PRELIMINARY PHOTOMETRIC REPORT

HAL-24-IPS-1224DC-50K-FL

LM-63 report generated from supplied IES photometric data

Preliminary Photometric Analysis Based on Assumed Installation Conditions.

LUMINAIRE LUMENS	MAXIMUM CANDELA	INPUT POWER	PRIMARY CASE
2,385 lm	**1,060.5 cd**	**21.29 W**	**20 ft**

Required Disclaimer

This report is a preliminary photometric analysis generated from the supplied IES photometric data using assumed installation conditions. It is intended only for conceptual planning and fixture evaluation. Actual lighting performance will vary depending on mounting height, aiming, room geometry, surface reflectance, obstructions, maintenance factors and environmental conditions. Final lighting layouts should be performed using project-specific dimensions and requirements.

Manufacturer metadata: LARSON | Test date: 20260626 | Report generated from HAL-24-IPS-1224DC-50K-FL.IES

1. Fixture Summary

Parameter	Result	Basis / Notes
Fixture model	HAL-24-IPS-1224DC-50K-FL	[LUMINAIRE] field
Manufacturer	LARSON	[MANUFAC] field
Lamp quantity / lamp lumens	1 / 2,385.31 lm	IES numeric header
Total luminaire lumens	2,385.31 lm	IES listed; integrated candela flux 2,385.24 lm
Luminaire efficiency	Not separately determinable	IES does not provide independent bare-lamp flux; listed/integrated ratio is not treated as optical efficiency
Input power / efficacy	21.29 W / 112.0 lm/W	Calculated from IES listed lumens and input watts
Maximum candela (CBCP)	1,060.49 cd	At C0.0 deg, vertical angle 7.0 deg
Beam angle (50% CBCP)	80.1 deg (estimate)	Full contiguous envelope around nadir on peak great-circle
Field angle (10% CBCP)	134.3 deg (estimate)	Full contiguous envelope around nadir on peak great-circle
Photometric type	Type C	LM-63 photometric type 1
Distribution classification	Type V-like / very broad (estimate)	Not explicitly classified in IES; inferred from full C-plane coverage and practical footprint
Symmetry description	Asymmetric C-plane distribution	16 unique C-planes plus 360-deg duplicate; weighted C-plane CV approximately 25.4%
Flux distribution	2,385 lm down / 0 lm up	100.0% lower hemisphere / 0.0% upper hemisphere

Beam-angle interpretation

The peak intensity is off-axis, and the reported beam and field angles are broad angular envelopes around nadir. Practical ground-plane footprints are calculated separately from horizontal illuminance and are used for spacing estimates.

Assumptions and Calculation Method

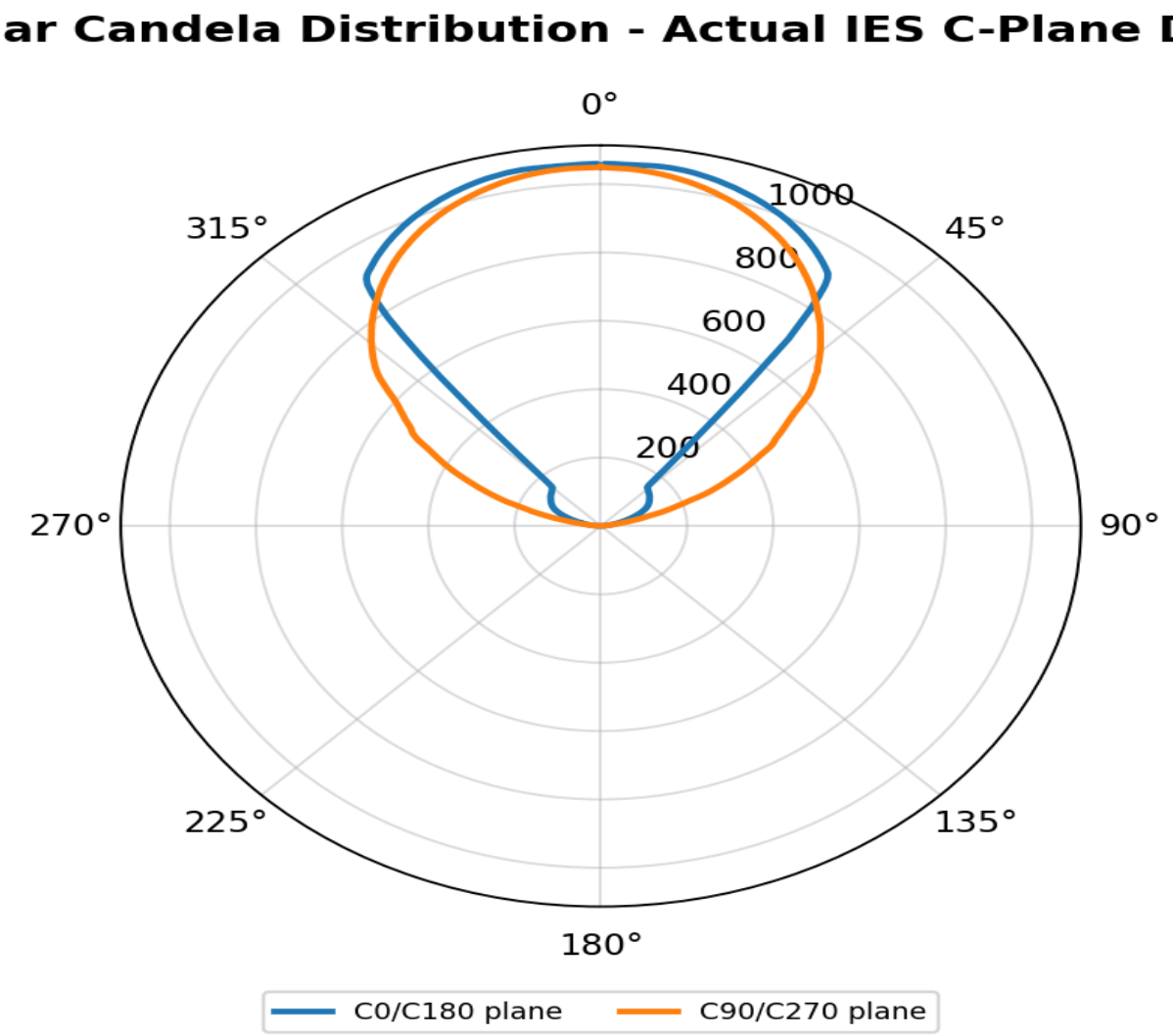
1	Fixture mounted 20 ft (6.1 m) above the primary calculation plane; additional cases at 10, 15, 25 and 30 ft.
2	Fixture aimed straight downward at 0 deg tilt.
3	Flat, unobstructed 50 ft x 50 ft calculation area.
4	Calculation grid spacing of 2 ft; primary numeric grid uses 25 x 25 points from -24 ft to +24 ft.
5	Fixture centered in the calculation area.
6	No reflected light from walls, ceilings or ground; direct component only.
7	Light Loss Factor (LLF) = 0.80 applied uniformly.
8	Standard atmospheric conditions; no atmospheric attenuation modeled.
9	No obstructions, shielding, poles, equipment or site geometry.
10	Single fixture unless a conceptual multi-fixture example is explicitly shown.

