

Introduction

Existing TAC Guide

Selection Process

Focus of New Guide

Document Format

Schedule

New TAC Guide for the Design of Roadway Lighting

*IESNA BC Chapter
Fall 2003 Outdoor Lighting Seminar*

Presented by

Don McLean/William Whitman

DMD & Associates Ltd.

Ian Lewin, PhD, FIES, LC

Lighting Sciences, Inc.



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Existing TAC Guide

- First published in the 1982
- Updated in 1988
- Authored by McCormick Rankin
- In need of updating
- Not widely accepted or used



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Selection Process

- Canada-wide advertisement
- Seven letters of interest received
- Proposals requested from McCormick Rankin and DMD
- DMD team selected



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Team for the New Guide

- DMD & Associates Ltd., Surrey, BC
 - Don McLean, CET
 - Dan Wong, PEng, PE
 - Bill Whitman
- Lighting Sciences Inc., Scottsdale, AZ
 - Ian Lewin, PhD, FEIS, LC
- Parsons Brinkerhoff, Boston, MA
 - Paul Lutkevich, PE
- Bunt & Associates Ltd., Calgary, AB
 - Greg Iwaskow, PEng, PTOE



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TAC Oversight

- Project ownership is by *Traffic Operations and Management Standing Committee* (TOMSC) of the Chief Engineer's Council
- A *Project Steering Committee* (PSC) has direct involvement

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Focus of the New Guide

- Safety
- Visibility (STV)
- Energy savings/conservation
- Obtrusive light mitigation
- Integration with other elements (signing, markings, etc.)



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- Visibility (STV)



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- Obtrusive light mitigation



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Goals

- Develop a document that will be accepted and used throughout Canada and North America
- Make new Guide consistent with other accepted documents
- Keep current with emerging research



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Goals (continued)

- Warrant System
- User-friendly layout and content
- Distributable as printed and/or electronic document



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Document Arrangement

- Avoid Duplication of Information
- Include Lighting Criteria
- Include Design Examples with Step-by-Step Design Methods



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Design Guide Chapters

- Chapter 1 – Introduction
- Chapter 2 – Lighting Theory and Concepts
- Chapter 3 – Design Process and Common Elements
- Chapter 4 – Obtrusive Light
- Chapter 5 – Computer Applications
- Chapter 6 – System Components
- Chapter 7 – Roadways
- Chapter 8 – Pedestrian and Cyclist Facilities
- Chapter 9 – Off Roadway Facilities
- Chapter 10 – Signs
- Chapter 11 – Streetscapes and Architectural Lighting
- Chapter 12 – Maintenance



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Chapter 1 – Introduction

- How to Use this Design Guide
- Purpose of Lighting
- Value of Lighting
- Planning



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Chapter 2 – Lighting Theory and Concepts

- Light and the Spectrum
- Basic Principles of Vision
- Fundamentals of Light Generation
- Measurements
- Visibility Fundamentals and Principles
- Calculation Methods
- Calculation Elements
- Light Loss Factors
- Reflection Factors
- Luminaire Calculation System

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Chapter 3 – Design Process and Common Elements

- Master Lighting Plans
- Pre-Design Considerations
 - ✓ Budgeting
 - ✓ Factors that May Impact Ability to Provide Lighting
 - ✓ Types of Lighting and Mounting
 - ✓ Light Sources
 - ✓ Integration with other Elements
 - ✓ Roadside Safety Hazards
 - ✓ Environmental Issues
 - ✓ Alternatives to Lighting
 - ✓ Aesthetics
 - ✓ Sustainable Design
 - ✓ Temporary Lighting
 - ✓ Maintenance Considerations

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Chapter 3 – Design Process and Common Elements (continued)

- Methods of Project Delivery
- Design
- Bid
- Construction
- Post-Construction
- Accident Investigation



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Chapter 4 – Obtrusive Light

- Sources for Obtrusive Light Standards and Recommendations
- Impacts from Off Roadway Sources
- Addressing Residents' Concerns/Lighting Ordinances
- Mitigation Techniques



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Chapter 5 – Computer Applications

- Basic Principles
- Photometric File Formats
- Lighting Level Computations using IESNA Practice
- Lighting Level Computations using CIE Practice
- Small Target Visibility Computation
- Glare Computations
- Lighting System Optimization
- Available Software



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Chapter 6 – System Components

- Foundations
- Poles
- Highmast Systems
- Conduit and Wiring
- Luminaires
- Alternate Luminaire Mounting
- Lamps
- Controls
- Electrical Service



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Chapter 7 – Roadways

- Chapter 7 is Where the “Design Guide” Begins
- Each Type of Lighting is Treated Separately in Terms of General Information, Warrants, Calculations, Lighting Requirements and Design Examples
- Progression is from General to Specific to Step-By-Step Example(s)



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Chapter 7 – Roadways

- Intersections
- Mid-Block Crosswalks
- Residential Roadways in Subdivisions
- Roadways between Intersections
- Highways and Freeways Between Intersections and Interchanges



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Chapter 7 – Roadways

(continued)

- Freeway Interchanges
- Over/Underpasses
- Roundabouts
- Railway Crossings
- Tunnels
- Bridges
- Toll Booths/Border Crossings/Inspection Stations
- Alleyways



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Chapter 8 – Pedestrian and Cyclist Facilities

