

Project Title BURLINGTON LIFT BRIDGE
 STEEL PANEL REPLACEMENT

Project Number R.012843.055

Project Date 2014-01-24

END OF SECTION

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END OF SECTION

Part 1 General

1.1 MINIMUM STANDARDS

- .1 Execute work to meet or exceed:
 - .1 CSA S6 PACKAGE - Consists of CAN/CSA-S6-06, Canadian Highway Bridge Design Code; S6S1-10, Supplement #1; S6S2-11, Supplement #2 and S6S3-13, Supplement #3 to CAN/CSA-S6-06, Canadian Highway Bridge Design Code.
 - .2 CSA S6.1 PACKAGE - Consists of S6.1-06, Commentary on CAN/CSA-S6-06, Canadian Highway Bridge Design Code, S6.1S1-10, Supplement #1, S6.1S2-11, Supplement #2 and S6.1S3-13, Supplement #3 to S6.1-06, Commentary on CAN/CSA-S6-06, Canadian Highway Bridge Design Code
 - .3 National Building Code of Canada 2010, National Fire Code of Canada 2010, Ontario Building Code 2012 and any other code of provincial or local application, including all amendments up to project date, provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
 - .4 Rules and regulations of authorities having jurisdiction.
 - .5 Federal Fire Commissioner, No. 301, Standard for Construction Operations, and No. 302, Standard for Welding and Cutting, June 1982.
 - .6 Treasury Board of Canada Secretariat, Fire Protection Standard, April 1, 2010.
 - .7 Observe and enforce construction safety measures required by National Building Code 2010, Part 8 Safety Measures at Construction and Demolition Sites, Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended by O. Reg. 631/94, O. Reg. 143/99, O. Reg. 571/99, O. Reg. 145/00, O. Reg. 527/00, R.R.O. 1990, Reg. 834, O. Reg. 278/05 (Asbestos), Workplace Safety and Insurance Board and municipal statutes and authorities.
 - .8 Environmental Protection Act, O. Reg. 102/94 and O. Reg. 103/94.

1.2 AUTHORITIES HAVING JURISDICTION

- .1 The Federal Fire Commissioner is the sole authority having jurisdiction over this project with regards fire standards.

1.3 TAXES

- .1 Pay applicable Federal, Provincial and Municipal taxes.

1.4 FEES, PERMITS, CERTIFICATES AND LETTERS

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates, permits and letters required.
- .3 Furnish certificates, permits and letters when requested.

1.5 EXAMINATION

- .1 Examine existing conditions and determine conditions affecting work.

- .2 Measure dimensions of existing bridge deck grating panel to be replaced before fabricating new panel.
- .3 Measure dimensions and locations of supporting stringers and bridge railing post on panel to be removed.

1.6 DOCUMENTS

- .1 Keep one copy of Contract documents and shop drawings on the site.

1.7 ELECTRONIC SUBMISSIONS

- .1 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf, NMS Word format, MS Word, MS Excel, and Autocad dwg files; on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.8 CONTRACTOR'S AS-BUILT DRAWINGS AND SPECIFICATIONS

- .1 As work progresses, neatly record significant deviations from the Contract drawings and specifications using fine, red marker on full size white prints and specifications. Make the same changes on the electronic files.
- .2 Neatly print lettering and numbers in size to match original. Lines may be drawn free-hand but shall be neat and accurate. Add at each title block note: "AS BUILT". Also circle on List of Drawings each title and number of drawing marked with "AS-BUILT" information. Circle on Table of Contents each specification section number and title of specification sections marked with "AS-BUILT" information.
- .3 Departmental Representative will provide one electronic set of drawings, schedules and specifications for as-built drawing and specification purposes.
 - .1 Drawings are in Autocad.
 - .2 Specifications are in NMS Word format.
 - .3 Amendments and addenda are in MS Word.
- .4 Record following significant deviations:
 - .1 Field changes of dimension.
 - .2 Other significant deviations which are concealed in construction and cannot be identified by visual inspection.
 - .3 Alternative materials and systems installed replacing original materials and systems specified by trade name.
- .5 Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work. Submit pdf files on USB compatible with PWGSC encryption requirements, through email or alternate electronic file sharing service such as ftp.
- .6 If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".

1.9 MAINTENANCE DATA

- .1 On completion of project submit to Departmental Representative 3 copies of Operations and Maintenance Data assembled in three 255 x 295 mm vinyl-covered, 3-ring, loose-leaf binders with title sheet labelled "Maintenance Manual", project title, date and list of contents.
- .2 Include maintenance instructions for finished surfaces, warranties and guarantees in form approved by Departmental Representative and complete set of final shop drawings (bound separately), names, addresses and phone numbers of sub-contractors and suppliers, list of materials with names of manufacturer and source of supply. Neatly type lists and rates. Use clear drawings, diagrams or manufacturer's literature.

1.10 SHOP DRAWINGS AND PRODUCT DATA SHEETS

- .1 Prior to submission check and certify as correct, shop drawings and product data sheets. Issue to Departmental Representative each submission at least 14 days before dates reviewed submission will be needed.
- .2 Where technical sections specify that shop drawings bear the stamp of a Registered Professional Engineer, the Engineer must be registered in the Province of Ontario.
- .3 Submit 3 prints and 1 electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .4 Submit 3 prints and 1 electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .5 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept. This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.
- .6 Responsibility for errors, omissions or deviations from requirements of Contract Documents is not relieved by Departmental Representative's review of submittals.

1.11 CONSTRUCTION PHOTOGRAPHS

- .1 Submit electronic and hard copy of colour digital photography in jpg format, standard resolution.
- .2 Identification: name and number of project and date of exposure indicated.
- .3 Number and location of viewpoints determined by Departmental Representative.
- .4 Frequency: as directed by Departmental Representative.

1.12 ADDITIONAL DRAWINGS

- .1 Departmental Representative may furnish additional drawings to clarify work.
- .2 Such drawings become part of Contract Documents.

1.13 PROTECTION

- .1 Protect existing work from damage.
- .2 Protect existing trees and plants on site and adjacent properties.

1.14 EXISTING SERVICES

- .1 Establish location, protect and maintain existing utility lines.

1.15 TEMPORARY FACILITIES AND SERVICES

- .1 Provide and maintain temporary facilities and services required to carry out work.
- .2 Remove temporary facilities and services on completion of work.
- .3 Provide and maintain temperature and enclosure required to prevent weather related damage to work.
- .4 The Contractor shall retain the Area Maintenance Contractor (AMC) presently retained by MTO to perform winter maintenance on bridge approaches during Construction, and to restore bridge approaches to safe, passable condition prior to opening any previously closed lanes.

1.16 METRIC SIZED MATERIALS

- .1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.
- .2 The Contractor is required to provide metric products in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.
- .3 Claims for exemptions from use of metric sized products shall be in writing and fully substantiated with supportive documentation. Promptly submit application to Departmental Representative for consideration and ruling. Non-metric sized products may not be used unless Contractor's application has been approved in writing by the Departmental Representative.
- .4 Difficulties caused by the Contractor's lack of planning and effort to obtain modular metric sized products which are available on the Canadian market will not be considered sufficient reasons for claiming that they cannot be provided.
- .5 Claims for additional costs due to provision of specified modular metric sized products will not be considered.

1.17 MATERIAL AND EQUIPMENT

- .1 Use new products unless otherwise specified.
- .2 Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.

- .3 When material or equipment is specified by standard or performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.18 CUTTING AND REMEDIAL WORK

- .1 Co-ordinate work to keep cutting and remedial work to a minimum.
- .2 Execute cutting and remedial work required. Notify Departmental Representative before cutting, boring or sleeving structural members.
- .3 Use specialists in affected material to execute cutting and remedial work.
- .4 Match work to adjoining construction and finishes.
- .5 Fit components tight to adjoining surfaces.
- .6 Make good surfaces exposed or disturbed by work with material and finish to match existing adjoining surfaces.

1.19 FASTENINGS

- .1 Provide fastenings of type, size and spacing required to assure anchorage.
- .2 Obtain Departmental Representative's permission before using explosive actuated fasteners.

1.20 CO-ORDINATION AND CO-OPERATION

- .1 Bridge site will be operational during execution of work.
- .2 Work area will not be occupied during execution of work.
- .3 Execute work with minimum disturbance to public and normal use of site.
- .4 Maintain access and exits.
- .5 Where security has been reduced by work of Contract, provide temporary means to maintain security.
- .6 Co-ordinate work on the bridge with the Bridge Master.

