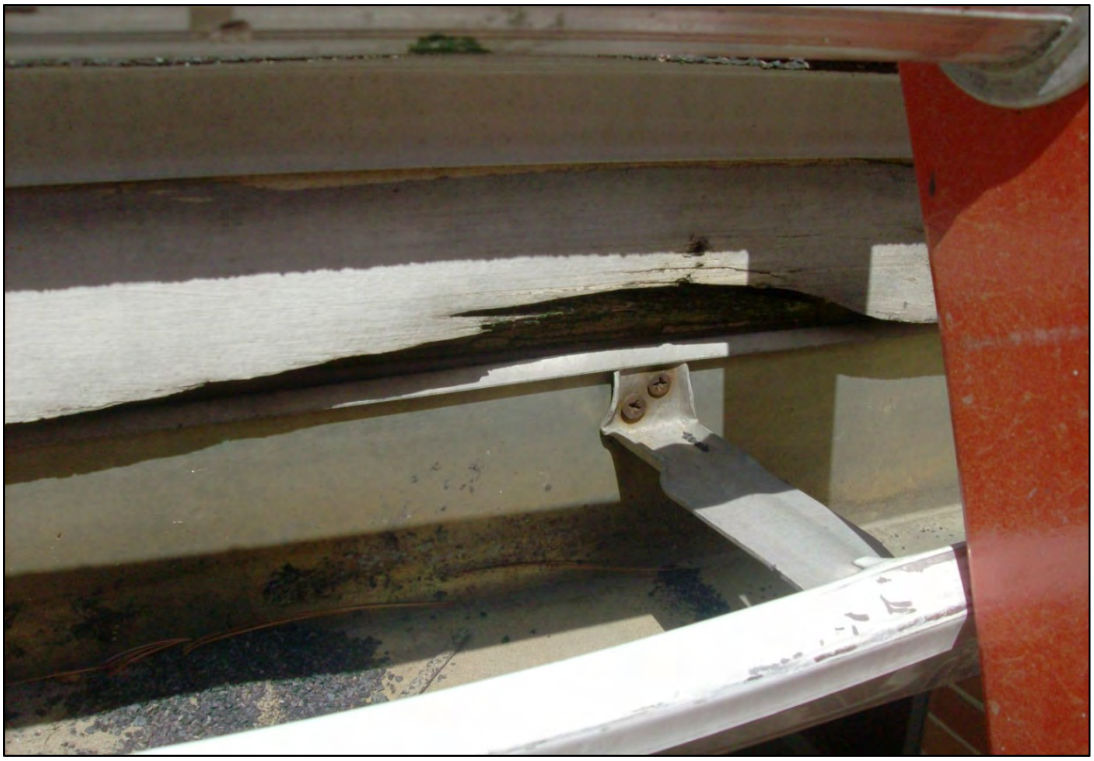
We observed an air handling closet in the finance department with exposed wall stud framing and unfaced fiberglass insulation. There are storage boxes blocking or reducing the required path for egress. There are also boxes full of paper and files piled in hallways and offices in numerous locations. Not only do they impede egress paths, they contribute to the fuel load of the building, and can lead to flame and smoke spread. The building does not have a sprinkler system, so some of these issues are critical and should be addressed.

Recommendations

- Consider a redesigned storage room for records storage. The room should have a 3-hour fire rating and be temperature and humidity controlled.
- Replace the carpeting throughout the building.
- Replace the sheet vinyl in the break room.
- Repair the cracks in the concrete floor inside the east side vestibule. Seal the floor.
- Replace stained and discolored ceiling tiles.
- Install a 2-hour fire rated ceiling over the IT room.
- Replace the damaged gypsum inside the door into community development.
- Upgrade the railing on the communicating stairway between the first floor and the second floor to meet State fire code.
- Upgrade the bathrooms to meet accessibility requirements. Address floor drain issue in lower level women's bathroom.
- Provide an ADA required, multi-level drinking fountain.
- Remove all boxes of paper from the floor in offices and in some of the corridors.

In general, there seems to be areas in the building that are under-utilized while other areas seem overcrowded. For example, the finance department has insufficient room for file storage as they have to constantly rotate a year's worth of files into and out of the space. Also, the area lacks natural light as there are an insufficient number of windows in the space.

We recommend a current space use and future space needs study be performed for all of the departments and uses within the building to determine the most efficient utilization and consolidation of space, equipment, and utilities to meet the needs of the staff, as well as the public.



Rotted fascia board on east side.

Deteriorated and failed control joint sealant.

Failed control joint sealant.

Repointing needed at brick chimney.

Exposed gas line to boiler room runs over roof and across north wall.

Gas line runs from attic space to mechanical units on roof and over to boiler room.

Rotted fascia on high roof over stairwell.

Peeling paint on cupola.

Peeling paint on gable end. Also note deteriorated compressor pad and cracked door sill.

Sealant around window needs replacement.

Open hole in brick face allows air and moisture infiltration, as well as access for insects and rodents.

East side beam enclosure is separating at canopy and there is some rot starting.

Typical condition of rust on lintels over windows.

Damaged and cracked concrete and damaged brick at southeast corner.

Doorway cut into wall at finance department left large gaps between trim and brick façade.

Large gaps left behind brick façade when door frame was cut in and installed.

Rotted ceiling board under canopy at finance department entry door.

Rusted door and frame at mechanical room at northeast corner.

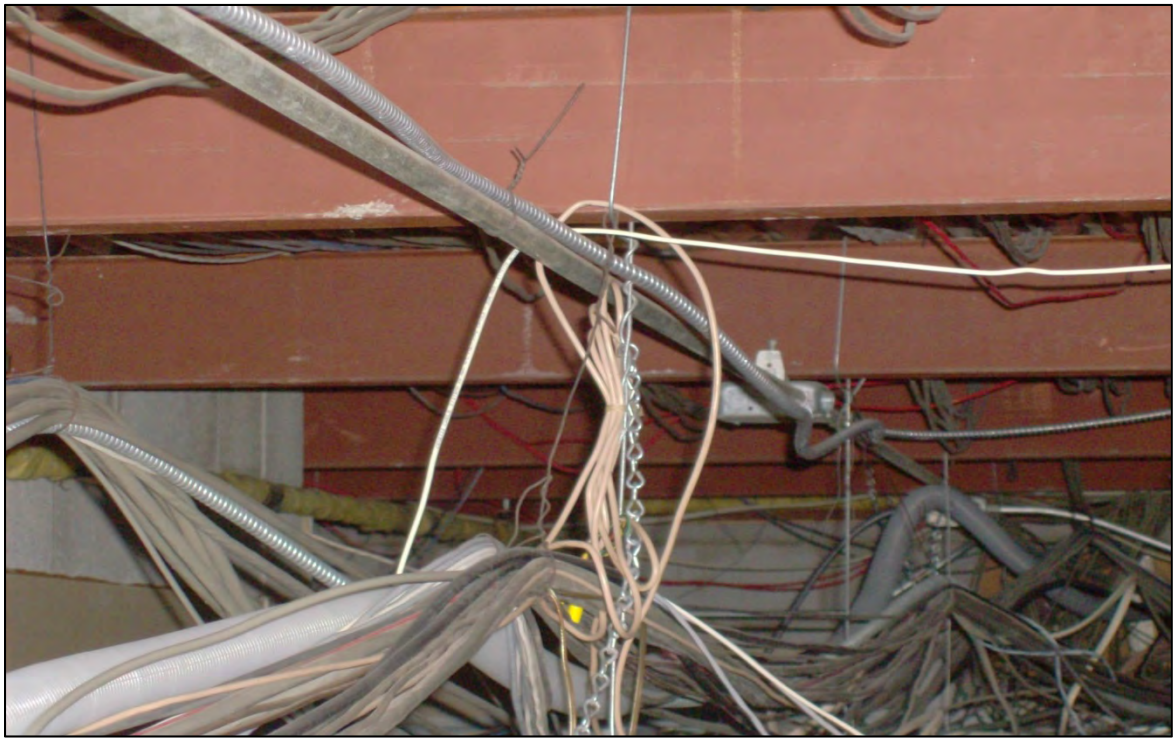
Damage to gypsum above suspended ceiling in community development area from water damage.

Stained ceiling tiles typical throughout building from pipe and/or roof leaks.

Stained ceiling tiles in bathroom from roof leaks.

Open ceiling grate in east side bathroom to let warm air above ceiling so pipes don't freeze.

Counter area for serving the local residents. Note worn out carpet.



Tangle of wiring and communication cables over corridor ceiling. Many cables are no longer used.

Old abandoned air handling unit in attic above.

Insulation in attic space over original building, plus old abandoned ductwork open to the space.

Lack of enough receptacles results in power strips and circuit overloads.

Records storage area.

Worn out carpeting is typical throughout.

Tears, bulges, and wear on carpets.

Sheet vinyl in break room needs replacement.

Non-compliant stair rail on communication stair between upper and lower levels.

Floor cracks in concrete at vestibule on east entry at lower level.

PROJECT NO. 4529 ~ SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

ARCHITECTURAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Wood Trim & Soffit at Roof Edges	Paint is flaking and peeling.	Scrape and paint trim and soffits. Replace rotted wood.	2 years	$3,500		
Abandoned Air Handling Units in Attic	Old units left in attic.	Remove old units and insulate attic space.	N/A	$3,000		
Building Attic/Ceiling Insulation	Insulation lacking in many areas. Insulation out of place or improperly installed.	Upgrade insulation through all ceiling/attic locations to R-38 (16").	N/A	$20,000		
Natural Gas Line	Gas line on roof and on side of building is susceptible to damage from ice dams and falling ice.	Relocate gas line or protect line with steel cover.	N/A	$17,000		
Cupola	Paint is peeling. Some rotted wood.	Scrape and pain cupola. Replace rotted wood.	2 years	$2,500		

PROJECT NO. 4529 ~ SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

ARCHITECTURAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Wood Trim, Gravel Stop & Fascia at High Roof over Stairwell	Trim is deteriorated and needs replacement.	Replace wood trim and gravel stop.	2 years	$3,500		
Concrete Foundation	Cracks in foundation at southeast corner and southwest corner at DMV addition.	Patch cracks and perform needed foundation repairs.	2 to 3 years	$2,500		
Masonry Control Joints	Control joint sealants have failed and are starting to fall out.	Replace all control joint sealant with backer bar and new sealant.	1 year	$12,000		
Masonry Repairs	Gaps around masonry at finance department door opening.	Repair gaps and openings in masonry.	1 year	$2,000		
Flat Roof over 1970's Addition	EPDM is ok for now but will need replacement long-term.	Replace EPDM with new membrane.	10 to 12 years			$28,000

PROJECT NO. 4529 ~ SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

ARCHITECTURAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Gable Ends	Paint is peeling.	Scrape and repaint gable ends of building.	2 years	$600		
Canopy at East Entry from Parking Lot	Fascia, beam enclosure, and soffit. Need repairs to column supports.	Make repairs as needed.	2 years	$2,500		
Ceiling Under Canopy at Finance Department Entry	Ceiling panel is deteriorated.	Replace ceiling panel.	1 to 2 years	$1,500		
Accessible Entry at Southeast	Ceiling and lintel needs repainting. Damaged downspout.	Repaint ceiling and lintel and replace downspout	4 years		$1,200	
Perimeter Sealant Around Windows	Window sealant is dried out, cracked and deteriorated.	Install new sealant around all windows.	2 to 3 years	$8,000		
Metal Door into Mechanical Space at Northeast Corner	Door and frame are rusted. Frame has rusted through at bottom.	Replace hollow metal door and frame.	1 to 2 years	$2,500		

PROJECT NO. 4529 ~ SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

ARCHITECTURAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Steel Lintels over Windows	Steel is rusting.	Scrape and wire brush lintels and repaint.	3 to 5 years		$1,500	
Windows	Replacement windows – ok for now.	Consider new window long-term.	10 to 12 years			$85,000
Window Shutters	Flaking and peeling paint causing staining on brickwork.	Repaint or replace shutters.			$3,000	
Records Storage	Non-fire rated, moisture intrusion issues.	Redesign storage room to provide fire rated, temperature and humidity controlled space.	N/A		$80,000	
Carpet	Carpet throughout building is badly worn.	Replace carpet.	1 to 2 years	$25,000		
Sheet Vinyl in Break Room	Floor is worn out.	Replace sheet vinyl.	1 to 2 years	$2,500		

PROJECT NO. 4529 ~ SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

ARCHITECTURAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Concrete Floor at East Side Vestibule	Floor has cracks just inside east side entry door.	Repair cracks and seal floor.	1 to 2 years	$1,000		
Ceiling Tiles Throughout	Numerous stained and discolored ceiling tiles.	Replace ceiling tiles as required.	N/A	$4,000		
Ceiling Over IT Room	Ceiling is not fire rated.	Construct 2-hour fire rated ceiling.	N/A	$5,000		
Gypsum Wall Inside Community Development	Wall is damaged from water intrusion at entry door to community development.	Repair existing gypsum wall.	N/A	$2,500		
Communicating Stairway from Lower Level to Upper Level	Railing does not meet code.	Upgrade handrail to meet code requirement for distance off wall and continuous railing.	N/A		$3,500	

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ARCHITECTURAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Bathroom Accessibility Compliance	Most bathrooms are lacking in meeting accessibility requirements.	Upgrade bathrooms as required.	N/A		$25,000	
Floor drain in Women's Bathroom at Lower Level	Floor drain trap dries out and creates odor problem.	Install trap seal.	N/A	$250		
Drinking Fountain	Does not comply with ADA guidelines.	Provide multi-level fountain per ADA guidelines.	N/A		$5,000	
Boxes Stored in Offices and Corridors	Excess boxes of paper stored in corridors and offices.	Move paper to storage rooms so as to not impede egress and reduce fire hazard.	N/A	$0		
Space Allocation	Some areas overcrowded, other areas under-utilized.	Perform current space use and future space needs study.	N/A	$6,000		

PROJECT NO. 4529 ~ SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

ARCHITECTURAL			$ Opinion of Cost			
COMPONENT	OBSERVATION	RECOMMENDATION	*Remaining Useful Life*	Short-Term	Mid-Term	Long-Term
		TOTALS		$127,350	$119,200	$113,000

Mechanical Narrative
Salem Town Office Building

Existing Systems

Heating, Ventilating, and Air Conditioning (HVAC)

As described in the Architectural portion of the report, the Salem Town Office building consists of an original two-story building constructed in 1967, a one-story addition on the east side added in the late 1970s/early 1980s, and a one-story addition on the south side for the DMV in the early 1990s. The total building area and areas per floor are listed in the Architectural section.

