INNOVATIONS IN LIGHTING FOR PEDESTRIAN SAFETY AND WALKABILITY

Photo credit: NACTO website

ITE Western District Meeting, San Diego, June 2017

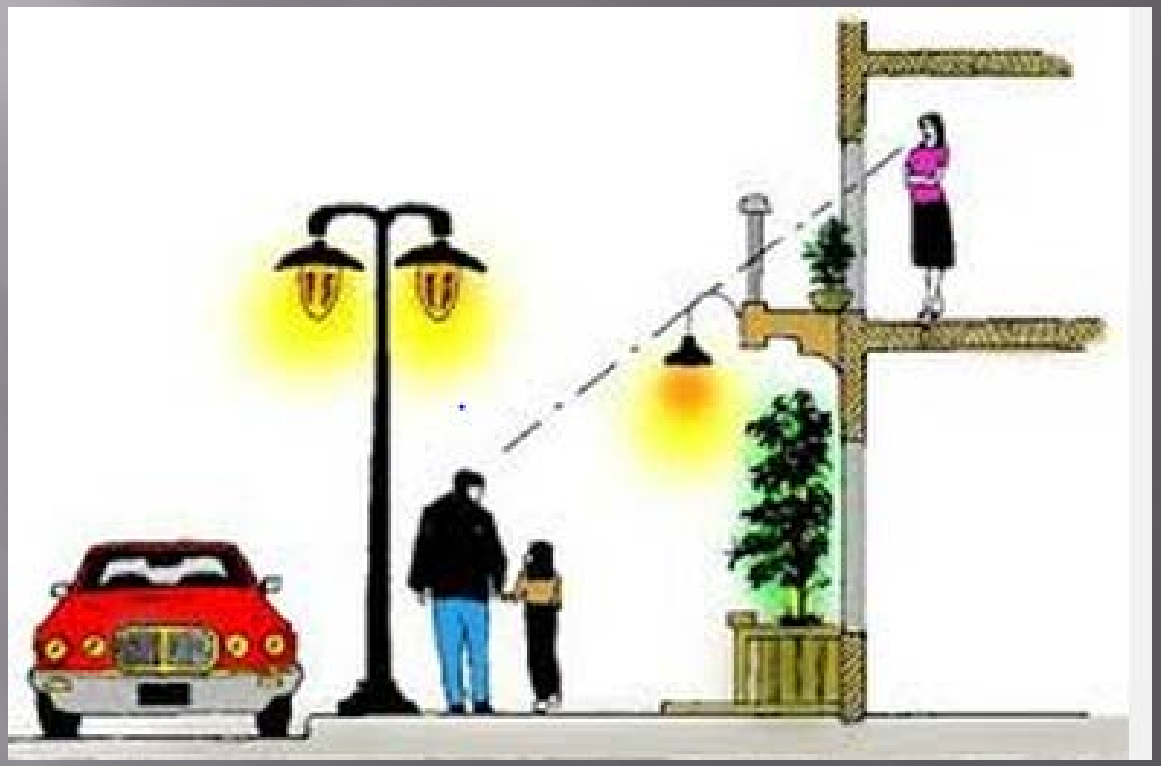
Frank Markowitz, Principal Transportation Planner, San Francisco Municipal Transportation Agency

Benefits of Lighting for Pedestrians: Safety

- Pedestrian fatalities 3+ X more likely at night
- Reduction in pedestrian injuries:
  - 42-59% (national meta-analysis)
  - 12% reduction in Minnesota

Photo credit: Streetsblog

Benefits of Lighting for Pedestrians: Security & Comfort



- Reduced crime 38% in UK and 7% in US
- Seattle: “low lighting” barrier citizens cited for walking after dark

