

SECTION 26 50 00  
LIGHTING  
Design Standard

## PART 1 GENERAL

### 1.1 PURPOSE

This design standard has the purpose of creating a consistent application of lighting system design and specification requirements throughout the San Mateo County Community College District. The intent is to maintain a standard of quality for functionality, ease of maintenance, reliability and energy conservation.

Lighting represents a large portion of the District's energy consumption. Design safe, low maintenance and high efficiency lighting systems is a priority. In alignment with District sustainability strategies and efforts, lighting installations should strive to reach an optimum balance of aesthetic appeal, effectiveness and efficiency.

## PART 2 PRODUCTS

### 2.1 GENERAL REQUIREMENTS:

All lighting shall be designed to comply with or exceed Title 24 and follow the recommendations of the Illuminating Engineering Society (IES).

- A. Comply with applicable ANSI standards pertaining to lamp materials, lamp ballasts and transformers, and luminaires.
- B. Comply with applicable NEMA standards pertaining to lighting equipment.
- C. Lighting fixtures shall be on the DesignLights Consortium Qualified Products List.
- D. Provide luminaires and lampholders which comply with UL standards and have been UL listed and labeled for location and use indicated.
- E. Provide attic stock as noted:
  - 1. Furnish 2 percent extra lenses or louvers for each size and type of fluorescent luminaire.
  - 2. Furnish 10 percent extra lamps for each size and type installed.
  - 3. Furnish 5 percent extra ballasts for each size and type.
- F. Comply with CEC as applicable to installation and construction of luminaires.
- G. Comply with fallout and retention requirements of CBC for diffusers, baffles, louvers, and the like.
- H. Provide recessed fluorescent luminaires with supports as required by DSA.
  - I. Lighting design to conform with latest Title 24 requirements for energy efficiency and control.
- J. Provide lighting levels for both interior and exterior spaces that conform to IES recommendations for the task and type space to be illuminated.
- K. Lighting in office and study spaces to be designed for minimum levels of ambient light. Task lights to be provided at each workstation to provide required lighting level at the workplane. Generally task lights to be incorporated into the system furniture, coordinate with design team and provide LED task lights where not otherwise furnished.
- L. Submit documentation to the District for any and all rebate/incentive applications that may apply to the project.

### 2.2 LUMINAIRES

Luminaires shall meet code requirements and industry standard of design and care.

- A. Where recessed luminaires are installed in cavities intended to be insulated, provide IC rated luminaires or other code approved installation.
- B. UL label luminaires installed under canopies, roof or open porches, and similar damp or wet locations, as suitable for damp or wet locations.
- C. Recessed Luminaires: Frame compatible with ceiling material installed at particular luminaire location. Provide proper factory trim and frame for luminaire to fit location and ceiling material.
- D. Finishes:
  - 1. Manufacturer's standard finish (unless otherwise indicated) over a corrosion resistant primer.
  - 2. Interior Light Reflecting Finishes: White or specular finish with not less than 85 percent reflectances.
  - 3. Exterior Finishes: In most cases, to match existing. Confirm with the Executive Director of Construction Planning or the Vice Chancellor of Facilities.
- E. Light Transmitting Components:
  - 1. Plastic diffusers, molded or extruded of 100 percent virgin acrylic.
  - 2. Prismatic acrylic, extruded, flat diffusers, 0.125 inch overall thickness.
- F. Fluorescent Luminaires:
  - 1. Provide open lamp fluorescent luminaires without diffusers or guards with turret type, spring loaded sockets.
  - 2. To facilitate multilevel lamp switching with adjacent fixtures, multi-lamp fixtures and tandem fixtures, provide a master/slave installation with the ballasts to maximize the capability of switching and providing uniform lighting distribution.
  - 3. For T5HO lamps, provide twist and lock design sockets, socket body rated to 110C and socket rotor rated to 140C.
  - 4. Provide wire lamp guards on exposed lamp fluorescent luminaires.

### 2.3 Ballasts/Drivers

Ballasts shall meet code requirements and industry standard of design and care.

- A. Provide ballasts UL rated for specified lamps.
- B. Thermal Protection: Internal UL Class 'P' with automatic reset.
- C. Sound Ratings: Class 'A'. Where not available as standard product from any specified manufacturer, provide quietest rating available.
- D. Total Harmonic Distortion: Not to exceed 20 percent of the input current unless otherwise indicated.
- E. Input Voltage: Provide universal voltage ballast matching branch circuit supply voltage.
- F. Provide quantity of ballasts to provide switching as required.
- G. Provide factory printed wiring diagram on ballast housing.
- H. Ballasts used in enclosed and gasketed luminaires shall be of Type 1 construction.
  - I. Comply with FCC rules and regulations Part 18, Class A concerning generation of both electromagnetic interference and radio frequency interference.
- J. Provide 3-year warranty against defects in materials and workmanship, including either a USD10 replacement labor allowance or complete replacement including labor by an agent of the manufacturer.
- K. Ballasts for Linear Fluorescent Lamps:
  - 1. Power Factor: Minimum 97 percent.
  - 2. Do not provide magnetic fluorescent ballasts.
  - 3. Nondimming Electronic:
    - a. Tandem wiring between luminaires may be used to minimize the number of ballasts while accomplishing the switching requirements shown on Drawings. Provide label in lamp compartment of luminaire to identify the function of ballast. Label shall not be visible from room.
    - b. Provide ballasts that meet requirements of UL 935, ANSI C82.11 and bear the appropriate UL label.

