Lighting Efficiencies for Bridges Spanning Navigable Water

Presented by:
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Western Bridge Engineers' Seminar
Portland, OR
September 6, 2017

Sealite®

Western Bridge Engineers' Seminar

Welcome

- **Sealite Background**
- **Marking Solutions**
- **Approval Process**
- **Applications: Case Studies**
- **Additional Lighting Considerations**
  - **Control/Monitoring**
  - **Obstruction Lighting**
  - **New Technologies**

About Sealite

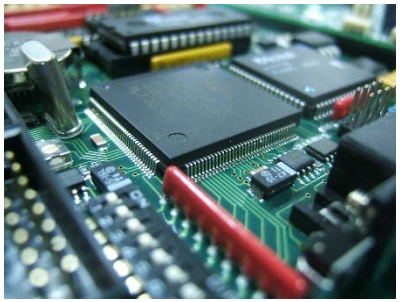
- **Global manufacturer; 2 brands**
- **Established: 1982**
- **Locations: United States, Australia, Singapore, United Kingdom**
- **Strategic focus: In-sourced design & production**

About Sealite

- **Corporate Headquarters: Australia**
- **Manufacturing facility: 50,000 s.f.+**
- **Representation: 110+ countries**

Sealite USA Territorial Responsibility

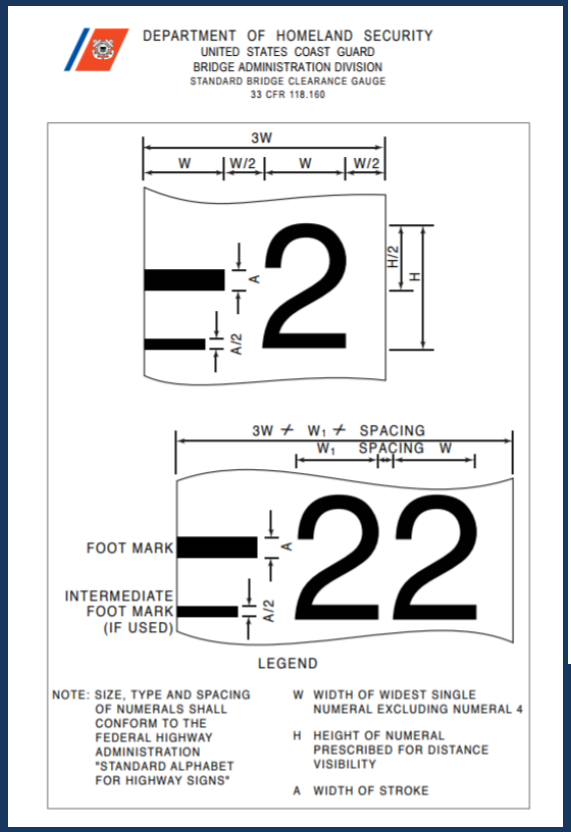
- **Central location: New Hampshire**
- **Fulfilment and manufacturing**
- **Geographic markets:**
  North, Central and South America

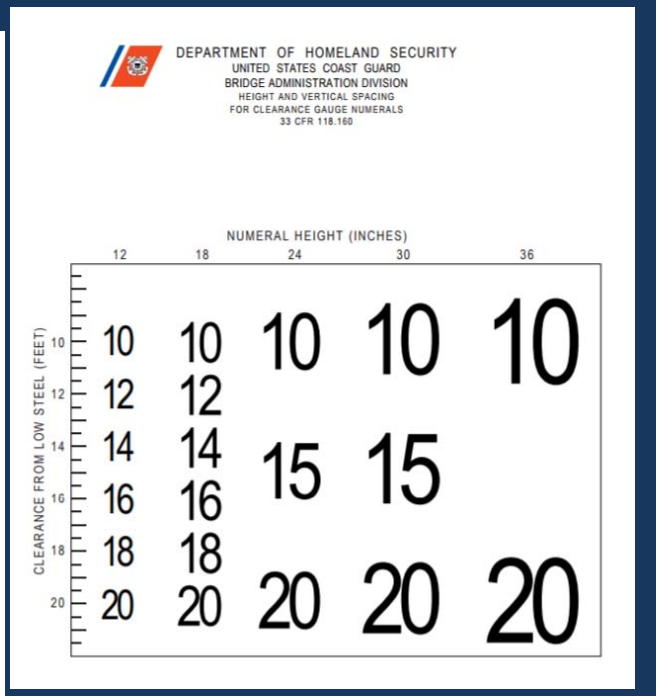


Marking Solutions/1

- Solar Solutions
- Main Powered Solutions
- Remote Monitoring
- Reliability/Redundancy
- Centralized or Individual Photo Cells
- Fault Indicator Lights
- Day Marks
- Bridge Gauges
- RACONS
- Fog Sensors
- Centralized Communication Enclosures
- Switches for Moveable Bridges

Marking Solutions/2





Approval Process/1

1. **USCG: District Level**
2. **Submit Plan**
3. **Timeline**

Approval Process/2

Responsibility: Project Engineer

Process: Submit Bridge Lighting Plan
Project Overview, Scope of Work

Application: New Bridge: Submit Bridge Lighting Plan
Full engineering drawings or not!

