

PART 1 GENERAL**1.1 Summary**

- .1 Unless otherwise indicated, follow the standards below when specifying exterior lighting for landscape use. These standards are not intended to restrict or replace professional judgment.

1.2 Related Sections

- .1 This section should be read in conjunction with section **26 50 00 Éclairage**.

1.3 Design Requirements**.1 Light pollution**

- .1 In order to meet LEED® credit requirements, considerations must be made to meet uplight and light trespass requirements, using either the backlight-uplight-glare (BUG) method or the calculation method. The requirements must be met for all exterior luminaires using:

- .1 The photometric properties of each luminaire once mounted in the specified orientation and tilt.
- .2 LZ-2 lighting zone as defined in the IES/IDA Model Lighting Ordinance (MLO) User Guide.

.2 Spacing

- .1 Spacing between light fixtures is to be determined by the measured output of the light fixtures and the desired illumination level. Refer to article 1.4 below, Illumination Levels.

.3 Circulation Lighting**.1 Lighting Roadways**

- .1 All streets or roads dedicated to vehicular circulation.
 - .1 For the location of vehicular roadways, refer to the document “Special Building Standards – Landscape”.
- .2 Roadways are to be lit with the use of street lamp posts. Refer to article 2.1.1 below, Street Lamp Posts.
- .3 For recommended average maintained illumination levels for roadways, refer to article 1.4 below, Illumination Levels.
- .4 For technical references, refer to article 1.5 below, Technical References.

.2 Lighting Sidewalks

- .1 All pedestrian paths along the side of a street or a road. It is a space separated from vehicular circulation.
 - .1 For the location of vehicular roadways and their sidewalks, refer to the document “Special Building Standards – Landscape”.

- .2 Sidewalks are to be lit with the use of street lamp posts. Refer to article 2.1.1 below, Street Lamp Posts.
- .3 For recommended average maintained illumination levels for sidewalks, refer to article 1.4 below, Illumination Levels.
- .4 For technical references, refer to article 1.5 below, Technical References.
- .3 Lighting Pedestrian Pathways
 - .1 All paths that pass through lawn areas.
 - .1 For the location of pedestrian pathways, refer to the document “Special Building Standards – Landscape”.
 - .2 Pedestrian pathways are to be lit with the use of pedestrian lamp posts. Refer to article 2.1.2 below, Pedestrian Lamp Posts.
 - .1 Where free-standing fixtures cannot be installed, surface mounted fixtures may be used where the context permits. Refer to article 2.1.4 below, Surface Mounted Light Fixtures.
 - .3 For recommended average maintained illumination levels for pedestrian pathways, refer to article 1.4 below, Illumination Levels.
 - .4 For technical references, refer to article 1.5 below, Technical References.
- .4 Shared Pathways
 - .1 All pedestrian pathways that are shared with occasional vehicles such as emergency or service vehicles. Shared spaces on campus are the main roads connecting streets to the Campus buildings entrances, loading areas, and egress points.
 - .1 For the location of shared pathways, refer to the document “Special Building Standards – Landscape”.
 - .2 Shared pathways are to be lit with the use of street lamp posts (Refer to article 2.1.1 below, Street Lamp Posts), pedestrian lamp posts (Refer to article 2.1.2 below, Pedestrian Lamp Posts) or bollards (Standards forthcoming), depending on the context.
 - .1 Where free-standing fixtures cannot be installed, surface mounted fixtures (Refer to article 2.1.4 below, Surface Mounted Light Fixtures) may be used where the context permits.
 - .3 For recommended average maintained illumination levels for shared pathways, refer to article 1.4 below, Illumination Levels.
 - .4 For technical references, refer to article 1.5 below, Technical References.
- .5 Bicycle Circulation
 - .1 This category includes all cycling infrastructure consisting of marked lanes, tracks, shoulders and paths designated for use by cyclists and from which motorized and pedestrian traffic is generally excluded.
 - .1 For the location of bicycle circulation, refer to the document “Special Building Standards – Landscape”.
 - .2 Dedicated bicycle circulation lanes are to be lit with the use of street lamp posts (Refer to article 2.1.1 below, Street Lamp Posts), pedestrian lamp

posts (Refer to article 2.1.2 below, Pedestrian Lamp Posts) or bollards (Refer to article 2.1.3 below, Bollards which contain a light source), depending on the context.