Point-by-point direct illuminance method

At each calculation point, horizontal and vertical offsets are converted to LM-63 Type C vertical angle gamma and C-plane azimuth. Candela is bilinearly interpolated from the measured IES table. Horizontal illuminance is calculated as E = I(gamma,C) x cos(gamma) / d^2, then multiplied by the 0.80 LLF. Distances are in feet, so the result is foot-candles.

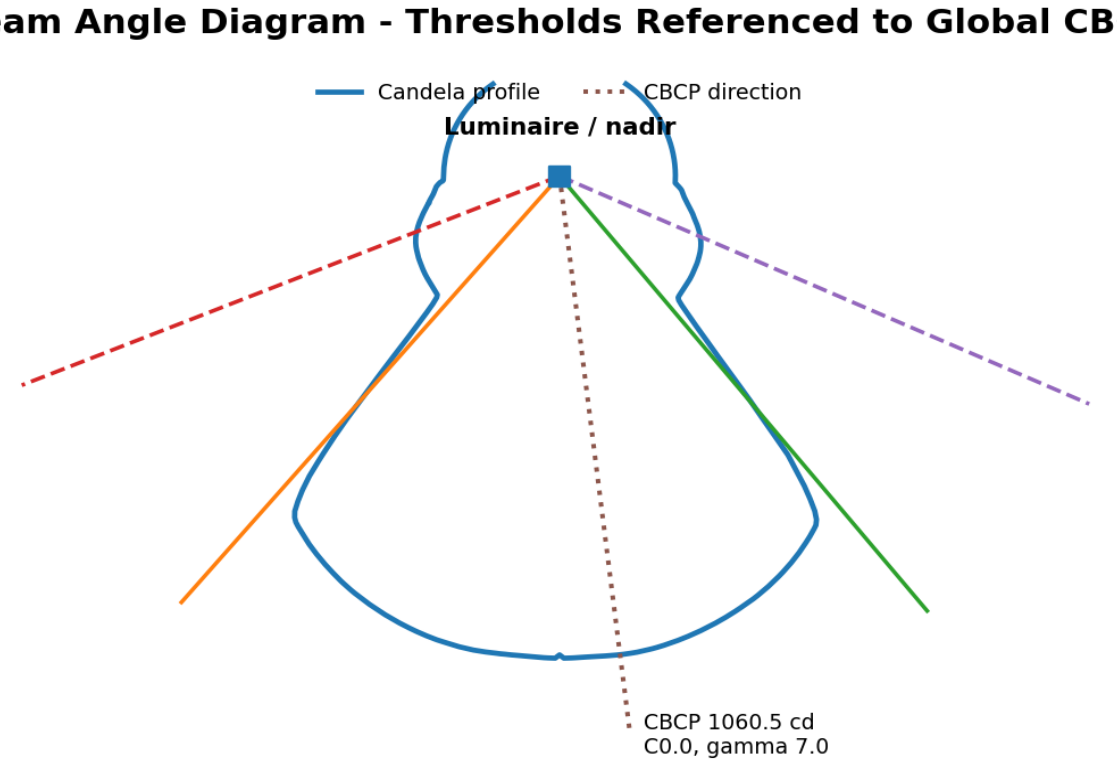
No room-cavity, radiosity, interreflection, dirt-depreciation model, glare model, emergency criterion or code-compliance assessment is included.

2. Polar Candela Distribution



The plot uses actual candela values from the C0/C180 and C90/C270 great-circle planes. Because the file contains 17 C-planes, all plan-view calculations use the complete measured dataset rather than a rotational average.