Light Replacement:
Must remain lit or Temp Light

Timeframe: 1 hour to a few weeks depending on complexity

Approval Process/3

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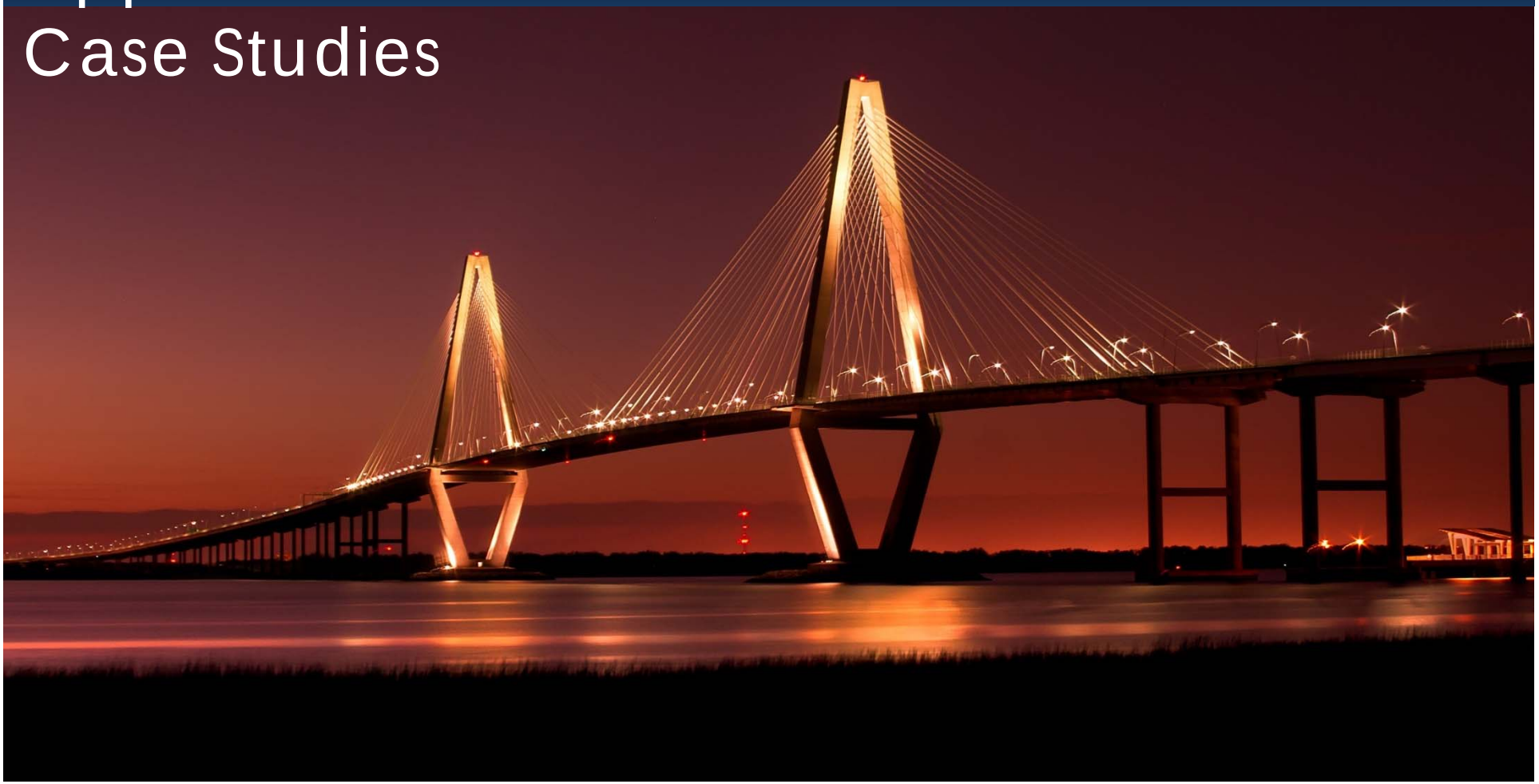
Applications:
Case Studies



Millard E. Tydings Bridge

Millard E. Tydings Bridge

Application Details

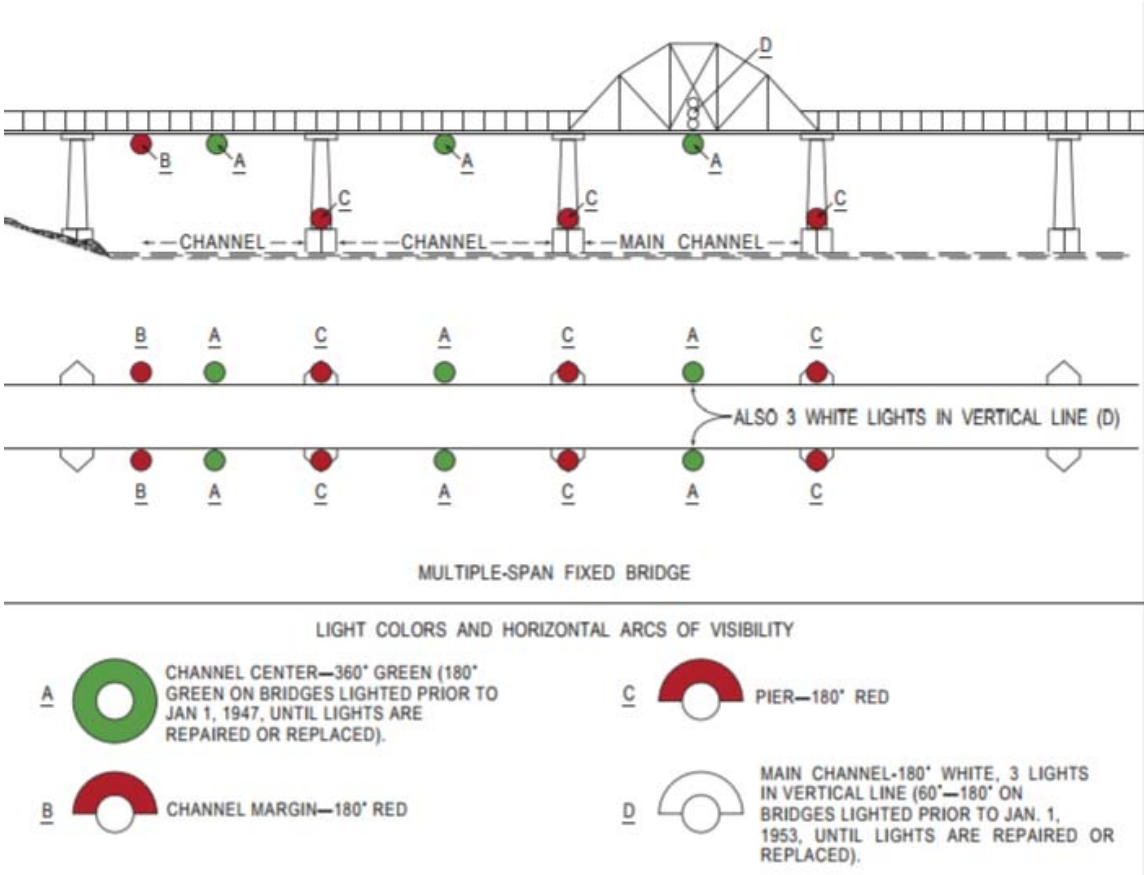
PROJECT OVERVIEW	
Region:	Mid Atlantic
Date:	2016
Site:	I-95 over Susquehanna River
Product:	SL-BR, Power Supplies, Mounts*
Application:	Fixed Bridge Over Navigable River

