Mechanical and Electrical Systems
Existing Conditions Narrative

Island Avenue Elementary School
Madison, Connecticut

3/11/10

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CES Project No. 29066.00

A. ***PLUMBING NARRATIVE***

APPLICABLE CODES AND STANDARDS

The plumbing systems will be reviewed in conformance with the requirements of the following codes and regulations and all applicable local authority requirements, including the Bureau of School Facilities.

1. 2005 Connecticut State Building Code
2. 2005 Connecticut State Fire Safety Code
3. 2003 International Building Code(IBC)
4. 2003 International Plumbing Code
5. 2003 International Energy Conservation Code
6. NFPA, Latest Version
7. ASHRAE 90.1
8. State Department of Education School Construction Program

PLUMBING UTILITIES

1. Domestic Water:
   a. Existing Domestic Water Service: The building is currently served by a domestic water main fed from Connecticut Water Company. This water service currently serves all of the school's domestic water needs including the portable classrooms. The water distribution system is original to the building.
2. Natural Gas:
   a. Existing Natural Gas Service: The building is currently served by natural gas fed from the local utility's distribution system. Equipment which the gas main currently serves includes the boilers and water heater.
3. Sanitary:
   a. Existing Sanitary Service: The School's sanitary sewer system provides sanitary waste drainage for plumbing fixtures located throughout the School. The sanitary waste piping discharges to a septic tank and leaching field.
4. Storm:
   a. Existing Storm System: Building is served by a combination of gutters and roof drains with internal rain leaders.

PLUMBING FIXTURES AND SPECIALTIES

1. Grease trap: Refer to 2004 Underground Storage Tank Report done by Flagship Environmental LLC, 2004.
2. Existing plumbing fixtures are as follows:
   a. At the original 1950 section of the building, the water closets are floor mounted; flush valve, vitreous china; original to the building. Portable classrooms are newer fixtures.

b. Lavatories at main building are wall hung vitreous china. Faucets are installed with two twist handle faucets.

c. Urinals at the main building are floor mounted with flush valves. Under new construction these are not allowed to be installed by the State of CT Department of Public Health. They are grandfathered in and are allowed to remain.

DOMESTIC HOT WATER SYSTEMS

1. Existing Domestic Hot Water System: The Schools domestic hot water is generated by a Smith boiler/tank system; natural gas fired. The water heater system is 1 year old and in good condition.

B. ***FIRE PROTECTION NARRATIVE***

FIRE PROTECTION SERVICE

1. There is no central fire protection system (sprinklers) currently at the facility.

C. ***MECHANICAL NARRATIVE***

APPLICABLE CODES AND STANDARDS

The mechanical systems will be reviewed in conformance with the requirements of the following codes and regulations and all applicable local authority requirements, including the Bureau of School Facilities.

1. 2005 Connecticut State Building Code
2. 2005 Connecticut State Fire Safety Code
3. 2003 International Building Code(IBC)
4. 2003 International Mechanical Code
5. 2003 International Energy Conservation Code
6. NFPA, Latest Version
7. ASHRAE 90.1
8. State Department of Education School Construction Program

EXISTING SYSTEMS

1. Boiler Plant: The building is heated by two, dual fuel Columbia MPH-50 steam boilers each with a capacity of 2,100 Mbh input. This boiler plant system including the boiler feed pumps, piping in the basement and steam traps throughout the building were installed in 2008 and are in good condition.

2. Buried Fuel Tanks: Refer to 2004 Underground Storage Tank Report done by Flagship Environmental LLC, 2004.
3. Original 1950 section of the building:
   a. Steam supply and return piping in the main building is original to the building. The piping is primarily distributed throughout the building through a tunnel system.
   b. Heating and Ventilating (H&V) systems consist of finned tube radiation, radiation in convectors and exhaust systems at toilet rooms. Ventilation at classrooms is accomplished by operable windows (natural ventilation) and a nominal amount of exhaust through a ducted exhaust system.
   c. “Cafetorium” is served by a heating and ventilating unit which is about 20 years old.
   d. Temperature controls at individual rooms are local, pneumatic controls. Temperature control system serving the boiler room and core H&V systems is an Alerton DDC system installed in 2008.
4. Air conditioning is provided at specific areas such as administrative areas, library, nurse’s offices and computer lab with combination of window air conditioners and ductless split units.
5. Portable classrooms are air conditioned and are served by Trane packaged roof top units (RTU’s) which are electric heat and electric cooling. At the portable classrooms constructed in 1994, the RTU’s were replaced in 2006. The RTU’s at the portable classrooms constructed in 1998 are original equipment.

D. ***ELECTRICAL NARRATIVE***

APPLICABLE CODES AND STANDARDS

The electrical power, interior lighting, and fire alarm systems will be reviewed in conformance with the requirements of the following codes and regulations and all applicable local authority requirements, including the Bureau of School Facilities.

