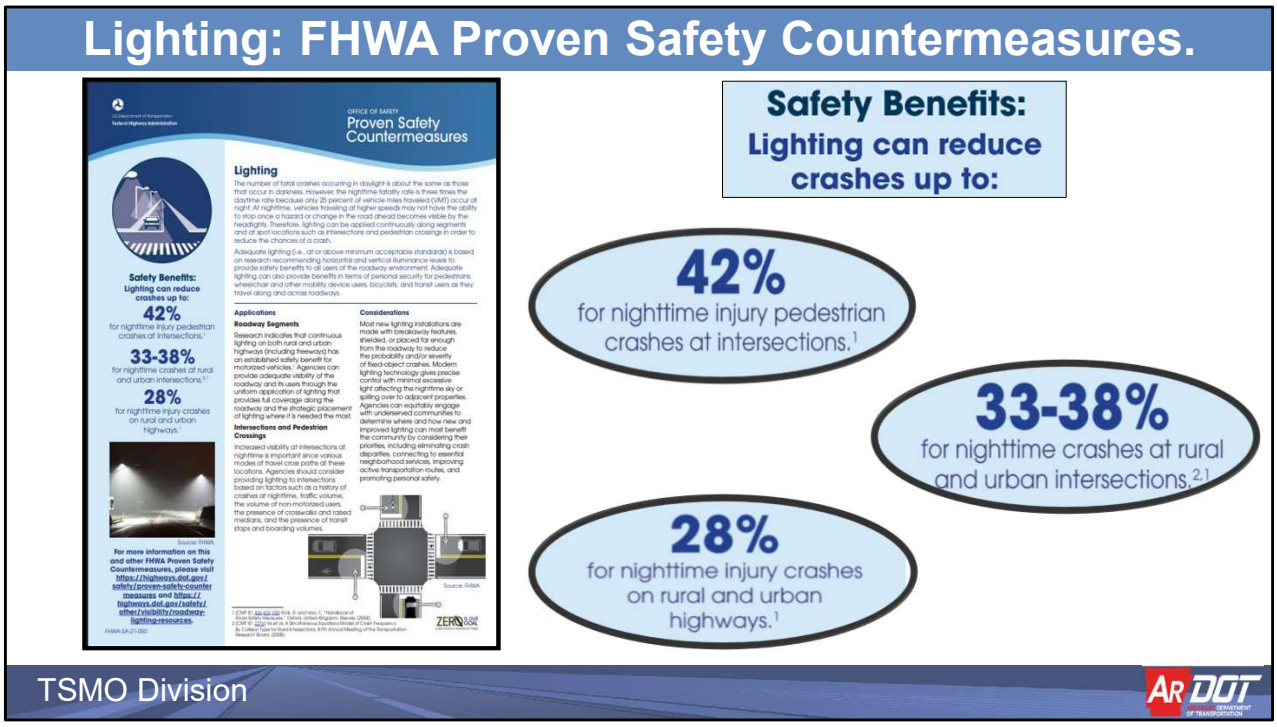
Thank you for joining us today as we present about the benefits of lighting and the steps for the lighting process.

The main goal today is to inform you all about, WHY lighting is strongly encouraged for widespread implementation by FHWA.
And the steps to take for implementing lighting.

So by the end of this presentation you should be able to answer.
How does lighting benefit our roadway system?
What are the steps to implement lighting?
What design criteria is being used to implement lighting?



Lighting, why should we use them and why are they an essential part of our transportation system?

One of the main reason for the use of lighting is safety.
We know this because lighting is one of the FHWA - proven safety countermeasure.
So what does it say about lighting?
Its says - Day time crashes and night time have the same # of fatalities. If they are equal do we need lighting?

Yes, we do because the vehicles miles traveled differ at night, about 25%. When accounting for this variable the nighttime fatality is 3 times greater than as the daytime.

Listing out the safety benefits for lighting, we have the reduction of crashes up to 42% for nighttime injury pedestrian crashes at

intersection.
and reduction of 33-38% for nighttime crashes at rural and urban intersections and a reduction of 28% for nighttime injury crashes in rural and urban highways.

This is why lighting is an essential part of the roadway system because it can reduce the number of injuries in our roadways.

Lighting also benefits by improving the ability to see roadway geometry, objects in the road, other vehicles at extended distances not just through vehicle headlights.

Now that we know the importance of lighting, lets see how we implemented them.

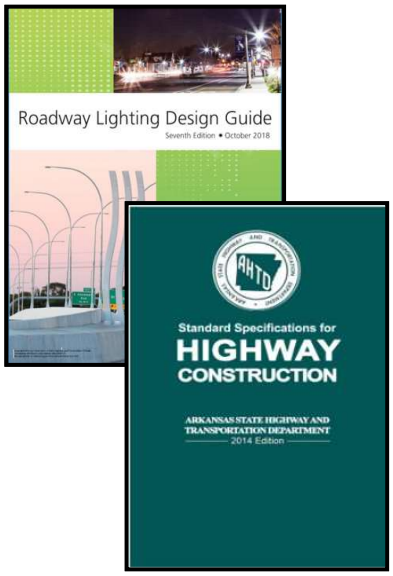
Guidelines & Resources?

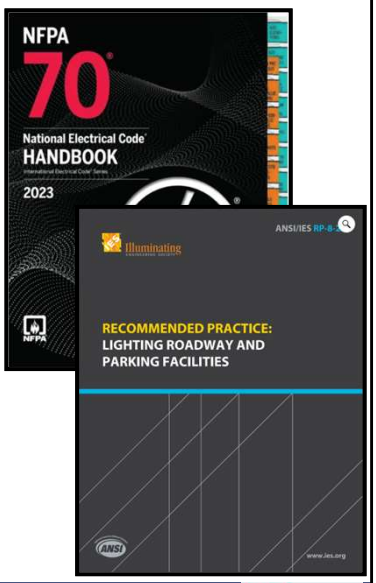

02/09/23, 08/02/23 Rev, 07/05/24 Rev, 02/25/25 Rev. Page 1 of 11

ARDOT - TSMO ROADWAY LIGHTING DESIGN GUIDE

A. LIGHTING DESIGN GUIDES:

A. AASHTO Roadway Lighting Design Guide (7th Ed., October 2018)
B. IES RP-8-14 Roadway Lighting
C. IES RP-20-14 Lighting for Parking Facilities (revised 2016)
D. IES DG-19-08 Design Guide for Roundabout Lighting
E. NCHRP Report 672 Roundabouts: An informational Guide
F. IES RP-22-11 Tunnel Lighting
G. Nighttime Lighting Guidelines for Work Zones – ATSSA, FHA
H. IES DG-26-16 Design Guide for Lighting the Roadway in Work Zones.
I. AASHTO Roadside Design Guide, 4th Ed. With incorporating errata
J. AASHTO Roadside Design Guide, 4th Ed. With incorporating errata
K. National Electrical Code (NFPA 70, Current Edition)
L. ARDOT Standard Specifications for Highway Construction, 2014 Edition





TSMO Division

ARDOT DEPARTMENT OF TRANSPORTATION

To implement lighting these are the Guidelines & Resources utilized. They help with the uniformity and adequate level of lighting and information on design and standards.
As of February 25, 2025
Here is a list of Lighting Design Guides we use.
We have:
AASHTO Roadway Lighting Design Guide,
Illuminating Engineering Society - IES RPs Roadway Lighting, Lighting for Parking Facilities, Tunnel lighting
IES DG Roundabouts Lighting, Lighting in Work Zones
NCHRP Roundabouts
NEC National electrical code
Standard Specification for Highway Construction.

These are the guidelines and resources we can use to go through the steps for lighting.

How is the lighting being done at ArDOT TSMO?

Step 1: Maintenance Agreement
Step 2: Design Criteria
Step 3: Photometric
Step 4: 60%, 90%, 100% Plan
Step 5: Letting
Step 6: Construction
Step 7: Testing, Inspection, and Validation

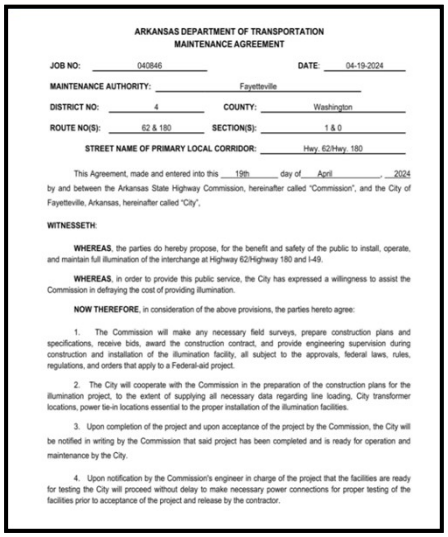
TSMO Division

What is the process for lighting for ARDOT TSMO?

So we have section them off into 7 steps
Which are:
Maintenance Agreement
Design Criteria
Photometric
60%,90%,100% Plans
Letting
Construction
Testing, Inspection, and Validation.

And we will go into more details for each of the steps.

Step 1: Maintenance Agreement



ARKANSAS DEPARTMENT OF TRANSPORTATION
MAINTENANCE AGREEMENT

JOB NO: 040846 DATE: 04-19-2024

MAINTENANCE AUTHORITY: Fayetteville

DISTRICT NO: 4 COUNTY: Washington

ROUTE NO(S): 62 & 180 SECTION(S): 1 & 0

STREET NAME OF PRIMARY LOCAL CORRIDOR: Hwy. 62/Hwy. 180

This Agreement, made and entered into this 19th day of April, 2024 by and between the Arkansas State Highway Commission, hereinafter called "Commission", and the City of Fayetteville, Arkansas, hereinafter called "City",

WITNESSETH:

WHEREAS, the parties do hereby propose, for the benefit and safety of the public to install, operate, and maintain full illumination of the interchange at Highway 62/Highway 180 and I-49.

