

HARRISON ELEMENTARY SCHOOL

HVAC

M-01 Heating Plant:

Observations:

The existing boilers have recently been upgraded. (2) Steam boilers (circa 2000) manufactured by H.B. Smith have been installed. A hot water heat exchanger has been added to provide hot water for space heating in the newer addition. The space heating boilers produce domestic hot water in the winter months, while a stand-alone water heater produces hot water during the summer months. The boilers are controlled by a Johnson-Metasys DDC system. The newer boiler breeching connects to the original masonry chimney.

Recommendations:

Since the boilers utilize a positive pressure flue venting system, the chimney should be fitted with a metal chimney liner for protection of the building occupants. Should major upgrades in M-02 or M-03 be undertaken, we recommend a changeover of the boiler trim to operate as hot water in lieu of steam. Cost is included in M-02 & M-03.



M-02 Heating & Ventilating Systems:

Observations:

Classrooms - Most classrooms are served by steam unit ventilators with supplemental fin-tube radiation. The units are original to the building and appear to be in fair to poor condition and have well exceeded their expected operating life. The top floor of the original 1929 structure has been retrofitted with self-contained heating/cooling unit ventilators. Scattered throughout the school are window air conditioners to provide cooling to select rooms. Operating along with the unit ventilators, are exhaust fans, which assist in maintaining building pressure. Some fans were not energized and some appeared in need of repair.



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Kitchen – The kitchen contained small cooking hoods, which did not have an Ansul fire protection system. However, no food preparation is performed at this school.



Multi-Purpose Rooms - The older room is served by steam heating & ventilating (H&V) units. The units are original to the building and appear to be in fair condition, though they have exceeded their expected operating lives. The newer room is served by gas-fired, heating/cooling rooftop units and are in good condition.

Media Center - The media center utilizes steam unit ventilators and window air conditioners.

Miscellaneous Areas – The main circulation corridors utilize steam cabinet unit heaters, but currently receive no ventilation to the space.

MDF Closet - The room containing the school's computer server does not have any independent cooling system. The room was quite warm at the time of our visit.

Recommendations:

Spaces such as the classrooms and older multi-purpose room should have the HVAC equipment replaced since it has been in service long after its expected operating life. The new equipment will replace the existing equipment in-kind, except that additional outdoor ventilation air will be introduced per today's codes and the new equipment will be fitted with microprocessor controllers to integrate with a building control system. Areas that receive little or no ventilation must be upgraded as required. Exhaust fan maintenance should be addressed by repairing units where possible and replacing those in bad repair. In addition, boilers should be retrofitted to operate as hot water (instead of steam). New piping, pumps and controls are required. Previously installed heater exchangers can be removed.

M-03 Cooling Systems:

Observations:

Newer Classrooms – Circa 2000 classrooms are served by self-contained heating cooling units manufactured by

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Airedale. SGI's are served split-system type units, also manufactured by Airedale.

Office Areas – The administration area currently does not have a cooling system.

Media Center – The media center utilizes steam unit ventilators and window air conditioners.

MDF Closet - The room containing the school's computer server does not have any independent cooling system. The room was quite warm at the time of our visit.



Recommendations:

Though no immediate upgrades are required, consideration should be given to eliminate the thru-the-wall units with split systems or rooftop units. The new rooftop units will be more efficient, provide better ventilation, acoustics and temperature control throughout the areas. There is, however, an immediate need to provide a cooling system for the server room to protect the equipment. Consideration should also be given to provide cooling to the classrooms, cafeteria and multi-purpose room. Vertical, self-contained heating/cooling units are recommended for the classrooms, while multiple rooftop units with heating/cooling are recommended for the larger spaces. (media center, multi-purpose, music, gym)

M-04 Temperature Control Systems:

Observations:

With the exception of the boilers and newer additions, the control of the heating, ventilation and temperature control of the spaces is accomplished via a pneumatic control system, which is interconnected via P/E switches to a newer DDC system. The DDC system provides global start/stop of the HVAC equipment. The newer, temperature control air compressor was operating continuously, indicating the system may have air leaks. The system appears to be marginally adequate for task at hand. The newer additions have been fitted with new Johnson-Metasys DDC controls.



