Appendix I Lighting Evaluation

Harvard-Westlake Parking Improvement Plan

Lighting Evaluation

By: Lighting Design Alliance

27 September 2013

LIGHTING DESIGN ALLIANCE

Harvard Westlake Parking Improvement Plan
Lighting and Glare Analysis

Contents:

LIGHTINGDESIGNALLIANCE

1.0 EXECUTIVE SUMMARY

This report considers the potential lighting impacts of the proposed Harvard-Westlake Parking Improvement Plan. The proposed project consists of a three level parking structure, an athletic field located on the top of the parking structure, and a pedestrian bridge connecting the structure to the Harvard-Westlake campus.

Currently, the proposed site consists of a large hillside with no existing lighting. This report examines the potential impact of the parking structure as it pertains to the neighborhood, motorists driving on Coldwater Canyon Avenue, and particularly to the five private residences located just north of the proposed site. The analysis will review the parking structure, the athletic field, and the pedestrian bridge.

To reduce potential impacts to the adjacent residences the structure would be constructed on a site set into the hillside. Retaining walls would be used on the North, South, and West elevations enabling the structure to be recessed into the hill. The athletic field would be 45 feet above grade (755 feet ASML) with focused lighting instruments used to illuminate the athletic field which extend 39 feet above the field (794 feet AMSL). **Table 1.0-1** shows the elevations of the neighboring private residences.

TABLE 1.0-1: ELEVATIONS OF PRIVATE RESIDENCES	
Address	Elevation of Residence (AMSL)
3901 N. Van Noord	716 ft
12917 W. Galewood	765 ft
12920 W. Galewood	831 ft
12949 W. Blairwood	866 ft
12952 W. Blairwood	945 ft

The fixtures within the parking structure would be shielded so that the source of the fixture cannot be seen from outside of the structure. Fixture shielding would prevent any potential glare caused from the fixtures. The parking structure light on the North and West elevation are blocked by retaining walls and therefore there would be no spillover light from the parking structure on to the neighboring open spaces and private residences.

Musco sports lighting fixtures have been used to illuminate the adjacent Ted Slavin field and similar shielded lights (lighting fixtures) would be used to illuminate the athletic field on top of the parking structure. These fixtures, however, would be on a much shorter pole than the ones used on the Ted Slavin field, and would include only two to three lights on each pole as opposed to the Ted Slavin field, which has 68 lights located on four poles. Calculations show that while getting an average of 30 footcandles (fcs)[1] on the athletic field, 0.0 fcs would extend into the neighboring open space and private residential properties. Therefore, the light from the fixtures would be well below the City of Los Angeles Municipal

[1] A footcandle (fcs) is the unit of measurement for illuminance. One footcandle equals the light from one candle (candela or lumen) at a distance of one foot.
Illuminance is defined as the perceived power (or brightness) of light landing onto a surface, per unit area.
Luminance is defined as the intensity of light per unit area from a light source traveling in a given direction. Units are candela per square foot (c/ft^2).

Code requirement which allows no more than two fcs of spillover light on private property developed with a residential use.

The pedestrian bridge lighting would be integrated within the handrails. Based on the proposed bridge design, the lighting for the bridge would be completely self-contained. The fixtures are concealed eliminating any potential glare to motorists on Coldwater Canyon Avenue. There would also be no spillover light onto the roadway below from these fixtures.

After an infield analysis of the site and review of the proposed lighting design for the parking structure, athletic field, and pedestrian bridge, it has been determined that the project would not create any significant impact to adjacent private residences, Coldwater Canyon Avenue, or to any adjacent open space.

2.0 PROJECT

2.1 Existing Conditions

Currently there is no existing lighting on the hillside of the proposed project site. Previously, the site was developed with two single family homes. Along Coldwater Canyon Avenue there are several street lights that provide general illumination for the roadway and the intersection of Coldwater Canyon Avenue and Harvard Westlake Driveway. Across the proposed site location is the Harvard-Westlake campus with an outdoor swimming pool and the Ted Slavin field directly adjacent to Coldwater Canyon Avenue both of which are illuminated. See **Appendix A** for existing site photos.

2.2 The Project

Parking Structure
The project includes a three level parking structure that would be built into the hillside along Coldwater Canyon Avenue opposite the main campus of Harvard-Westlake. The Parking Structure would include natural colors and increased landscaping to help screen and blend the structure into the neighboring surroundings.

Athletic Field
An athletic field would be located on top of the proposed Parking Structure. The material used for the athletic field would be Field Turf which would be approximately 3" thick to simulate normal grass. The field would be located approximately 45 feet above grade and would include a 32 foot tall catchment fence around the perimeter of the field. The top of the catchment fence would be approximately 77 feet above grade. To illuminate the field, approximately 10 light poles would be used, with each pole having two to three adjustable sports lights. These 39 foot tall poles would be the tallest elements on the project reaching a height of approximately 84 feet above grade and painted a natural color to match the surrounding color palette.

Pedestrian Bridge
The project also includes a pedestrian bridge that would connect the Parking Structure with the campus. The bridge crosses over Coldwater Canyon Avenue leaving approximately 25 feet 7 inches in clearance from the bottom of the bridge to the roadway. The proposed

Bridge would be approximately 163 feet long, 13 feet wide, and reach an overall height of approximately 41 feet. The bridge would be constructed from prefinished metal and painted with a flat, diffuse texture with finishes that have an earthy tone and low reflectances. No glass is proposed on the bridge.

At each end of the bridge would be an elevator, where the elevator shaft on the West side would reach a height of 63 feet above grade and the elevator shaft on the East side would reach a height of 46 feet above grade. This bridge would be the only pedestrian pathway between the Harvard-Westlake Campus and the proposed Parking Structure.

2.3 Intended Operations

Parking Structure
The parking structure would be used for supplemental parking for the Harvard-Westlake campus.

Athletic Field
The athletic field is not intended to be used on weekdays past 8:00pm and would be used only during limited daytime hours on weekends (no lights on weekends). The athletic field is intended to be used for recreational play only, placing it in a “Class of Play” of IV according to the Illuminating Engineering Society (IES)[2].

Pedestrian Bridge
The pedestrian bridge is intended to be used as a connection between the parking structure and the Harvard-Westlake campus.

2.4 Proposed Lighting Design

Parking Structure
Parking Structure lighting would have an average illuminance of 5 fcs over the parking stalls that diminish to approximately 1 fcs at the exterior perimeter of the structure. The lighting sources chosen would be either linear fluorescent striplights or LED downlights. Any fixtures used within the interior of the parking structure would have shielding elements. When viewed from outside of the parking structure, these shielding elements eliminate any direct views of the light source.

There would be an average illuminance of 40 fcs at the parking structure entries and exits during daylight hours. This provides a transitional area to allow drivers to adapt to the relatively low illuminance levels within the parking structure.

To comply with the Title 24 energy codes, the parking structure would be controlled with photocells to conserve energy during daytime operational hours. The Parking Structure would also utilize occupancy sensors which would turn the lights off when no activity is detected within the structure.

