The Peace Bridge Rehabilitation Project

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PRESENTATION AGENDA

- 2011 Deck Study Overview
- Project Justification
- Deck Study Alternatives
- Increasing Operational Efficiency
- Project Improvements
2011 FEASIBILITY STUDY

Why was the study commissioned?

- Negative impacts of deck service levels on travel and trade
- Overlay exceeding expected service life
- Concrete deck degradation and delamination
- Failing deck joints
- Deteriorating sidewalks and railing
Goals of the Study

- Identify methods to replace or rehabilitate the deck
- Evaluate the implications of replacement vs. rehabilitation
- Estimate potential traffic diversions, if any
- Determine optimal capital outlay approach
Key Considerations

- Capacity Expansion Project
- Remaining service life of components
- Increase load capacity
- Structural repairs
- Increasing operationally efficiency
- Daytime vs. night-time construction
Study Conclusion and Recommendation

- **Expected Delay of Second Bridge (Years)**
  - **0-10**: Do not invest in major rehabilitation program – not a valued return on investment
  - **10-20**: Deck rehabilitation alternative – acceptable return on investment
  - **20+**: Deck replacement alternative – limited or no confidence in expansion project
PROJECT JUSTIFICATION

More than just a deck replacement...

Curb Stringers
Sidewalks
Expansion Joints
Truss Cantilever Straps
Fascia Stringers
Railings
Risk grows exponentially...

![Diagram showing the project justification for the Peace Bridge re-decking project. The diagram illustrates the exponential increase in risk associated with the structural deck and wearing surface over years of service. The recommended rehabilitation horizon is indicated by a shaded area, suggesting the need for preventive maintenance.]
Traffic volume at historic lows...

- Passenger Vehicles
- Commercial Vehicles
- Total Vehicles

Volume (000's)

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What was proposed?

- Identified preferred deck type
- Refined options – optimized for traffic:
  - Daytime construction
  - Nighttime construction
  - Rehabilitation
- Detailed inventory of steel repair needs
- Updated life-cycle cost estimate
Option 1
Daytime Replacement
Traffic Volume (Cars and Trucks)

Option 1

Much Less Traffic
DECK STUDY ALTERNATIVES

Construction Process:

- Deck Removal
- Grid Deck Installation
- Steel Repairs
- Concrete Pour

Option 1

Planning for re-decking of the Peace Bridge
Cast In Place Concrete Filled Steel Grid Deck – 3 Seasons

Advantages:

- Lightweight
- Good durability
- No construction joints
- Cost effective steel repairs
- Ability to work multiple shifts

Disadvantages:

- Full time lane closures
- Public misperception of traffic impacts
Option 2
Nighttime Replacement
DECK STUDY ALTERNATIVES

Construction Process:

Option 2

Steel Repairs

Sawcut/Deck Removal

Continuous Overlay

Deck Installation and Grouting
Precast Concrete Filled Steel Grid Deck – 2 Extended Seasons

Advantages:
- Lightweight
- Good durability
- Minimal traffic disruption

Disadvantages:
- Construction joints
- Risk associated with delayed opening
- More costly (~20% more than Option 1)
- Inability to perform all structural upgrades
Option 3
Nighttime Rehabilitation
Construction Process:

Option 3

- **Daytime**
- **Steel Repairs**
- **Overlay Removal**
- **9 PM - 10 PM**
- **10 PM - 11 PM**
- **11 PM - 12 AM**
- **12 AM - 1 AM**
- **1 AM - 2 AM**
- **2 AM - 3 AM**
- **3 AM - 4 AM**
- **4 AM - 5 AM**
- **Daytime**

- **Full and Partial Depth Deck Repairs / Temporary Steel Plates**
- **Continuous Overlay**

Planning for re-decking of the Peace Bridge
Rehabilitation – 1.5 years

Advantages:

- Lowest initial cost
- Minimal traffic disruption

Disadvantages:

- Short term solution
- Requires replacement in 20 years
- Increasing maintenance intensity
- Difficult to identify precise scope of repairs
- No opportunity to perform all structural upgrades
Life Cycle Costs:

Lifecycle Evaluation Period: **100 years**
Base Year for Expense Costs: **2016**
Year of Initial Rehabilitation: **2015**
Real Rate of Return **1.74%**
   US Treasury 5-year Yield / BLS PPI HC
   Monte Carlo Analysis (10,000 iterations)
Confidence Interval: **75%**

**Option 1:** Daytime Deck Replacement: $100.0 M
**Option 2:** Nighttime Deck Replacement: $121.0 M
**Option 3:** Repair and Overlay Existing Deck: $110.0 M
INCREASING OPERATIONAL EFFICIENCY

Planning for re-decking of the Peace Bridge
INCREASING OPERATIONAL EFFICIENCY

Previous U.S. Plaza Capacity

- 142 Cars
- 28 Trucks

“Pinch” Point
INCREASING OPERATIONAL EFFICIENCY

Widened U.S. Plaza Capacity

20% More Cars
170 Cars

50% More Trucks
43 Trucks

“Pinch” Point
Canadian Approach

- Trucks caught in auto traffic (↑)
- Empty truck inspection plaza (↑↑)
- Inability to access NEXUS lanes
- Conflicts exacerbated during construction
INCREASING OPERATIONAL EFFICIENCY

Previous

- Three travel lanes
- Sidewalk

Widened

- Four travel lanes
- Service path (PBA staff only)
- Bikeway/sidewalk

Planning for re-decking of the Peace Bridge
PROJECT IMPROVEMENTS

Bikeway

“Every transportation agency has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems.”

Ray LaHood,
United States Secretary of Transportation

To strive for our vision of a more cycling-friendly Ontario, we need to work in partnership – across ministries, with municipalities, schools, transit agencies, cycling associations, tourism organizations, drivers, health promotion agencies, and many others. There’s a role for everyone.

Glen Murray
Minister of Transportation, Minister of Infrastructure
PROJECT IMPROVEMENTS

- Bikeway
- Pedestrian separation
- Decorative features

- Observation platform
- River flow viewing
- Facts and history
- Historic light posts
PROJECT IMPROVEMENTS

- Architectural overhead lane control gantries
- Intelligent system with dedicated lanes
The Peace Bridge Rehabilitation Project
Supplemental Slides
Peace Bridge Components