This review of the system is based primarily on observations made on-site. The Owner did not find any drawings or other documentation of the mechanical systems for us to review.

The primary heating source for the original two-story 1967 portion is a Burnham Model V1107 cast iron boiler, which has been converted from heating oil to natural gas. The boiler is located in the boiler room on the lower level. This boiler has a rated gross output of 1,281,000 BTU/hour. The boiler is labeled as being originally fired with No. 2 heating oil. The boiler is dated 2006; the gas burner is dated 2012. The underground 2,000 gallon oil tank, installed in 1989, was reportedly removed from the ground in 2013; though oil piping, tank controls, and paper documentation remain on the wall with no indication that the tank was removed. The hot water from the boiler is distributed by two circulating pumps to fintube radiation throughout this portion of the building, and to a few duct heating coils at indoor air handling units (AHUs) including those in the east-side addition.

An additional heating source for the original 1967 portion of the building is Carrier gas-fired rooftop HVAC units (RTUs #7, #9, and #10) mounted on the roof of the addition. Nameplates for these are not visible because they are covered by duct insulation, but they appear similar to RTU #8 which serves the addition (see below). Based on their outer dimensions and single condenser fan, they may be three to six tons cooling capacity each. They are placed above the low-slope membrane roof of the addition, on sloped metal bases set on pressure-treated lumber, and ducted through the sloped roof into the attic.

Heating for the east-side addition is provided by all-air HVAC systems. The large meeting room is served by Carrier gas-fired rooftop unit #8 with nameplate indicating a manufacturing age of 2003, six-ton nominal cooling capacity, and two-stage gas heating with 115,000 BTU/hr gas input at approximately 80% efficiency. RTU #8 is on a roof curb flashed into the low-slope membrane roof of the addition, and ducted within the curb down to the meeting room.

Vertical fancoil-style AHUs #4 and #5 are floor-mounted in a mechanical room with outdoor access door, and have hot water duct heating coils piped to the boiler with three-way valves and circulating pumps. AHU #4 is by the First Co. with indicated date of 2013. AHU #5 is by Lennox with indicated date of 1979.

In the south-side DMV addition, a concentric PVC vent was observed through the southern sloped roof over the addition (former DMV area) but its source was not identified. This may serve a gas furnace. Gas piping to this area was observed outside the building.

Electric heaters include an electric unit heater in the boiler room, and small wall-mounted heaters in the toilet rooms in the addition. Some offices also have portable electric heaters which appear to have been provided by the individual occupants.

Cooling and ventilation for the two-story 1967 portion of the building is provided by the three gas-fired rooftop units (RTUs #7, #9, and #10). The RTUs appear to have replaced the two York AHUs which are abandoned in the attic (with apparent concrete support slabs visible in rooms below), and individual window air conditioners for which there are 20-amp receptacles remaining in some rooms. There are also vertical, floor-mounted, fancoil-style AHUs including #2 (an older Lennox unit with an old Lennox outdoor condensing unit) and #6 (a Payne unit with indicated date of 2004, with a Payne outdoor condensing unit of similar age).

Also within the 1960s building is a computer server IT room, which has a Mitsubishi ductless split system air conditioner or heat pump, with outdoor condensing unit, three ton capacity, dated December 2015. The condensing unit has a baffle designed to enable cooling to run at colder outdoor temperatures. The room also has a supply diffuser ducted from one of the AHUs.

Cooling and ventilation for the east-side addition is provided by RTU #8. Additional cooling is provided by AHU #5 which has an old Lennox outdoor condensing unit that ran during our visit. AHU #4 has a cooling coil, but no cooling piping. Ventilation air connections to supply outside air were not observed for either of these AHUs.

Exhaust fans include a wall-mounted fan at the lower level of the 1967 building, and individual ceiling-mounted fans in the toilet rooms in the east-side addition. For ventilation of the 1967 attic, an exhaust fan at a gable-end louver is cycled by a cooling thermostat. Exhaust ventilation was not observed in the janitor's closet.

Ceiling paddle fans are placed over the public service counter area in the east-side addition to supplement air movement.

Control systems for the mechanical equipment are simple, stand-alone type devices which are not interconnected, including individual programmable thermostats for the RTUs and AHUs. In the 1967 building, there are separate heating thermostats for the fintube heating, mounted adjacent to some of the RTU and AHU thermostats. In the meeting room in the east-side addition, there are two thermostats, apparently for RTU #8 and one or more of the AHUs, one of which is covered by a heavy curtain on the raised seating platform. Room thermostats are generally mounted high above ADA-required height, but have occupant adjustments which should be within reach. At the boiler, supply-water reset temperature control based on outdoor air temperature was not observed. There appear to be only a few zones of temperature control. There is a Carrier control box in the attic with a number of control wires to it, which may serve some type of control dampers or valves or interconnect the room thermostats, but what devices these wires run to was not observed.

Plumbing

The water service entrance is a 1-inch copper line which enters the boiler through the floor slab. It has a single line through the water meter with a "meter horn" or "meter setter" to allow the meter to be installed horizontally on a vertical pipeline. The water supply splits downstream of the meter, with one pipe running overhead, and the other running back under the floor to another area.

Hot water is provided by two residential, tank-type electric water heaters. One is in the janitor's closet and another is in the mechanical room, north of the east addition.

Natural gas piping now serves the entire building, and the boiler was converted from oil to gas in recent years. The piping is labeled at the meter and in the boiler room as a high-pressure 2 psi system, which enabled the piping to be run at smaller sizes. The piping enters the building at the southwest corner, but the terminal loads are primarily far from the entrance meter, so the piping runs into the attic, back out onto the roof, and is exposed on the outside of the building to reach the boiler room. The entrance also includes a branch which runs back into the ground after the meter, apparently to serve the emergency generator which is on the opposite (northeast) corner of the building.

Fire Protection

No fire protection systems are currently installed in the building. The existing domestic water entrance is too small to serve fire protection.

Equipment Condition

Heating, Ventilating, and Air Conditioning (HVAC)

Boiler System:

1. The boiler appears to be in good condition, quite clean and undamaged on the exterior, with approximately 20 or more years of remaining useful life. Its burner is newer and should have similar life. The boiler appears to have an operating control, high limit control, and low water cutoff. The boiler appears to have replaced an original of larger based dimensions. The boiler sits directly on the floor slab, which is at or below the outside grade, and does not appear to have a floor drain, increasing the likelihood of leaked water or high groundwater causing rusting of the base and casing panels. The walls and chimney show signs of past high water levels and rust. The site has drainage issues that could contribute to high groundwater in the boiler room, as described in the Site section of this report.

2. The combustion air system is by means of openings in the outside doors, both of which have low openings in the room, while current codes require both a high and a low inlet for gas-fired boilers of this type. One opening has its original door louver and a fixed opening with an inner reduction plate with the note "New damper sized for boiler fresh air needs." The other door, instead of a louver, has an increased opening with outer weather hood, and a motorized damper with flexible wiring connection which allows the door to open.

3. The hot water circulating pumps each serve a separate building area or temperature control zone, and appear to be replacements (one labeled 2015) that are in good condition. However, for redundancy, dual pump circulating systems with automatic lead-lag operation would be an improvement. The pumps are in the vertical return pipes at the back of the boiler, pressurizing the boiler during operation, whereas better air separation and over-pressure prevention would be obtained by pumping away from the boiler.

4. The pumps are piped very simply, without pressure gauges, balancing valves, strainers, or check valves, but do have ball or gate valves at the inlet and outlet, to allow servicing without draining the building piping.

5. The heating piping seen is soldered copper. The copper appears to connect directly to the boiler's cast iron fittings without dielectric fittings to prevent galvanic corrosion. The piping is simple and doesn't appear to have any provisions for injecting treatment chemicals to prolong the life of the system.

6. The boiler's Apollo relief valve discharge piping is corroded showing signs of leakage or frequent discharge, and terminates fairly high above the floor which can be hazardous to personnel. The valve's pressure setting and relief capacity were not observed to verify suitability for this boiler. The valve's inlet piping is much reduced in size from the boiler's relief pipe fitting.

7. Expansion control is outdated. Instead of a modern expansion tank with bladder or diaphragm to separate the air cushion from the system water, there are two, old overhead compression tanks. The tanks appear to lack the proper fittings which would help keep the air charge in the tanks from migrating into the heating water.

8. The boiler and piping are not well vented to eliminate air from the system. The boiler has a simple copper pipe from a top fitting, which also serves as the cold water makeup fill point, and runs up to old, overhead compression tanks. There is no air scoop or other air separator in the hot supply piping, and no special air venting fittings at the boiler. There is no automatic air venting, which would be incompatible with compression-type tanks.

9. The boiler was turned off during our visit, with a temperature of 75 to 80 deg. F and a very low water pressure of about 5 psig. Usually a somewhat higher cold fill pressure is recommended to ensure positive pressure at the high points of the system to keep air bubbles from forming in the piping.

10. The boiler breeching (flue venting) is thinwall galvanized steel, screwed joints, not pressure tight, apparently gravity vented. We did not observe a barometric draft damper. The boiler has a damper at its outlet for draft balancing. The breeching is not insulated for personnel safety, or reduction of heat loss into the boiler room.

11. The masonry chimney has two clay-lined flues. One of these is used for the boiler and had a fair amount of debris behind its cleanout door, including many chips of the clay lining. This door has in the past been sealed shut with orange, high-temperature sealant, apparently to reduce fumes entering the boiler room, which may have become unnecessary after switching to gas. The other flue is currently unused, and shows little or no sign of ever having been used except for some debris in the base.

12. The oil supply piping, high level monitoring of the tank, leak alarm system, and paper signs such as the operating permit from 2013, remain in the boiler room. No indication was observed as to whether the tank was removed, or whether it would be usable in the future.

13. Room openings, such as piping penetrations and top edges of walls, have various degrees and types of sealing. Some are sealed with ordinary yellow spray foam. Some have orange

spray foam, which is generally classified as a fire block, but not as a fire stop. Some have only fiberglass batts, or are open. A fire rating of this room relative to adjacent spaces may be required.

14. Efficiency improvements are possible with the existing system. Some form of outdoor-reset control of the supply water temperature should be added to allow for reduced heat loss from the piping and improved temperature control in the rooms. Reset of the pump flow using variable frequency drives (VFDs) should be added for reduced pumping power during moderate winter weather. The hot water heating piping in the boiler room is bare and pipe insulation was not observed in other areas of the building. Piping should be insulated to reduce heat loss to spaces that do not require heat and ensure hot water reaches the other end of the system.

15. Additional boiler capacity would allow improvements such as increased ventilation air (if needed), adding fintube heating to rooms in the addition, and/or replacing gas-fired rooftop units with water-based heating for better efficiency and control. Converting to condensing boilers would increase operating efficiency, particularly if heating terminals were upgraded to operate with lower water temperatures. A restriction to either of these scenarios is the size of the boiler room, which is already quite full with the boiler and other systems. The chimney's spare flue could be used with a larger gas boiler. Condensing boilers would require different venting.

Space Heating:

1. The fintube heating in the 1960s building is old and has been painted more than once. Its vent louvers are somewhat restricted by layers of paint. A few end covers are missing. It is uncertain whether matching components such as end caps are available anymore. Otherwise, the fintube hasn't been abused and is functional.

2. Zoning appears to be very minimal, meaning that large floor areas are on a single hot water heating zone, or air heating zone. This appears to result in discomfort for some occupants.

3. Occupant discomfort with the zoning may be the reason that individual portable electric heaters were observed. One such heater is plugged into a plug-in receptacle strip along with other devices, with the potential for overloading the strip or the wall circuit.

4. The toilet rooms in the addition have had problems with heating. The space above the ceiling has sometimes been cold enough to freeze the water piping. As noted about the meeting room previously in this report, after the pipe freezing incidents, ducts were run from the meeting room to supplement the small electric heaters in these rooms. Also, a

temporary solution implemented by the Owner has been to replace ceiling tiles with open grid panels to allow room heat to enter the attic. It was observed that there is no continuous air barrier between the ceiling cavities and the attic. Adding heat to the attic has apparently contributed to ice damming issues on the roof in this area.

5. AHU #5 has a branch supply duct which appears to run into a sidewall grille in the adjacent stairwell, and runs low above and beside the electrical circuit breaker panel; we did not observe a fire damper or other protection for the stairwell. It was reported that the stairwell gets very cold in the winter.

Air Handling and Air Conditioning:

1. The four gas-fired rooftop units (RTUs), at about 14 years old, have approximately 5 to 10 years of remaining useful life. Their service records were not noted.