Lights: 8 red, 6 green, 6 white
Power Supplies: 2x40w, 6 x 10w
Mounts: 12 swing arm (gr/wh); 4 wall, 2 post

OPPORTUNITY/SOLUTION
• Navigation Lights 1-2nm
• 1 Preferred Nav Channel
• Mulitple Nav Channels Available
• Long Bridge Span
• Eliminate installation challenges (cable & conduit between lights)

Millard E. Tydings Bridge

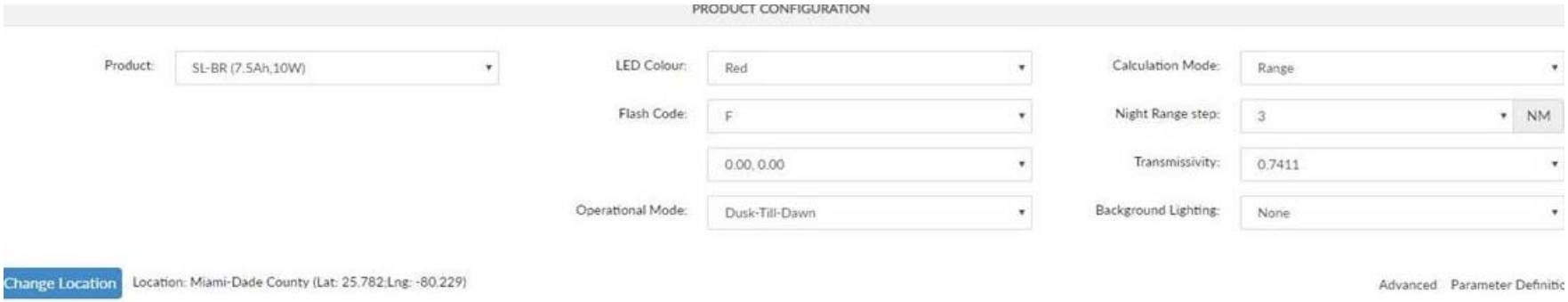
USCG Minimum Lighting Requirements for Fixed Bridges



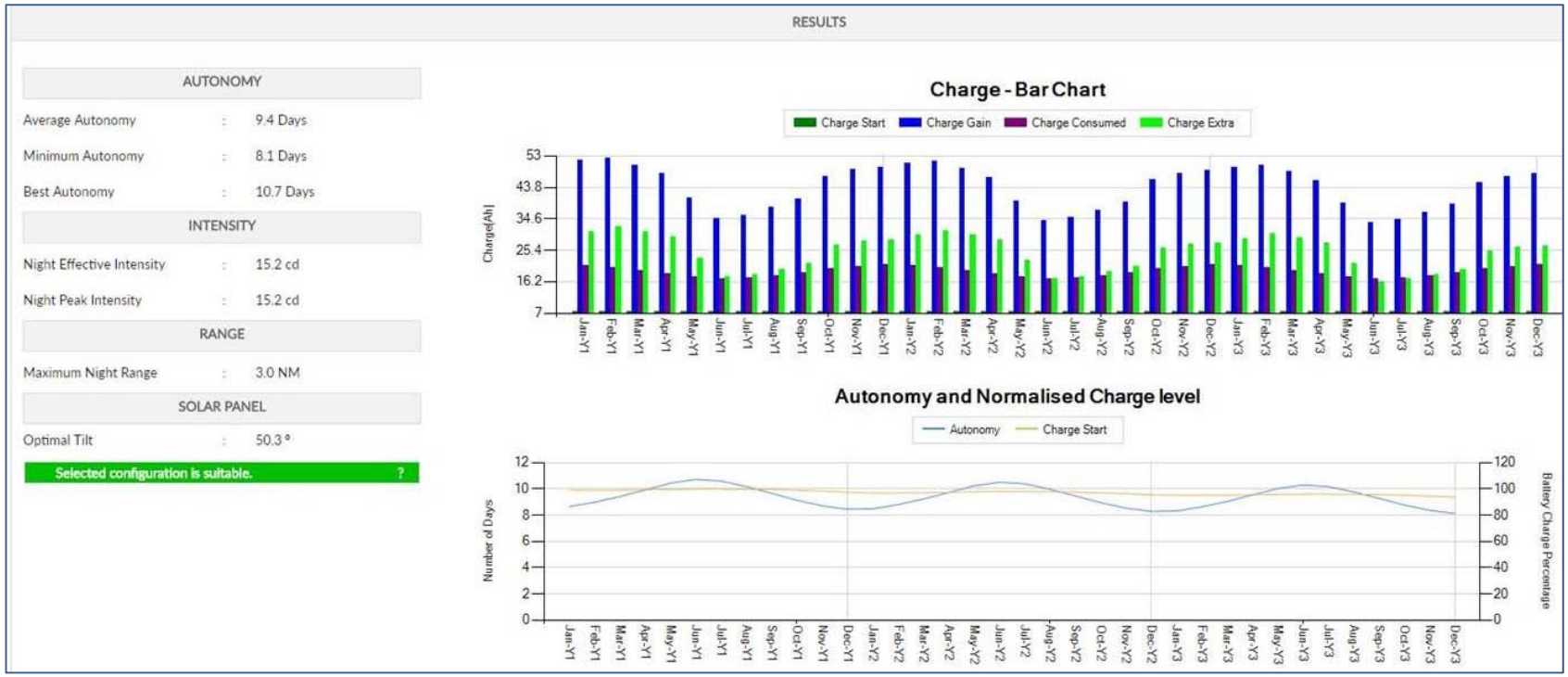
Solar Calculations/1

Solar Calculator

- Web application
- User configurable
- Calculates Autonomy
  - minimum autonomy for location
  - battery capacity
- Results/Performance
  - viability
  - charge/discharge data