[2] *Illuminating Engineering Society: The Lighting Handbook Tenth Edition,* Section 35.1: Project Type and Status, Table 35.2

Athletic Field

The athletic field would be illuminated similarly to the Ted Slavin field by using similar fixtures manufactured by Musco. Ten 39 foot tall light poles would be used to illuminate the field, five light poles per side. Each pole would consist of two or three Musco sports lights. Each fixture would be individually aimed and use one of Musco's visor systems (see **Figure 2.4-1**) which allows for better light control, reduced glare, and reduced spill light. The fixtures also include an integral house side shield to minimize any spillover light behind the fixtures. Based off of the calculations provided by Musco, the average horizontal illuminance on the athletic field would be approximately 30 fcs (see Appendix B),[3] in contrast to the 75 fcs illuminance during play at the Ted Slavin field

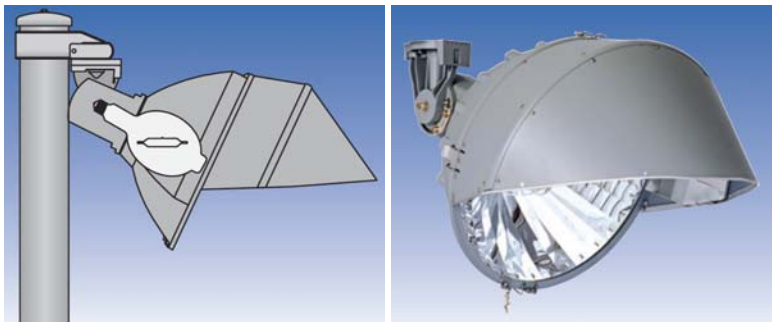


Figure 2.4-1
Musco luminaire with visor system

Pedestrian Bridge

The proposed lighting design for the bridge utilizes a small LED striplight that would be integrated within the handrail. The fixtures would be concealed so that there are no direct views of the source. The low level handrail lighting would be activated by occupancy sensors which would turn the lights off when no activity is detected on the bridge.

3.0 POTENTIAL IMPACTS

As defined by the Los Angeles CEQA Threshold Guide, the significance threshold shall be made on a case-by-case basis, considering the following factors:

- The change in ambient illumination levels as a result of project sources; and
- The extent to which project lighting would spill off the project site and affect adjacent light-sensitive areas.

Light trespass or light pollution can introduce glare or stray light into private, residential lots. The balance of ambient light to promote pedestrian safety and a sense of security must be compared to stray light that could affect a resident from sleeping at night in their own bedroom. Section 93.0117 of the City of Los Angeles Municipal Code (LAMC) provides that no person shall construct, establish, create, or maintain any stationary exterior light source that may cause the following locations to either be illuminated by more than two fcs of lighting intensity or receive direct glare from the light source:

[3] Illumination levels provided by the design team, but they directly correspond to the recommended lighting levels within *Illuminating Engineering Society: The Lighting Handbook Tenth Edition*.

1. Any exterior glazed window or sliding glass door on any other property containing a residential unit or units
2. Any elevated habitable porch, deck, or balcony on any other property containing a residential unit or units
3. Any ground surface intended for uses such as recreation, barbecue, or lawn areas on any other property containing a residential unit or units.

It should be noted that the landscape and natural topography surrounding the proposed site would visually block the light from the Parking Structure. The Harvard-Westlake campus, located across from the proposed structure, contains pole mounted lights to illuminate the Ted Slavin field and the pool outside the Taper Athletic Pavilion. In addition, Coldwater Canyon Avenue contains street lighting which provides additional light for pedestrian safety at the intersection of Coldwater Canyon Avenue and Harvard Westlake Drive. **Figure 3.0-1** below was developed to identify all potential sensitive receptors (the private residences shaded in orange) adjacent to the proposed Parking Structure.

Privately Owned Residences

Harvard-Westlake Owned Residence

Proposed Parking Structure Building Footprint

Figure 3.0-1
Aerial map showing location of adjacent residential properties

4.0 LIGHTING ANALYSIS

4.1 Methodology/Project Procedure

The process required to establish a design guideline is straight forward. The first step is to identify all of the current private properties that would be affected. This step is outlined and identified above. The second step is to determine adjacencies between the proposed Parking Structure and the surrounding residential neighbors. Specific residential properties would be identified as "sensitive receptors" that could be impacted by any lighting modifications. The next step is to evaluate the existing conditions with the proposed lighting design for the Parking Structure, the athletic field, and the pedestrian bridge. By comparing current conditions with the proposed structure it would be possible to predict and to mitigate any future lighting issues. Next, any major violations of current lighting guidelines should be corrected, both as an act of good faith, but also to voluntarily comply with all known lighting ordinances or recommendations.

On September 16, 2013 between 6:30 PM and 8:30 PM, a site visit was conducted to analyze the current site features and lighting, and to measure the luminance of existing lighting within the project site. During this two hour window, we were able to see the project site during daylight hours and night time hours. The sky conditions were as follows: clear sky, full moon, clear visibility of up to approximately 20 miles. Luminance measurements were taken using a luminance meter, which measures in cd/m^2, of the existing fixture to mimic the view point of the private residences. The brand of Luminance meter that was used for the site survey was a Minolta LS-110 Luminance Meter

4.2 Lighting and Glare Evaluation: Parking Structure

The lighting design for the Parking Structure proposes using linear fluorescent fixtures or LED downlights. In either situation, fixtures would be shielded so the fixture source would not be visible from outside the parking garage thereby preventing glare from the fixtures. The parking structure would be constructed from materials which have low reflectances and have diffuse finish to prevent any glare caused by the sun.

The private residences north and northwest of the Parking Structure would be most concerned with light trespass. The parking structure, however, would be situated within the hillside. The retaining walls surrounding the project on the North and the West side are higher than the walls of the parking structure; therefore there would be no spillover light from the parking garage onto the private residences. There may be some spillover light onto Coldwater Canyon Ave, but the design intent is to have an average of 1fcs at the perimeter edge of the structure. As all fixtures would be shielded, spillover light onto Coldwater Canyon Ave would be less that 1 fcs and would be negligible (see **Appendix B: Parking Structure Lighting Calculation**).

4.3 Lighting and Glare Evaluation: Athletic Field

Of the surrounding five adjacent private residences, two of the residences (12917 W Galewood and 3901 N. Van Noord) are physically located below the pole mounted light fixtures which would be mounted approximately 84 feet above ground level (approximately 794 feet AMSL). Due to the design of the Musco visor shield, any residence located above the pole mounted fixtures would not be able to see the fixture's lamp source or any glare coming from the fixture or its reflector system.

The two residences below the fixtures (12917 W. Galewood and 3901 N. Van Noord) are the only two private residences that may experience glare from the fixtures. Given the amount of light coming off of a fixture (or its luminance) the amount of light onto a residence (or its illuminance) can be calculated using the following equation.

$$E_V = \frac{LQS}{D^2}$$

Where:
Ev= Illuminance (in fcs) onto the residence
L= Luminance (cd/ft²) out of the fixture
Q = Quantity of Fixtures per head
S= Area of the source (sq. ft)
D= Distance from the fixture to the property line

In order to determine the approximate luminance of the proposed fixture, a luminance meter was used to measure the luminance out of the existing Musco fixtures. The luminance from one of the existing fixture would be the same as the proposed fixture assuming that the same Musco fixtures would be used for the new athletic field. The luminance was measured at low angle increments that would be similar to the viewing angles experienced by the nearby residences. These field measured values are represented in **Table 4.3-1** below[4].

