Lighting Forum

2014 Design Training Expo

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Topics

- Intersection Pedestrian Lighting
- Proposed Changes to IESNA RP-8
- Update on LED on Future Projects

Bike/Pedestrian Safety Initiative

- Pedestrian Lighting Component
  1. Lighting Criteria for Intersection Lighting
  2. Secretary's Initiative for Sidewalk Illumination
  3. Resolve Challenges in Implementation

Top Twenty Intersections w/ Highest Nighttime Pedestrian Crashes

District	Town	SR No.	Intersection		Nighttime Pedestrian Crashes			Total Crashes
			On	At	Crashes	Injuries	Fatalities	
7	Tampa	SR 685	Florida Ave.	Waters Ave.	11	12	0	14
5	Orlando	SR 438	Hiawassee Rd.	SR 438	7	6	1	12
6	Hialeah	SR 9	27th Ave. NW	95th St. NW	7	3	2	7
6	Miami	US 1	Dixie Highway	SR 9	7	5	1	11
4	Ft. Lauderdale	SR 870	Commercial Blvd.	Powerline Rd.	7	5	2	9
4	Wilton Manors	SR 816	Oakland Park Blvd.	Powerline Rd.	7	8	0	11
6	Hialeah	SR 9	27th Ave. NW	95th St. NW	6	3	2	6
6	Miami Beach	SR A1A	Collins Ave.	16th St.	6	5	0	11
4	Davie	US 441	SR 7	Griffin Rd.	6	6	0	10
6	Miami Gardens	SR 817	SR 817	SR 860	6	5	0	17
6	Miami Shores	US 441	7th Ave. NW	95th St. NW	6	7	0	15
5	Castleberry	SR 436	SR 436	Oxford Rd.	6	6	1	7
7	Tampa	SR 582	Fowler Ave.	15th St.	6	6	0	9
6	Miami	US 441	7th Ave. NW	80th St. NW	6	4	0	11
4	Lauderdale Lakes	US 441	SR 7	Oakland Park Blvd.	6	6	0	14
7	Clearwater	SR 60	SR 60	Belcher Rd.	6	7	0	9
4	Plantation	US 441	SR 7	Davie Blvd.	6	5	2	7
4	Tamarac	SR 870	SR 870	SR 7	6	3	1	9
4	Ft. Lauderdale	SR 842	Broward Blvd.	Andrews Ave.	6	7	0	12
6	N. Miami Beach	SR 826	163rd St. NE	Biscayne Blvd.	6	4	2	11
					124	109	12	201