2. The RTUs have condensate piping with traps to prevent drawing the condensate back into the airstream. The traps on three of the units are concealed under the duct insulation shrouds, and so are difficult to access for cleaning or for winter draining to prevent freezing. The piping discharges onto the membrane roof, and the condensate runs off the membrane onto the steeper shingled roof below it, constantly wetting the roof during cooling operation, causing unsightly staining, and the potential for mold or other growth which may harm the shingles.

3. Access to the RTUs is difficult, requiring a portable ladder. For our visit on a dry sunny day, a short extension ladder was leaned against a gutter and we climbed up the shingled sloped roof to reach the flat roof. Climbing on shingles shortens their life, is difficult when carrying parts and tools, and is more difficult in rain or snow. Good access improves maintenance, and safe access reduces hazards. In the current condition of the building, such as poor roof insulation that causes ice damming, frequent roof access is needed in winter to deal with ice and snow issues.

4. The RTUs, particularly #7 and #8, are near the edge of the flat roof where it transitions to sloped shingled roofs. There are no guardrails or substantial tie-off points for safety harnesses. The Code requires 10 feet from serviceable equipment to roof edges, and some other requirements such as OSHA can be more stringent.

5. There are no walkway pads on the roof around the RTUs or on any access route to them. This can result in premature wear and damage to the roof membrane.

6. Indoor AHUs: AHU #2 and its condensing unit are near the end of their useful life. AHU #4 has approximately 15 to 20 years of remaining useful life. AHU #5 and its condensing unit are past the end of their useful life. AHU #6 and its condensing unit have approximately 10 years of remaining useful life.

7. The remaining useful life of duct hot water heating coils is uncertain, and may vary with conditions, such as hot water system water quality maintenance, and condition and care of upstream air handling filters.

8. The air systems generally have only few centralized return grilles, relying on door undercuts to transfer the supply air back from perimeter rooms into the central areas to reach the return grilles. This can lead to pressurization issues and restricted supply air when doors are closed; it can even lead to excess infiltration of outside air and cold drafts as the air follows the path of least resistance.

9. Several room partitions have been added. In some instances this has isolated the rooms from their return air, and required changes to the supply outlets that may not have been done properly. We observed areas where the air movement seemed low, and noted one or more portable electric heaters.

10. The Planning Director's office in the middle of the west (Geremonty Drive) side of the upper level has many reported comfort complaints, such as sometimes greatly overheating, and the room is stifling when the door is closed (see note about return grilles and door undercuts). Its temperature seems to be controlled by air and water thermostats that are fighting with each other. In the attic, we observed that the supply duct to this room runs across from the RTU serving the end of the building (#7). It would be more logical if the space were served by RTU #9, which apparently serves the middle of the street-side wall.

11. The upper level, having had the original air handling units abandoned and replaced by the RTUs, also had its old ceiling diffusers abandoned in place, with open-ended branch duct stubs left attached and open to the attic, with only a manual damper loosely closed in the duct to restrict the airflow somewhat. The ceiling insulation around these and the new duct drops is pushed aside, leaving many areas with little or no ceiling insulation.

12. In the attic, the RTU ducting includes long runs of flexible ductwork with many turns that restrict airflow. On the return side, the flexible ducts are the uninsulated type. Of the ducts which are insulated (which includes supplies and the rigid return mains), there appears to be no extra duct insulation to compensate for the ducts being in the hot/cold attic. Airflow restrictions and lack of insulation waste energy, and reduce available airflow and heating/cooling capacity.

13. In the meeting room in the addition, there are two sets of diffusers, apparently serving both the RTU and one of the vertical AHUs. There are long loose runs of flexible duct to diffusers, which restrict airflow. There are sweating stains at the diffusers, apparently because the ducts run above the ceiling insulation batts with no air barrier or vapor barrier in the ceiling construction. There are two thermostats in this room, and reportedly the air systems "have been split" to run heat into the adjacent toilet rooms.

14. In the addition, some of the ductwork (such as above the meeting room ceiling and return risers in the open counter area) is fiberglass ductboard type instead of metal, which has a shorter service life.

15. It appears that some rooms may lack outside ventilation air due to lack of outside air provisions at the associated air handler, and/or haphazard relocation of partitions and duct outlets.

16. Condensing Units (CUs): All the condensing units have their suction piping insulation disintegrating heavily due to sunlight and other factors; even the integral jacket on the newest (CU #3) unit's piping is failing and allowing the insulation to disintegrate. CU #2's piping runs into the ground and below the south exterior concrete-and-granite entry stair, which raises the potential for damage that could cause a leak. CU #6 is being surrounded by landscaping mulch, and although it was placed on a plastic pad designed for this service, it has one side propped up with a loose rock. All the condensing units have debris such as leaves, inside near the compressors.

17. IT Room: It is our understanding that the Owner intends in the near future to install a duplicate of the Mitsubishi split system #3, to provide redundant back-up. It is important to coordinate with the gas utility, to ensure that proper clearances are maintained to the gas meter and regulator.

18. IT Room: The supply duct penetration from the AHU, along with concerns about other penetrations, is not properly fire protected for what reportedly should be a 2-hour fire rating. A horizontal duct penetration of a 2-hour vertical assembly such as a room partition requires a fire damper. Also, the room door is deeply undercut to allow this supply air to return, which is another issue with the room's fire rating (see the Architectural section of this report). It is unclear what purpose this supply air can serve, since it is likely that the AHU could be in a heating mode when this room requires cooling. It would be better for this room to be heated and cooled independently, eliminating duct penetrations and the potential for systems to fight each other.

19. The elevator machine room has only a small grille (possibly exhaust) approximately 10" x 4" in size, similar to the adjacent phone closet. Modern electronically controlled elevators require that the machine room be maintained within strict temperature limits, which this grille is unlikely able to achieve.

Controls:

1. The automatic temperature controls are outdated and do not provide any modern ability for remote access or ease of operation. New controls would allow the introduction of alarms for equipment malfunction or lack of temperature control that would improve troubleshooting and maintenance operations.

2. In the meeting room in the east-side addition, there are two thermostats, apparently for RTU #8 and one or more of the AHUs, one of which is covered by a heavy curtain on the raised seating platform. There is the potential for the two systems to fight each other, and the thermostat being covered makes it less responsive to room conditions.

3. Room thermostats are generally mounted high above ADA-required height and reach distances, but have occupant adjustments which should be within reach of all occupants.

Plumbing

Piping:

1. The piping did not have any serious problems observed. Water piping is generally copper, with soldered joints that would be expected to include lead-bearing solder in a building of this vintage. Vents through the roof are copper in most locations, and located on the side away from the street for better appearance.

2. The hot and cold water piping is not insulated to conserve energy and prevent sweating.

3. Gas piping is steel with outdoor piping having been lightly painted at one time, but now having lost most of its paint and rusting. Gas piping on the roof is mostly on wide-based Cuddy polymer blocks set on the roof membrane. Some gas piping is on pressure-treated blocks which are deteriorating. All supports lack slip sheets to protect the roof membrane. Gas piping has some threaded rods bracing it to the RTUs for restraint, but in general is held only by gravity and by the end connections. Gas piping at the RTUs lacks sediment traps at each RTU as required by Code. There also is not a sediment trap at the boiler between the shut-off ball valve and the high pressure regulator. That regulator is vented to the outdoors. There are sediment traps in the two gas mains inside the attic, at the point

where they rise through the roof penetrations, but in the rare event these need to be used to clear the piping, the entire main would have to be shut-off, so it is unlikely any dirt or water will be manually drained out before reaching the equipment regulators. The support of the piping below these penetrations is not particularly substantial, so service people should be cautioned not to step on the piping above the roof. Identification labels are lacking in the attic, and above the roof they are faded and peeling off. The wall penetrations into the attic appear to not be well sealed, with daylight coming in. The roof penetrations are sealed with Kozy Collar EPDM roof flashing devices.

4. The gas entrance has a regulator which appears to be less than three feet from an operable window. Gas utilities usually require at least three feet from a regulator's vent to an operable window.

Fixtures:

1. Plumbing fixtures throughout the building are functional, but in varying condition. Some in the 1960s building appear to date from the original construction, and should be replaced in the mid-term. Some toilets are tank type, while others have flush valves. Faucets and flush valves are manual type. Water piping to some fixtures is run exposed on the CMU walls and partitions, including at lower floor toilet rooms in the 1960s building and below gang countertop lavatories in the addition.

2. One water closet on the lower level of the 1960s building reportedly plugs more frequently than others. Whether this is a user issue or something else is unclear.

3. Handicapped access appears lacking at some fixtures. Employee sinks in the office areas include a kitchen-type stainless steel sink, a bar-type stainless steel sink, and a bathroom-type china hand sink, which lack accessibility. The two water coolers are fairly modern pushbar type with single-height bowls, which does not comply with current requirements for dual-height for varying abilities. Lavatory drains and supplies are not protected from knee contact.

4. Fixture replacement should take into account any ADA (Americans with Disabilities Act) requirements indicated in the Architectural portion of this report. Likewise, replacement water coolers should be coordinated with architectural requirements for dual height units.

5. A floor drain in a toilet room on the lower level of the 1960s building is in poor condition, and reportedly has odor issues that require the trap to be filled with water quite often. It is recommended that the top of the drain be replaced to fit with the surrounding flooring

finish, and that a mechanical flapper-type trap seal protection device be inserted into the drain.

6. Hose Bibbs: The exterior hose bibb at the boiler room door and the water meter remote reader, are between the outdoor electrical main service disconnect and the generator transfer switch, making them difficult to use and possibly creating an electrical safety issue. These items appear to have been existing at the time the electrical devices were installed. A shut-off valve was not observed in the water supply pipe to this hose bibb, and it was not clear whether this and other hose bibbs are the freeze-proof type. Some of the other hose bibbs lack handles, attachment to the wall, or sealing of the wall. Several of the hose bibbs are made by old Tanner Company.

Water Service:

1. There is not any whole-building backflow preventer, pressure gauge, or pressure reducing valve at the water entrance. This water supply is small for the number of fixtures served, particularly with some toilets and the urinals having flush valves which require high flow and pressure.

2. A water pressure reading taken with a hand-held gauge at an upper level outdoor hose faucet indicated 85 psig average pressure, with fluctuations that ranged from 20 to 100 psig (possibly due to toilet flushing on a small pipe). There was also air and rust in the line which may have affected the pressure readings. These readings are higher than is recommended by the Plumbing Code, and would normally require a pressure reducing valve at the water entrance.

3. Cross-contamination prevention is incomplete. The janitor's sink has a vacuum breaker on the faucet, allowing the attachment of the short hose for filling buckets. The boiler has an atmospheric-vent type backflow preventer, which is adequate only if there are no treatment chemicals in the heating system. The outdoor hose bibbs are all without vacuum breakers, including one which had a garden hose attached at the time of our visit. The Town of Salem's Water District requires vacuum breakers on hose connections, including any faucet with threaded connections, as well as adherence to the State Plumbing Code.

Water Heating:

1. Electric Water Heaters: These appear to be fairly recent replacements in good condition.

2. The water heaters lack tempering valves to mix the hot and cold water for safety, which would prevent scalding at fixtures and would allow the heaters to store water at a higher temperature to prevent Legionella growth.

3. The heaters do not have recirculating pumps for fast response of hot water at fixtures.

4. Provisions for draining leaks and relief valve discharges were not observed, although the heater in the mechanical room at the north of the east addition is sitting in a drain pan that doesn't drain to anywhere.

Recommendations

Heating, Ventilating, and Air Conditioning (HVAC)

The primary focus for HVAC system changes should be the air handling systems, due to their age, condition, complexity, ducting issues such as excessive use of flexible duct and lack of return air paths, concerns about ventilation such as those caused by changes to rooms without properly revising the air handling systems, excessive complexity and difference of system types and effectiveness, and zone temperature control issues. The RTUs (rooftop units) and some of the smaller AHUs (air handling units) and CUs (condensing units) have some serviceable life remaining, while some of the AHUs are at the end of their usable life or lack features such as positive ventilation air. We would recommend that RTU ductwork in the attic be rerouted or replaced, eliminating zoning crossover issues, reducing lengths of flexible duct to five feet or less, with no sharp bends or other restrictions, and adding extra duct insulation to account for the attic air temperatures to reduce heat loss that wastes energy and contributes to ice damming. We recommend combining or relocating thermostats serving the RTUs for the upper floor to reduce zoning and comfort issues.

The abandoned York air handling units in the attic should be removed, making way for ductwork, and allowing full-depth attic insulation in their place. See Architectural section of this report for more information.

The abandoned duct openings into the attic and the associated ceiling diffusers should be removed, with the openings sealed tight, the attic insulation replaced, and the affected ceiling tiles replaced.

We recommend rectifying the heating deficiencies and pipe freezing concerns in the toilet rooms in the east-side addition. This should be done in coordination with any remedies recommended in the Architectural section of this report. The solution should eliminate the current openings that allow warm room air into the attic. Piping should be relocated if necessary to ensure that it is on the room side of the roof insulation, and the roof insulation should have a tight and strong protected air barrier to prevent cold air leaking in from the attic. Insulating the piping, as recommended previously in this report for all piping, can help slow the heat loss from the piping, but will not prevent freezing by itself.

We recommend eliminating the ductwork from the AHU serving the meeting room, so the RTU is the single source of heating and cooling, but only after an evaluation of the capacity of the RTU relative to the room heating, cooling, and ventilation needs is made. If the AHU is still needed, the controls for both systems should be integrated. The thermostat which is behind the curtain should be relocated.