- .1 Where free-standing fixtures cannot be installed, surface mounted fixtures (Refer to article 2.1.4 below, Surface Mounted Light Fixtures) may be used where the context permits.
- .3 For recommended average maintained illumination levels for shared pathways, refer to article 1.4 below, Illumination Levels.
- .4 For technical references, refer to article 1.5 below, Technical References.
- .6 **Parking Areas**
 - .1 This category includes all designated outdoor parking areas on campus for faculty, staff, students and/or service vehicles.
 - .1 For the location of parking areas, refer to the document “Special Building Standards – Landscape”.
 - .2 Parking areas are to be lit with the use of street lamp posts (Refer to article 2.1.1 below, Street Lamp Posts) or surface mounted light fixtures (Refer to article 2.1.4 below, Surface Mounted Light Fixtures) depending on the context.
 - .3 For recommended average maintained illumination levels for parking zones, refer to article 1.4 below, Illumination Levels.
 - .4 For technical references, refer to article 1.5 below, Technical References.
- .4 **Lighting Places**
 - .1 **Entrances of Buildings**
 - .1 The space in front of the entrance of a building that acts as the threshold of the building. This category includes all the buildings of the campus, both heritage and contemporary.
 - .2 Entrances of buildings are to be lit with the use of surface mounted light fixtures (Refer to article 2.1.4 below, Surface Mounted Light Fixtures) or integrated light fixtures (Refer to article 2.1.5 below, Integrated Light Fixtures), depending on the context.
 - .3 For recommended average maintained illumination levels for entrances of buildings, refer to article 1.4 below, Illumination Levels.
 - .4 For technical references, refer to article 1.5 below, Technical References.
 - .2 **Building Facades**
 - .1 All the buildings of the campus, both heritage and contemporary.
 - .2 Building facades are to be lit with the use of surface mounted light fixtures (Refer to article 2.1.4 below, Surface Mounted Light Fixtures) or integrated light fixtures (Refer to article 2.1.5 below, Integrated Light Fixtures), depending on the context.
 - .3 Optical accessories such as louvers and cut-off visors should be considered to control light spill and focus the majority of the light on the intended target.

- .4 Lamp colour temperature should be harmonized with the building material, refer to article 1.4.3 below, Material of Illuminated Surface.
- .5 Relative intensity vs. context: Buildings should be lit not more than 3 times more intensely than its neighbor unless approved by AAC as an important focal building.
- .6 For recommended illumination levels for building facades, refer to article 1.4 below, Illumination Levels.
- .7 For technical references, refer to article 1.5 below, Technical References.
- .3 Shared Open Places
 - .1 All quads, squares, gardens, terraces and lawns of the campus.
 - .2 Building facades are to be lit with the use of integrated light fixtures (Refer to article 2.1.5 below, Integrated Light Fixtures).
 - .3 For recommended average maintained illumination levels for shared open places, refer to article 1.4 below, Illumination Levels.
 - .4 For technical references, refer to article 1.5 below, Technical References.
- .4 Gates
 - .1 All lighting mounted on gates, portals and fences on campus. The gates, portals and fences are located at the entries and site limits of the campus.
 - .1 For details on gates, refer to the document “Special Building Standards – Landscape”.
 - .2 Gates are to be lit with the use of surface mounted light fixtures (Refer to article 2.1.4 below, Surface Mounted Light Fixtures) or integrated light fixtures (Refer to article 2.1.5 below, Integrated Light Fixtures), depending on the context.
 - .3 For recommended illumination levels for campus gates, refer to article 1.4 below, Illumination Levels.
 - .4 For technical references, refer to article 1.5 below, Technical References.
- .5 Building Service Areas
 - .1 All service areas surrounding buildings, including but not limited to secondary entrances, emergency exits and loading bays.
 - .2 Building service areas are to be lit with the use of surface mounted light fixtures (Refer to article 2.1.4 below, Surface Mounted Light Fixtures) or integrated light fixtures (Refer to article 2.1.5 below, Integrated Light Fixtures), depending on the context.
 - .3 For recommended illumination levels for building service area, refer to article 1.4 below, Illumination Levels.
 - .4 For technical references, refer to article 1.5 below, Technical References.
- .5 Accent Lighting
 - .1 Permanent Art Work