Solar Calculations/2



Above: **Optimal "charging" months:**
Amount of charge provided by the solar system must exceed discharge

Francis Scott Key Bridge

Francis Scott Key Bridge

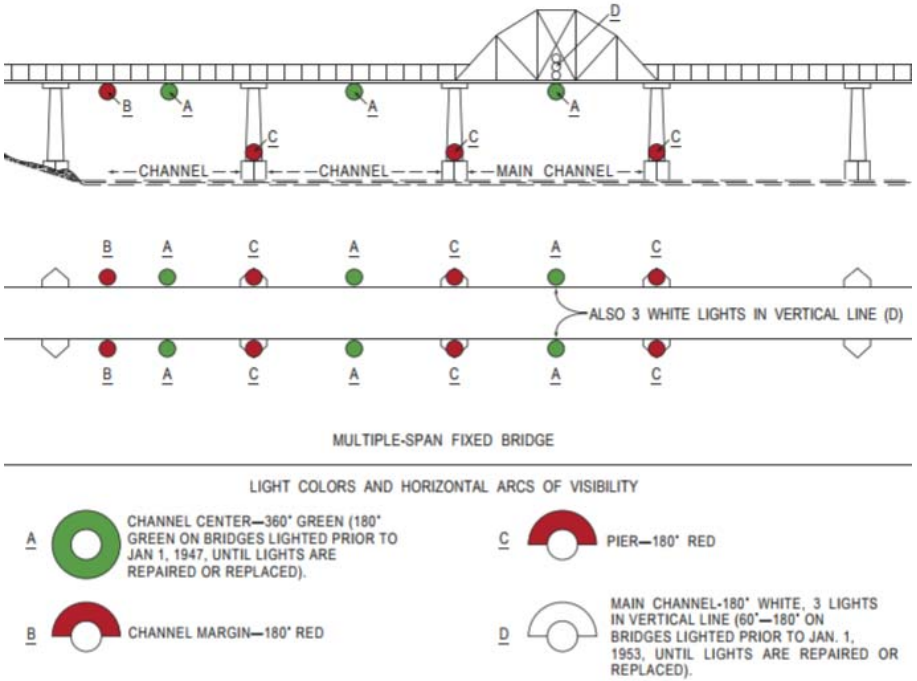
Application Details

PROJECT OVERVIEW	
Region:	Mid-Atlantic, United States
Date:	Spring, 2015
Site:	Baltimore, Maryland over Patapsco River
Product:	3-5nm Lights, Solar Panels, Power Supplies, Batteries, Mounting Hardware, Central Photoelectric Control
Application:	Fixed Bridge over Navigable Water

OPPORTUNITY/SOLUTION
• Bridge Nav Lighting Visible Against Confusing Background Lighting
• Visibility 5+ miles
• Custom Power
• Custom Mount
• Custom Shielding

Francis Scott Key Bridge

USCG Minimum Lighting Requirements for Fixed Bridges



Tar Heel/David B. Melvin Bridge

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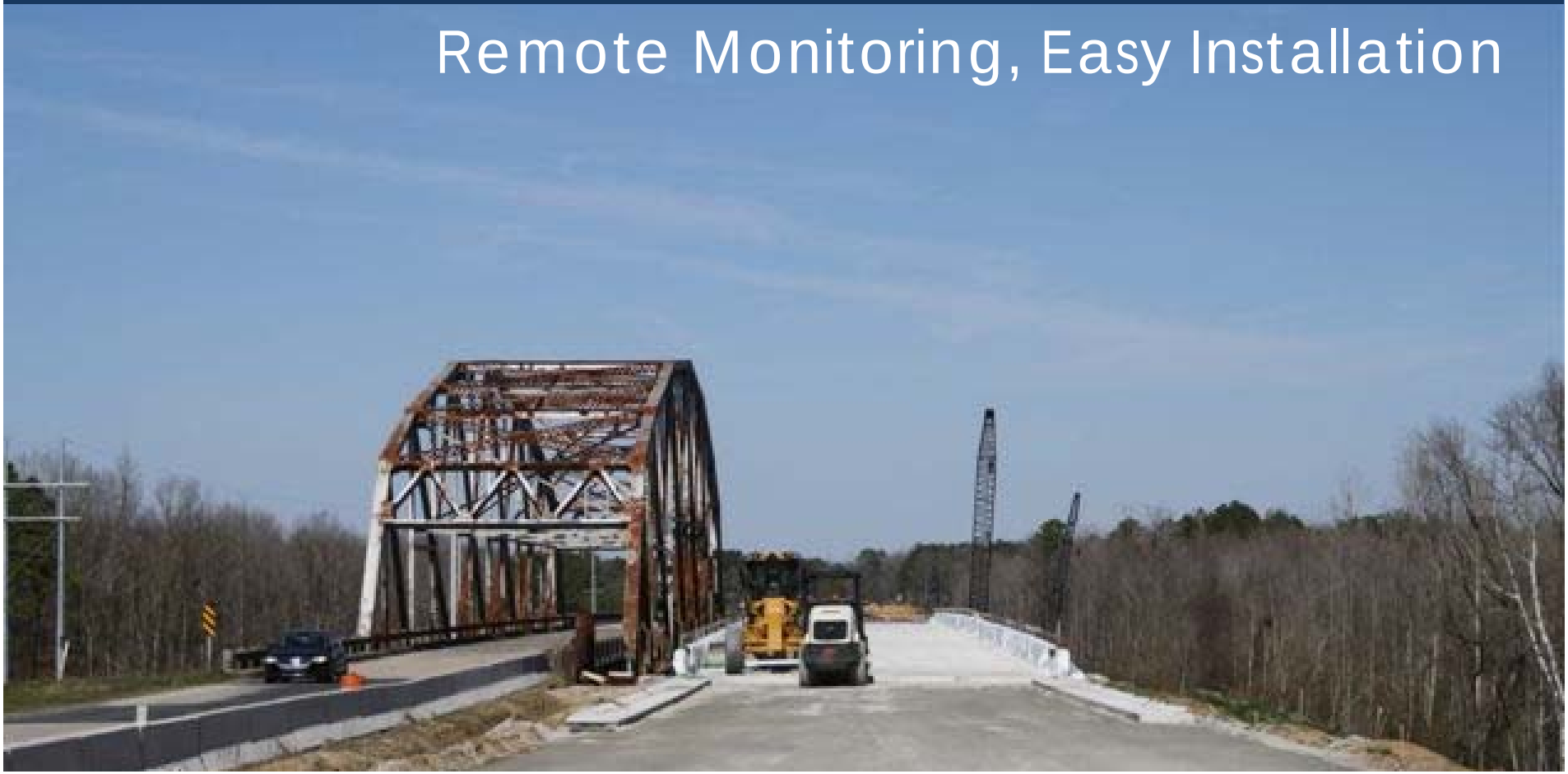
Remote Monitoring, Easy Installation