We recommend evaluating the distribution of supply diffusers and other outlets, relative to any current comfort issues, particularly in any locations where building partitions have been revised, or occupancy of the spaces have changed, since the air systems were installed and properly balanced. Such an evaluation should take place in coordination with the space needs study recommended in the Architectural section of this report.

We recommend providing additional return ductwork so that the flow of return air doesn't restrict the ability of the supply air to enter the room when the doors are closed. This would be most easy to achieve on the upper floor, where the ductwork can be run in the open attic.

We recommend eliminating the supply air into the base of the stair tower due to fire rating concerns and poor heating performances, and provide space heating such as an electric or hydronic (hot water) cabinet unit heater.

We recommend replacing any AHUs and associated CUs which are at the end of their life. We recommend evaluating the ventilation provided, including testing and balancing the systems to ensure that adequate ventilation is provided to the occupants.

Condensing Units: All the condensing units need their outdoor suction piping insulation replaced and protected with heavy-duty PVC or aluminum jackets to maintain efficiency and proper operation, including the insulation with integral jacket on the newest CU #3. The piping to CU #2 should be rerouted so rather than running along the ground and below the south concrete-and-granite entry stair, it runs indoors as much as possible. CU #6 should be cleared of landscaping mulch, and reset on a higher and more stable base. All the condensing units should be maintained to vacuum out debris from the coils and the compressor area on a regular basis.

In the 1990s addition, we recommend further evaluation of the existing air system(s), particularly regarding the distribution of heating, cooling, and ventilation air to the spaces in relation to their needs. Considerations would include how the recent addition of room partitions has already affected airflows and occupancies, and how any further changes in use or layout of the former DMV desk area will affect the system. Condition and serviceability of the system, such as ease of access, should be evaluated. The current location of the thermostat which is in the DMV desk area should be considered relative to comfort.

In the long term, as the RTUs near the end of their service life, we recommend reevaluating these systems. Considerations could include energy efficiency which is limited in the non-condensing furnaces, supply temperature swings with simple two-stage gas heating, limited zoning over multiple rooms, and distribution of ventilation air in proportion to supply airflow. There are currently other types of systems which might be suitable, and others may become available in the future. These systems currently lack heat recovery for the ventilation air, which might be capable of being incorporated into these or other types of systems.

We recommend evaluating the exhaust systems' effectiveness and adequacy, for exhausting toilet rooms, and for relieving building ventilation air so that ventilation supply is not restricted and so that over-pressurization doesn't force indoor air into attics and walls. Exhaust should be extended to the janitor closet, and should be considered at odor sources such as kitchenettes and photocopiers. Existing exhaust fans are aged and should be expected to need replacement in the near term. Control of exhaust fans should be evaluated to ensure toilet rooms are exhausted at the same time that other spaces are occupied.

Currently there is no heat recovery to exchange energy between exhausted toilet room air and incoming ventilation air. When replacing or modifying ventilation, both supply and exhaust, the possibility of providing heat recovery should be evaluated.

The current boiler should have many years of operation remaining. It could remain in place until the end of its useful life, or be replaced sooner to provide more capacity if required by changes to other systems. Whenever it is replaced, we recommend providing a natural gas condensing boiler plant with two or more boilers for at least partial redundancy, revising the combustion air intake to include outside air, hard-ducted to each boiler, and revising the chimney as necessary. At the same time, replacing the fin tube radiators around the perimeter of the building and other heating terminals such as duct coils, would make them compatible with lower temperature water and allow the boiler to run more efficiently.

When air handling systems or boilers are replaced or substantially modified, a new control system should also be installed. The control system should have the ability to be expanded for

future equipment changes, such as the addition of zones for heating or cooling control. The control system should provide remote access to setpoints and alarms in order to notify maintenance workers of issues as they happen.

We recommend relocating existing room thermostats and other occupant-adjustable controls to within ADA-required height and reach distances, and installing any future controls of this type per ADA.

The heating system could be revised to a dual pump, variable speed system immediately, if desired. This would provide more efficient operation, as well as back-up in the event of pump failure. This is also the pumping arrangement we would recommend to be combined with a future boiler replacement. Because there are currently two separate pumps serving different areas, combining these mains into a single pair of pumps and varying their speed could affect other system controls such as zoning, and these concerns should be part of a more detailed system evaluation and occupant survey prior to changing pumps. The pumps should be directed in the supply piping away from the boiler to aid in proper air removal, reduce pressure increases, and relieve valve discharges at the boiler. Note that some types of boilers have limits on the minimum allowable water flow and minimum allowable return water temperature.

The hot water system should have a proper system of air elimination and expansion control. Air elimination would avoid noise and blockage due to bubbles at high points in the system, and reduce internal piping corrosion. Expansion control would provide a “point of no pressure change” for good pump operation, and prevent most discharges of the boiler relief valve. A microbubble type air separator with automatic air venting should be provided in the hottest supply piping downstream of the boiler, preferably upstream of the pumps. The old compression tanks should be replaced with an expansion tank, of the type with a bladder or diaphragm, to separate the air charge from the system water.

Hot water supply temperatures should be reset based on outdoor air temperature as part of control system replacements, for energy savings and better control of space temperatures. There are various ways to do this, depending somewhat on the type of boiler. Note that return water temperature should not be colder than the boiler manufacturer allows, and this is of particular concern with cast iron boilers such as the existing one.

Hot water heating piping throughout the building should be insulated per current Code to reduce wasted energy, reduce excess heat being transferred into rooms where it is unwanted, and improve control of system and space temperatures. Provide piping identification labeling on the outside of the insulation.

The existing boiler, and any new boilers, should be protected from water on the floor due to high groundwater or the occasional relief valve discharges. If the existing boiler is repiped, it would be difficult and unusual, but not impossible, to raise it off the floor while the piping is disconnected, and provide a raised base of a solid concrete pad or precast concrete units. An alternative to this for the existing boiler would be to provide a floor drain in this floor which is lower than adjacent rooms, and piping it to the sanitary drain system, possibly requiring a recessed pump in a floor pit. When the existing boiler is replaced, the new boilers should be on raised concrete pads. It may not be feasible to raise the boilers as high as the sill of the exterior or interior door to ensure drainage without a floor drain.

A program of boiler water treatment should be considered in cooperation with the boiler service company. This could include treatment chemicals and creating a location such as a permanent inline pot feeder for adding chemicals. If chemicals are added to the system, the makeup water backflow preventer should be changed to a reduced-pressure-zone (RPZ) type to comply with the Plumbing Code.

Penetrations of the boiler room should be sealed to the extent necessary to be compatible with any presumed fire rating of the room.

At the IT room, we recommend removing the supply duct from the AHU, and patching the partition to restore the 2-hour fire rating. If the heat pumps need any other source of heating (because the heat pumps don't heat sufficiently on the coldest days), a safe and permanent electric heater would be recommended to avoid duct penetrations and avoid adding more water piping in the room. Other existing penetrations of the partitions such as pipes and wiring should have any non-compliant sealant removed and replaced with proper firestopping. If there is existing water piping above the ceiling to serve fintube heaters on the upper floor, drain pans below the piping to direct dripping water away from the computer equipment would be advisable as a minimum, and rerouting the piping out of this ceiling cavity altogether would be better.

There should be written policies in place and education of appropriate staff members, regarding the use of fire stopping materials vs. fire blocking materials at penetrations. This building has at least a few fire-rated spaces, such as the IT room, the north stair tower, and possibly the boiler room. It has other assemblies such as non-rated floors, where simply limiting the passage of air and smoke may be advisable. Contractors and other service people should be held accountable for proper protection of penetrations. For example, the yellow spray foams have no official fire-related use at all, and the orange spray foams are only for fireblocking which is to slow the passage of air and smoke in concealed combustible construction that is not fire rated. True firestopping materials are required for fire-rated construction, in their simplest form are most

often red color, and if properly installed will protect penetrations to the same degree as the fire-rated building assembly that is being penetrated. Some types of penetrations require specialty firestops, fire dampers, or other types of protection. Resources for information could include firestop manufacturers, the local fire inspector, and the State Fire Marshal, as well as architects and engineers.

The elevator machine room should have a dedicated ductless split system or other air conditioning added, sized for the elevator horsepower and as recommended by the elevator manufacturer, to remove heat and ensure that the elevator systems and controls stay within the temperature range required by the manufacturer, as required by the Elevator Code. Any unnecessary ducts or other openings should be removed and patched. It is possible in a large, open, and well-ventilated building to simply exhaust, through fire-dampered openings, in proportion to the horsepower, a large quantity of cooler air from adjacent rooms, but it has not so far been done in this building, and is less practical in this building where spaces connected to the elevator room are small and lightly ventilated.

In the Architectural section of this report there is a suggestion that a records storage room be created, with 3-hour fire rating, and with temperature and humidity control. We recommend considering a separate air system for such a space due to its unique needs. Due to the fire rating, a system that doesn't require duct penetrations would be advantageous. The need for ventilation could be weighed against the need for document security.

For roof access to the mechanical equipment, as well as for snow removal and other purposes, a permanent means of access should be provided. A suggested method would be to provide a fixed welded steel ladder with safety cage and lockable access to the bottom, on the north face of the building adjacent to the stair tower. From the top of that ladder to the mechanical equipment, walkway pads of the glued-in-place rubber type should be provided, including on the service sides of the equipment, to protect the roof membrane from the most frequent foot traffic. At the sides of the equipment, any equipment which is closer than a safe distance from the transition from flat roof to lower sloped roofs, should have OSHA-compliant guardrails added, and permanent tie-off points for safety harnesses, designed as recommended by OSHA.

The condensate piping from the RTUs should be repiped so that it does not drain onto the shingled roofs below, in a manner which protects water in the piping (particularly the traps) from freezing. One method would be to pipe each RTU's drain down through the membrane roof individually, relocating the traps down into a nearby warm space (not in the cold attic), and directing them to some type of indirect waste receptor. Another method could be to provide a gutter system to direct the condensate over the shingles to a safe ground location. A third method could be to provide roof drains in the membrane roof, but this would necessitate

creating low spots in the roof which could lead to other issues, and finding a route out of the building for dedicated storm piping so that rainwater is not piped into the sanitary sewer.

Plumbing

As indicated above, the plumbing fixtures should be replaced in conjunction with other work in the building (such as accessibility upgrades, see Architectural section). For example, when urinals are moved to an ADA height, it would be practical to provide an entirely new fixture, flush valve, and a good support carrier.

Lavatories and sinks should have guards added to the piping below the fixture for knee protection per ADA guidelines.

The sinks such as kitchenette and bar sinks should be replaced for ADA compliance.

When replacing fixtures, faucets, and flush valves, consideration should be given to the use of lower-flow equipment and automatic, electrically controlled, devices for water conservation.

Water coolers should be replaced with dual-height type, in accordance with ADA guidelines. These guidelines require both a low side for wheelchair accessibility, and a high side allowing standing use for people with difficulties in bending over. Automatic hands-free bottle fillers are a popular option with modern bottle fillers, and filters are available to improve taste or water quality.

The domestic water entrance should be revised, adding whole building backflow prevention, and pressure reduction as required. If possible, the piping within the building should be enlarged to better serve fixtures with flush valves. Selection of lower-flow replacement fixtures and faucets could help reduce the total flow rate, but often have little effect on the instantaneous demands of flush valves. If a fire protection sprinkler system is added, there may be an opportunity to provide a larger domestic water service along with the large sprinkler water service.

For local cross-contamination prevention, interior hose bibbs and drain points should have vacuum breakers added, and exterior hose bibbs should be replaced with freeze-proof wall hydrants with vacuum breakers or other backflow prevention devices.

Floor drains should have mechanical trap seal protection devices such as Sure Seal inserts added to slow the drying of the traps, to prevent sewer gas and other odors entering the building.

Water piping should be insulated. Hot water piping should be insulated per Code to reduce heat loss, and cold water piping should be insulated including a good vapor barrier for condensation prevention. Provide piping identification labeling on the outside of the insulation.

Gas Piping: Clean outdoor gas piping of rust as necessary and repaint. Replace any pressure treated piping supports on the roof with polymer/rubber type, and provide slip sheets to protect the roof membrane. Provide pipe identification labels on piping above the roof and in the attic. Reinforce support of the piping below the roof penetrations to ensure it can support a person stepping on the piping. Relocate gas regulator near gas meter, which serves underground supply to generator, if it is too close to the operable window on the south side. See Architectural section in this report for protection of outdoor piping where it is vulnerable to ice damage. For any future installations or modifications, be sure to comply with Code requirements for a sediment trap between each unit's shut-off valve and its regulator.

Water heaters should have tempering valves added downstream. Current Code does not consider the heater's integral thermostat adequate protection from scalding. A mixing valve will also allow the heater to be run hotter, preventing the growth of Legionella and providing more heat storage. Adding hot water circulation should be considered relative to current waiting times at fixtures. The heaters should be controlled on timeclocks to save energy. Provisions should be added to drain leaks and relief valve discharges to safe locations, preferably to the sanitary waste system, to prevent damage to the building and to nearby stored records and other items. If the heaters are raised off the floor to facilitate drainage and the use of a drain pan, it is important to note that the relief valve should not discharge into the drain pan because of the pan's limited outlet capacity. The concern for drainage is greater in the janitor's closet which is adjacent to occupied rooms. The concern about drainage in the mechanical room at the north of the east addition may be less due to its location, although the base of the wallboard and wood wall framing are vulnerable to water damage, and a leak may go unnoticed longer in this room.

