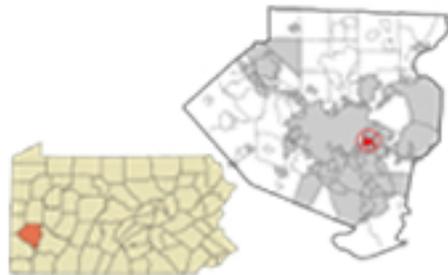


Borough Of
Swissvale
Established in 1898.
Swissvale, Pa 15218

CORE
ARCHITECTS

ARCHITECTURE
STRATEGIC MASTER PLANNING
CONSTRUCTION MANAGEMENT



06.30.2021

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Borough of Swissvale –Municipal Building Study
EXISTING FACILITY EVALUATION REPORT

EXECUTIVE SUMMARY

The Borough of Swissvale has asked Core Architects, to help facilitate a Municipal Building Study. This report contains the existing conditions analysis of the Swissvale Municipal building. The methodology used to evaluate the facilities included on-site visual examination of: the site; structural integrity and thermal envelope; Interior environment and finishes; building systems including suitability and life expectancy of mechanical, electrical, plumbing, and telecommunication systems; evaluation of building scheduled spaces; life safety; and compliance with the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

Core Architects and our consulting engineers, in conjunction with the Borough of Swissvale, administration and staff, had made multiple visits to the municipal building in an effort to evaluate the condition and viability of the building.

The goal of this report is to bring to the Borough’s attention any issues related to Municipal Building conditions that should be addressed in the upcoming building program(s). The report is organized as follows, for each of the issues we discovered, and have broken them down into five basic categories:

- **Property Overview**
- **Building Overview**
- **Site Summary**
 - Safety
 - Site Grading and Drainage
 - Pavement and Sidewalk Management
 - Foundation and Geotechnical
- **Building Summary**
 - Exterior Building Evaluation
 - Interior Building Evaluation
 - Building Code Considerations
 - Building Code Construction Classification Type
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- **Structural Evaluation**
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- **Plumbing Summary**
 - Existing Conditions Overview
 - Sanitary Sewer
 - Roof Drainage
 - Water Supply System
 - Fire Protection

We have attempted to prioritize what we believe to be the most critical facility issues. These issues are identified as “Issues of Immediate Concern”, and are further prioritized as:

- **High Priority:** Issues that if not addressed pose a significant level of safety hazard, liability, structural failure, or threat to the integrity of the building envelope. Also categorized as “High Priority” are issues that will become more costly to remediate as time passes, as well as issues that could generate a significant cost impact through consequential damage – such as excess moisture that could cause indoor air quality issues.
- **Medium Priority:** Issues that should be addressed because they currently cause the Borough to incur cost or inconvenience. Also included in this category are issues that have the potential to degrade the condition of the building over time.

If the Borough does not immediately enter a capital building campaign; we recommend that the issues identified as “High Priority” are addressed by the Borough as targeted projects as soon as the budget for this work can be put in place. We recommend that the Borough evaluate each “Medium Priority” issue on a case-by-case basis to determine the appropriate time to address the concern.

All other issues can be considered Low Priority. These issues relate mostly to interior finishes and programmatic elements. We do not mean to minimize the importance of these issues, as some are quite significant. It is our opinion that these issues can be deferred in the short term for the following reasons:

- The cost to remediate these issues will likely not increase beyond the rate of inflation due to further deterioration.
- Continued degradation, or even failure, of the system or component will not likely result in a safety hazard or severe operational inconvenience on the part of the District.
- Aesthetic and related quality-of-life concerns may not require immediate attention.

SWISSVALE MUNICIPAL BUILDING – Existing Conditions Report

7560 Roslyn Street
Swissvale, PA 15218



Municipal Building:

Property Overview

- Per the Borough Website: *“The Borough of Swissvale is 1.3 square miles nestled on the eastern border of the City of Pittsburgh within Allegheny County. Surrounding communities include Edgewood, Braddock Hills, North Braddock and Rankin Boroughs. Located in the historic “Steel Valley” along the Monongahela River, the community is urban in nature and is comprised of residential, commercial and industrial occupancies with a current population of just under 9,000 residents.”*
- The Swissvale Municipal Offices, Police Station and Public Works are currently located in a freestanding building.
- The original two (2) story building was constructed in 1906 with: a two (2) story addition in 1936; a one (1) story garage addition circa 1950; and a two (2) story elevator addition built in 1996.
- The building is situated on an urban neighborhood, on a corner lot; Parcel ID 0178-H-279. The Borough also owns the adjacent properties: Parcel ID 0178-H-288 and 0178-H-188 respectively; in addition, the Borough owns two lots Parcel ID 0178-H-41 and 0178-H-42 located across the street.

Building Overview

- The building is currently used by the borough: police, municipal offices, and some of the streets department. The other services have offices located in other facilities within the borough.
- The existing building has been owned and maintained by the Swissvale Municipality since its construction around 1906. It has had 3 obvious additions and several renovated as conditions require. Existing documentation is not available, so construction methods are based on visual understanding and historical information from staff interviews.
- The original building was constructed as a 2-story structure for a professional and volunteer fire brigade, to house horse drawn fire trucks, and as a dormitory.
- About 1936 an addition to the facility was constructed to house the municipal offices and full-time police barracks with jail cells.
- We estimate in the 1940's a garage addition was constructed to the rear of the building for public works and streets departments use.
- In 1996 a final renovation was performed to provide for an elevator, and a new police station entrance.
- In 2019, the south end of the 1936 building addition suffered a bearing wall failure, which caused part of the roof to collapse onto the second floor. The existing 2nd floor framing was modified to become a near flat metal roof with a new wood enclosure wall and secure the remaining roof construction.
- The existing building is not designed to meet the current requirements for emergency services occupancy. The building is not robust or hardened against severe weather events. It does not have the necessary redundant services should utility services be interrupted. The current building systems are not complete nor robust enough for the additional level of service required to maintain emergency services in the case of excessive environmental events.

Site Summary

- **Safety**
 - There is inadequate pedestrian/vehicle separation in front of building; there are conflicts between pedestrian access and the Police garage and driveway(s).
 - The public parking lot is located across the street at a busy intersection. The parking lot has limited access and it is inefficiently laid out.
 - Accessible Parking is not available.
- **Site Grading and Drainage**
 - In general site drainage appears to be adequate.
 - The adjacent gravel service lot is showing signs of weathering and erosion.
- **Pavement and Sidewalk Management**
 - Pavement generally shows evidence of weathering damage and age.
 - Most pavements are in fair to poor condition; continued maintenance is required.
 - Some paved areas are starting to show evidence of structural failure; these areas will need to be monitored and repaired as required.
 - Sidewalks are in fair to poor condition.
- **Foundation and Geotechnical Issues**
 - No significant structural building foundation issues reported or noted to date.
 - Moisture/ water infiltration issues were observed in the basement.