- .1 Commemorative elements such as monuments, historical plaques and statues as well as contemporary art work that are meant to be permanently installed on campus.
- .2 Permanent artwork is to be lit with the use of surface mounted light fixtures (Refer to article 2.1.4 below, Surface Mounted Light Fixtures) or integrated light fixtures (Refer to article 2.1.5 below, Integrated Light Fixtures), depending on the context.
- .3 For recommended illumination levels for permanent artwork, refer to article 1.4 below, Illumination Levels.
- .4 For technical references, refer to article 1.5 below, Technical References.
- .2 Temporary Art Work
 - .1 All types of temporary art work such as ephemeral installations and temporary exhibits which require particular lighting.
 - .2 Temporary artwork to be lit with the use of surface mounted light fixtures (Refer to article 2.1.4 below, Surface Mounted Light Fixtures). Lighting strategies for these works will be evaluated by the designer, representatives more McGill Operations and Maintenance as well as the approval body which authorized the installation of the work.
 - .3 For recommended illumination levels for campus temporary artwork, refer to article 1.4 below, Illumination Levels.
 - .4 For technical references, refer to article 1.5 below, Technical References.
- .3 Signage and Wayfinding
 - .1 This category includes all campus signage and wayfinding elements which are meant to be distinguished at night.
 - .2 Signage to be lit with the use of . - *in progress*.
 - .3 For recommended illumination levels for campus signage, refer to article 1.4 below, Illumination Levels.
 - .4 For technical references, refer to article 1.5 below, Technical References.

1.4 Illumination Levels

.1 Average Maintained Illumination Levels (Horizontal)

CATEGORY	SPACE TYPE	RECOMMENDED ILLUMINATION LEVELS See on page 61.4.1.1 below	MAXIMUM UNIFORMITY (AVG./MIN.)
1.3.3 Circulation	1.3.3.1 Roadways (primary)	12 lux	4:1
	1.3.3.1 Roadways (secondary)	9 lux	6:1
	1.3.3.2 Sidewalks (primary)	8 lux	4:1
	1.3.3.2 Sidewalks (secondary)	5 lux	4:1
	1.3.3.3 Pathways (primary)	8 lux	4:1

	1.3.3.3 Pathways (secondary)	5 lux	4:1
	1.3.3.4 Shared pathways	10 lux (vert.) 20 lux (horiz.)	4:1
	1.3.3.5 Bicycle circulation	10 lux (vert.) 20 lux (horiz.)	4:1
	1.3.3.6 Parking Areas	5 lux	4:1
1.3.4 Places	1.3.4.1 Entrances of buildings	30 lux (horiz.) 50 lux (vert.)	4:1
	1.3.4.2 Building façades	See table 2.7.5.2	
	1.3.4.3 Shared open spaces	Variable by space use	
	1.3.4.4 Gates	30 lux (horiz.) 50 lux (vert.)	5:1
	1.3.4.5 Building Service areas	Variable by space use	
1.3.5 Accents	1.3.5.1 Artwork (permanent)	relative to area	4:1
	1.3.5.2 Artwork (temporary)	relative to area	4:1
	1.3.5.3 Signage and Wayfinding	50 lux	2:1

- .1 Average maintained illumination levels (E_{avg}). Light loss factor is calculated at 0.70 and assumes a reasonable level of fixture maintenance and lamp replacement.
- .2 These criteria are based on IESNA 90.1 2010 and reference the following Recommended Practice Documents:
 - .1 IESNA RP-33-99: Lighting for Exterior Environments, 1999.
 - .2 IESNA DG-5-1994: Recommended Lighting for Walkways and Class 1 Bikeways.
 - .3 IESNA G-1-03: Guidelines for Security Lighting for People, Property and Public Safety.
 - .4 IESNA RP-8-00: Roadway Lighting, 2005.
- .3 Uniformity is a more critical criterion to achieve than average maintained illumination. Variation in illumination levels can cause glare irrespective of actual illumination levels attained.

.2 Average Maintained Illumination Levels (Vertical)

PARAMETERS	CONDITIONS	URBAN AREA
Illuminance E_v on the façade	Daytime to late evening 07.00 - 23.00	15 lux
	Night 23.00 - 07.00	5 lux
Luminous intensity (cd) of each luminaire	Daytime to late evening 07.00 - 23.00	15 000 cd
	Night 23.00 - 07.00	1 500 cd
Average luminance, façade or object (L_{avg})		15 cd/m ²

.3 Material of Illuminated Surface

MATERIAL OF ILLUMINATED SURFACE	SURFACE REFLECTANCE	MAXIMUM RECOMMENDED AVERAGE ILLUMINANCE
White stone White marble Pale pastel colours	0.9	35 lux
Lightly coloured stone Lightly coloured marble Pastel colours	0.6	52 lux
Coloured stone Concrete Coloured marble	0.3	104 lux
Dark stone Grey granite Dark marble	0.1	314 lux
Aluminum Polishes surfaces	Be aware of possible reflection interference	350 lux

1.5 Technical References

- .1 For source recommendations, see McGill Standard Construction specification, Division 26.
- .2 For the required ingress protect rating for exterior fixtures, see McGill Standard Construction specification, Division 26.
- .3 For a list of required certifications, see McGill Standard Construction specification, Division 26.
- .4 For colour temperature recommendations, see McGill Standard Construction specification, Division 26. When lighting building facades, lighting colour temperature should be harmonized with building materials.
- .5 For fixture cut-off recommendations see night sky compliance for LZ-2 lighting zones by IDA-IES.