Fire Protection

Fire protection systems should be installed when it is feasible during a renovation that impacts the existing ceilings. Installing a fire protection system would require a new water service entrance into the building to achieve the required water flow rates. A location for the entrance riser other than the boiler room would likely be required due to space constraints. In general, water-based sprinkler systems are recommended for their quick response, fire-control effectiveness, and cost-effectiveness. In cold attics of combustible wood construction, dry-pipe sprinkler systems are usually recommended. In the IT room (and possibly the proposed new records storage room), an alternative type of system, such as a water system with "pre-action"

or a non-water-based system such as a gas, should be considered to reduce water hazards to the computer equipment.

Opinion of Cost

Short-Term (2-3 years)

Air Handling Equipment	$ 50,000
Air Handling Systems for Meeting Room	$ 10,000
Abandoned Ducts into Attic	$ 5,000
Ductwork in 1967 Attic	$ 20,000
Elevator Machine Room	$ 10,000
Penetrations of Fire Ratings	$ 15,000
Boiler Air and Expansion Control	$ 20,000
Heating Piping Insulation and Labels	$ 20,000
Cold Toilet Rooms in East Wing	$ 10,000
Refrigerant Pipe Insulation	$ 10,000
CU-2 Piping	$ 5,000
RTU Condensate Re-Piping off Roof	$ 10,000
Plumbing Piping Insulation and Labels	$ 15,000
Water Entrance Improvements	$ 5,000
Cold Water Increase for Flushing	$ 5,000
Hose Connection Backflow and Replacement	$ 3,500
Gas Piping Painting and Support	$ 10,000
Automatic Temperature Controls	$ 110,000
Roof Access Ladder, Guardrails, Tie-offs, Walkway Pads	$ 35,000

Mid-Term (5-6 years)

Air Handling Equipment .....$ 200,000

Hot Water Pumping.....$ 25,000

Water Heater Improvements .....$ 5,000

Plumbing Fixtures..... See Architectural Section

Long-Term (10-12 years)

Boilers.....$ 100,000

Fintube and Coils .....$ 50,000

Cold Water Entrance Upgrade for Flushing.....$ 10,000

Fire Protection Systems.....$ 150,000

Abandoned oil piping and signs to remove.

Abandoned oil tank alarm to remove.

Attic ducts excess flex and poor insulation.

Gas piping needs repainting and supports.

Gas regulator close to window.

Hose bibb lacks vacuum breaker.

Gas line on side of building prone to ice damage.
Ladder location potential.

Office sink not ADA.

Refrigerant piping under stair and bad insulation.

RTUs need safety protection.

Water entrance small and lacks features.

Typical air handling unit in a closet space.

Older cooling unit in need of replacement.

Insulation on cooling lines needing replacement.

Gas line penetration through gable end.

PROJECT NO. 4529 ~ SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

MECHANICAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Air Handling Systems and Condensing Units	Some equipment is at end of life.	Replace oldest equipment.	0	$50,000		
Air Handling Systems and Condensing Units	Some equipment is at mid-life.	Plan for replacement, and consider options at that time.	10 to 15 years		$200,000	
Air Handling Systems for Meeting Room	Dual systems have potential to fight each other.	Evaluate systems, deleting or repurposing old AHU if possible, or consolidating controls.	0 to 15 years	$10,000		
Abandoned Air Handling Units in Attic	Old York units left in attic on concrete bases.	Remove old units and insulate attic space.	N/A	See Architect's Sheet		
Abandoned Ducts into Attic	Old ducts and diffusers at upper floor are abandoned in place. Still open to attic.	Remove, patch openings tight, replace ceiling tiles. See Architectural section for ceiling insulation.	N/A	$5,000		
Ductwork in 1967 Attic	Ductwork has long flexible ducts, lacks insulation for attic temperatures, lacks distributed return air, and doesn't zone well.	Replace most flex duct with rigid type, increase insulation, add return air grilles in more rooms, and improve routing so thermostats control proper rooms.	N/A			

PROJECT NO. 4529 ~ SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

MECHANICAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Records Storage	Non-fire rated, moisture intrusion issues.	Redesign storage room to provide fire rated, temperature and humidity controlled space.	N/A		See Architect's Sheet	
Elevator Machine Room	Lacks cooling required for modern controls.	Provide ductless split system air conditioner.	N/A	$10,000		
IT Room, Boiler Room, and Stair Tower	Unsealed penetrations in fire-rated assemblies.	Remove unnecessary duct penetrations, seal other penetrations, add heat to stair tower.	N/A	$15,000		
Boiler	Boiler is older type, low efficiency, sized for only part of the building, lacks redundancy.	Plan to upgrade to condensing boilers, with at least two boilers in staged control sequence. Upsize to heat more of the building. Revise combustion air and chimney.	15			$100,000
Fintube and Coils	These are aged and won't be compatible with low-temperature boilers.	Plan to replace along with new condensing boilers, resizing for low-temp water.	10 to 15 years			$50,000
Hot Water Pumping	Pumps lack redundancy, pump into boiler return.	Provide dual lead-lag pumps in supply side.	10 to 15 years		$25,000	

PROJECT NO. 4529 ~ SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

MECHANICAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Air Elimination and Expansion Control	Boilers lack air venting, compression tanks outdated, relief valve shows signs of repeated discharges.	Provide microbubble air separator in hot supply piping with automatic air vent. Replace tanks with bladder expansion tank.	N/A	$20,000		
Hot Water Piping Insulation	None seen (wastes energy).	Insulate piping and provide identification labels.	N/A	$20,000		
RTU Condensate Piping	Piping drains onto shingled roof below, unsightly and detrimental.	Reroute piping into warm indoor spaces and to indirect waste receptor.	N/A	$10,000		
Cold Toilet Rooms	Piping above east wing toilets has frozen in the past due to cold ceiling cavity.	See Architectural section for room repairs. Relocate piping as necessary, and verify adequate heating.	N/A	$10,000		
Refrigerant Pipe Insulation	Suction piping outdoors was insulated, but insulation is very deteriorated.	Replace insulation, and provide heavy jacketing to protect from sunlight and impact.	N/A	$10,000		
CU-2 Piping	Piping runs into ground and below south stair.	Replace outdoor piping, routing indoors to near CU-2.		$5,000		
Automatic Temperature Controls	Systems are simple, outdated, not interconnected.	Provide a whole building control system including remote access.	N/A	$110,000		

PROJECT NO. 4529 ~ SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

MECHANICAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Roof Access	Accessing rooftop equipment is difficult, requires portable ladder and walking-up shingled sloped roof. Equipment is near edge, unsafe working condition. Flat roof lacks traffic protection.	Provide a fixed welded steel ladder with safety cage, lockable at bottom to prevent unauthorized use, possible location on north face of building. Provide safety guards and tie-off points at RTUs. Protect roof with walkway pads.	N/A	$35,000		
Plumbing Fixtures	Fixtures lack some compliance with ADA, including urinal heights and kitchenette sink access.	Replace as part of Architectural upgrades.	N/A		See Architect's Sheet	
Drinking Fountains (Water Coolers)	Do not comply with ADA guidelines.	Provide multi-level water coolers per ADA guidelines. May include bottle fillers and water filtration.	N/A		See Architect's Sheet	
Floor Drain in Women's Bathroom at Lower Level	Floor drain trap dries out and creates odor problem.	Install trap seal, typical for all floor drains.	N/A	See Architect's Sheet		

PROJECT NO. 4529 ~ SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

MECHANICAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Water Heaters	Heaters lack tempering valves, recirculation, drainage, and timeclocks.	Provide tempering valves to allow hotter storage and prevent scalding, recirculation pump and piping in janitor's closet for faster response at fixtures in 1967 building, drainage at heater in 1967 building, and timeclocks on both.	N/A		$5,000	
Domestic Water Entrance	Lacks backflow prevention, pressure reduction, system pressure is high.	Add whole-building backflow preventer and PRV as required.	N/A	$5,000		
Domestic Cold Water Piping Size	Piping is smaller than should be for flush valves. Pressure fluctuations seen during flush.	Increase size of indoor piping mains to toilet rooms. Consider upgrading entrance size when installing sprinkler system.	N/A	$5,000		$10,000
Hose Connections	Hose connections lack cross-connection control.	Add vacuum breakers indoors. Replace outdoor hose faucets with freeze-proof wall hydrants with vacuum breakers.	N/A	$3,500		
Plumbing Water Piping Insulation	None seen, wastes energy, promotes sweating.	Insulate piping and provide identification labels.	N/A	$15,000		

PROJECT NO. 4529 ~ SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

MECHANICAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Gas Piping	Piping outdoors rusting, needs repainting and labeling, and replacement of some support blocks.	Clean and repaint outdoor piping, and replace supports as needed, including slip sheets.	N/A	$10,000		
Fire Protection Systems	Building lacks sprinkler systems.	Provide water type system generally (19,000 sq. ft), dry type in attics (approximately 9,500 sq. ft), and special systems in IT room and new records storage.	N/A			$150,000
		TOTALS		**$348,500**	**$230,000**	**$310,000**

Salem Town Office Building

Salem, New Hampshire

2017

Building Assessment & Study

Prepared For:
HL Turner Group Inc.
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Concord, New Hampshire 03301

Prepared By:
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311 Great Road
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07/17/2017

ELECTRICAL SYSTEMS

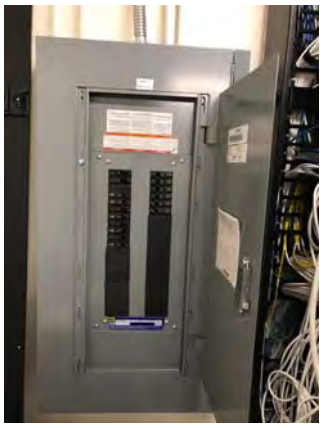
Electrical Service and Distribution

Summary of Existing Conditions and Assessment

The main electrical service is a 400A, 120/208V, 3-phase, 4W service. The service enters the main electrical room underground from a 150 KVA padmounted transformer. The utility meter is located on the side of the transformer. The electrical switchgear is approximately 5 years old and is in good condition and will be reaching its life expectancy in 25 years. The main distribution panel (Square D) MDP contained a 400A MLO, (11) branch breakers and had a 3-pole space. There are (10) electrical panels. The panels were in good condition. The majority of the panels appeared to have been replaced when the main switchboard was installed. Panels P1, P2, P3 were manufactured by Siemens. The IT room panel is a Square D panel. A few of the older load centers are approaching their expected life.

Recommendations

It is recommended that the main electrical switchgear and panels be tested for proper operation next year and replaced within the next 20-25 years; the load centers replaced within the next 3-5 years.



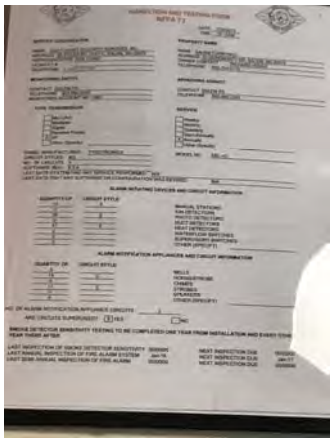
Fire Alarm

Summary of Existing Conditions and Assessment

The fire alarm system is a conventional zoned Cerberus Pyrotronics MXL-IQ fire alarm control panel located in the main lobby. The FACP is 15 to 17 years old and is approaching its expected life. The automatic smoke detection coverage was adequate. The notification device coverage was adequate. There are manual pull stations within 5' of exit doors meeting NFPA 72.

Bathrooms did have strobe devices as required by NFPA 72 and ADA. The system is connected to the Salem Fire Department via a Digitize Masterbox No. 1263.

The panel has been tested yearly, as is evidenced by the yearly report mounted adjacent to the FACP. Although the coverage was adequate, the devices are approaching their useful life expectancy, as well as the FACP, therefore, it is recommended that the entire system be replaced with a new addressable Fire Alarm system to meet the 2012 IBC, ADA and 2015 International Fire Code.



Lighting

Summary of Existing Conditions and Assessment

The lighting fixture types consisted of recently retrofitted lensed 2x2 and 2x4 acrylic lensed fixtures in offices, continuous surface wraparound pendant lights, and utility strips in mechanical rooms. The majority of the lighting fixtures contained new LED modules. Some fixtures contained dirty and cracked fixture lenses. Although the fixtures were retrofitted within the past two years, the fixtures are approaching their useful life. The site lighting consisted of wooden pole mounted LED fixtures for the parking lot. They appeared to be in good working condition. The building did have exterior emergency lighting, meeting the International Building Code Section 1006. They included self-contained weather proof emergency light fixtures ceiling mounted, and does appear to meet the illumination levels for the exterior means of egress.

Lighting Controls

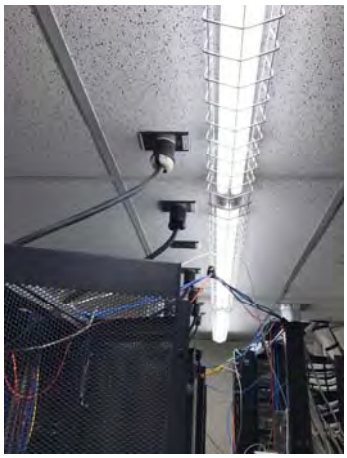
The building interior lighting was controlled by manual toggle switches. There were no occupancy sensors. The exterior lighting is controlled by a time clock.

Recommendations

It is recommended that all light fixtures should be replace with new modern architecturally-pleasing LED fixtures.

All exterior fixtures should be retained; the poles should also be retained.