WHEREAS, in order to provide this public service, the City has expressed a willingness to assist the Commission in defraying the cost of providing illumination.

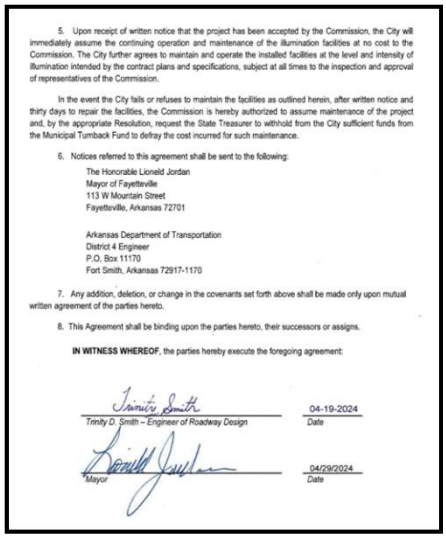
NOW THEREFORE, in consideration of the above provisions, the parties hereto agree:

1. The Commission will make any necessary field surveys, prepare construction plans and specifications, receive bids, award the construction contract, and provide engineering supervision during construction and installation of the illumination facility, all subject to the approvals, federal laws, rules, regulations, and orders that apply to a Federal-aid project.

2. The City will cooperate with the Commission in the preparation of the construction plans for the illumination project, to the extent of supplying all necessary data regarding line loading, City transformer locations, power tie-in locations essential to the proper installation of the illumination facilities.

3. Upon completion of the project and upon acceptance of the project by the Commission, the City will be notified in writing by the Commission that said project has been completed and is ready for operation and maintenance by the City.

4. Upon notification by the Commission's engineer in charge of the project that the facilities are ready for testing the City will proceed without delay to make necessary power connections for proper testing of the facilities prior to acceptance of the project and release by the contractor.



5. Upon receipt of written notice that the project has been accepted by the Commission, the City will immediately assume the continuing operation and maintenance of the illumination facilities at no cost to the Commission. The City further agrees to maintain and operate the installed facilities at the level and intensity of illumination intended by the contract plans and specifications, subject at all times to the inspection and approval of representatives of the Commission.

In the event the City fails or refuses to maintain the facilities as outlined herein, after written notice and thirty days to repair the facilities, the Commission is hereby authorized to assume maintenance of the project and, by the appropriate Resolution, request the State Treasurer to withhold from the City sufficient funds from the Municipal Turnback Fund to defray the cost incurred for such maintenance.

6. Notices referred to this agreement shall be sent to the following:

The Honorable Lioneld Jordan
Mayor of Fayetteville
113 W Mountain Street
Fayetteville, Arkansas 72701

Arkansas Department of Transportation
District 4 Engineer
P.O. Box 11170
Fort Smith, Arkansas 72917-1170

7. Any addition, deletion, or change in the covenants set forth above shall be made only upon mutual written agreement of the parties hereto.

8. This Agreement shall be binding upon the parties hereto, their successors or assigns.

IN WITNESS WHEREOF, the parties hereby execute the foregoing agreement:

Trinity Smith — 04-19-2024
Trinity D. Smith – Engineer of Roadway Design — Date

Mayor — 04/29/2024
Mayor — Date

TSMO Division

What is the first rule of lighting? The first rule of lighting, is we talk about, the maintenance agreement.

We emphasize the lighting maintenance agreement to be signed because we want to ensure the longevity of the lighting in our roadways.

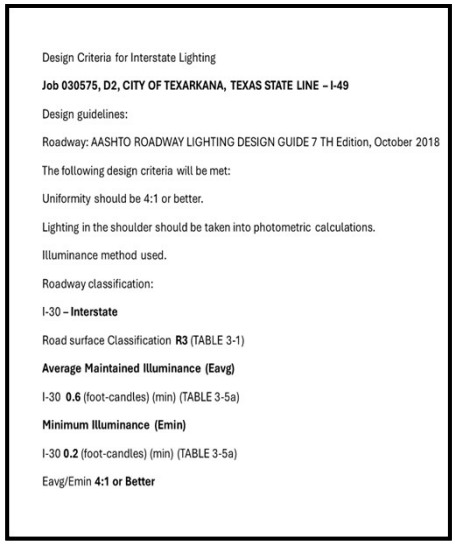
The maintenance authority agrees to maintain and operate the installed facilities at the level and intensity of illumination intended by the contract plans and specifications.

This also helps us determine who is responsible maintaining the lighting during transitions between personnel's. Such as Majors, and Judges.

And this an example of the lighting maintenance agreement that has been signed.

Once the agreement has been discussed we can move onto the design criteria.

Step 2: Design Criteria



Design Criteria for Interstate Lighting

Job 030575, D2, CITY OF TEXARKANA, TEXAS STATE LINE – I-49

Design guidelines:

Roadway: AASHTO ROADWAY LIGHTING DESIGN GUIDE 7 TH Edition, October 2018

The following design criteria will be met:

Uniformity should be 4:1 or better.

Lighting in the shoulder should be taken into photometric calculations.

Illuminance method used.

Roadway classification:

I-30 – **Interstate**

Road surface Classification **R3** (TABLE 3-1)

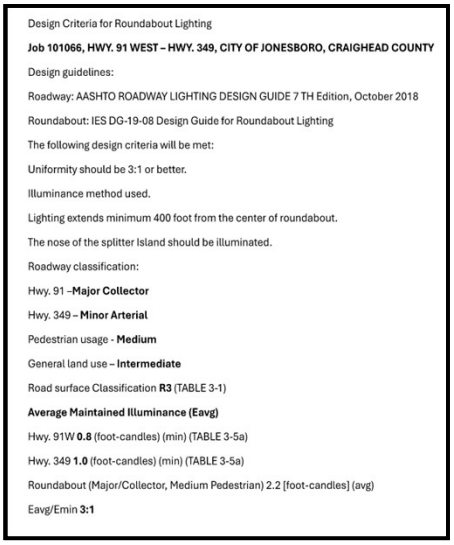
Average Maintained Illuminance (Eavg)

I-30 **0.6** (foot-candles) (min) (TABLE 3-5a)

Minimum Illuminance (Emin)

I-30 **0.2** (foot-candles) (min) (TABLE 3-5a)

Eavg/Emin **4:1 or Better**



Design Criteria for Roundabout Lighting

Job 101066, HWY. 91 WEST – HWY. 349, CITY OF JONESBORO, CRAIGHEAD COUNTY

Design guidelines:

Roadway: AASHTO ROADWAY LIGHTING DESIGN GUIDE 7 TH Edition, October 2018

Roundabout: IES DG-19-08 Design Guide for Roundabout Lighting

The following design criteria will be met:

Uniformity should be 3:1 or better.

Illuminance method used.

Lighting extends minimum 400 foot from the center of roundabout.

The nose of the splitter Island should be illuminated.

Roadway classification:

Hwy. 91 –**Major Collector**

Hwy. 349 – **Minor Arterial**

Pedestrian usage - **Medium**

General land use – **Intermediate**

Road surface Classification **R3** (TABLE 3-1)

Average Maintained Illuminance (Eavg)

Hwy. 91W **0.8** (foot-candles) (min) (TABLE 3-5a)

Hwy. 349 **1.0** (foot-candles) (min) (TABLE 3-5a)

Roundabout (Major/Collector, Medium Pedestrian) 2.2 [foot-candles] (avg)

Eavg/Emin **3:1**

TSMO Division

In step 2, the design criteria step, we check if the design guidelines criteria are met.

And this is an example of a Check List for the Design Criteria

Here we have 2 different types of examples.

We have Interstate and Roundabout Lighting.

What kind of information do we use to create the check list.

Step 2: Design Criteria

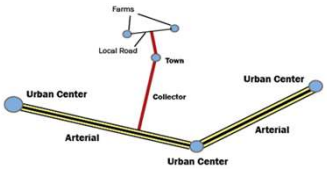
Table 3-5a Illuminance and Luminance Design Values (U.S. Customary)

Table 3-5a. Illuminance and Luminance Design Values (U.S. Customary)