Table 4.3-1: ON SITE LUMINANCE MEASUREMENTS OF AN EXISTING FIXTURE	
Viewing Angle to the Fixture (degrees)	**Luminance (cd/ft²)**
0	22.30
5	13.85
10	33.41
15	53.49
20	81.46

The closer of these two residences, 12917 W. Galewood, is located 257 feet from the parking structure and is located at an elevation of 765 feet, 29 feet below the light fixtures. Assuming the worst case scenario, where a pole is located exactly 257 feet away from the residential property line and uses three Musco luminaires; the maximum viewing angle into the fixtures would be 6 degrees above the horizon (see **Figure 4.3-1**). The luminance

[4] Luminance measurements were taken at the Harvard-Westlake campus on September 16, 2013 at approximately 8:00pm using a Minolta LS-110 Luminance Meter. Measurements were taken from one of the existing Musco fixtures located near the outdoor pool.

measured on an existing fixture at that approximate angle was 13.85 cd/m² (refer to **Table 4.3.1** for luminance measurements). Similarly the residence located at 3901 N. Van Noord, located 330 feet from the structure and 78 feet below the fixtures, the maximum viewing angle into the fixture would be 13 degrees above the horizon (see **Figure 4.3-2**). The luminance from the fixture would be approximately 53.49 cd/m².

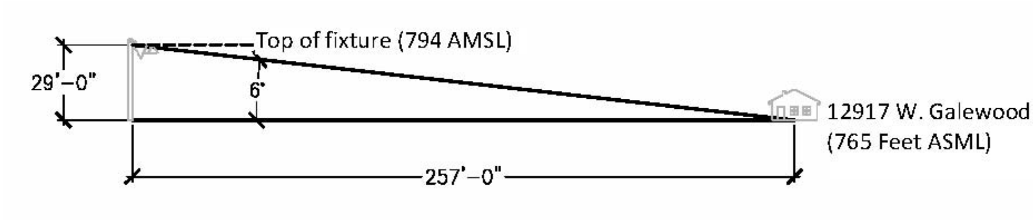


Figure 4.3-1
Angle from 12917 W. Galewood to the top of the athletic field fixtures.

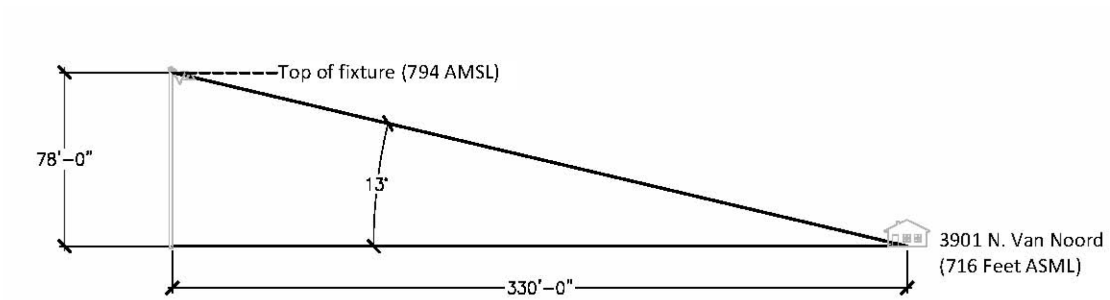


Figure 4.3-2
Angle from 3901 N. Van Nord to the top of the athletic field fixtures.

Using these values we can calculate the illuminance onto the residences from the light source by the following equation:

$$E_V = \frac{LQS}{D^2}$$

For the two scenarios we get the following illuminance values outlined in **Table 4.3-2**.

Table 4.3-2 ILLUMINANCE CALCULATION FROM SITE MEASUREMENTS

Residence	[L] Measured Luminance	[Q] Quantity of Fixtures per pole	[S] Area of source (sqft)	[D] Distance (ft)	[E_v] Illuminance (fcs)
12917 W. Galewood	13.85	3	2*	257	0.0013
3901 N. Van Nord	53.49	3	2*	330	0.0029

*Assumed luminous area of each fixture head

In a scenario, where three luminaires are mounted on a pole located at the point closest to the residences, the illuminance on the residence as a result of the fixtures would be 0.0029 fcs at the neighboring property line. In the equation for calculating illuminance, illuminance is indirectly proportional to the distance such that when distance increases illuminance decreases. The residences would have a decreased illuminance on their property as the distance from the fixture to the property line is increased. Even if all 30 fixtures were mounted at the same point on the athletic field which would be closest to the residence, the total cumulative effects of all the lights would only add 0.029 fcs onto the residence, which would still be well below the two footcandles allowed by Section 93.0117 of the LAMC. . These calculations assume direct line of sight to the fixtures. It is important to note that the existing topography of the hillside and the natural vegetation would conceal the fixtures from view and block the light from the fixtures.

The property located at 3663 Potosi would also have direct views of the fixtures, however, this residence is owned by Harvard-Westlake.

Another concern for the neighboring residences caused by the athletic field lights would be light trespass. The proposed Musco Light-Structure Green System has a unique reflector and visor system that allows for precise optics and minimal spill light. These fixtures are currently being used to illuminate the Ted Slavin football field and the outdoor swimming pool. An infield analysis of the existing fixture shows the precision of the Musco optics. **Figure 4.3-3** is a picture taken of the existing swimming pool fixtures at night. The poles are positioned approximately two to three feet from the edge of the roof line, and the light coming from the fixture only spills approximately two feet onto the roof. The majority of the light is being directed towards the swimming pool.

Figure 4.3-3

(1) Shows the light distribution of the fixtures limited spill light on the roof.

(2) Illustrates the fixture cutoff as the South wall is well illuminated however the adjacent East wall remains dark.

The City of Los Angeles indicates that spillover lighting shall not be greater than two fcs at any residential property[5]. Based off the calculations provided by Musco, the most spillover lighting would occur on the public road of Coldwater Canyon Avenue with a maximum of up to 3.5 fcs. The lighting spillover at the 3680 Potosi Drive residence (Harvard-Westlake owned property) would be approximately 0.3 fcs, and the spillover at the North and West adjacent spaces would be 0.0 fcs due to the topography of the site and the proposed architectural design (see **Appendix B: Harvard-Westlake Athletic Field Lighting Calculation**). Based upon our field observations of the existing Musco fixtures and review of the photometric analysis provided by Musco, spillover light would be negligible and no substantial light would be anticipated to reach the neighboring private residences or open space property.

While light from the light fixtures would not spill onto the neighboring private properties, the views of the site caused by the new field would alter the existing landscape. An illuminated field would now replace an otherwise dark hillside. While it is important to note that the field would not be operational after 8:00pm on weekdays and only during limited daytime hours on weekends, it is also important to note that this field would be used as a recreational field only. The field would not be used for competitive game play, and therefore falls within Class IV within the IES definition of class of play. For a Class IV recreational soccer field, the IES recommends a maintained average of approximately 50 fcs on the horizontal plane of play. The proposed Musco fixtures provide an average illumination of 30 fcs, 20 fcs below the IES recommended illuminance levels. In comparison, the neighboring Ted Slavin Field would be classified as a Class III playing field (competition play with some spectator facilities). The illuminance for a Class III field is recommended to be approximately 75 fcs on the horizontal plane of play. While there would be times before 8:00pm that the field would be in use, the lighting levels provided by the proposed fixtures would be approximately half the amount of light that is currently present on the Ted Slavin Field; therefore, Ted Slavin Field would still remain the brightest area on campus.