Tar Heel/David B. Melvin Bridge

Application Details

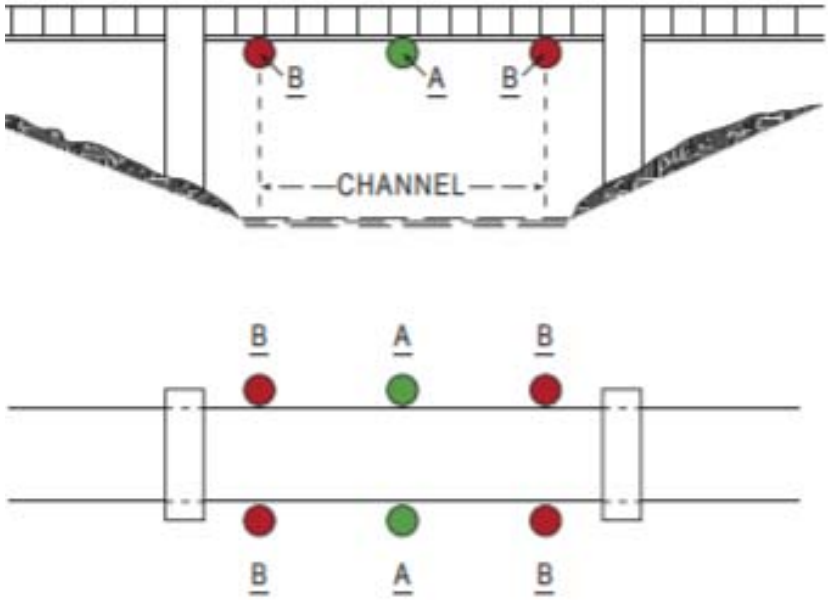
PROJECT OVERVIEW
Region: Southeast United States
Date: Fall 2016
Site: Tar Heel, North Carolina over Cape Fear River
Product: SL-BR Red & Green, Solar Panels, Solar Power Supplies, Standalone GSM Monitoring
Application: Fixed Bridge over Navigable Water

OPPORTUNITY/SOLUTION
• Difficult to reach: GSM Monitoring
• Utility Cost Reduction: Solar Power
• Easy Replacement/Installation of New Lighting: Solar Power
• Automatic Operation: Dawn to Dusk