Building Summary:

- The municipal building is a two-story building with a walk-out lower level to the rear of the property.
- **Exterior Building Evaluation**
 - The building consists of masonry bearing construction with brick masonry veneer.
 - The brick veneer is in poor condition; there are signs of deterioration and compromise of the weathering and thermal envelope; including mortar cracking, disintegration, and water infiltration.
 - The brick veneer at the 1906 building is not properly tied back to the masonry backup construction. It is observed that many parts of the veneer are bulging and/or out of plane.
 - In general, the masonry veneer needs to be cut and pointed; the veneer needs to be retrofitted mechanically to be tied back to the structural backup.
 - The masonry chimney is in poor condition and needs to be repointed and recapped. Incinerating waste is illegal in Allegheny County, therefore there is no longer any reason to maintain the existing height of the chimney. It is recommended that the chimney be reduced in height by (+/-) two-thirds, and topped with a new precast capstone with pest screen cap.
 - The storefront entry systems are at the end of their life cycle and should be replaced.
 - The exterior hollow metal doors and frames are in need of replacement.
 - The aluminum window systems are no longer operable; and are in need of replacement.
 - The exterior louvers have deteriorated and should be refurbished.
 - The high roof of the 1906 building has an adhered EPDM membrane system that is out of warranty. The roofing system is well beyond the end of its serviceable life and is in need of full replacement. During inspection it was observed that there were open tears in the roof membrane system; it is our understanding that these roof leak locations have been temporarily repaired.
 - The high roof is sloped to through wall scuppers that drain to exposed downspouts on the façade(s). The scuppers and downspouts are in fair condition. At some point in the past, electrical wiring was laid around the roof perimeter, in the valleys, and into the downspouts in an attempt to prevent winter ice build-up. The wiring is in disrepair and poses an electrocution and/or fire hazard. The existing heating wiring needs to be removed and/or replaced with a UL listed exterior heating wire system.
 - The curbing and roof cap of what used to be the hose and/or bell tower is in disrepair and needs to be completely replaced.
 - The roof venting cupola is in disrepair and needs to be removed and/or replaced.
 - The roof curbs and caps that have been abandoned and/or are obsolete should be removed and re-decked when the roof is replaced.
 - The combination of the stone, metal, and membrane coping systems are in disrepair and appear to be contributing to the infiltration of water to the building; new coping should be installed when the roof is replaced.
 - The roof of the 1939 addition is a sloped metal roof that was installed on prefabricated wood trusses that rest on what was originally the second-floor structure; this roof was installed following the catastrophic collapse of the third-floor roof of the 1939 addition. The metal roof drains to exposed gutters and down spouts that are in fair to good condition.
 - The low roof on the circa 1950's garage is a combination of rolled asphalt and asphalt shingles. The roof is actively leaking throughout and needs to be replaced. The valley where the low roof meets the building should be re-framed to reduce drifting loads and improve drainage. The corresponding gutters and downspouts should be replaced during re-roofing.

- The access to the high roof is via a second story window onto a shaky metal platform up an exterior metal ladder. The platform and access ladder does not meet OSHA standards and presents a fall and/or safety hazard. The platform is in disrepair; it does not have guard rails or fall protection; the ladder is in need of maintenance and repair. The roof access is an unsafe condition and should be immediately replaced.
- All abandoned or outdated roof top mounted equipment needs to be removed or replaced.
- **Interior Building Evaluation**
 - The interiors of the building are in generally poor condition and are in need of replacement and/or repair:
 - The vinyl asbestos tile (VAT) in the corridors and/ or common areas are beyond the end of their useful life and should be replaced.
 - The VAT and/or carpeting in all of the offices/ support spaces are beyond the end of their useful life and should be replaced.
 - The interior of the exterior walls show signs of systemic water infiltration; once the exterior envelope has been repaired and all of the sources of water infiltration have been rectified the interior plaster will need to be repaired and refinished.
 - Asbestos containing plaster has been identified in the 1939 portion of the building; as with all other asbestos containing materials the asbestos containing plaster should be abated and replaced.
 - The Acoustical Ceiling Tile System (ACT) in the corridors, offices, and common areas is beyond the end of their useful life and should be replaced.
 - The plaster ceilings throughout will need to be repaired and refinished.
 - The interior doors, frames, and hardware in the corridors and in all of the offices are beyond the end of their useful life and should be replaced.
 - The administration office/ suite should be reconfigured and upgraded.
 - The offices and conference areas are all in need of updated finishes and programmatic upgrades.
 - The toilet rooms are in need of updated finishes and fixtures.
 - The Staff resources including the copy room, workroom, and staff offices are all in need of updated finishes and programmatic upgrades.
- **Building Code Considerations**
 - The Swissvale Borough Building and Police Station is tasked with exceeding the minimum requirements established by the Model Building Codes; and to provide the recommended emergency shelter capacities.
 - Code Required Basis of Design
 - Pennsylvania Uniform Construction Code
 - American Society of Civil Engineers ASCE – 7 “Minimum Design Loads for Buildings and Other Structures”
 - Emergency services building required to sustain operations under 250-year environmental storm events.
 - Wind 120 mph
 - Snow 30 psf = 30” snow for more than 30 days
 - Earthquake 150% stronger than typical construction.
 - Rain / Flood 500-year storm event
 - Federal Emergency Management Agency P-261 “Safe Rooms for Tornadoes and Hurricanes “
 - Emergency service building should also have a designate storm shelters to resist the extreme storm events and have hardened shelter in place area of refuge (Safe Room).
 - Western PA event: Tornado with wind speed = 250 mph

- **Building Code Construction Classification Type**
 - Building Construction Type VB (Most Restrictive)
 - Mixture of Non-Combustible and Combustible Materials.
 - Exterior Walls are Non-combustible Load-Bearing Masonry.
 - Structural Steel Columns and/or Beams are Unprotected.
 - Floor and Roof Structures are Unprotected Combustible Materials.
 - Exterior Walls Cannot Meet Fire Rating Requirements; Floor and Roof Joist are Not Fire-cut.

- **Use and Occupancy Classifications**
 - Borough Offices = Business Group B
 - Council Chambers/ Meeting Room = Assembly Group A-3
 - Police Station Offices = Business Group B
 - Police Holding Areas = Institutional Group I-3
 - Police Parking Garage = S-2
 - Borough Maintenance Garage = S-1

- **Required Occupancy Separations**
 - Minimum of 1- or 2-hour separations between most groups in a non-sprinklered building.
 - There are current no separations between occupancies.
 - Without proper occupancy separations the Building Codes require that the most stringent Occupancy requirements must be followed.

- **Emergency Means of Egress**
 - Existing Exit Stairways do not meet current Code requirements.
 - Existing Exit Stairways cannot be accessed without walking through adjoining or intervening spaces and/or areas.
 - Existing Exit “Corridors” do not meet current Code requirements.
 - There are no required Areas of Rescue.
 - The Main stairs do not meet the minimum the requirements for construction and/or condition.

- **Accessibility - Americans with Disabilities Act Accessibility Guidelines (ADAAG)**
 - In general, the entrances to the building do not comply with ADAAG.
 - The building is a two-story structure with scheduled spaces on both floors. There are no mechanisms to allow a physically challenged person direct access from one side of the first floor to the other without going outside into the elements.
 - There are many scheduled spaces that do not have the required door clearances or hardware.
 - The toilet rooms do not comply with current ADAAG.
 - Signage and wayfaring do not comply with current ADAAG.
 - The audible and visual components of the fire alarm system do not comply with ADAAG or National Fire Protection Association (NFPA) codes.
 - Accessible Parking is not available.

- **Historical Attributes**
 - Over the years, the historical building elements have been systematically removed from the building.
 - Bell/ hose tower has been removed and capped.
 - The decorative pediments have been stripped and replaced with metal coping.
 - The decorative stone cornices/ copings have been stripped and replace with metal.
 - The arched garage doors and decorative stone has been demolished and replaced with a steel lintel and a modern garage door.

- There are no interior historical features of note.