Top Twenty Intersections w/ Highest Nighttime Pedestrian Crashes

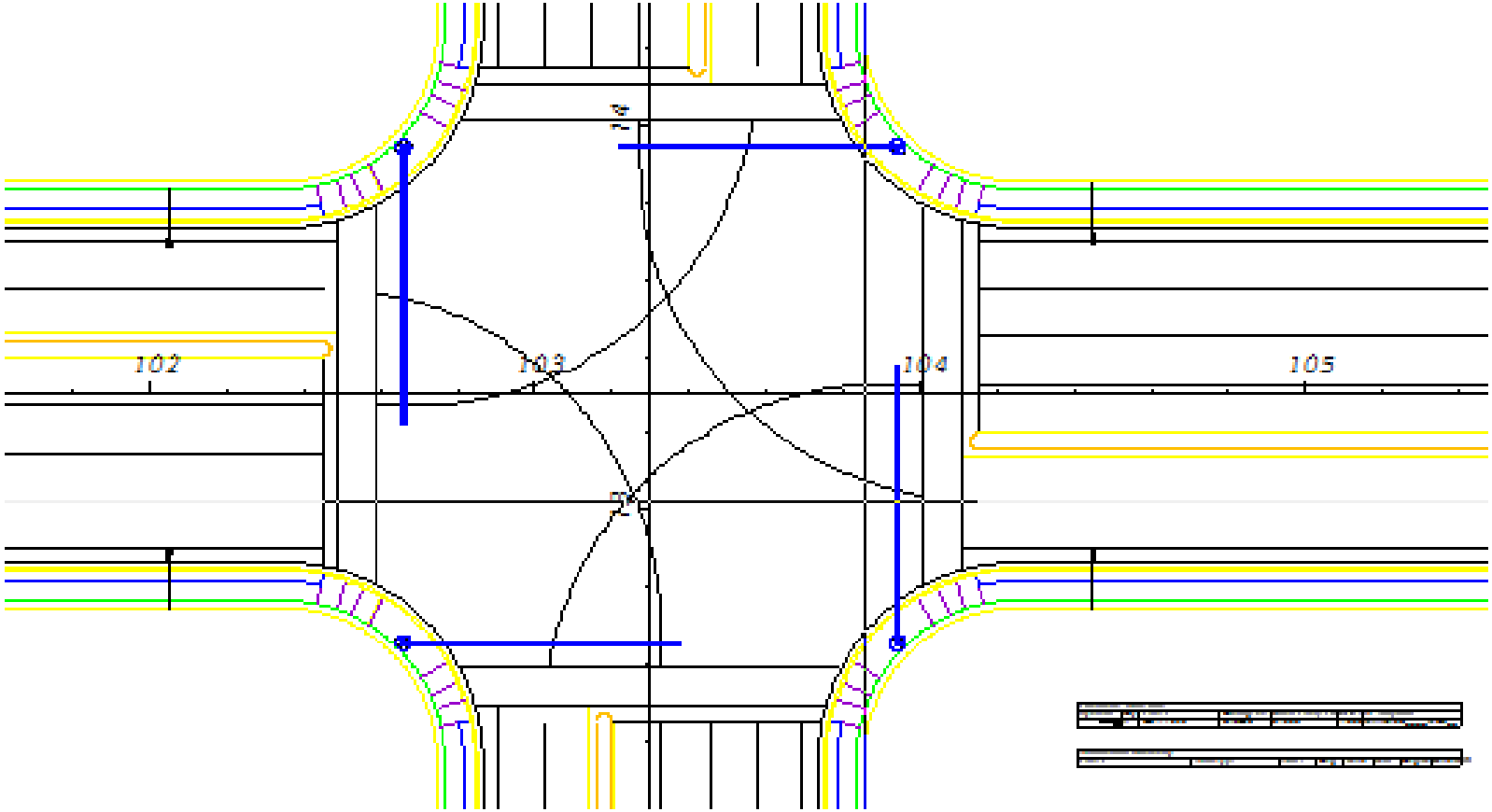
- 62% of Total Crashes Occurred at Night
- 55% Occurred at Intersection of Two State Highways
- 100% Occured at Signalized Intersections
- All But One of the Intersections Had Some Form of Lighting

