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Via email: brian.m.boom@gmail.com

June 29, 2017

Brian Boom, Head of Vestry
St. John in the Wilderness
PO Box 180
Copake Falls NY 12517

RE: MEP Assessment Report
St. John in the Wilderness - Copake Falls, NY
C&A# 4903.0

Dear Mr. Boom:

The St. John in the Wilderness Episcopal Parish (St. John's) was established in 1852 in the Hamlet of Copake Falls, NY. Construction of the Church was completed in 1852 and construction of the Rectory followed shortly thereafter in 1853. In the 1960s, the original stone foundations of both buildings were removed and replaced with concrete block foundations accommodating full height basements. In the late 1960s, both buildings' original mechanical, electrical, & plumbing (MEP) systems were installed. Since that time, both buildings have undergone various renovations / upgrades to architectural and MEP elements and several small additions have been constructed, the most recent of which appears to be the Rectory Office in 1991. St. John's Church and Rectory were both originally designed by renowned architect Richard Upjohn and were placed on the National Register of Historic Places in 1995.

Currently, St. John's recognizes that some existing architectural and MEP elements of the Church and Rectory have become dated and the need for maintenance and/or upgrades is being assessed. Crawford & Associates Engineering (C&A) was retained to assist in the MEP assessment. Christopher Knox of C&A visited the site with Dale Peterson and Marjorie Hoog on June 16, 2017 for a discussion and visual inspection of both buildings' MEP components. Based on this site visit, the following conditions report summarizes C&A's findings and recommendations as to the MEP systems' condition, size / capacity, age, usefulness, life span, etc.

EXECUTIVE SUMMARY

The existing MEP systems serving St. John's Church and Rectory appear to be generally in in good, well maintained condition, adequately sized, and sufficient for continued use. Some minor issues were noted that should be addressed to ensure code compliance and/or to ensure proper maintenance for continued operation. Several upgrades and / or improvements for the future are contemplated. These items and associated budget cost estimates are discussed in the Recommendations – Long Term section at the end of this conditions report.

EXISTING MEP CONDITIONS ASSESSMENT

A. CHURCH

a. MECHANICAL

The building is heated by a single oil-fired hydronic boiler plant, which is located in the basement along with its associated fuel oil tank, circulator pumps, valves, piping, and controls. The boiler plant serves two space heating zones: the basement, which includes a mix of cabinet convector and baseboard fin tube terminal units, and the first floor, which includes baseboard fin tube terminal units. Each zone's terminal units are generally piped with copper piping, located along exterior walls, and controlled by a single thermostat located in the space served. The boiler plant and terminal units appear to be adequately sized to serve the building. The boiler plant and its appurtenances appear to have been installed circa 1996 and are in good, well maintained condition; it is estimated that approximately 10 years remain in their service life. According to its service notes, the boiler operates between 80% and 85% efficiency, which is typical of an oil-fired boiler.

No central cooling equipment exists. A stand-alone dehumidifier is located in the basement for moisture control and mold prevention (it was noted that mold had been observed in the past). The dehumidifier appears to be sized adequately and in condition fit for continued use; however, it exhibited elevated noise during operation (it was noted that the unit is typically shut off during space use to eliminate noise).

The first floor is naturally ventilated with operable windows and doors and ceiling fans are utilized for air circulation / destratification. No ventilation is provided in the basement with the exception of the basement restroom, which is fitted with an individual exhaust fan. This exhaust fan appears to be adequately sized and fit for continued use, but exhibits some signs of aging. Combustion air for the boiler is provided by indoor air. The existing boiler room is likely inadequately sized for indoor combustion air per a stringent code interpretation; however, no combustion air issues have been experienced given the existing loose construction.

b. ELECTRICAL

An overhead service tying into a meter at the northwest corner of the building feeds a 150A main breaker main electrical panel in the basement closet adjacent to the stairs. A main lug subpanel fed by a 70A breaker in the main panel and a 50A disconnect serving the kitchen area are located adjacent to the boiler room. Multiple conduits, raceways, junction boxes, and wiring serve the building. All components appear to be modern, sized adequately to serve the use, and in condition fit for continued use. However, it should be noted that some junction boxes / wires were observed to be uncovered / exposed.

The majority of lighting in the basement consists of recently installed LED recessed fixtures. The majority of lighting on the first floor consists of track and pendent fluorescent / incandescent fixtures, which are likely inefficient when compared to modern fixtures, but generally appear to be in condition sufficient for continued use.

One emergency light fixture is provided in the basement, but exit/emergency lighting generally appears otherwise absent.

