THOMAS JEFFERSON MIDDLE SCHOOL: BUILDING SYSTEMS SUMMARY

The following is summary of Plumbing, HVAC and Electrical needs. This is not intended to be a comprehensive list, but a summary of existing building system needs and possible recommendations as identified by the engineering team. Full engineers' reports are located later in this document.

Thomas Jefferson Middle School	Analysis	Recommendations
Building Systems		
Plumbing		
Domestic Water		
Water Service	Water Service includes 4" Copper Ductile water service supplied by the local municipal water utility and 3" water meter with bypass piping and valves.	
Water Distribution Piping	Piping system is copper with galvanized piping. Domestic cold and hot water piping system is in poor condition. There is no water softening. Cross connect issue reported in the lower level locker rooms lavatories faucets.	Backflow preventer shall be maintained / repaired. Water shall be tested. Galvanized piping shall be replaced. Repair leaks, insulate, remove mechanical mixing tees for faucets, and provide properly sized water piping system. All piping shall be routed above floor with accessible isolation valves.
Fire Sprinkler System	There is no automatic fire sprinkler system in the building.	Existing water service is not capable of supporting a whole building automatic fire sprinkler system. A properly sized water service will be required.
Sanitary and Storm Piping		
Sanitary Waste	Sewer includes the following: Sewer lateral discharging to the local municipal sewage utility. There is no backwater valve.	
Sanitary Waste and Vent Piping	System material is Cast Iron & Galvanized. Sanitary and grease waste piping are original and in fair condition. Acid waste neutralization basin or waste piping system is not present in the building. The system relies on a sanitary ejector pump for the lower level, overall condition status is fair.	Repair leaks, inspect flow, replace problem areas, and provide maintenance. Clay, cast iron, and galvanized piping shall be replaced. Provide properly sized system.
Kitchen Equipment	Grease interceptor is adequately sized. Natural gas system supplying plumbing and kitchen equipment pressure is 1/2 pounds without the need of regulators. Natural gas system material piping system is black iron steel.	Provide a larger grease interceptor for kitchen area if any renovation occur.
Art Room Equipment	Solid waste interceptors are present at the art room sinks. They are poor condition and a challenging location to service.	
Storm System	Piping is Cast Iron & Galvanized, original, and in fair condition. Interior roof drain and conductor piping discharges to drainage system. There are no secondary overflow drains. Rain gutters discharge to grade. The system relies on a sump pump for the technical education and the area lower level, in fair condition.	Repair leaks, inspect quality and flow, replace problem areas, insulate, and provide maintenance. Cast iron and galvanized piping shall be replaced.
Plumbing Equipment		
Gas Water Heater	2qty. 80-gal. with 120 degree storage temperature, in fair condition.	Provide domestic hot water heating plant equipment for any addition and domestic hot water piping with ne balancing valves.
Circulating Pumps	2qty. One is 5gpm. – 120 degree hot water, the other 3gpm. – 140 degree hot water, in fair condition.	
Thermostatic Mixing Valves	120 degree outlet temperature – Water Heaters, in fair condition. 120 degree outlet temperature – Showers, in poor condition.	
Plumbing Fixtures		
Plumbing Fixtures		Provide senor operated valves and faucets, new fixtures and trim, wall mounted fixtures, and floor drains. Replace non-ADA compliant fixtures with ADA compliant ones. Revise piping for maintenance accessibility.
Water Closets	Water Closets are wall mount with manual flush valves. The majority of the fixtures are in poor condition and ADA compliant.	
Lavatories	Lavatories are mix of wall mount with manual faucets. The majority of the fixtures are in poor condition and ADA compliant.	
Urinals	Urinals are mix of floor mount with a common type flush valve for two to three fixtures. The majority of the fixtures are in poor condition and ADA compliant.	

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Plumbing		
Showers	Showers are a mix of private and multiple use gang units. The majority of the fixtures are in poor condition and ADA compliant.	
Electrical Water Coolers	Electrical Water Coolers are a mix of with and without bottle filling stations. The majority of the fixtures are in fair condition and ADA compliant.	
Sinks - General	The majority of the fixtures are in poor condition and not ADA compliant.	
HVAC		
Heating System		
Boiler Plant	The building is served by two new Thermal Solutions AMP high-efficiency condensing hot water boilers and by two Munchkin high-efficiency hot water boilers, installed in 1999. They appear to be in satisfactory condition. The ASHRAE service life expectancy is about 20-25 years.	Continue preventative maintenance. Plans should be made for the eventual replacement of the Munchkin boilers.
Piping and Pumping	The system is a primary-secondary variable flow arrangement with a stand-by pump. The south wing is a primary-secondary constant flow system. The ASHRAE service life expectancy is about 20-25 years.	Continue preventative maintenance. Plans should be made for the eventual replacement of the 1999 system.
Ventilation and Air Conditioning Systems		
Air Handling Units	Served by multiple air handling systems. The two largest units serve the classrooms and are in a mechanical room. Each unit contains hot water heating and chilled water cooling coils. The 1968 units have exceeded their expected ASHRAE service life. The units have not been well maintained.	Continue with the current maintenance program. Plans should be made for the eventual replacement of the 1968 units.
	Other units serve the south wing addition, gym, and swimming pool. The air handling unit that serves the pool is located in a separate mechanical room on the roof. The unit utilizes a "solar attic" for heat required in the pool room.	When units are replaced, consideration should be given to VAV conversion. The unit serving the gym should be replaced with a one with hot and chilled water coils.
	Air conditioning is provided by a new Daikin water-cooled scroll compressor chiller. The new chilled water system pump is served by a variable frequency drive. The condenser side of the chiller is cooled by an outdoor cooling tower. The outdoor cooling tower is old, but in good condition. The cooling tower should continue to serve for another 10 years or more.	Continue with the current maintenance program. The chiller should continue to serve for 30-35 years.
	A packaged rooftop unit was installed in 2019 to cool the office area. The ASHRAE service life expectancy is 15-20 years. Hot water fin pipe radiation in rooms along the exterior wall and is controlled by the pneumatic control system.	To address the current COVID-19 situation as well as future health concerns, we recommend installing bipolar ionization equipment within all existing air handling units.
Control Systems		
System	Served by a pneumatic temperature control system that is original to the building. A combination of Johnson Controls and Trend digital controllers have been installed. The majority of damper and valve actuation is pneumatic, in good condition.	It is our recommendation that the entire system be upgraded to a complete digital system of a single manufacturer.