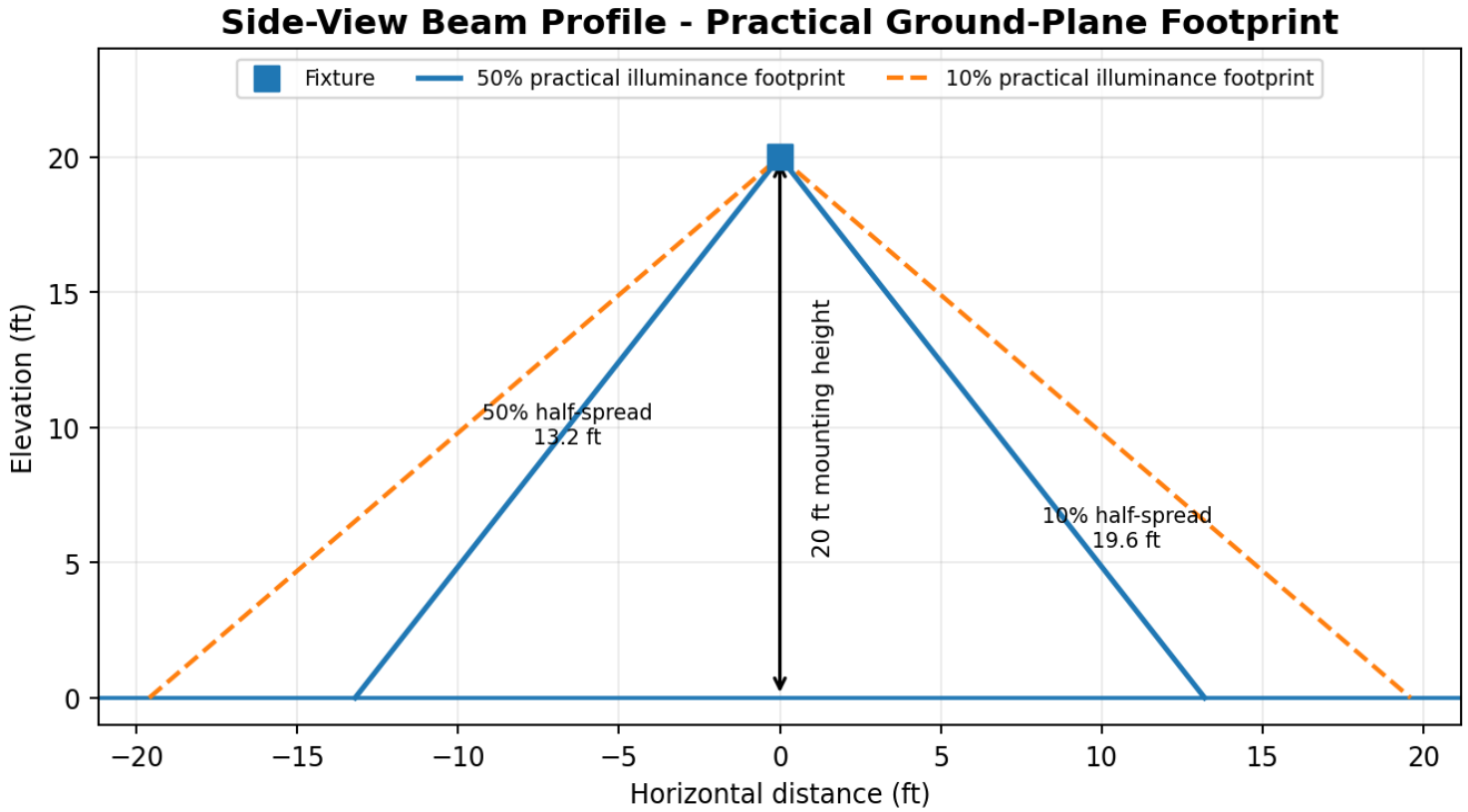
3. Beam Angle Diagram



50% candela envelope: 80.1 deg | 10% field envelope: 134.3 deg

Item	Result	Interpretation
CBCP	1060.49 cd at C0.0, gamma 7.0	Off-axis peak
50% beam envelope	-40.7 deg to 39.4 deg (80.1 deg)	Estimated around nadir
10% field envelope	-68.2 deg to 66.1 deg (134.3 deg)	Estimated around nadir

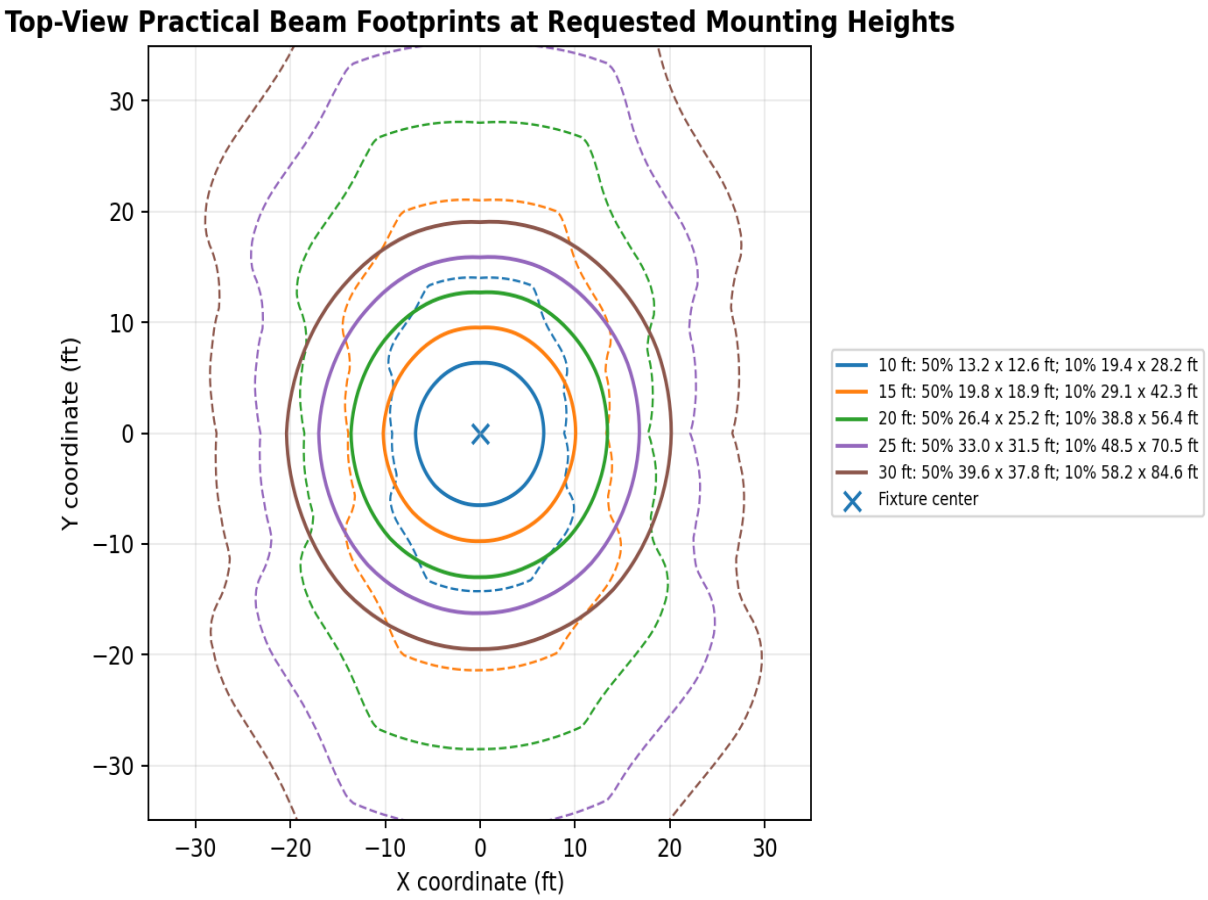
4. Side-View Beam Profile



Engineering interpretation

At 20 ft, the practical 50% horizontal-illuminance footprint is approximately 26.4 x 25.2 ft and the 10% footprint is approximately 38.8 x 56.4 ft. These ground-plane footprints are used for spacing estimates because the candela envelope is very broad and does not behave as a conventional narrow cone.

