

## EXISTING CONDITIONS

### GENERAL

This report is based on a December 19, 2017 site visit with Ivan G. Smith school facilities personnel, taking into consideration the various systems viewed and current system conditions described by them.

### FIRE PROTECTION

A. The existing building is not protected by a fire protection system at this time.

### PLUMBING

#### A. Plumbing Fixtures

- 1) Existing water closets throughout the building are predominantly wall mounted, flush valve type fixtures. The water closets viewed during this site inspection do not appear to be low flow type fixtures which are currently required per the state plumbing code.
- 2) Existing urinals throughout the building are predominantly wall mounted, flush valve type fixtures. The urinals viewed during this site inspection do not appear to be low flow type fixtures. Urinals in Boy's and Girl's bathrooms appeared to be installed at accessible heights, but this condition should be verified and rectified if needed.
- 3) Existing lavatories throughout the building are predominantly wall hung type fixtures with handle faucets for separate hot and cold-water control. The lavatories viewed during this site visit do not appear to be provided with individual mixing valves to limit the temperature of water provided at the fixture. Current plumbing code requirements limit the temperature of hot water at public lavatories to 110°F. Based on the temperature of hot water being stored and delivered (approximately 140°F) throughout the building, this requirement doesn't appear to be able to be met currently.
- 4) Janitor's service sinks throughout the building are predominantly pedestal type fixtures with wall mounted faucets. These fixtures appear to be in fair working order although all of these fixtures are older models and showing signs of age.
- 5) Toilet rooms are located on both levels of the school. The current plumbing fixture configurations of most of these toilet rooms appear to meet current ADA requirement for fixture types.

#### B. Domestic Cold Water System

- 1) The building is currently provided with a 2" domestic water service that resides in Custodian room #225 on the upper floor. This 2" service is not equipped with any backflow prevention device although it is equipped with a strainer valve to help stop the flow of large particles that could harm the cold-water service as it feeds fixtures throughout the building. No problems or issues have been reported with this size of service or the current water pressure in the building.

C. Domestic Hot Water System

- 1) Custodian room #225 also houses an existing electric water heater that provides domestic hot water to all fixtures in the school, except for the three-pot sink in the kitchen. This heater has 80-gallons of storage and is in good condition. The heater has been replaced recently and the hot and cold-water piping connected to it appear to be relatively new. The heater drains directly onto the floor. This room is not equipped with a floor drain and this could present a problem if the water heater or the cold-water service ever had any type of failure or leak.
- 2) This domestic hot-water piping system is not provided with a separate hot-water recirculation system. Thus, the delivery of hot water to the fixtures on this system is not immediate, as it should be.
- 3) There is an existing electric water heater located within the kitchen in a storage room that feeds the kitchen's three-pot sink only. This heater is a 50-gallon storage unit and sit on a concrete housekeeping pad. The unit also drains directly to the floor only. A floor drain is not present in this room as well.

D. Sanitary and Vent System

- 1) The original plans indicate the sanitary system is a gravity system. The system appears to exit the building below the slab of the lowest level but was not visible.
- 2) The sanitary and vent piping that could be viewed was cast iron. The existing piping appears to be older and in poor condition.

E. Storm Drainage

- 1) The building storm drainage system consists of roof drains located throughout the various building roof heights. All roof drains observed appeared to be in fair condition. All roof drains observed were clear of debris, however ponding on the roof was clearly visibly in many places. Internal storm system piping was not visible. The storm system appears to be adequate for the facility at present.

F. Natural Gas System

- 1) A fairly new high-pressure gas service is located just outside of the lower level storage room that houses the existing heating boilers. The gas service is equipped with in-line regulators that reduce the gas pressure before entering the building.
- 2) This gas service currently feeds the existing heating boilers only. No other equipment within the building is supplied by this gas service.
- 3) Any gas piping observed appeared to be in good condition.

G. Piping Insulation

- 1) Hot and cold water piping that was in view is in fair condition. The pipe insulation appears to be fiberglass. Overall, where insulation exists, it is in fair condition. Due to the age of the building, it can reasonably be assumed that the insulation may contain asbestos. Further testing would be needed.