1. 2005 Connecticut State Building Code
2. 2005 Connecticut State Fire Safety Code
3. 2003 International Building Code(IBC)
4. 2003 International Energy Conservation Code
5. 2005 National Electrical Code, NFPA 70 (NEC)
6. Illuminating Engineering Society Lighting Handbook (IESNA), 9th Edition
7. ASHRAE 90.1
8. State Department of Education School Construction Program

EXISTING SYSTEMS

1. The Original 1950 section of the building is served by an electrical service rated at 400 amperes, 208Y/120volts, 3-phase. This service equipment consists of a 400amp main disconnect switch, distribution section and metering per utility company requirements. The service equipment is original to the building and is in fair condition.

2. Each section of the portable classrooms (two sections) is served by a separate electrical service rated at 400 amperes, 208Y/120volts, 3-phase.

3. There are a number of electrical panels located throughout the facility. These panelboards are original to the facility. The condition of these panelboards is good to poor. The majority of the panelboards do not have spare circuit breakers available for new circuits to be added, or have space to add new circuit breakers.
4. Lighting at classrooms, corridors and administrative areas consists primarily of fixtures with acrylic lenses and T8 fluorescent lamps. The Cafetorium is served by T5 fluorescent fixtures and the portable classrooms are served by T8 fluorescent fixtures with motion sensors. Lighting throughout the facility is in good condition and light levels are within recommended levels. Fixtures within the corridors are reaching the end of their useful life. There are plans to replace the ceilings in the corridors. The light fixtures should be replaced at this time.
5. Site lighting has fair to good coverage with pole mounted fixtures and building mounted fixtures.
6. The fire alarm system is a Notifier system with a Fire Lite dialer. There are manual fire alarm pullstations throughout the building and smoke detectors within the corridors.
7. Emergency lighting is handled by 2-head emergency lighting fixtures with integral battery packs.

E. ***MEP SYSTEMS CONCLUSION***

In general, the systems at the 1950 section of the building are original to the building and are 50+ years old, thus have met their useful life expectancy. The heating plant is newer (2008). Expansion of the Alerton DDC system is recommended. Ventilation is not a full mechanical ventilation system as designed in new construction. At the newer portable classrooms, RTU's should be scheduled for replacement. Light fixtures in the corridors should be replaced when the ceiling renovations are done. The following capital needs survey form highlights the major systems in need of replacement and their respective capital costs to implement.

Town of Madison								
Capital Needs Survey Form						Orig Building	Portables	Total Floor Area (sf):
Island Avenue Elementary School						27,148	8,900	36,048

Note: The "System Priority Rating" (1 to 4 rating) and "Condition of the Existing System Rating" (1 to 5 rating) are to be reviewed together to assist in prioritizing replacement and/or upgrades. As an example, we recommend line items with a System Priority rating of 1 and Existing Conditions rating of 1 be prioritized for replacement and/or upgrades.

SYSTEM	**System Priority 1 to 4** (1-Highest Priority, 4-Lowest Priority)	**Condition of the Existing System 1 to 5** (1 Poor, 5 Excellent)	**Last Major Reconstruction (Year)**	**Projected Replacement (Year)**	**Quantity**	**Unit Price**	**Current Replacement Cost**	**REMARKS**
Division 2 - Site Construction								
Site - Electrical								
Site - Lighting								
Site - General								N/A
Division 15 -Plumbing								
Water Main								
Overall Plumbing Renovations - includes:	3	3	1950	2010	27,148	$12	$325,776	
Water Distribution System								
Plumbing Fixtures								
Water Heater			2008					No short term recommendations.
Division 15 - HVAC								
Steam Boilers			2008					No short term recommendations.
Overall HVAC Renovations - includes:	3	3	1950	2010	27,148	$28	$760,144	
Ventilation Systems								
Air Handling Systems								
Exhaust Systems								
Temperature Control Systems								
Air Conditioning Systems - added cost	4	3		2010	27,148	$12	$325,776	
Air Conditioning Systems - 1998 portables	4	3	1998	2018	4,200	$7	$29,400	Replace RTU's at 1998 portable classrooms
Division 16 - Electrical								
Overall Electrical Renovations - includes:	2	3	1950	2010	27,148	$15	$407,220	Upgrade to 1000A - 480Y/277V
Electrical Service								
Distribution and Local Panels								
Lighting	1	2		2011	2,000	$2	$4,000	
Emergency Lighting								
Misc Low Voltage Systems								
Fire Alarm System								
Added Elec Cost for A/C Systems	4	3		2010	27,148	$5	$135,740	
							$1,852,316	
							$ 51	per sf