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Electrical		
Electric Service		
Utility Service	The service is 2,500 amp 208Y/120 volt 3-phase 4-wire. The switchboard is an ITE and is located in the Mechanical Room, installed in 1967, no surge protection. The utility transformer is located outside the Mechanical Room. The CT's are located inside the main switchboard. The meter is located inside on a wall.	We recommend replacement of each switchboard. If large additions and/or large air conditioning loads are added, a new service upgrade will be required. Provide surge protection device on main service.
Panelboards		
	The panelboards in the newer areas are Square D. The panelboards in the older areas are ITE. The Square D panelboard in the pool equipment room is severely rusted. A majority of the panelboards are full.	Additional panelboards can be added when new circuits are required. Replace all older panelboards, feeders, the pool equipment room panelboard with new.
Generator		
	The generator is an 80 kW Kohler, located on the exterior west side. The unit is natural gas fueled, and the cooling is from city water. There are two automatic transfer switches feeding two separate emergency panels with mixed loads.	Existing Emergency panel "E1" should be replaced with new in a new location. Redistribute emergency loads between emergency panels "E1" and "E2."
Light Fixtures & Controls		
Classrooms	The classrooms have 2x4 acrylic lens 4-lamp fixtures. Existing fixtures were converted to T8 lamps and electronic ballasts in 2012. The classrooms have 2 switches to control separate rows and do not have occupancy sensors.	Provide dual technology occupancy sensors in classrooms and offices.
Corridors	Areas that are not classrooms have either LED light fixtures or LED retrofit bulbs. There are 24/7 night light fixtures connected to the emergency generator. There is a 3-way switch on each end of the corridor, with no occupancy sensors.	Provide ultrasonic occupancy sensors in corridors.
Exterior Lighting	Building mounted wall pack fixtures and area lights serving the parking lot and driveways are LED. The exterior lighting is controlled from the BAS.	
Wiring Devices		
	The receptacles and toggle switches are commercial grade 15A and original. In a classroom there are one or two receptacles, many have been added in surface plastic raceway.	Replace any broken switches and receptacles. Add additional receptacles to classrooms as required.
Fire Alarm System		
	There is an EST addressable fire alarm system. The fire alarm control panel is located in the Teacher's Lounge, pull stations by all exterior doors, horn strobe appliances and smoke detectors in corridors, heat detectors in mechanical rooms, strobe appliances in the classrooms, and duct smoke detectors in the air handling units operating at 2000 CFM or greater.	Additional fire alarm devices can be added to the existing system.
Clock System		
	There is a Simplex hard wired synchronized clock system located in the main office. There are Simplex analog clocks in the classrooms, offices, and other public areas. The bell tone is controlled by the master clock controller.	We recommend the installation of a central wireless master clock with GPS receiver. Replace all hard wired synchronized clocks with battery powered GPS clocks.
Intercom System		
	There is a Rauland Telecenter intercom system located in the office, recessed ceiling mounted speakers in the corridors, flush wall mounted combination clock speakers in the classrooms, and some classrooms have push to call buttons. The bell system is toned through the speakers.	Additional intercom speakers can be added. Replace old intercom speakers with new. Integrate new intercom speakers with new bell system.

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Electrical		
Phone System		
	There is a Mitel SX-2000 LIGHT analog PBX phone system located in the server room. The phone cabling is CAT5 and is routed back to the server room and punched down on wall mounted voice wiring blocks.	Provide CAT6 wiring for new phones to accommodate the future VoIP phone system.
Data System		
	The floor mounted MDF data rack is located in the server room and distributes fiber optic cable to various wall mounted IDF data racks. The data cable is CAT6 which is routed to patch panels in the data rack.	Additional data can be added. If an addition would require that the data cable have a total installed length of over 300 feet, then an additional IDF data rack will be required.
CATV System		
	There is a CATV service to this building with splitters located in the corridor ceiling, a CATV jack, and a ceiling mounted projector or smart board in each classroom.	Additional CATV jacks can be added.
Security System		
	There is a Radionics security system located in the Receiving Room. The security system has motion sensors in the corridors. The pool has door contact switches.	Additional security devices can be added.
CCTV System		
	The entire exterior as well as some interior areas of the building and have new IP based security cameras.	Additional interior CCTV devices can be added.
Access Control System		
	There is a Brivo door access control system for this building. There are electric strikes on 5 exterior doors. There are FOB readers at each door.	Additional doors can be added to this system.