Roadway and Walkway Classification[a]	Area Classifications	Illuminance Method						Luminance Method			Additional Values (both Methods)
		Average Maintained Illuminance (E_{avg})				Minimum Illuminance E_{min}	Illuminance Uniformity Ratio E_{avg}/E_{min}	Average Maintained Luminance			Veiling Luminance Ratio
		R1	R2	R3	R4			L_{avg}	Uniformity		
	General Land Use	(footcandles) (min)	(footcandles) (min)	(footcandles) (min)	(footcandles) (min)	(footcandles)	Avg/min (max)[b]	cd/m² (min)	L_{avg}/L_{min} (min)	L_{max}/L_{min} (max)	L_{max}/L_{avg} (max)[b]
Principal Arterials:											
Interstate and other freeways	All	0.6	0.6	0.6	0.6	0.2	4:1	0.4[d]	3.5:1	6:1	0.3:1
Other Principal Arterials (partial or no control of access)	Commercial	1.1	1.6	1.6	1.4	An uniformity ratio allows	4:1	1.2	3:1	5:1	0.3:1
	Intermediate	0.8	1.2	1.2	1.0		4:1	0.9	3:1	5:1	0.3:1
	Residential	0.6	0.8	0.8	0.8		4:1	0.6	3.5:1	6:1	0.3:1
Minor Arterials	Commercial	0.9	1.4	1.4	1.0		4:1	1.2	3:1	5:1	0.3:1
	Intermediate	0.8	1.0	1.0	0.9		4:1	0.9	3:1	5:1	0.3:1
	Residential	0.5	0.7	0.7	0.7		4:1	0.6	3.5:1	6:1	0.3:1
Collectors	Commercial	0.8	1.1	1.1	0.9		4:1	0.8	3:1	5:1	0.4:1
	Intermediate	0.6	0.8	0.8	0.8		4:1	0.6	3.5:1	6:1	0.4:1
	Residential	0.4	0.6	0.6	0.5		4:1	0.4	4:1	8:1	0.4:1
Local	Commercial	0.6	0.8	0.8	0.8		6:1	0.6	6:1	10:1	0.4:1
	Intermediate	0.5	0.7	0.7	0.6		6:1	0.5	6:1	10:1	0.4:1
	Residential	0.3	0.4	0.4	0.4		6:1	0.3	6:1	10:1	0.4:1
Alleys	Commercial	0.4	0.6	0.6	0.5		6:1	0.4	6:1	10:1	0.4:1
	Intermediate	0.3	0.4	0.4	0.4		6:1	0.3	6:1	10:1	0.4:1
	Residential	0.2	0.3	0.3	0.3		6:1	0.2	6:1	10:1	0.4:1
Sidewalks	Commercial	0.9	1.3	1.3	1.2		3:1	Use illuminance requirements			
	Intermediate	0.6	0.8	0.8	0.8		4:1				
	Residential	0.3	0.4	0.4	0.4		6:1				
Pedestrian Ways and Bicycle Ways[e]	All	1.4	2.0	2.0	1.8		3:1				

[a] See AASHTO's *A Policy on Geometric Design of Highways and Streets (1)* for roadway and walkway classifications.
[b] Higher uniformity ratios are acceptable for elevated ramps near high-mast poles.
[c] L_{max} refers to the maximum point along the pavement, not the maximum in lamp life. The Maintenance Factor applies to both the L_v term and the L_{avg} term.
[d] Use 0.6 for R1 surface.
[e] Assumes a separate facility. For Pedestrian Ways and Bicycle Ways adjacent to roadway, use roadway design values. Use R3 requirements for walkway or bikeway surface materials other than the pavement types shown. Other design guidelines such as IES or CIE may be used for pedestrian ways and bikeways when deemed appropriate.

Notes:
1. Meet either the Illuminance design method requirements or the Luminance design method requirements and meet veiling luminance requirements for both the Illuminance and the Luminance design methods.
2. There may be situations when a higher level of illuminance or luminance is justified. The higher values for freeways may be justified when deemed advantageous by the agency to mitigate off-roadway sources.
3. Physical roadway conditions may require adjustment of spacing determined from the base levels of illuminance indicated above.

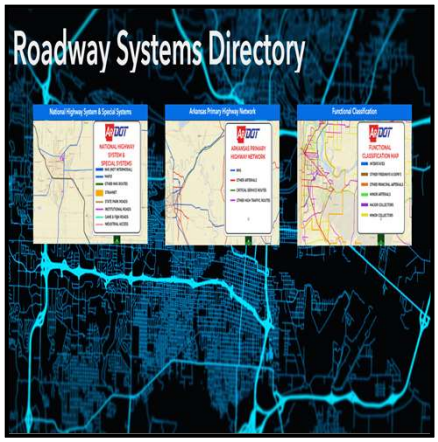


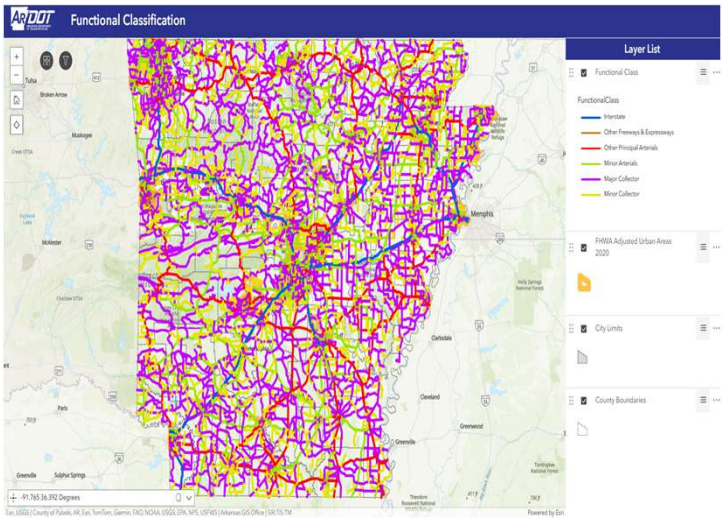
TSMO Division

In the AASHTO Roadway Lighting Design Guide - Table 3-5a Illuminance and Luminance Design Values

The list of information for Design Criteria we look for are:
Roadway Classification
Road Surface Classification
Footcandles (min)
Avg maintained Illuminance / Minimum Illuminance
Uniformity Ratio

Step 2: Design Criteria





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There are many different tools that are utilized to determine the proper design for the project.

One of the tools used is the ARCGIS Portal provided by Planning and Research - GIS section.

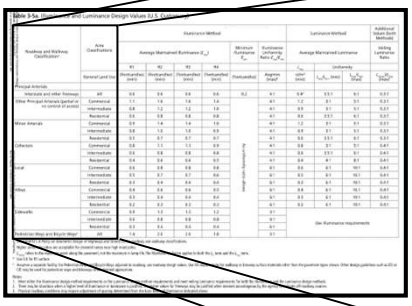
In the ARCGIS portal we use the roadway systems directory and then go into the functional classification map

The functional classification map help us determine which principal arterial.

Interstate, freeways, Minor Arterials, Major/Minor collector

Step 2: Design Criteria

Roadway and Walkway Classification
Principal Arterials:



Roadway and Walkway Classification[a]	Area Classifications
	General Land Use
Principal Arterials:	
Interstate and other freeways	All
Other Principal Arterials (partial or no control of access)	Commercial
	Intermediate
	Residential
Minor Arterials	Commercial
	Intermediate
	Residential
Collectors	Commercial
	Intermediate
	Residential
Local	Commercial
	Intermediate
	Residential
Alleys	Commercial
	Intermediate
	Residential
Sidewalks	Commercial
	Intermediate
	Residential
Pedestrian Ways and Bicycle Ways[a]	All

TSMO Division

Table 3-5a we can see it lists the different types of Principles Arterials.

By knowing the roadway classification we can now identify the which min footcandles to use with the illuminance method.

But before we can determine the min. footcandles will find the Roadway surface classification.

Picture-
Managed lanes- Interstate

Hwy 10 Cantrell- Other Principal Arterials

Step 2: Design Criteria

Table 3-1. Road Surface Classifications

Class	Q_o[a]	Description	Mode of Reflectance
R1	0.10	Portland cement concrete road surface. Asphalt road surface with a minimum of 12 percent of the aggregates composed of artificial brightener (e.g., Synopal) aggregates (e.g., labradorite, quartzite).	Mostly diffuse
R2	0.07	Asphalt road surface with an aggregate composed of minimum 60 percent gravel [size greater than 0.4 in. (1 cm)]. Asphalt road surface with 10 to 15 percent artificial brightener in aggregate mix. (Not normally used in North America.)	Mixed (diffuse and specular)
R3	0.07	Asphalt road surface (regular and carpet seal) with dark aggregates (e.g., trap rock, blast furnace slag); rough texture after some months of use (typical highways).	Slightly specular
R4	0.08	Asphalt road surface with very smooth texture.	Mostly specular

[a] Q_o representative mean luminance coefficient.

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In table 3-1 will find the types of roadway classifications.

The different types of roadway surfaces will reflect light in various ways.

Such as surfaces made with Portland cement will have a higher luminance coefficient than a Asphalt road surfaces with dark aggregates.

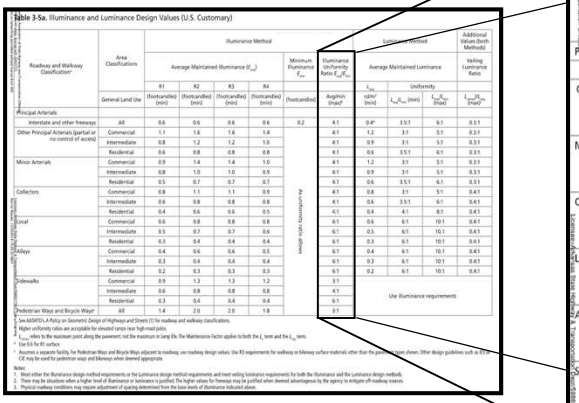
They are categorized by 4 class. R1-R4

Also, classes are being separated for there different mode of reflectance.

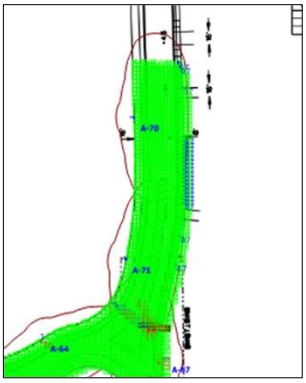
To identify the class roadway surface, mixtures of pavement can be utilized.