- c. Provide ballasts that withstand input power line transients as defined in ANSI C62.41, Category-A and IEEE 587.
  - d. Provide series wired programmed start ballast unless noted on drawings.
  - e. High frequency operation: Not less than 42kHz.
  - f. Lamp Crest Factor: Maximum 1.7 for programmed rapid start ballasts and maximum 1.85 or less for instant start ballasts.
  - g. Average Ballast Factor (BF): Minimum 88 percent.
  - h. Provide 0 degree Fahrenheit minimum starting temperature ballasts for luminaires installed where exposed to anticipated ambient temperature less than 55F.
4. Dimming Electronic:
- a. Shall meet requirements of nondimming electronic ballasts.
  - b. Do not use tandem wiring between luminaires.
  - c. Ballast shall start lamp at any preset light output setting and provide continuous, square law dimming from 100 percent to specified low-end output.
  - d. 10 Percent Dimming: Control protocol shall be 0-10V type with positive line voltage On/Off.
  - e. 1 Percent Dimming: Control protocol shall be 0-10V type with positive line voltage On/Off. Ballasts for Compact Fluorescent Lamps:
- L. Ballasts for Compact Fluorescent Lamps:
- 1. Power Factor: Minimum 97 percent.
  - 2. Provide ballasts which meet requirements of UL 935, ANSI C82.11 and bear the appropriate UL label.
  - 3. With integral end of lamp life detection and shutdown circuit with automatic reset.
  - 4. Nondimming Electronic:
    - a. Series wired, programmed rapid start circuitry.
    - b. High frequency operation: Not less than 50kHz.
    - c. Lamp Crest Factor: Maximum 1.5.
    - d. Average Ballast Factor (BF): Minimum 98 percent.
    - e. 0 degree Fahrenheit minimum starting temperature.
  - 5. Dimming Electronic:
    - a. Shall meet requirements of nondimming electronic ballasts.
    - b. Ballast start lamp at any preset light output and provide continuous, square law dimming from 100 percent to specified low-end output.
    - c. Supply line voltage controls with air-gap disconnect.
- M. Ballasts for High Intensity Discharge (HID) lamps:
- 1. Power Factor: Minimum 90 percent.
  - 2. Provide HID ballasts with end of life anti cycling protection technology where available.
  - 3. Do not use tandem wiring between luminaires.
  - 4. Provide proper ANSI-series designation for specified lamp.
  - 5. Average Ballast Factor (BF): Minimum 98 percent.
  - 6. Minus 20F minimum starting temperature.
  - 7. Pulse-start types specifically for pulse-start lamps.
  - 8. Provide electronic ballast for Metal Halide lamps up to 150 watts.
  - 9. Constant Wattage Autotransformer (CWA):
  - 10. With fully wired, integral dry-film type capacitor and potted ignitor (where applicable).
  - 11. Lamp Crest Factor: Maximum 1.6.
  - 12. Metal Halide (MH) lamps: Ballasts shall tolerate input voltage variation of plus or minus 10 percent with less than plus or minus 5 percent variation in output voltage.
  - 13. High Pressure Sodium (HPS) lamps: Ballasts shall tolerate input voltage variation of plus or minus 10 percent with output voltage within trapezoidal limits of lamp operating voltage over lamp life.
  - 14. High leakage reactance high power factor (HX-HPF) equal to Advance 72C Series acceptable for 100 watt or less HPS lamp.
  - 15. Nondimming Electronic:
    - a. With integral end of lamp life detection and shutdown circuit with automatic reset.

- b. High frequency operation: not less than 170Hz.
  - c. Ballast shall tolerate input voltage variation of plus or minus 10 percent with less than plus or minus 0.5 percent variation in output voltage.
  - d. Lamp Crest Factor: Maximum 1.3.
16. Drivers for LED Lamps:
- a. Drivers shall have a minimum efficiency of 85%
  - b. Starting Temperature of -40F
  - c. Input voltage 120V to 480V nominal (+/- 10%)
  - d. Power Factor to exceed 0.90.
  - e. Total Harmonic Distortion (THD) 20% or less.
  - f. Drivers must be Reduction of Hazardous Substances (RoHS) compliant.
17. 0-10 Volt Dimming.

## 2.4 Lamps

Lamps shall meet code requirements and industry standard of design and care.