H. Hose Bibbs and Wall Hydrants

- 1) Hose bibbs are required in toilet rooms with two or more water closets or urinals. The toilet rooms that were observed have hose bibbs installed, however these units appear to be older and should be replaced.
- 2) Exterior wall hydrants were not observed on the outside of the building. It does not appear that the building has access to water for cleaning purposes etc. on the exterior.

I. Cross Connection Control

- 1) Currently cross connection control in the form of vacuum breakers for the protection of the domestic water system is not in place. This should be corrected.

J. Kitchen

- 1) All equipment in the kitchen is electric only. No equipment is fed from the existing gas service.



Kitchen

- 2) The three-compartment sink is not connected to a code required grease interceptor. Thus, any grease being drained from this unit discharges directly into the town's waste water system. This is a state plumbing code violation.
- 3) A dishwasher was not observed during this visit.
- 4) The kitchen does have two (2) floor drains within the center of the room. These drains are subject to grease as well but drain directly to the town's waste water system. This is also

state plumbing code violation.

- 5) Visual inspection outside of the building did not reveal the existence of an exterior grease trap. Existing conditions drawings do not indicate one either. It is fair to assume that the kitchen waste piping discharges directly to the town's waste water system without being treated.

## ELECTRICAL

### A. Power Distribution

- 1) Utility primary feeders are extended overhead to a pole on Orrantia Circle where it drops and extends underground approximately 300' to a utility owned pad mounted transformer located behind the building. Secondary service conductors are extended underground from the transformer to a 2000A, 277/480V, 3 $\phi$ , 4w switchboard. Branch distribution panelboards are located throughout the building in electrical rooms and other storage closets. With the exception of a few panelboards, all equipment is original to the building and over 45 years old. The distribution equipment is manufactured by Federal Pacific, which is no longer in existence and so reconditioned or custom parts are required for repairs.



Federal Pacific switchboard



Typical Federal Pacific panelboard

- 2) The building has a 50kW/62.5kVA, 277/480V, 3 $\phi$ , natural gas generator system and the generator and automatic transfer switch (ATS) are located in the main electric room. The generator has a single distribution panel and so life safety, such as emergency lighting, and optional standby loads are mixed on the same panel. The generator is reported to be operational but is original to the building and over 45 years old.



Generator in shared electrical room

**B. LIGHTING**

- 1) Lighting consists primarily of fluorescent surface wraparounds or recessed troffers. Recently fixtures have been retrofitted with LED lamps, but existing housings and lenses are original to the installation of the fixtures. Lighting controls are primarily but some areas have occupancy sensor controls. Selected fixtures are connected to the generator for emergency egress lighting and illuminated exit signs are also connected to the generator panels.



Retrofitted wraparound



LED retrofit lamp

**C. FIRE ALARM**

- 1) The building is protected by an addressable fire alarm system that has been installed within the last 10 years. The system consists of a Firelite MS9200 fire alarm control panel located in the main office with manual pull stations and horn/strobe units throughout the building. An older set of heat detectors are also present in the building and it is unclear if these are tied into the new system. A master box is located at the exterior of the main entrance and municipal loop cabling is extended underground to the utility pole on Orrantia Circle.



New addressable FACP



Old style heat detector

D. Telephone/Data

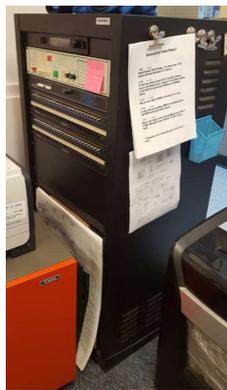
- 1) There are two main distribution racks for telephone and data cabling located in shared rooms with the electrical rooms. Category 5 cabling is utilized for both telephone and data cabling and cabling is run exposed above ceilings. Wireless access points are distributed throughout the building and classrooms in general have a single tel/data outlet at the teachers stations in the front of the classroom.



Typical IDF rack adjacent to panelboard  
in shared electrical room

E. Public Address/Class Change

- 1) The building does not utilize a class change signal. A public address system is located in the main office and consist of an older Bogen rack relay based control switch. Ceiling speakers are located throughout the building for one way, all call voice announcements.