Step 2: Design Criteria

Illuminance Uniformity Ratio



Roadway and Walkway Classification[a]	Illuminance Uniformity Ratio E_{avg}/E_{min} Avg/min (max)[b]
Principal Arterials:	
Interstate and other freeways	4:1
Other Principal Arterials (partial or no control of access)	4:1
	4:1
	4:1
Minor Arterials	4:1
	4:1
	4:1
Collectors	4:1
	4:1
	4:1
Local	6:1
	6:1
	6:1
Alleys	6:1
	6:1
	6:1
Sidewalks	3:1
	4:1
	6:1
Pedestrian Ways and Bicycle Ways[c]	3:1



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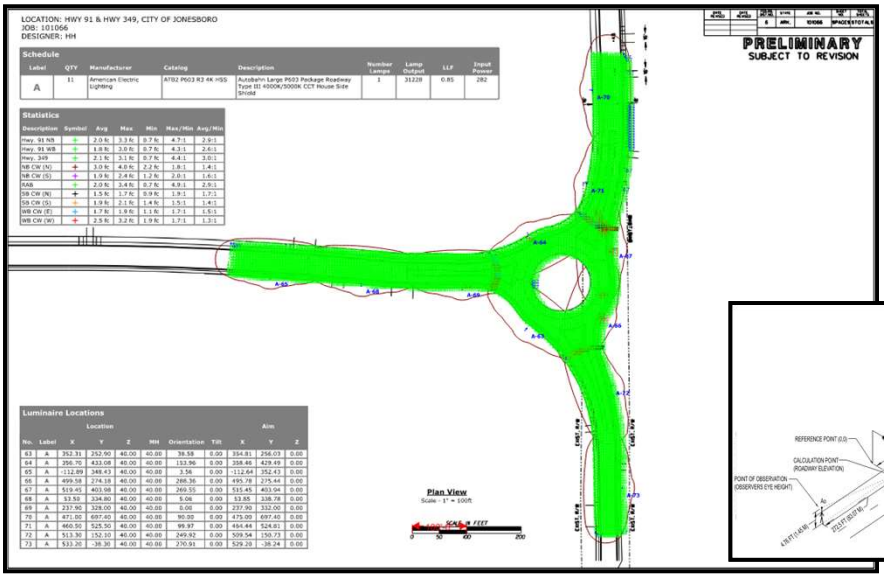
Now that we know the type of roadway class and surface class, will find the uniformity ratio.

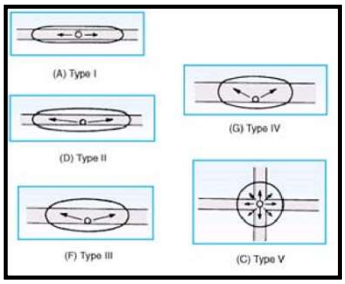
The illuminance uniformity ratio measures the how evenly light is distribute across a surface.

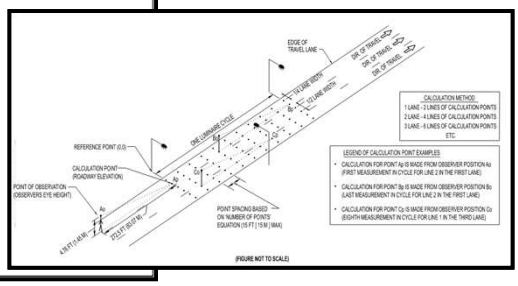
The ratio mostly used are 4:1 Average/Minimum (Max) for interstate, minor arterials, collectors.

Now that we have gathered all the information necessary will go into the next step Photometrics.

Step 3: Photometric

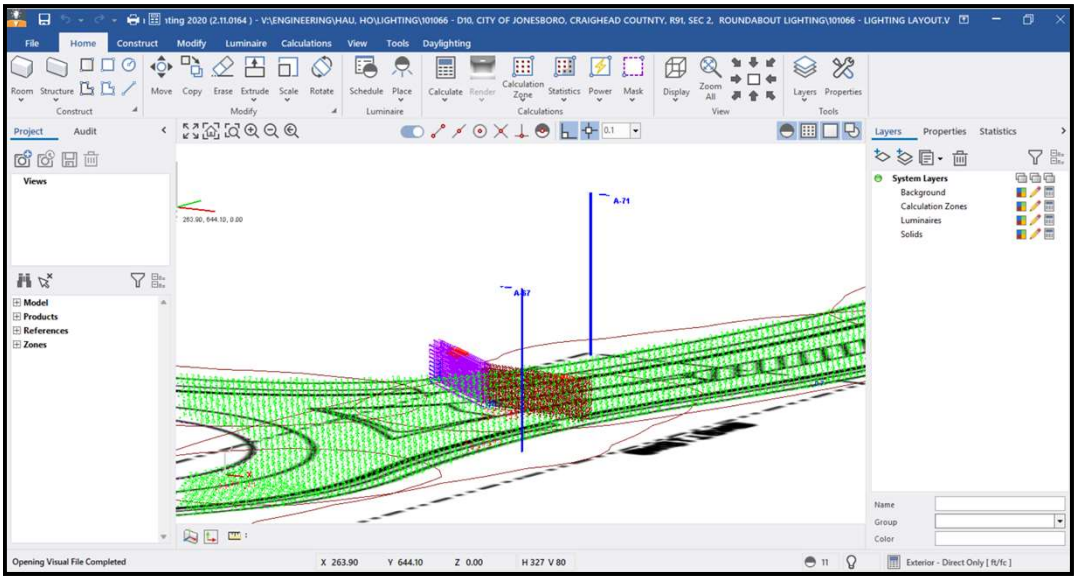






TSMO Division

Step 3: Photometric



Step 3: Photometric

TSMO Division

Positive/Negative Contrast

High Mast Lighting

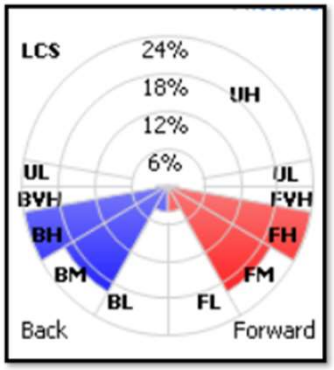
High Pressure Sodium

LED

LED High Mast Lighting

Performance Package		Color temperature	
P1	31,000 Lumens	30K	3000K CCT
P2	42,000 Lumens	40K	4000K CCT
P3	63,000 Lumens	50K	5000K CCT
P4	85,000 Lumens		
P5	105,000 Lumens		
P6	112,000 Lumens		
P7	120,000 Lumens		

Optical	
LN	Long and Narrow
MAS	Medium, Asymmetric
MAW	Medium, Asymmetric Wide
NAS	Narrow, Asymmetric
FTA	Forward Throw, Asymmetric
AN	Area Narrow
AW	Area Wide
AWS	Area Wide Square



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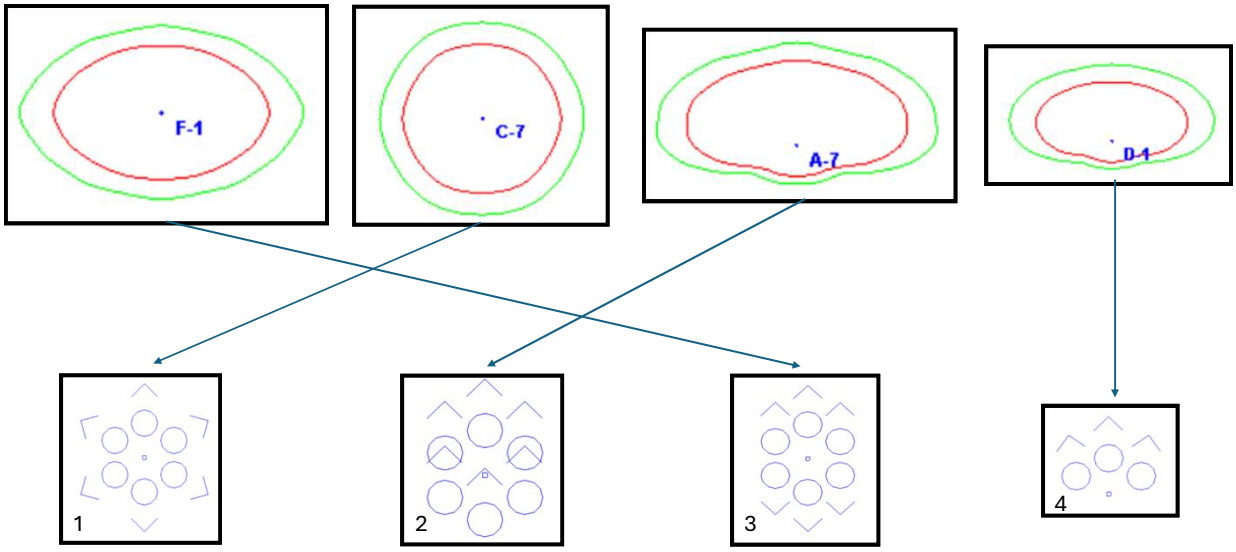
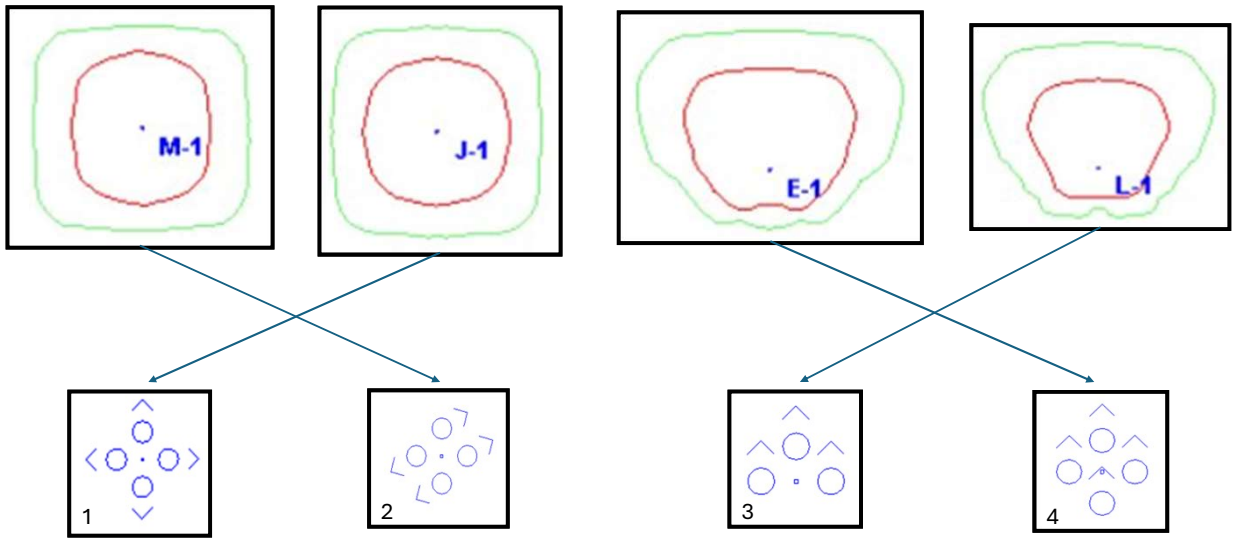
Optical lighting fixtures use lenses, reflectors, and other optical elements to control and direct light from a source, shaping it into specific beam patterns (like spotlights or wide floods)