The final concern with the athletic field is the new potential for glare as a result of the newly installed athletic field. The concern is that during nighttime hours, the light from the lights would reflect off the field causing glare. A sample of artificial grass was used to help better understand the reflectance of the material and to assess any potential glare. An illuminance meter was place on the surface of the grass to determine the average illuminance on the horizontal plane of the grass (see **Figure 4.3-4**). The illuminance meter was then flipped over and held above the grass and another measurement was taken. Using the equation:

$$\rho = \frac{\phi_{off}}{\phi_{on}}$$

ρ = reflectance

ϕ_{off} = illuminance off of a surface [fcs]

ϕ_{on} = illuminance on a surface [fcs]

[5] The City of Los Angeles Municipal Code Section 93.0117

It was observed that the illuminance on the grass was 210 fcs, and the illuminance off of the grass was 110 fcs resulting in a relatively low reflectance of approximately 0.50 (meaning the grass is absorbing 50% of the light that lands on the field). The grass also exhibits a diffuse reflectance. A diffuse reflection is a surface that has irregularities that are large and not locally smooth. Any light, whether it is daylight or electric light, would not be reflected off the grass in any predictable direction; therefore, no reflection or glare from the lights would be seen on the grass by any observer. Based off the observed low reflectance and the diffuse nature of the artificial grass, there would be no significant glare as a result of the proposed artificial grass.

Figure 4.3-4
Artificial grass reflectance calculation[6]

The other visual impact from the athletic field comes from the direct views of the light poles and fixtures themselves. As most of the private residences are above the light fixtures, there would be no impact to the scenic views that they currently have. For the two residences below the light fixtures (12917 W. Galewood and 3901 N. Van Noord), views to the field and the fixtures would be mostly screened by natural vegetation and the hillside itself. Motorists on Coldwater Canyon Avenue would also have direct views of the light poles; however, any potential glare would be shielded and minimized due to the proposed Musco fixture's visor and house side shield accessories.

4.4 Lighting and Glare Evaluation: Pedestrian Bridge

The proposed lighting design for the bridge utilizes a small LED tapelight that would be integrated within the handrail. The biggest source of glare for this application would come from direct views of the individual LED diodes. Based on the design of typical LED handrail systems, direct views of the diodes only occur when the fixture is viewed from below. The design of the bridge consists of a solid stained concrete flooring combined with prefinished metal panel siding. The Americans with Disabilities Act (ADA) requires the top of gripping

6 Reflectance measurements were taken on September 21, 2013 at approximately 2:00pm. Reflectances are based on relative illuminance values; therefore it is unnecessary for the illumination on the grass to be equal to the proposed illumination on the athletic field.

surfaces of handrails to be a minimum of 34 inches and a maximum of 38 inches vertically above walking surfaces. Assuming the prefinished metal panels are at a height greater than the maximum 38 inch required by ADA code, the light within the bridge would be self-contained and there would be no direct views of the LED fixture from outside the bridge. Similarly the light from the LED handrail system would also be contained and limited to only the bridge's walkable surface. There would be no spillover light onto any of the private residences or onto Coldwater Canyon Avenue below (See **Appendix B: Pedestrian Bridge Lighting Calculation**).

Another potential source of glare would come from the sun. Days when the sun is low in the sky reflective surfaces have the potential to reflect light onto roadways which can potentially distract drivers. The proposed design would minimize potential glare. The eastern elevator core would be positioned to the west to minimize potential glare cause by the winter morning's low sun. Extended overhangs shade the glass from direct sunlight during the day and early evenings, while the proposed landscape would screen the glass elements from street views. The materials of the bridge would be painted with diffuse finishes and have low reflectances. Similar to the athletic field, any light reflecting off of the bridge's materials would be reflected in a diffuse manner; therefore the pedestrian bridge is not anticipated to result in significant glare.

4.5 Mitigation Recommendations

Based on the proposed design, we recommend the following steps be considered to ensure minimal lighting impact on adjacent private residences:

1. All interior parking garage fixtures must be shielded to prevent direct views of the source when viewed from outside the structure.
2. The design of the parking structure shall incorporate screening elements to prevent lighting and car headlights from disturbing residences around the project site.
3. Interior lighting fixtures shall be controlled by photocells and occupancy sensors to reduce the light output of the fixtures when the structure is unoccupied.
4. Permanent exterior lighting shall be shielded to prevent direct views of the fixture source from adjacent residential neighbors. Fixtures shall also be focused properly to limit the amount of spillover lighting.
5. Project shall comply with section 93.0117 of LAMC. Spillover lighting levels shall not exceed 2.0 fcs on adjacent privately owned residential properties.
6. Musco sports lighting fixtures (or equal alternative) with visor system shall be used to illuminate the athletic field to provide better light control, reduce glare, and reduce the amount of spill light.
7. Sports lighting fixtures shall be painted a natural green color so that they blend in to its natural surroundings.
8. Sports lighting fixtures shall be on a time clock to ensure the fixtures are turned off at or before 8:00pm on weeknights.
9. Lighting for the Pedestrian Bridge should be integrated within the handrails and mounted at a height below the adjacent solid metal panels to eliminate any source of glare from the bridge. Light from the handrails shall illuminate the bridge walkway only and not spillover onto Coldwater Canyon Avenue.
10. All building materials shall be diffuse and of low reflectance to prevent potential glare.

5.0 CONCLUSION

Based on calculations provided by Lighting Design Alliance and Musco, it has been determined that no spillover light from the parking structure or the athletic field would impede on any neighboring open spaces or private residences. By utilizing an integrated handrail light, there would also be no spillover light coming from the pedestrian bridge.

All proposed lighting fixtures would be shielded to prevent any potential glare to the residences and motorists on Coldwater Canyon Avenue. Any potential glare caused by the reflection from direct sunlight on the athletic field would be mitigated by the diffuse material of the Field Turf. Similarly, the diffuse materials used on the pedestrian bridge would also eliminate potential glare to the neighboring residences and motorists on Coldwater Canyon Avenue.

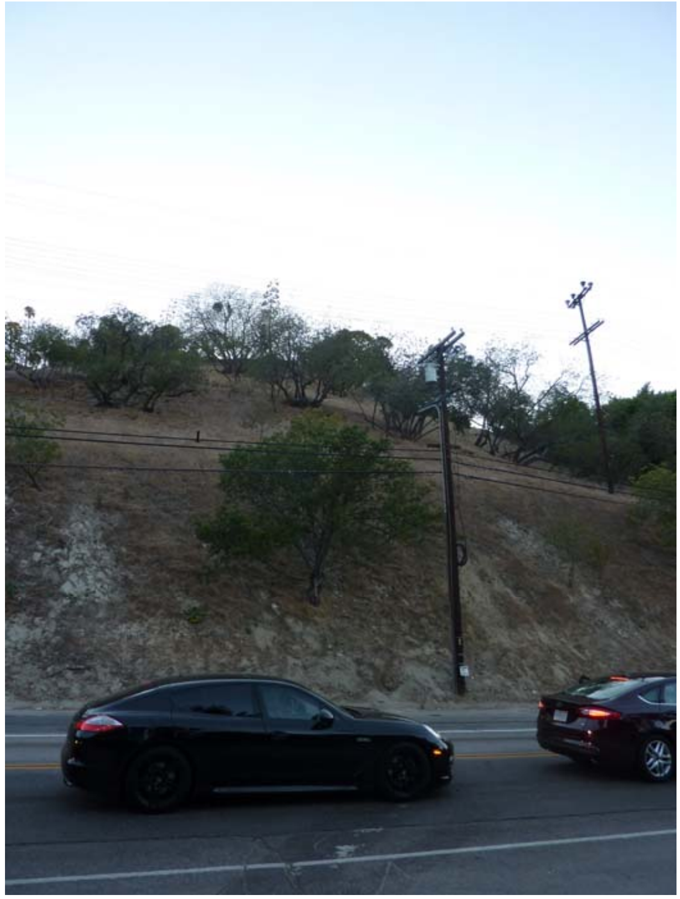
After a complete analysis and review of the project, the proposed lighting design for the parking structure, the athletic field, and the pedestrian bridge will not result in any significant impacts to the adjacent private residences.