Structural Summary:

- **General Building**
 - The existing building has been intermittently maintained and looks to be in fair to poor condition depending on the location. The building requires continuing maintenance of the exterior envelope and also structural interior reinforcement in some areas. With the proper maintenance and repair it is potentially, a satisfactory structural condition, and/or construction, for a Business (office) or Residential type occupancy.
 - The structure was not built to the current design requirements to secure an emergency service agency against the catastrophic environmental events as required per modern building codes or as mandated by the Federal Emergency Management Agency (FEMA). The building would require substantial structural modifications to provide for the recommended redundancy and durability requirements of an emergency service occupancy.
- **Bearing and Shear Walls**
 - The primary load path is masonry load bearing and unreinforced masonry shear walls. The existing walls are multi-wythe brick bearing walls. For the 1906 and 1936 parts of the building the walls are constructed without physical locking of the interior bearing wythes to the exterior finish brick. Without a lock between wythes all the continuity between layers is achieved through a bonding parge layer of mortar. Over time this bond deteriorates, and the exterior veneer can become unstable while inducing additional load on the interior wythes. This condition can be accelerated by water infiltration and the freeze thaw cycle. The walls should be inspected for bulging and movement. There is a slight bulge on the north wall and as the windows in this area are not all operable this condition is likely in the more urgent levels of addressing.
 - Modern restoration techniques are available to establish a more secure wythe bond by inserting metal ties, drilled in the mortar joints and epoxying the wythes together.
 - In general the exterior lintels look to be in fair to good condition. Some of the arched lintels have been repaired in the past and should be repointed as continuing movement has occurred. The newer steel lintel over the front garage bay is rusting and damaging the end supports. This lintel should be exposed, cleaned and repaired as necessary. This will require removing some of the existing brick in stages.
 - The foundation walls look like solid sandstone and have no signs of bulges, movement, or cracking. There are signs of some ground water saturating the walls but not excessively or limiting to the current occupancy.
 - The basement is the lowest level with at grade access from the east (rear) garage door and the south garage door. This area appears to be the old police sally port and streets department entrance respectively. The basement is damp and congested.
 - We found one primary steel column with excessive deterioration to the web and flange. The steel has been in contact with damp concrete for 95+ years and is exhibiting common corrosion. This condition should be repaired as soon as possible, by exposing the base plate and installing new material. Other basement walls and floors are in fair to poor condition.

Area	Construction
1906	Multi wythe brick bearing walls with solid limestone or arch brick lintels
1936	Multi wythe brick bearing walls with solid limestone or arch brick lintels
1996	Brick exterior, interior Unknow

▪ **1st Floor Framing**

- The 1906 slab on grade is in good condition but mostly covered.
- In the 1936 addition the floors are closely spaced wood joists with hardwood flooring. This floor has a live load of more than 100psf and is adequate for most standard commercial and retail occupancies. The jail cells are on concrete slabs supported by integral steel framing. We could not measure the framing to assess the service loading but would expect it to exceed the adjacent wood framing areas.

Area	Construction
1906	Slab on Grade
1936	Wood 2x floor joists and steel beams with concrete slabs between.

▪ **2nd Floor Framing**

- The 1906 floor is assessed for the accessible floor joists. This level has sizable beams which span the full 31 feet of width of the area. These members are concealed and cannot be qualified for occupancy loading. As the previous bunk house and current borough offices have occupied this space over 100 years, we would not recommend exceeding this occupancy without exposing and the girders and qualifying the loading condition. 80 psf live load is the typical office space loading for public access and corridors.
- The 1936 addition has smaller joists and tighter spacing allowing a more exact loading level. This floor area has a live load of 90 psf based on the southern 15'-6"span and construction materials. The qualified 90 psf floor loading is below the allowable live load of public assembly spaces. We recommend this area be modified to limit public assemblies and only allow for office, locker room or other back of house services.

Area	Construction
1906	Wood 2"x12" floor joists at 16" o.c.
1936	31' girders and masonry bearing walls

▪ **Roof Framing**

- Main Roof Structure Remarks: The roof framing is in fair shape. There has been areas of water intrusion and access to these areas would not allow physical inspection. The trusses bearings are in fair condition and the exterior walls are bonded to the attic and roof diaphragm with metal strapping.
- The roof joists were qualified to support a snow load with additional factors of safety required for an emergency services facility.
- Garage Roof Structure Remarks: The roof framing is in fair shape. The wall failure repair looks adequate. This roof was not assessed for loading or condition as it is exposed, and it is an unheated occupancy.

Area	Construction
1906	Wood 2x Joists and Ceiling rafters to 6x9 built up wood girder trusses
1936	Wood 2x Joist and Ceiling rafters to 8x9 built up wood girder trusses.
1940	Wood 2x Joists to Steel riveted girder trusses

Mechanical Summary (Heating, Ventilating, and Air Conditioning (HVAC) Systems):

- **Existing Conditions Overview**
 - The building is heated by a steam boiler installed in 2014 which feeds steam through 1906 piping to radiator and unit heaters. There is no mechanical ventilation provided and not all windows are able to be opened. The only air conditioning provided is through two window units and one gas fired DX cooling furnace for the Police squad room.
- **Heating Systems**
 - One Weil-McLain gas fired Cast Iron Steam Boiler, 1,144 MBH input. The Boiler was not in operation at the time of the visit, but the staff indicated that it was operating good. Heat is provided by steam radiators and unit heaters, and it is reported the building overheats, likely due to inoperable control valves and steam traps. The steam and condensate piping are original to the building 1906. The staff noted that they have not had issues with leaks. If there was to be a future renovation that included keeping the steam piping it would be recommended that pipe cut be taken to determine the condition of the pipe. We noticed the boiler room does not meet code due to a couple of issues:
 - There is no code required combustion air provided.
 - The boiler does not have the code required 30” clearance.
- **Air Conditioning Systems**
 - Three spaces are currently air conditioned: The Borough offices, with two spaces utilizing window units which are removed in the winter. The Police squad room which is air conditioned from a Bryant gas fired furnace with DX cooling that was installed in 1986. This unit is currently working but has exceeded its expected service life.
- **Ventilation**
 - There is no mechanical ventilation for this building. The current system relies on natural ventilation through operable windows. The staff did note that several windows throughout the building were not able to be opened.
 - The toilet rooms on the second floor have dedicated exhaust but the make-up air for this exhaust comes from windows or infiltration.
 - It was also noted that the police jail cells did not have any exhaust or ventilation provided.
- **HVAC Controls**
 - There is no central control system for this building. The steam radiators are controlled by thermostatic control valves and the steam unit heaters are controlled by a thermostat. It was noted that the building overheats when the steam system is in operation which is an indication that the steam control valves are not operating correctly, and the steam traps may be failing.

Electrical Summary:

▪ Existing Conditions Overview

- The existing building is presently fed with two overhead services: (1) 120/240V, 1-phase, 200A service; (1) 230V, 3-phase, 400A service. The electrical services appear to be recently updated and not in need of repair. Power and lighting conditions throughout the building however are not compliant with current code requirements and create unsafe conditions, i.e. required workspace clearances are not met, wiring is not secured properly or in an organized manner, and emergency egress lighting is inadequate. Additionally, the electrical system does not comply with National Electrical Code (NEC) Article 708 requirements for Critical Operations Power Systems necessary for the continuity of operation for an emergency services agency. It is recommended that these systems be brought into compliance for the building to serve as an emergency services facility.
- There appears to be no lightning protection system. There is no existing fire alarm system, only smoke detectors provided. There is no centralized security access or monitoring, intercom and public address systems. Individual security cameras are located at key locations of the building, but do not appear to provide comprehensive coverage of the facility. The building recently received a new fiber-optic telecommunications service. The building managers are currently in the process of moving data and telecommunications systems over to the new fiber-optic service. There is no main distribution frame and data/telecommunication cabling is not secured or protected properly in many locations.
- It is recommended that a fire alarm system be installed, and power and emergency lighting conditions be remedied to address life safety issues and continue as an office occupancy.
- If the building is to operate as an emergency services facility, significant alterations and installations will need to be made to ensure continuity of systems including, but not limited to, power, HVAC, fire alarm, security, communications, and monitoring in designated critical operations areas.

▪ Power Systems

- Both services are in good condition. The 3-phase service appears to be under-utilized and serves primarily 3-phase mechanical loads and the elevator. The 1-phase Main Distribution Panelboard serves building receptacle, lighting, and small mechanical loads. This service appears to be near capacity and should be evaluated for loading and updated with an accurate circuit directory. Additionally, it is recommended that both services be provided with surge protection. Utility weatherheads, overhead service drop conductors, meters and meter sockets are all in good condition.
- Panelboards are in good physical condition, and all appear to be less than 30 years old. However, NEC (National Electrical Code) required workspace clearances are not typically met throughout the entire building. In most locations this issue can be resolved by moving stored equipment and furniture away from electrical equipment. Panelboards are not clearly labelled to indicate where they are fed from and what service they are on, and circuit directories are not up to date, which may result in unsafe conditions when working on the electrical system. It is recommended that a detailed survey of the system be completed, panelboard labelling and circuit directories be brought up to date and electrical equipment be provided with required working space clearances.
- Equipment disconnect switches throughout the basement level are in variety of conditions. Most appear to be operating adequately but are not accessible or provided with adequate clearances for safe operation and maintenance. Individual locations should be evaluated for quality of enclosure (i.e. rust and moisture conditions) and working space, and brought into compliance with the current NEC to ensure safe conditions.
- Power wiring and cabling, where observable, were not properly secured, protected or organized creating potentially hazardous conditions. In 1930s building addition, water infiltration exacerbates electrical hazards. Wiring methods observed include nonmetallic

cable, metal clad cable and conduit. Building staff noted that an electrician working at the facility recently expressed concern over existing knob and tube wiring with severely degraded insulation that may result in an arc fault. Recent additions of surface mounted raceway and receptacles are in good condition. It is recommended that branch circuit wiring that is antiquated with degraded insulation should be removed and replaced, with wiring methods brought up to current codes and standards, ensuring proper grounding the system.

- **Emergency Power**

- A 15kW, natural gas generator has been in operation for approximately 38 years and is beyond its expected useful life. However, staff noted that it performed as needed during a recent power outage. The controller continues to exercise the generator weekly. In its current condition, the generator is not adequate to support life safety systems. It is recommended that a service technician evaluate the system to confirm that it is operating properly. This evaluation along with routine maintenance may provide another 5 years of useful life.
- Existing Onan Transfer Switch is in good condition and functioning properly.
- Emergency distribution panelboards serve some lighting and receptacles loads throughout the building and appears to serve all loads on the second floor panelboard, although this panelboard is not clearly labelled as emergency or being fed from an emergency panelboard.
- For this generator to operate as a power source for emergency services it must have a fuel supply independent of public utilities, operate for a minimum of 72 hours under full load conditions, be located in a sprinklered or 2-hour fire rated space and batteries required for operation must be connected to the Critical Operations Power System. Additionally, the system must provide a means for connecting a portable generator.

- **Lighting**

- In general, existing LED and fluorescent fixtures provide adequate light levels in office, conference, corridor, bathroom and garage spaces. Some fluorescent fixtures have been retrofitted with LED lamps. It is recommended that remaining fluorescent fixtures be updated with LED retrofit lamps to reduce energy usage and streamline maintenance and facility lamp supply. Lighting in stairwells was off when observed and controls are not readily accessible at all access points, creating unsafe light levels and controls conditions.
- Exterior lighting includes building mounted flood lights at rear of building and wall packs on front of the building. Existing lighting does not appear to achieve safe light levels and uniformity throughout the entire site. Improving horizontal and vertical light levels with high color rendering index sources at the perimeter of the building would significantly improve the safety and security of the site.
- Lighting control is provided with local switches. Building staff noted that no automatic or centralized lighting controls are provided. To reduce energy usage and improve functionality, it is recommended that local automatic lighting controls (i.e. vacancy sensors and daylighting sensors) be added in offices, conference rooms and restrooms. For common spaces and exterior lighting, it is recommended that a basic control panel with photocell and time clock control be added to provide reliable general control, with local override switches for interior spaces.

- **Emergency Lighting**

- Emergency egress lighting consists of battery pack units in good condition and some lighting served from emergency panelboards; extent of egress lighting served from emergency panelboards unclear due to incomplete circuit directories. Majority of exit signs are in good condition. The only location on the exterior of the building with emergency egress lighting evident is at the elevator egress door. It is recommended that emergency

egress lighting be accessed and supplemented with additional interior battery pack units, exterior remote fixture heads, and exit signs.

- In general, emergency egress lighting does not provide complete coverage for safe egress from the building.
- **Fire Alarm**
 - The building does not have a fire alarm system. Fire protection is provided only by smoke detectors. Some smoke detectors are not properly installed for correct operation. The current system does not provide adequate fire protection. It is recommended that a building fire alarm system be installed.
- **Data/Telecommunications**
 - A fiber optic service was recently brought to the building. Building staff is in the process of transitioning data and telecommunications systems to this service. The fiber optic service is adequate.
 - Building data infrastructure has been pieced together over many years and needs reorganization utilizing a Main Distribution Frame (MDF) and intermediate distribution frames (IDF). It is unclear if there is any network redundancy to ensure continuity of communications. System should be provided with an uninterruptible power supply to improve reliability for emergency services occupancy.
- **Intercom, Access & Security Systems**
 - Building staff noted that there is no centralized building intercom, access or security monitoring systems. These functions are addressed with standalone devices in varying conditions. Intercom devices are near end of life. Security cameras, located in key locations, are in good condition, but do not provide comprehensive coverage of the interior and site.
- **Lightning Protection**
 - The building does not appear to have a lightning protection system. A risk assessment should be completed to determine required protection level.

Plumbing Summary:

- **Existing Conditions**
 - The Plumbing systems are old and repairs and replacement have taken place as needed over the years, resulting in a system of mixed of pipes, materials and devices of various age and condition throughout the building.
- **Sanitary Sewer**
 - The building's main sanitary sewer has not had any issues and is not known to be deficient. Plumbing is old and repairs and replacement have taken place as needed so the system is a large mix of various pipe materials and vintage. Sanitary piping throughout the building is a mix of cast iron and PVC piping. The main building sanitary sewer must be camera'ed and cleaned from within the building to its connection in the street to ensure proper flow and operation of the existing sewer lateral before any new connections are made.
- **Roof Drainage**
 - Roof areas are pitched and is drained by gutters and downspouts. Gutters and downspouts are in working order. There are no known deficiencies in the underground storm piping or connections.
- **Water Supply System**
 - The existing building domestic water system consist of a 1" water service with the appropriate metering and backflow prevention. A 2" water line continues to serve the building. Hot and cold-water piping within the building is copper. All visible water pipe is not insulated to which helps mitigate condensation on cold water pipes and is required per modern energy code for hot water piping. The existing water heater is in fair shape and should be replaced in a renovation.
- **Natural Gas System**
 - The existing building Gas meter is located outside the building wall.
 - The gas serves the furnace, boilers, unit heaters and the emergency generator.
 - Existing gas piping is Schedule 40 black steel throughout the building, with some corrugated lines at and around equipment.
- **Fire Protection**
 - The existing building is not currently sprinkled. Under a renovation a new 4" fire line will need to be extended from the water main in the street into the building following the municipal water authorities' standards.

Issues of Immediate Concern at the Swissvale Municipal Building:

High Priority

Issue No.1:

- The building does not meet emergency service(s) code and/or provide the robust construction and/or redundancies required for a public safety/ emergency service building.

Consequence:

- The building occupants and/or the Swissvale community could be at a disadvantage during and after an emergency and/or extreme weather event.

Recommended Next Step:

- The building needs to be substantially deconstructed and then re-constructed to meet the robust construction and/or redundancies required for an emergency service(s) building.