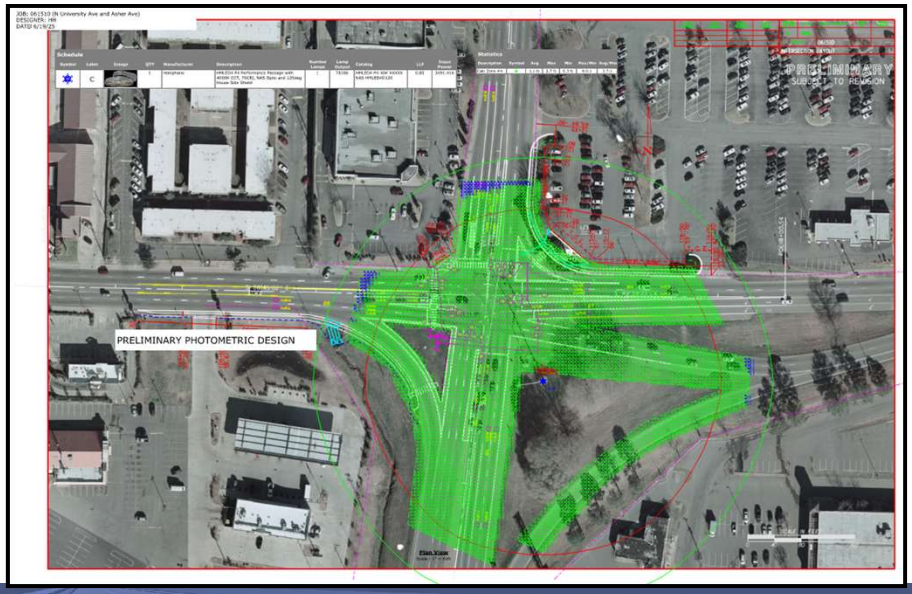
Asymmetric Fixture



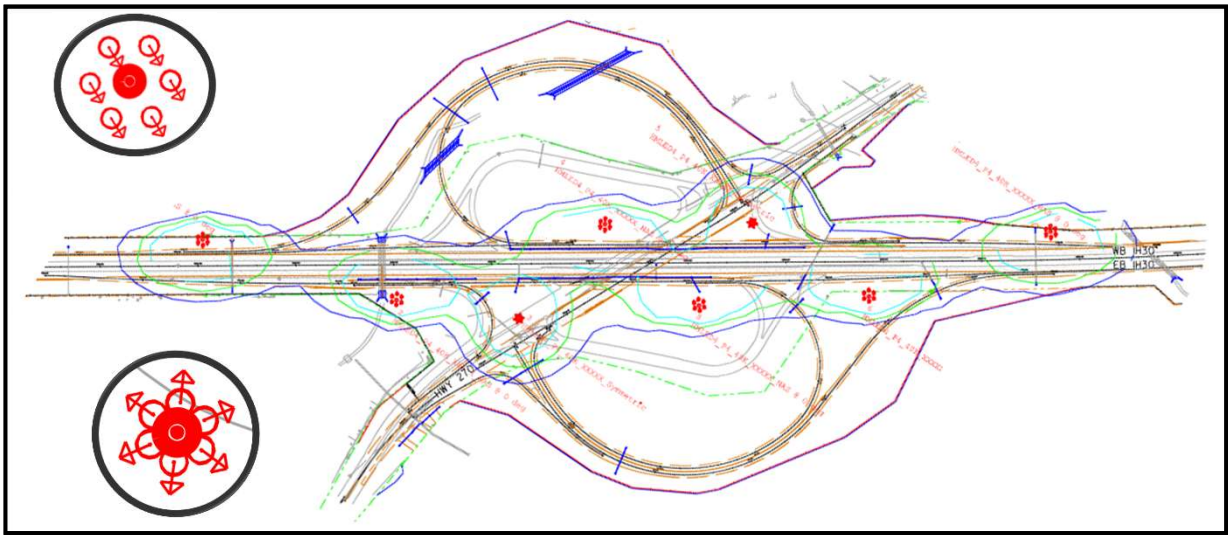
Symmetric Fixtures



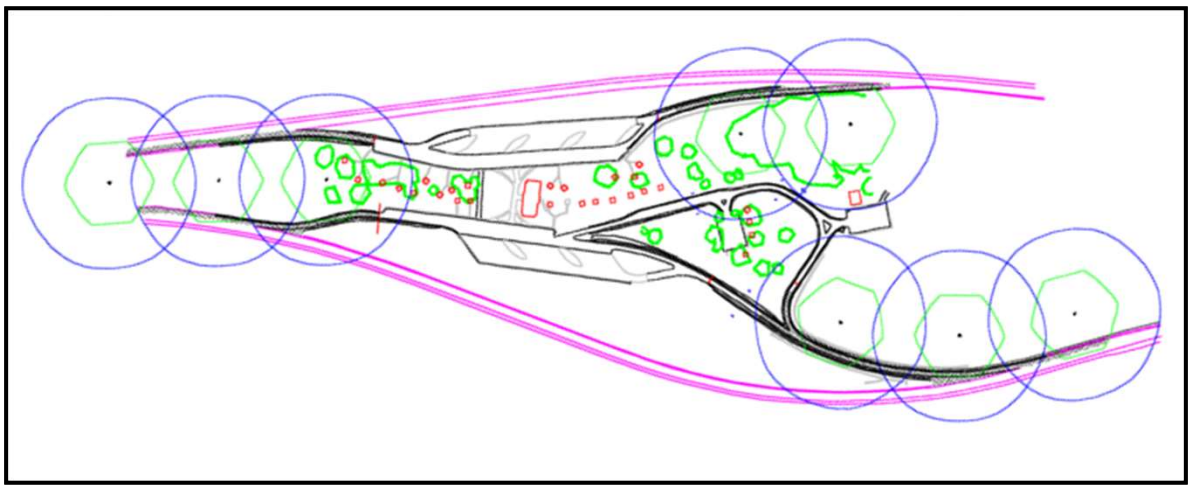
Intersection Application



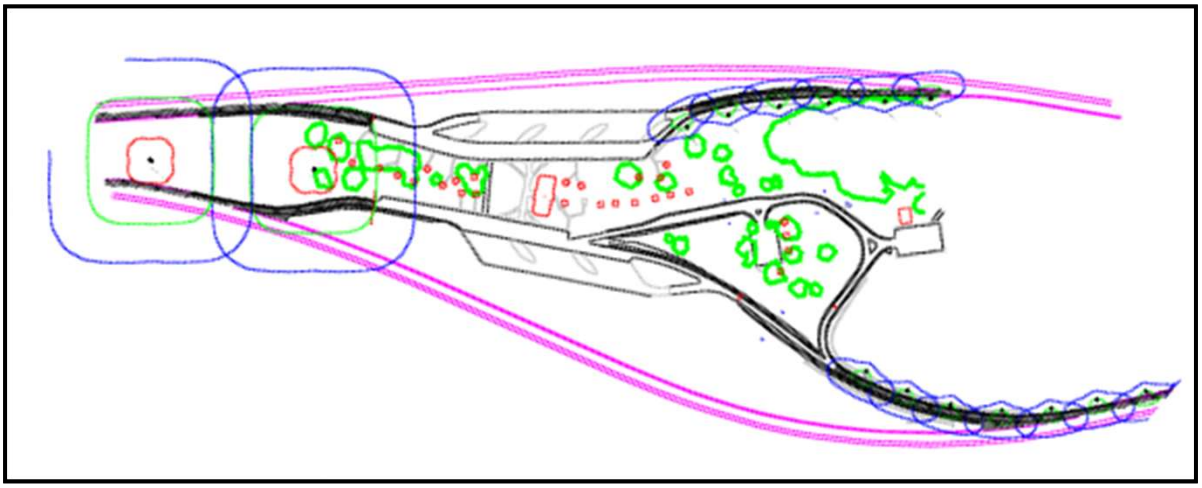
Interchange application



Rest Area Application



Rest Area Application



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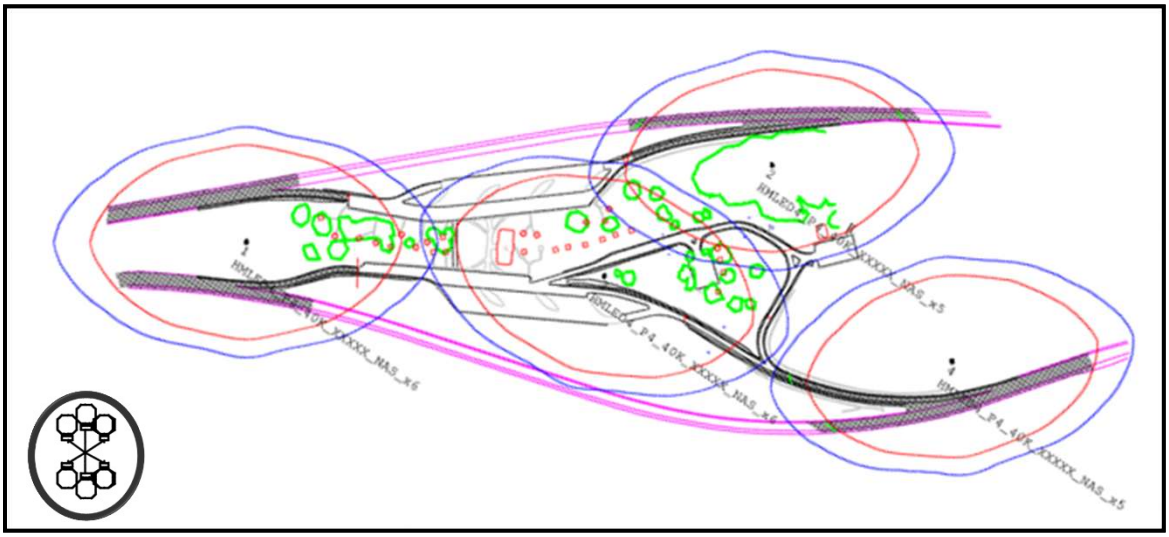
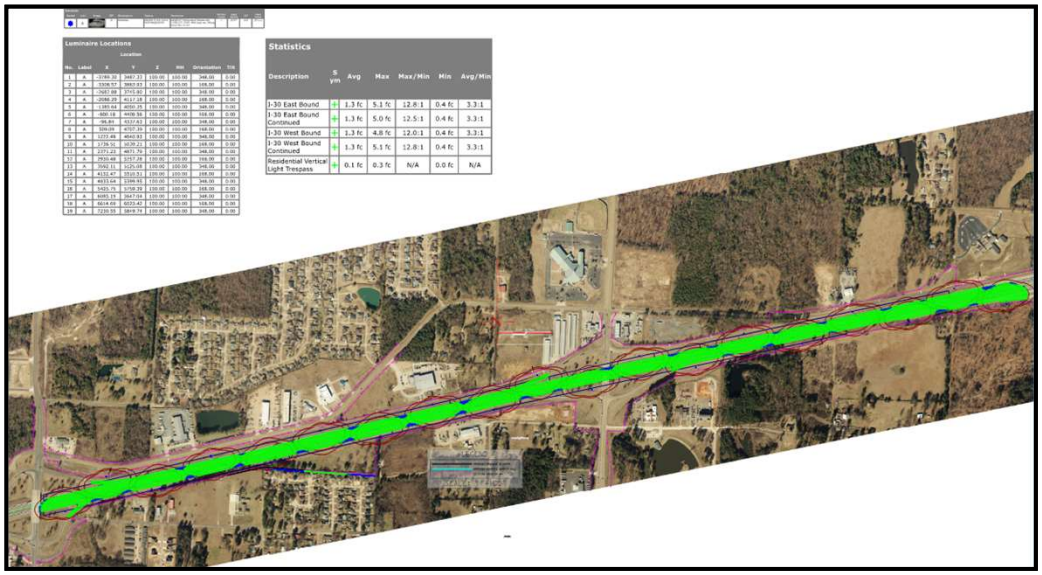
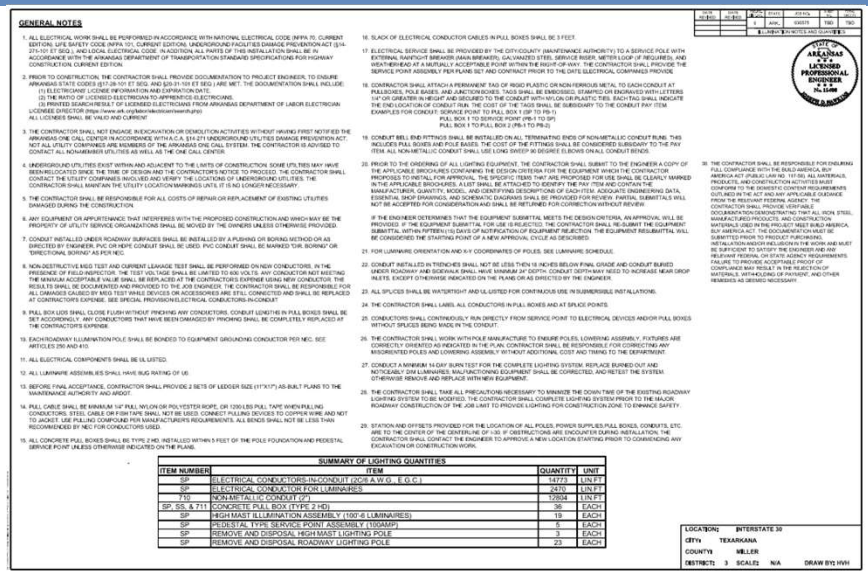


Interstate Application



Design and Plan Development



GENERAL NOTES

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE (NFPA 70, CURRENT EDITION), LIFE SAFETY CODE (NFPA 101, CURRENT EDITION), UNDERGROUND FACILITIES DAMAGE PREVENTION ACT (§14-271-101 ET SEQ.), AND LOCAL ELECTRICAL CODE. IN ADDITION, ALL PARTS OF THIS INSTALLATION SHALL BE IN ACCORDANCE WITH THE ARKANSAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, CURRENT EDITION.

2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE DOCUMENTATION TO PROJECT ENGINEER, TO ENSURE ARKANSAS STATE CODES (§17-28-101 ET SEQ. AND §20-31-101 ET SEQ.) ARE MET. THE DOCUMENTATION SHALL INCLUDE:
   (1) ELECTRICIANS' LICENSE INFORMATION AND EXPIRATION DATE;
   (2) THE RATIO OF LICENSED ELECTRICIAN TO APPRENTICE ELECTRICIANS;
   (3) PRINTED SEARCH RESULT OF LICENSED ELECTRICIANS FROM ARKANSAS DEPARTMENT OF LABOR ELECTRICIAN LICENSEE DIRECTOR (https://www.ark.org/labor/electrician/search.php)
   ALL LICENSES SHALL BE VALID AND CURRENT.

3. THE CONTRACTOR SHALL NOT ENGAGE IN EXCAVATION OR DEMOLITION ACTIVITIES WITHOUT HAVING FIRST NOTIFIED THE ARKANSAS ONE CALL CENTER IN ACCORDANCE WITH A.C.A. §14-271 UNDERGROUND UTILITIES DAMAGE PREVENTION ACT. NOT ALL UTILITY COMPANIES ARE MEMBERS OF THE ARKANSAS ONE CALL SYSTEM. THE CONTRACTOR IS ADVISED TO CONTACT ALL NONMEMBER UTILITIES AS WELL AS THE ONE CALL CENTER.