APPENDIX A

All pictures were taken on September 16, 2013 between the hours of 6:30 PM and 8:30 PM.

Existing Musco Fixtures

Existing Musco Fixtures

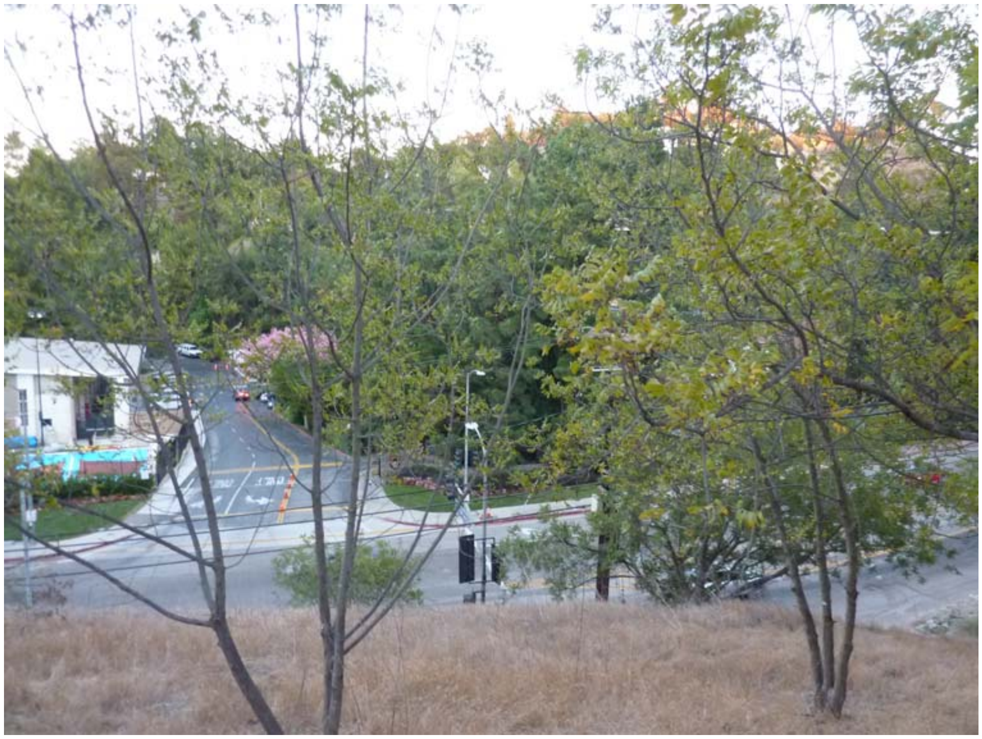


View of Development Site

Intersection at Coldwater Canyon Avenue and Harvard Westlake Drive

View from on top of the Development site looking northeast

View from on top of the Development Site looking east.



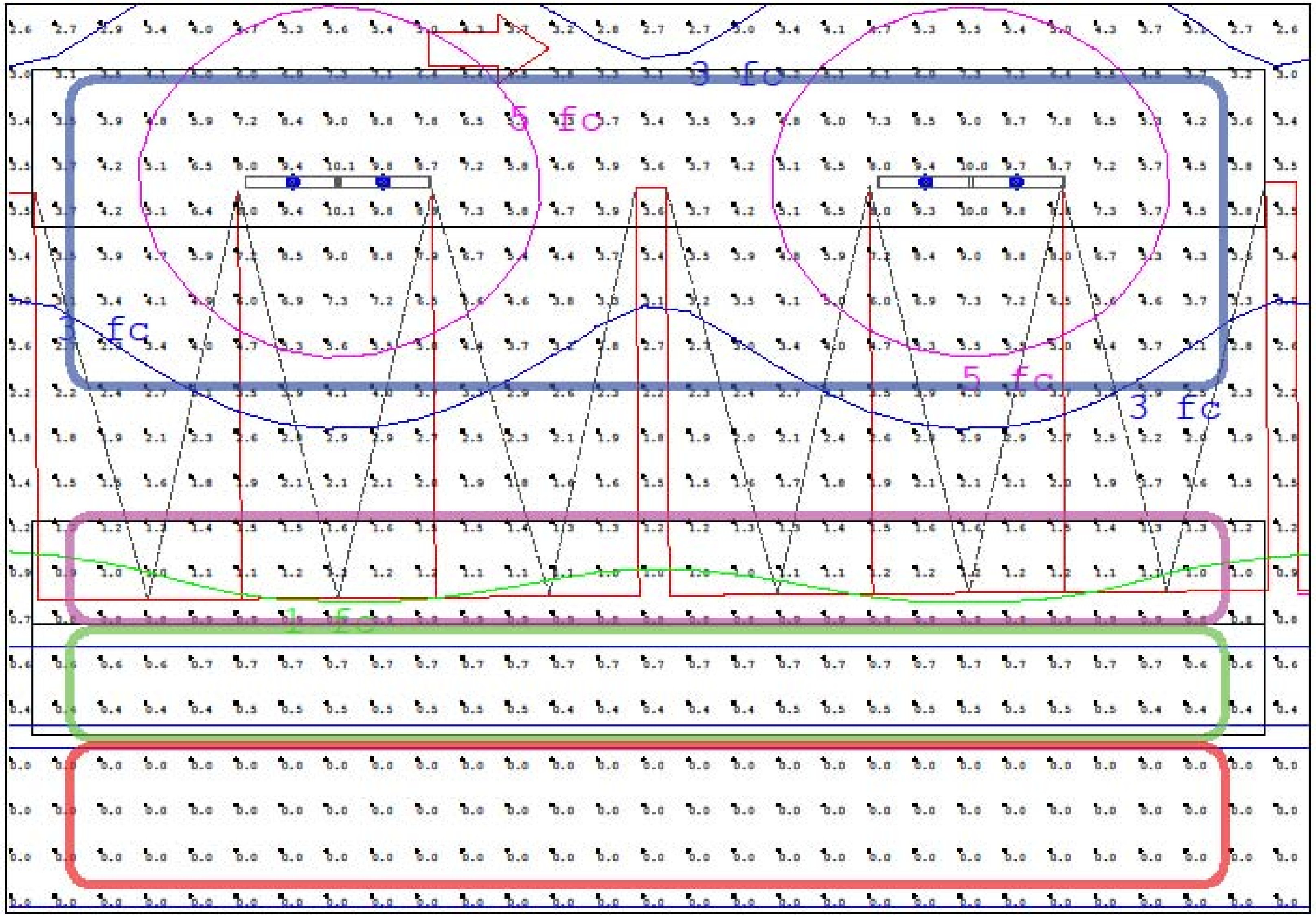
View from on top of the Development site looking southeast

View from on top of the Development Site looking south

View from on top of the Development site looking at Taper Athletic Pavilion at before sunset

View from on top of the Development Site looking at Taper Athletic Pavilion after sunset

Appendix B: Parking Structure Lighting Calculation
Option 1: Linear Fluorescent Downlight



Holophane
Controlume Series
1 32W T8 Fluorescent Lamp

Interior Drive Aisle
Illuminance (fc.)