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Recommendations:

While the present system may be functional and familiar to the operating staff, we recommend that a complete upgrade of the existing pneumatic temperature control system be initiated. A new system of direct digital controls (DDC) should be employed. The DDC system will automate the operation of the HVAC equipment, aid in maintenance efforts, signal trouble alarms and reduce overall building energy usage. The new DDC system should be based on Johnson-Metasy's (or another compatible company), which is currently in use in the District. The system will be networked to a district-wide monitoring system

M-05 Plumbing:

Observations:

The main domestic water service enters the building in the front northeast corner of the original building in a basement electric room. Service size is 3" and there is no backflow prevention.

Domestic water heating is provided by a large horizontal indirect heated storage tank which is heated with boiler water. There is a separate gas fired summer water heater to provide hot water during boiler shut down periods.

Natural gas enters the building in the basement of the original building. It supplies the boilers, a domestic range in the second floor faculty lounge, the school kitchen 6-burner range/oven and rooftop HVAC on the Multi-Purpose room at the south end of the building.

The school Kitchen 3-compartment sink has a recessed grease interceptor on the waste line.

The boy's toilet rooms on the first and second floor of the older original building do not have ADA compliant fixtures however, the girl's toilet rooms do. The nurse's office has an ADA compliant toilet room and is accessible from the corridor.

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The student toilet rooms in the east wing have ADA compliant fixtures but the piping below the designated lavatory sinks is not insulated.

The two toilet rooms outside the south side Multi-Purpose room are ADA compliant.

Aside from the older original building, most classrooms have a counter sink with a drinking fountain bubbler affixed. These sinks are showing age and the faucets and bubblers are quite worn.

There are several wall mounted drinking fountains throughout the building that are operating sufficiently. Not all locations have ADA fountains.

There are two toilet rooms with showers behind the stage of the Multi-purpose room that have been abandoned.

Recommendations:

All toilet rooms should be modified for ADA accessibility. Toilet rooms that have been modified should be corrected for the proper clearances and insulations.

Classroom sinks should have the old faucets and drinking bubblers replaced.

Drinking fountain locations should have an ADA compliant fixture.

Remove abandoned plumbing fixtures at rear of Multi-purpose stager to accommodate new area use.

M-06 FIRE PROTECTION:

Observations:

The older, northern portion of this school is equipped with fire protection sprinklers.

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The central, east and south wings do not have fire sprinkler protection.

Storage rooms in the newer wing of the school have limited area sprinklers.

There is no fire suppression in the kitchen hood.

Recommendations:

All existing sprinkler systems should remain operational.

All commercial cooking hoods require fire suppression.

ELECTRICAL

E-01 Service Entrance:

Observations:

A JCP&L utility pole # E60976LVT with three pole mounted transformers, at the entrance loop to the parking lot, runs secondary voltage underground to a 208/120V, 3 phase, 4 wire C/T & meter combination inside a closet in the faculty room. Recently installed Murray switchgear backfeeds the old 400A service panelboards. The new service entrance is 800A MLO utilizing the 6 disconnect rule. A separate 150A service was installed for a fire pump in the sub-basement. PSE&G is the utility company serving electrical power under account #1262510201. In September of 2007 the max demand was 130.8 kw/363A.

Recommendations:

Should it be decided to fully or partially air-condition the subject building then the electrical service entrance will have to be replaced/upgraded. (500 KVA minimum)

E-02 Distribution:

Observations:

Local panelboards distribute power to lighting, devices and equipment. Most older vintage 208V panelboards were



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found to be loaded to circuit breaker capacity and lacking spares or spaces. Newer computer panels have been installed to feed computer areas.

Recommendations:

Any addition to the original section will require new panelboard placement. Should substantial modifications take place requiring connection to antiquated panelboards the panels should be replaced in their entirety as parts are scarce if available at all. (BK & old GE panelboards).