PA main controller



PA speakers

F. Classroom technology

- 1) Classrooms either have a ceiling mounted data projector with whiteboard or wall mounted short throw data projector with Smartboard. The equipment was installed within the last 10 years.



Ceiling mounted data projector with whiteboard



Short throw data projector with Smartboard

- 2) Classrooms communications consists of a ceiling mounted public address speaker and wall mounted administrative phone at the teachers desk. The public address speaker does not have talk-back capability and is utilized for all school announcements. Teachers are reached individually thru the wall mounted administrative phone, and if teachers need to access office staff they must use the wall mounted administrative phone.

G. CCTV/Intrusion Detection/Door Access

- 1) There are a small number (less than 6) of IP cameras in selected locations. Cameras are connected to the network and are displayed on a computer in the main office. It was not known if the system has video storage and if so system capacity. Furthermore, it was not known when the current system was installed, but it is assumed it was less than 10 years old.
- 2) There is not a door access or card reader system. Visitors arriving at the main entrance are required to announce their arrival through an intercom system connected to the main office and the main office remotely unlocks the main entrance door. A small intrusion detection system is present in the building. Magnetic door contacts were not observed in the exterior doors but motion detectors were found in the corridors and other locations. A keypad located in the facilities managers are enables and disables the system.



IP camera at entrance



Intrusion detection keypad and motion detector

## RECOMMENDATIONS AND CODE UPGRADES

### FIRE PROTECTION

- 1) To comply with current codes, this building will require a complete sprinkler system installation per the Massachusetts State Building Code, Chapter 34. The Fire Protection system would be designed to meet the requirements of NFPA 13 "Installation of Sprinkler Systems" and Chapter 9 of the Massachusetts State Building Code, 780 CMR, "Fire Protection Systems". The system would include the following.
  - 1) A new dedicated 8" sprinkler service, connected to the town water system in the street, should be brought into the building. The exact entrance location will need to be coordinated with the Architect. As the sprinkler service enters the building a Massachusetts approved double check valve backflow preventer assembly, complete with OS&Y valves on the inlet and outlet, will be required.
  - 2) The system alarm check valve for the sprinkler system will be installed on the riser after the double check valve assembly in the water service entrance room. The alarm check valve will be complete with a standard trim package including pressure gauges, retard chamber, 2" main drain, water flow indicator and supervisory switches.
  - 3) The main feeds out to the system from the alarm check valve will extend out to the building through the lower level ceiling space. The piping will then extend to all areas of the building to provide complete sprinkler coverage. Zoning of the sprinkler system, if needed, when be coordinated with any fire compartment design of the building.
  - 4) Due to the building being only two stories, the Massachusetts State Building Code does not require a standpipe system throughout the School.
  - 5) The sprinkler system risers will feed the sprinkler system at each floor level. Each floor will be a separate zone. The floor's control valve station will contain a flow switch and tamper switch. An inspector's test connection will be installed on the floor control valve station.
  - 6) Sprinkler heads throughout the building, where gypsum or suspended ceilings are installed, will be glass bulb, quick response, chrome plated semi-recessed type. In areas where no ceilings are installed brass upright sprinklers will be installed. Where upright sprinklers are subject to potential damage, such as in storage rooms, protective cages will be installed. In areas where it is not possible to run piping above the ceiling the use of sidewall sprinkler heads would be recommended.
  - 7) Sprinkler piping for the system will be as follows: Piping 2" and smaller shall be schedule 40 black steel with cast iron fittings with threaded joints. Piping 2 1/2" and larger shall be Schedule 10 black steel with malleable iron fittings with rolled grooved joints.
  - 8) All tamper and flow switches installed on the sprinkler system will be connected to the building's fire alarm system. Each tamper and flow switch will be a dedicated point on

the fire alarm system.