4. UNDERGROUND UTILITIES EXIST WITHIN AND ADJACENT TO THE LIMITS OF CONSTRUCTION. SOME UTILITIES MAY HAVE BEEN RELOCATED SINCE THE TIME OF DESIGN AND THE CONTRACTOR'S NOTICE TO PROCEED. THE CONTRACTOR SHALL CONTACT THE UTILITY COMPANIES INVOLVED AND VERIFY THE LOCATIONS OF UNDERGROUND UTILITIES. THE CONTRACTOR SHALL MAINTAIN THE UTILITY LOCATION MARKINGS UNTIL IT IS NO LONGER NECESSARY.

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS OF REPAIR OR REPLACEMENT OF EXISTING UTILITIES DAMAGED DURING THE CONSTRUCTION.

6. ANY EQUIPMENT OR APPURTENANCE THAT INTERFERES WITH THE PROPOSED CONSTRUCTION AND WHICH MAY BE THE PROPERTY OF UTILITY SERVICE ORGANIZATIONS SHALL BE MOVED BY THE OWNERS UNLESS OTHERWISE PROVIDED.

7. CONDUIT INSTALLED UNDER ROADWAY SURFACES SHALL BE INSTALLED BY A PUSHING OR BORING METHOD OR AS DIRECTED BY ENGINEER. PVC OR HDPE CONDUIT SHALL BE USED. PVC CONDUIT SHALL BE MARKED "DIR. BORING" OR "DIRECTIONAL BORING" AS PER NEC.

8. NON-DESTRUCTIVE MEG TEST AND CURRENT LEAKAGE TEST SHALL BE PERFORMED ON NEW CONDUCTORS, IN THE PRESENCE OF FIELD INSPECTOR. THE TEST VOLTAGE SHALL BE LIMITED TO 600 VOLTS. ANY CONDUCTOR NOT MEETING THE MINIMUM ACCEPTABLE VALUE SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE USING NEW CONDUCTOR. THE RESULTS SHALL BE DOCUMENTED AND PROVIDED TO THE JOB ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGES CAUSED BY MEG TEST WHILE DEVICES OR ACCESSORIES ARE STILL CONNECTED AND SHALL BE REPLACED AT CONTRACTOR'S EXPENSE. SEE SPECIAL PROVISION ELECTRICAL CONDUCTORS-IN-CONDUIT

9. PULL BOX LIDS SHALL CLOSE FLUSH WITHOUT PINCHING ANY CONDUCTORS. CONDUIT LENGTHS IN PULL BOXES SHALL BE SET ACCORDINGLY. ANY CONDUCTORS THAT HAVE BEEN DAMAGED BY PINCHING SHALL BE COMPLETELY REPLACED AT THE CONTRACTOR'S EXPENSE.

