DESIGN STANDARD 26 00 00

ELECTRICAL SYSTEMS DESIGN

1.01 GENERAL

A. Intent of Standard: This Design Standard provides guidelines for developing the design of and construction specifications for power supply and control for Park features that require electricity, all in accordance with industry-accepted operation and maintenance practices and standards observed by the Seattle Department of Parks and Recreation (SPR). It also delineates the responsibilities of the Designer in developing the design and overseeing its construction.

B. Design Mission: SPR's goal is to achieve sustainable, well-maintained park facilities that include power and lighting as appropriate to the facility's anticipated usage and safety needs. Important objectives include energy conservation, reduced maintenance needs, and the health, safety and welfare of the general public.

C. Designer Qualifications: Individuals participating in the design of electrical systems shall either have or be under the direct supervision of an individual who has the following qualifications and credentials:

- Professional Electrical Engineer registered in the State of Washington, with minimum five (5) years of experience in design of commercial electrical systems;

D. Design Product: The design product shall include the following elements, as applicable in the Design contract:

1. **One-Line Diagram:** A power distribution diagram that provides complete description of all electrical components and/or infrastructure to be provided, incorporated, or otherwise modified during construction, consistent with industry-accepted practices, and in accordance with the scope of work established by the Designer's contract or agreement with SPR. This diagram must clearly delineate between existing, new, and modified components of the system.
2. **Maintenance & Utility Impact Report:** The One-Line Diagram shall be accompanied by a Maintenance & Utility Impact Report that quantifies expectations in terms of electricity usage and operations/maintenance costs for any new electrical component(s). This report shall be prepared using the format and applicable labor and utility rates provided by SPR at the request of the Designer, such request being made at the time the report is prepared.
3. **Drawing Set:** A complete set of drawings showing all site preparation, demolition, installation, system components, and instructions necessary for successful construction of the approved electrical distribution and controls design. Standard Details as listed in Section 1.02 shall be utilized to the extent possible.
4. **Final Technical Specifications:** The Designer shall complete the template Technical Specifications Section 26 00 00 - Electrical or Section 26 56 00 - Outdoor Lighting

Design to the extent required to properly coordinate with the approved Irrigation Plan and the design drawings, as needed for its inclusion as part of the final Construction Contract Documents.

Text within the template specification that is intended to be edited by the Designer is identified by use of highlighted red bold font. Such items usually entail making choices about what type of equipment is needed for the conditions and requirements particular to the subject project. Other than appropriate finalization of these specially-identified areas in the template specification, the Designer shall not make any changes (add, delete, or alter) to Sections 26 00 00 or Section 26 56 00 unless specifically approved by the Park Engineer, through the project's technical review process.

5. **Permits:** The Designer shall determine all permitting needs related to construction of the electrical system, and coordinate as necessary with SPR and the Contractor to ensure that all necessary permits are obtained.

6. **As-Built Drawings:** The Designer shall submit a complete as-built drawing set within 10 calendar days of the marked-up setting being provided by the construction contractor, developed in accordance with the process outlined below. The Designer shall verify that the Construction Contract Project Manual is completed in a manner that contractually obligates the Contractor to follow this process.

   a. The Contractor shall keep a current working set of drawings with all as-built changes or actual conditions as work proceeds, to be submitted to Designer at substantial completion of electrical system installation.

   b. The Contractor shall arrange for surveying services to locate all conduit and equipment with trenches or vaults open as the system is constructed, with survey data properly recorded into field books.

   c. The Contractor shall perform all required tests, audits, etc. with adequate notice as detailed in the specifications.

   d. The Designer shall interpret and incorporate field information into a scaled AutoCAD drawing (utilizing same scale as contract documents) and provide to the Park Engineer prior to final acceptance of project.

   e. The Designer shall prepare Mylar record drawings ("as-builts") with contractor's and SPR surveyor's information included, and CD(s) containing electronic AutoCAD and Adobe pdf drawings with that same information, to be submitted to the Owner along with all other required information, manuals, etc.