Maximum: 10.0
Minimum: 3.1
Average: 5.97
Max/ Avg: 1.68

Perimeter Edge
Illuminance (fc.)

Maximum: 1.5
Minimum: 0.7
Average: 1.07
Max/ Avg: 1.40

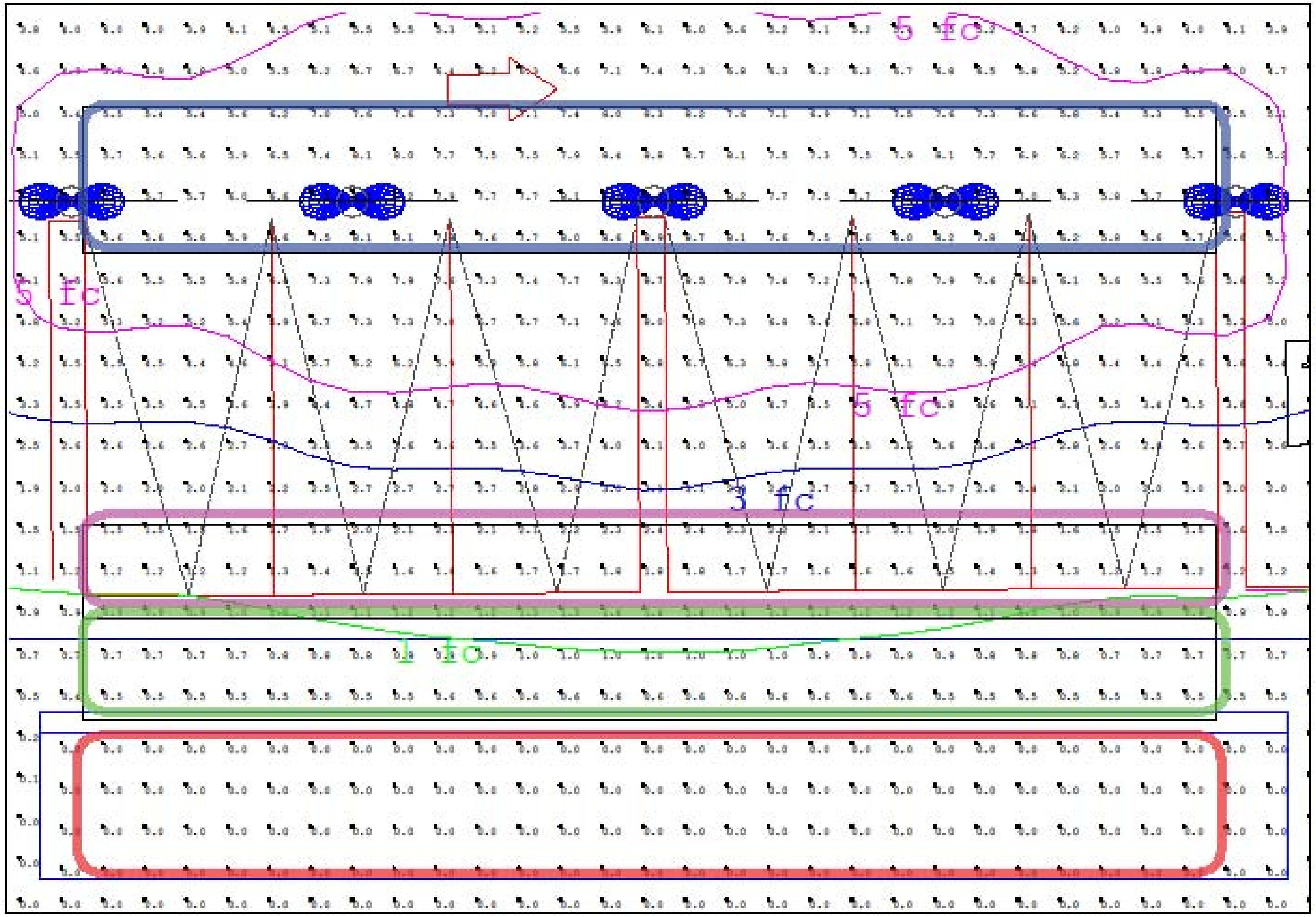
Outside Structure
Illuminance (fc.)

Maximum: 0.7
Minimum: 0.2
Average: 0.34
Max/ Avg: 1.70

Hill Top
Illuminance (fc.)

Maximum: 0
Minimum: 0
Average: 0
Max/ Avg: N/A

Appendix B: Parking Structure Lighting Calculation
Option 2: LED Downlight



Kim Lighting
PGL7 LED
PGL72-Type I 68W

Interior Drive Aisle
Illuminance (fc.)

Maximum: 9.0
Minimum: 5.3
Average: 7.12
Max/ Avg: 1.26

Perimeter Edge
Illuminance (fc.)

