



### *Site Infrastructure*

**Stormwater** – The stormwater management system will consist of a mix of on-site water quality and water quantity control components which will be designed in accordance with the NYSDEC Stormwater Management Design Manual dated August, 2010. The collection system will consist of a series of catchbasins and pipes to collect the runoff and distribute it to the various components.

**Water Supply** – The City of Rensselaer water supply and distribution system has sufficient capacity to provide the anticipated demand for the project. There is an existing watermain stub at the driveway into the property that will be the connection point, and a new waterline will be installed through the site to provide domestic and fire protection service to the building.

**Sanitary Collection System** – The City of Rensselaer sewer collection system and the Rensselaer County wastewater treatment plant have sufficient capacity to collect and treat the sewage generated by the project. A gravity sewer main will be installed from the building to an existing sewer manhole within the public right-of-way.

### *Mechanical Systems*

Mechanical system design will incorporate concepts geared toward providing cost effective, energy saving and sustainable systems. Systems design will include use of variable frequency drives, economizers and controls with the capability of optimizing performance. High efficiency equipment, to meet or exceed the requirement by code will be provided to assist the overall design in achieving compliance with the New York Energy Code, as well as 20% reduction in energy usage when compared to ASHRAE 90.1-2007 baseline model and to achieve LEED certification.

A complete Building Automation System (BAS) shall be provided for the facility. The BAS will consist of a fully integrated direct digital control (DDC) system for energy management, equipment monitoring and control, and complete energy management system and subsystems. Energy saving control schemes shall be incorporated into the design including demand controlled ventilation, transfer of casino ventilation to kitchens for make-up air and night setback to shut down equipment when areas of the facility are not in use. The BAS shall also include provisions for measurement and verification, trending, and sustainability to coordinate with the requirements of LEED for indoor environmental quality, in support of the project achieving LEED certification.

Control of outdoor airflow to large, open spaces such as the gaming floor, multipurpose and restaurants will be performed via demand control sequence noted above, utilizing space-mounted CO<sub>2</sub> sensors. In addition to the demand control for outdoor airflows, outdoor airflow control will also be configured to provide makeup air to replace exhausted air.

Air handling units will be packaged direct expansion type with double wall construction, horizontal draw thru configuration. Units include filtration sections, cooling coils, and gas heating. Outside airflow and relief airflow measurement will be provided for all air handling units with airflow measuring stations. All units will be variable volume and will utilize variable frequency drives for fan speed control. HVAC systems will include air handling units located on the roof. Use of energy recovery from toilet exhaust and building relief air to precondition outside air for supply to the public spaces will be evaluated.

Demand controlled ventilation with CO<sub>2</sub> monitoring shall be used for casino, theater and other high density occupancy areas to minimize cooling and heating loads while maintaining adequate ventilation in the building when needed. Units will include air side economizers to allow for use of 100% outside air when ambient conditions permit. Air distribution will include variable air volume (VAV) boxes, each provided with reheat coils. VFD's will be included for supply and return fans for each air handling system to allow for proper operation of the building pressure control. Airflow monitoring stations will be provided in the supply ducts and outside air intakes for building pressure control purposes. Ductwork distribution and coils in the air handling equipment shall be sized to minimize fan energy consumption.

All ductwork systems (except special exhaust systems) will be galvanized sheet metal, medium (6") and low pressure (+/-2") construction. Type I kitchen hood exhaust ductwork will be welded 16 gauge steel, constructed in accordance with the code required sloping, cleanouts, etc. Hood exhaust will be wrapped with 2 layers of external fire barrier duct wrap. Dishwasher and vapor hood/Type II exhaust ducts will be stainless steel welded construction with drains at all low points.

Kitchen ventilation systems will include consideration of VFD's for exhaust and make-up air fans controlled by sensors included with the hood assemblies, to ramp up fans only when cooking operations are occurring. With the ventilation capacity available for the casino/public areas, transfer of this ventilation air to the kitchens as make-up for exhaust will also be evaluated for further energy savings.

Vertical stacked fan coil units will be provided for each typical guestroom in the hotel tower, with horizontal concealed units above the ceiling with ductwork distribution and linear diffusers provided in suites. The fan coil units will be selected to serve the peak cooling load at the medium fan speed setting. Remote wall mounted thermostats will be utilized for each fan coil. The use of "smart" energy saving guestroom thermostats will be evaluated to allow for setback when the room is unoccupied. All stats will be remote mounted from the fan coil at the entrance foyer to the room, with the temperature sensor located within the fan coil return air plenum.

Ventilation make-up air and toilet exhaust for the guestrooms will be provided by a dedicated system of roof mounted energy recovery units (ERU's) which introduce 100 percent outside air, using the toilet exhaust to precondition the outside air.

### ***Electrical System***

Customer-owned, exterior medium voltage service switchgear will feed exterior pad mount transformers (480/277V secondary). The exterior switchgear and transformers will be located adjacent to the back of house. 480/277V will be distributed throughout the building and transformed to 208/120V, as required. The standby generator(s) will feed multiple automatic transfer switches, as required by the NEC and the building code.

The emergency power generation system will be designed to support (but not be limited to) life safety (egress lighting & fire alarm), fire protection systems, elevators, communication systems, domestic water system, hot water system, public restrooms, one Food venue, food refrigeration, critical systems (data, security, surveillance, etc.) and the casino floor, including the associated support areas. The exterior generators will be located adjacent to the back of house and its fuel system will be designed to have a minimum capacity of 24-hours at full load.

All low voltage systems (data, communication, surveillance, security, etc.), the slot machines, Gaming table lighting, Cage lighting and all Gaming support equipment will be supported by UPS.