- A. Specify the provision of similar lamps by a common manufacturer. The predominant interior fixture lamp should be a 4' fluorescent tube. For 2'x2' fixtures, U-tube fluorescent lamps are not allowed; specify 2' lamps instead.
- B. Incandescent: Not allowed unless approved by the Executive Director of Construction Planning or the Vice Chancellor of Facilities.
- C. Tungsten Halogen Incandescent:
  - 1. Line voltage:
    - a. PAR lamps: Provide HIR technology, medium screw base, size, wattage and beam spread as applicable.
    - b. Tubular: Provide HIR technology, wattage and base configuration as applicable.
  - 2. Low Voltage: Wattage, voltage, beam spread, base style and type as applicable.
- D. Fluorescent:
  - 1. Provide 3500K fluorescent lamps unless approved by the Executive Director of Construction Planning or the Vice Chancellor of Facilities.
  - 2. Linear Fluorescent:
    - a. T-8: Provide the following:
      - 1. Bi-pin base, tri-phosphor coated
      - 2. CRI equal to or exceeding 85
      - 3. 30,000 hours rated on 3 hour switching cycle when used with programmed start ballast
      - 4. Compatible with dimming ballasts
      - 5. Length and wattage as applicable
    - b. T-5: Provide the following:
      - 1. bi-pin base, tri-phosphor coated
      - 2. CRI equal to or exceeding 85.
      - 3. Compatible with dimming ballasts.
      - 4. Length and wattage as applicable.
    - c. Do not specify or allow T-12 lamps.
    - d. For fluorescent lamp fixtures installed in art, multi-media, and any space where accurate color rendition (i.e. cosmetology, art, video production, and graphic arts work) is required, lamp CRI is to equal or exceed 90.
- E. Compact Fluorescent:
  - 1. Single ended, four-pin plug-in base, tri-phosphor coated, CRI exceeding 81, CCT, wattage and configuration as applicable.
  - 2. Do not provide self ballasted screw-in type unless applicable.
  - 3. Do not provide magnetic starter type luminaires, ballasts or lamps.
  - 4. For compact fluorescent lamp fixtures installed in art, multi-media, and any space where accurate color rendition (i.e. cosmetics, painting, paintshops, video production, and graphic arts work) is required, lamp CRI is to equal or exceed 90.
- F. LED:

1. Provide color temperature between 2700 and 5000K
  2. Operating temperature for exterior fixtures: -40F to 120F
  3. Lamp CRI is to equal or exceed 80.
  4. Minimum 60 Lumens/Watt
  5. Utilize high performance Class 1 LED System.
  6. Dimming required to 5%, except specialty location such as auditoriums, theater, and similar spaces where dimming shall be to 0%
- G. High Intensity Discharge (HID):
1. Rate lamps used in open luminaires for such use.
  2. Provide coated or clear lamps as recommended by the luminaire manufacturer for maximum luminaire efficiency and distribution.
  3. Lamps installed in common interior areas shall be of the same manufacturer's production run.
  4. Provide self extinguishing lamps or lamps with protective shroud in open luminaires
  5. Ceramic arc tube metal halide:
    - a. CRI exceeding 80, CCT, wattage, configuration, and base style and type as indicated in luminaire schedule.
    - b. Maximum plus or minus 200 Kelvin color shift over rated lamp life.
    - c. Provide lamp base and orientation compatible to luminaire.
  6. Quartz arc tube metal halide:
    - a. CRI exceeding 64, CCT of 4000 Kelvin, wattage, configuration, and base style and type as indicated in luminaire schedule.
    - b. Maximum plus or minus 600 Kelvin color shift over rated lamp life.
    - c. Provide pulse-start type when at least one approved manufacturer supplies specified lamp with that technology and where burning position is compatible with luminaire.
  7. High Pressure Sodium: Ceramic arc tube type, mogul or medium screw base, universal burn rated, wattage and configuration as applicable.
  8. Do not specify mercury vapor lamps.
- H. 26 52 00 Emergency Lighting
- Most areas of the three campuses do not have emergency generator or UPS backup.
1. Central inverter units should be used to provide the necessary illumination for egress in case of a power outage.

## 2.5 Emergency Lighting

The design professional shall design emergency lighting to meet code requirements and industry standard of design and care

- A. Most areas of each campus do not have emergency generators.
- B. Individual battery units should be avoided because they constitute a greater operational cost for maintenance staff.
- C. If individual battery powered emergency lights are more appropriate to any particular new construction or retrofit project, the design professional must first seek approval from the Executive Director of Construction Planning and/or the Vice Chancellor of Facilities.
  1. If battery powered emergency downlights smaller than 6" in diameter are approved, also provide access hatches for emergency battery backup ballasts, adjacent to downlights installed in inaccessible ceilings.

## 2.6 Exit Lights

Exit lighting shall be designed to meet code requirements and industry standard of design and care.

- A. Exit fixtures shall be AC, LED with battery backup, self diagnostic, thin profile for high abuse areas. Color of lettering shall be Red or Green, as determined by the Executive Director of Construction Planning and/or the Vice Chancellor of Facilities.

