



The Corporation of the Municipality of
Central Elgin

Report

DATE:	April 21, 2009	REPORT:	PW-36-09
TO:	Her Worship the Mayor and Council		
PREPARED BY:	Scott Mathers Assistant Director of Physical Services		
SUBJECT:	Brouwers Line – Bridge Structure No. 414		
TO COUNCIL:	April 27, 2009		

RECOMMENDATION:

THAT the Council of the Corporation of the Municipality of Central Elgin appoint Dillon Consulting Limited the detailed engineering design and contract administration for the rehabilitation of Bridge Structure No. 414 on Brouwers Line in the amount of \$119,800;

AND THAT reserved funding from the “Investing in Ontario Fund” be used to subsidize the engineering work;

AND THAT BYLAW NO.1130 restricting the weight of vehicles passing over Brouwers Line Bridge Structure No. 414 be considered.

REPORT:

As part of the Brouwers Line Environmental Assessment project, Dillon Consulting completed a structural load evaluation on bridge No.414 which is located on Brouwers Line 900m west of Tisdale Road crossing Catfish Creek. Dillon Consulting’s evaluation found severe corrosion and structural problems with the bridge. The evaluation concluded that further load restriction should be placed on the bridge and recommended a load restriction limiting vehicles to those weighing less than 5 tonnes. This load restriction will adversely impact winter control operations and school bus service on Brouwers Line as these vehicles weigh in excess of 5 tonnes.

Dillon Consulting has provided Staff with a work plan to undertake the detailed engineering design and contract administration for the rehabilitation of the bridge structure. Rehabilitation of the existing structure is preferred because the work is both cost effective and will extend the design life of the structure by approximately 40 years. When the bridge has reached the end of its design life it will be replaced by a two lane bridge. The Brouwers Line road design will accommodate the ultimate two lane bridge replacement.

A preliminary estimate of the rehabilitation cost of the Bridge No. 414 is \$400,000. The current estimated replacement cost of a two lane bridge is 1.33 million dollars. The



municipality received \$796,006 from the provincial government's Investing in Ontario program which is currently being held in reserve which can be applied to this project. The Brouwers Line Bridge Structure No. 414 rehabilitation work will not impact the capital budget.

Prepared by:

Approved by:

Approved for Council by:



Scott G. Mathers
Assistant Director of Physical
Services



Lloyd J. Perrin
Director of Physical Services

Donald N. Leitch
C.A.O. and Clerk

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MAR 31 2009

Municipality of Central Elgin
PER: _____ TIME: _____

By-Law 1130 - Schedule "A"

March 30, 2009

Municipality of Central Elgin
450 Sunset Drive, 1st Floor
St. Thomas, Ontario
N5R 5V1

Attention: Mr. Lloyd Perrin, CET
Director of Physical Services

Municipality of Central Elgin
Brouwers East – Bridge No. 414 over Catfish Creek

Dear Mr. Perrin:

As discussed, this letter provides our finding, concerns and proposed course of action related to the traffic load capacity of Bridge No. 414 on Brouwers Line East.

During our visual inspection of the bridge on February 24, 2009, we made the following observations:

- Severe corrosion of the exterior stringers, cross bracing, and bottom chord connection at the west abutment. The bottom chord connection deterioration at the west abutments was likely due to leaking expansion joint.
- The steel members above the east abutment, the end where the span is fixed, were also corroding but to a lesser extent than the west abutment. Two vertical truss members are in poor condition, with 50 to 60% section loss. Some lacings from the top chord diagonal members have 50 to 90% section loss.
- The abutments and wingwalls have several delaminated and spalled areas.
- Flex beam guide rails are used at the approaches and on the bridge. Flex beams on the bridge are of unknown performance level, and the length of approach guide rails is substandard.
- We observed that there is a triple load posting (8/14/21 tonnes) in place at this location.

Due to accessibility restrictions, our visual inspection was limited to determining the condition (section loss) of the main truss members and their critical connections. Despite these restrictions, it was apparent that the rivets connecting the diagonal compression chords and the bottom tension chords at the west abutment have suffered considerable section loss. The diagonal compression chords, the bottom tension chords and the connection rivets are classified as 'single-load-path' members. Failure to any of the single-load-path members will lead to collapse of the entire superstructure.

We have carried out an evaluation of the load capacity of the bridge based on the estimated section loss from our visual inspection, and in accordance with the Evaluation Section of the

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Limited

2006 Canadian Highway Bridge Design Code. Although most of the truss members have more than sufficient capacity to support the load posting, **the riveted connections at the west abutment found to be inadequate to support the current triple load posting.** We could only confirm 12 of the 22 rivets connecting each bottom chord are fully functional (i.e., 6 of the 11 rivets per bottom chord angle, with 2 angles per chord). The other 10 rivets are in poor condition as we observed those rivet heads crumbling under a light hammer tap. Our analysis suggests that **the bridge should be posted for a load limit of 5 tonnes live load**, until the appropriate corrective action is taken.

Further to our discussions on March 25, 2009, we have examined the effect of this reduced load limit on school buses based on the information we received from Murphy Line and Pearson Bus. Since the curb weight of a school bus is approximately 8.4 tonnes and the gross vehicle weight approximately 13.7 tonnes, the existing structure is therefore not suitable for use by school buses.

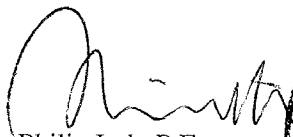
We recommend that the Municipality expedite the following actions:

- Post the new load limit.
- Advise emergency services, school boards, school bus operators, the Municipality of Central Elgin, the City of St. Thomas, nearby businesses, the Ontario Trucking Association and the public of the new load limit.

If you have any questions regarding this structure, please do not hesitate to contact us.

Yours sincerely,

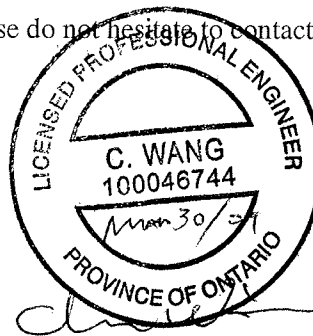
DILLON CONSULTING LIMITED

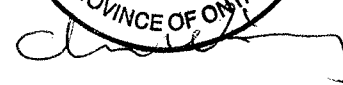

Philip Loh, P.Eng.
for Brian Huston, P.Eng.
Project Manager



PLL/JCL:lpt

Our File: 08-1028




Chun Wang, P.Eng.
Structural Engineer