- 9) The exterior fire department connection for the sprinkler system will be a flush type mounted on the exterior of the building within 100' of a fire hydrant. Final location of the siamese connection would be coordinated with the Danvers Fire Department.
- 10) The hydraulic requirements for the building will be as follows:
  - a. All classrooms, offices, and corridors are considered Light Hazard and the sprinkler system will provide 0.1 gpm per square foot over the most remote 1,500 square feet.
  - b. All storage rooms and mechanical rooms are considered Ordinary Hazard Group I and the system will provide 0.15 gpm per square foot over the most remote 1,500 square feet.

## PLUMBING

### A. Plumbing Fixtures

- 1) The majority of water closets, urinals and lavatories in the building are old and not current water conserving type. Removal of all fixtures is recommended as the existing fixtures have reached the end of their serviceable life. Water closets should be replaced with new low-flow flush valve fixtures (1.6 gpf or less). Urinals should be replaced with 0.25 gpf fixtures. Lavatories should be replaced and new low-flow type faucets (0.5 gpm or less) added with temperature limit stops which will deliver water with a maximum temperature of 110°F. ADA requirements will also need to be met during a renovation to the toiletrooms.
- 2) The state plumbing code dictates the number of plumbing fixtures required in a building. Minimum plumbing fixture requirements will be determined once the total building occupancy numbers have been established.

### B. Domestic Cold Water System

- 1) The 2" domestic water service that enters the building in Custodian Room #225 is the original service to the building. Although this 2" service appears to be adequate to meet the current building water requirements, it is recommended that the sizing be re-evaluated based on any addition of plumbing fixtures. The installation of a water meter and backflow preventer on the service would also be recommended.

### C. Domestic Hot Water System

- 1) The existing electric water heaters in Custodian Room #225 and in the kitchen storage room are in good condition. However, if the building is renovated, it is strongly recommended to utilize the existing gas service and replace these units with a central water heating system consisting of gas-fired equipment. A new hot water system should be provided with a recirculation system to properly assist in delivering hot water to fixtures without delay.

D. Sanitary and Vent System

- 1) The sanitary system in the existing building appears to be in fair to poor condition. Replacement is recommended and may be required because of a possible fixture count change and probable relocation of fixtures in any renovation plan.

E. Storm Drainage

- 1) The existing building roof drainage appears to be in fair condition. However, if the building undergoes a major renovation, it is recommended that the roof drains and storm water piping system be replaced.
- 2) Backwater valves should be installed on all interior storm system piping originating from roof drains on lower roof sections as per the state plumbing code.
- 3) Opportunities for the management and /or re-use of the storm water drainage should be explored with the civil engineer to determine if there could be any benefit to the school.

F. Natural Gas System

- 1) Currently the existing gas service only serves the heating boilers. Consideration should be given to connecting any new mechanical equipment and kitchen cooking equipment to the existing gas service. Coordination with the local gas company will be required to ensure proper gas supply to the building.

G. Piping Insulation

- 1) The insulation that currently exists should be tested to determine the extent of any hazardous materials. The insulation should be removed and replaced with new fiberglass insulation with an all service jacket. Piping which is not currently insulated should have new insulation installed.
- 2) Insulation will also need to be provided on waste and water piping below handicapped lavatories and sinks.

H. Hose Bibbs and Wall Hydrants

- 1) During any renovation done to the building, the existing hose bibbs in the toilet rooms should be removed and new wall mounted hose bibbs with an integral vacuum breaker and removable tee handle installed.
- 2) Consideration should be given to adding exterior wall hydrants during a renovation. These will assist school maintenance personnel with any exterior water needs.

I. Cross Connection Control

- 1) As stated previously, the addition of a new backflow preventer assembly on the cold water

service would provide total building cross connection protection. Backflow devices should also be integral to all new hose bibbs and wall hydrants installed during the renovation.

- 2) All service sink faucets installed during a renovation will also have integral vacuum breakers.

