

## Church of the Epiphany

3285 Buffalo Road  
Rochester, New York  
October 13, 2008

Prepared by: Energy Concepts  
3445 Winton Place  
Suite 102  
Rochester, New York 14623

Prepared for: CMA Architecture, P.C.  
72 Cascade Drive  
Rochester, New York 14614

### Existing Systems

#### Mechanical –

The existing mechanical systems are located in two mechanical rooms within the building. The main mechanical room is located at the juncture of the classroom wing and the office wing. Located in this room are a series of forced air gas fired heating furnaces. The mechanical room is as follows:

1. System 1: Serves the offices and meeting room. Two units, 1000 cfm and 77mbh heating output each, are co-joined for a total of 2000 cfm and 154mbh heating.
2. System 2: Serves the worship hall. Two units, 1250 cfm each and 98mbh heating output, are co-joined for a total of 2500 cfm and 196mbh heating.
3. System 3: Serves the altar area. One unit of 920 cfm and 57mbh heating output.
4. System 4: Serves the classroom area. Two units, 1000 cfm and 77mbh heating output each, are co-joined for a total of 2000 cfm and 154mbh heating.
5. Ventilation Air: To meet code, ventilation is provided by operable windows. In addition to this a central outside air intake located on the roof and ducted to each of the heating systems provides ventilation air. This intake does not provide for any conditioning of the ventilation air.
6. Air Distribution for furnaces: A galvanized metal distribution duct for both supply and return air is utilized by each of the furnace systems. See existing plans for routing and airflows.
7. Furnace Controls: Each system is controlled by a seven day programmable thermostat.

The banquet area is served by a series of hot water convectors. The hot water boiler was recently updated and is a condensing type.

## **Electrical –**

### **Electrical Service Equipment:**

The existing Church of the epiphany electric service is fed from Rochester Gas and Electric pole mounted overhead transformer located in the Parking Lot. The pole is numbered RGE 111B. The transformer feeds a 350 ampere main circuit breaker distribution panel which in turn feeds the existing distribution equipment. The Main Distribution Electric Panel board is located in the first floor. At time of walkthrough, the working space area was filled with supplies. This area should be cleared to maintain code required clearances. The Main Distribution Panel is rated for 400 amperes, 240/120 volts, 1-phase, 3-wire and was installed original to building. The Main Distribution Panel was manufactured by Electric Panelboard Company. This panel is in good condition for its age, however the main panel is beyond its useful life and spare parts are not readily available. There is no space for future additions and panel has already been tapped to allow for addition panel space.

### **Electrical Distribution and Branch Equipment:**

The main distribution panel feeds all of the existing branch circuit power and lighting panels. The power and lighting panels are of the same vintage as Main Distribution Panel. The panels are in good condition for their age, however lack adequate spare capacity for minor additions and spare parts are not readily available. All branch panels are listed for 240/120 volts, 1-phase, 3-wire and are manufactured by Electric Panelboard Company.

### **Branch Circuit Wiring:**

Branch circuit wiring through facility is installed in conduit and is in good condition. Spot checks at branch circuit panels, receptacles and switches show THHN wire has been installed and is in good condition. There was some cloth covered cables and type NM or NMC cables also noted. These cables should be replaced.

### **Lighting Systems:**

The existing lighting is accomplished through the use of original fixtures installed at time of original construction. Lighting is accomplished through the use of incandescent and T-12 fluorescent luminaries.

### **Fire Alarm System:**

The existing Fire Alarm system consists of a manual local switch and a bell. This does not conform to current Building Code of New York State, which requires a manual and automatic fire system for the portion of building which falls under

group 'A' building and a manual system for the portion of building which is used for group 'E' occupancy.

**Telephone/Data System:**

The existing Telephone system consists of an 8 pair cable coming from the utility to individual phones. The Service is located on utility pole in the parking lot.

**Plumbing –**

**Sanitary:** The existing sanitary system utilizes a septic tank and leach field located on the north side of the building. The condition of the tank and associated leach field has been in question.

**Domestic Water:** The building is served domestic water from a 1 inch service on northwest corner of the building. Much of the interior piping is from the original construction when the building obtained its water from a well. There may be significant deposits within the piping which may be contributing to a lack of pressure in some areas of the building.

**Domestic Hot Water:** The building is served by a number of tank-type water heaters, both electric and gas. All are in acceptable condition.

**Options for Systems Serving Future Additions and Renovations**

**Mechanical –**

Existing Systems: The existing furnace systems, while old, are in good order and condition. The boiler is new and operating well.