Typical Intersection Lighting

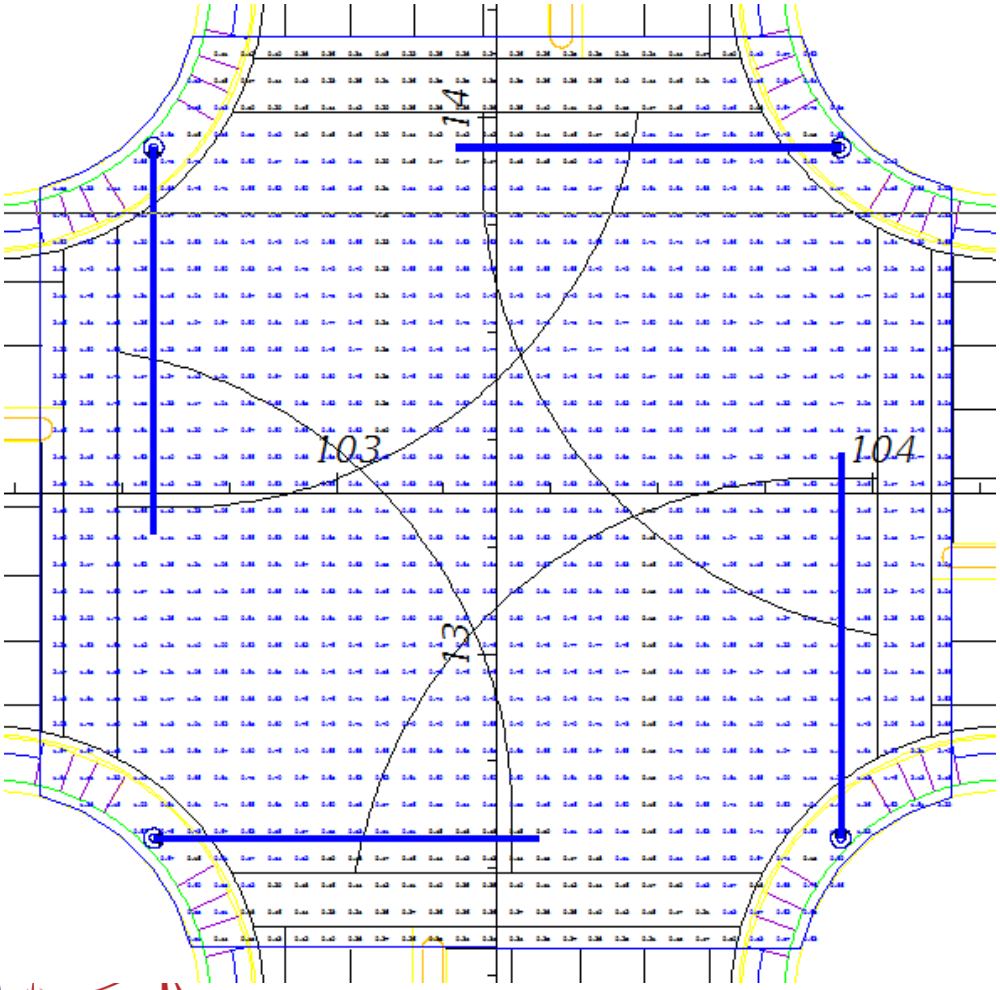
Typical Intersection Lighting

Typical Intersection Lighting

Main Roadway Lighted



Typical Intersection Lighting
Main Roadway Lighted