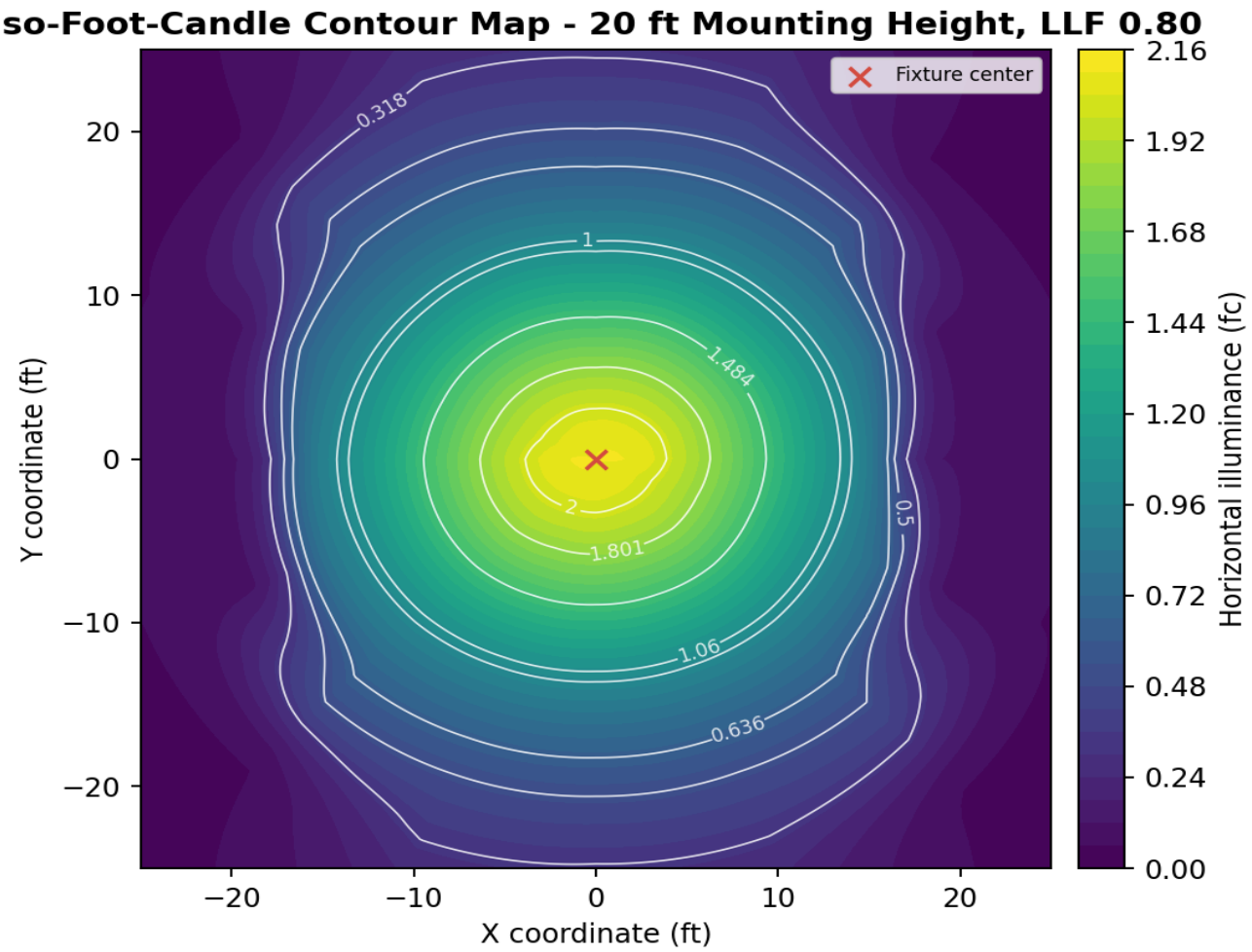
5. Top-View Beam Footprint



Height	50% footprint (ft)	10% footprint (ft)
10 ft	13.2 x 12.6	19.4 x 28.2
15 ft	19.8 x 18.9	29.1 x 42.3
20 ft	26.4 x 25.2	38.8 x 56.4
25 ft	33.0 x 31.5	48.5 x 70.5
30 ft	39.6 x 37.8	58.2 x 84.6

Footprints are practical horizontal-illuminance contours at 50% and 10% of the maximum value calculated at each mounting height. They are not conventional 50% and 10% candela cone intersections.

6. Iso-Foot-Candle Contour Map - Primary 20 ft Case



Requested contour	Status
20 fc	Not reached
15 fc	Not reached
10 fc	Not reached
5 fc	Not reached
2 fc	Reached
1 fc	Reached
0.5 fc	Reached

Dense-map maximum: 2.119 fc. Supplemental visible isolines: 0.318, 0.636, 1.06, 1.484, 1.801 fc. Requested contour values that exceed the calculated maximum are identified as not reached rather than plotted.