- B. For illustrative purposes, this Energy Star rated Lithonia Quantum LQM EL N exit light (with LED lamp, Nickel-Cadmium Battery and Thermoplastic housing) is the preferred type of exit light.



- C. Non-electric supplied exit signs shall be non-radioactive photoluminescent signs. Tium powered (radioactive) exit signs are prohibited for installation on campus.

## 2.7 Exterior Lighting Poles

All lighting poles to meet the following requirements based on Code requirements and industry standard of design and care.

- A. Provide exterior light poles with minimum 30" concrete bases when installed in vehicle traffic area or direct buried in pedestrian or landscaped areas and which are structurally supportive of pole under design loading.
- B. Provide exterior poles clean and scratch free with base bolt covers to match pole and luminaire finish.
- C. Provide poles and pole bases rated for area's minimum wind EPA loading for quantity and type of luminaire it supports with a 1.3 gust factor.
- D. Provide poles with gasketed handholes, stainless steel tamper resistant hardware and ground lugs.
- E. Provide concrete footings for pole-mounted lighting units and bollard lights.
- F. Ensure installation of luminaire poles plumb and straight.
- G. Exterior fixtures to be capable of multilevel control as required by Title 24.
- H. Lighting fixture shall be capable of providing IES type II, III, IV and V distributions.

## 2.8 Interior Lighting Requirements

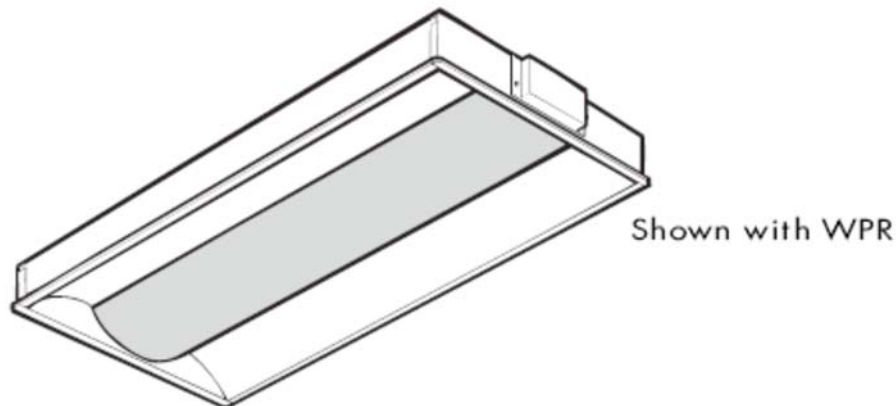
Interior lighting shall be designed to meet code requirements and industry standard of design and care.

- A. All lighting fixtures shall be selected and their placement designed with operational and maintenance requirements in mind.
  1. Specify fixtures that can be serviced by a single maintenance staff person (i.e., that do not require more than one person to service the fixture due to lens attachment configurations, ballast access configurations, etc.)
  2. Specify fixture locations in areas that allow maintenance personnel to access the fixture for re-lamping or other service with a standard 6', 8' or 10' ladder. High bay ceilings are an exception to this requirement; high bay ceiling fixtures can be accessed with a lift, provided the floor is flat.
  3. Restroom lighting shall be specified with acrylic lenses for ease of cleaning. Per Restroom Design Standard, avoid installation of lighting over stalls (hard to relamp).
  4. In stairways, do not design fixtures that cannot be safely serviced from a flat landing area of the stairway.
  5. Predominantly, fluorescent fixtures shall be 2x4 (not 2x2). This preference is stated in an effort to minimize the number of types of lamps needed for replacement stock.
  6. Lighting levels to meet IES Recommendations

- B. The following classroom lighting conceptual planning aspects shall be reviewed in the schematic design phase for classroom lighting and switching.
1. For classrooms supporting AV presentations, provide at a minimum bi-level switching. The first row of lights in these rooms is to be switched separately and controlled from the front of the class for control by the instructor. The switch shall be identified by a distinct color (preferably, blue). This is intended to support AV presentations while still allowing some light for emergency egress, general circulation and note taking.
  2. Half or greater than half of each fixture lamps are to be tied to the front zone and manually controlled on/off by switches at the podium or nearest exit door to instructor, whichever is closest.
  3. Switch control labeling and relative position: Label all light control switch device plates only at instructional podium position in rooms where there are more than two switches in a single gang. Possible labels for the lights operated – FRONT, MIDDLE, BACK, SCREEN DIM, TABLE, CHALKBOARD, AISLES, etc. Lettering to be minimum 1/8" high, in nonitalicized, sanserif font, either all upper case or upper and lower case. Orient all switching positions and labeling to the room orientation.
- C. In small rooms or offices with more than one light fixture, do not tandem wire the fixtures such that they rely on a single ballast. The intent of this requirement is that a single ballast failure will not result in total darkness within an enclosed space.
- D. In circulation spaces, such as lobbies, corridors, vestibules, stairways, common area lighting shall be controlled through the Building Management System. This requirement allows for programmed on/off times, in lieu of the historic need for daily manual switching of lights by security and facilities personnel.
1. Every third light (approximately) should be circuited to remain on at all times, so that after-hours access is minimally illuminated.
- E. Daylight sensors shall be installed to meet or exceed code.
- F. Occupancy sensors shall be installed to meet or exceed code. At a minimum, SMCCCD requires occupancy sensors in classrooms, offices, meeting rooms and restrooms.
- G. For illustrative purposes, this SensorSwitch line voltage wide view sensor, or equivalent, is the preferred type of occupancy sensor in offices, meeting rooms, small classrooms and other similar applications. Line voltage sensors negate the need for transformers (which are not desired because it is another component that must be installed and maintained). In restrooms, medium to large classrooms and other similar applications, occupancy sensors should be ceiling mounted and have 360° coverage for best function.