PART 2 PRODUCTS

2.1 McGill Standard Collection

- .1 Street Lamp Posts
 - .1 Model
 - .1 “City Elements CE180/AR800/1LV-1LEVO Module”, as fabricated by HESS, or approved equivalent.
 - .1 Mounting option: external flange (due to electrical conduit diameter).
 - .2 Colour: RAL #7016 Anthracite Grey.
 - .3 Light colour temperature: WW-3000k.
 - .4 Hardware: stainless steel.
 - .5 Distribution: ME-Type III.
 - .6 Volt: 120-277V.
 - .7 GFCI/IU Internal GFCI receptacle.

- .8 Whenever possible, lamp post anchoring shall not be visible.
- .2 Pedestrian Lamp Posts
 - .1 Model
 - .1 Refer to article 2.1.1.1 above, Model.
- .3 Bollards which contain a light source
 - .1 McGill Standard Collection
 - .1 Model “City Elements CE180/P3.5/AR”, as fabricated by HESS, or approved equivalent.
 - .1 Mounting option: external flange (due to electrical conduit diameter).
 - .2 Colour: RAL #7016 Anthracite Grey.
 - .3 Light colour temperature: WW-3000k.
 - .4 Hardware: stainless steel.
 - .5 Distribution: ME-Type III.
 - .6 Volt: 120-277V
 - .7 Whenever possible, bollard anchoring shall not be visible.
- .4 Surface Mounted Light Fixtures
 - .1 This includes, but is not limited to, accent lighting, light fixtures mounted on campus building or structures.
 - .2 Surface mounted light fixtures are typically found at the entrances or egress points of buildings as well as on the facades of buildings to light adjacent pathways.
 - .3 *Standard forthcoming.*
- .5 Integrated Light Fixtures
 - .1 This includes, but is not limited to, accent lighting, facade lighting, tree lighting, step lighting, handrail lighting, etc.
 - .2 *Standard forthcoming.*

2.2 Custom designed lighting

- .1 Custom-designed lighting may be used in exceptional circumstances, but design must be approved by Architectural Advisory Committee.
 - .1 The decision making process regarding the replacement or restorations of the light fixtures should be based on the following factors:
 - .1 If its value is **heritage**, restoration should be prioritized, even if the cost is higher. If it can't be restored, it should be rebuilt with identical design and construction.
 - .2 If its value is **non heritage**, either repaired, rebuilt identically or with a brand new design.
 - .3 If it is a **new** pedestrian lamp post, its style and materiality should be in relation to its context: either with a contemporary style or a more heritage approach.

- .2 All fixtures should distinguish themselves as being unique to McGill University. This can be achieved through subtle and elegant custom detailing to reinforce the prestige of the university.
 - .1 Example of heritage style detailing:
 - .1 A McGill crest on the access panel on the base.
 - .2 An example of contemporary style detailing:
 - .1 A McGill red fillet in the shaft at handrail height introducing the pedestrian scale and creating a guiding ribbon throughout the campus. This separation also subtly mirrors the tripartite classical composition.
- .2 **Street Lamp Posts**
 - .1 The scale of street lamp posts present on campus should be proportional to the setting as well as adjacent lamp posts by the City of Montreal. The height range of McGill street lamp posts should be between 3 and 4 m.
 - .2 Spacing between street lamp posts is to be determined by the measured output of the light fixtures as well as circulation needs. Refer to article 1.3.3.2.2 above.
 - .3 Street lamp posts should be finished in dark grey powder coat so as to blend into the night sky.
 - .1 Preferred colour: #7016 Anthracite grey.
 - .4 Depending on the context, the street lamp post can be either **heritage** or **contemporary**.
 - .1 **Heritage** style fixtures should consist of the following attributes:
 - .1 tripartite construction (base, shaft & capital);
 - .2 base: sand-cast articulated base (to accentuate the play of light and reference the detailing of adjacent buildings);
 - .3 capital: lantern with rectilinear faceted geometry;
 - .4 diffuse glow to refer the historic gaslight;
 - .5 using similar light intensity, color et distribution as the historic source it references;
 - .6 single or multiple lanterns with horizontal bracket arms below the lantern.
 - .2 **Contemporary** style fixtures should consist of the following attributes:
 - .1 monolithic construction;
 - .2 platonic geometry;
 - .3 directional shielded light;
 - .4 single lamp head on shaft.
- .3 **Pedestrian Lamp Posts**
 - .1 The scale of pedestrian lamp posts present on campus should be proportional to the setting. The height range of pedestrian lamp posts should be between 3 and 4 m.