Issue No.2:

- The building does not meet current Code and/or Life Safety standards that are required for a municipal/ public safety/ emergency service building.

Consequence:

- The building occupants could be at a disadvantage during an emergency event.

Recommended Next Step:

- The building needs substantial alterations and possibly additions to rectify all of the life safety issues.

Issue No.3:

- The building envelope is showing signs of deterioration and is contributing to the collection of water in the exterior envelope system and/or the building interior due to moisture infiltration.

Consequence:

- Moisture collection and infiltration of the building envelope and interior accelerates the deterioration of the building structure and can contribute to poor indoor air quality.

Recommended Next Step:

- Investigate the causes of the building envelope failures and make the necessary corrections. This would minimally include: replacing the roofing system(s), copings, gutters, and downspouts; masonry repair and restoration; mechanically securing the brick veneer to the structural back-up; lintel repair and restoration; full window/ doors/ frames replacements; and potentially basement waterproofing. Note: Any renovation of the building will need to involve inspection and evaluation of the existing wood framing for structural deficiencies due to moisture deterioration and/or rot.

Issue No.4:

- One of the primary steel columns in the basement has excessive deterioration of the web and flanges.

Consequence:

- Continued deterioration will lead to structural failure of the primary structural support for the building; potentially causing catastrophic collapse.

Recommended Next Step:

- The existing structure needs to be temporarily braced and supported; the base of the column needs to be uncovered; the existing steel needs to be prepared; and new structural material needs to be added to permanently repair and stabilize the column.

Issue No.5:

- The Steam boiler is new. However, the remaining heating plant system(s) has greatly exceeded its service life.

Consequence:

- The heating plant could fail causing damage to the building and/or a complete shutdown of the building heating system. Shut down during a severe weather event would cause the closure of the municipal building and possible further damage due to freezing.

Recommended Next Step:

- Replace the heating plant equipment and/or distribution system as required.

Issue No.6:

- The air side equipment is non-existent and/or beyond their expected service life.

Consequence:

- Lack of ventilation and/or air conditioning leads to poor indoor air and environmental quality which can adversely affect the building occupants.

Recommended Next Step:

- Provisions should be made to mechanically ventilate and/or air condition all of the necessary interior spaces.

Issue No.7:

- There are no central HVAC controls for the building. The limited heating controls are well beyond their serviceable life and/or inoperable.

Consequence:

- Lack of HVAC controls leads to energy waste; and poor indoor air and environmental quality which can adversely affect the building occupants.

Recommended Next Step:

- When new HVAC equipment is installed building wide Direct Digital Controls (DDC) should be installed.

Issue No.8:

- The electrical distribution system does not meet current codes, is undersized, and beyond its serviceable/ useful life.

Consequence:

- Low efficiency and increased level of electrical service interruptions; potential short circuiting, property damage and/or fire.

Recommended Next Step:

- Replace the Electrical Distribution system.

Issue No.9:

- The building does not have a fire alarm system and does not meet current Life Safety Code(s).

Consequence:

- In an emergency the building occupants could be at a disadvantage.

Recommended Next Step:

- Replace the fire alarm system to meet current Life Safety Code(s).

Issue No.10:

- The Emergency Signage, Lighting and Generator does not meet current Life Safety Code(s).

Consequence:

- In an emergency the building occupants could be at a disadvantage.

Recommended Next Step:

- Replace the Emergency Signage, Lighting, and Generator to meet the current Life Safety Code(s).

Issue No.11:

- The building data and telecommunication infrastructure does not meet current standards and/or code(s) for municipal/ public safety/ emergency service(s).

Consequence:

- The building occupants and/or the Swissvale community could be at a disadvantage if the data and telecommunication infrastructure fail.

Recommended Next Step:

- Install new data and telecommunication infrastructure including a Main Distribution Frame (MDF) and corresponding Intermediate Distribution Frames (IDF) to ensure network continuity and redundancy with uninterrupted power supply required for municipal/ public safety/ emergency services.

Issue No.12:

- The building intercom, access, and security infrastructure does not meet current standards and/or code(s) for municipal/ public safety/ emergency service(s).

Consequence:

- On a day to day basis and/or in an emergency the building occupants could be at a disadvantage.

Recommended Next Step:

- Install new building intercom, access, and security infrastructure required for municipal/ public safety/ emergency services.

Medium Priority**Issue No.1:**

- The roof access platform and ladder does not meet OSHA standards and presents a safety hazard.

Consequence:

- Accessing the roof for required maintenance could put maintenance personnel in harm's way.

Recommended Next Step:

- The roof access platform and ladder should be replaced with OSHA compliant equipment and structure.

Issue No.2:

- There is not adequate handicap parking, building access, accessible paths of travel throughout the building, or toilet facilities for persons with disabilities.

Consequence:

- Physically challenged persons have difficulty attending meetings and/or events at the District Administration Offices.

Recommended Next Step:

- Create additional barrier free access and add additional accessible toilet facilities.

Issue No.3:

- The building lighting consist of a mixture of incandescent, florescent and some retrofit LED fixtures. Automated lighting control is not present.

Consequence:

- The building operates inefficiently and does not meet the current energy code.

Recommended Next Step:

- Replacement/ upgrade of the entire building lighting and control system(s).

Issue No.4:

- Plumbing distribution and sanitary piping is a mismatch of sizes and materials throughout. The portions of original plumbing have far exceeded their useful, serviceable life.

Consequence:

- The plumbing distribution and sanitary piping will continue to deteriorate causing intermittent stoppages of use of facilities.

Recommended Next Step:

- Replace the distribution and sanitary piping in its entirety.

Low Priority

- All remaining issues in this evaluation can be considered to be low priority.

1- MAIN ENTRANCE



2 – ACCESSIBLE ENTRANCE



3 – OLD PUBLIC WORKS ENTRANCE



4 – POLICE SIDE DOOR



5 – POLICE SALLY-PORT



6 – MAINTENANCE GARAGE



7 – SALT STORAGE SHED



8 – TYPICAL EXTERIOR



9 – COLLAPSED THIRD FLOOR LOCATION



10 – COLLAPSED THIRD FLOOR LOCATION



11 – TYPICAL HIGH ROOF (EPDM)



4 – TYPICAL HIGH ROOF (EPDM)



13 – ROOF VENT CUPOLA



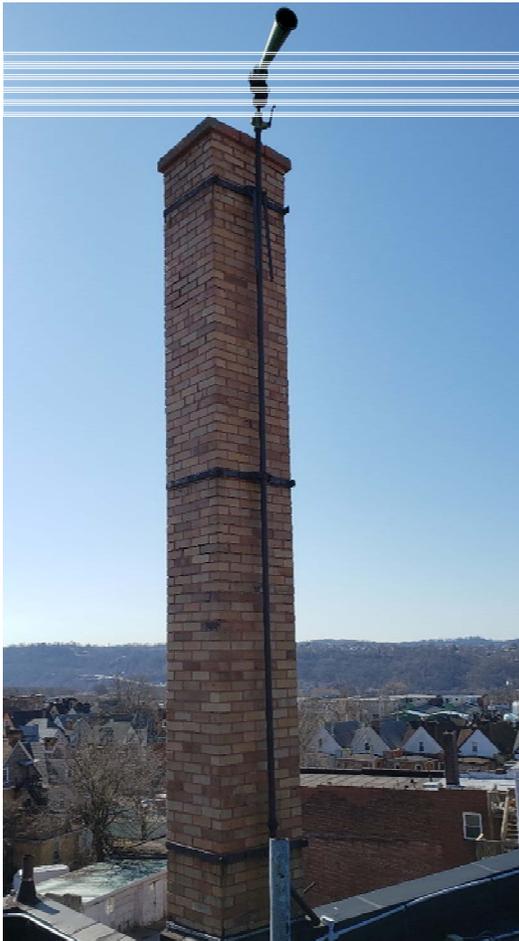
14 – DETERIORATED HEAT TRACE WIRES



15 – HOSE/ BELL TOWER CAP



16 – MASONRY CHIMNEY



17 – METAL ROOF AT THIRD FLOOR COLLAPSE



18 – METAL ROOF AT THIRD FLOOR COLLAPSE



19 – ASPHALT ROLL AND SHINGLE ROOF (MAINTENANCE GARAGE)



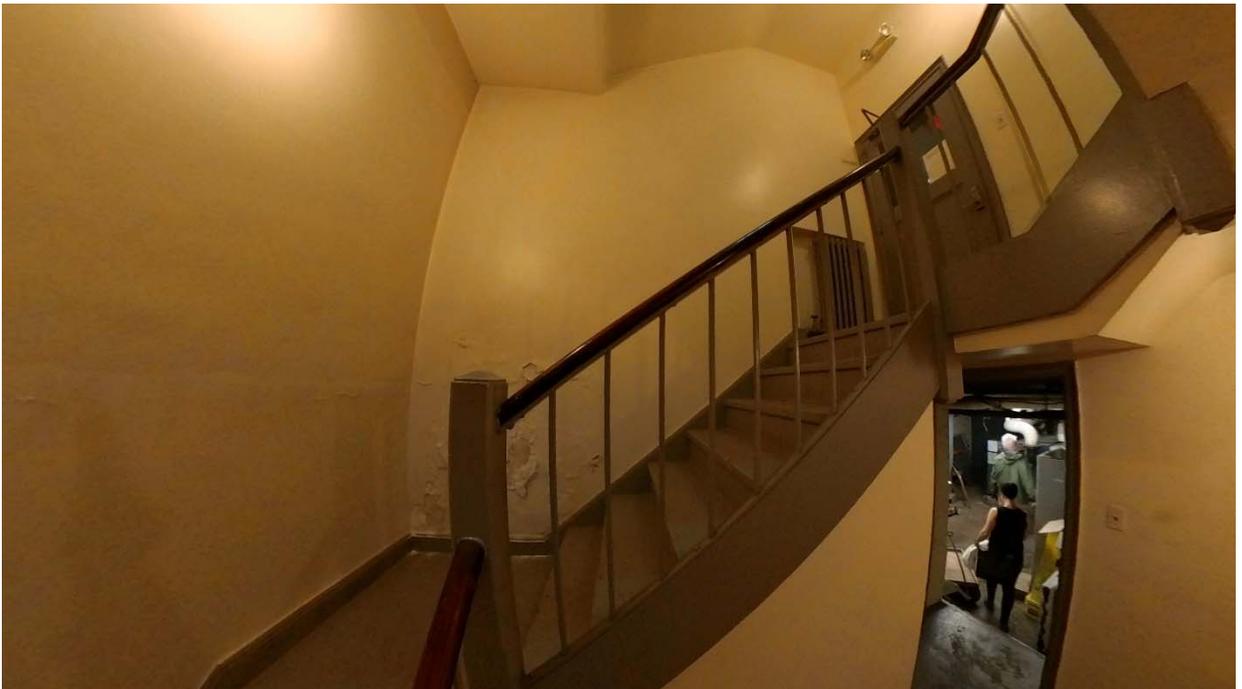
20 -ROOF ACCESS PLATFORM AND LADDER



21 – MAIN STAIR



22 – EMERGENCY STAIR



23 – COUNCIL CHAMBER (AFTER COLLAPSE)



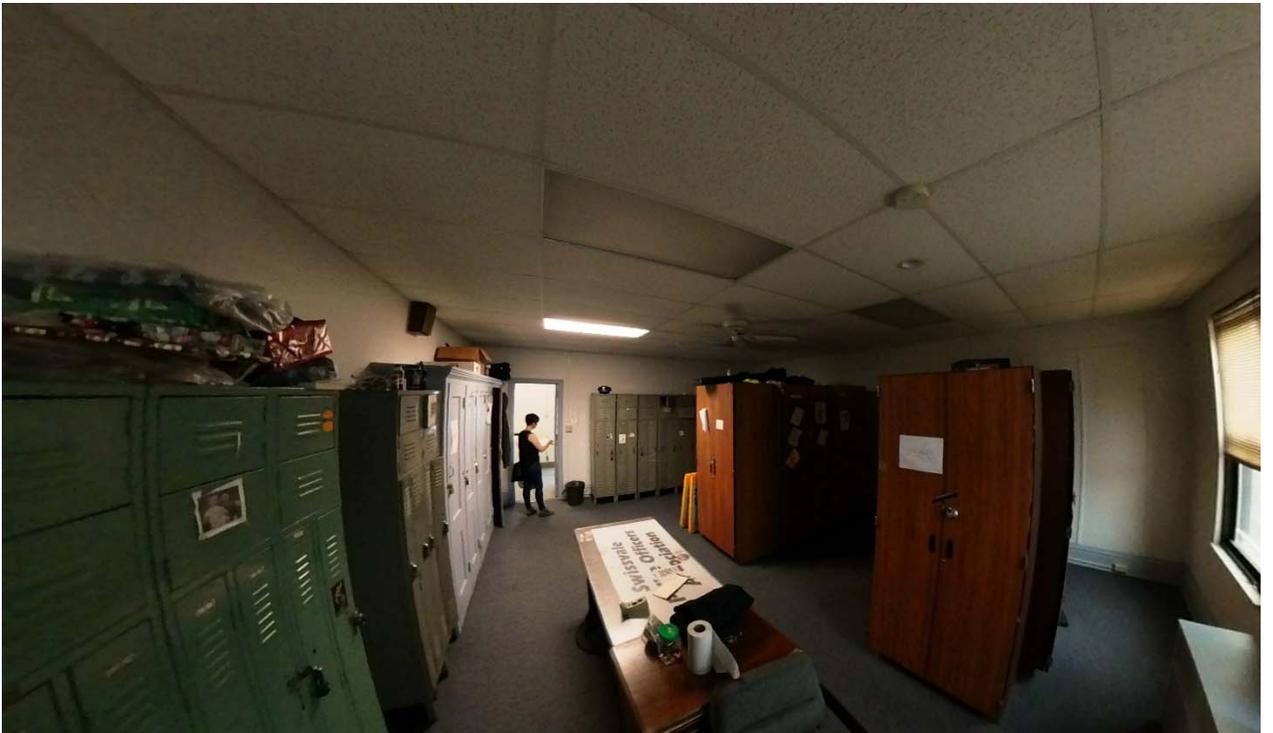
24 – MAIN OFFICE



25 – CONFERENCE ROOM



26 – LOCKER ROOM



27 – EXPOSED STRUCTURE WITH WATER DAMAGE (TYPICAL)



28 - EXPOSED STRUCTURE WITH WATER DAMAGE (TYPICAL)



APPENDIX 1

BUILDING MATERIALS GLOSSARY

A/C	Air Conditioner or Air Conditioning
A/C Condenser	The outside fan unit of the Air Conditioning System.
A/C Disconnect	The main electrical ON-OFF switch near the A/C Condenser.
ACT	Acoustical Ceiling Tile – The key component in an acoustical suspended ceiling system. Typically ACT is available in 24”x 24” or 24”x 48” sizes.
ADA	Americans with Disability Act
ADAAG	ADA Accessibility Guidelines
ANSI	American National Standards Institute
ASTM	American Society for Testing & Materials
Backfill	The replacement of excavated earth into a trench around or against a basement /crawl space foundation wall.
Ballast	A transformer that steps up the voltage in a florescent lamp.
Base	A finished trim material placed against the wall around the room next to the floor.
Batt	A section of fiber-glass or rock-wool insulation.
Brick Lintel	The metal angle iron that brick rests on, especially above a window, door, or other opening
Brick Mold	Trim used around an exterior door jamb that siding butts to
Brick Tie	Corrugated metal or wire inserted into the grout mortar joint of the veneer brick, and holds the veneer wall to the sheeted wall behind it.
Brick Veneer	A vertical facing of brick laid against and fastened to sheathing of a framed wall or tile wall construction.
Bridging	Small wood or metal members that are inserted in a diagonal position between the floor joists or rafters at mid-span for the purpose of bracing the joists/rafters & spreading the load
Built-Up Roof	A roofing system composed of three to five layers of asphalt felt laminated with coal tar, pitch, or asphalt. The top is finished with crushed slag or gravel. Generally used on flat or low-pitched roofs
Caisson	A cast-in-place concrete and re-bar foundation/ pier; drilled into earth and embedded into bedrock.