Maximum: 2.4
Minimum: 0.9
Average: 1.51
Max/ Avg: 1.59

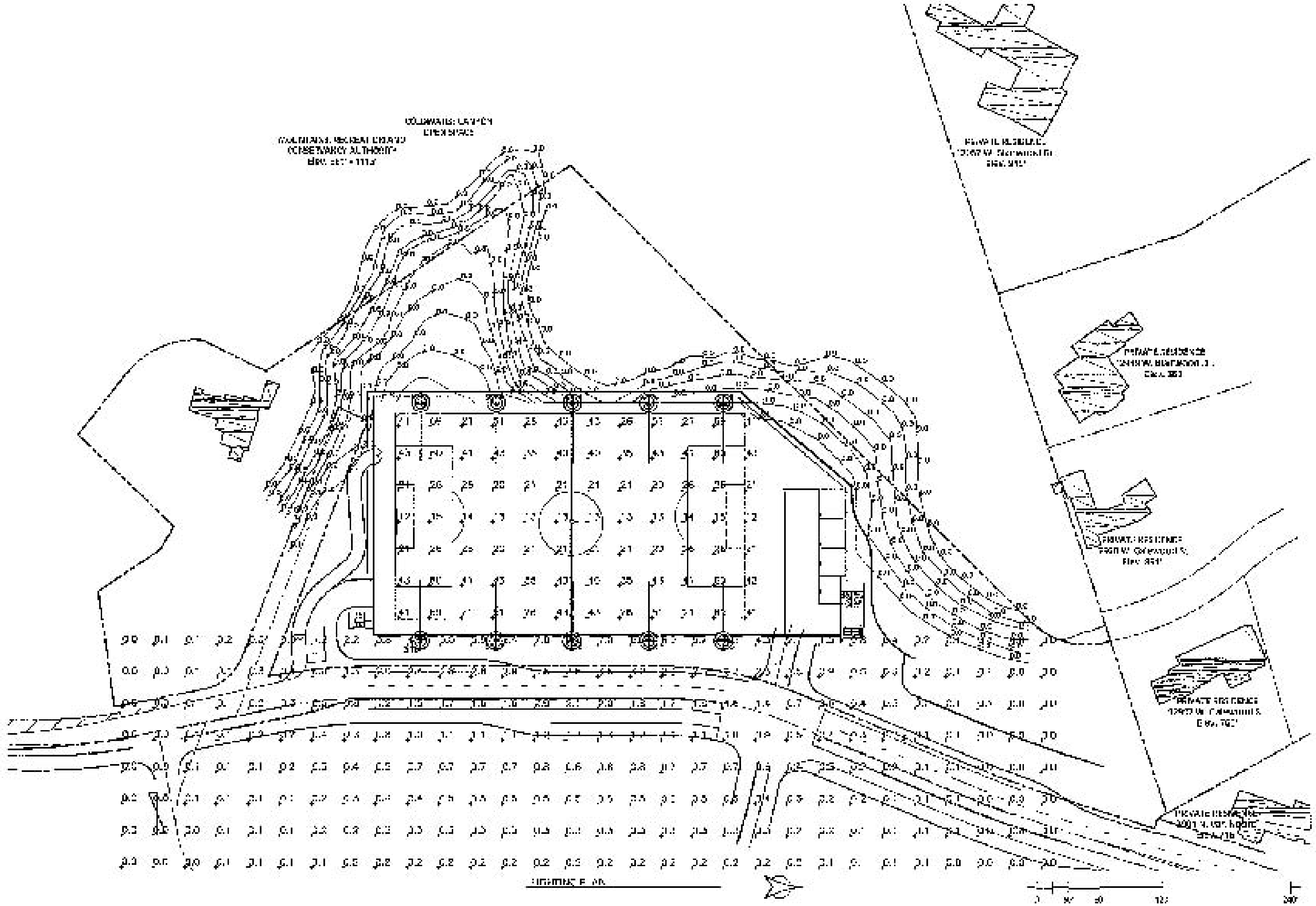
Outside Structure
Illuminance (fc.)

Maximum: 1.0
Minimum: 0.5
Average: 0.7
Max/ Avg: 1.43

Hill Top
Illuminance (fc.)

Maximum: 0
Minimum: 0
Average: 0
Max/ Avg: N/A

APPENDIX B: HARVARD-WESTLAKE ATHLETIC FIELD LIGHTING CALCULATION - PROVIDED BY MUSCO



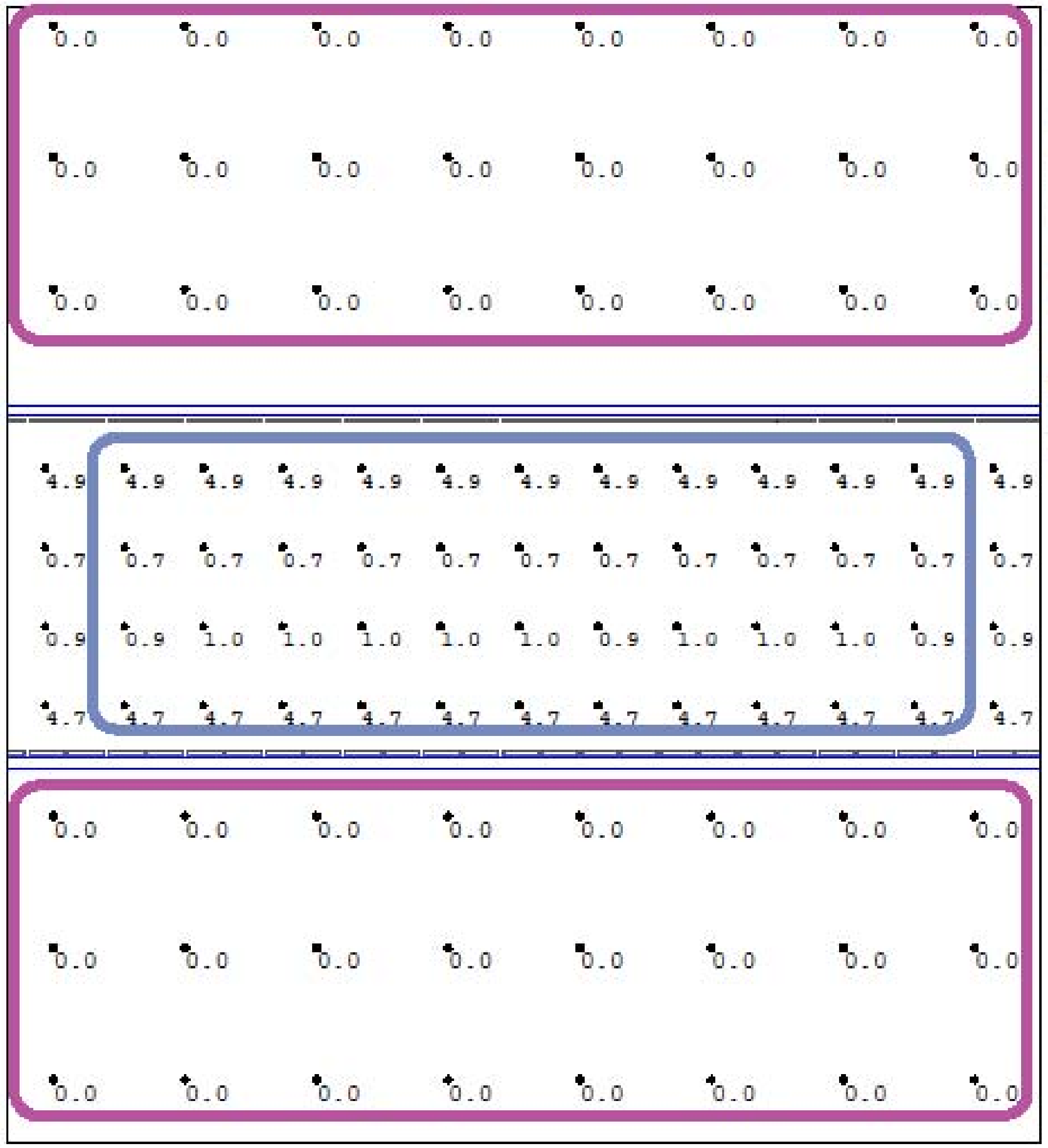
SOURCE: Innovative Design Group, Musco Sports Lighting, LLC

Harvard-Westlake Parking Structure ■

Figure 3.1-25

Lighting Map

Appendix B: Pedestrian Bridge Lighting Calculation



IO Lighting
Luxrail
Asymmetrical Standard Output

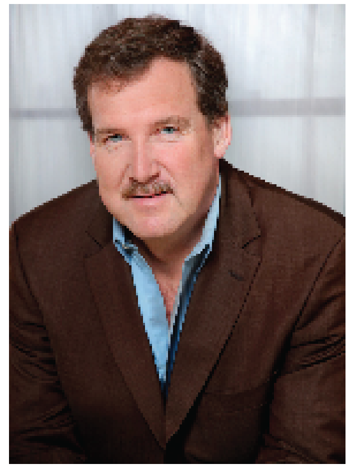
Pedestrian Bridge Top
Illuminance (fc.)

Maximum: 4.9
Minimum: 0.7
Average: 2.82
Max/ Avg: 1.74

Coldwater Canyon Avenue
Illuminance (fc.)