- .2 Spacing between pedestrian lamp posts is to be determined by the measured output of the light fixtures as well as circulation needs. Refer to article 1.3.3.2.2 above.
- .3 Pedestrian lamp posts should be finished in gloss black or dark grey powder coat so as to blend into the night sky.
 - .1 Preferred colour: #7016 Anthracite grey.
- .4 Depending on the context, the pedestrian lamp post can be either **heritage** or **contemporary**.
 - .1 **Heritage** style fixtures should consist of the following attributes:
 - .1 tripartite construction (base, shaft & capital);
 - .2 base: sand-cast articulated base (to accentuate the play of light and reference the detailing of adjacent buildings);
 - .3 capital: lantern with rectilinear faceted geometry;
 - .4 diffuse glow to refer the historic gaslight;
 - .5 using similar light intensity, color et distribution as the historic source it references;
 - .6 single or multiple lanterns with horizontal bracket arms below the lantern.
 - .2 **Contemporary** style fixtures should consist of the following attributes:
 - .1 monolithic construction;
 - .2 platonic geometry;
 - .3 directional shielded light;
 - .4 single lamp head on shaft.
- .4 Bollards which contain a light source
 - .1 Scale should be consistent with bollards which do not contain light sources. All campus bollards should maintain a consistent height throughout the campus. See section 32 37 00 – Exterior Furnishings.
 - .2 Spacing between bollards is to be determined by the measured output of the light fixtures as well as circulation needs. Refer to article 1.3.3.2.2 above.
 - .3 Bollards should be finished as with a dark grey colour so as to blend into the night sky.
 - .1 Preferred colour: #7016 Anthracite grey.
 - .4 The fixture style should be similar to the family of fixtures found in the same context. The fixture style should be consistent with bollards which do not contain light sources.
 - .5 Detailing should be consistent with bollards which do not contain light sources.
 - .6 Whenever possible, bollard anchoring shall not be visible.
- .5 Surface Mounted Light Fixtures
 - .1 This includes, but is not limited to, accent lighting, light fixtures mounted on campus building or structures.

- .2 Surface mounted light fixtures are typically found at the entrances or egress points of buildings as well as on the facades of buildings to light adjacent pathways.
- .3 The scale of surface mounted light fixtures should be proportional to the building or structure on which they are mounted.
- .4 Surface mounted light fixtures should be finished in a complementary manner to the surface upon which they are mounted and match existing architectural hardware finishes. Where surface conduit is used, it should also be painted to blend in with the surface upon which it is mounted.
- .5 Depending on the context, the fixture style can be either **heritage** or **contemporary**.
 - .1 Heritage style fixtures should consist of the following attributes:
 - .1 lantern with rectilinear faceted geometry;
 - .2 diffuse glow to refer the historic gaslight;
 - .3 using similar light intensity, color and distribution as the historic source it references;
 - .4 single or multiple lanterns with horizontal bracket arms below the lantern;
 - .5 material must match the existing hardware;
 - .2 Contemporary style fixtures should consist of the following attributes:
 - .1 monolithic construction;
 - .2 platonic geometry;
 - .3 directional shielded light;
 - .4 single lamp head on shaft.
- .6 Integrated Light Fixtures
 - .1 This includes, but is not limited to, accent lighting, facade lighting, tree lighting, step lighting, handrail lighting, etc.
 - .2 By definition, heritage fixtures are designed to be expressed. They are distinct, radiant, decorative elements within the campus landscape. By contrast, contemporary fixtures should be integrated whenever possible.
 - .3 The scale of integrated fixtures should be responsive and proportional to the space or object which is being lit.
 - .4 Light fixtures which are integrated within urban furniture, paving materials, building facades, etc. should be concealed from sight lines. Where surface conduit is used, it should also be painted to blend in with the surface upon which it is mounted.

END OF SECTION