J. Kitchen

- 1) If kitchen renovations include the addition of new or replaced gas-fired equipment, this equipment can be connected to the new gas service located outside the building as noted above.
- 2) Any new gas equipment would be fed by gas piping connecting to a master shut-off valve for the kitchen that would be interconnected with the kitchen hood and exhaust system. Gas would only operate as long as the kitchen hood exhaust system is operating.
- 3) Additional floor sinks and/or floor drains would be added to any new equipment design to ensure proper drainage throughout the kitchen.
- 4) A new three-compartment sink with new grease trap should be included per state code requirements.
- 5) A new dishwasher with accompanying grease trap should also be provided per state code requirements.
- 6) A new exterior grease trap, located underground, outside of the kitchen portion of the building will also need to be considered as part of any new design or renovation to the kitchen. Venting of this exterior grease trap should enter back into the school building and exit to the atmosphere above the roof.

**ELECTRICAL**

A. Power Distribution

- 1) The existing electrical distribution system is over 45 years old. The manufacturer of the existing equipment is no longer in existence and so repairs are problematic. The entire system should be removed and replaced. The new system consists of a new 2000A, 277/480V, 3 $\phi$ , 4w switchboard with new underground secondary service conductors extended to the existing utility transformer in the back of the building. New electrical branch circuit panelboards will be provided in dedicated electrical rooms. Lighting loads, the elevator, large mechanical equipment and large kitchen electrical loads will be connected to 277/480V panelboards and all other loads will be connected to 120/208V panelboards.
- 2) The generator is reported to be operational but is original to the building and has reached the end of its useful life. Furthermore, the generator system does not meet current code requirements since it is not located in a 2hr rated, dedicated emergency electrical room and emergency lighting and optional loads are mixed on the same

panelboards. The entire system should be removed and replaced with a new diesel generator system with separate optional standby and emergency distribution feeders from the system. The exact size of the generator will depend on additional discussions with the Town of Danvers regarding desired auxiliary power needs, but the generator size is expected to be approximately 100kW. The generator will be pad mounted on the exterior of the building. A dedicated 2hr emergency electrical room will be provided for the emergency lighting panelboards and automatic transfer switch. The optional standby panel and ATS can be located in the main electrical room. It is expected that optional standby loads will include kitchen freezers/cooler, the building heating system, Tel/Data and communications systems, and security systems.

**B. LIGHTING**

- 1) The lighting fixtures are operational and due to the lamp retrofits will continue to operate in the near future. However, the original fixture housings and lenses remain. Existing lenses are yellowed and some of the housings are blackened. To improve lighting quality, it is recommended to replace all existing lighting fixtures with new LED fixtures.
- 2) Below are suggested lighting approaches

Location	Illumination Level	Notes
Corridors	5-10 FC	1'x4' or 2'x 2' recessed "indirect" style LED fixtures.
Private offices, small conference rooms	35-45 FC	Suspended direct/indirect LED fixtures.
Gymnasium	35-45 FC	High bay linear LED fixtures.
Classrooms	30-35 FC	Suspended direct/indirect LED fixtures.
Bathrooms	10-20 FC	LED Slot fixtures over mirror supplemented with recessed LED downlights
Mechanical and electrical rooms	30+ FC	LED strips, pendant or surface.
Stairway	10-15 FC	Wall-mounted direct/indirect LED fixtures, high impact polycarb lens.

- 3) All lighting will be automatically controlled using a combination of ceiling occupancy sensors in classrooms, offices and smaller spaces and network programmable relays for larger spaces such as corridors and gymnasium. Perimeter spaces will have closed loop light level sensors 12' from window for 2 zone dimming control of primary and secondary daylight zones. Selected fixtures in egress paths will be connected to emergency panels

C. FIRE ALARM

- 3) The existing fire alarm system is operational, but does not meet 780 CMR 907 building code requirements for voice evacuation. A new fire alarm and voice evacuation system is recommended. The new system would consist of an addressable voice evacuation fire alarm control panel, automatic smoke and heat detectors, manual pull stations, audible and visible alarm signals, elevator recall, connections to automatic fire suppression systems, and connection to the Fire Department. The new fire alarm system will report to the Fire Department through the existing master box.
- 4) The fire alarm control panel will be located in the main electric room with a LCD remote annunciator located at the Main entrance where the fire department responds to an alarm condition.
- 5) Audio speakers and visual high intensity strobes alarm devices will be installed per NFPA-72.
- 6) Since the building will be covered by a sprinkler system, full automatic detection is not required. System type smoke detectors will be provided as a minimum in the main electrical room, electrical closets, data/telephone rooms, elevator machine room, elevator lobbies, along exit paths and at the top of the stairways. Fire suppression systems shall be tied to the fire alarm control panel. Interface & control modules will be provided for elevator recall, air handling unit shut down, gas shut off, door hold release, door hardware bypass and any other systems requiring control under an alarm condition. The building is K-12 and must follow the appropriate risk category requirements under the IBC