<u>Illuminance Values</u>

Avg. = 0.99 fc

Max. = 3.07 fc

Rdwy. Min. = 0.25 fc

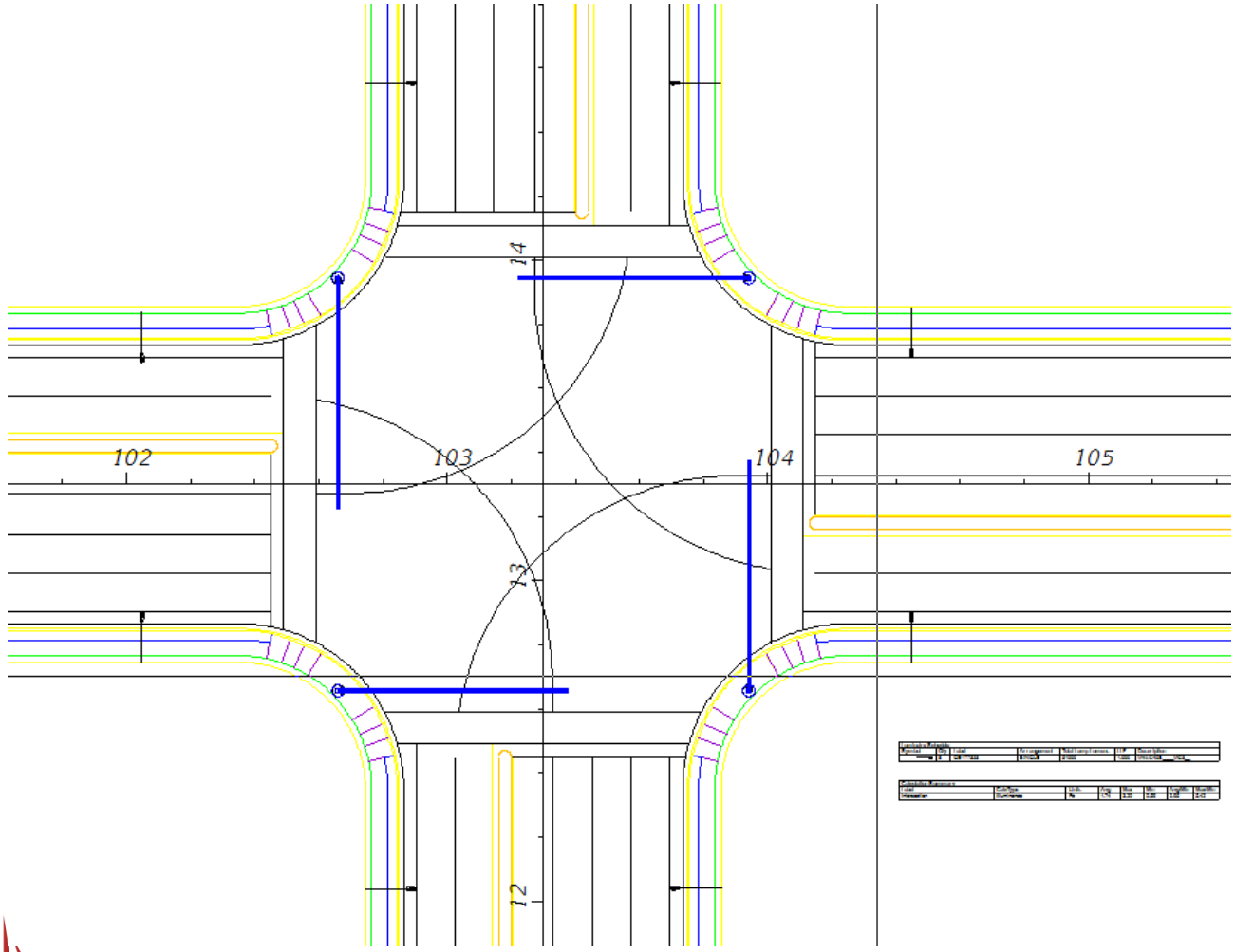
Inter. Min. = 0.15 fc

Avg./Min = 3.96

Typical Intersection Lighting
Main Roadway Lighted

- Rendering