- H. Illumination Level: Minimum uniform light level at desk height is to be 50 FC adjusted for bulb burn-in and dirt.
- I. For computer labs, classrooms and offices, direct/indirect fixtures are preferred.
- J. For illustrative purposes, this H.E. Williams 2' x 4' recessed direct/indirect fluorescent fixture with white perforated round bottom, or equivalent, is the preferred fixture type in classrooms, offices and other spaces with similar lighting requirements. An equivalent pendant-type fixture, such as Finelight, would be acceptable in applications without suspended ceilings.



- K. For corridors, use standard lay-in with acrylic prismatic lenses to minimize required maintenance of exposed fluorescent tubes. This is the most economic solution in terms of first and life cycle cost, since acrylic prismatic lenses have not only the lowest first cost but also require the least effort in routine cleaning.

## 2.9 Exterior Lighting Requirements

Exterior Lighting shall be designed to meet code requirements and industry standard of design and care. In addition, take into account the following considerations:

- A. Communications between fixtures and the network LCS shall be conducted over IEEE802.15.4 using Zigbee Mesh or compatible technology. Default for failed communication shall be “on”
- B. Network lighting control system will control all lights in zones (parking lot, roadway, etc.) and sub-zones (intersection areas, high traffic, secure areas, etc.) that will be defined by the user during the project. The network lighting control system will execute the sequence of operations that is defined by the user during the project.
- C. Photocell control will be provided on each fixture to control a high and low light level based on a signal from the network lighting control system. High and low levels shall be adjustable.
- D. Occupancy sensors will be installed on each fixture to control high and low light level based on a signal from the network lighting control system. High and low levels shall be adjustable.
- E. The network lighting control system will be capable of allowing each fixture to be controlled by its own occupancy sensor and photocell, with programmable time delays, sensitivity, and light levels
- F. The network lighting control system will also allow fixtures to be in multiple control groups so that their on-off and dimming operation is remotely controlled according to programmable logic. This will allow a large group, such as a section of parking lot, to be controlled together. It will also allow the programming of smaller groups, such as every fixture adjacent to any other fixture, so that a finer level of control can be achieved. Each fixture can be in multiple control groups.
- G. The network lighting control system shall have the capability to monitor, track, report, and store operating and energy use data for the controlled fixtures.
- H. The network lighting control shall retain basic sequence of operations and functionality in the event of loss of communication with the BMS.
- I. The network lighting control system shall be provided with functionality to override the basic control sequences, e.g. when override control is required.
- J. When the system operates improperly, such as fixtures not following required commands, the network lighting control system software shall initiate factory-programmed diagnosis of failure and display messages identifying the problem and possible causes.
- K. The network lighting control system functionality should be accessible through a web-based service with multi-level password and access control.



- L. The network lighting control system shall have the ability to interface with the existing campus building management system via BACnet IP.
- M. DBE shall provide a data drop (CAT 5 or 6 where appropriate) and route to the nearest IDF cabinet or data connection (in Coordination with District Information Technology Services).
- N. System manufacturer shall meet the following qualifications and at a minimum shall make the following site visits to ensure proper system installation and operation:
- O. Qualifications for factory certified field service engineer:
  - 1. Minimum experience of 2 years training in the electrical/electronic field.
  - 2. Certified by the equipment manufacturer on the system installed.
  - 3. Prior to installation of wiring, system manufacturer shall review with the District the following items:
    - a. The desired sequence of operations, grouping and sub grouping of fixtures associated with the advanced control system. (Street Lighting, Parking Lots, Secure Areas etc.)
    - b. Network wiring requirements for the advanced control system.
    - c. Connections to other equipment (BMS).
    - d. Advance control system locations and location of associated devices.
  - 4. Upon completion of the installation, all systems of the networked lighting control system including all other components controlling the associated lights, such as photocell, individual lighting controllers and the networked lighting control systems shall be tested by the manufacturer's certified field service engineer(s) who will commission communication devices, program schedules and all interfaces to ensure a trouble-free wireless outdoor monitoring and control system. System manufacturer shall provide operation, administration and maintenance training of the advance control system to the District at the project site. It shall be comprehensive and cover all aspects of the wireless communication monitoring and advance control system operation, configuration and troubleshooting. Submit a synopsis of the training content with detailed content for approval to the owner at least 4 weeks prior to the initial training.
- P. Design accent lighting for buildings, particularly near entries. Entrance lighting is important as there are as many evening students as daytime students, and accent lighting enhances building wayfinding. Ground mounted uplights should be minimized, but where used should have sealed or remote drivers and sealed conduit to minimize chance of water entering fixture.
- Q. Consider lighting provisions for planned or future art installations.
- R. Consider dark sky concerns, and to the extent practical specify lights with cut offs to cover intended area but no more. Balance dark sky concerns against project budgets and requirements to match existing fixtures.
- S. Special controls may be needed to minimize light pollution around astronomical observatories (ground or structure). Work closely with the Executive Director of Construction Planning and/or the Vice Chancellor of Facilities to ascertain the exact areas and controls to be designed near the following locations:
  - 1. College of San Mateo, Building 36 rooftop Observatory
- T. Roadway Lighting on the three campuses shall be high pressure sodium, full cut off, cobra head type.
- U. Lamp types for site lighting shall be LED.
- V. Illumination level shall be as follows:

Parking Lot Illumination Requirements			
Level	Horizontal Illuminance Footcandles (avg)	Vertical Illuminance Footcandle (avg)	Uniformity Ratio (max/min)
Basic Maintained Illuminance	0.2	0.1	20/1
Enhanced Security Illuminance	0.5	0.25	15/1

Street Lighting Illumination Requirements			
Street Lighting Classification	Illuminance Footcandle (avg)	Illuminance Uniformity (avg/min)	
Road Way Lighting	0.5	6/1	

2.10 APPROVED MANUFACTURERS

- A. BALLASTS FOR LINEAR FLUORESCENT LIGHTS:
  - 1. Advance, Motorola, Universal Lighting Technologies, OSRAM/Sylvania
- B. 10% Dimming Electronic Ballasts for Linear Fluorescent Lights:
  - 1. Lutron TVE, OSRAM/Sylvania Pho-Dim, Advance Mark VII
- C. 1% Dimming Electronic Ballasts for Linear Fluorescent Lights:
  - 1. OSRAM/Sylvania Pho-Dim
- D. Ballasts for Compact Fluorescent Lights:
  - 1. Advance, OSRAM/Sylvania, Universal Lighting Technologies
- E. 5% Dimming Electronic Ballasts for Compact Fluorescent Lights:
  - 1. Lutron Compact SE, Lutron Tu-Wire, Advance Mark X
- F. 1% Dimming Electronic Ballasts for Compact Fluorescent Lights:
  - 1. Lutron Hi-Lume
- G. Ballasts for HID Lights:
  - 1. Advance 73B Series, Holophane, Universal Lighting Technologies
- H. Nondimming Electronic Ballasts for HID Lights:

- 1. Aromat
- I. Light Fixtures:
  - 1. H.E. Williams, DI Series, white perforated round bottom diffuser
  - 2. Finelight
  - 3. Cooper
  - 4. General Electric
  - 5. Philips
  - 6. OSRAM/Sylvania (OSI)
  - 7. Venture
  - 8. Ushio (MR only)
  - 9. EYE (MR only)
  - 10. Ruud
  - 11. Louis Paulsen
- J. Lamps:
  - 1. T-8 and T-5 lamps: Philips Alta or equivalent low mercury lamp
  - 2. Compact fluorescent lamps: Lumatech TLM/20/H/R30 or equivalent

**PART 3 EXECUTION**

**3.1 SUBSTITUTES ALLOWED?**

Yes, if performance and quality equivalency can be evidenced.

**3.2 ASSOCIATED DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS**

- A. Space Standards – Administrative Spaces
- B. Space Standards – Circulation Spaces
- C. Space Standards – Instructional Spaces
- D. Restroom Design Standard
- E. 25 55 00 Integrated Automation Facility Controls (Building Management System) Design Standard
- F. 26 27 26 Wiring Devices Design Standard
- G. Division 26 Design Standards

END OF SECTION  
(Appendices A – D follow)

**Appendix A to 26 50 00 Lighting Design Standard  
Cañada College Existing Light Fixture Listing**

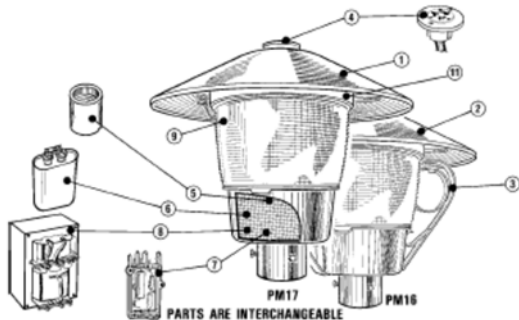
**Table 1: Parking Lot and Roadway Lighting**