1.21 ALTERATIONS TO EXISTING BRIDGE

- .1 Remove and recycle or dispose of existing steel grating panel as shown on the Contract Drawings.
- .2 Fabricate, deliver and erect new steel grating panel including all mounting hardware and appurtenances.
- .3 Remove existing railing post, store, and reinstall with new mounting hardware after grating panel replacement.
- .4 Coat top flange of stringers.
- .5 Touch up all damaged galvanized surfaces with zinc rich paint.
- .6 Rebalance bridge by relocating counterweights, as directed by the Department Representative

1.22 TEMPORARY SIGNS

- .1 Erect dressed wood frame capable of supporting signs in 130 km/h winds.
- .2 Public Works and Government Services Canada and Contractor's signs of 1200 x 2400 x 20 mm thick, medium density overlaid plywood. Apply to frames with non-ferrous or hot dip galvanized fasteners. Sand and seal plywood edges.
- .3 Paint wood surfaces with 1 coat primer to CGSB 1-GP-55M and 2 coats exterior enamel to CAN/CGSB-1.59-M89, paints Ecologo certified. Frames black and signs white colour.
- .4 Install overlay in accordance with manufacturer's instructions. Overlay and instructions supplied by Public Works and Government Services Canada.
- .5 Contractor's sign to match size, style and format of PWGSC sign. All information in both official languages. Do not include Federal symbols and logo. Submit drawing of Contractor's sign for Departmental Representative's review prior to erection.
- .6 Maintain signs for duration of project.
- .7 Dismantle and dispose of signs and frames on completion of work.

1.23 INSPECTION AND TESTING

- .1 When initial tests and inspections reveal work not to Contract requirements, pay for tests and inspections required by Departmental Representative on corrected work.
- .2 Remove existing damaged grating panel, grind down remnants pre-existing welds on the stringer flanges, and perform magnetic particle tests to confirm existing stringer integrity. The weld inspector shall be certified as a weld inspection organization by the Canadian Welding Bureau under CSA standard W178.1. Inspection technicians shall be certified visual welding inspectors under CSA standard W178.2 by the CWB and shall be certified to perform magnetic particle, liquid penetrant, and ultrasonic inspection under CGSB standards. All inspections shall be carried out under the direction of a professional engineer competent in the inspection of steel structures.
- .3 After replacing the grating panel, rebalance the bridge by adding weights to the counterweight pockets as directed by the Departmental Representative. Additional weights (approximately 45 Kg each) are stored on site and will be supplied by PWGSC. Allow for relocation of approximately 14 weights in the Contract Bid Price.

1.24 COST BREAKDOWN

- .1 Within 48 hours of notification of acceptance of bid furnish a cost breakdown by Section aggregating Contract amount.
- .2 Within 48 hours of acceptance of bid submit a list of subcontractors.

1.25 SCHEDULING

- .1 On award of Contract submit bar chart construction schedule for work, indicating anticipated progress stages within time of completion. When schedule has been reviewed by the Departmental Representative take necessary measures to complete work within scheduled time. Do not change schedule without notifying Departmental Representative.
- .2 The Contractor shall schedule his operations in such a manner that the entire panel replacement is complete and the bridge re-opened to existing four lanes of traffic operating, within 48 hours from the time of closure.

- .3 In the event of a closure of the adjacent Burlington Skyway structure(s), the Burlington Lift Bridge becomes a critical detour route for traffic on the QEW. The Contractor shall accommodate such an event as specified elsewhere in the Contract Documents.

1.26 CLEANING

- .1 Maintain project free of accumulated waste and rubbish.
- .2 Final cleaning:
 - .1 Remove temporary protection.
 - .2 Remove dust, dirt and foreign matter from surfaces.
 - .3 Broom clean paved exterior surfaces, rake clean other exterior surfaces.

1.27 CONSTRUCTION AND DEMOLITION WASTE

- .1 Carefully deconstruct and source separate materials/equipment and divert from D&C waste destined for landfill to maximum extent possible. Reuse, recycle or sell material off site for reuse except where indicated otherwise. On site sales are not permitted. Target for this project is 75% diversion from landfill.
- .2 Submit a waste reduction workplan indicating the materials and quantities of material that will be recycled and diverted from landfill.
 - .1 Indicate how material being removed from the site will be reused or recycled.
- .3 Submit proof that all waste is being disposed of at a licensed land fill site or waste transfer site. A copy of the disposal/waste transfer site's license and a letter verifying that said landfill site will accept the waste must be supplied to Departmental Representative prior to removal of waste from the demolition site.

1.28 DESIGNATED SUBSTANCES

- .1 The work area has been surveyed for the presence of designated substances referred to in the Occupational Health and Safety Act and Regulations for Construction Projects, O. Reg. 213/91 as amended.
- .2 The list of designated substances present at the work area is attached at the end of this section.
- .3 Provide copies of this list to each prospective subcontractor prior to entering into a Contract with them.
- .4 Post prominent notices identifying and warning of the hazardous agent in the part of the workplace in which the agent is found or used. Notices shall be in English and other languages prescribed under the Act.

1.29 SPECIAL PROTECTION AND PRECAUTIONS

- .1 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and the provision of material safety data sheets acceptable to HRSDC - Labour Program.
- .2 The Contractor shall protect all openings in the bridge deck from traffic and public entry. No openings in the bridge deck shall be permitted when the Contractor is not on site.

1.30 POLLUTION CONTROL

- .1 Spills of deleterious substances:
 - .1 Immediately contain, limit spread and clean up in accordance with provincial regulatory requirements.
 - .2 Report immediately to Ontario Spills Action Centre: 1-800-268-6060.
 - .3 Further information on dangerous goods emergency cleanup and precautions including a list of companies performing this work can be obtained from the Transport Canada 24-hour number (613) 996-6666 collect.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

List of Designated Substances

- 1. Lead in existing paint

END OF SECTION

November 8, 2013

XCG File No.: 1-336-150-02

Ms. Maegan Harrison
Environmental Services
Public Works and Government Services Canada
4900 Yonge Street, 11th Floor
Toronto, Ontario M2N 6A6

Re: Lead-Containing Coatings at Burlington Lift Bridge, Burlington, Ontario

Dear Ms. Harrison:

XCG Consultants Ltd. (XCG) is pleased to submit this letter report describing the results of sampling potentially lead-containing coatings at the Burlington Lift Bridge, Burlington, Ontario.

1. BACKGROUND

Public Works and Government Services Canada (PWGSC) is proposing to undertake replacement of the bridge deck grating at the Burlington Lift Bridge, Burlington, Ontario.

Based on the previously identified presence of designated substances, and the presence of lead-based paint in the work area, PWGSC Environmental Services required the services of an environmental consultant to provide the following:

- Review the previous lead assessment and preliminary project information to determine the presence of lead within the areas affected by the grating replacement project; and
- Collect samples of paint that may be disturbed as part of the grating replacement project.

The proposed work area is identified on the site photographs. Please refer to the photos included in Appendix A for the surveyed areas.

2. REVIEW OF HISTORIC DSHMs

Part of XCG's assignment was the review of four existing reports for the structure:

- Pinchin. 2005. Lead Management Plan. Burlington Lift Bridge.
- Genivar. March 2011. Burlington Lift Bridge, PWGSC Engineering Asset Properties. Asbestos and Lead Reassessment Report.
- Genivar. February 2012. Burlington Lift Bridge, PWGSC Engineering Asset Properties. Asbestos and Lead Reassessment Report.
- Genivar. December 2012. Burlington Lift Bridge, PWGSC Engineering Asset Properties. Asbestos and Lead Reassessment Report.



These surveys identified that lead-containing paints were present on bridge surfaces. XCG reviewed the above-referenced reports and determined that the proposed work area associated with the deck replacement project may not have been sufficiently investigated.

As such, XCG recommended that additional sampling would be required to determine if lead-containing coatings are present in the proposed work area.

3. METHODOLOGY

The survey included a visual inspection of accessible areas that will be affected by the proposed renovation activities. It is XCG's understanding that a single deck grate is currently proposed to be replaced; however, PWGSC wishes to be prepared to replace other deck grates if required.

The sampling of suspected lead-containing paints was carried out by Ms. Natalia Baranova of XCG on September 19 and 20, 2013. The paint coating samples were collected in accordance with recognized sampling techniques and in accordance with XCG's standard operating procedures, and health and safety requirements.

4. LABORATORY ANALYSIS

Paint samples were collected and submitted for analysis of lead using the American Society for Testing and Materials (ASTM) D3335-85A "Standard Method to Test for Low Concentrations of Lead in Paint by Atomic Absorption Spectrophotometry." The lead analysis was completed by the International Asbestos Testing Laboratory (IATL) in Mt. Laurel, New Jersey, USA.

5. FINDINGS

Surface coatings such as paint are considered lead-containing if they have lead concentrations above the permissible concentration of 90 parts per million (ppm) (0.009 percent by weight) as specified in the Federal Hazardous Products Act – Surface Coating Material Regulation (2005), as amended.

