



CI-0703

TAB 7: TECHNICAL DISCIPLINES

Electrical

Station locations with a high probability of vandalism shall have extra bright illumination, if required and viable in terms of adjacent neighbourhoods.

Uniformity Ratio

Maximum to minimum: 4:1 or better

Average to minimum: 3:1 or better.

LIGHT SOURCES AND CONTROLS

INTERIOR LIGHTING SOURCES AND CONTROLS		
Location	Light Source	Control and Backup
Waiting	LED down lighting LED sconce lights	Time-of-day controller, 100% station open hours, 10% minimum station closed, 10% on Generator. Day light harvesting were possible.
Station Attendant	LED, continuous task lights over counters with parabolic lenses for glare-free illumination (no visible light source)	Local switches. One fixture UPS + Generator backed-up over sales counter, one over cash area and safe, or 10% minimum station closed
Staff Washroom	Mirror task light or surface mounted LED vandal resistant lenses	Occupancy sensor switch. One luminary on UPS + Generator
Public Washroom	LED, vandal resistant luminaries or valance or cove lights for large facilities	On/Off switch with occupancy sensor, one fixture on UPS + Generator
Electrical, Comms., Mechanical, Janitor, and Storage Rooms.	Linear LED 1219 mm long or surface mounted luminaries vandal resistant	On/Off switch with occupancy sensor, 50% on UPS + Generator in Mechanical, Electrical and Comms. Rooms only
Shop	Linear LED 2438 mm long, suspended. Task lights over equipment and workbenches to suit functions	Local switching or to suit particular application, 10% on UPS + Generator
Garage Maintenance Shop	LED for shops. LED Task lights where required	Panel or central switching to suit particular application. 10% on UPS + Generator or to Code requirements
Dispatch	LED, and supplementary illumination for maintenance with task lights to suit	Local switches, dimmers, 10% on UPS + Generator.
Office	Per IES	10% on UPS + Generator



CI-0703

TAB 7: TECHNICAL DISCIPLINES

Electrical

EXTERIOR LIGHTING SOURCES AND CONTROLS

Location	Light Source	Control and Backup
Parking Lot, Passenger Drop-off and Pick-up Areas, and Bus Loop Areas including Bus Platforms and Access Roads	LED area lights or down lights on 6 or 12 m high galvanized steel poles or 30m high masts (use of LED on 30m high masts approved by GO Transit on a case by case basis). See Notes below.	Circuited for 30% in operation during station closed hours (photo-control only) and to have manual override of the photo control and time-clock (the manual override shall not be digital)
Parking Structure	LED	Day light harvesting and occupancy sensor control of two light levels and timer
Rail Platform	LED on 6 m hinged poles on 300 mm high concrete bases or in canopy. Urban platforms may require LED or Metal Halide luminaries if requested by the Municipality	Both timer and photo cell controlled, on Generator. During station closed hours 100% off. Override switch (snow removal use): 100% on
Mini-Platform	Same as Rail Platform	Controlled as part of Rail Platform
Tunnel, enclosed bridges and canopies	LED , 1219 mm long, c/w vandal resistant lenses, lights should be dimmable, when space not occupied	Breaker control, 30% on UPS + Generator
Internal Stairwell (tunnel, parking structure)	LED luminaries, semi-recessed in walls, below handrails	Breaker control, 30% on UPS + Generator
Exterior Stair and Walkway	Same as parking lot, Pole location to suit	Same as parking lot



CI-0703

TAB 7: TECHNICAL DISCIPLINES

Electrical

The Consultant shall examine the different alternatives of parking lot illumination design: high mast, flood lighting and area lighting. Generally, stations near residential areas shall have area lighting. (Flood lighting should be avoided where ever possible) Where floodlighting is used, upward glare shall be addressed and minimized. High mast lighting shall be considered for parking lots in industrial areas.

For ease of lighting maintenance, large areas (tunnel, bride, waiting area, boardrooms, lunch rooms, maintenance facilities, etc) lighting shall have at least two sources of light control.

LED LIGHTING MINIMUM REQUIREMENTS

- > LED light fixtures shall be warranted for a minimum of 5 years.
- > LED light fixtures shall work with the available power supply on site. Every fixture shall have surge suppression.
- > Fixtures' lighting efficiency shall equal the most current industry accepted standard. The lighting efficiency shall not be achieved by overdriving the LEDs.
- > The LEDs in the fixture must be of the same colour temperature. LEDs with CRI below 75 are not acceptable for indoor lighting.
- > Colour temperature of LED light fixtures shall be uniform throughout the area
- > Fixtures shall be provided with a lighting facts label. Outdoor fixtures must have an IP65 general use rating. For locations subject to high pressure washing (tunnels, platforms or parking structures) the fixtures shall have an IP 66 rating.
- > The lighting design shall be such that the specified minimum lighting levels shall be maintained for a minimum of 15 years
- > The fixture shall meet LM 79 rating and the chips shall meet LM 80 rating. LED B50 and L70 lifetime graph shall be provided.
- > The fixture must be vandal resistant and shall be modular in design for easy upgrade of the LED light engine, simple maintenance (straightforward part replacement) and installation.
- > The component connections shall be of plug-in type, tool-less removal and replacement.
- > The fixture shall be dark sky compliant, with good light control and minimum to no glare.



CI-0703

TAB 7: TECHNICAL DISCIPLINES

Electrical

- > Lens, if required, shall be flat tempered glass, unless otherwise noted.
- > The fixtures shall have network connectivity and be remotely dimmable.

LIGHTING CONTROL DESIGN CRITERIA

EARLY MORNING PERIOD

One half (1/2) hour before the first AM train:

- > Platform, platform canopy, platform shelter, information signs and shelters, and building canopy lighting to be 100% ON.

One half (1/2) hour before the first AM bus:

- > Bus loop and bus loop shelter lighting to be 100% ON.
- > Parking lot lighting shall be 100% ON.

Where applicable, illuminated Station ID signs to turn ON 1/2 hour before the first AM bus or train, whichever is earlier.

All lights to turn OFF once the light levels are high enough that the photocell turns the exterior lights off.

EVENING PERIOD

One (1) hour after the last PM train:

- > Platform, platform canopy, platform shelter, information signs and shelters, and building canopy lighting to be 100% OFF.
- > Building canopy security lighting (i.e. 30% or better, as determined by Station Services) to remain on where ON/OFF is to be controlled by photocell.
- > Parking lot lighting to drop to security lighting (i.e. 30% or better, as determined by Station Services).
- > Illuminated Station ID sign to turn OFF.

One (1) hour after the last PM bus: