MODERN PLACE

LINEAR LIGHTING LAYOUT PLANNING CHECKLIST

Grid • Perimeter • Cove Patterns

> Essential formulas, specifications, and coordination checklists for commercial linear lighting systems. Designed for architects, lighting designers, and electrical engineers.

ESSENTIAL FORMULAS

AVG. MAINTAINED ILLUMINANCE 01

Calculate the estimated footcandles (fc) over time.

```
E_avg = (Lm/Lamp × Lamps/Fixt × #Fixt × CU × LLF) / Area
```

Where Area is in sq. ft.

TOTAL LUMENS NEEDED 02

Determine total luminous flux required for the space.

```
Lumens = (Desired fc × Area) / (CU × LLF)
```

REQUIRED FIXTURES 03

How many fixtures to specify.

```
Fixtures = (Desired fc × Area) / (Lm/Fixt × CU × LLF)
```

SPACING TO MOUNTING HEIGHT 04

Max spacing to maintain uniformity.

```
Max Spacing = SC × (MH - WP)
```

SC: Spacing Criteria (typ. 1.0-1.5)
MH: Mounting Ht, WP: Work Plane Ht

LIGHT LOSS FACTOR (LLF) 05

Depreciation factors for LED systems.

```
LLF = LLMF × LDD × RSDD
```

- LLMF: 0.85-0.95 (Lumen Maintenance)
- LDD: 0.85-0.95 (Dirt Depreciation)
- RSDD: 0.90-0.98 (Room Surface)

COEFFICIENT OF UTILIZATION 06

Percentage of lumens reaching work plane.

Consult fixture spec sheet table based on Room Cavity Ratio (RCR) and surface reflectances (typ. 80/50/20).

WORKED EXAMPLE: OPEN OFFICE

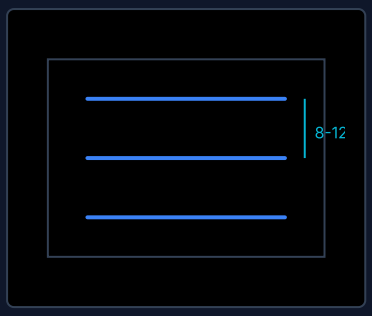
Inputs:
- Area: 1,000 sq ft
- Target: 40 fc
- CU: 0.55 (derived)
- LLF: 0.80 (conservative)

Calculation:
Lumens = (40 × 1,000) / (0.55 × 0.80)
Lumens = 40,000 / 0.44
= 90,909 Lumens Required

Fixture Selection: Using a 4ft linear pendant @ 5,200 lumens
Fixtures = 90,909 / 5,200 = 17.48 → **Specify 18 Fixtures**

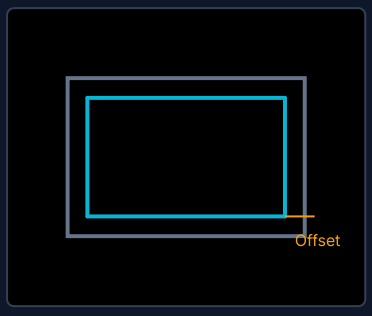
LAYOUT PATTERNS

GRID



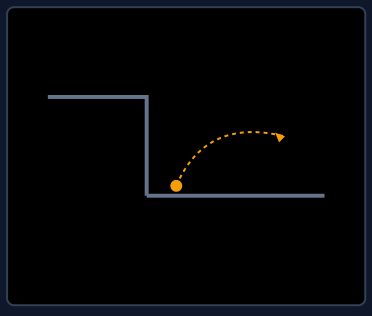
- [ ] Spacing: 8–12 ft on-center (typical for open plan)
- [ ] Mounting height: 9–12 ft above finished floor
- [ ] Uniformity target: ≥0.70 (avg:min)
- [ ] Verify alignment to ceiling grid / architecture
- [ ] Confirm end-of-run conditions (dead vs. illuminated)

PERIMETER



- [ ] Wall offset: 12–18 inches from wall face typically
- [ ] Vertical illuminance: ≥20 fc on vertical surfaces
- [ ] Spacing: Continuous or 4–8 ft on-center
- [ ] Confirm corner transitions (mitered vs. overlapping)
- [ ] Check for shadows from columns or obstructions

COVE



- [ ] Recess depth: 12–24 inches minimum for smooth gradient
- [ ] Fixture setback: 6–12 inches from cove edge
- [ ] Ceiling reflectance: ≥0.80 (Matte White is critical)
- [ ] Indirect ratio: ≥90% uplight for soft ambient
- [ ] Maintenance: Confirm driver accessibility

ILLUMINANCE BY SPACE TYPE

Reference targets based on IES RP-1 guidelines for commercial spaces.

SPACE TYPE	TARGET (FC)	UNIFORMITY	NOTES
Open Office	30–50	≥0.70	Task lighting recommended to supplement
Private Office	30–50	≥0.60	Personal dimming/adjustability recommended
Conference Room	30–50	≥0.70	Deep dimming essential for A/V presentation
Corridors	10–20	≥0.40	Wayfinding priority; consider vertical light
Lobbies / Reception	20–50	≥0.60	Vertical illuminance critical for facial recognition
Retail / Showroom	30–75	≥0.70	High CRI (90+) preferred; adjustable CCT
Healthcare / Exam	50–100	≥0.80	High uniformity; strictly flicker-free
Stairwells	10–20	≥0.40	Code minimums apply; safety priority
Restrooms	15–30	≥0.50	Mirror lighting should be vertical/diffused
Back of House / Storage	10–30	≥0.40	Occupancy sensors aggressive timeout

> ***Note:*** *All values are maintained illuminance on horizontal work plane at 30" AFF (Above Finished Floor) unless noted otherwise. Uniformity is defined as Average : Minimum ratio. Consult IES RP-1 for detailed sub-category guidance.*

PRE-SPECIFICATION CHECKLIST

ARCHITECTURE & ALIGNMENT

- [ ] Fixture runs aligned to dominant geometry (columns, bays, mullions)
- [ ] Transitions at corners, columns, and sprinklers resolved
- [ ] Module spacing + end conditions documented
- [ ] Coordination with MEP: HVAC diffusers, fire protection, structure

VISUAL COMFORT & GLARE CONTROL

- [ ] UGR (Unified Glare Rating) ≤19 for office, ≤22 for general areas
- [ ] Shielding angle ≥45° for direct-view fixtures
- [ ] Luminance limits: ≤2,000 cd/m² @ 45° typical for office
- [ ] Brightness hierarchy established (Ambient vs Feature vs Accent)

ELECTRICAL & CONTROLS

- [ ] Circuit layout: zones aligned to daylight availability, occupancy, and function
- [ ] Dimming protocol confirmed: 0-10V, DALI, or Networked Wireless
- [ ] Scenes programmed: Open / Focused / After-hours / Cleaning
- [ ] Daylight harvesting sensors specified and placement verified
- [ ] Emergency/egress lighting code compliance verified

PERFORMANCE SPECIFICATIONS

- [ ] CCT: 2700K / 3000K / 3500K / 4000K (Specify + Binning Tolerance)
- [ ] CRI: ≥80 General, ≥90 for Color-Critical Tasks (R9 > 50)
- [ ] Efficacy: ≥100 lm/W (Target for Energy Code Compliance)
- [ ] Lumen Maintenance: L70 ≥50,000 hrs, L90 ≥36,000 hrs
- [ ] Warranty: 5-Year Minimum (Fixture + Driver)

COMMISSIONING & MAINTENANCE

COMMISSIONING & TESTING

- [ ] Photometric spot-check measurements (grid sampling)
- [ ] Verify illuminance levels ±10% of design target
- [ ] Uniformity compliance confirmed (scan for hot spots/dark spots)
- [ ] Dimming range tested (100% → 1% smooth, no flicker)
- [ ] Control scenes programmed and user-tested
- [ ] As-built documentation delivered (photometric report, control settings)

MAINTENANCE PLANNING

- [ ] Maintenance factor assumptions documented for future reference
- [ ] Group relamping schedule established (LED L70 rated life basis)
- [ ] Driver replacement plan (typically 50k–100k hours)
- [ ] Cleaning schedule: Quarterly (high-dust) to Annual (low-dust)
- [ ] Access equipment needs defined (ladder, lift, scaffolding)
- [ ] Spare parts inventory: 2% of total fixtures + drivers on-hand