The analytical results for the samples collected from the proposed work area are summarized in Table 1. Approximate sampling locations are shown on Photo 1 in Appendix A. Laboratory certificates of analysis for the samples collected have been included in Appendix B.

It was determined that the deck grating is welded onto the sub-deck beams. The grating, last replaced in 2000, is not painted with the exception of the white and yellow lane markings. No reports relating to the deck replacement in 2000 were available for review. The underside of the beams was recoated in 2010-2011 as part of the bridge repainting project that took two winters to complete. The underside of the bridge was pressure washed to remove existing lead-containing paint and was repainted orange. Through recent inspections the tops of the beams were identified to be painted green. Certain areas were noted to be rusting and painted rust flakes were observed in several locations on the tops of the sub-deck beams. The grating replacement project is expected to involve removal of some of the top of beam coating to prepare the beam surfaces for welding.



During the survey, a total of three paint samples were collected from the proposed work area of Burlington Lift Bridge. The samples included composite paint samples from the both the north and south ends of the bridge. An additional sample of the rust flakes with green paint was collected from the north end of the bridge. The north sample was collected from the approximate area of the proposed single grate replacement. Approximate sampling locations and additional site photos are attached. The summarized analytical results for the samples collected from the proposed work area are provided below in Table 1. The laboratory certificates of analysis are attached at the end of this letter.

Table 1 Analytical Lead Results, Burlington Lift Bridge

Sample ID	Sample Description	Sample Location	Condition Classification	Lead Concentration by % weight
Bridge North	Green	North end of the bridge on grating	Fair to Good	0.028
Bridge South	Green	South end of the bridge on grating	Fair to Good	0.069*
Bridge North Rust	Green with Rust	North end of the bridge on top of beam	Poor	0.023**

Notes:

- 1. Bold** - Lead concentration exceeds of the Surface Coating Regulation standard of 90 ppm (0.009% by Weight).
- 2. *** - Insufficient sample provided to perform QC re-analysis (<200 mg).
- 3. **** - Matrix/substrate interference possible.

Based on the findings of the survey and laboratory analytical results, all three of the paint samples collected were found to have lead concentrations above the permissible concentration of 90 ppm (0.009 percent by weight) as specified in the Federal Hazardous Products Act – Surface Coating Material Regulation (2005), as amended.

XCG made every effort to collect sufficient paint samples for analysis. Samples were collected from the roadway during bridge lifts to avoid additional traffic shut-downs. Factors such as short bridge lifts, difficulty in collecting the paint from the beam through the grating and wind blowing away the scraped sample had to be addressed. In the case of the Bridge South sample, an insufficient quantity of sample was provided to perform quality control (QC) reanalysis.

6. RECOMMENDATIONS

Based on the findings of the survey and laboratory analytical results, all of the sampled surface coatings were identified as lead-containing coatings as they were found to have lead concentrations above the permissible concentration of 90 ppm (0.009 percent by weight) as specified in the Federal Hazardous Products Act – Surface Coating Material Regulation (2005), as amended in October 2010.



XCG recommends that all painted surfaces be treated as lead-containing and that any demolition/renovation activities that would involve the disturbance of this paint be conducted in accordance with Ontario Regulation (O. Reg.) 490/09 and the Ontario Ministry of Labour Guideline “Lead on Construction Projects,” dated April 2011. Workers are not at risk of being exposed to lead unless they are undertaking an activity that disturbs surfaces covered with lead-based paint.

7. LIMITATIONS

The findings of this report are based upon visual observations and analytical results of select sampling at Burlington Lift Bridge, Burlington, Ontario. Paint samples were collected from the proposed work areas as indicated by on preliminary drawings supplied by PWGSC. This project was limited in scope to select sampling of suspected lead-containing coatings. While every effort was made to ensure that the samples collected were representative of the general sampling area, it is possible that conditions outside the specific sampling locations may differ. XCG cannot be held responsible for conditions that were not apparent during XCG’s site visit.

The scope of this report is limited to the matters expressly covered. This report was prepared for the sole benefit of Public Works Government Services Canada (PWGSC) and may not be relied upon by any other person or entity without the written authorization of XCG Consultants Limited. Any use or reuse of this document (or findings, conclusions, or recommendations represented herein) by parties other than Public Works Government Services Canada (PWGSC) is at the sole risk of those parties.

Yours very truly,

XCG CONSULTANTS LTD.

A handwritten signature in black ink, appearing to read 'Natalia Baranova'. The signature is fluid and cursive, with a large initial 'N' and 'B'.

Natalia Baranova, B.A.Sc., EIT
Project Specialist

A handwritten signature in black ink, appearing to read 'Dale White'. The signature is fluid and cursive, with a large initial 'D' and 'W'.

Dale White, Senior Technologist
Project Manager

Attachments: Attachment A - Site Photographs
Attachment B - Laboratory Certificate of Analysis

***ATTACHMENT A
SITE PHOTOGRAPHS***

Samples:
Bridge North
and
Bridge North

Sample:
Bridge South

Proposed work
area.



Photo 1: View of the Burlington Lift Bridge, looking east.

Grating (not
painted)

Top of Beam
(painted &
sampled)

Underside of
Beam
(repainted in
2010/2011)



Welds

Photo 2: Close up view of the grating and supporting beam.

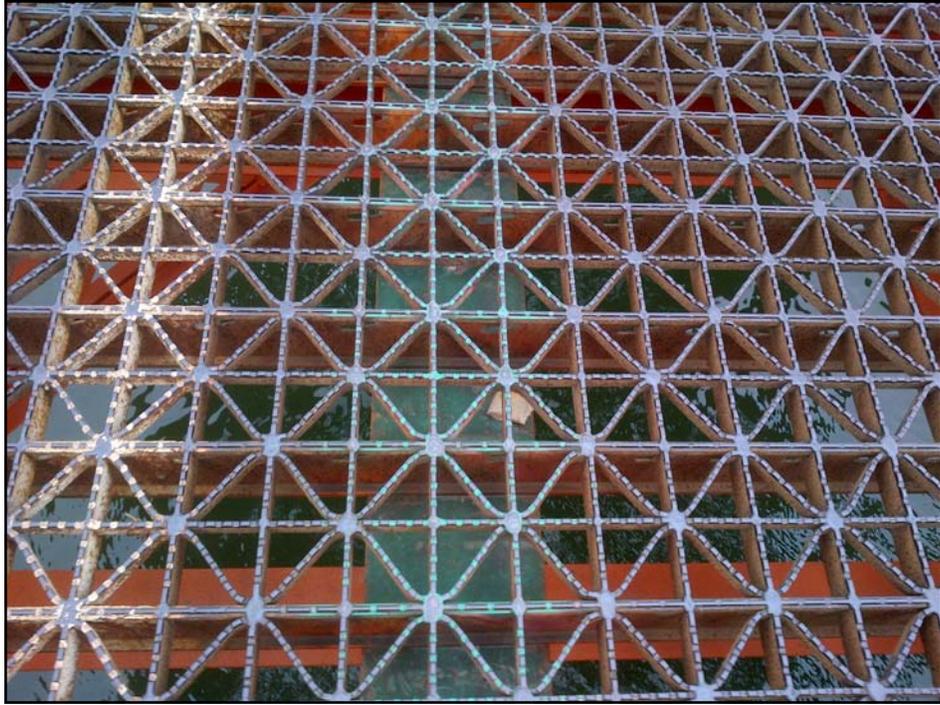


Photo 3: Close up view of the grating and supporting beams.



Photo 4: Close up view of the grating and supporting beam. Paint on the top of the beam is partially covered by dirt.

ATTACHMENT B
LABORATORY CERTIFICATE OF ANALYSIS

CERTIFICATE OF ANALYSIS

Client: XCG Consultants Ltd.
6 Cataraqui St;Woolen Mill
Kingston Ontario K7K 1Z7

Report Date: 10/9/2013
Report Number: 316384
Project: Burlington Lift Bridge
Project No.: 1-336-150-01

LEAD PAINT SAMPLE ANALYSIS SUMMARY

<u>Lab No.</u>	<u>Client No.</u>	<u>Location / Description</u>	<u>Concentration Lead By Weight (%)</u>
5139332	Bridge North	Green Paint	0.028
5139333	Bridge South	Green Paint	0.069*
5139334	Bridge North Rust	Green Paint Over Rust	0.023***

Accreditations:**NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)**

AIHA-LAP, LLC No. 100188

NYSDOH-ELAP No. 11021

Analytical Methods: ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry"
EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

Comments: Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation. All results are based on the samples as received at the lab. IATL assumes that appropriate sampling methods have been used and the data upon which these results are based have been accurately supplied by the client. Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Appendix B. Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies. LSD=0.2 ppm MDL=0.0044% by weight. RL= 0.010% by weight (based upon 100 mg sampled). * Insufficient sample provided to perform QC reanalysis (<200 mg) ** Not enough sample provided to analyze (<50 mg) *** Matrix / substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks. This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any government agency. This report shall not be reproduced except in full, without written approval of the laboratory.