Caulking	A flexible material used to seal a gap between two surfaces
CCA	Chromated Copper Arsenate: A pesticide that is forced into wood under high pressure to protect it from termites, other wood boring insects, and decay caused by fungus
Ceiling Joist	One of a series of parallel framing members used to support ceiling loads and supported in turn by larger beams, girders or bearing walls
Cement	The gray powder that is the "glue" in concrete. Portland cement
Ceramic Tile	A man-made or machine-made glazed and/or fired clay tile used to finish a floor or wall
CFM	Cubic Feet per Minute: The volume of air (measured in cubic feet) that can pass through an opening/ fan in one minute
Control Joint	An expansion joint in masonry, concrete, drywall, or other material(s) which allows movement due to expansion and contraction.
Chase	A framed enclosed space in a wall or through a ceiling; for something (I.E. Piping, wiring, and/or metal ducts) to lie in or pass through adjacent construction.
Circuit	The path of electrical flow from a power source through an outlet and back to ground; an individual power loop which extends from a panel board originating from its respective Circuit breaker.
Circuit Breaker	A device which looks like a switch and is usually located inside the electrical breaker panel or circuit breaker box is designed to (1) shut off the power to portions or all of the house and (2) to limit the amount of power flowing through a circuit (measured in amperes).
Class "A"	Optimum fire rating issued by Underwriter's Laboratories
Class "C"	Minimum fire rating issued by the Underwriters' Laboratories
Clean out	An opening providing access to a drain line. Closed with a threaded plug.
CMU	Concrete Masonry Unit. (See Concrete Block).
Cold Air Return	The ductwork (and related grills) that carries room air back to the furnace for re-heating
Combustion Air	The duct work installed to bring fresh, outside air to the furnace and/or hot water heater.
Compressor	A mechanical device that pressurizes a gas in order to turn it into a liquid, thereby allowing heat to be removed or added. A compressor is the main component of conventional heat pumps and air conditioners. In an air conditioning system, the compressor normally sits outside and has a large fan (to remove heat).
Concrete	The mixture of Portland cement, sand, gravel, and water.

Concrete Block	A solid or hollow concrete 'brick' often 8" x 16" in size and in widths of 4", 6", 8", 10", and 12".
Concrete Board	A panel made out of concrete and fiberglass usually used as a tile backing material.
Condensation	Beads or drops of water (and frequently frost in extremely cold weather) that accumulate on the inside of the exterior covering of a building.
Condensing Unit	The outdoor component of a cooling system. It includes a compressor and condensing coil designed to give off heat.
Conduction	The direct transfer of heat energy through a material.
Conduit	A pipe, usually metal, in which wire is installed
Control Joint	Intentional horizontal or vertical breaks in material usual finished with sealant; designed to "control" the effects of minor expansion and contraction of materials.
Convection	Currents created by heating air, which then rises and pulls cooler air behind it. Also see radiation
Cooling Load	The amount of cooling required to keep a building at a specified temperature during the summer, usually 78° F, regardless of outside temperature.
Counter Flashing	A metal flashing usually used on transitions/ openings of the exterior envelope to cover flashing and used to prevent moisture entry into the building
Course	Parallel layers of building materials such as bricks, or siding laid up horizontally
Cricket	A second roof built on top of the primary roof to increase the slope of the roof or valley
Cross Bridging	Diagonal bracing between adjacent floor joists, placed near the center of the joist span to prevent joists from twisting
Dampproofing	The black, tar like waterproofing material applied to the exterior of a foundation wall.
Dead bolt	An exterior security lock installed on exterior entry doors that can be activated only with a key or thumb-turn.
Dedicated Circuit	An electrical circuit that serves only one appliance (ie, dishwasher) or a series of electric heaters or smoke detectors
De-humidistat	A control mechanism used to operate a mechanical ventilation system based upon the relative humidity in the home.
Disconnect	A large (generally 20 Amp) electrical ON-OFF switch
Double Hung Window	A window with two vertically sliding sashes, both of which can move up and down.

Downspout	A pipe, usually of metal, for carrying rainwater down from the roof's horizontal gutters
Drywall	or Gypsum Wallboard (GWB), Sheet rock or Plasterboard)- Wall board or gypsum- A manufactured panel made out of gypsum plaster and encased in a thin cardboard. Used for covering metal framing to create wall and/or ceiling surfaces.
Ducts	Usually round or rectangular metal pipes installed for distributing warm (or cold) air from the mechanical units to the respective rooms.
Easement	A formal contract which allows a party to use another party's property for a specific purpose
Eaves	The horizontal exterior roof overhang.
EFIS	Exterior Finish Insulation System: Mechanically fastened or adhered rigid insulation on the exterior of a building with a synthetic polymer stucco coating.
Egress	A means of exiting a building; particularly during an emergency.
Expansion Joint	A joint or gap between adjacent parts of a building, structure, or concrete work which permits their relative movement due to temperature changes (or other conditions) without rupture or damage.
EPDM	Ethylene Propylene Diene Monomer single-ply rubber membrane roofing system. Used primarily on flat roofs .
Evaporator Coil	The part of a cooling system that absorbs heat from air the system. Also see condensing unit.
EWC	Electrical Water Cooler
Expansion Joint	Intentional horizontal or vertical breaks in material usual filled with compressible material and finished with an expansion cover; designed to "control" the effects of major expansion and contraction of materials/ structures.
Expansive Soils	Earth that swells and contracts depending on the amount of water that is present. ("Betonite" is an expansive soil).
Facing brick	The brick used and exposed on the outside of a wall.
Fascia	Horizontal boards attached to rafter/truss ends at the eaves and along gables.
Floor Drain	A fixture providing an opening in a floor to drain water into a plumbing system
Fire block	Short horizontal members sometimes nailed between studs, usually about halfway up a wall. See also 'Fire stop'
Fire-resistive Fire rated	Applies to materials that are not combustible in the temperatures of ordinary fires and will withstand such fires for at least 1 hour.