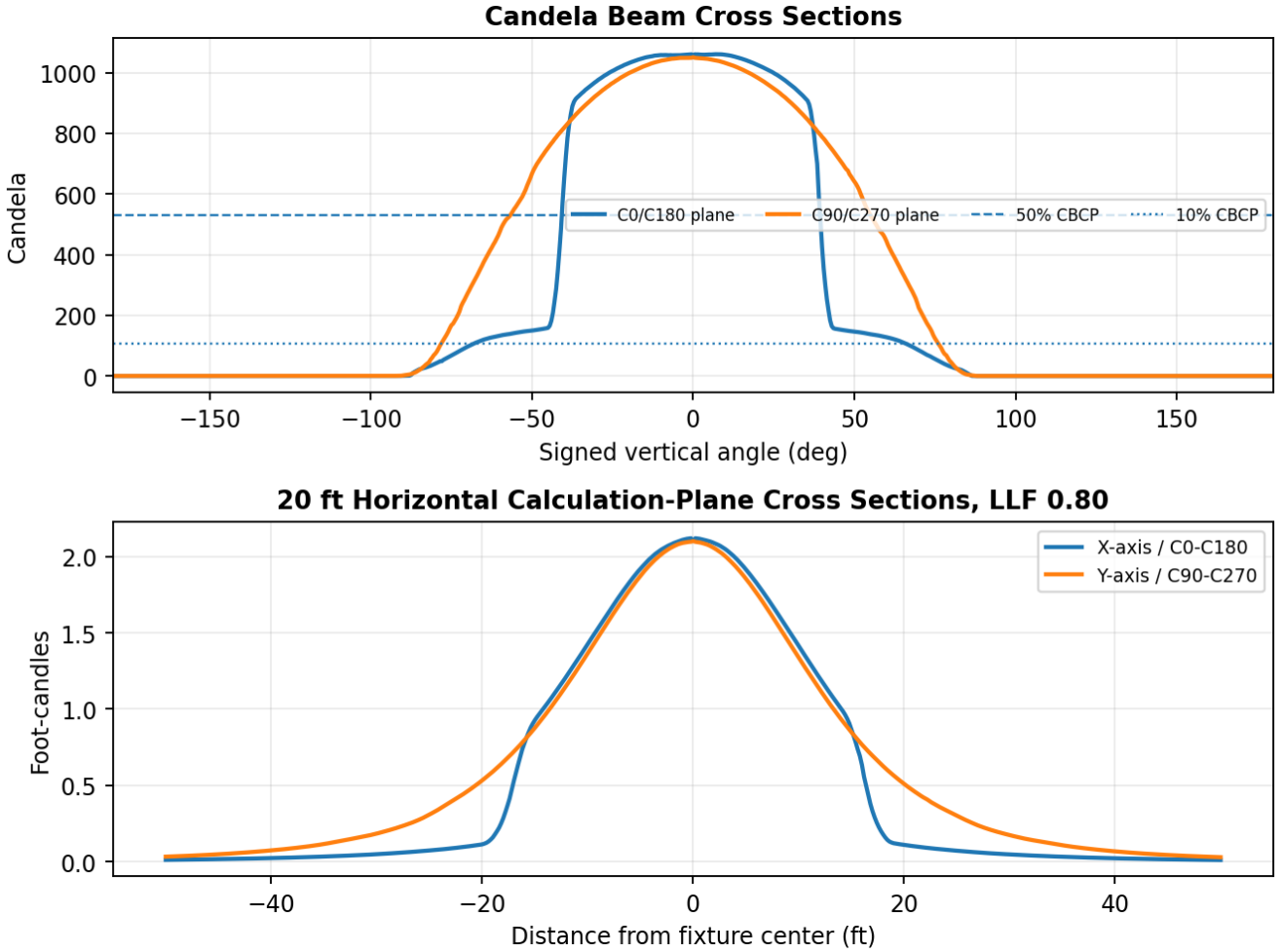
7. Foot-Candle Grid - 20 ft Mounting Height

MAXIMUM FC	MINIMUM FC	AVERAGE FC	AVG/MIN	MAX/MIN
2.101	0.028	0.625	21.93	73.79

Y\X	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	-4	-2	0	2	4	6	8	10	12	14	16	18	20	22	24
24	0.028	0.044	0.065	0.092	0.128	0.175	0.230	0.286	0.304	0.320	0.330	0.335	0.335	0.333	0.325	0.312	0.295	0.274	0.218	0.170	0.128	0.093	0.066	0.045	0.029
22	0.032	0.036	0.059	0.091	0.143	0.209	0.279	0.338	0.371	0.391	0.406	0.414	0.414	0.414	0.405	0.386	0.361	0.314	0.242	0.178	0.129	0.090	0.060	0.037	0.033
20	0.037	0.041	0.049	0.103	0.185	0.283	0.361	0.414	0.451	0.478	0.498	0.509	0.509	0.510	0.500	0.481	0.454	0.389	0.294	0.202	0.126	0.080	0.047	0.042	0.037
18	0.042	0.048	0.076	0.152	0.281	0.385	0.449	0.500	0.546	0.583	0.610	0.625	0.626	0.626	0.613	0.587	0.550	0.497	0.413	0.281	0.153	0.067	0.054	0.048	0.042
16	0.047	0.065	0.119	0.240	0.396	0.469	0.533	0.597	0.657	0.708	0.744	0.765	0.767	0.767	0.749	0.714	0.662	0.602	0.534	0.430	0.253	0.114	0.064	0.054	0.047
14	0.055	0.085	0.165	0.285	0.408	0.548	0.627	0.707	0.785	0.853	0.903	0.932	0.935	0.934	0.907	0.859	0.791	0.714	0.632	0.548	0.367	0.185	0.090	0.061	0.053
12	0.062	0.099	0.176	0.271	0.412	0.596	0.728	0.829	0.927	1.015	1.082	1.121	1.128	1.124	1.088	1.022	0.935	0.838	0.736	0.571	0.388	0.234	0.116	0.071	0.058
10	0.063	0.089	0.145	0.246	0.467	0.704	0.836	0.958	1.078	1.189	1.276	1.327	1.338	1.333	1.286	1.199	1.089	0.968	0.845	0.672	0.395	0.216	0.123	0.078	0.064
8	0.067	0.079	0.096	0.248	0.593	0.806	0.944	1.088	1.232	1.366	1.472	1.537	1.554	1.547	1.487	1.379	1.243	1.100	0.954	0.802	0.480	0.179	0.094	0.079	0.068
6	0.071	0.084	0.117	0.317	0.692	0.885	1.043	1.210	1.378	1.532	1.659	1.738	1.762	1.749	1.674	1.548	1.392	1.224	1.055	0.894	0.608	0.205	0.101	0.084	0.071
4	0.074	0.088	0.131	0.352	0.736	0.951	1.126	1.312	1.499	1.675	1.816	1.905	1.937	1.916	1.833	1.693	1.516	1.327	1.134	0.950	0.641	0.237	0.108	0.088	0.074
2	0.077	0.092	0.129	0.342	0.770	0.998	1.186	1.387	1.589	1.775	1.922	2.013	2.055	2.033	1.947	1.791	1.597	1.390	1.184	0.991	0.653	0.228	0.112	0.090	0.076
0	0.078	0.093	0.112	0.285	0.775	1.020	1.216	1.426	1.637	1.834	1.992	2.083	2.101	2.088	1.992	1.827	1.627	1.414	1.203	1.004	0.634	0.178	0.109	0.091	0.077
-2	0.077	0.092	0.114	0.296	0.765	1.003	1.194	1.399	1.605	1.796	1.950	2.036	2.062	2.021	1.927	1.775	1.587	1.382	1.178	0.987	0.655	0.251	0.118	0.089	0.075
-4	0.075	0.089	0.108	0.264	0.711	0.961	1.140	1.333	1.526	1.704	1.847	1.923	1.952	1.913	1.830	1.684	1.504	1.312	1.124	0.943	0.655	0.281	0.116	0.087	0.073
-6	0.072	0.085	0.101	0.207	0.618	0.898	1.063	1.236	1.409	1.569	1.687	1.758	1.783	1.750	1.673	1.551	1.391	1.218	1.047	0.885	0.645	0.251	0.103	0.083	0.070
-8	0.068	0.080	0.095	0.175	0.474	0.806	0.968	1.119	1.268	1.396	1.496	1.562	1.581	1.556	1.486	1.383	1.253	1.104	0.955	0.809	0.554	0.210	0.092	0.078	0.066
-10	0.064	0.084	0.140	0.228	0.400	0.681	0.864	0.992	1.110	1.214	1.295	1.350	1.365	1.346	1.288	1.203	1.097	0.979	0.852	0.700	0.437	0.234	0.148	0.094	0.062
-12	0.060	0.083	0.151	0.270	0.405	0.587	0.759	0.858	0.954	1.037	1.103	1.145	1.156	1.141	1.096	1.027	0.942	0.848	0.749	0.598	0.411	0.279	0.192	0.117	0.069
-14	0.054	0.070	0.122	0.248	0.414	0.573	0.652	0.732	0.807	0.871	0.925	0.957	0.964	0.953	0.918	0.863	0.797	0.723	0.644	0.566	0.421	0.307	0.201	0.109	0.063
-16	0.049	0.057	0.085	0.174	0.349	0.478	0.554	0.617	0.675	0.725	0.766	0.790	0.795	0.787	0.760	0.718	0.667	0.609	0.547	0.485	0.422	0.291	0.168	0.084	0.051
-18	0.044	0.050	0.059	0.100	0.216	0.350	0.453	0.515	0.560	0.599	0.630	0.648	0.652	0.646	0.625	0.593	0.553	0.509	0.461	0.409	0.333	0.220	0.109	0.060	0.043
-20	0.039	0.044	0.050	0.086	0.152	0.243	0.342	0.417	0.462	0.493	0.516	0.529	0.532	0.527	0.512	0.488	0.457	0.423	0.380	0.320	0.232	0.135	0.067	0.044	0.038
-22	0.035	0.039	0.062	0.093	0.134	0.194	0.267	0.339	0.382	0.404	0.421	0.431	0.433	0.429	0.418	0.400	0.377	0.345	0.296	0.229	0.159	0.101	0.061	0.038	0.034
-24	0.031	0.047	0.068	0.095	0.129	0.172	0.226	0.288	0.311	0.329	0.340	0.346	0.347	0.345	0.336	0.322	0.303	0.279	0.230	0.178	0.131	0.093	0.066	0.046	0.030