Date Received: 10/8/2013**Date Analyzed:** 10/9/2013**Analyst:** M. Stewart**Approved By:** _____Frank E. Ehrenfeld, III
Laboratory Director

Part 1 General

1.1 SECTION INCLUDES

- .1 Traffic control, traffic and pedestrian protection, and pavement/grating marking painting.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 In an emergency, the Burlington Skyway at QEW may be fully closed to public traffic. In this event, an Emergency Work Zone reconfiguration will be required to establish the traffic control plan shown on the Contingency Traffic Control Plan Drawing. The cost associated with an Emergency Work Zone reconfiguration shall be negotiated should this circumstance arise and shall not be included in the Lump Sum bid price. The Emergency Work Zone reconfiguration is expected to include:
 - .1 Relocation of barriers, signage and traffic control to establish and maintain 2 lane bidirectional traffic on the bridge; and
 - .2 Upon conclusion of the emergency, relocation of barriers, signage and traffic control to restore the work zone prior to resuming Construction.
- .2 All other work under this specification will be deemed to be included in the Lump Sum Contract Price.

1.3 REFERENCES

- .1 Ministry of Transportation, Ontario (MTO)
 - .1 Ontario Traffic Manual, Book 7: Temporary Conditions - 01.

1.4 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 When working on travelled way:
 - .1 Place equipment in position to minimize interference and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
 - .4 Provide Mobile Work Zone Barrier to protect work area as indicated on drawings.
 - .5 Provide Buffer Vehicle to protect work area as indicated on drawings.
- .3 Close lanes of road only after receipt of written approval from Departmental Representative.
 - .1 Before re-routing traffic erect suitable signs and devices to Ontario Traffic Manual, Book 7: Temporary Conditions.

- .4 Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic.
 - .1 Provide 3.4 m wide minimum temporary roadway for traffic in one-way sections through Work and on detours.
- .5 Provide and maintain road access and egress to property fronting along Work under the Contract and in other areas as indicated, except where other means of road access exist that meet approval of Departmental Representative.

1.5 MOBILE WORK ZONE BARRIER

- .1 Supply and use a mobile work zone barrier, semi-tractor, crash truck, Ontario Provincial Police for assistance with rolling lane closures, and necessary vehicle operators for the protection of bridge deck grating work zones.
- .2 The intent of the mobile work zone barrier use is to allow bridge deck grating work to be completed without the use of Temporary Concrete Barrier. The mobile work zone barrier shall be used to protect workers and delineate the lane closure in areas of steel deck grating replacement where the minimum required separation between workers and live traffic cannot be met. The work will include supplying, locating, relocating, erecting, operating, maintaining and removal of all equipment.
- .3 The lane shall be closed in advance of the steel deck grating work zone by TC-54's as per Ontario Traffic Manual (OTM) Book 7. While the mobile work zone barrier is in place, a crash truck shall be placed up-stream of the mobile work zone barrier as shown in the Contract Drawings.
- .4 The mobile work zone barrier shall remain in place while workers are in the work zone. Once the steel deck grating replacement work is complete and workers have vacated the work zone, the mobile work zone barrier may be removed. TC-54's shall then be used to delineate the lane closure, as per OTM Book 7, until the lane is re-opened.
- .5 Placement and relocation of the mobile work zone barrier within the construction zone may require the use of a rolling lane closure administered by the Ontario Provincial Police. This requirement will be determined as needed by the Contractor through consultation with the Departmental Representative. All costs associated with any necessary rolling lane closures shall be the responsibility of the Contractor.
- .6 The Contractor is hereby advised that if the dimensions of the vehicle combination exceed those allowed under the Highway Traffic Act, a special Oversized/Overweight Project Permit will be required in order to move the equipment to and from the location where the barrier is fully deployed. Two (2) Ontario Provincial Police officers and vehicles will have to be contracted to accompany the movement of this equipment to conduct traffic control operations. The costs of the police escort duty shall be borne by the Contractor.
- .7 The Carrier responsible for the transportation of this equipment must apply for the Project Permit(s) no less than 2 weeks before the start of operations from:

O/O Permit Section
Carrier Safety & Enforcement Branch
301 St. Paul St., 3rd Floor
St. Catharines, Ontario, L2R 7R4
Tel: (416) 246-7166 ext 6306

Fax (905) 704-2545

- .8 The application form and payment options are available by following the links to Project Permit Application from <http://www.mto.gov.on.ca/english/trucks/oversize/>. Additional permitting may be required for any travel on roads within Municipal Jurisdictions.

1.6 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs, and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices to Ontario Traffic Manual, Book 7: Temporary Conditions.
- .3 Place signs and other devices in locations recommended in Ontario Traffic Manual, Book 7: Temporary Conditions.
- .4 Provide Temporary Programmable Variable Message Board Signs on both approaches, one week in advance of the proposed work, to inform the Public of the traffic delays.
- .5 Remove or cover signs which do not apply to conditions existing from day to day.
- .6 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.
- .7 Continually maintain traffic control devices in use:
 - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Remove or cover signs which do not apply to conditions existing from day to day.

1.7 CONTROL OF PUBLIC TRAFFIC

- .1 Cover existing traffic signals for bridge lifting operation control during construction and lane closures. Flagging personnel shall not control traffic when the traffic signals are in operation.
- .2 Provide competent flag personnel, trained in accordance with, and properly equipped to Ontario Traffic Manual, Book 7: Temporary Conditions for situations as follows:
 - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
 - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .5 For emergency protection when other traffic control devices are not readily available.

- .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
- .7 At each end of restricted sections where pilot cars are required.
- .8 Delays to public traffic due to Contractor's operators: 15 minutes maximum.
- .3 Where roadway, carrying two-way traffic, is restricted to one lane on the bridge, provide competent flag personnel, trained in accordance with, and properly equipped to Ontario Traffic Manual, Book 7: Temporary Conditions.

1.8 OPERATIONAL REQUIREMENTS

- .1 Maintain existing conditions for traffic throughout period of Contract except that, when required for construction under Contract and when measures have been taken as specified and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted as follows:
 - .1 One lane of alternating traffic for 300 m, from start of construction zone to end of construction zone
 - .2 Staging lanes closure shall be a continuous closure no longer than 48 hours. The Contractor shall schedule his operations in such a manner that the panel replacement is complete and the bridge re-opened to existing four lanes of traffic operating, within 48 hours from the time of closure. One-lane-two-way traffic through the work area shall be controlled by competent flag personnel, and temporary illumination shall be provided for night works where required.
 - .3 Ensure a working window with no snow in the weather forecast to avoid interference with snow ploughing operation.
 - .4 Maintain existing conditions for traffic crossing right-of-way.
 - .5 Provide steel security fencing and affix between truss members to maintain pedestrian safety on bridge adjacent to work area.
 - .6 Be able to remove all vehicles, equipment and materials from the bridge with no more than 1 hours' notice to accommodate a bridge lift.
 - .7 The shipping channel is closed during winter months (approximate dates: December 31st to March 15). It is unlikely that the bridge will be lifted during this period.
 - .8 In emergency cases where the Burlington Skyway at QEW is fully closed to public traffic, under the direction of the Departmental Representative, the Contractor shall reconfigure the work zone and move the work zone barriers to allow a minimum of two lanes of traffic operating (one lane each way), as shown as the Contingency Traffic Control Plan drawing. The two-lane operation shall be opened to traffic within 2 hours of the time of notification.

1.9 FINAL PAVEMENT MARKING

- .1 Supply and apply final pavement marking on the replaced panel as shown in the Contract Drawing. Final pavement marking shall be organic solvent based traffic paint in accordance to OPSS 710 & OPSS 1712.
- .2 If the temperature requirement cannot be met prior to re-opening to existing four lanes of traffic operating, Contractor shall come back to apply pavement marking paint at the earliest possible date.

Part 2 Products

2.1 MOBILE WORK ZONE BARRIER

- .1 The mobile work zone barrier shall meet the following criteria:
 - .1 Shall be an integrated, rigid wall, trailer that can be used in conjunction with a standard semi-tractor;
 - .2 Shall meet the requirements of the National Co-operative Highway Research Program (NCHRP), Report #350, Level 3, or higher;
 - .3 Shall have a steerable front and rear axle;
 - .4 Shall provide variable length of work zone protection of up to a maximum of 30m;
 - .5 Shall include LED lighting and beacons;
 - .6 Shall be capable of being configured to protect to the right or left side of the road; and
 - .7 Shall be equipped with an energy attenuator that meets the requirements of the National Co-operative Highway Research Program (NCHRP), Report #350, Level 3, or higher.
 - .8 The following product is one example of a mobile work zone barrier that conforms to the above requirements; other products that meet the above specifications can also be used.