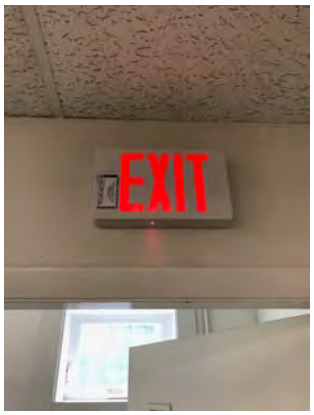

Life Safety/Emergency

Summary of Existing Conditions and Assessment

The emergency lighting consisted of remote heads powered from emergency battery units, self-contained dual-head emergency lights, combination exit sign/emergency lights and illuminated exit signs. All fixtures appear to be in good working condition.

Recommendations

The emergency lighting system appears to be in good working condition with an 8-10 years remaining life. The emergency fixtures should be tested annually and replaced as required.



Receptacles

Summary of Existing Conditions and Assessment

There was insufficient quantities of receptacles, as was evidenced by the use of extension cords, in some areas of the building.

Recommendations

Provide additional wall and floor receptacles to accommodate the new loads that have been added over the years.

Standby Generator

Summary of Existing Conditions and Assessment

The building's entire services is backed up by an exterior 125 KW Kohler diesel generator. The generator is enclosed in a weatherproof enclosure. There is a 400 amp Kohler automatic transfer switch located on the building exterior. There is also a Kohler remote generator annunciator in the building. All of the associated generator equipment appear to be in excellent working condition.

Recommendations

Continue to test the generator monthly, as is required by code, and provide typical maintenance such as oil changes, lubrication.

Miscellaneous Electrical

Summary of Existing Conditions and Assessment

There are (3) exterior disconnects serving HVAC equipment that are showing signs of deterioration/rusting.

Recommendations

Replace these disconnects, in kind, immediately.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PROJECT NO. 4529 - SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

ELECTRICAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Lighting – Exterior	Pole-mounted LED highway-type fixtures. Fixtures are in good condition	No action required at this time.	10 to 15 years			$10,000
Emergency Lighting	Self-contained wall dual-headed emergency lights; self-contained exit signs in good condition.	Provide annual testing.	8 to 10 years			$12,000
Receptacles	Good condition; inadequate coverage in some areas.	Provide additional receptacles as required.	1 to 2 years	$5,000		
Standby Generator, Automatic Transfer Switch	125 KW diesel exterior generator and ATS by Kohler in excellent condition.	Provide monthly testing, annual maintenance, oil changes, lubrication.	25 years			$50,000
Miscellaneous Electrical	(3) Exterior HVAC disconnects; rusting	Replace disconnects.	1 year	$3,000		
Electrical Main Service and Panels	In good condition; approximately 5 years old.	Provide bi-annual testing of circuit breakers and re-torqueing of lugs/bolts.	25 years			$30,000

PROJECT NO. 4529 - SALEM TOWN OFFICE BUILDING - FACILITY ASSESSMENT

ELECTRICAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Older Panels and Load Centers	Load centers have reached their expected life.	Replace load centers.	1 year	$6,000		
Fire Alarm System	Panel and devices are approximately 17 years old and are approaching their expected life.	Replace entire fire alarm system.	1 to 2 years	$40,000		
Lighting – Interior	Majority of fixtures have been retrofitted with LED modules. Some still contain inefficient fluorescent lamps.	Replace fixtures that weren't retrofitted immediately. Replace the retrofitted fixtures.	1 year 3 to 5 years	$3,000	$80,000	
Lighting Controls	Manual wall switches; no automatic occupancy controls.	Replace all manual switches with new occupancy sensors to meet the latest energy conservation codes.	1 to 2 years	$15,000		
		TOTALS		**$72,000**	**$80,000**	**$102,000**

Site Evaluation

Overview

The Salem Town Hall is located at 33 Geremonty Drive in the Town of Salem, NH, identified on Tax Map 100, Lot 7534 (the Town Hall appears on Tax Map 91). The parcel is shared with the Salem District Court, located south of the Town Hall. A wooded area separates the two parts of the lot, connected by a pedestrian walkway.

The Town Hall is a two-story structure with three primary public entrances. The front entrance on the west side (facing Geremonty Drive) provides direct access to the upper story. Entrances on the south and east sides provide access to the lower floor. The entrance on the south side is also the only public handicapped accessible entrance to the building.

The site provides 68 parking spaces on the west, south, and east sides of the building, five of which are reserved as handicapped accessible spaces. There is an additional parking lot south of the driveway entrance to the Town Hall site with space for 64 cars. Traffic enters this site off Geremonty Drive and travels in a one-way, counter-clockwise direction around the building, exiting onto Geremonty Drive on the north side of the Town Hall. The parking spaces on the west side of the building have a separate exit out to Geremonty Drive, located between the driveway entrance and the exit noted above.

The parcel slopes from west to east, dropping approximately 15 feet from the front entrance to the rear parking lot. The terrain immediately surrounding the building is grass-covered. Runoff and snowmelt flows primarily overland, eastward toward a wooded channel, off the edge of pavement at the east side of the site.

At the northeast corner of the parcel, there is a Prime Wetland located in close proximity to the parking lot on the east side of the building. There is a narrow (10 to 15 feet wide) vegetated buffer between the edge of pavement and this forested wetland area.

Drainage

Overview

Based on our field observations and conversations with Salem Department of Public Works (DPW) employees, managing the problems related to drainage and snowmelt on this site consumes a disproportionate amount of their time and resources. With the exception of some

limited roof drains and a single drop inlet adjacent to the exit driveway on the north side of the building, there is no closed drainage system on this site. All runoff and snowmelt flows overland toward the perimeter of the site, with the majority flowing in an easterly direction toward a wooded channel flowing outward from the Prime Wetland area. Months with freeze/thaw cycles pose the greatest challenges, particularly on the east side of the building. Snow melts off the roof of the facility onto the asphalt parking lot, because there are no roof gutters or ground level area (i.e. surface drip edge) to capture the roof runoff. The parking lot pavement extends to the face of the building. As the snowmelt flows east across the lot, it freezes across the parking spaces and the driveway, creating a hazard for both pedestrians and drivers. DPW employees spend a lot of time salting and chipping away the ice, often multiple times throughout the day, to maintain safe conditions.

Another area of immediate concern is groundwater against the face of the foundation on the west side of the building. Town Hall employees report groundwater infiltrates through the foundation wall into the finished basement space behind it. This space is dedicated to records storage and the Town fears valuable documents may be damaged or destroyed by the excessive moisture. There are roof gutters on the west side of the Town Hall to direct roof runoff away from the foundation, so it appears the moisture problems are due to groundwater. It is unknown if a foundation drain was installed when the building was constructed. If there is such a drain, it is no longer functioning as designed.

Compounding these problems, particularly on the east side of the building where the parking lot is at the lowest elevation of the site, is the presence of ledge underlying the parking lot. The ledge limits the Town's ability to install additional drainage measures on the site, and it is a contributing factor to the difficulties Salem experiences in maintaining the longevity of the asphalt pavement on this site. These issues are discussed in further detail in this report, but it is important to recognize that unless the drainage issues can be effectively remedied, the problems will continue to negatively affect this site.

West Side

The terrain slopes gradually away from the building toward Geremonty Drive, allowing runoff to flow across the asphalt driveway and a thirteen-space parking lot toward the grass-covered front lawn, adjacent to the public street. Rain gutters collect the roof runoff on this side of the building. The gutter at the south end of the Town Hall discharges directly to the front lawn, approximately 15' away from, and downslope of the face of the foundation. The gutter at the north end ties into an underground pipe that daylights through a 6-inch diameter, high-density polyethylene (HDPE) pipe onto the grass slope on the north side of the building. The ground at

the discharge point is scoured out and the grass has died off, exacerbating the scour with every rain event. These gutters appear to be functioning properly though it would be preferable to eliminate the direct discharge at the southwest corner of the building and pipe the runoff to an underground culvert that daylights farther away from the building and any traffic or pedestrian routes.

There is no drip edge along the west face of the foundation, nor is there evidence of any underdrains or footing drains to intercept groundwater and surface infiltration on this side of the building. With ledge beneath this site, it is probable there is an impervious layer that prevents water from draining away from the basement space, so the foundation remains in a state of near-constant contact with groundwater. The saturated condition eventually leads to water infiltration through the foundation, because the concrete is more porous than the ledge.

At the northern edge of the thirteen parking spaces there is an area where runoff ponds. A section of patched pavement indicates this occurs with frequency because it appears to be compromising the integrity of the base gravels that provide support for the asphalt surface. Presumably, it is an area that also freezes over in winter. Ice on the surface creates a safety hazard and ice beneath the pavement leads to its degradation. Runoff becomes trapped in this location because the pavement has settled and the landscaped area around the perimeter of the lot creates a berm over which the water cannot flow.

Parallel to Geremonty Drive, the DPW created a shallow grass-lined swale to capture and control runoff flowing from the public right-of-way. The design intent was to channel the runoff to the wetland at the northeast corner of the property, but reportedly, it does not do so. The water ponds in the front lawn and extends beyond the swale's side-slopes. There does not appear to be adequate slope to move runoff away from the site and the swale is too shallow to retain significant runoff volumes.

The bituminous curbing along the edge of Geremonty Drive directs runoff across the Town Hall existing driveway toward the wetland. The pavement is in poor condition here and that seems to be due partially to the excess runoff concentrated in this area. The grass swale along the front of the property also discharges to this location.

North Side

The ground on this side of the building is grass-covered and slopes steeply down to the exit driveway. Runoff flows across the driveway to the forested (Prime) wetland. The roof drain at the northwest corner of the building (noted above in the previous section) daylights onto this

slope. At the toe of the slope below the roof drain outlet is a grated drop inlet structure with a 15-inch diameter concrete outlet pipe crossing beneath the exit driveway and discharging into the wetland. The pipe is relatively shallow (±12 inches of cover over its crown at the drop inlet structure) and there is a crack across the entire width of the driveway, aligned with the pipe below. There do not appear to be any significant drainage concerns on this side of the Town Hall, because there is enough of an elevation change to allow runoff to flow away from the building.

East Side

The asphalt parking lot slopes gradually eastward from the Town Hall building to the wooded area at the east end of the site. Runoff flows overland across this lot, and as noted in the Overview, during colder months of the year, this presents significant problems for DPW staff, trying to prevent and eliminate the lot from icing over. Compounding the problem is the snowmelt from the roof that drips onto the pavement and flows across the lot. The eave on this side of the Town Hall does not have gutters, and the parking lot is paved up to the building foundation, so there is nothing to intercept this runoff and divert it from the parking lot. The gutters on the south side of the building appear to be piped into an underground drain pipe that flows eastward under the parking lot into the wooded area at the east end of the site (see below). If so, the opportunity may exist to tie new gutters into this drain to divert the roof runoff away from the parking lot.

At the northeast corner of the building, the electrical transformer sits in a corner that does not appear to have a drainage outlet. The ground elevation is flush with the top of the concrete equipment pad, and although the surface is covered with crushed stone, there is concern water may pond in this area and surround the equipment.

South Side

The Town has installed rain gutters along the building's eaves on the south side of the building and tied them into an underground drain pipe that appears to run east underneath the parking lot to the wooded channel at the east side of the parcel, although there are no drawings or definite confirmation of the location of this outlet pipe. This system appears to be functioning adequately at transporting roof runoff away from the Town Hall. If this outlet pipe does flow along the south side of the building toward the channel, perhaps there is an opportunity to connect new rain gutters on the south side of the building, or even to run a new outlet pipe adjacent to this one, in the event it may not be large enough to accommodate additional roof area.

The entrance driveway slopes down from Geremonty Drive to the lower parking lot. Runoff flows directly from this asphalt surface to the wooded channel. Bituminous curbing helps contain the runoff to the driveway.

South Side Parking Lot

This lot has a gradual slope from its north end (where it intersects the entrance driveway circling Town Hall) to its southern terminus, where the asphalt abuts a wooded area between the Town Hall and Courthouse sites. Runoff flows across this sloping surface to the wooded area, where it disperses naturally.

Recommendations

- Excavate along the foundation on the west side of the building down to the footing. Install a waterproofing membrane and rigid insulation along the face of the foundation. Install a stone-wrapped perforated pipe along the foundation footing and slope it to drain. If ledge makes it impractical to daylight the pipe, the Town will have to install a stormwater pump station to pump the collected groundwater away from the building. Backfill the excavation with a free-draining material, such as crushed gravel (NHDOT 304.3). The purpose of the foundation drain is to capture groundwater in the pipe, prevent it from seeping through the foundation, and pipe it away from the building. The waterproofing and insulation will also help prevent groundwater from contacting the face of the foundation.
- Install a stone drip edge (minimum 4' wide and 12" deep) along the face of the foundation on the west side of the Town Hall. Place a perforated pipe, sloped to drain, at the bottom of the stone and daylight it a minimum of 10 feet away from the building. The purpose of the drip edge is to capture surface runoff and prevent it from seeping into the ground against the foundation.
- Install a stone drip edge (similar to that described above) along the east side of the building, adjacent to the foundation. An outlet pipe (or pipes) will need to be installed beneath the east parking lot to daylight at the wooded channel (or alternatively, a pump station will be required). The drip edge will capture roof runoff and prevent it from flowing across the parking lot and it will also provide some separation between the lot and the building, so drivers will be less inclined to pull so close to the building that they drive into it.
- Tie the roof gutter outlet at the southwest corner of the building to an underground pipe, daylighting at least 10 feet away from the foundation.