Grid values are direct horizontal illuminance in foot-candles with LLF 0.80. The grid uses 2 ft spacing and excludes the outer 1 ft boundary of the nominal 50 ft x 50 ft calculation area.

8. Beam Cross Sections



Section	Peak / center result	Engineering note
C0/C180 candela	1060.5 cd	Measured great-circle plane
C90/C270 candela	1050.6 cd	Measured great-circle plane
X-axis at 20 ft	2.120 fc	Horizontal plane, LLF 0.80
Y-axis at 20 ft	2.101 fc	Horizontal plane, LLF 0.80

9. Spacing Recommendations - Engineering Estimates

Spacing basis	C0/C180 axis	C90/C270 axis	Basis
Maximum spacing for 50% footprint overlap	26.4 ft	25.2 ft	Approximately the full 50% practical footprint
Recommended conceptual uniform spacing	20 ft	20 ft	About 70% of the mean 50% footprint dimension
Approximate spacing criterion (SC)	1.00	1.00	Recommended spacing / 20 ft mounting height

Conceptual spacing range at 20 ft

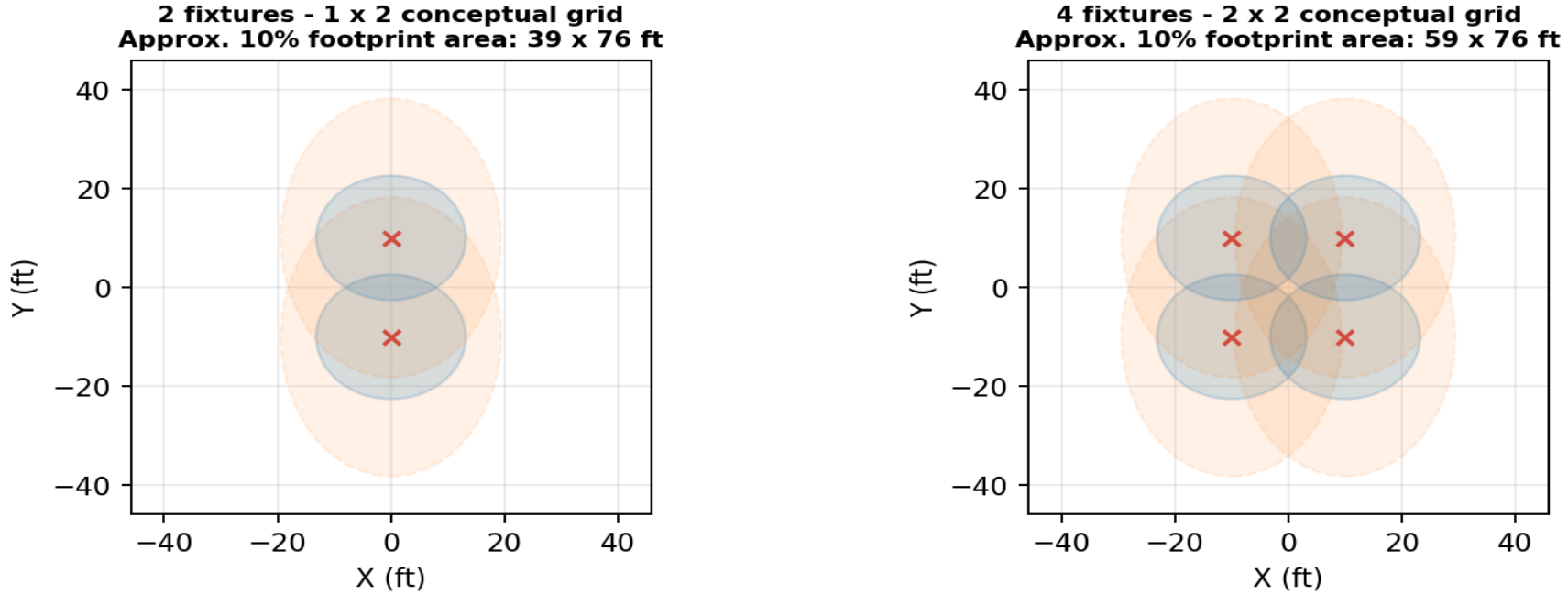
20 ft recommended; approximately 26 x 25 ft maximum for nominal 50% footprint overlap. The recommended spacing is intentionally conservative because this is a direct-only calculation with no interreflection. At maximum spacing, adjacent 50% footprints only meet or overlap slightly; closer spacing generally improves uniformity.