Fire stop	A solid, tight closure of a concealed space, placed to prevent the spread of fire and smoke through such a space.
Flashing	Sheet metal or other material used in roof and wall construction to protect a building from water seepage.
Flatwork	Common word for concrete floors, driveways, basements, and sidewalks.
Flue	Large pipe through which fumes escape from a gas water heater, furnace, or fireplace
Flue damper	An automatic door located in the flue that closes it off when the burner turns off; purpose is to reduce heat loss up the flue from the still-warm furnace or boiler
Fluorescent Lighting	A fluorescent lamp is a gas-filled glass tube with a phosphur coating on the inside. Gas inside the tube is ionized by electricity which causes the phosphur coating to glow. Normally with two pins that extend from each end.
Footer, Footing	Continuous concrete pad installed before and supports the foundation wall or monopost
Foundation Ties	Metal wires that hold the foundation wall panels and rebar in place during the concrete pour.
Foundation Waterproofing	High-quality below-grade moisture protection. Used for below-grade exterior concrete and masonry wall damp-proofing to seal out moisture and prevent corrosion. Normally looks like black tar.
Frost line	The depth of frost penetration in soil and/or the depth at which the earth will freeze and swell. This depth varies in different parts of the country.
Fuse	A device often found in older installations designed to prevent overloads in electrical lines. This protects against fire. See also 'circuit breakers'.
Gable	The end, upper, triangular area of a building, beneath the roof
Galvanized	Zinc based coating for iron or steel which inhibits oxidation (rust).
Gate valve	A valve that lets you completely stop—but not modulate—the flow within a pipe.
GFCI or GFI	Ground Fault Circuit Interrupter- an ultra sensitive plug designed to shut off all electric current. Used in bathrooms, kitchens, exterior waterproof outlets, garage outlets, and "wet areas".
Girder	A large or principal beam of wood or steel used to support concentrated loads at isolated points along its length.
Glazing	The process of installing glass, which commonly is secured with glazier's points and glazing compound.
Grade	Ground level, or the elevation at any given point. Also the work of leveling dirt. Also the designated quality of a manufactured piece of wood.

Grade beam	A foundation wall that is poured @ level with or just below the grade of the earth.
Groundwater	Water from an aquifer or subsurface water source.
Grout	A wet mixture of cement, sand and water that flows into masonry or ceramic crevices to seal the cracks between the different pieces. Mortar made of such consistency (by adding water) that it will flow into the joints and cavities of the masonry work and fill them solid.
Gutter	A shallow channel or conduit of metal or wood set below and along the (fascia) eaves of a building to catch and carry off rainwater from the roof.
GWB	Gypsum Wallboard.
Gypsum Wallboard	Drywall. Wall board or gypsum- A panel (normally 4' X 8', 10', 12', or 16')made with a core of Gypsum (chalk-like) rock, which covers interior walls and ceilings.
Insulation	Material such as fiberglass, mineral wool, cellulose, foam, or urethane; used to slow the transfer of heat or sound through walls and/or a roof structure.
NFPA	National Fire Protection Association
Plastic Laminate	Resin-impregnated layers, fused together under heat and pressure to form a hard, durable, decorative finished surface material; which is often used as a veneer for cabinetry and/or countertops.
Plywood	A structural material made of layers of wood glued together, usually with the grains of adjoining layers at right angles to each other. A flat sheet-good in various thicknesses; typically fabricated and sold in 4'x8' sheets.
PSF	Pounds Per Square Foot
PSI	Pounds Per Square Inch
PVC	Polymer of Vinyl Chloride is tasteless, odorless; insoluble in most organic solvents; a member of the family of vinyl resins; used in soft flexible films for food packaging and in molded rigid products such as pipes, fibers, upholstery, and bristles.
Quarry Tile	Unglazed ceramic tile, machine-made by the extrusion process from natural clay or shales; often used in kitchen and/or service areas.
R Value	A measure of a materials resistance to the passage of heat. The higher the R value, the more insulating "power" it has.
Sanitary Sewer	A sewer system designed for the collection of waste water from the bathrooms, kitchens and laundry drains, etc.; sanitary sewers are to be independent of the storm sewers.

SBS 2-Ply Modified

Roofing System Styrene Butadiene Styrene polymer-modified bitumen membrane roofing system is a two layer system consisting of reinforced asphalt sheets that are either hot mopped, torched, or installed with cold adhesive(s). The cap (top) sheet is often coated with mineral surfacing (similar to asphalt shingles) to protect the cap sheet from Ultraviolet (UV) exposure/ degradation.

Sheathing The structural wood sheeting/ paneling and/or covering; I.E. plywood or oriented strand board (OSB); which is installed on wall studs, on top of floor joists or roof joist and/or trusses of a structure.

STC Sound Transmission Class, The measure of sound stopping of ordinary noise through a specific material and/or assembly.

Storm Sewer A sewer system designed to collect and convey storm water from a structure and/or site. The storm sewer is to be independent/ separated from the waste water system.

Suspended Acoustical

Ceiling A ceiling system typically consists of a suspended metal grid which is in-filled with a finished, pressed mineral fiber panel. Suspended systems are typically based on a 24" x 24" or 24" x 48" module.

Vapor barrier A building product installed on exterior walls and roof systems on the warm side of the thermal insulation; A vapor barrier is used to help prevent the free movement of water vapor through the building envelope. Proper placement of a vapor barrier will retard the movement of water vapor into walls/ roof and prevent condensation within the building structure.

Vent A pipe or duct which allows the flow of air and gasses from the interior to the outside of a structure.

Vermiculite A mineral fiber used as bulk insulation and also as aggregate in insulating and acoustical plaster and in insulating concrete floors.

Water closet (WC) Another name for toilet.

Water meter pit (or vault) The box /cast iron bonnet and concrete rings that contains the water meter.

Weep holes Small holes in masonry and/or window frames/ systems which allow moisture trapped in a wall to escape.

UL Underwriters Laboratory

VCT Vinyl Composition Tile is a material which is PVC based and blended with limestone dust and pigments to create a decorative, durable flooring material.

VAT Vinyl Asbestos Tile is a material which is PVC based and blended with asbestos, limestone dust and pigments to create a decorative, durable flooring material.

APPENDIX 2

System Components Data

- An on-site visit was conducted at each the mentioned buildings and an assessment to their condition and operational functions were reviewed and analysis for this report along with the follow table from ASHRAE for the estimates of service life of various system components.

Table 3 Estimates of Service Lives of Various System Components^a

Equipment Item	Median Years	Equipment Item	Median Years	Equipment Item	Median Years
Air conditioners		Air terminals		Air-cooled condensers	20
Window unit	10	Diffusers, grilles, and registers	27	Evaporative condensers	20
Residential single or split package	15	Induction and fan-coil units	20	Insulation	
Commercial through-the-wall	15	VAV and double-duct boxes	20	Molded	20
Water-cooled package	15	Air washers	17	Blanket	24
Heat pumps		Ductwork	30	Pumps	
Residential air-to-air	15 ^b	Dampers	20	Base-mounted	20
Commercial air-to-air	15	Fans		Pipe-mounted	10
Commercial water-to-air	19	Centrifugal	25	Sump and well	10
Roof-top air conditioners		Axial	20	Condensate	15
Single-zone	15	Propeller	15	Reciprocating engines	20
Multizone	15	Ventilating roof-mounted	20	Steam turbines	30
Boilers, hot water (steam)		Coils		Electric motors	18
Steel water-tube	24 (30)	DX, water, or steam	20	Motor starters	17
Steel fire-tube	25 (25)	Electric	15	Electric transformers	30
Cast iron	35 (30)	Heat exchangers		Controls	
Electric	15	Shell-and-tube	24	Pneumatic	20
Burners	21	Reciprocating compressors	20	Electric	16
Furnaces		Package chillers		Electronic	15
Gas- or oil-fired	18	Reciprocating	20	Valve actuators	
Unit heaters		Centrifugal	23	Hydraulic	15
Gas or electric	13	Absorption	23	Pneumatic	20
Hot water or steam	20	Cooling towers		Self-contained	10
Radiant heaters		Galvanized metal	20		
Electric	10	Wood	20		
Hot water or steam	25	Ceramic	34		

Notes: 1. ASHRAE makes no claims as to the statistical validity of any of the data presented in this table.

2. Table lists base values that should be adjusted for local conditions (see the section on Service Life).

Source: Data obtained from a survey of the United States by ASHRAE Technical Committee TC 1.8 (Akalin 1978).

^a See Lovvorn and Hiller (1985) and Easton Consultants (1986) for further information.

^b Data updated by TC 1.8 in 1986.