Image Credit: Santa Monica Office of Sustainability & the Environment

Benefits of Lighting for Sense of Place

- Improved Ambience of Streets and Plazas

Photo credit: Dave Burdett, Map the Novel.com

Low Light Conditions Common

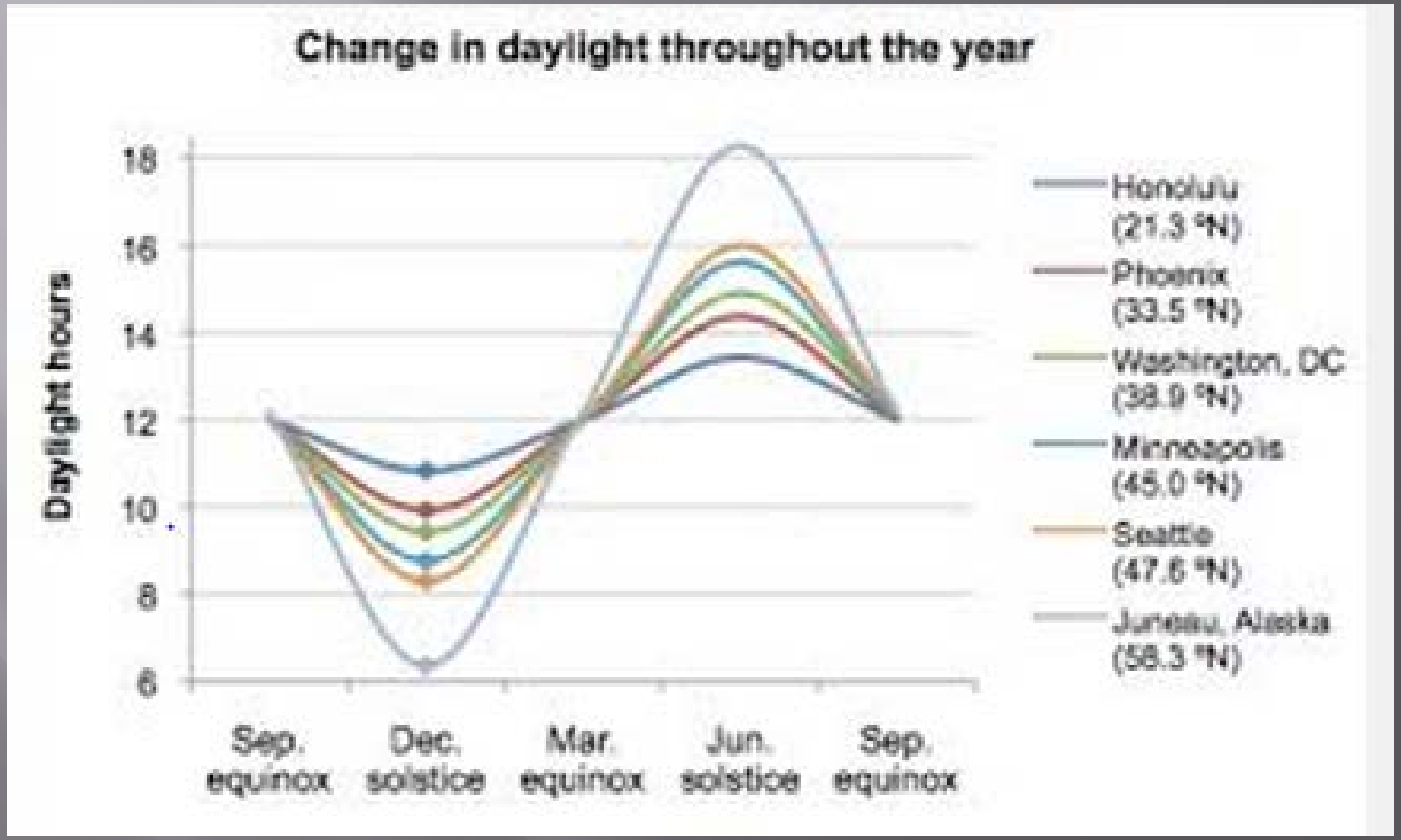


Image credit: WashingtonPost.com

Traditional Lighting Options

Street (Roadway) Lighting

- Over 20 feet high
- Spaced 100+ feet apart

Pedestrian-Scale Lighting

- 10-18 feet high
- Spaced about 50 feet apart

What's Possible? Smart Lighting

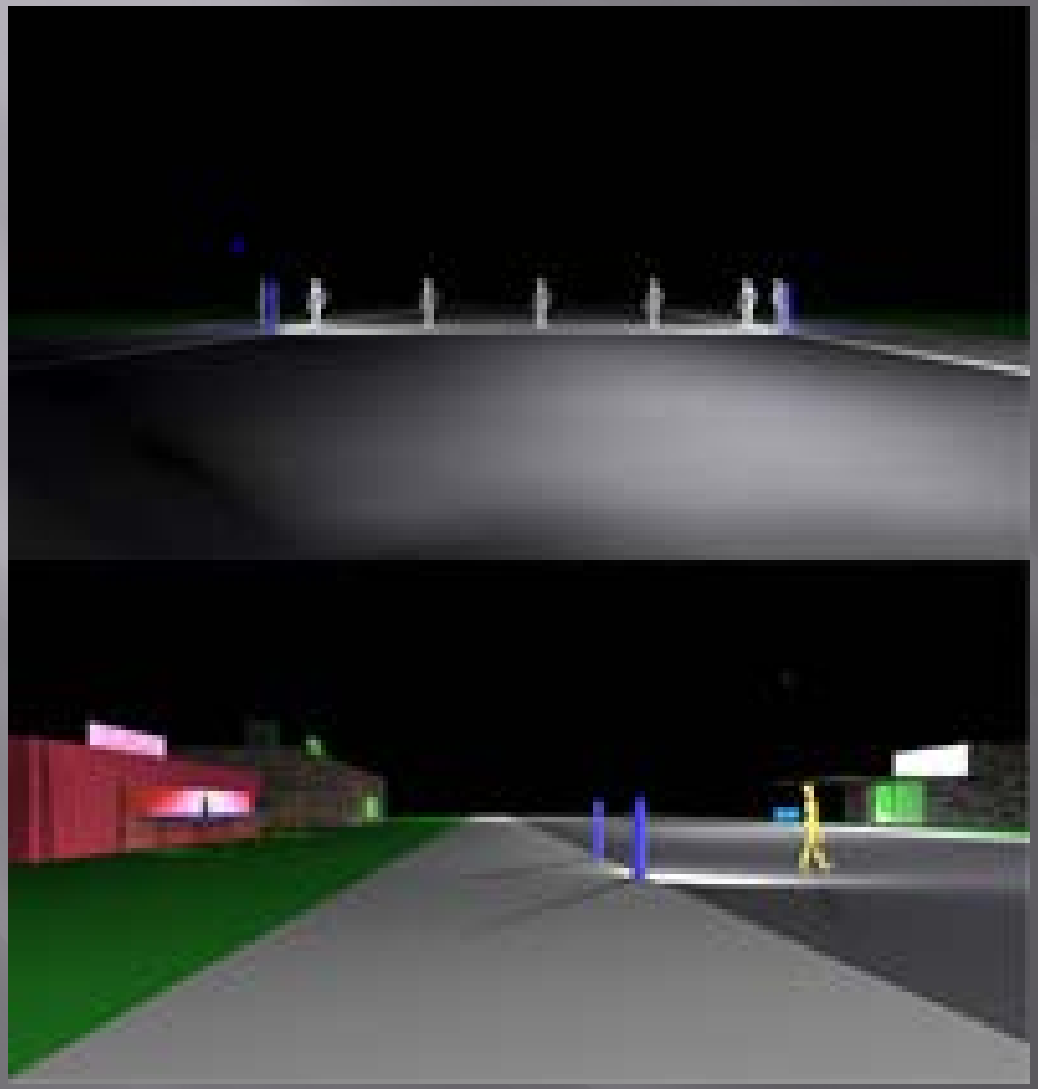
Michael Siminovitch, director of UC Davis' California Lighting Technology Center, demonstrates how the lights switch from low power to high when they sense that someone is walking or driving nearby. (Karin Higgins/UC Davis photo)

Las Vegas: Supplemental crosswalk lighting triggered by pedestrian video detection

Image Credit: http://safety.fhwa.dot.gov/ped_bike/tools_solve/ped_scdproj/webinar052809/las_vegas/

What's Possible? LEDs

What's Possible? Bollard Lighting



- Illuminates pedestrians in crosswalk but not background
- Not field tested

Image credit: RPI website

What's Possible?
Communications and the Internet of Things

- Poles transmit civic information via Bluetooth (Wipperfurth, Germany)

Wireless control of lighting networks (San Jose)

What's Possible? Aesthetics

Photo Credits:
DIALOG, Stephane Laroye

- Vancouver
- San Jose underpass

Photo credit: http://www.artplaceamerica.org/articles/illuminating-downtown-2/

What's Possible? Aesthetics and Information

Photo credit: ILLUMINATE (http://illuminatethearts.org/projects/)

- San Francisco: LightRail

Costs of Enhanced Lighting

- CAPITAL COSTS
  - Crosswalk: $11,000 - $42,000
  - Block: $600,000 for 1/3 mile of ped scale lighting in SF
- OPERATING & MAINTENANCE COSTS/Energy
  - $700+ per year per intersection (Minnesota)

Other Potential Issues with Enhanced Lighting

- GLARE

- LIGHT TRESPASS

Prioritizing Areas for Enhanced Lighting

- COLLECT DATA
  - Lighting fixtures
  - Crash patterns and locations
  - Crime patterns
  - Citizen preferences
- SCORE AND MAP PRIORITY AREAS