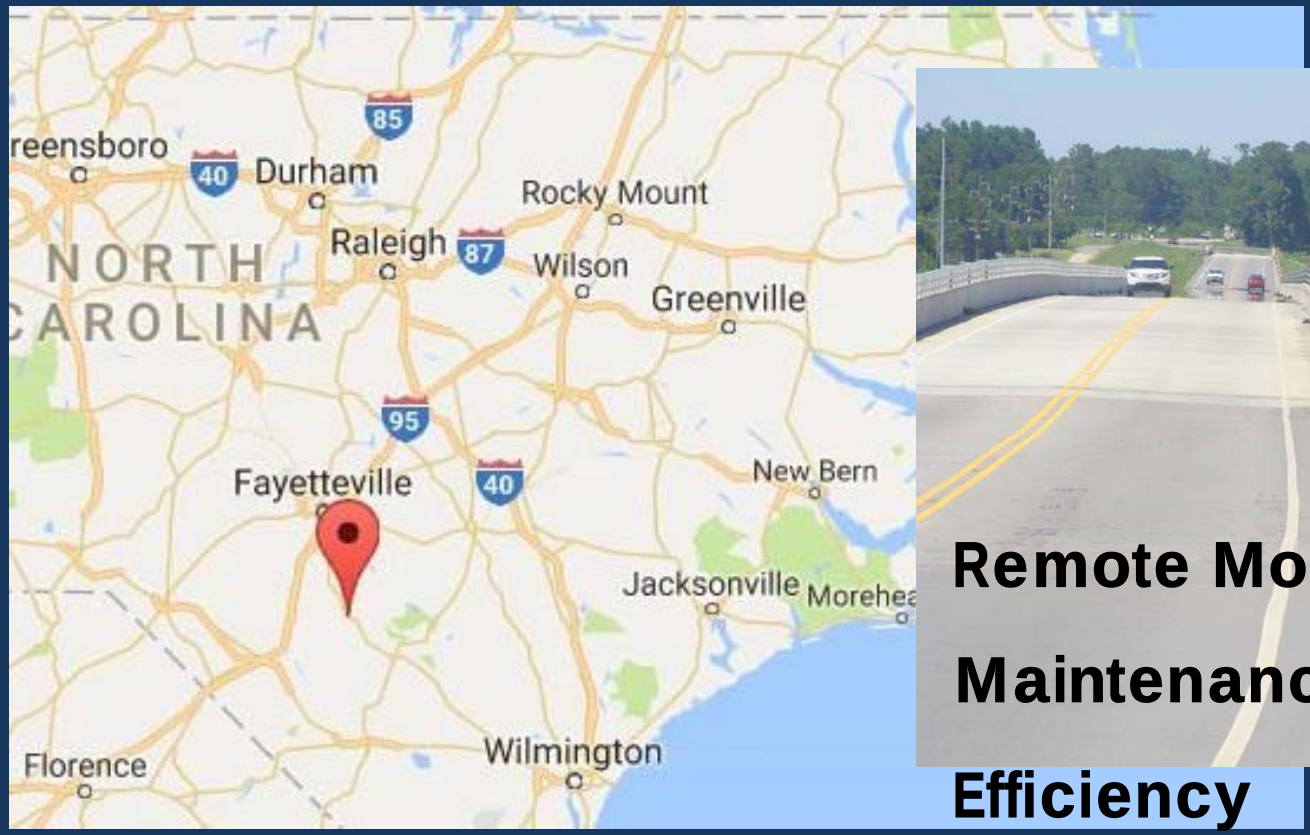
Tar Heel/David B. Melvin Bridge

USCG Minimum Lighting

Requirements for Fixed Bridges



Tar Heel/David B. Melvin Bridge



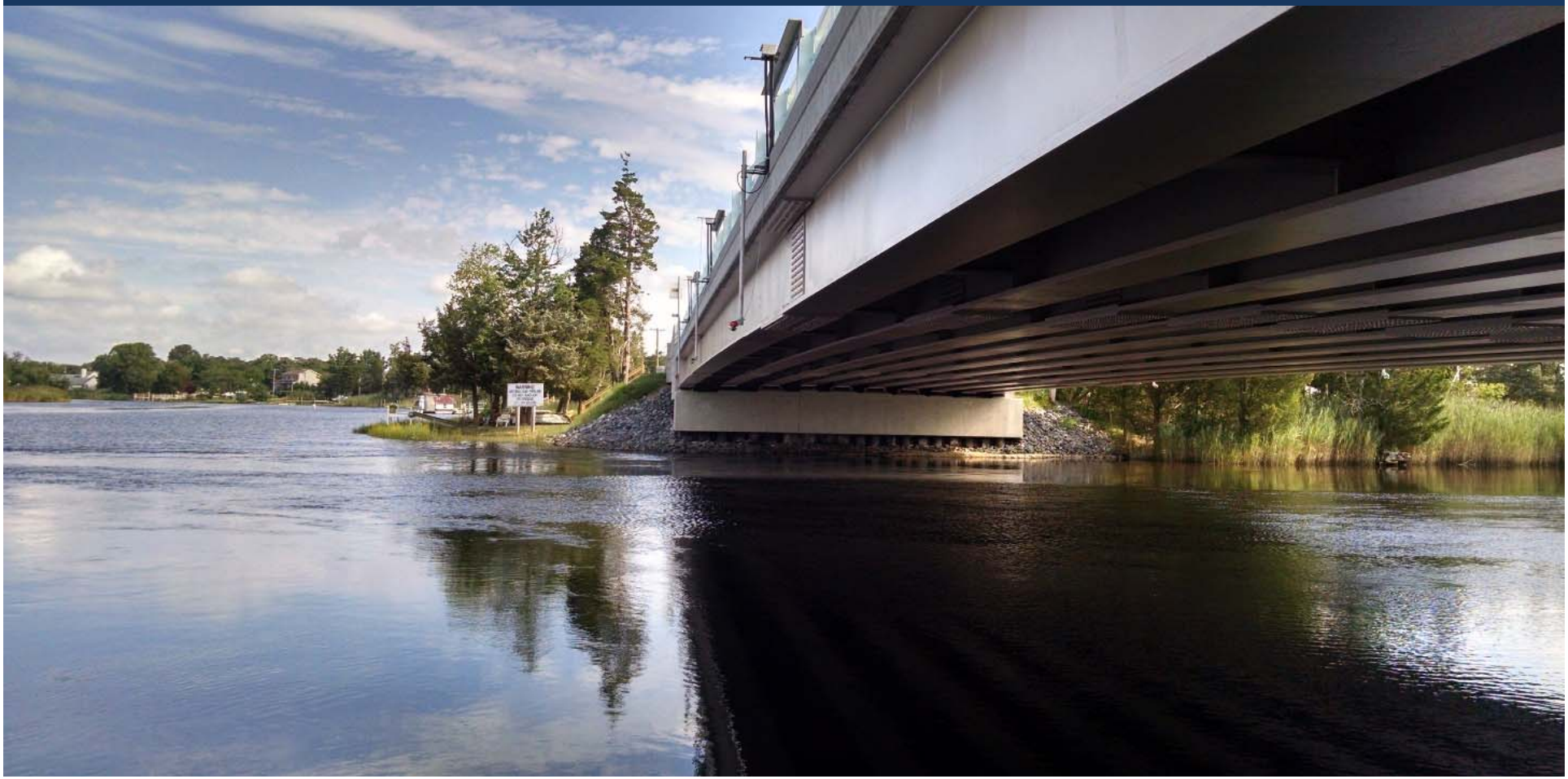
Remote Monitoring

Maintenance

Efficiency

Tar Heel/David B. Melvin Bridge

Tuckahoe Bridge



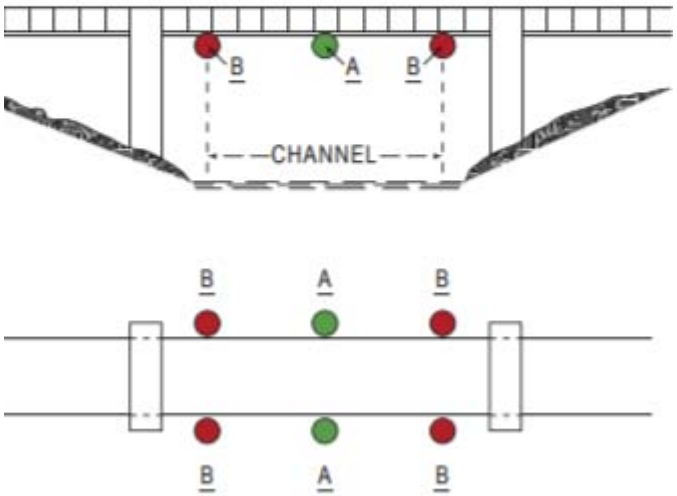
Tuckahoe Bridge

Application Details

PROJECT OVERVIEW	
Region:	Mid-Atlantic, United States
Date:	Summer, 2017
Site:	New Jersey
Product:	SL-BR, Solar Panels, Back-up Battery with Fail-Over from Mains Power, Blue Fault Indicator Light, GSM Monitoring
Application:	Fixed Bridge over Navigable Water

OPPORTUNITY/SOLUTION
• Fully Integrated Lighting System
• A/C Power w/Battery Back-up
• Fault/Remote Monitoring
• Single Manufacturer Sales & Service Support
• Automatic Nighttime Operation

Tuckahoe Bridge



Sealite

Bid Specifications

750.02.01 Navigation Lights

A. Provide LED-type navigation lights of sufficient candlepower as to be visible against the background lighting at a minimum distance of 2000 yards (1.8 km) 1 Nautical Mile, 90% of the nights of the year. Use optically aligned lamp and lens of such design to provide this visibility.

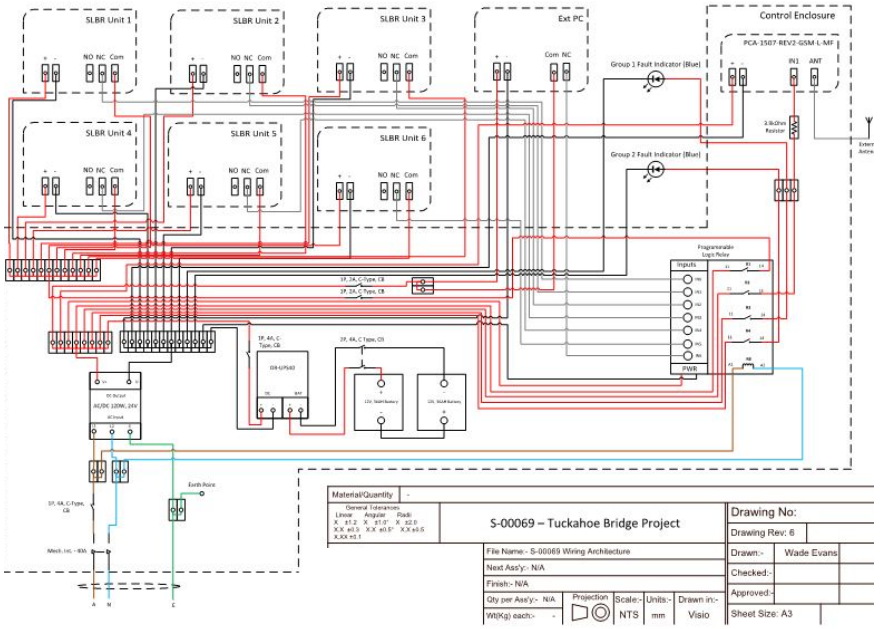
B. Design navigation light system to operate directly at 24VDC nominal from a battery and charger sourced as part of the service entrance cabinet. See 750.02.05 Battery and Battery Charger. (part of **750.02.03)**

C. Navigation light fixtures are herein defined as assemblies consisting of LED type lantern with integral driver/power supply and pendant-type swing arm assembly designed and manufactured by a single manufacturer.