- Walkways
- Pedestrian Tunnels
- Transit Shelters



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Chapter 9 – Off Roadway Facilities

- Weigh Scales
- Rest Areas
- Parking Lots
- Transit Loops



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Chapter 10 – Signs

- Warrants
- Design Methods
- Lighting Requirements
- Design Examples
- Installations and Operations



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Chapter 11 – Streetscape and Architectural Lighting

- Warrants
- Design Methods
- Lighting Requirements
- Design Examples
- Installations and Operations



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Chapter 12 – Maintenance

- Re-Lamping
- Trees and Shrubs
- Preventative Maintenance
- Corrective Maintenance
- Contract Methods
- Management Systems
- Record Keeping



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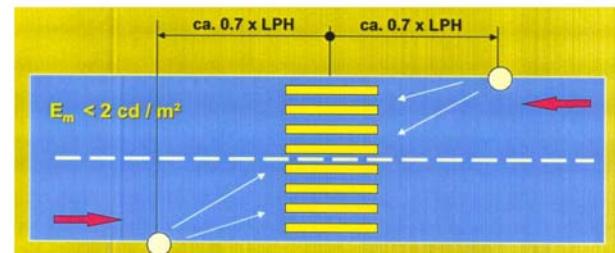
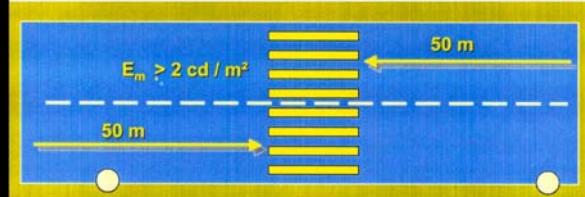
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Crosswalks

Crosswalks



Switzerland recommendation is to position poles so that pedestrian is seen in positive contrast.



Positive Contrast

Negative Contrast

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Crosswalks



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Crosswalks



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Roundabouts

Center lighting – 28 lux



Approach lighting – 25 lux



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Document Layout

- Well-conceived document design
- Focus on ease of use and navigation
- Effective use of white space
- High-quality printing



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Document Layout

Introduction

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April 2005

Guide for the Design of Roadway Lighting

Chapter Summary

Drop Cap

Navigational Icons

Introduction

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Document Layout (continued)

Navigational Headers

2 Guide for the Design of Roadway Lighting

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Introduction ▾ Chapter 1 3

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Table Z – Morbi et nulla et urna congue scelerisque

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Inline Graphic

Stylized Tables

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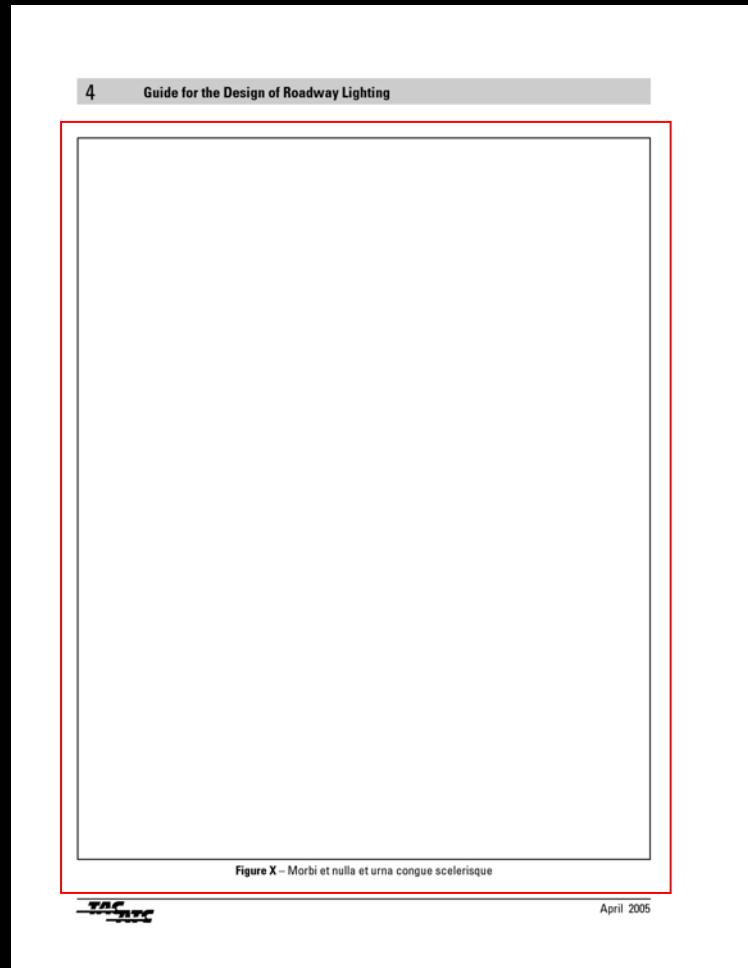
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Document Layout (continued)



Full Page Graphics
will Be Inline with
Text

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Companion CD

- Software for calculations
- Color photos (if book published in black and white)
- Link to Guide update web site to keep current
- Additional “Printable” Resources
- Additional “Viewable” Resources
- Commercial Software Demos



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- Awarded 2003
- Authoring is underway
- Final draft to TAC Chief Engineer's Council by end of summer 2004
- Distribution in 2005



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Questions and Answers