10. EACH ROADWAY ILLUMINATION POLE SHALL BE BONDED TO EQUIPMENT GROUNDING CONDUCTOR PER NEC. SEE ARTICLES 250 AND 410.

11. ALL ELECTRICAL COMPONENTS SHALL BE UL LISTED.

12. ALL LUMINAIRE ASSEMBLIES SHALL HAVE BUG RATING OF U0.

13. BEFORE FINAL ACCEPTANCE, CONTRACTOR SHALL PROVIDE 2 SETS OF LEDGER SIZE (11"X17") AS-BUILT PLANS TO THE MAINTENANCE AUTHORITY AND ARDOT.

14. PULL CABLE SHALL BE MINIMUM 1/4" PULL NYLON OR POLYESTER ROPE, OR 1200 LBS PULL TAPE WHEN PULLING CONDUCTORS. STEEL CABLE OR FISH TAPE SHALL NOT BE USED. CONNECT PULLING DEVICES TO COPPER WIRE AND NOT TO JACKET. USE PULLING COMPOUND PER MANUFACTURER'S REQUIREMENTS. ALL BENDS SHALL NOT BE LESS THAN RECOMMENDED BY NEC FOR CONDUCTORS USED.

15. ALL CONCRETE PULL BOXES SHALL BE TYPE 2 HD, INSTALLED WITHIN 5 FEET OF THE POLE FOUNDATION AND PEDESTAL SERVICE POINT UNLESS OTHERWISE INDICATED ON THE PLANS.

16. SLACK OF ELECTRICAL CONDUCTOR CABLES IN PULL BOXES SHALL BE 3 FEET.

17. ELECTRICAL SERVICE SHALL BE PROVIDED BY THE CITY/COUNTY (MAINTENANCE AUTHORITY) TO A SERVICE POLE WITH EXTERNAL RAINTIGHT BREAKER (MAIN BREAKER), GALVANIZED STEEL SERVICE RISER, METER LOOP (IF REQUIRED), AND WEATHERHEAD AT A MUTUALLY ACCEPTABLE POINT WITHIN THE RIGHT-OF-WAY. THE CONTRACTOR SHALL PROVIDE THE SERVICE POINT ASSEMBLY PER PLANS SET AND CONTRACT PRIOR TO THE DATE ELECTRICAL COMPANIES PROVIDE.

18. CONTRACTOR SHALL ATTACH A PERMANENT TAG OF RIGID PLASTIC OR NON-FERROUS METAL TO EACH CONDUIT AT PULLBOXES, POLE BASES, AND JUNCTION BOXES. TAGS SHALL BE EMBOSSED, STAMPED OR ENGRAVED WITH LETTERS 1/4" OR GREATER IN HEIGHT AND SECURED TO THE CONDUIT WITH NYLON OR PLASTIC TIES. EACH TAG SHALL INDICATE THE END LOCATION OF CONDUIT RUN. THE COST OF THE TAGS SHALL BE SUBSIDIARY TO THE CONDUIT PAY ITEM.
   EXAMPLES FOR CONDUIT: SERVICE POINT TO PULL BOX 1 (SP TO PB-1)
   PULL BOX 1 TO SERVICE POINT (PB-1 TO SP)
   PULL BOX 1 TO PULL BOX 2 (PB-1 TO PB-2)

19. CONDUIT BELL END FITTINGS SHALL BE INSTALLED ON ALL TERMINATING ENDS OF NON-METALLIC CONDUIT RUNS. THIS INCLUDES PULL BOXES AND POLE BASES. THE COST OF THE FITTINGS SHALL BE CONSIDERED SUBSIDIARY TO THE PAY ITEM. ALL NON-METALLIC CONDUIT SHALL USE LONG SWEEP 90 DEGREE ELBOWS ON ALL CONDUIT BENDS.

20. PRIOR TO THE ORDERING OF ALL LIGHTING EQUIPMENT, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER A COPY OF THE APPLICABLE BROCHURES CONTAINING THE DESIGN CRITERIA FOR THE EQUIPMENT WHICH THE CONTRACTOR PROPOSES TO INSTALL FOR APPROVAL. THE SPECIFIC ITEMS THAT ARE PROPOSED FOR USE SHALL BE CLEARLY MARKED IN THE APPLICABLE BROCHURES. A LIST SHALL BE ATTACHED TO IDENTIFY THE PAY ITEM AND CONTAIN THE MANUFACTURER, QUANTITY, MODEL, AND IDENTIFYING DESCRIPTIONS OF EACH ITEM. ADEQUATE ENGINEERING DATA, ESSENTIAL SHOP DRAWINGS, AND SCHEMATIC DIAGRAMS SHALL BE PROVIDED FOR REVIEW. PARTIAL SUBMITTALS WILL NOT BE ACCEPTED FOR CONSIDERATION AND SHALL BE RETURNED FOR CORRECTION WITHOUT REVIEW.

    IF THE ENGINEER DETERMINES THAT THE EQUIPMENT SUBMITTAL MEETS THE DESIGN CRITERIA, AN APPROVAL WILL BE PROVIDED. IF THE EQUIPMENT SUBMITTAL FOR USE IS REJECTED, THE CONTRACTOR SHALL RESUBMIT THE EQUIPMENT SUBMITTAL WITHIN FIFTEEN (15) DAYS OF NOTIFICATION OF EQUIPMENT REJECTION. THE EQUIPMENT RESUBMITTAL WILL BE CONSIDERED THE STARTING POINT OF A NEW APPROVAL CYCLE AS DESCRIBED.

21. FOR LUMINAIRE ORIENTATION AND X-Y COORDINATES OF POLES, SEE LUMINAIRE SCHEDULE.

22. CONDUIT INSTALLED IN TRENCHES SHALL NOT BE LESS THEN 18 INCHES BELOW FINAL GRADE AND CONDUIT BURIED UNDER ROADWAY AND SIDEWALK SHALL HAVE MINIMUM 24" DEPTH. CONDUIT DEPTH MAY NEED TO INCREASE NEAR DROP INLETS, EXCEPT OTHERWISE INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

23. ALL SPLICES SHALL BE WATERTIGHT AND UL LISTED FOR CONTINUOUS USE IN SUBMERSIBLE INSTALLATIONS.

24. THE CONTRACTOR SHALL LABEL ALL CONDUCTORS IN PULL BOXES AND AT SPLICE POINTS.

25. CONDUCTORS SHALL CONTINUOUSLY RUN DIRECTLY FROM SERVICE POINT TO ELECTRICAL DEVICES AND/OR PULL BOXES WITHOUT SPLICES BEING MADE IN THE CONDUIT.

26. THE CONTRACTOR SHALL WORK WITH POLE MANUFACTURE TO ENSURE POLES, LOWERING ASSEMBLY, FIXTURES ARE CORRECTLY ORIENTED AS INDICATED IN THE PLAN. CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECTING ANY MISORIENTED POLES AND LOWERING ASSEMBLY WITHOUT ADDITIONAL COST AND TIMING TO THE DEPARTMENT.

27. CONDUCT A MINIMUM 14-DAY BURN TEST FOR THE COMPLETE LIGHTING SYSTEM. REPLACE BURNED OUT AND NOTICEABLY DIM LUMINAIRES. MALFUNCTIONING EQUIPMENT SHALL BE CORRECTED, AND RETEST THE SYSTEM. OTHERWISE REMOVE AND REPLACE WITH NEW EQUIPMENT.

28. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO MINIMIZE THE DOWN TIME OF THE EXISTING ROADWAY LIGHTING SYSTEM TO BE MODIFIED. THE CONTRACTOR SHALL COMPLETE LIGHTING SYSTEM PRIOR TO THE MAJOR ROADWAY CONSTRUCTION OF THE JOB LIMIT TO PROVIDE LIGHTING FOR CONSTRUCTION ZONE TO ENHANCE SAFETY.

29. STATION AND OFFSETS PROVIDED FOR THE LOCATION OF ALL POLES, POWER SUPPLIES, PULL BOXES, CONDUITS, ETC. ARE TO THE CENTER OF THE CENTERLINE OF I-30. IF OBSTRUCTIONS ARE ENCOUNTER DURING INSTALLATION, THE CONTRACTOR SHALL CONTACT THE ENGINEER TO APPROVE A NEW LOCATION STARTING PRIOR TO COMMENCING ANY EXCAVATION OR CONSTRUCTION WORK.

SUMMARY OF LIGHTING QUANTITIES

ITEM NUMBER	ITEM	QUANTITY	UNIT
SP	ELECTRICAL CONDUCTORS-IN-CONDUIT (2@6 A.W.G., E.G.C.)	14773	LIN.FT.
SP	ELECTRICAL CONDUCTOR FOR LUMINAIRES	2470	LIN.FT.
710	NON-METALLIC CONDUIT (2")	12804	LIN.FT.
SP, SS, & 711	CONCRETE PULL BOX (TYPE 2 HD)	36	EACH
SP	HIGH MAST ILLUMINATION ASSEMBLY (100'-6 LUMINAIRES)	19	EACH
SP	PEDESTAL TYPE SERVICE POINT ASSEMBLY (100AMP)	5	EACH
SP	REMOVE AND DISPOSAL HIGH MAST LIGHTING POLE	3	EACH
SP	REMOVE AND DISPOSAL ROADWAY LIGHTING POLE	23	EACH

30. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING FULL COMPLIANCE WITH THE BUILD AMERICA, BUY AMERICA ACT (PUBLIC LAW NO. 117-58). ALL MATERIALS, PRODUCTS, AND CONSTRUCTION ACTIVITIES MUST CONFORM TO THE DOMESTIC CONTENT REQUIREMENTS OUTLINED IN THE ACT AND ANY APPLICABLE GUIDANCE FROM THE RELEVANT FEDERAL AGENCY. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY DOCUMENTATION DEMONSTRATING THAT ALL IRON, STEEL, MANUFACTURED PRODUCTS, AND CONSTRUCTION MATERIALS USED IN THE PROJECT MEET BUILD AMERICA, BUY AMERICA ACT. THE DOCUMENTATION MUST BE SUBMITTED PRIOR TO PRODUCT PURCHASING, INSTALLATION AND/OR INCLUSION IN THE WORK AND MUST BE SUFFICIENT TO SATISFY THE ENGINEER AND ANY RELEVANT FEDERAL OR STATE AGENCY REQUIREMENTS. FAILURE TO PROVIDE ADEQUATE PROOF OF COMPLIANCE MAY RESULT IN THE REJECTION OF MATERIALS, WITHHOLDING OF PAYMENT, AND OTHER REMEDIES AS DEEMED NECESSARY.

ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 11498

		1	AHK	10/07/5	TBD	TBD

ELECTRICAL NOTES AND QUANTITIES

LOCATION: INTERSTATE 30
CITY: TEXARKANA
COUNTY: MILLER
DISTRICT: 3 SCALE: N/A DRAW BY: HVH

TSMO Division

Submittal

TSMO Elements Compliance

- Build America, Buy America (BABA) Compliance Requirements
  - **For projects obligated on or after October 1, 2025**, final assembly of all manufactured projects must occur in the U.S.
  - **For projects obligated on or after October 1, 2026**, in addition to the final assembly requirement, the cost of components of products that are mined, produced, or manufactured in the U.S. must be greater than 55 percent of the total cost of all components of the manufactured product.

RFI #9 - HDPE Conduit Couplings and Fittings – UL Listing Requirement

Published

Miscellaneous edit

Arkansas Department of Transportation

Transition Actions

4 comments 0 supporting documents

Sep 17 2025 04:17 PM CDT **Published**
Document copied to CON - Correspondence - From Department to Contractor drawer.
Arkansas Department of Transportation - Jason James

Sep 17 2025 03:52 PM CDT **Construction Division - Reviewed**
It appears that HDPE fittings and couplers are available meeting both the UL listing and BABA requirements. Please see the vendor list and comments as provided by Maintenance/TSMO on their 9/17/2025 comment.
Document transitioned from Maintenance Division - Reviewed to Construction Division - Reviewed.
Arkansas Department of Transportation - Andy Tackett Electronically Signed (Confirm)

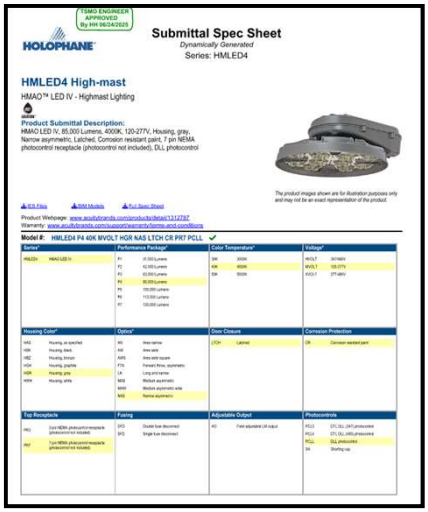
Sep 17 2025 03:52 PM CDT **Transition Reverted**
Document RFI #9 - HDPE Conduit Couplings and Fittings – UL Listing Requirement reverted from Construction Division - Reviewed to Maintenance Division - Reviewed.
Arkansas Department of Transportation - Andy Tackett

Sep 17 2025 03:51 PM CDT **Construction Division - Reviewed**
It appears that fittings and couplers are available meeting both the UL listing and BABA requirements. Please see the vendor list and comments as provided by Maintenance/TSMO on their 9/17/2025 comment.
Document transitioned from Maintenance Division - Reviewed to Construction Division - Reviewed.
Arkansas Department of Transportation - Andy Tackett Electronically Signed (Confirm)

Sep 17 2025 02:47 PM CDT **Maintenance Division - Reviewed**
TSMO are able to found some vender that provide UL Listed and BABA compliant HDPE coupling and fitting. Our engineer has called the vender and ask for UL listed and BABA compliant, these vender stay they provide UL Listed and BABA compliant product if the Contractor requested in the purchase order. Here is the list of those vender.
https://isco-pipe.com/hdpe-pipe/
https://www.mymillennium.us/
https://shop.chapmanelectric.com/pipe-conduit/couplings
Document transitioned from TSMO - Under Review to Maintenance Division - Reviewed.
Arkansas Department of Transportation - Hau Ho Electronically Signed (Confirm)

Sep 16 2025 01:27 PM CDT **TSMO - Under Review**
Please review and advise concerning the contractor's RFI.
Document transitioned from Submitted to TSMO - Under Review.
Arkansas Department of Transportation - Andy Tackett

Contractor's Submittal



TSMO ENGINEER APPROVED By HH 06/24/2025

HOLOPHANE

Submittal Spec Sheet

Dynamically Generated

Series: HMLED4

HMLED4 High-mast

HMAO™ LED IV - Highmast Lighting

Product Submittal Description:

HMAO LED IV, 85,000 Lumens, 4000K, 120-277V, Housing, gray, Narrow asymmetric, Latched, Corrosion resistant paint, 7 pin NEMA photocontrol receptacle (photocontrol not included), DLL photocontrol

The product images shown are for illustration purposes only and may not be an exact representation of the product.

Product Webpage: www.acuitybrands.com/products/detail/1112797

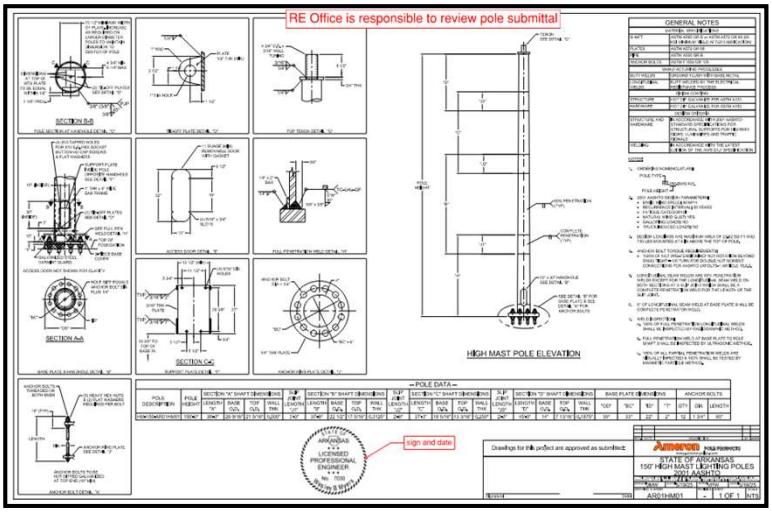
Warranty: www.acuitybrands.com/support/warranty/terms-and-conditions

Model #: HMLED4 P4 40K MVOLT HGR NAS LTCH CR PIR7 PCLL

Series*	Performance Package*	Color Temperature*	Voltage*
HMLED4 HMAO LED IV	P1 15,000 Lumens P2 42,000 Lumens P3 63,000 Lumens P4 85,000 Lumens P5 100,000 Lumens P6 113,000 Lumens P7 120,000 Lumens	30K 3000K 40K 4000K 50K 5000K	MVOLT 347-480V HVOLT 120-277V

Housing Color*	Optics*	Door Closure	Corrosion Protection
HAG Housing, as specified HBK Housing, black HBZ Housing, bronze HGH Housing, graphite HGM Housing, gray HWH Housing, white	A01 Area narrow A02 Area wide A03 Area wide square FTA Forward throw, asymmetric LA Long arm narrow M02 Medium asymmetric M03 Medium asymmetric wide N02 Narrow asymmetric	LTCH Latched	CR Corrosion resistant paint

Top Receptacle	Fusing	Adjustable Output	Photocontrols
PR7 Zone NEMA photocontrol receptacle (photocontrol not included) PR7 7 pin NEMA photocontrol receptacle (photocontrol not included)	SFD Double fuse disconnect SFS Single fuse disconnect	A01 Field adjustable 1A output	PCLL 3TT, DLL (347) photocontrol PCLU 3TT, DLL (480) photocontrol RCL DLL photocontrol SA Shorting cap



RE Office is responsible to review pole submittal

GENERAL NOTES

HIGH MAST POLE ELEVATION

POLE DATA

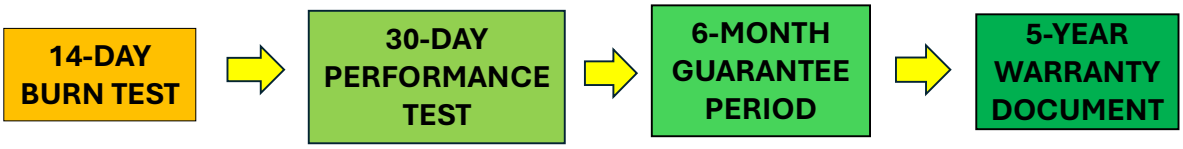
sign and date

Drawings for this project are approved as submitted.

STATE OF ARKANSAS 150' HIGH MAST LIGHTING POLES 2001 AASHTO

AR01HM01 1 OF 1

Testing & Validation



Inspection & Burn Test

Thank you

Hau Ho
TSMO Engineer
Phone: 501-569-2378
Cell: 501-920-7146

Daniel Park.
TSMO Engineer
Phone: 501-569-2613
Cell: 501-553-5655

FULL STEAM AHEAD

Safety • Trust • Excellence • Accountability • Modern


PLEASE NO QUESTIONS
NETFLIX


PARADISE
hulu
ANY QUESTIONS
FOR ME?


Thank You!


THAAAAANK
YOOOOOOU!