

December 18, 2019

Doherty High School

Worcester, MA

RE: Electrical Recommendations – B.1 New Construction on Foley Stadium Site Narrative

Net Zero Energy

The City of Worcester has established efficient energy, sustainable design and net zero energy as a goal for the project. A net zero energy building is one that is optimally efficient and generates energy onsite using clean renewable resources in a quantity equal to or greater than the total amount of energy consumed onsite.

The building mechanical and electrical systems are the chief consumers of energy within the building. A combination of the following strategies contributes to the success in reducing energy demand from these systems.

- a. Reduce Energy Demand – size mechanical equipment adequately, reduce plug and lighting loads, and improve the building shell.
- b. Harvest Site Energy - Orient the building to maximize passive solar, and daylighting opportunities.
- c. Maximize Efficiency - use efficient equipment to maximize benefit.
- d. Efficient Operations and Maintenance – building commissioning, training of staff, and ongoing preventative maintenance, combined with monitoring of ongoing performance, can ensure energy efficiency gains are realized.
- e. Renewable Energy - Generate enough energy on-site using renewable technologies to meet all energy demands for the facility.

As the project progresses, meetings and design charrettes with the Owner will be planned and existing building performances will be evaluated to advance the efficient energy, sustainable design and net zero energy goals.

New Construction

- a. Electrical Service:
 - i. Provide electrical primary duct bank to a utility company padmount transformer located on the exterior of the building.
 - ii. Provide new secondary electrical service conductors and new main switchboard and distribution equipment to a new main electrical room.
 - iii. Provide new telecommunications underground duct system to a new server room.
 - iv. Provide new electrical distribution and branch circuits.
 - v. Coordinate with utility company to disconnect power to the existing building at the end of construction to facilitate demolition by the General Contractor.

- b. Electrical Distribution
 - i. Provide electrical distribution equipment and feeder.
 - ii. Provide wiring devices and branch circuits.
 - iii. Provide lightning protection system.
 - iv. Provide solar photovoltaic system.

- c. Emergency Power:
 - i. Provide new emergency/standby generator, transfer and power equipment. Emergency equipment must be separated from normal and standby power equipment per the Massachusetts Electrical Code.
 - ii. All emergency equipment and feeders must be installed in 2-hour rated rooms or must be 2-hour rated.
 - iii. Provide power to emergency egress and exit lighting, life safety and standby equipment.

- d. Lighting:
 - i. Provide new emergency egress and exit lighting fed from the emergency life safety branch of the emergency/standby system.
 - ii. Provide new light fixtures with LED lamps.
 - iii. Provide new network lighting control system including occupancy sensors and daylight harvesting.
 - iv. Integrate lighting controls with HVAC system to optimize energy performance of the building.
 - v. Provide roadway, parking lot and athletic field lighting. The exterior lighting will have the appropriate cut-offs to reduce light pollution and be considerate to the residential neighbors.

- e. Fire Alarm:
 - i. Provide new voice evacuation fire alarm system.
 - ii. Provide new public safety radio distributed antenna system.
 - iii. Provide area of refuge communications system.

- f. Data Communications:
 - i. Provide new telecommunications cabling infrastructure per the BICSI standards. Utilize Category 6 cabling for voice and data drops and Category 6A shielded cabling for wireless access points. Install telecommunications equipment in dedicated rooms.
 - ii. Provide data network switches based on HP Procurve (Aruba Enterprise Company).
 - iii. Provide wireless access points based on Cisco Meraki.
 - iv. Provide VoIP telephone system and handsets based on Mitel.

- g. Audio-Video Systems:
 - i. Provide new sound system in the gym/cafetorium/auditorium/athletic field.
 - ii. Provide in-building classroom audio system.



- iii. Provide in-building cellular amplification system.
 - iv. Provide handheld radio amplification system.
 - v. Provide public address system.
 - vi. Provide digital signage and clock system.
- h. Security Systems:
- i. Provide new video surveillance system based on Genetec.
 - ii. Provide new access control system based on HID.
 - iii. Provide intrusion detection system based on DMP.

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RE: Electrical Recommendations – C.2 New Construction on Chandler Magnet School Site with Added Land Narrative

Net Zero Energy

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- a. Reduce Energy Demand – size mechanical equipment adequately, reduce plug and lighting loads, and improve the building shell.
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- c. Maximize Efficiency - use efficient equipment to maximize benefit.
- d. Efficient Operations and Maintenance – building commissioning, training of staff, and ongoing preventative maintenance, combined with monitoring of ongoing performance, can ensure energy efficiency gains are realized.
- e. Renewable Energy - Generate enough energy on-site using renewable technologies to meet all energy demands for the facility.

As the project progresses, meetings and design charrettes with the Owner will be planned and existing building performances will be evaluated to advance the efficient energy, sustainable design and net zero energy goals.

New Construction

- a. Electrical Service:
 - i. Provide electrical primary duct bank to a utility company padmount transformer located on the exterior of the building.
 - ii. Provide new secondary electrical service conductors and new main switchboard and distribution equipment to a new main electrical room.
 - iii. Provide new telecommunications underground duct system to a new server room.
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- b. Electrical Distribution
 - i. Provide electrical distribution equipment and feeder.
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 - iv. Integrate lighting controls with HVAC system to optimize energy performance of the building.
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- g. Audio-Video Systems:
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