The Mobile Barriers Trailer MBT-1

Manufactured by: Mobile Barriers LLC
24918 Genesee Trail Road
Golden, Colorado, 80401
Phone: (303) 526-5995
Fax: (303) 526-9959
Email: info@mobilebarriers.com
Web: www.mobilebarriers.com

Distributed by: Powell Contracting and/or Impact Absorption
180 Ram Forest Road 46-04 245th Street,
Gormley, Ontario L0H 1G0 Douglaston, NY 11362
Tel: (905) 727-2518 Phone: (718) 229-0046
Fax: (905) 727-1229 Fax: (718) 225-2845
Web: powellcontracting.com

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1

Part 2 General

2.1 REFERENCES

- .1 Canadian Standards Association (CSA): Canada
 - .1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
- .2 National Building Code 2010 (NBC):
 - .1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.
- .3 National Fire Code 2010 (NFC):
 - .1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 Province of Ontario
 - .1 Occupational Health and Safety Act, R.S.O. 1990, Chapter O.1 as amended, and regulations for Construction Projects, O. Reg. 213/91 as amended.
 - .2 O. Reg. 490/09, Designated Substances.
 - .3 Workplace Safety and Insurance Act, 1997.
 - .4 Municipal statutes and authorities
- .6 Treasury Board of Canada Secretariat (TBS):
 - .1 Treasury Board, Fire protection Standard April 1, 2010 www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316§ion=text.
- .7 Fire Commission of Canada (FCC):
 - .1 FC-301 Standard for Construction Operations, June 1982.
 - .2 FC-302 Standard for Welding and Cutting, June 1982.

2.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 11 01.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

- .3 Measures and controls to be implemented to address identified safety hazards and risks.
- .4 Contractor's and Sub-contractors' Safety Communications Plan.
- .5 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Emergency Response requirements and procedures provided by Departmental Representative.
- .3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 3 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 3 days after receipt of comments from Departmental Representative.
- .4 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .5 Submit names of personnel and alternates responsible for site safety and health.
- .6 Submit records of Contractor's Health and Safety meetings when requested.
- .7 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, daily.
- .8 Submit copies of orders, reports or directions issued by health and safety inspectors of the authorities having jurisdiction.
- .9 Submit copies of incident and accident reports.
- .10 Submit WHMIS MSDS - Material Safety Data Sheets.
- .11 Submit Workplace Safety and Insurance Board (WSIB) – Experience Rating Report.

2.3 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.

2.4 WORK PERMIT

- .1 Obtain building and other permits related to the project prior to beginning of Work

2.5 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.

2.6 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

2.7 REGULATORY REQUIREMENTS

- .1 Comply with the Acts and regulations of the Province of Ontario.

2.8 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:

- .1 Silica in concrete.
- .2 Lead in paint.
- .3 Guano on bridge surfaces

2.9 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.
- .3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety plan shall be submitted to the Departmental Representative in writing. .

2.10 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act for the Province of Ontario.

2.11 COMPLIANCE REQUIREMENTS

- .1 Comply with Ontario Health and Safety Act, R.S.O. 1990 Chapter O.1, as amended.

2.12 UNFORSEEN HAZARDS

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.
- .2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

2.13 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have site-related working experience specific to activities associated with abatement of lead and guano containing materials.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

- .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- .5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

2.14 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Ontario, and in consultation with Departmental Representative.
 - .1 Contractor's Safety Policy
 - .2 Constructor's Name.
 - .3 Notice of Project.
 - .4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
 - .5 Ministry of Labour Orders and reports.
 - .6 Occupational Health and safety Act and Regulations for Construction Projects for province of Ontario.
 - .7 Address and phone number of nearest Ministry of labour office.
 - .8 Material Safety Data Sheets.
 - .9 Written emergency Response Plan.
 - .10 Site Specific Safety Plan
 - .11 Valid certificate of first aider on duty.
 - .12 WSIB :In case of Injury at Work: poster.
 - .13 Location of toilet and cleanup facilities.

2.15 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

2.16 BLASTING

- .1 Blasting or other use of explosives is not permitted.

2.17 POWDER ACTUATED DEVICES

- .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

2.18 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

- .2 Assign responsibility and obligation to Competent supervisor to stop or start Work when, at Competent Supervisor's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.

Part 3 Products

3.1 NOT USED

- .1 Not used.

Part 4 Execution

4.1 NOT USED

- .1 Not used.

END OF SECTION

1.1 REFERENCES

- .1 Definitions:
 - .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.
- .2 Reference Standards:
 - .1 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.
 - .2 EPA General Construction Permit (GCP) 2012.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 11 01.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS.
- .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.
- .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .6 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Develop and submit a Storm Water Pollution Prevention Plan (SWPPP).
 - .6 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

- .7 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .8 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .9 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
- .10 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .11 Waste Water Management Plan identifying methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

1.3 FIRES

- .1 Fires and burning of rubbish on site is not permitted.

1.4 DRAINAGE

- .1 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .2 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.5 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
 - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.

1.6 WORK ADJACENT TO WATERWAYS

- .1 Construction equipment to be operated on land only.
- .2 Use waterway beds for borrow material only after written receipt of approval from Departmental Representative.
- .3 Waterways to be kept free of excavated fill, waste material and debris.
- .4 Design and construct temporary crossings to minimize erosion to waterways.
- .5 Do not skid logs or construction materials across waterways.

- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .7 Blasting is not allowed.

1.7 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where directed by Departmental Representative.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.8 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
 - .1 Take action only after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 11 01.
 - .1 Leave Work area clean at end of each day.
- .2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 11 01.

- .4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 11 01
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Comply with requirements of this Section when performing following Work: Type 1 Operation.
 - .1 Removal of lead-containing coatings from structural steel stringers below the grating panel designated for replacement using a power tool with an effective dust collection system equipped with a HEPA filter.

1.2 REFERENCES

- .1 Ontario Ministry of Labour
 - .1 Occupational Health and safety Branch, Guideline Lead on Construction Projects, September 2004, and O .Reg. 490/09 respecting Designated Substances – Lead made under the Occupational Health and Safety Act as amended by O. Reg. 148/12 and O. Reg. 149/12.
- .2 Department of Justice Canada
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .3 Health Canada
 - .1 Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).
- .4 Human Resources and Social Development Canada (HRSDC)
 - .1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.
- .5 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .6 U.S. Environmental Protection Agency (EPA)
 - .1 EPA 747-R-95-007-1995, Sampling House Dust for Lead.
- .7 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (NIOSH)
 - .1 NIOSH 94-113 - NIOSH Manual of Analytical Methods (NMAM), 4th Edition (1994).
- .8 U.S. Department of Labour - Occupational Safety and Health Administration (OSHA) - Toxic and Hazardous Substances
 - .1 Lead in Construction Regulation - 29 CFR 1926.62-1993.
- .9 Underwriters' Laboratories of Canada (ULC)
- .10 Report of the Royal Commission on Matters of health and Safety Arising from the Use of Asbestos in Ontario, 1984.

- .11 Report: Lead-Containing Coatings at Burlington Lift Bridge, Burlington, Ontario dated November 8, 2013.

1.3 DEFINITIONS

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Authorized Visitors: Departmental Representative or designated representatives.
- .3 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects over cuts and tears, and elsewhere as required to provide protection and isolation. For protection of underlying surfaces from damage and to prevent lead dust entering in clean area.
- .4 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.
- .5 Action level: employee exposure, without regard to use of respirators, to airborne concentration of lead of 50 micrograms per cubic meter of air (50 ug/m³) calculated as 8-hour time-weighted average (TWA). Minimum precautions for lead abatement are based on airborne lead concentrations less than 0.05 milligrams per cubic meter of air for removal of lead based paint by methods noted in paragraph 1.1.
- .6 Competent person: individual and Departmental Representative capable of identifying existing lead hazards in workplace taking corrective measures to eliminate them.
- .7 Lead dust: wipe sampling on vertical surfaces and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 11 01.
- .2 Provide proof satisfactory to Departmental Representative] that suitable arrangements have been made to dispose of lead based paint waste in accordance with requirements of authority having jurisdiction.
- .3 Provide proof of Contractor's General and Environmental Liability Insurance.
- .4 Quality Control:
 - .1 Provide Departmental Representative necessary permits for transportation and disposal of lead based paint waste and proof that lead based paint waste has been received and properly disposed.
 - .2 Provide proof satisfactory to Departmental Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, and aspects of work procedures and protective measures.
- .5 Provide proposed layout of decontamination systems and enclosures.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead paint, provided that in case of conflict among those

requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.

- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.
 - .2 Safety Requirements: worker and visitor protection.
 - .1 Protective equipment and clothing to be worn by workers and visitors in work Area include:
 - .1 Respirator NIOSH approved and equipped with replaceable HEPA filter cartridges with an assigned protection factor of 10, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure. Provide sufficient amount of filters. It should be noted that respirators should not be necessary if general work procedures are followed and if the level of lead in the air is less than 0.05 mg/m³.
 - .2 Half mask respirator: half-mask particulate respirator with N, R, P - series filter, and 95, 99, 100 % efficiency could be provided.
 - .2 Eating, drinking, chewing, and smoking are not permitted in work area.
 - .3 Ensure workers wash hands and face when leaving work area. Facilities for washing are to be provided by the Contractor.
 - .4 Visitor Protection:
 - .1 Provide approved respirators to Authorized Visitors to work areas.
 - .2 Instruct Authorized Visitors procedures to be followed in entering and exiting work area.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 11 01
- .2 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
- .3 Disposal of lead waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of lead waste in sealed double thickness 0.15 mm bags or leak proof drums. Label containers with appropriate warning labels.
- .4 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.7 EXISTING CONDITIONS

- .1 Reports and information pertaining to lead based paint to be handled, removed, or otherwise disturbed and disposed of during this Project are included elsewhere in the Contract documents.
- .2 Notify Departmental Representative of lead based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

1.8 SCHEDULING

- .1 Not later than two days before beginning Work on this Project notify following in writing:
 - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
 - .2 Provincial Ministry of Labour.
 - .3 Disposal Authority.
- .2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.
- .3 Provide Departmental Representative copy of notifications prior to start of Work.
- .4 Hours of Work: perform work involving existing paint removal located at existing panel to be removed during specified working hours. Include in Contract Sum additional costs due to this requirement.

1.9 PERSONNEL TRAINING

- .1 Provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of lead exposure, in personal hygiene, in aspects of work procedures, and in use, cleaning, and disposal of respirators.
- .2 Instruction and training related to respirators includes, at minimum:
 - .1 Proper fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.
 - .4 Limitations of equipment.
- .3 Instruction and training must be provided by competent, qualified person.
- .4 Supervisory personnel to complete required training.

Part 2 Products

2.1 MATERIALS

- .1 Polyethylene 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.
- .2 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under cold, dry conditions and wet conditions using amended water.
- .3 Lead waste containers: metal or fibre type acceptable to dump operator with tightly fitting covers and 0.15 mm thickness sealable polyethylene liners.
 - .1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.

Part 3 Execution

3.1 SUPERVISION

- .1 One Supervisor for every ten workers is required.
- .2 Supervisor must remain within work area during disturbance, removal, or handling of lead based paints.

3.2 PREPARATION

- .1 Remove and store items to be salvaged or reused.
 - .1 Protect and wrap items and transport and store in area specified by Departmental Representative.
- .2 Work Area:
 - .1 Provide containment to Class 1P requirements of SSPC Guide 6 with polyethylene shrouding around work area.
 - .2 Pre-clean steel stringers within work area, using HEPA vacuum and cover and seal with polyethylene sheeting and tape.
 - .3 Clean work area using HEPA vacuum. If not practicable, use wet cleaning method. Do not raise dust.
 - .4 Where water application is required for wetting lead containing materials, provide temporary water supply appropriately sized for application of water as required.
 - .5 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical cables and equipment.
- .3 Do not start work until:
 - .1 Arrangements have been made for disposal of waste.
 - .2 Tools, equipment, and materials waste containers are on site.
 - .3 Arrangements have been made for building security.
 - .4 Notifications have been completed and preparatory steps have been taken.

3.3 LEAD ABATEMENT

- .1 Removal of lead-containing coatings using power tools with an effective dust collection system equipped with a HEPA filter.
- .2 Remove lead based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.
- .3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.

- .4 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .5 After wire brushing and wet sponging to remove visible lead based paint, and after encapsulating lead containing material impossible to remove, wet clean entire work area, and equipment used in process. After inspection by Departmental Representative and when dry apply primer coat to surfaces of work area in accordance with Section 09 79 19.

3.4 INSPECTION

- .1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from these requirements not approved in writing by Departmental Representative will result in work stoppage, at no cost to Owner.
- .2 Departmental Representative will inspect work for:
 - .1 Adherence to specific procedures and materials.
 - .2 Final cleanliness and completion.
 - .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

3.5 FINAL CLEANUP

- .1 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .2 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .3 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

3.6 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

- .1 Repair or replace objects damaged in course of work to their original state or better, as directed by Departmental Representative.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Ontario Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario RSO 1990, Chapter O.1 as amended, O. Reg. 838/90 (Asbestos - Construction) as amended by O. Reg. 510/92 as amended.
- .2 Canada Labour Code 1985 Canada Occupational Safety and Health Regulations.
- .3 Environmental Protection Act RRO 1990, O. Reg. 347 as amended.

1.2 OUTLINE OF WORK

- .1 Cleanup steel stringer surfaces in the work area and decontaminate.
- .2 Removal of guano shall follow Type 1 asbestos removal process in accordance with Ontario Regulation 838 under the Occupational Health and Safety Act as modified in this Section.
- .3 Removal, disposal and cleanup must proceed slowly and carefully in a systematic manner.

1.3 DEFINITIONS

- .1 HEPA Filter: a high efficiency particulate aerosol filter that is at least 99.97% efficient in collecting a 0.3 micrometer aerosol.
- .2 HEPA vacuum: vacuum equipment utilizing HEPA Filters.
- .3 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape seals along all edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from water damage, and to prevent escape of spores through sheeting into clean areas.
- .4 Authorized visitors: Departmental Representative or designated representatives, Clerk-of-Works, and persons representing regulatory agencies.
- .5 Work areas: where actual removal of guano and sealing of surfaces takes place.
- .6 Amended water: water with a non-ionic surfactant wetting agent added to reduce water tension to allow thorough wetting of guano.

1.4 REGULATORY AGENCIES

- .1 Comply with Federal, Provincial, and local requirements, provided that in any case of conflict among these requirements or with these specifications the more stringent requirement shall comply.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Before commencing work:
 - .1 Obtain from the appropriate agency and submit to Departmental Representative all necessary permits for transporting and disposal of waste. Ensure that dump

operator is fully aware of hazardous nature of material being dumped and proper methods of disposal. Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to receive and properly dispose of waste. In Ontario, this means that the wastes shall be handled and disposed of under the requirements of Ontario Regulation 347.

- .2 Submit proof satisfactory to Departmental Representative that all employees have had instruction on the hazards of the work, respirator use, dress, use of showers, entry and exit from work areas, and all aspects of work procedures and protective measures. The Contractor's Superintendent shall have attended an asbestos abatement course, of not less than two days duration, approved by the Departmental Representative Submit proof of attendance in the form of a certificate.
 - .3 Submit layout of proposed scaffolding and enclosures to Departmental Representative for review.
- .2 Work must be carried out by an experienced asbestos removal company that is familiar with the hazard controls required for such an operation. Submit an outline of experience.

1.6 WORKER PROTECTION

- .1 Instructions: Before commencing work instruct workers in use of respirators, dress, showers, entry and exit from work areas, and all aspects of work procedures and protective measures.
- .2 Respirators: Provide workers with personally issued and marked respiratory equipment. Equipment must be powered air purifying positive pressure dust respirators with HEPA filters. An acceptable example is the Breathe-Easy 1 system by RACAL. This equipment must be worn at all times. Filters must be replaced daily. All respiratory protective devices shall be acceptable to the Occupational Health Branch of Ministry of Labour. No supervisor, worker or authorized visitor shall wear facial hair which affects seal between respirator and face.
- .3 Protective Clothing: Provide workers with full body coveralls including head covers. Once coveralls are worn in the work area, they must be treated as contaminated waste and disposed of. Provide safety shoes and other protective apparel required by Ministry of Labour construction regulations.
- .4 Eating, drinking, chewing, and smoking are not permitted in the Guano Work Area.
- .5 Before leaving Guano Work Area, the worker can decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for guano waste, impervious to guano, identified as guano waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.
- .6 Facilities for washing hands and face shall be provided within or close to the Guano Work Area.

- .7 Ensure workers wash hands and face when leaving Guano Work Area. Facilities for washing are to be provided by the Contractor.
- .8 Ensure that no person required to enter a Guano Work Area has facial hair that affects seal between respirator and face.

1.7 VISITOR PROTECTION

- .1 Provide protective clothing and approved respirators to authorized visitors to work areas.
- .2 Instruct authorized visitors in the use of protective clothing and respirators.
- .3 Instruct authorized visitors in proper procedures to be followed in entering into and exiting from work areas.