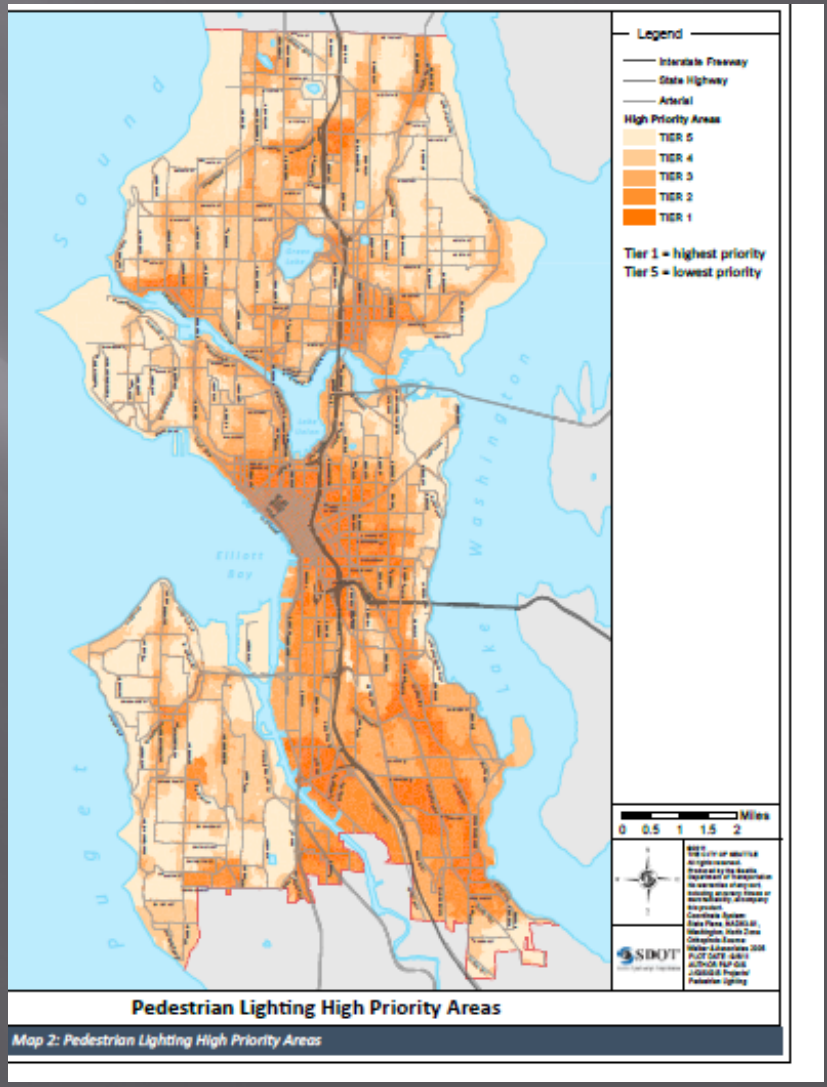


Image credit: Seattle Department of Transportation

Prioritizing Areas for Enhanced Lighting

- BENEFIT/COST ANALYSIS
  - metrics such as ease of implementation, time frame, funding availability
- PROGRAM OF IMPROVEMENTS
- FUNDING AND IMPLEMENTATION STRATEGY

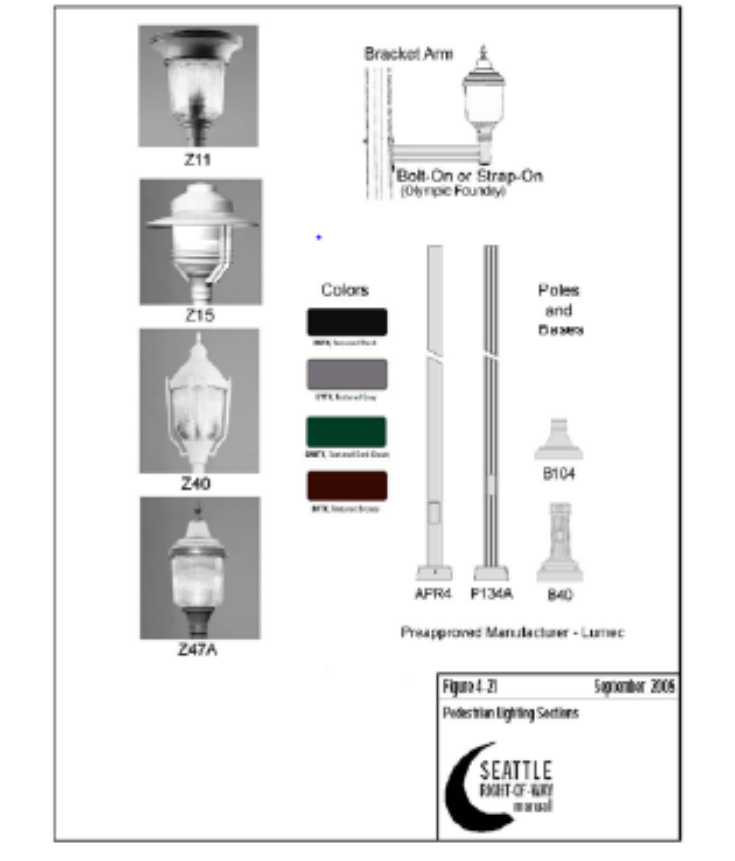


Image credit: Seattle Department of Transportation

Additional Areas for Research

- Crash reduction potential of lighting strategies
- Pedestrian preferences
- Cost-effectiveness of lighting improvements versus other pedestrian improvements
- Impact of lighting conditions on the effectiveness of vehicle-mounted crash avoidance technologies.

LIGHTING FOR PEDESTRIANS

Fiat lux!

Photo credit: NACTO website