Rehabilitation of the County Road 11 Bridge

Town of Gouverneur
St. Lawrence County, New York

By: Thomas Butler
Stantec Consulting Services
October 2006

St. Lawrence County Department of Highways
General Project Information

Project Location
General Project Information
General Project Information
General Project Information
General Project Information

- Serves traffic between the Village of Gouverneur and points north of the river
- Rural Minor Collector Road
- Owned and maintained by St. Lawrence County
Existing Bridge

Formwork for 1929 Bridge Construction
Existing Bridge

September 2003
Existing Bridge

Concrete Thrust Block / Foundation

Ledge Rock
Existing Bridge

- Abutments and piers constructed to be similar in configuration
Existing Bridge

- Spill-through abutments

South Abutment

- Voids filled at north abutment

North Abutment
Existing Bridge

Completed 1929 Bridge
Existing Bridge

1984 Bridge Rehabilitation
Bridge Significance

Existing Bridge

- Eligible for the National Register of Historic Places
Structural Deficiencies

- Jointed configuration allowed water and de-icing salts to penetrate deck surface
- Existing piers and spandrel walls exhibited significant deterioration
Structural Deficiencies

- Additional deck slab increased dead load of the structure

- Flexural cracking was evident at each spandrel column
Functional Deficiencies

- Non-standard travel lane and shoulder widths
Functional Deficiencies

- Rock outcrops and non-standard roadway geometry limited sight distance and encroached on desired clear zone.
Design Concept
Approach Span Reconstruction

- Removal of existing superstructure
- Removal and replacement of abutments and piers
- Construction of new wingwalls
- Deck slab construction
Core Sampling and Analysis

- Concrete cores extracted and tested
- Poor durability, no air entrainment, high compressive strength
Main Span Rehabilitation

- Removal and replacement of deck slab and railing system
- Removal and replacement of spandrel columns
- Rehabilitation of arch barrel
Main Span Rehabilitation

- Removal and replacement of deteriorated concrete
- Application of penetrating sealer
Main Span Rehabilitation

- Bridge width increased
- Curbless configuration

Transverse Section

- Main span constructed to be jointless

Section @ Pier
Main Span Rehabilitation

- Columns similar to existing
- Inspection access maintained
Correcting Functional Deficiencies

Existing Bridge

Potential Realignment
Correcting Functional Deficiencies

- Travel lane and shoulder widths increased
- Roadway raised at bridge
- Superelevation improved
Correcting Functional Deficiencies

- Transition between curves improved
- Rock outcrops cut back to gain clear zone width
Construction
Construction
Construction
Construction

- Abutments constructed concurrently with spandrel columns

South Abutment

North Abutment
Front row of piles driven to top of existing foundation

South Abutment
Construction

Spandrel Wall Demolition
Construction

Spandrel Column Construction
Construction

Deck construction utilized removable formwork

Placing Forms

Underside of Formwork
Construction

Bracing of Approach Span Formwork
Construction

Water Curing of Deck Slab
Construction

- Segmental block retaining wall

Existing Access Road

Wall Construction

Completed Wall
Lessons Learned
Lessons Learned

Section at Pier

Typical Pier Cracking
Lessons Learned

Cracking of Fascia at Joint
Outstanding Features

East Elevation
Interesting Facts

1854 Original Crossing

1854 Crossing
$285

1929 Replacement Bridge

1929 Replacement
$50,000

2005 Rehabilitation

2005 Rehabilitation
$1,650,000