1.8 NOTIFICATION

- .1 Not later than ten (10) days before commencing work on this project notify the following in writing:
 - .1 The appropriate Regional or Zone Director of Medical Services Branch, Health and Welfare Canada.
 - .2 Regional Office of Labour Canada.
 - .3 Provincial Department of Labour.
 - .4 Disposal Authority.

Part 2 Products

2.1 MATERIALS

- .1 Polyethylene: minimum 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.
- .2 FR polyethylene: minimum 0.15 mm thick, woven fibre reinforced fabric bonded both sides with polyethylene.
- .3 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.
- .4 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether, or other material approved by Departmental Representative, mixed with water in a concentration to provide adequate penetration and wetting of material to be removed.
- .5 Receptors: Receptors for the disposal of waste materials contaminated with guano shall comply with Section 14 of Ministry of Environment Regulation 309. Use a "double bagging" system with the first container consisting of minimum 0.15 mm thick sealable polyethylene bag; second container to be rigid sealable metal or fibre drum with tightly fitting cover and 0.15 mm thickness sealable, polyethylene liner or a rigid, sealable, impermeable cardboard box. Containers must be acceptable to disposal site selected and Ministry of the Environment. Labelling shall refer to "Pigeon Guano" rather than "Asbestos".
- .6 Bleach: Undiluted household bleach, approximately 5% sodium hypochlorite.
- .7 Sprayer: garden reservoir type, low velocity, capable of producing mist or fine spray.

Part 3 Execution

3.1 PREPARATION

- .1 Before beginning Work, isolate Guano Work Area using, minimum, preprinted cautionary guano warning signs in both official languages that are visible at access routes to Guano Work Area.
 - .1 At each access to work areas install warning signs in upper case "Helvetica Medium" letters reading as follows: "CAUTION GUANO HAZARD AREA (25mm) NO UNAUTHORIZED ENTRY (19mm) WEAR ASSIGNED PROTECTIVE EQUIPMENT (19mm) BREATHING GUANO DUST MAY CAUSE SERIOUS BODILY HARM (7mm)".
- .2 Prevent spread of dust from Guano Work Area using measures appropriate to work to be done.
 - .1 Supply and erect steel scaffolding system under work area to gain access to steel stringers.
 - .2 Obtain approval from the Ontario Ministry of Labour, Construction Safety Branch, prior to allowing workmen access to scaffolding system.
 - .3 Use FR polyethylene drop sheets over flooring in Guano Work Area where dust and contamination cannot otherwise be safely contained. Drop sheets are not to be reused.
 - .4 Use polyethylene sheeting with taped seals to create an enclosure around the perimeter of Guano Work Area to contain dust.
- .3 Guano Removal work shall not commence until:
 - .1 Arrangements have been made for disposal of waste.
 - .2 Work areas are effectively segregated.
 - .3 Tools, equipment and materials waste containers are on hand.
 - .4 Warning signs specified are displayed where access to contaminated areas is possible.
 - .5 Scaffolding has been approved.
 - .6 All notifications have been completed and other preparatory steps have been taken.

3.2 GUANO REMOVAL

- .1 All work must proceed slowly and carefully.
- .2 Remove dead birds prior to removal of guano.
- .3 Apply the amended water in a fine mist using the pump type sprayer until the guano is just damp. Apply with care so that water does not drip from surfaces but only dampens them
- .4 Remove guano in small sections and place gently in first container. Limit the weight of material in each bag to prevent breakage.

- .5 Start guano removal from steel stringers. Dampen guano and scrape off surfaces carefully into containers. Work from top of stringers downwards. Clean stringers at completion of this stage.
- .6 Complete the removal with HEPA vacuum equipment, ensuring that guano is removed from all cracks and openings. Use vacuum only on dampened surfaces; dry vacuuming is NOT permitted.
- .7 Wipe the entire attic area clean with household bleach. Workers must wear the proper gloves when working with bleach. (Contractor should note that this work can be done only over short time periods due to the strong odour). Application of bleach must be sufficient to dampen the surface but not cause bleach to drip from the surface. Ensure coverage on rough surfaces by using a mist spray or a brush. Do not use bleach on plaster ceiling. Allow sufficient time for surfaces to dry before applying sealer.
- .8 After all guano removal, disinfecting of surfaces, wet clean the equipment used in the process.

3.3 DISPOSAL

- .1 As containers are filled with waste material, seal and place in second container and seal second container. Remove to staging area, clean and store in Holding Room.
- .2 Dispose of waste materials in accordance with O. Reg. 347 and Section 01 11 01.
- .3 Although the guano is not considered to be "Hazardous Waste" as defined by the Ministry of the Environment, caution must be taken to avoid damage to the containers prior to burial. Do NOT label as "Hazardous Waste".
- .4 Ensure that each shipment of containers transported to dump is accompanied by Contractor's representative who shall ensure that dumping is done in accordance with governing regulations.

3.4 FINAL CLEANUP

- .1 Following cleaning specified above, proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum all visible particles observed during cleanup, immediately, using HEPA vacuum equipment.
- .3 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Work areas and other enclosures that may be contaminated shall be included in the clean-up.
- .5 Sealed waste containers and all equipment used in the work shall be included in the cleanup and shall be removed from work areas, via the Container and Equipment Decontamination Enclosure System, at an appropriate time in the cleaning sequence.
- .6 A final check shall be carried out to ensure that no dust or debris remains on surfaces as a result of dismantling operations.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Removal and disposal of existing steel grating panel.
- .2 Preparation of existing structural steel surfaces including magnetic particle testing.
- .3 Remove existing railing post, store, and reinstall with new mounting hardware after grating panel replacement.
- .4 Fabrication and installation of the replacement grating panel.

1.2 REFERENCES

- .1 American Association for State Highway and Transportation Officials (AASHTO)
 - .1 AASHTO Standard Specifications for Highway Bridges-17th Edition 2002.
- .2 American National Standards Institute (ANSI)
 - .1 ANSI/NAAMM MBG 532-09 Heavy Duty Metal Bar Grating Manual – Fifth edition
- .3 ASTM International
 - .1 ASTM A123/A123M-12, Standard Specification for Zinc Hot-Dip galvanized Coatings on Iron and Steel Products.
 - .2 ASTM A325M-13, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength Metric.
 - .3 ASTM A490M-12, Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints.
- .4 CSA International
 - .1 CSA G40.20/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA S6 PACKAGE – consists of CAN/CSA-S6-06, Canadian Highway Bridge Design Code; S6S1-10, Supplement #1; S6S2-11, Supplement #2 and S6S3-13, Supplement #3 to CAN/CSA-S6-06, Canadian Highway Bridge Design Code.
 - .3 CSA S6.1 PACKAGE – Consists of S6.1-06, Commentary on CAN/CSA-S6-06, Canadian Highway Bridge Design Code; S6.1S1-10, Supplement #1; S6.1S2-11, Supplement #2 and S6.1S3-13, Supplement #3 to S6.1-06, Commentary on CAN/CSA-S6-06, Canadian Highway Bridge Design Code.
 - .4 CSA S16-09, Design of Steel Structures.
 - .5 CSA S269.1-1975 (R2003), Falsework for Construction Purposes.
 - .6 CSA W48-06 (R2011), Filler Metals and Allied Materials for Metal Arc Welding.
 - .7 CSA W59-03 (R2008), Welded Steel Construction, (Metal Arc Welding).

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Installation Meetings:
 - .1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with Contractor's Representative and Departmental Representative to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other subtrades.
 - .4 Review manufacturer's written installation instructions and warranty requirements.
 - .2 Prior to start of Work arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work.
 - .3 Hold project meetings every week.
 - .4 Ensure key personnel, site supervisor and project manager attend.
 - .5 Departmental Representative will provide written notification of change to meeting schedule established upon Contract award 24 hours prior to scheduled meeting.
 - .6 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 11 01.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for structural steel, grating, rivets, anchor details and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies of WHMIS MSDS.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Indicate shop and erection details including shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, rivets and welds. Indicate welds by CSA W59, welding symbols.
 - .3 Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.
 - .4 Submit description of methods, temporary bracing and strengthening, sequence of erection and type of equipment proposed for use in erecting structural steel.
- .4 Installation sequence and plan for review by Departmental Representative.
 - .1 Ensure coordination with marine traffic operations.
 - .2 Indicate duration and inter-relation of all tasks to be performed.