A fire alarm / security system with smoke / heat / temperature detection serves the building. These components appear to be suitable for continued use, but exhibit some signs of aging. No carbon monoxide (CO) detector was observed in the boiler room.

c. PLUMBING

Potable water is provided to the building by HDPE site piping from the Rectory basement. Hot water is provided by an indirect water heater connected to the boiler plant. Supply piping is primarily copper and drain and vent piping is primarily plastic. One sink in the sacristy appears to have been retrofitted with HDPE drain piping, which is not an approved drain pipe material. It was noted that the supply for both sinks in the sacristy have experienced temporary freezing in the winter, likely due to the fact that the sacristy is located above a sparsely insulated shallow crawlspace. It was also noted that the main drain under the length of the basement floor slab is believed to be “Orangeburg” bitumenized fiber pipe (which is notorious for crush failure). The water heating components appear to have been installed at the same time as the boiler plant and, thus, it is estimated that they have approximately 10 years remaining in their service life. All potable and drain and vent piping appears to be in condition sufficient for continued use. Although the condition of the basement main drain could not be visually confirmed at the time of inspection, no issues have been experienced and it is likely fit for continued use.

B. RECTORY

a. MECHANICAL

The original portion of the building is heated by a single oil-fired hydronic boiler plant, which is located in the basement along with its associated circulator pumps, valves, piping, and controls. The fuel oil tank is located outdoors in a small covered shed attached to the east side of the building. The boiler plant serves three space heating zones: the basement, which includes one ducted air handler with a hydronic coil, the first floor, which includes cast iron radiator terminal units, and the second floor, which also includes cast iron radiator terminal units. Each zone’s terminal units are generally piped with copper piping, located along exterior walls, and controlled by a single thermostat located in the space served. The small additions to the east side of the building, including the office, are heated by electric baseboard terminal units. The boiler plant and all terminal units appear to be adequately sized to serve the building. The boiler plant and the ducted air handler and their appurtenances appear to have been installed circa 1996 and are in good, well maintained condition; it is estimated that approximately 10 years remain in their service life. According to its service notes, the boiler operates between 80% and 85% efficiency, which is typical of an oil-fired boiler.

Central cooling is provided for the basement space by a ducted air handler with a DX cooling coil connected to an outdoor condensing unit. No cooling is provided for the first and second floor of the original portion of the building. A window air conditioner unit provides cooling for the office addition. The ducted air handler, cooling coil, and condensing unit appear to have been installed circa 1996 and are in good, well maintained condition; it is estimated that approximately 10 years remain in their service life. The window air conditioner unit appears to have been installed at the time of construction of the office addition in 1991. It exhibits signs of aging and is likely nearing the end of its service life.

All spaces are primarily naturally ventilated with operable windows and doors. Mechanical ventilation is provided by individual exhaust fans serving the basement restrooms and kitchen as well as the first and second floor restrooms. These exhaust fans appear to be adequately sized and fit for continued use, but exhibit signs of aging and some may be nearing the end of their service lives. Outdoor wall caps associated with the exhaust fans and dryer were observed to have missing / stuck backdraft components and/or to be clogged with dust / lint. The existing boiler room is likely inadequately sized for indoor combustion air per a stringent code interpretation; however, no combustion air issues have been experienced given the existing loose construction. The boiler is also served by a power venting unit, which is not installed with the proper clearance to grade and was noted to have caused intermittent boiler system operation / maintenance issues. This issue emphasizes that CO safety is a significant concern and that boiler room CO detectors are needed, as discussed below.

b. ELECTRICAL

An overhead service tying into a meter at the southeast corner of the building adjacent to the office addition feeds a 200A main breaker main electrical panel in the basement. A main lug subpanel that appears to be fed by an 80A breaker in the main panel is located in the basement east stairwell. A main lug subpanel with a backfed 100A main breaker that appears to be fed by a 100A breaker in the main panel is located in the office addition. Multiple conduits, raceways, junction boxes, and wiring serve the building. All components appear to be modern, sized adequately to serve the use, and in condition fit for continued use. However, it should be noted that some junction boxes / wires were observed to be uncovered / exposed.

The majority of lighting in the basement and office addition consists of linear fluorescent fixtures. Some recessed fluorescent / incandescent fixtures were also observed in the basement. The majority of lighting for the first and second floor of the original portion of the building consists of recessed and pendent fluorescent / incandescent fixtures. All fixtures are likely inefficient when compared to modern fixtures, but generally appear to be in condition sufficient for continued use.

One exit light fixture is provided in the basement, but exit/emergency lighting generally appears otherwise absent.