Typical Intersection Lighting
Main & Cross Roadway Lighted



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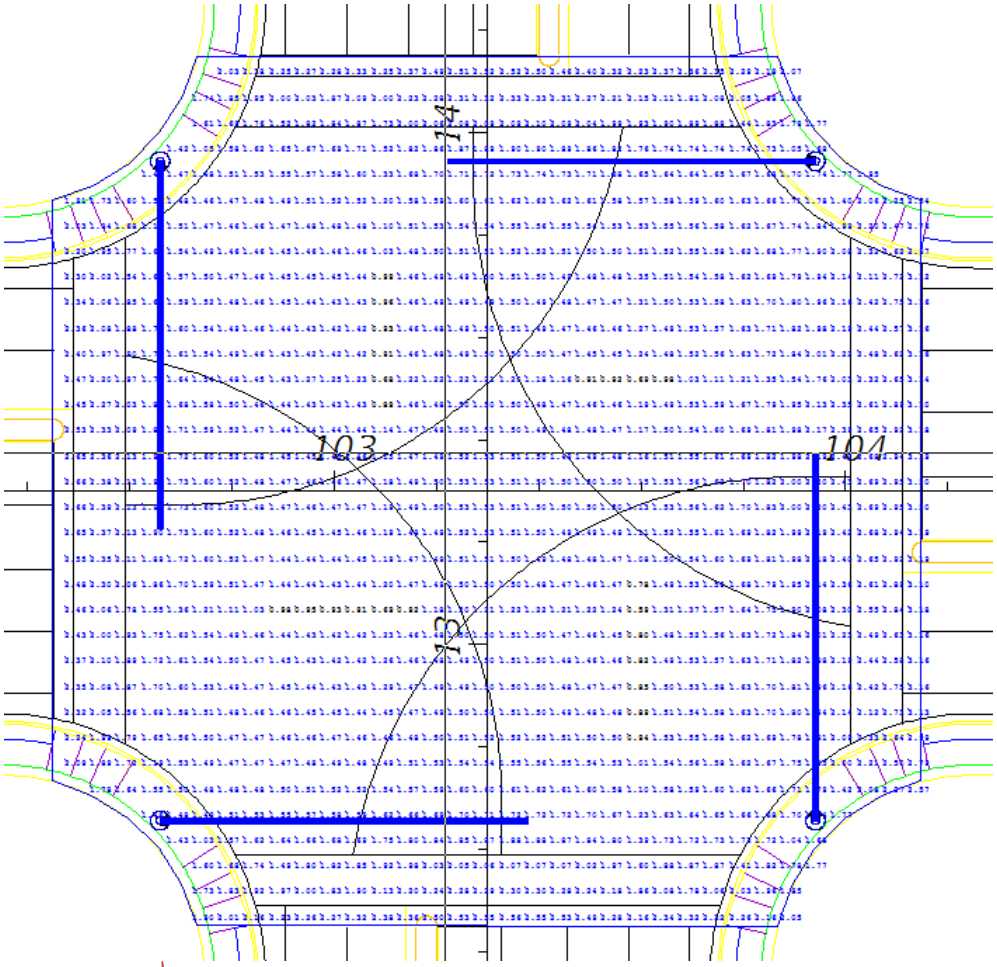
Typical Intersection Lighting
Main & Cross Roadway Lighted