E-03 Devices:

Observations:

Local receptacles were sparse as the building is 1960's vintage. Currently additional power has been provided via power poles and surface mounted raceway.

Recommendations:

As the building is block wall construction any renovation would likely require surface mounted raceway and outlets built into new partition walls.

E-04 Normal Lighting:

Observations:

The majority of the building is served via linear fluorescent fixtures with T-8 lamps. 2x4, 1x4 and 2x2 recessed prismatic troffers are used in most office areas, newer classrooms and some corridors. Surface or pendant mounted prismatic wrap fixtures are used in older classrooms and utility areas with fluorescent industrials/shrouded lamps in the boiler room etc. The new Multi-purpose room is served via Hi-Bay HID's. Limited incandescent was seen in storage and utility rooms.



Recommendations:

Replace all incandescent lighting with compact fluorescent. Clean and/or replace all acrylic diffusers that have turned yellow.

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E-05 Emergency lighting:

Observations:

Emergency lighting is supported by the use of local and remote unitized battery packs with local and remote unitized heads.

Recommendations:

Coverage seems deficient. Employ the services of a lighting professional to meter and record emergency lighting levels and add battery ballasts to existing fixtures to supplement existing conditions.



E-06 Exit Lighting:

Observations:

Exit lighting was provided by mostly battery backed up fixtures but some uranium fixtures were present. Units were seen with a mixture of incandescent and replacement L.E.D. sticks.

Recommendations:

Replace exit signs with factory L.E.D. units as the uranium & L.E.D. light sticks do not meet NFPA 101 required face illuminances.

E-07 Egress Lighting:

Observations:

Egress lighting was deficient at this facility.

Recommendations:

Provide and install combination normal and emergency light fixtures incorporating local or remote battery ballasts.



E-08 Exterior Security lighting:

Observations:

Wall mounted H.I.D. fixtures are located around the perimeter. H.I.D. with reflector cone post tops were seen at walkways and small parking areas for pedestrian traffic.

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Rectangular spot light style H.I.D. fixtures were seen in large parking lots.

Recommendations:

H.I.D. cannot be used for emergency lighting. See E-07.

E-09 Fire Alarm:

Observations:

An EST-2 serves as the F.A.C.P. It is a digital addressable system. It is located in the main office with an annunciator at the entrance vestibule for firefighter diagnosis. Manual pull stations (MPS) were seen to be located at the exits without covers to prevent nuisance alarms. Smoke detectors were seen throughout.

Recommendations:

Provide and install stopper II covers over pull stations to prevent nuisance tripping.

E-10 Tele/data:

Observations:

Telephone enters through the original electric room where the demarc exists. The services are fiber optic (FO), CATV, and Copper phone lines. Voice over internet protocol (VOIP) is distributed through a Meridian system and utilizes Cisco IP handsets. Copper is distributed to the desktop for telephone and computer services via surface mounted raceways and power poles where block walls exist and in partitions where available.

The telephone service is provided by Verizon PRI-T1, digital circuits and various copper POTS lines. The telephone service is distributed to users over combined voice and data network via Cisco Unity Servers.

Recommendations:

Verify TIA/EIA standards were used for distance limitations, cable mapping, etc. Verify TVSS devices were used on utility and emergency links (faxes, 911, F.A.C.P. dialer, etc.)



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E-11 Clock/Speaker/Intercom:

Observations:

An Institutional Systems Service (ISS) central clock system was seen located in the Main office. Standard time clock/speaker combinations were seen located throughout. A Telecor XL intercom system was also located in the Main office.



Recommendations:

No recommendations at this time.

E-12 Security:

Observations:

A camera is located at the main entrance with a weatherproof call-in button and speaker. A Panasonic VCR was located in the Main office to record the main entrance activity. A Radionics Alpha II system keypad was seen for security system interaction. Motion detectors were seen at interior corridor spaces.

Recommendations:

No recommendations at this time.