A fire alarm / security system with smoke / heat / temperature detection serves the building. These components appear to be suitable for continued use, but exhibit some signs of aging. No CO detector was observed in the boiler room.

c. PLUMBING

Potable water is provided by a well located just east of the building. Plastic site piping from the well enters the building and is connected to a 44 gallon well pressure tank, water conditioner, and appurtenances. A branch of the cold supply piping exits the building and serves the Church with HDPE site piping. Hot water is provided by an indirect water heater connected to the boiler plant. Supply piping is primarily copper and drain and vent piping is primarily plastic. It was noted that the main drain pipe in the basement has experienced intermittent blockages, likely due to the fact that it is connected with flexible couplings exhibiting some misalignment. The water heating components appear to have been installed at the same time as the boiler plant and, thus, it is estimated that they have approximately 10 years remaining in their service life. The pressure tank's pressure gauge is severely corroded / inoperable and its check valve was observed to be noisy during flow conditions, which could indicate wear and eventual failure. The water conditioner appears to be aged and nearing the end of its service life. All other potable and drain and vent piping and appurtenances appear to be in condition sufficient for continued use.

C. SITE

a. MECHANICAL

N/A

b. ELECTRICAL

Overhead wiring from the Church feeds several pole-mounted LED area lights located to the south of the building. All components appear to be in good condition sufficient for continued use.

Overhead wiring from the Rectory serves two poles located between the Church and the Rectory. Both poles include LED area lights and the eastern pole also includes a 70A subpanel for photocell control of the area lights and a GFCI weatherproof switched receptacle. The receptacle appears to have been installed upside-down and its weatherproof cover is missing. Otherwise, components appear to be in good condition sufficient for continued use.

c. PLUMBING

It was noted that the Church building sewer is believed to exit the building near its northwest corner and to extend to a septic system downhill and to the west of the building.

It was also noted that the Rectory building sewer extends to a septic system downhill and to the west of the building. This septic system was reported to have recently failed and been repaired / reconstructed.

The condition of the building sewers and septic systems could not be visually confirmed at the time of inspection.

RECOMMENDATIONS – IMMEDIATE MAINTENANCE / REPAIRS

The following items are considered high-priority and recommended to be addressed as soon as possible. The majority involve retroactive code requirements or correcting conditions which are causing or will likely lead to operation and maintenance issues. All items should be addressed according to all applicable code(s).

- Church & Rectory
  - Install covers for uncovered / exposed junction boxes / wires
  - Install CO detectors in boiler rooms
  - Verify required locations of exit/emergency lighting and install new fixtures as needed
  - Verify proper operation of all fire alarm / security system components and install new components as needed
- Church
  - Replace sacristy sink HDPE drain piping with approved material
  - Install additional insulation and/or pipe heat trace cable to protect sacristy supply plumbing
- Rectory
  - Clean / repair / maintain boiler power vent
  - Clean / repair / maintain exhaust fans and dryer wall caps
  - Replace pressure tank pressure gauge and check valve
  - Replace main drain flexible couplings with solid couplings
- Site
  - Reinstall weatherproof receptacle oriented correctly and with weatherproof cover

RECOMMENDATIONS – LONG TERM

The following items were identified by St. John's as potential elective upgrades and / or improvements for the future. These items need not be addressed unless the existing component fails or unless desired. If undertaken, items should be addressed according to all applicable code(s). Estimated budget installed costs are estimated as indicated.

- Church & Rectory
  - Replace existing boilers with high-efficiency propane-fired, wall-hung condensing boilers. Estimated installed cost $10,000 per boiler. Given current fuel oil and propane prices, it is estimated that it is now less expensive to operate the existing oil-fired boilers than new high-efficiency propane-fired boilers. Thus, it is recommended to continue maintenance and operation of the existing boilers through the end of their service lives. However, fuel prices can vary greatly over time and can be monitored. If the price of fuel oil becomes more than that of propane (and is expected to remain that way for an extended period of time), boiler replacement may then become cost effective.
  - Replace aging fire/security system. Estimated installed cost $4,000.
  - Replace aging exhaust fans. Estimated installed cost $500 per fan.
- Church
  - Install new split AC system for basement cooling. Estimated installed cost $7,500.
  - Install new split AC system for basement and first floor cooling. Estimated installed cost $20,000.
  - Install new large, high-volume low-speed ceiling fans on first floor. Estimated installed cost $3,000 per fan.
  - Scope / inspect main drain pipe below basement floor slab. Estimated cost $500.
- Rectory
  - Replace aging office window air conditioner. Estimated installed cost $750.
  - Replace aging water conditioner. Estimated installed cost $2,000.
- Site
  - Inspect Church septic system. Estimated cost $1,000.
  - Install yard hydrant near outdoor tent area east of Rectory. Estimated installed cost $1,500.
  - Install larger breaker(s) and additional weatherproof receptacle(s) at existing pole to serve outdoor tent area east of Rectory. Estimated installed cost $1,500.

Should you have any additional questions, or require more information, please feel free to contact me at (518) 828-2700 ext. 1138.

Sincerely,

CRAWFORD & ASSOCIATES ENGINEERING PC

Christopher J. Knox

Christopher J. Knox, PE
Senior Engineer

cc: File 4903.0

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