- Regrade the swale along Geremonty Drive so it is deeper to detain more runoff. Install a chambered stormwater detention system beneath the floor of the swale to provide additional storage (if depths to ledge allow). The design of the chambers should include an outlet pipe running beneath the exit driveway and toward the wetland.
- Clean the sediment out of the drop inlet sump. Flush any sediment out of the concrete pipe and dispose of them outside of wetland areas. Inspect the pipe outfall for blockage, scour, or erosion and make any necessary repairs. Inspect the drop inlet structure for cracks or other signs of damage.
- Install a yard drain near the transformer if the outlet pipe can be routed to drain (into the drop inlet possibly).
- Create a swale or install a yard drain to collect runoff at the perimeter of the west side parking lot to capture runoff and direct it away from the parking spaces.
- Place stone at the 6-inch outfall from the west side roof gutter to prevent further scour.

Pavement and Parking

Overview

In all areas of the site, the pavement is in poor condition at best. Although some of the existing cracks have been filled at various times, it does not appear the asphalt has been overlaid or replaced in many years (if ever). The asphalt shows extensive cracking and spalling and there are numerous patches where holes and other damage has been repaired. The cracking is too extensive to continue sealing. The pavement needs to be replaced across the entire site, including the replacement or supplementation of structural base gravels. The presence of ledge across the property compounds the problem and is one of the factors contributing to the deterioration of the pavement. In locations where the depth to ledge is shallow, it may not be feasible to place adequate depths of gravel to support the pavement. Further, the ledge may be creating a perched water table condition, holding groundwater in the gravels directly below the pavement surface where freeze/thaw cycles hasten the destruction of the asphalt surfaces. Differential settlement in multiple areas creates low spots that trap water, leading to cracking, infiltration, and further degradation. Designing a new complete parking lot cross-section that utilizes a structural geogrid layer integral to the base gravels will provide additional strength, rigidity, and longevity for the paved surfaces.

West Side

Where the entrance and exit driveways meet Geremonty Drive, the pavement is in failing condition. Extreme differential settlement indicates the base gravels no longer have the

structural capacity to support traffic loads. A contributing problem is the concentration of runoff from Geremonty Drive onto these areas. Any crack that develops allows water to seep below the surface, washing away fine granular material and creating areas susceptible to heaving during freeze/thaw cycles. Creating a diversion to keep runoff within the street right-of-way and off this property will help protect these areas.

North Side

The pavement along the exit driveway is in failing condition. Extensive cracking ('alligator' or fatigue cracking) and multiple pothole patches indicate asphalt that is past its useful life. The driveway runs in close proximity to the wetland, and it is likely runoff from the slope on the north side of the building and elevated groundwater levels infiltrate the base gravels and weaken their ability to support the asphalt.

East Side

The condition of this pavement is poor. Multiple cracks, differential settlement, and spalling is visible throughout the 48-space lot. The pavement extends to the face of the foundation, which as noted in the 'Drainage' section, becomes an ice-covered hazard in the colder months when snow melts off the roof and freezes on the pavement below.

South Side

The asphalt sidewalk adjacent to the driveway entrance is in poor condition, as is the bituminous curbing separating the driveway from this sidewalk. Visually there is little contrast between the sidewalk surface and the driveway surface, creating a potential trip hazard. The asphalt surface of the driveway along the south side of the building is in poor condition.

There are five handicapped accessible parking spaces on this side of the building, which is the required number for the 132 spaces on the lot; however, none of the five complies with the Americans with Disabilities Act (ADA) requirements for accessible parking spaces, for multiple reasons:

- ADA specifies that handicap spaces and their adjacent reserved area(s) slope no more than 2% in any direction. All five spaces violate this condition.
- Each space must be adjacent to a reserved no parking area that extends the length of the space and is 5 feet wide (8 feet wide for a van accessible space). Three of the five spaces have no such area.

- None of the spaces is signed as a van accessible space, although one of the five is required to be designated as one.
- Accessible spaces must be located in a location where there is an ADA compliant accessible route to the accessible entrance. The two spaces adjacent to the south side of the building require people to walk up a non-compliant slope to access the entrance. Site conditions may make it difficult, if not impossible, to comply with this condition, short of reconstructing the entire lot.

The pavement at the two accessible spaces closest to the building abuts the foundation, similar to the east side of the building. The brickwork on the south side is broken and cracked in many locations from vehicle impacts against this wall.

South Side Parking Lot

The pavement in this lot is in poor condition, although it is marginally better than any other portion of the site. There is a trench patch in very poor condition running the length of this lot near its east side. It is visibly deteriorating and spalling in multiple areas. Loose aggregate, cracks, and broken pavement are evidence of its failing condition, and these deficiencies will lead to further deterioration if not addressed.

Recommendations

- Repave the entire site. Remove or reclaim the existing pavement, place new base gravels, fine grade the site to ensure proper drainage and to provide for ADA compliant slopes, and repave. The design of the new pavement assembly should include the use of a geogrid stabilization mat to provide additional structural support. Where feasible the design should include underdrains to remove groundwater from beneath the assembly, particularly where the lot and driveway abut the wetland.
- Provide a transition space between the face of the foundation and the end of the parking spaces (east and south sides). The potential exists for a vehicle to cause serious damage to the building by driving into it. Parking bumpers, bollards, or a guardrail between the spaces and the wall can provide a measure of protection. As discussed in the 'Drainage' section above, a stone drip edge along the face of the foundation may help encourage vehicles to park with some separation from the Town Hall; however, drip edges will not prevent a car from driving forward into the building.
- Paint a 4-inch wide white or yellow stripe where the sidewalk and bituminous curb meet to provide visual contrast for pedestrians.

- Sacrifice two of the seven parking spaces at the southeast corner of the Town Hall to ensure all five accessible spaces abut a reserved no parking aisle at least five feet in width.
- Install signage indicating which accessible space is reserved for van parking.

Accessibility

Overview

None of the exterior handrails at the Town Hall comply with ADA regulations. The handrails are typical for a residential installation, not a public facility.

The Town Hall has several sidewalks functioning as direct entrance and egress routes (at the main entrance on the west side, the entrance to the finance department at the northeast corner, and the doorway at the southwest corner of the building) that slope in excess of 5%. Public routes with slopes in excess of 5% require handrails on both sides of the walkway and there are slope-based limits mandating how high a sidewalk can rise before a level landing is required. The sidewalk at the southwest corner of the building slopes in excess of 10% and will need to be realigned and reconstructed to become compliant.

West Side

The asphalt sidewalk between the driveway and the steps up to the entry slopes at ±7%, requiring handrails.

At the steps up to the entry porch there is a caulked joint between a concrete tread and riser, indicating some settlement and a past attempt at a repair. The caulking is cracked, allowing water to penetrate beneath the stairs, which can cause further settlement and destabilization.

North and East Sides

As discussed in the Overview, the handrails at the entrance to the finance department and at the public entrance to the lower level of the Town Hall do not comply with ADA standards. Additionally, the sidewalk to the finance department slopes at ±7% and requires handrails along its entire length on both sides.

The sidewalk from the stairway exit slopes in excess of 9%, requiring handrails.

South Side

The asphalt ramp serving as an egress from the southwest corner of the facility slopes at ±10% without handrails or landings. Ramps with slopes of 10% are limited to a 6-inch elevation gain between landings. This walkway climbs for several feet with no landings.

The stairs at the door on the southwest corner of the building should be replaced. The risers have inconsistent heights, there are no handrails, the landing is not flush with the threshold, and this concrete landing is cracked.

Recommendations

- Replace all existing handrails with ADA compliant railings.
- Install handrails at the ramps noted that slope in excess of 5% (west side entrance, the ramp to the finance department, and the ramp from the stair exit).
- Replace the stairs leading to the door at the southwest corner of the building.

Landscaping

Overview

In general, the landscaping is in good condition, though there are some items that require attention. The trees and shrubs planted adjacent to the building on its west side are overgrown. They partially obstruct the sidewalk leading to the entrance and many of the branches are growing against the face of the exterior wall and across the front of some directional signs at the southwest corner of the building, adjacent to the driveway entrance.

On the north side of the Town Hall one of the trees has died.

Across the site there are a number of areas where the grass cover is sparse, particularly on the slopes north of the Town Hall.

Recommendations

- Trim and prune landscape plantings on the west side of the Town Hall to ensure pedestrian routes remain unobstructed and the vegetation is not growing against the exterior walls and roof, and to ensure all signage is visible.
- Replace the dead tree on the north side of the building.
- Revegetate sections of lawn where the grass cover is sparse, particularly across the slopes on the north side of the building.

Miscellaneous

West Side

The decorative fence at the head of the thirteen parking spaces in front of the building is missing a horizontal rail.

There is no stop sign where the west side parking lot exit intersects with Geremonty Drive.

The entrance and exit signage on Geremonty Drive is undersized and difficult for drivers to see.

The utility lines feeding the building from the street hang low over the driveway accessing the thirteen parking spaces on the west side of Town Hall. It was reported to TTG that in the past tall vehicles have struck these lines and torn them down, and further, the Town was informed the lines cannot be elevated any further.

North Side

The dumpster is set on a gravel surface and has a gravel surfaced approach which is deeply rutted from the garbage truck collections.

There is no lighting along the exit driveway.

At the northeast corner of the building, there is a concrete landing and staircase with no safety railings or handrails. The concrete is in poor condition, with spalling, cracking, and exposed rebar.

The DPW staff reports there is a recurring problem with roof runoff freezing at the natural gas line mounted to the face of the building near the transformer, encasing the line in ice during cold weather months.

East Side

The concrete stairs at the public entrance to the lower level show cracking and spalling.

South Side

At the stone retaining wall adjacent to the southwest building egress, there is no railing to protect someone from the 30-inch vertical drop.

The concrete supporting the mechanical unit at the southwest corner shows extensive deterioration and spalling.

South Side Parking Lot

At the northwest corner, there is a parking space immediately adjacent to the location where the sidewalk meets the parking lot, creating a possible obstruction to pedestrians if a car parks in this location.

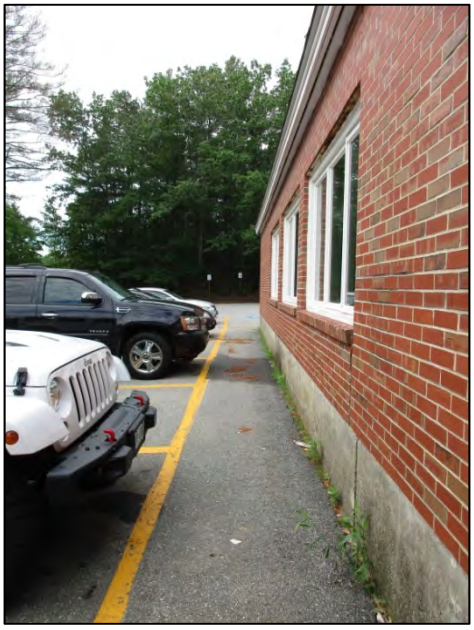
Recommendations

- Install underground conduits for the electrical and communication lines that feed the Town Hall.
- Replace entrance and exit signage on Geremonty Drive with signs that have greater visibility.
- Replace the missing fence rail.
- Install stop sign(s) at the driveway exit from the parking lot on the west side of the building.
- Install a concrete dumpster pad and a concrete approach apron to provide support for the collection vehicles.
- Install lighting along the driveway exit.
- Repair the concrete at the stairs and landings on the north and east sides of the building.
- Provide a guardrail and handrail on the stairs and landing at the northeast corner of the building.

- Install protection around the gas line pipe so it does not become encapsulated in ice, or provide a diversion so snowmelt and roof runoff cannot drip down the pipe.
- Install a railing along the top of the stone retaining wall at the southwest corner.
- Replace the concrete pad beneath the mechanical unit at the southwest corner.
- Stripe the space at the northwest corner of the remote parking lot to prevent vehicles from parking in the space adjacent to the sidewalk.

Drainage

West face of building. Install stone drip edge



Pavement at face of foundation on east side. Note absence of roof gutter. Potential location for stone drip edge with underdrain. Installation of a guardrail or parking bumpers can help protect the building from vehicle impacts.

Drop inlet along exit driveway.
Note pavement crack above pipe.

Transformer location. No means to drain away runoff.

Drainage concern at the west side parking lot. Note evidence of ponding and the pavement repairs.

6-inch roof drain outfall on the north side.

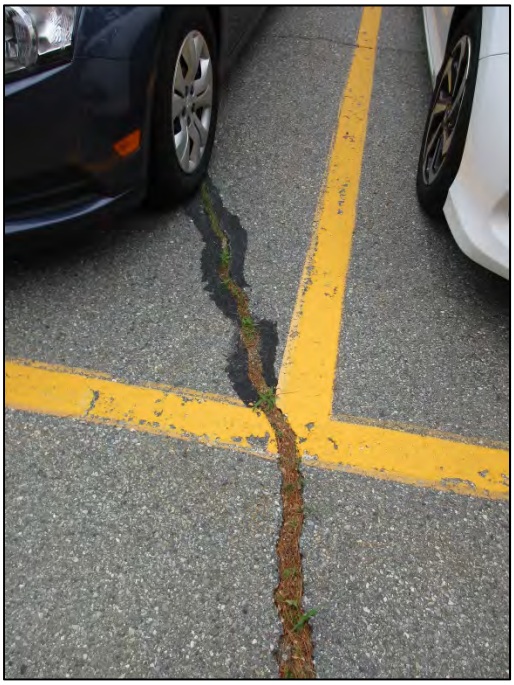
Gutter outlet at southwest corner of building. Tie into an underground piping system to eliminate direct discharge.

Roof gutter on the south side of the building connected to an underground system. Underground system likely crosses east parking lot and discharges in wooded swale on east side of property.

Pavement and Parking

Cracked pavement on east side.

Enlarged detail of pavement cracking on east side.



Example of past crack repair.

Pavement deterioration at south side parking lot.

Failing sidewalk pavement and bituminous curbing. Paint a white or yellow stripe along the top edge of curb.