<u>Illuminance Values</u>

Avg. = 1.74 fc

Max. = 3.20 fc

Rdwy. Min. = 0.59 fc

Inter. Min. = 0.59 fc

Avg./Min = 2.95

Lighting Criteria
Continuously Lighted Roadway

AASHTO Lighting Guide	IESNA RP-8
E_H = 1.6 to 2.1 fc	E_H = 1.3 to 1.7 fc
E_{AVG} / E_{MIN} = 3.0	E_{AVG} / E_{MIN} = 3.0
$L_{V\ MAX}$ / L_{AVG} = 0.3	$L_{V\ MAX}$ / L_{AVG} = 0.3

Intersection Criteria

Based on Medium & High Pedestrian Classification
Based on RP-8

Major/Major

E_H = 3.9 & 4.5 fc

E_V = 1.3 fc

$E_{AVG} / E_{MIN} = 3.0$

$L_{V\ MAX} / L_{AVG} = 0.3$

Major/Collector

E_H = 2.9 & 3.5 fc

E_V = 1.3 fc

$E_{AVG} / E_{MIN} = 3.0$

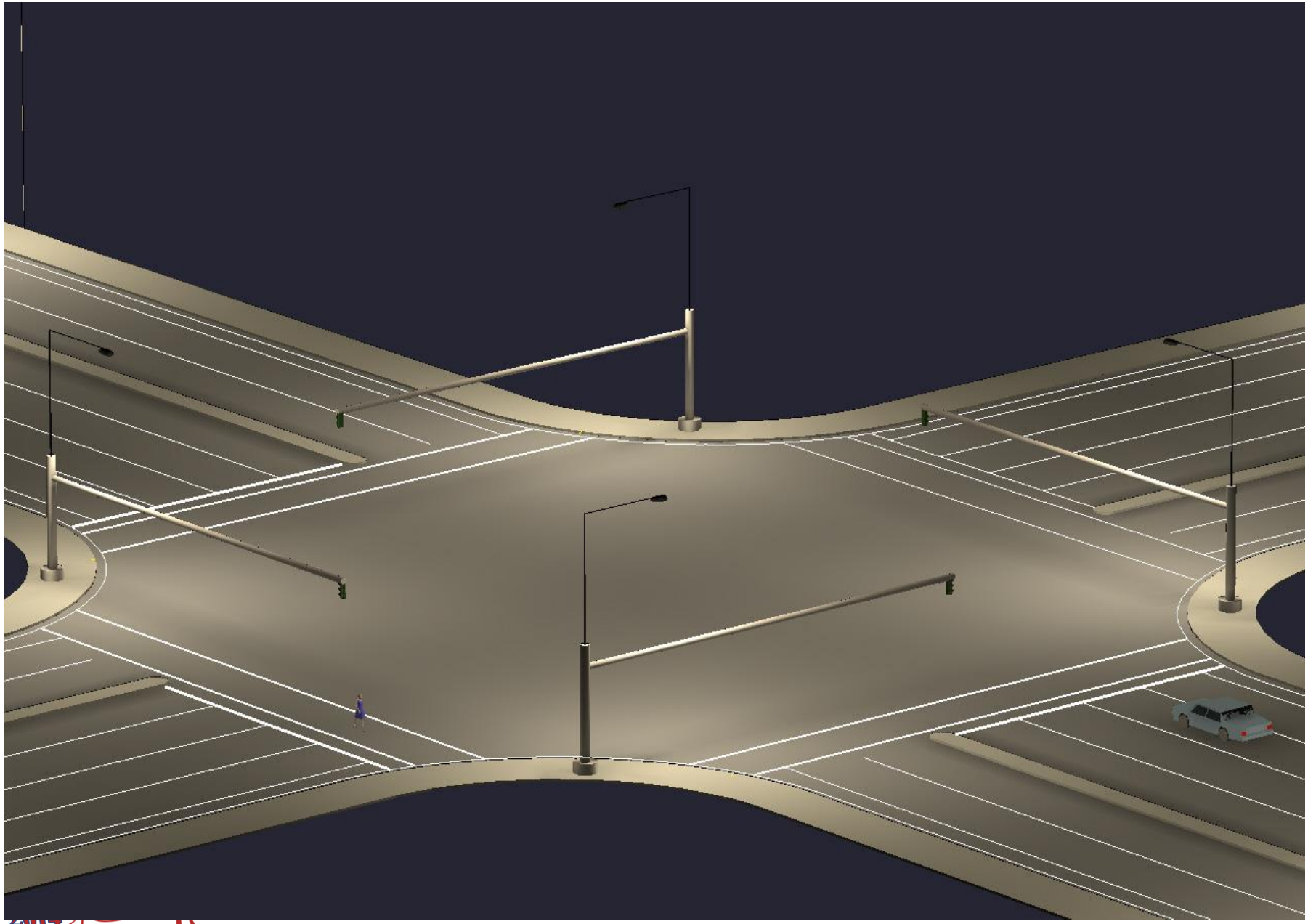
$L_{V\ MAX} / L_{AVG} = 0.3$

Intersection Pedestrian Lighting

- Created Six Intersections for Analysis
  1. 6 Lane / 6 Lane w/ Dual Lefts & Rt. Turn Slip Lanes w/ Islands
  2. 6 Lane / 4 Lane w/ Dual Lefts & Rt. Turn Slip Lanes w/ Islands
  3. 6 Lane / 4 Lane w/ Dual Lefts & Rt. Turn Lanes
  4. 4 Lane / 4 Lane w/ Dual Lefts & Rt. Turn Lanes
  5. 4 Lane / 4 Lane w/ Dual Lefts & Rt. Turn Lanes
  6. 4 Lane / 4 Lane w/ Single Lefts