D. Subject to compliance with all of the requirements of this specification, active membership in IALA or other national or international association of manufacturers such as ISO and approval by the RE provide navigation light fixtures manufactured by:

B. The signal light shall be a low-profile, LED type with blue lens, rated NEMA 4X with an operating temperature rating to -20 degrees C. The light shall be fitted with an integral ½ inch NPT threaded opening for pipe-mounting. The LED array shall be rated 24VDC. The lens shall be protected with a wire guard as provided by the manufacturer of the signal light. The manufacturer of the navigation light fixture shall provide the signal light and pipe mount either as part of the complete assembly or as a separate field-mounted item with all necessary fittings for connecting the signal light wiring to the lantern fault relay contact.

Tuckahoe Bridge



Additional Bridge Lighting Considerations/1

Material Considerations

Sectored Bridge Light

Additional Bridge Lighting Considerations/2

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Solar Obstruction Lighting

Avlite

Additional Bridge Lighting Considerations/3

Smart Bridges

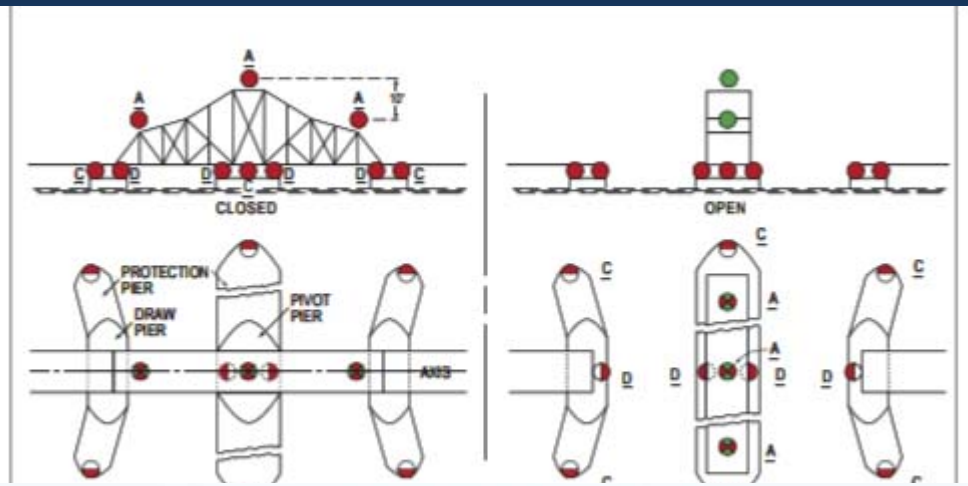
- AC powered lights
- DC backups
- Remote real-time monitoring
- Environmental sensors broadcasting to marine information system network to enhance vessel safety while transiting bridges
- Completely integrated systems with monitoring and control of sensors, lights, and even security systems (motion sensors, cameras, etc.)