Manufacturer	Model	Description
General Electric	M2AR-15-S-4-A-1-G-MS3-2-U, 277V, LU150/55	Single cobra head fixture, 17ft high pole, 4ft arm, 277v
Union Metal	203-11-065-170-1-4G w/metal base cover	Round steel tapered pole for single head fixture
General Electric	M2AR-15-S-4-A-1-G-MS3-2-U, 277V, LU150/55	Double cobra head fixture, 17ft high pole, 4ft arm, 277v
Union Metal	203-11-065-170-2-4G w/metal base cover	Round steel tapered pole for double head fixture

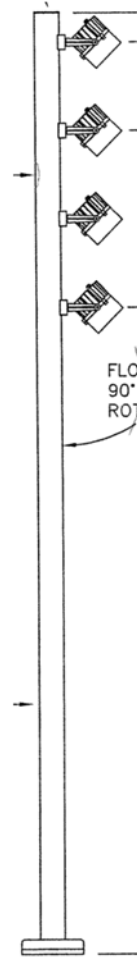
**Table 2: Area Lighting**

<b>Manufacturer</b>	<b>Model</b>	<b>Description</b>
Spectra	SP2-IND-3-100HPS-277-MAL-AD4	Modern Lantern fixture in Quad areas, post top mount, indirect hood style, type 3 light pattern, 277V ballast, adapter for 4" O.D. pole, matte aluminum finish, with 100W high pressure sodium
Spectra	SP2-IND-5-100HPS-277-MAL-AD4	Modern Lantern fixture in Quad areas, post top mount, indirect hood style, type 5 light pattern, 277V ballast, adapter for 4" O.D. pole, matte aluminum finish, with 100W high pressure sodium
Architectural Area Lighting	PR4-4R12-125-LGY	4" Round Pole for modern lantern fixture, .125" wall thickness, light warm gray finish
Gardco	BRM827B-50HPS-277-NP-SHD	Beveled top louver bollard, 42" high with beige concrete base, natural aluminum paint, internal 180° shield
Bega	9850 - Silver	8 Floodlights with shields on custom poles at Amphitheater, with 300W PAR-56 lamps
General Electric	P17M-10-S-4-G-L-MN2-GR, 277V, LU150/55	Original Lantern fixture, 277v, semi-cutoff
General Electric	P17M-15-S-1-A-1-L-MS5-GR-F, 120V, LU150/55	Original Lantern fixture, 120v, semi-cutoff
General Electric	P17M-15-S-1-A-1-L-MN5-GR, 120V, LU150/55	Original Lantern fixture, 120v, non-cutoff
Hapco	78S-004	Pole for original lantern fixture, 12'H x 4" Round x .125" wall thickness pole with 3" tenon top, in standard factory finish natural satin aluminum
Kim Lighting	DBF711/70PMH277/NB/DBF7-FH/NB/DBF-LS	In-grade direct buried floodlight, cast bronze housing, wide flood distribution, 70W MH lamp, 277V operation, natural bronze finish, fixed hood, Lexan lens shield
Gardco	A142FM-150HPS-120-BRA, 120V, LU150/55	Square head fixture, bronze finish
Hapco	7BS-019, W/2, 3/8", 14' pole	Pole for square head fixture

