SECTION 26 50 02

EXTERIOR LIGHTING

This section includes exterior lighting fixtures and supporting poles, with requirements for the design of site illumination.

PART 1 - DESIGN DIRECTIVES

1.1 RELATED SECTIONS

A. Lighting Controls

B. Interior Lighting

1.2 DESIGN REQUIREMENTS & CRITERIA

A. An NCQLP Certified Lighting Designer with at least 3 years of experience designing similar projects shall be consulted for developing campus site, parking lot and street lighting.

B. The lighting designer shall provide point-by-point illuminance calculations and tabulations for each area that includes the design criteria and assumptions used in the design. The point-by-point illuminance calculations shall be reviewed by FOM-Engineering prior to any project permit submittals. A copy of the design documentation shall be included in the O&M manuals.

1.3 DESIGN DIRECTIVES

A. Initial fixture light levels shall be minimum 15% above the required light levels to allow dimming to extend the L70 life of the LED modules.

B. Standard Color Temperature for all exterior campus areas, walkways, streets/drives, building mounted exterior lighting.

1. 3000K

C. Exterior building mounted lighting:

1. Shall be full cut-off, Dark Sky compliant.
2. 3000K is standard color temperature.
3. Maximum height - 25 ft AFG. Higher mounting heights only by FOM-Engineering approval.
4. Controls - May be connected either to the local Site Light controller (Lightcloud) or may be connected to the building lighting controller.

D. Dartmouth Campus Standard Illumination Levels. The following table is a guideline and reflects what previous lighting designers have consistently applied on campus. The Campus areas are typically considered rural in terms of IESNA area categories.

Dartmouth Campus Standard Illumination Levels for its rural nighttime environment.			
	Horizontal Footcandles	Uniformity (Ave/Min)	Vertical Footcandles (at 5 feet above pavement)

Roadways	0.8	6:1	0.8
Parking Lot and Areas	0.5	10:1	0.5
Walkways	0.5	8:1	0.5

PART 2 - PRODUCTS

2.1 STANDARD WALKWAY SITE LIGHT AND POLE

A. BEGA 77929, 3000K, Pole: 1308HR 3"-5" Tapered round hinged. Black (BLK)

1. Mounted at 12 ft AFG,
2. Dimmed by 15% at initial installation

2.2 STANDARD PARKING LOT AND AREA LIGHT AND POLE

A. Ligman Steamer Fixture USE-90001-DARTMOUTH-_W (Wattage per design)-T_(Distribution per design)-W30-01-120/277V-__H(height of hinged pole)-DIM-F / FS-A91260-18" EXTENDED TOP-01 /(POLE) HAPD-RSA__C5-H-01 Notes: 01 = black finish. FS = Factory Special (1/2" NPT hole at 2.5" from top, opposite of fixture, for mounting controller). W30 = 3000K LED Color.

1. Height – typically mounted at 20 feet which requires Town of Hanover approval.
2. Dimmed by 15% at initial installation

2.3 DARTMOUTH COLLEGE/TOWN OF HANOVER STANDARD STREET LIGHT.

A. This standard streetlight is used on Town of Hanover streets - East Wheelock, College, N Main, Wentworth, Maynard, Dewey Rd and on Dartmouth College Tuck Mall:

B. LUMEC Serenade DSX - S56-72W-32LED-3K—T-LE5-VOLT-SFX-FN6-PH3-TN3-BKTX / Mounted to 12 ft pole with optical center @~14 ft AFG. Dimmed by 15%. This is a 72W (in 2020) Type 5. It provides illumination both at front and rear to serve the sidewalks that are typically "behind" the pole/luminaire.

1. Dimmed by 15% at initial installation.

C. Pole – HADCO P2565 – 12 – A. 12' Pole Height, Black paint finish, no options.

PART 3 - EXECUTION

3.1 CONCRETE BASE INSTALLATIONS

A. Variances to the following shall require approval by DC Landscape Committee.

B. Base diameter shall not be more than 5" larger than pole base cover.

C. Base edge shall be finished with a 2" radius rounded chamfer.

D. Concrete Base elevation above finished grade:

1. Grass areas - 2" AFG
2. Sidewalk/Paved – flush with pavement. Alternate - maximum 2" with base diameter same as pole base.
3. Parking Lot without curbed protection – 24" AFG

E. Ground rod shall be installed through center of concrete base.

3.2 CONTROLLER MOUNTING

A. RAB Controller shall be mounted on Parking Lot (Ligman Steamer) and Walkway (BEGA 77929) lights above or below fixture. A 90-degree fitting shall be used to mount the RAB controller so that it points downward and is parallel to pole.

3.3 CONTROLS - TESTING, COMMISSIONING

A. Site Lighting controls commissioning shall be required as a part of all projects including commissioning. Commissioning shall proceed only after all adjustments and functional testing of lighting controls has been completed.

B. Site Lighting Controls Programming Process shall be managed by FOM-Engineering or by the Project Manager. The process shall include:

1. One week prior to site lighting programming, Dartmouth shall submit the following documents to Contractor for programming:
   a. FOM-Electric Shop shall provide the pole numbers written on the site drawing for all new and/or un-numbered poles on the site.
   b. Pole mounted lights shall be named 'Pole- XXX' (three-digit number field)
   c. Building mounted exterior lights shall be identified by an abbreviation indicating the building, and the side of the building that the fixture is located. Example – "IPF-N1", "IPF-N2" (indicates two fixtures on north side of Indoor Practice Facility)
   d. Sequence of Operation (SOO) for Site lighting,
   e. Name of Gateway - "Campus Area (building where the gateway is installed)"
   f. Example – "West Campus (Boathouse)"

2. Contractor shall schedule RAB Lightcloud to set up Dartmouth Lightcloud Site. Programming shall include light identifications, gateway name, tuning/trim, and schedule.
3. FOM-Engineering shall review Lightcloud site to verify and make corrections as needed.

C. Sequence of Operation for Site lighting:

1. Tuning/Trim at initial installation (typically 15%)
2. Schedule
   a. ON - 45 minutes before dusk
   b. ON - 45 minutes before dusk
   c. Other controls per project design and/or Town permit requirements.

3.4 RECORDS, AS-BUILT DOCUMENT REQUIREMENTS

A. Site Lighting shall be shown on the site record drawings.

B. Approved Lighting fixture Submittal including BOM and distributor information

C. Sequence of Operation

D. Design photometrics (point-by-point calculations).

END OF SECTION 26 50 02