1.02 GOVERNING DESIGN STANDARDS

A. Accepted Standards: All materials, components, hardware, fixtures, and any other items associated with the design shall be in accordance with approved standards, details, and technical specifications provided in the documents referenced below. The Designer shall demonstrate to the Engineer that all specifications relevant to the project have been included into the Construction Contract Documents.

1. **Lockout/Tagout (Control of Hazardous Energy):** Electrical design and all recommended construction/maintenance procedures shall be developed in accordance with WISHA Chapter 296-803. Reference:

   http://www.lni.wa.gov/wisha/rules/locktagout/pdfs/296-803-complete.pdf

2. **SPR's Technical Specification Section 26 00 00 - Electrical**

3. **SPR's Technical Specification Section 26 56 00 - Outdoor Lighting Design**

4. **Seattle City Light Resources:** Nearly all SPR facilities are located within the Seattle City Light (SCL) service area. SCL has a website that provides various instructions, standards, guidelines, and similar information regarding electrical systems within its service area, publicly accessible at http://www.seattle.gov/light/newconstruction/ . All pertinent resources available from SCL shall be utilized to the extent practicable, including but not limited to information and details contained in the following documents:

   a. "Requirements for Electric Service Connection": Provides SCL guidelines for all types of electrical projects.

   b. SCL Construction Guidelines

   c. SCL Material Standards

5. **SPR's Series Division 26 Standard Detail Drawings:** Any Standard Details that are part of the project Scope of Work shall be used as provided by SPR (without alterations) and shall be included in the Contract Documents.

B. Exceptions: In general, all aspects of the design shall be in accordance with the accepted standards cited in Section 1.02.A. However, the Designer has the added responsibility to expand upon these documents as required, dictated and/or warranted by considerations that include, but are not limited to, the following:

- As directed by the Park Engineer as a result of SPR's Technical Review process;
- Special conditions pertaining to the project and/or site;
- Environmental considerations and constraints;
- The integrity of the proposed design;
- The health, safety, and welfare of the general public;
- Adherence to National Electric Code (NEC) requirements;
- Adherence to other applicable codes or legal standards.

1.03 DESIGN GUIDELINES

The following guidelines reflect SPR preferences that are not necessarily reflected in the governing standards provided in Section 1.02, and shall be incorporated into the electrical design as applicable, in addition to requirements dictated by the governing standards.

A. Panels: Any new electrical main panels shall be rated at 125 amps minimum, 3-wire single-phase. Any service over 200 amps shall be 3-phase, 4-wire, and only utilized in areas where such service is readily available. A minimum of twelve connections, to include no less than six spare connections, shall be provided in each new panel rated at 125 amps or above.

B. Conduit: Exterior conduit or conduit exposed to public shall be rigid galvanized steel or Schedule 80 PVC per code.

C. Receptacles: Indoor receptacles shall be side-wired only. All exterior (outdoor) receptacles must be weatherproof with ground fault interrupters, installed on pedestals or other easily accessible locations, at least 2 feet above grade to avoid water damage, and also be provided with a durable locking cover. Exterior receptacles shall be on dedicated circuits (independent of lighting) and provided with timer mechanisms.

D. Temperature Controls: All public area thermostats shall have vandal resistant protective covers.

E. Light Fixtures: Refer to Design Standard No. 26 56 00. For supervised facilities, exterior light fixtures shall be vandal-resistant. For unsupervised facilities, both interior and exterior light fixtures shall be vandal-resistant. Exterior fixtures must be rated damp-proof or rain-tight.

F. Exterior Light Controls: Refer to Design Standard No. 26 56 00. A programmable light timer/clock with a photocell bypass switch is required for all exterior lighting systems. Pole lighting systems shall be on dedicated circuits. Controls shall be mounted in an interior location, if possible.