D. Telephone/Data

- 1) The existing structured cabling system utilizes Category 5 cabling which is functional and even though existing standards use Category 6 cabling, Category 5 cabling is sufficient for most data needs. However, it is unlikely that any major renovation or upgrade to the building will result in utilizing existing cabling outlets and IDF locations. Furthermore, the existing number of telephone/data outlets is limited and restrictive. Lastly the IDF locations are shared with electrical rooms and storage rooms which are difficult to maintain and preclude additions of new cabling. A new structured cabling system is recommended for long term technology use.
- 2) A new backbone system consisting of fiber optic cables and copper cables will be extended to the main telephone/data room (MDF) and all intermediate closets (IDF). All horizontal data, telephone, and CATV cabling will be extended from MDF and IDF rooms. The MDF and IDF rooms will be provided with 19" racks, fiber optic and unshielded twisted pair (UTP) patch panels. Ladder style cable tray will be provided for organizing cabling distribution.
- 3) All wiring, outlets and terminations will be installed to comply with EIA/TIA 568.

- 4) Horizontal cabling will consist of Category 6 UTP plenum rated cabling for telephone and data connected to modular telephone and data jacks. While CATV service will be brought to the building, horizontal distribution outlets is not anticipated at this time. In general, cabling will be extended in conduit from outlets to the ceiling space, but will be routed exposed above ceiling supported by J hooks.
- 5) Wireless Access Point points will be provided throughout building wide wireless network access.

**E. Public Address/Class Change/Master Clock**

- 1) The existing public address system is original to the building and is reported to be experiencing many nuisance failures. The system is beyond its useful life and should be replaced.
- 2) A public address system consisting of amplifiers, ceiling mounted speakers located throughout the corridors as well as in the gymnasium. The paging system will be accessed through the telephone system, and "all call" paging will be accomplished via telephone handsets. The new telephone switch (PBX) and PA control console will be located in the MDF. The PA system can also incorporate talk back speakers if desired.
- 3) A master clock system will be provided and be connected to the PA system for programmed class change signals. Clocks will be provided in all classrooms, shared offices, conference rooms and administration rooms.

**F. Classroom Technology**

- 1) The existing classroom data projectors and imaging technologies are in operational condition and will continue to function for the foreseeable future. However, whether this technology meets the instructional needs and plans for the school is not known at this time. It is assumed that for long term planning, classrooms will need to be fitout with new teacher computers and imaging technologies. Additional technology needs will require further discussions with the school.

**G. CCTV/Intrusion Detection/Door Access**

- 1) The existing security systems are operational but are reaching the end of their useful life. Neither the intrusion detection system or CCTV system has expansion capability. New CCTV and intrusion detection systems should be provided. Furthermore, the building does not currently have a door access system. The recommended new system(s) should consists if the following:
  - a. Intrusion detection for the exterior doors via door contacts
  - b. Intrusion detection in all first floor and basement corridors via motion detectors
  - c. Card access control points for main entrance.
  - d. CCTV surveillance system via POE (Power Over Ethernet) cameras connected to a central digital video recorder system in the main telecoms room.

- 2) The security video recording system shall be capable of recording a minimum of 30 days archive capacity. Cameras are to be provided internally at each entrance location and each stairwell and elevator lobby. Cameras externally will cover vehicle entrances, mains entrances as well as the 4 corners of the building.
  
- 3) This security access control and intrusion detection system will consist of a security system control panel, system operator keypads, door contact switches, and motion detectors. System shall transmit an alarm signal to the central station upon detection of an unauthorized building entry. The card access system will allow multiple levels of authority.