Maximum: 0
Minimum: 0
Average: 0
Max/ Avg: N/A

CHARLES E. ISRAEL, FIALD, MIES, LEED® AP
President



Chip Israel is an internationally recognized lighting designer with over 27 years of experience and is current President of the IES, the Illuminating Engineering Society. In 1992, he founded LIGHTING DESIGN ALLIANCE, a full-service architectural lighting design firm, where he built a highly-select team of lighting-design professionals who now serve a variety of clients worldwide. As President, Chip works closely with the owner, the design team, and manufacturers to ensure lighting systems are fully integrated with the architectural design and enhance the designer's concepts. Lighting Design Alliance has also been recognized by winning over 100 National and International design awards, including multiple awards for sustainable lighting design.

He serves as 2012-2013, President of the Illuminating Engineering Society of North America (IESNA). Chip has been an instructor at UCLA and the American College of Applied Arts in the field of interior lighting. Chip's design experience ranges from building facade lighting, to custom fixture design, to corporate office spaces, to themed hotels and resorts.

EDUCATION
Pennsylvania State University
Bachelor of Architectural Engineering, Environmental Systems

AWARDS & HONORS
International Association of Lighting Designers (IALD)—Fellow
Pennsylvania State University College of Engineering—Outstanding Engineering Alumnus
Martin Professional Lighting Designer of the Year—2002

PUBLICATIONS
Projects have been featured in World Gaming and Leisure Review, Casino Lighting- Architectural Record, The Citadel Landscape Architect & Specifier, Landscape Lighting, Architectural Lighting, and P'ZAZZ Yacht Showboats International.

ASSOCIATIONS
nternational Association of Lighting Designers (IALD)—Past Board of Directors, Past Director of Education
IALD Education Trust—Founder and Past President
Lighting Certified by the National Council on Qualifications for the Lighting Profession (LC)
Designers Lighting Forum—Past President
La Sfacciata Lighting Academy—Past Board of Directors
Illuminating Engineering Society of North America (IESNA)—President 2012-2013, Hospitality Committee, Bridges, and Building Committee

LECTURES & SEMINARS
Chip Israel is committed to promoting excellence in lighting design through education. As a leading industry spokesman, he has presented technical papers and educational seminars in 11 countries and lectured at over a dozen universities across the country. Chip is routinely asked to speak at domestic and international industry events - Designers Lighting Forum, Illuminating Engineering Society National, International Congress on Architecture and Technology in Germany, Energy Efficiency Program in Saudi Arabia, Light in India, various conferences and trade shows, Hospitality Design, NeoCon, and Lightfair International.

AWARDS
IESNA Awards of Merit
Disney Animal Kingdom Villas– Kidani Village
Ameristar Kansas City Lobby
Katsuya – Hollywood
S Bar
Payless ShoeSource Prototype Store
City National Plaza Lobby
Port of Los Angeles Waterfront
Cheesecake Factory – Rancho Mirage & Grove
Thomas Properties Group Office
Vincent Thomas Bridge
Port of Los Angeles Waterfront
City National Plaza Lobby
Disney's Wide World of Sports
Disney's Coronado Springs
Disney's Wilderness Lodge
MCA Music Publishing
Ontario Airport

GE Award of Excellence
The Venetian
911 Wilshire Lobby Renovation
Morrison & Foerster Law Offices

IES Lumen West Award of Excellence
Katsuya Glendale
Williams-Sonoma
Lighting Design Alliance Office
Stanley Fountain at the Hollywood Bowl
Co-Cathedral of the Sacred Heart Exterior
The Cheesecake Factory – Atlanta
Westlake Village Hotel & Spa – Exterior
Port of Los Angeles Waterfront Phase I
Borgata Hotel, Casino and Spa
Disney's Grand Californian Hotel
Sketchers
The Venetian – Exterior
The Venetian – Interiors
50 Beale Street
Pershing Square Park

GE Award of Merit
50 Beale Street
Sony Imageworks
Lighting Design Alliance Office

IES Lumen West Award of Merit
Herman Miller LA Showroom
Co-Cathedral of the Sacred Heart – Interior
Harvey Nichols Jakarta
The Water Club
Cole Haan Outlet
Caesars Palace-Beijing Noodle Co. No.9
Harvard-Westlake School
Ameristar Kansas City Lobby
Westlake Village Hotel & Spa - Interior
City National Plaza Lobby
Vincent Thomas Bridge
Spa Resort and Casino
Moody Gardens Aquarium
Parker's Lighthouse
Juxtapose
Bayside, Newport Beach
365 Murad Salon
The Citadel

Hospital Build Middle East Exhibition & Congress
Cleveland Clinic Abu Dhabi

cisrael@lightingdesignalliance.com | CHARLES ISRAEL

W. Patrick Salmons, MIES, LEED® AP
Designer

A complete and comprehensive architectural engineering background combined with real world experience has helped Patrick in understanding the art of lighting. Whether working as a lead designer or as a supporting team member, Patrick's strong technical background and work ethic make him a valuable asset to the LIGHTING DESIGN ALLIANCE team.

EDUCATION

University of Colorado at Boulder
Bachelor of Science, Architectural Engineering
Emphasis: Illumination Engineering

EXPERIENCE

Patrick joined LIGHTING DESIGN ALLIANCE as an intern in the summer of 2006. His responsibilities included, but were not limited to, conceptual design and development, lighting specification, calculations, renderings, and on-site work. After his summer internship came to an end, he continued to work part time assisting designers during his final school year. During his studies in Colorado, Patrick broadened his education with classes in psychology, architecture, art, and business. The majority of his studies were dedicated to architectural engineering where he studied basic building systems and construction with areas of study including civil, structural, electrical, mechanical, and construction management. After developing a fondness for lighting, he studied its history and theories, lighting design, radiative transfer, equipment design, and sustainability. While immersed in technical content, Patrick also performed laboratory work to test and verify theories. Combining a strong work ethic with good organization allowed him to complete his studies and earn an engineering degree.

Since joining LIGHTING DESIGN ALLIANCE as a full time designer, Patrick has worked on project all over the globe. He has worked on a variety of projects including hospitality, large mixed use retail, commercial, casino, and residential designs. A sample of completed projects includes the 97,000-square-foot flagship Harvey Nichols Department Store in Jakarta, Indonesia and the Greenland Luwan Riverfront in Shanghai China, which includes (3) office towers, (2) residential towers, a Marriot hotel, and a (3) story retail area that connects them all togetherS. Patrick has also been involved in many retail project redesigns including Cole Haan, Crocs, Fixtures Living, Pottery Barn, Victoria's Secret, and Williams Sonoma

AWARDS AND ASSOCIATIONS

IES Lumen West Award of Excellence
Williams Sonoma Brand Green Redesign

IES Lumen West Award of Merit
Galaxy Casino - Interiors
Galaxy Casino - Exteriors
Cole Haan Outlet Store Prototype
Harvey Nichols Department Store - Jakarta, Indonesia

Los Angeles Architectural Award of Excellence
28th Street Apartments, Los Angeles, CA

Los Angeles Conservancy Award
28th Street Apartments, Los Angeles, CA

Westside Urban Forum Design Award
28th Street Apartments, Los Angeles, CA

U.S Green Building Council: LEED
Accredited Professional

LIGHTING DESIGN ALLIANCE

psalmons@lightingdesignalliance.com | W. PATRICK SALMONS