Spacing limitations and required project checks

Final spacing must be evaluated against required maintained illuminance, task category, emergency-lighting criteria, glare limits, mounting restrictions, structural positions, obstructions, surface reflectance and the number of fixtures. The SC value above is an engineering ratio derived from the calculated practical footprint; it is not a manufacturer-published spacing criterion.

10. Multiple Fixture Layout Examples - Two and Four Fixtures

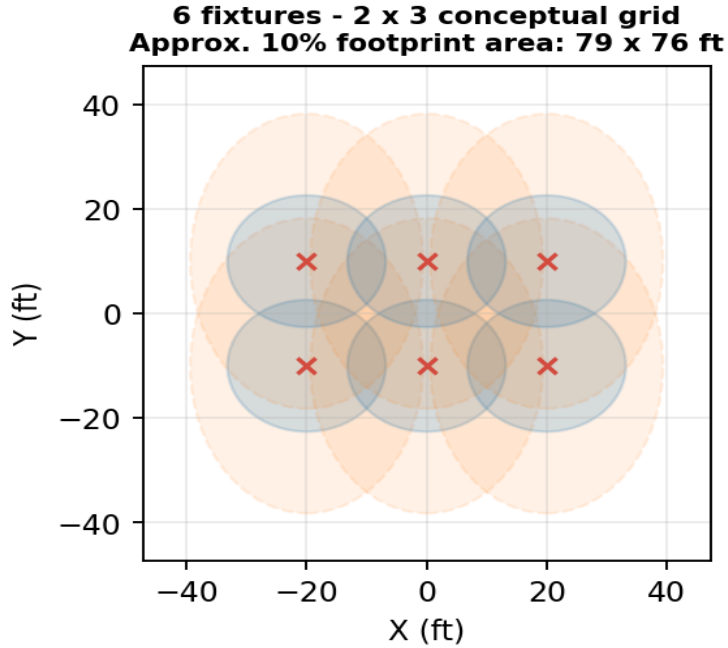
Conceptual Multiple-Fixture Layouts - 20 ft Spacing at 20 ft Mounting Height

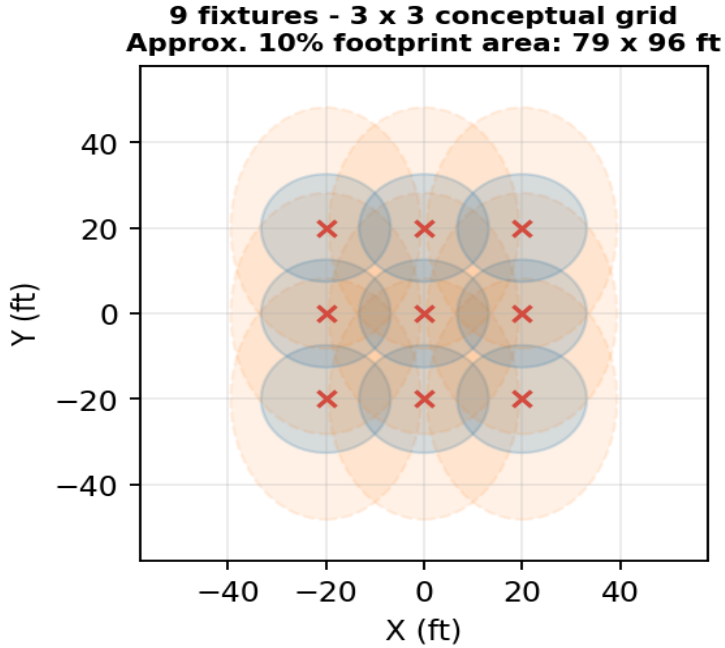


Red X marks show fixture centers. Blue areas represent approximate 50% practical footprints and orange areas represent 10% practical footprints. These examples use the estimated spacing at 20 ft mounting height and do not imply a site-specific lighting design.

10. Multiple Fixture Layout Examples - Six and Nine Fixtures

Conceptual Multiple-Fixture Layouts - 20 ft Spacing at 20 ft Mounting Height





Approximate illuminated-area dimensions are bounding dimensions of the 10% practical footprints, not guaranteed maintained-lighting limits. Actual multi-fixture foot-candle levels require a project-specific calculation using exact site geometry and fixture coordinates.

11. Performance Summary

BEAM TYPE

Very broad, off-axis Type V-like distribution with 100.0% of integrated flux in the lower hemisphere.

WIDE VS. NARROW

Wide. The practical 50% footprint is large relative to mounting height and significant intensity remains at high vertical angles.

BEST MOUNTING HEIGHT RANGE

15-30 ft for broad area coverage, subject to required maintained illuminance and spacing.

TYPICAL APPLICATIONS

Conceptual uses inferred from the distribution include broad ambient area lighting, low-bay open areas, walkways, equipment surroundings and perimeter zones. Application suitability and product certifications are not established by the IES file.

STRENGTHS

Broad coverage, generous beam overlap potential, and relatively gradual edge falloff. Multiple C-planes support an accurate asymmetric calculation.

LIMITATIONS

Low candela concentration compared with narrow-beam optics; high mounting heights may require closer spacing or more fixtures. No reflected-light contribution, glare evaluation, certification review or site-specific obstruction model is included.

Interpretive boundary

Applications and performance interpretations are based only on the photometric shape and assumed conditions. They are not product certification, hazardous-location suitability, code-compliance or environmental-rating claims.