Ventilation Air: The building currently meets code due to the operable windows located in each of the spaces. Two possible methods will accomplish the goal of greater ventilation air for the church:

1. Rebalance Existing outside air (OA) intake. The existing OA intake should be rebalanced such that the following ventilation schedule is met:
  - a. System 1: 150cfm
  - b. System 2: 1250cfm
  - c. System 3: 150cfm
  - d. Resultant mixed air temperatures, based upon a 0F OA temp, are 65F, 35F, and 65F respectively.
2. Install a dedicated outside air system. This unit, either roof or ground mounted, would heat and dehumidify the ventilation air required for the existing systems. It would supplant the existing ventilation air intake system.

Banquet Area: To provide cooling for this space, a dedicated DX cooling and gas heating unit of 4000 cfm would be installed. This unit can either be roof or ground mounted. Duct systems would be exposed in the space.

Future Expansions:

1. Geothermal: This system would utilize a series of wells that serve as a heat transfer system for a water source heat pump heating and cooling system. Prior to determination of the suitability of the well field a thermal conductivity test must be performed. These tests will determine the geological structure of the site and the ability of the geology to transfer heat. These tests consist of drilling a test bore (well), installing a loop of high density polyethylene tubing, grouting the test bore, and then circulating fluid over a finite time period to determine heat transfer. If found suitable, these systems will provide significant energy savings compared to a traditional water source heat pump system. There is a large initial capital cost associated with drilling the well field.
  - a. Budget Test Well: \$15,000
  - b. Additional Wells: \$4,000 - \$6,000; price will be dependent upon depth.
2. Solar: A series of either vacuum tube or flat plate collectors can be utilized for creating both domestic and heating hot water. However, these systems will need to be supplemented with traditional boilers.
3. Kitchen expansion: renovations of the existing kitchen area will require commercial quality exhaust and make up air systems. The grease type hood, exhaust fan, zero-clearance duct, and a make up air system would be designed to the NYS Mechanical Code.
  - a. System Budget (6' hood): \$12,000

**Electrical –**

**Electrical Service Equipment:**

A new electrical service would need to be installed if Air-conditioning a new addition or a commercial kitchen is installed in the building. We would anticipate a 600A – 800A, 208Y/120 volt new main distribution panel would be required. This would be fed from a new pad-mounted utility transformer. This panel would back-feed existing branch circuit panel boards located through-out the building. The existing branch circuit panels should be updated with new interiors and breakers or completely replaced as part of renovations

**Lighting Systems:**

All existing incandescent and T-12 Fluorescent luminaires should be replaced with energy efficient fluorescent fixtures.

New energy efficient LED exit signs and emergency luminaries should be installed throughout the facility.

Existing Site lighting is from Utility owned and maintained fixtures mounted on pole in parking lot. New pole mounted site lighting may be added for aesthetic and additional security concerns.

**Fire Alarm System:**

A new manual and automatic point addressable fire alarm system should be added as part of building renovations to comply with current codes. Visual notification should be added to comply with current NFPA 72 requirements.

**Telephone/Data System:**

The existing Telephone service can be upgraded to include additional lines which would be required for fire alarm system. Depending on needs, a data network and cabling could be set-up for classrooms. A new buried service would be required.

**Additional Owner Requests:**

At the time of original walkthrough the following additional items were anticipated to be additional work associated with the project.

1. A new wireless P.A. system, speakers, tuner, amplifier for the worship hall. The anticipated budgetary costs for this system installed will be \$3000.00.
2. A new projector and screen for the sanctuary. The anticipated installed costs for this upgrade will be between \$700.00 – \$1500.00 depending on options, that will be addressed further during design.
3. Getting existing tower chime to operate. Anticipated costs to put chime controls in main office utilizing existing chime. \$400.00 – \$600.00. This cost includes new time clock and switch and assumes old chime is operational. If chime is not operational a new electronic chime system including computer controls etc. cost around \$3500.00

**Plumbing –**

**Sanitary Drainage:** It is proposed to abandon the septic tank and leach field. The interior piping would be modified to exit the building to the south. The piping would then be extended to tie into the pump station that was installed with the development to the south. This would give a more reliable system that would involve no maintenance on the part of the Church.

**Domestic Water System:** Buildings such as the Church that are under construction are now required to be provided with backflow preventors. Given the requirement for additional flow for the proposed toilet rooms and potential increased use, a new

1-1/2" water service is recommended. The new water service will require a backflow preventor, which would likely be located in the vicinity of the road in an enclosure, due to the length of the service.

**Domestic Hot Water:** It is recommended that the existing water heaters continue to be utilized. Normally, it is recommended to combine systems. With the lack of ceiling space, or other routes for new piping, it would be difficult to combine hot water systems. The propose restrooms will be provided with a heater that will serve all the proposed fixtures.