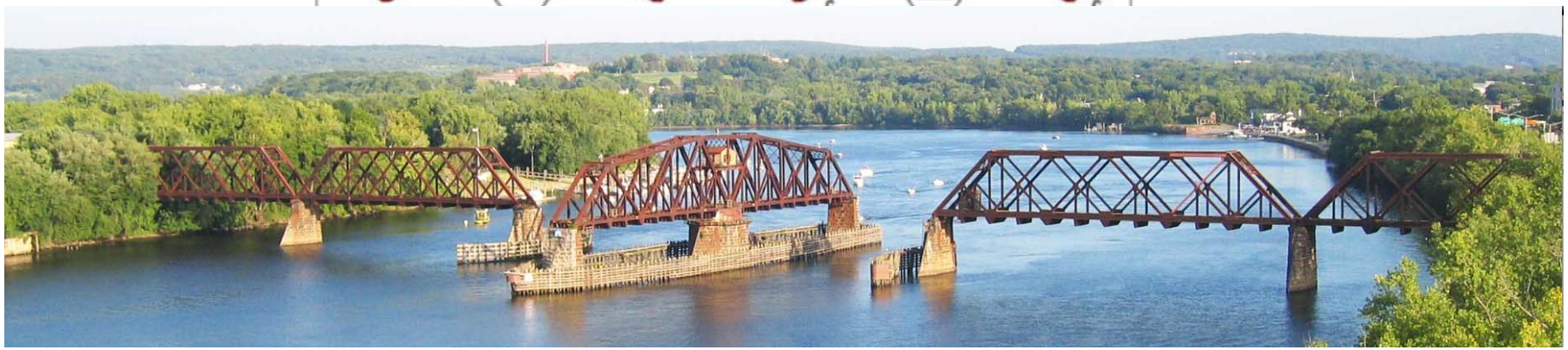
Additional Bridge Lighting Considerations/4

Day Marks

Different Bridges/Different Requirements/1

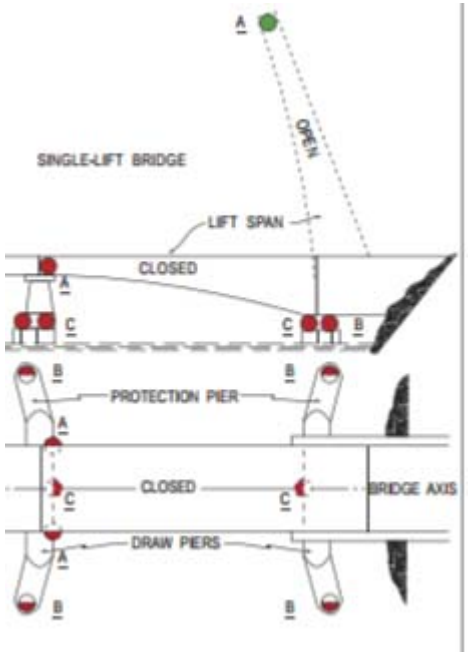
Swing Bridge





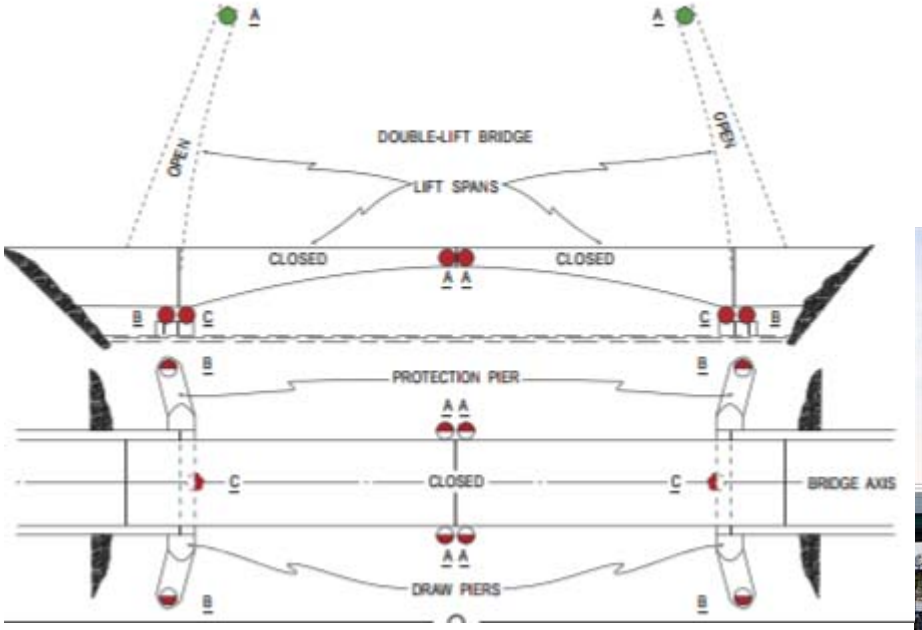
Different Bridges/Different Requirements/2

Single Lift Bridge



Different Bridges/Different Requirements/3

Double Lift Bridge



Reference Sites

- USCG

  Office of Bridge Administration:

  Bridge Lighting and Other Signals

- Sealite – Bridge Lighting

- Avlite Systems – Obstruction Lighting

Thank you!

Questions?

Appreciate your time!