Appendix A. C-Plane Beam and Field Edge Data

C-plane	Plane peak cd	50% width deg	10% width deg	50% edge range deg
0.0	1060.5	80.1	134.3	-40.7 to 39.4
22.5	1056.6	83.5	133.6	-41.7 to 41.8
45.0	1053.3	96.8	125.9	-49.0 to 47.8
67.5	1050.8	114.5	132.4	-57.3 to 57.1
90.0	1050.6	111.7	154.3	-56.7 to 55.0
112.5	1050.6	113.8	140.2	-56.9 to 56.9
135.0	1050.6	101.5	123.1	-51.3 to 50.2
157.5	1050.6	85.3	132.5	-42.4 to 42.9
180.0	1060.5	80.1	134.3	-39.4 to 40.7
202.5	1056.6	83.5	133.6	-41.8 to 41.7
225.0	1053.3	96.8	125.9	-47.8 to 49.0
247.5	1050.8	114.5	132.4	-57.1 to 57.3
270.0	1050.6	111.7	154.3	-55.0 to 56.7
292.5	1050.6	113.8	140.2	-56.9 to 56.9
315.0	1050.6	101.5	123.1	-50.2 to 51.3
337.5	1050.6	85.3	132.5	-42.9 to 42.4

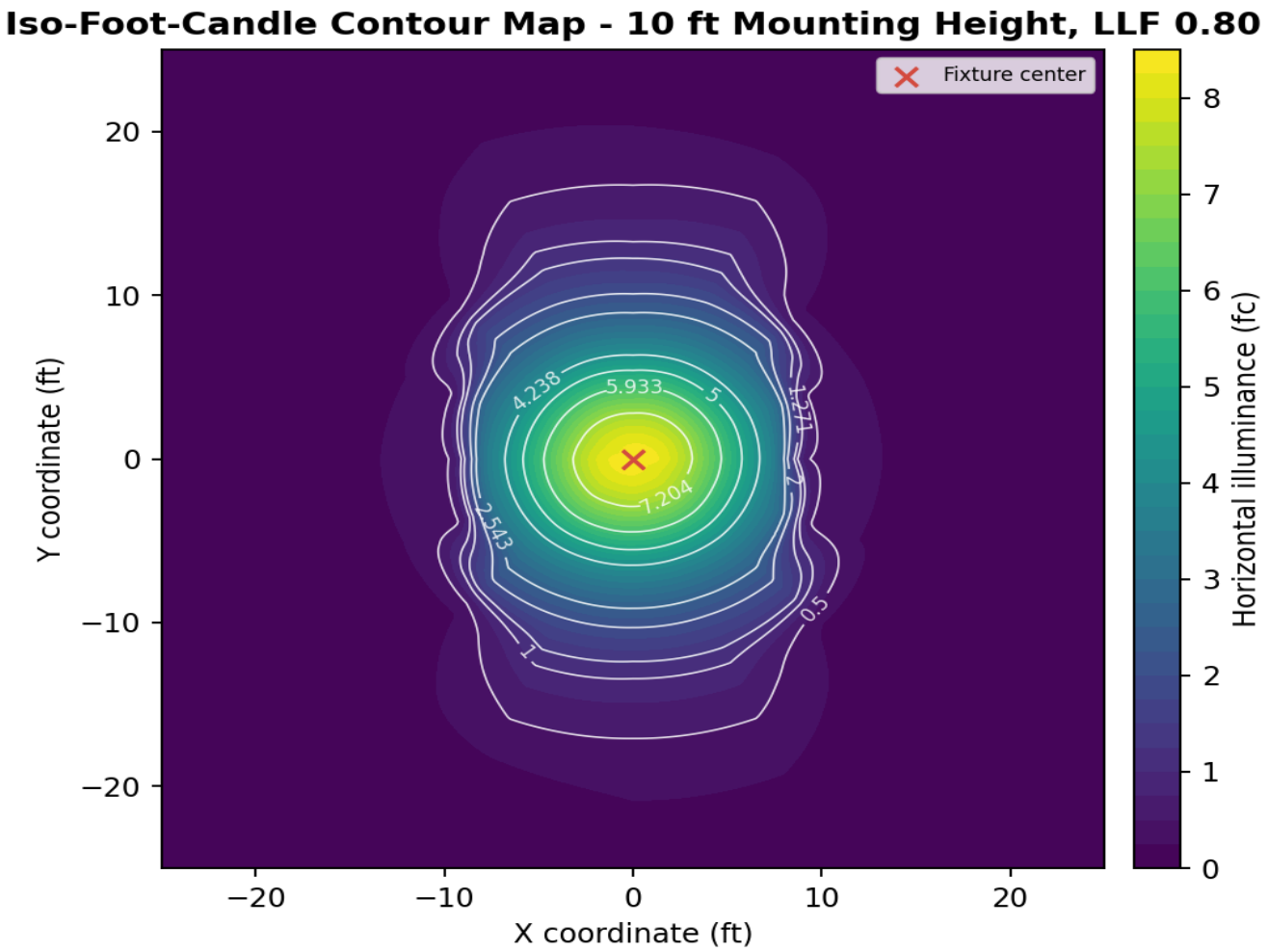
nal lumen summary

Vertical zone	Lumens	Percent of integrated
0-30 deg	842.5	35.3%
0-60 deg	2,113.3	88.6%
0-90 deg	2,385.1	100.0%
90-180 deg	0.1	0.0%
0-180 deg	2,385.2	100.0%

Angular edge method

For each C-plane, the measured plane is paired with its opposite C-plane to form
nadir. Values are interpolated at 0.2-deg resolution and are engineering estimate

Appendix B. Supplemental 10 ft Contours and Final Disclaimer



10 ft supplemental case	Result
Dense-map maximum	8.475 fc
Dense-map minimum	0.010 fc
50% footprint	13.2 x 12.6 ft
10% footprint	19.4 x 28.2 ft
LLF	0.80

Required Disclaimer

This report is a preliminary photometric analysis generated from the supplied IES photometric data using assumed installation conditions. It is intended only for conceptual planning and fixture evaluation. Actual lighting performance will vary depending on mounting height, aiming, room geometry, surface reflectance, obstructions, maintenance factors and environmental conditions. Final lighting layouts should be performed using project-specific dimensions and requirements.