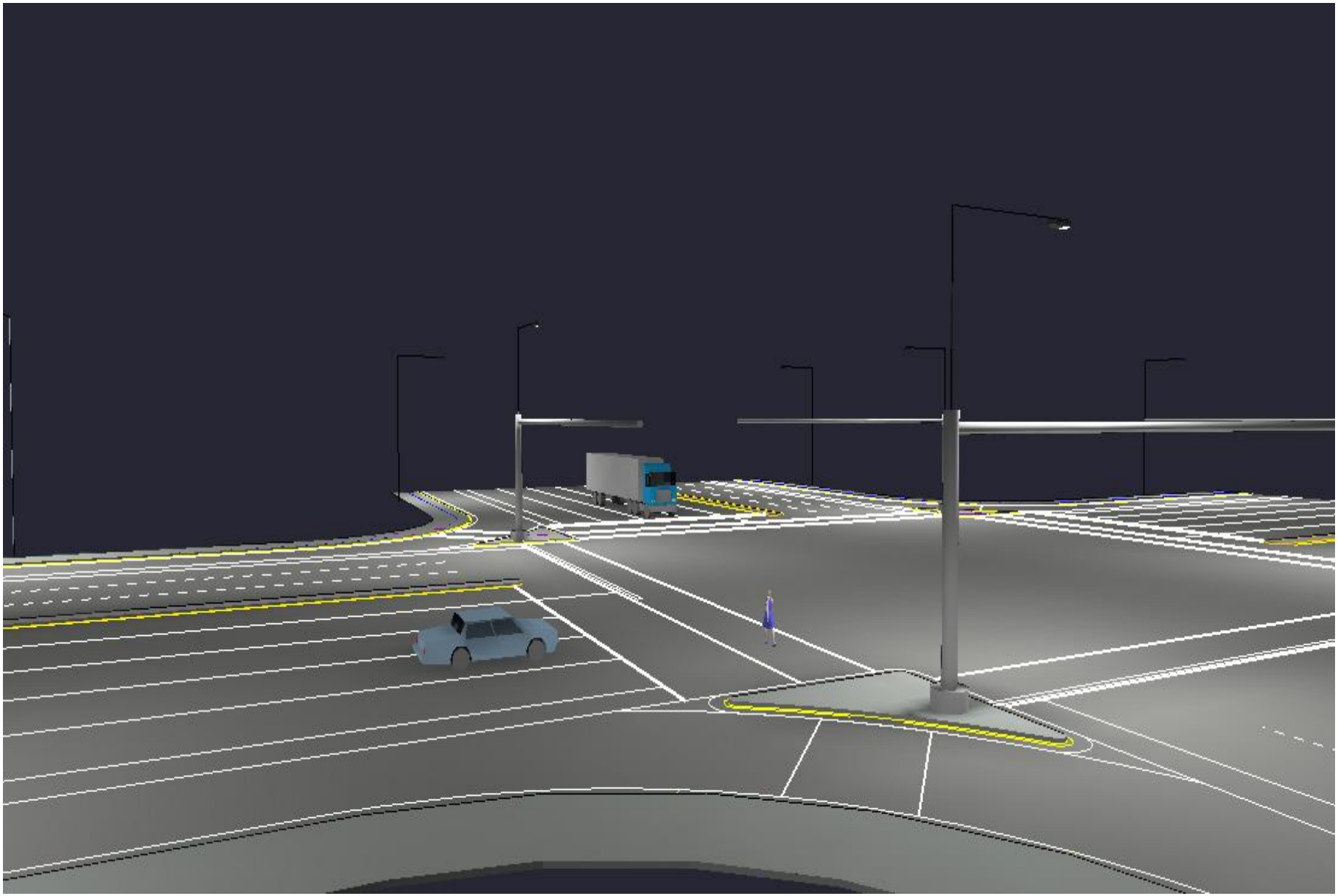
4 Lane / 4 Lane w/ Dual Lefts Intersection

Hyperlink to AGi File



6 Lane / 6 Lane w/ Dual Lefts & Rt. Turn Slip Lanes w/ Islands

Hyperlink to AGi File



Guidance Criteria
Signalized Intersection Lighting

- Method
  1. Horizontal & Vertical Illuminance
  2. Polygon (Bounded by Stop Bars on Each Approach and Back of Sidewalk Along Return)
  3. Measurement Points - 5’ Longitudinally and 5’ Transversely

Guidance Criteria
Signalized Intersection Lighting

- Design Values

1. $E_{H\ Avg}$ = 3.0 fc (Initial)
2. $E_{V\ Avg}$ = 1.3 fc (Initial)
3. E_{Avg}/E_{Min} = 3:1* (* Horizontal Only)
4. E_{max} of Intersection Segment ≤ E_{max} of Roadway Segment

Guidance Criteria
Signalized Intersection Lighting

- Fixture
  1. Use Same Light Source as Roadway, if No Roadway Lighting Use LED
  2. Orientation Should Be Over Crosswalk
  3. Use Mast Arm Support or Strain Poles When Possible

Guidance Criteria
Signalized Intersection Lighting

- Cross Street
  1. If Not Lighted Will Require Transition Lighting
  2. The Lighting Should be Reduced to ½ the $E_{H\ Avg}$ Value for a Distance Equivalent to 15 Seconds of Travel Time at the Posted Speed Limit.

Questions ??