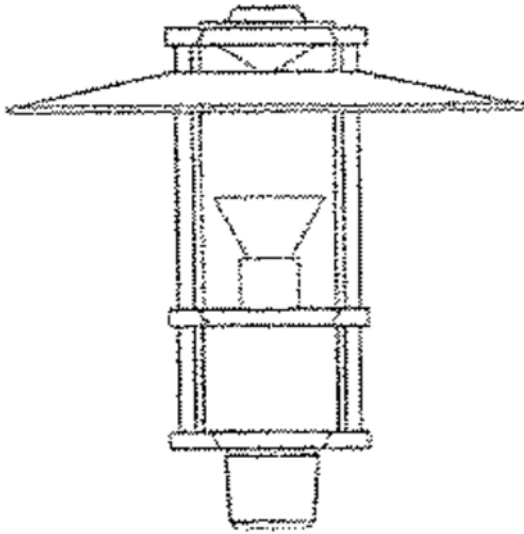
PM16 AND PM17 LUMINAIRES



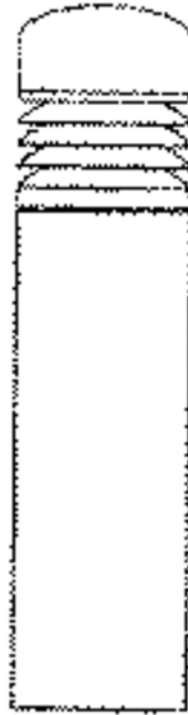
GE Original Lantern Fixture



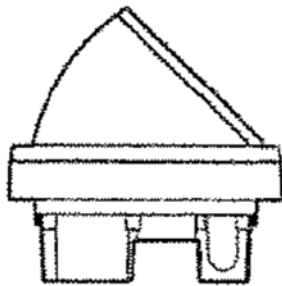
Bega 9850 Amphitheater Floodlights



**Spectra SP2 Modern Lantern Fixture**



**Gardco BRM Bollard**



**Kim Lighting Direct Buried Floodlight**

End of Appendix A to 26 50 00 Lighting Design Standa

**Appendix B to 26 50 00 Lighting Design Standard  
College of San Mateo Existing Light Fixture Listing**

**Table 1: Parking Lot and Roadway Lighting**

<b>Manufacturer</b>	<b>Model</b>	<b>Description</b>
General Electric	MDRL- 40-M-2-A-1-2-R-MS3-1-U, 208V, MVR400/U	Double cobra head fixture, 30ft. high pole, 6ft. Arm, 208v
Union Metal	203-11-080-300-2-6G w/metal base cover	Round steel tapered pole
General Electric	MDRL-40-M-5-A-1-2-R-MS3-1-U, 480V, MVR400/U	Single cobra head fixture, 30ft. high pole, 6ft. Arm, 480V
Union Metal	203-11-080-300-1-6G w/metal base cover	Round steel tapered pole
General Electric	MDRL-40-M-2-A-1-2-R-MS3-1-U, 208V, MVR400/U	Single cobra head fixture, 30ft. high pole, 6ft. Arm, 208V
Union Metal	203-11-080-300-1-6G w/metal base cover	Round steel tapered pole

**Table 2: Area Lighting**

<b>Manufacturer</b>	<b>Model</b>	<b>Description</b>
Louis Paulsen		Bollard lights around Building 36 Planetarium
Louis Paulsen		Uplights in planter around Building 36 Planetarium
Louis Paulsen		In ground lighting in planter around Building 36 Planetarium
Ruud	QVC410D w/120/277v Ballast	Exterior walkway -10'round pole with square head, center mount fixture
Visionaire	PS45 10CTBZ – RNTS103R11343T2RBZRBC	3" diameter steel pole w/square base cover
Bega	2896P	Exterior stairwell - wall mounted
Ruud	QVW410-D w/120/277V Ballast	Exterior stairwell - wall mounted
Enertron	7026-L-CW (Cool White) Lamps	Wall-Mounted Exterior Stairwell & Bldg perimeter Fixture
Ruud	QVO410D w/120/277v ballast	Exterior surface mount square ceiling fixture to match walkway lights
	GFPS-40-M-2-A-1-7X6-GR-P-S	Single flood light fixture, 30ft high, round steel tapered pole w/tenon mount
Union Metal	206-11-080-300-G, 30'ht., 11 gauge, galvanized metal finish	Mounting pole

End of Appendix B to 26 50 00 Lighting Design Standard

**Appendix C to 26 50 00 Lighting Design Standard  
Skyline College Existing Light Fixture Listing**

**Table 1: Parking Lot and Roadway Lighting**

<b>Manufacturer</b>	<b>Model</b>	<b>Description</b>
General Electric	MDRL-40-S-5-A-1-2-R-MS3-1-U, 277V, LU400	Single cobra head fixture, 27ft. high pole, 6ft. arm, 277V
Union Metal	203-11-075-270-1-6G w/metal base cover	Associated round steel tapered pole cover
General Electric	MDRL-40-S-5-A-1-2-R-MS3-1-U, 277V, LU400	Double cobra head fixture, 27ft. high pole, 4ft. Arm, 277V
Union Metal	203-11-075-270-2-4G w/metal base cover	Associated round steel tapered pole cover
General Electric	MDRL-40-S-5-A-1-2-R-MS3-1-U, 277V, MVR400/U	single cobra head fixture, 27ft. high pole, 6ft. Arm, 277V
Union Metal	203-11-075-270-1-6G w/metal base cover	Associated round steel tapered pole cover
	MDRL-40-S-5-A-1-2-R-MS3-1-U, 277V, MVR400/U	Double cobra head fixture, 27ft. high pole, 4ft. Arm, 277V
Union Metal	203-11-075-270-2-4G w/metal base cover	Associated round steel tapered pole cover

**Table 2: Area Lighting**

<b>Manufacturer</b>	<b>Model</b>	<b>Description</b>
Ruud	MPR8515-2PFWG-12, w/wire guard	Walkway Single Close Pole Mount Fixture
Ruud	PS4S10C1BZ	Pole

End of Appendix C to 26 50 00 Lighting Design Standard



**Appendix D to 26 50 00 Lighting Design Standard  
District Office Existing Light Fixture Listing**

**Table 1: Parking Lot and Roadway Lighting**

<b>Manufacturer</b>	<b>Model</b>	<b>Description</b>
	(refer to College of San Mateo)	

**Table 2: Area Lighting**

<b>Manufacturer</b>	<b>Model</b>	<b>Description</b>
Ruud	HCF213-1	Bollard around handicap ramp
Ruud	MPR8515-2P	Single bronze square head fixture on cross-shaped pole
Ruud	PS4S10C1BZ	Cross-shaped pole
		Bollard on walkway up to West Hillsdale Blvd.

END OF SECTION