Fatigue cracking at exit driveway. Note sparse cover on vegetated slope adjacent to pavement.

Exit driveway at intersection with Geremonty Drive. Cracking, differential settlement. Note undersized sign.

Entrance driveway at intersection with Geremonty Drive. Cracking, trench repairs. Note undersized sign.

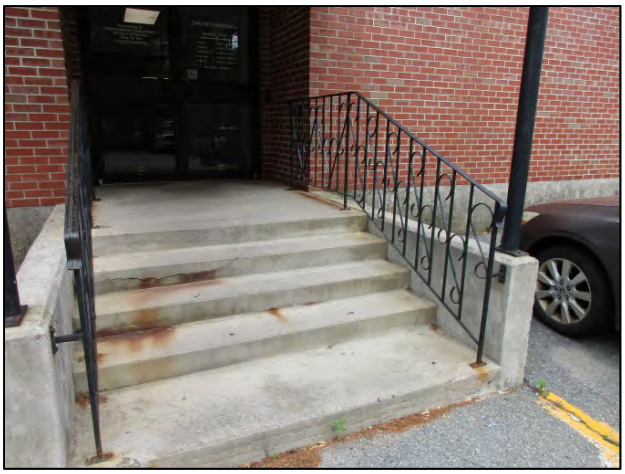
Three accessible parking spaces. Note that none of the spaces have an adjacent 'no parking' aisle.

Accessible spaces adjacent to south side of Town Hall. No 'Van Accessible' signage and the slope up to the concrete sidewalk is excessive.

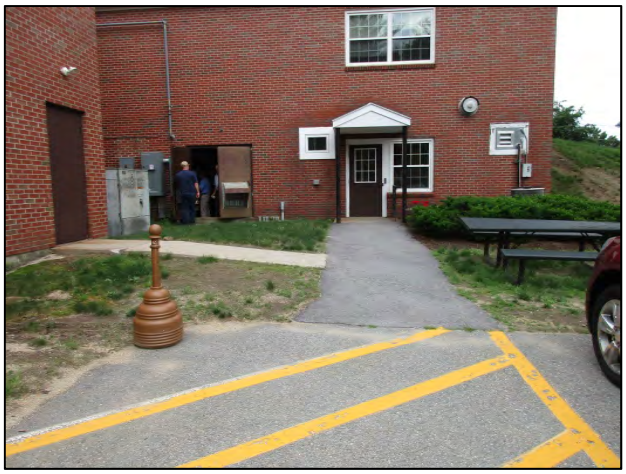
Damage to the brickwork from vehicle impacts. Bollards or a guardrail can protect the building from future damage.

Pavement deterioration and evidence of past repairs where south side parking lot drainage runs off the asphalt and into the wooded area between Town Hall and the Courthouse site.

Accessibility

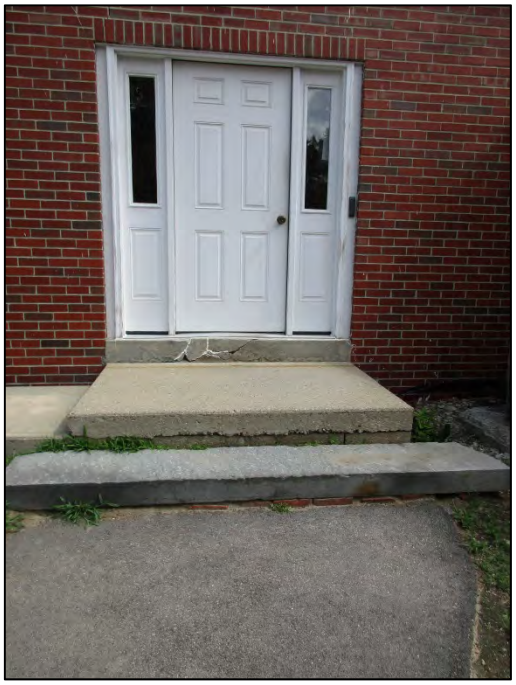


Non-ADA railings. Note cracked concrete riser and staining from corroding reinforcement steel.



Sidewalks requiring ADA compliant railings.

Sidewalk with 10% slope; no railings or landings.



Stairs at southwest entrance. Replacement required for compliance with ADA. Note absence of handrails.

Landscaping

Prune landscaping along west face of building. Note sparse vegetation (typical of several locations sitewide).

Replace the dead tree on the north side.

Sparse grass-cover on north side slope.

Poor grass cover and erosion along edge of pavement.

Miscellaneous

Relocate overhead utility services to underground conduits.

Replace fence rail.

Exit driveway from west side parking lot. No stop signs at intersection with Geremonty Drive.

Vehicle approach to dumpster. Gravel surface susceptible to rutting. Note gravel surface beneath dumpster.

Deteriorating concrete at northeast stairs and landing. Also note absence of guardrails and handrails.

Gas line on north side prone to ice encapsulation.

Stone retaining wall requires a guardrail and the concrete pad beneath the mechanical unit is deteriorating.

Paint striping in the parking space to prevent vehicles from parking here and obstructing access to sidewalk.

PROJECT NO. 4529 ~ SALEM TOWN HALL BUILDING AND SITE ASSESSMENT

CIVIL/SITE			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
DRAINAGE						
Foundation Wall Along West Side of Building	Groundwater infiltrates through foundation into occupied, finished space.	Install foundation drains along west side of building and provide waterproofing and insulation along the exterior face of foundation. Also install a stone drip edge along the foundation at the ground surface to manage surface runoff.	<3 years	$30,000		
Parking Lot on East Side of Town Hall	Snowmelt and roof runoff freezes as it flows eastward across the parking lot, creating hazardous conditions for walking and driving.	A. Install roof gutters and connect them to an underground pipe that daylights in the wooded channel at the east end of the site; or B. Remove the pavement along the east face of the building and install a 4'-6' wide stone drip edge with an underdrain; or C. Install options A and B.	<3 years	A. $8,000 B. $10,000 C. $15,000		
Grassed Swale Along Geremonty Drive	The swale is too shallow and flat to manage the volumes of water draining into it.	Regrade the swale so it is deeper and has steeper sidewalls. Install culverts beneath the two exit driveways crossing the swale so runoff can pass beneath the paved surfaces. Revegetate the swale.	<3 years	$3,500		

PROJECT NO. 4529 ~ SALEM TOWN HALL BUILDING AND SITE ASSESSMENT

CIVIL/SITE			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
DRAINAGE						
Drop Inlet	Sump appears to have an accumulation of sediment.	Clean sediments out of the sump. Inspect structure for cracks or other problems and repair as necessary. Flush sediments out of the culvert and dispose of them outside of wetland areas.	<3 years	$1,000		
Transformer	Finished grade is flush with the top of the concrete transformer pad and there is no means to dispose of runoff and snowmelt.	Install a yard drain to ensure water doesn't pond around the transformer.	<3 years	$6,000		
Parking Lot on West Side of Town Hall	At the northern end of the 13 parking spaces, runoff is trapped against the edge of pavement, leading to ponding and deterioration of the asphalt.	Create a vegetated swale or install a yard drain to collect water and drain it away from the parking spaces.	<3 years	$3,500		
Roof Leader Outfall on North Side of Building	Runoff flowing out of the pipe is scouring the hillside below.	Place geotextile separation fabric and 6" minus stone at the outlet to provide scour protection and prevent further erosion.	<3 years	$800		

PROJECT NO. 4529 ~ SALEM TOWN HALL BUILDING AND SITE ASSESSMENT

CIVIL/SITE			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
PAVEMENT & PARKING						
Asphalt Parking Lots, Driveways, and Sidewalks	The asphalt is in poor condition across the entire site. Extensive cracking, settlement and evidence of failing base gravels are endemic to all paved surfaces.	Repave the entire site. Remove pavement, reconstruct the structural gravel base layers, regrade the site to ensure proper drainage and ADA compliance, and repave with a minimum 3" asphalt surface.	<3 years	$100,000		
Asphalt Extends to the Exterior Walls of the Town Hall on the East and South Sides	Exclusive of the drainage problems noted above, the parking lot extending to the foundation creates a hazardous condition where vehicles can impact the exterior walls.	Install parking bumpers, guardrails, or concrete filled steel bollards to create a physical barrier between traffic and the building.	3 to 5 years		$8,000	
Sidewalks Adjacent to Bituminous Curbing	The edge of the sidewalk can be difficult for pedestrians to see, creating a potential trip hazard from the sidewalk surface to the driveway surface.	Paint a 4" wide yellow or white stripe on the sidewalk along the top of the bituminous curb to create a visual indication of the edge of the sidewalk.	<3 years	$300		
Handicap Accessible Parking Spaces	None of the five spaces are signed as a van accessible space, and the three spaces at the southeast corner of the site do not have an access aisle adjacent to the spaces.	Install an ADA compliant Van Accessible sign at the accessible parking space immediately adjacent to the accessible entrance. Sacrifice two regular existing parking spaces at the southeast corner of the site so two access aisles can be created for the three accessible spaces.	<3 years	$1,000		

PROJECT NO. 4529 ~ SALEM TOWN HALL BUILDING AND SITE ASSESSMENT

CIVIL/SITE			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
ACCESSIBILITY						
Handrails	None of the exterior handrails comply with ADA regulations.	Replace existing handrails with ADA compliant handrails.	<3 years	$4,000		
Steep Ramps	Any public walkway that slopes in excess of 5% requires ADA compliant handrails on both sides.	Install ADA compliant ramps in the following locations: The sidewalk leading to the main entrance on the west side; the sidewalk leading to the door at the southwest corner of the building; at the sidewalk leading to the finance department, and to the exit from the stairway at the northeast corner of the building.	<3 years	$5,000		
Stairs at the Door Located at the Southwest Corner of the Building	The stairs have three risers that are each a different dimension. There are gaps between a tread and riser and there is a step down from the threshold to the landing.	Reconstruct the stairs with consistent dimensions. The landing should be flush with the threshold.	3 to 5 years		$6,000	

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CIVIL/SITE			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
LANDSCAPING						
Plantings Along the West Side of the Town Hall	The trees and shrubs are overgrown, starting to grow up against the building, and partially obstructing the front walk.	Prune existing vegetation.	<3 years	$500		
Dead Tree on North Side of the Building		Replace the dead tree with a similar species.	N/A	$700		
Grass Cover	The lawn in many locations on this site has sparse grass coverage.	Aerate, fertilize, and reseed the lawn. Place secured straw mulch on reseeded sloping terrain until the grass fills in completely.	<3 years	$500		

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CIVIL/SITE			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
MISCELLANEOUS						
Low Overhead Utility Lines at the Entrance to the West Side Parking Lot	Low overhead wires pose a hazard to trucks and other tall vehicles.	Route the utility service lines through underground conduits to the building.	<3 years	$25,000		
Entrance and Exit Signage	The signs are small and difficult for drivers on Geremonty Drive to see.	Replace the signage with larger, more visible signs.	3 to 5 years		$1,200	
Split Rail Fence	One of the horizontal rails is missing.	Replace the rail.	3 to 5 years		$150	
Exit from West Side Parking Lot	There is no stop sign where the driveway intersects with Geremonty Drive.	Install a stop sign.	<3 years	$400		
Dumpster	The dumpster is set off the pavement on a gravel surface and the approach for garbage trucks is also a gravel surface that is deeply rutted from the heavy truck traffic.	Install a concrete pad for the dumpster to set on. Install a concrete approach apron to support garbage trucks as they drive to the dumpster and elevate it to empty the trash.	3 to 5 years		$6,500	
Driveway Exit from East (Lower) Lot	There is no exterior lighting along this section of driveway.	Install exterior lighting along the exit driveway.	3 to 5 years		$6,000	

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CIVIL/SITE			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
MISCELLANEOUS						
Concrete Stairs on the North Side	The concrete is deteriorating and the rebar is exposed.	Rebuild the concrete stairs. Install handrails and guardrails at the new steps and landing.	<3 years	$8,000		
Concrete Stairs on the East Side	The concrete is cracked and there is staining from corroding rebar.	Repair the cracked and spalling concrete.	<3 years	$1,500		
Concrete Stairs on the North Side	The landing does not have a guardrail on its east edge and the stairs don't have handrails.	Install a guardrail and handrails.	<3 years	$500		
Stone Retaining Wall	This wall at the southwest corner of the building has a 30-inch vertical drop and there is no guardrail or other fall protection.	Install a guardrail to prevent accidental falls.	<3 years	$700		
Concrete Equipment Pad at the Southwest Corner	The concrete is deteriorating, showing significant spalling.	Replace the concrete equipment pad.	3 to 5 years	$2,500		

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CIVIL/SITE			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
MISCELLANEOUS						
Window Wells - Conduits and Piping	Some wells have electrical conduits and/or irrigation lines running through them, suspended above the floor.	Re-route the conduits and irrigation lines so they pass through the wells in a less obtrusive manner.	3 to 5 years		$2,000	
Stone Walls and Exterior Stairs	The railings along the top of the walls are not building code compliant and the existing handrails (where they are present) are not compliant with ADA. Many of the rail supports and individual components are severely corroded.	Replace all guardrails on top of the exterior walls. Replace/install handrails at all exterior stairs. Installations and design shall be in compliance with all current codes.	>5 years			$35,000
South Side Parking Lot - Parking Space at Sidewalk Terminus	If a vehicle parks in this space it may create an obstruction for pedestrians exiting the sidewalk.	Sacrifice the space and paint diagonal 4" wide white or yellow lines across it so drivers know not to park there.	3 to 5 years		$500	
		TOTALS		**$228,400**	**$30,350**	**$35,000**

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