Topics

- Intersection Pedestrian Lighting
- Proposed Changes to IESNA RP-8
- Update on LED on Future Projects

Revisions to IESNA RP-8

- Recommending Luminance Method for Roadway Lighting
- Illuminance Should be Used for Curved Roadways and at Intersections
- No Distinction Between High Mast and Conventional Lighting Criteria

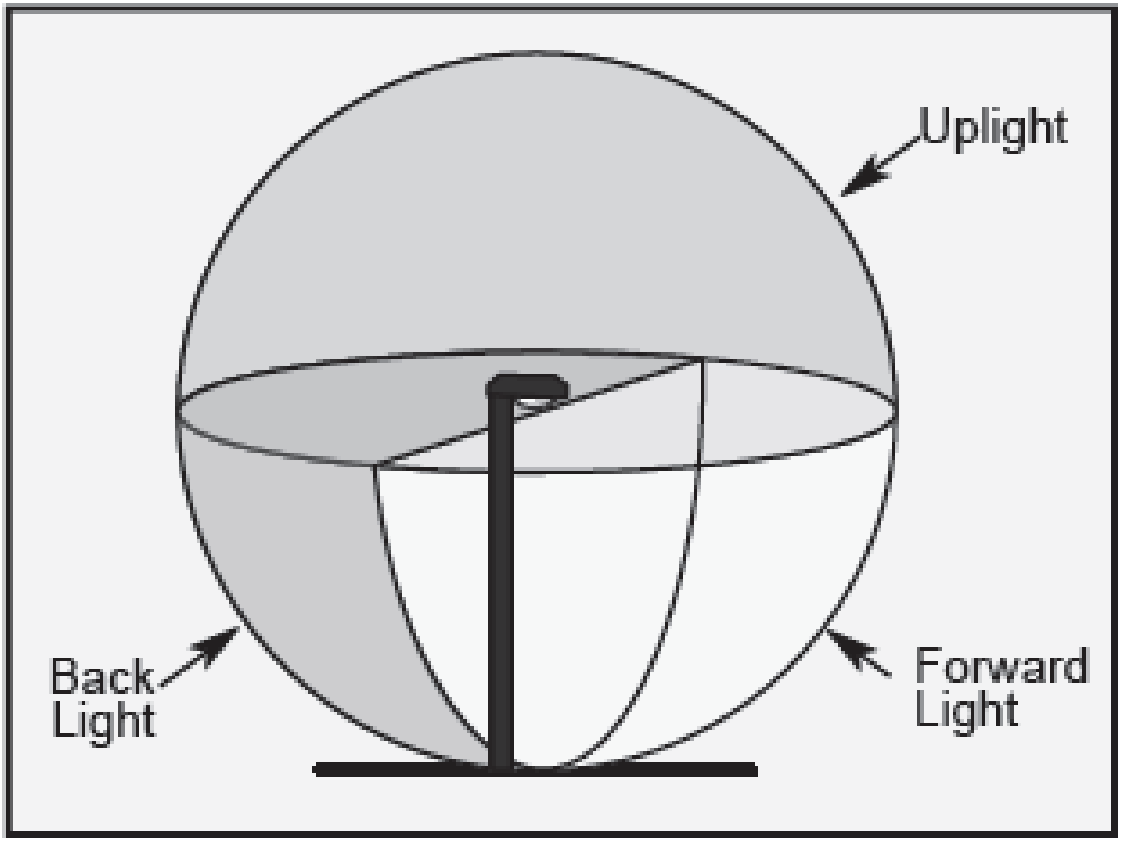
Revisions to IESNA RP-8

- Now Addresses Transitional Lighting
- Deleted Current Luminaire Classification System Based On Lateral & Longitudinal Distribution
- Deleted Current Luminaire Cutoff System
- New Luminaire Classification System Use BUG Ratings

Revisions to IESNA RP-8

- New Luminaire Classification System Uses BUG Ratings
- New System Describes General Distribution of Light in Three Zones: Front, Back and Uplight

Revisions to IESNA RP-8



Topics

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LED Update

- Developmental Specification for Conventional Roadway LED Fixtures
- Moving Forward With LED on Design Bid Build and Design Build Conventional Lighting Projects
- Evaluating Two High Mast Fixtures

LED Update

- New Interstate Interchange Lighting Policy

Questions ??