- .5 Submit experience of site foreman, minimum of 10 years of construction practice with open decks on steel bridges required.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 11 01 and with manufacturer's written instructions
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Ensure Departmental Representative has delivery schedules 7 days minimum prior to shipping.
- .3 Storage and Handling Requirements:
 - .1 Provide protective blocking for lifting, transportation and storing.
 - .1 Exercise care during fabrication, transportation and erection so as not to damage grating panel.
 - .2 Do not notch edges of members.
 - .3 Do not cause excessive stresses.
- .4 Mark mass on members weighing more than 3 tonnes.
- .5 Protect unpainted weathering steel, before erection, with waterproof covering.
- .6 Ensure that no portion of steel comes into contact with ground.
 - .1 Replace defective or damaged materials with new.
 - .2 Do not cause excessive stresses.

1.6 QUALITY ASSURANCE

- .1 Preconstruction Testing:
 - .1 Provide suitable facilities and cooperate with Departmental Representative in carrying out inspection and tests required.

Part 2 Products

2.1 MATERIALS

- .1 Grating panel shall be 5"-4 Way HD Modified Open Steel Grid Decking Galvanized as supplied by:
L.B. Foster Company
1016 Greentree Rd.
Pittsburgh, PA 15220
Attn: Mike Riley
Phone: (412) 875-3491
Mobile: (724) 355-1878
Fax: (412) 875-3510
- .2 All other structural steel to CSA G40.20/G40.21, Grade 350WTCategory 2.
- .3 Galvanized high strength bolts, nuts and washers: to ASTM A325M Type 1

- .4 Welding electrodes: to CSA W48 series.
- .5 Hot dip galvanizing: Hot dip galvanizing: to ASTM A123/A123M-12,
- .6 Self-levelling sealant shall be formulated for application to steel surfaces.

2.2 SOURCE QUALITY CONTROL

- .1 Steel producer qualifications: certified in accordance with CSA G40.20/G40.21.
- .2 Provide suitable facilities and co-operate with Departmental Representative in carrying out inspection and tests required.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for structural steel installation in accordance with manufacturer's written instructions.
 - .1 Carry out magnetic particle testing of tops of stringers after grinding down remnants of existing welds in accordance with Section 01 11 01.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

- .1 Clean steel surfaces as directed by Departmental Representative when staining or defacing occurs.
- .2 Verify location of substructure units, diaphragms and location of anchor bolts before erection of structural steel; report discrepancies to Departmental Representative.
- .3 Work near river banks or embankments in accordance with written instructions from Departmental Representative.
- .4 Restrict drifting during assembly to minimum required to bring parts into position without enlarging or distorting holes, and without distorting, kinking or sharply bending metal of any unit.
 - .1 Enlarge holes if necessary by reaming only after receipt of written approval from Departmental Representative.
 - .2 Ensure reamed holes are 2 mm maximum larger than bolt size used.

3.3 FABRICATION

- .1 The Contractor shall take all field measurements required to ensure proper fit of the new grating panel prior to fabrication, and shall re-measure the fabricated panel to confirm the as-fabricated panel conforms to the required dimensions prior to commencing removal of the existing panel.

- .2 The Contractor shall fabricate grating panel and all attachments as shown on the Contract drawings.
 - .1 Trim bars shall be fully shop welded to ends of bearing bars and are required on all edges where exposed ends of bearing bars would otherwise be present. Trim bars shall be flush with the top of main bearing bars.
 - .2 Provide cope in panel to suit truss member location as shown on drawings.
 - .3 To improve skid resistance for traffic, the Contractor shall remove galvanizing coating from the top wearing surface of all main and intermediate bearing bars (excluding recessed serrations) and a further (approximately) 0.1 mm of the parent steel below the galvanized coating. Removal of the parent steel below the galvanized coating shall not exceed 0.5 mm. The Contractor's removal apparatus shall be conducive of uniform material thickness removal. Such apparatus may include belt or floor sanding apparatus, or other equipment capable of achieving the specified removal limits. Methods which can easily result in rapid, unintended material removal shall not be permitted so as to avoid damage to the galvanizing coating adjacent vertical surfaces.

3.4 **INSTALLATION**

- .1 Provide traffic control in accordance with Section 01 35 00
- .2 Do falsework in accordance to CSA S269.1.
- .3 Prior to grating installation, Contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the gratings. Any inconsistencies between Contract drawings and supporting structure deemed detrimental to grating placement shall be reported in writing to the Departmental Representative prior to placement.
- .4 Clean top flange of stringers, removing all lead paint, and grind smooth all previous welds flush with the top of the stringer. Perform magnetic particle testing of stringer flanges before commencing with any further work. Submit test report to the Department Representative and remedy defects found as directed by the Department Representative prior to installing the new grating panel. Removals from stringer tops shall be by mechanical means only. Thermal removal methods (such as torch or plasma cutting) shall not be permitted.
- .5 Do fabrication and erection of structural steel in accordance with CAN/CSA S6, Design of Highway Bridges.
- .6 Install grating in accordance with shop drawings and standard installation clearances as recommended by ANSI/NAAMM MBG-532-09 Metal Bar Grating Manual.
- .7 Grating anchorage shall be as shown on the Contract drawings.
- .8 Do welding in accordance with CSA W59, except where specified otherwise.
 - .1 For CSA G40.20/G40.21, grade 350WT steel, deposited weld metal to have Charpy V-Notch value not lower than that of parent steel.
 - .2 Do welding in shop unless otherwise permitted by Departmental Representative.
 - .3 Weld only at locations indicated.
- .9 High strength bolting: in accordance with CAN/CSA S6 and CSA S16.1.

- .10 Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges.
- .11 Allowable tolerance for bolt or rivet holes:
 - .1 Matching holes for rivets and bolts to line up so that dowel 2 mm less in diameter than hole passes freely through assembled members at right angles to such members.
 - .2 Finish holes not more than 2 mm in diameter larger than diameter of rivet or bolt unless otherwise specified by Departmental Representative.
 - .3 Centre-to-centre distance between any two holes of group to vary by not more than 1 mm from dimensioned distance between such holes.
 - .4 Centre-to-centre distance between any two groups of holes to vary not more than maximum of the following:

Centre-to-Centre distance in metres	Tolerance in plus or minus mm
less than 10	1
10 to 20	2
20 to 30	3
 - .5 Correct mispunched or misdrilled members only as directed by Departmental Representative.
- .12 Span length tolerances:
 - .1 Girders and beams: plus or minus 6 mm
 - .2 Centre-to-centre of bearing stiffeners and bearing plates: plus or minus 3 mm.
- .13 Shop or field splices not permitted.
- .14 Mark members in accordance with CSA G40.20/G40.21.
 - .1 Do not use die stamping.
 - .2 Place marking at locations hidden when viewed from exterior after erection when steel is to be left in unpainted condition.
- .15 Match marking: shop mark bearing assemblies and splices.
- .16 Following grating panel installation, re-paint the top surfaces of the stringers supporting the new grating panel with a paint system in accordance with Section 09 79 19.
- .17 Following grating panel installation rebalance span in accordance with Section 01 11 01.

3.5 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, protecting and cleaning of steel.
 - .2 Submit manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Ensure manufacturer's representative is present before installation, during critical periods of installation and during construction of field joints and testing.
 - .4 Schedule site visits:

- .1 After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.
- .2 During progress of Work.
- .3 Upon completion of the Work, after cleaning is carried out.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 11 01.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 11 01.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 11 01.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Surface preparation of stringer flanges for structural steel coating.
- .2 Structural steel coating of stringer flange surfaces.

1.2 REFERENCES

- .1 The Master Painters Institute (MPI)
 - .1 Exterior Structural Steel and Metal Fabrications, 07.
 - .1 EXT 5.1D, Alkyd
 - .2 EXT 5.1G, Polyurethane, Pigmented (over epoxy zinc rich primer and high build epoxy).
 - .3 EXT 5.4, Aluminum.
 - .2 Federal Standard (FS)
 - .1 FED-STD-595B-[89], Colours Used in Government Procurement.
 - .3 The Society for Protective Coatings (SSPC)
 - .1 SSPC-SP 1-82(R2004), Solvent Cleaning.
 - .2 SSPC-SP 2-82(R2004), Hand Tool Cleaning.
 - .3 SSPC-SP 3-82(R2004), Power Tool Cleaning.
 - .4 SSPC-SP 6/NACE No. 3-07, Commercial Blast Cleaning.
 - .5 SSPC-SP 7/NACE No. 4-07, Brush-off Blast Cleaning.
 - .6 SSPC-Vis-1-89, Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs) Editorial Changes September 1, 2000 (Steel Structures Painting Manual, Chapter 2 - Surface Preparation Specs.).
 - .7 SSPC-Vis-3-11, Guide and Reference Photographs for Steel Surfaces Prepared By Power and Hand Tool Cleaning
 - .8 SSPC-SP 10/NACE No. 2-07, Near White Blast Cleaning.
 - .9 SSPC-PA 2-04, Measurement of Dry Coat Thickness with Magnetic Gauges.
 - .10 SSPC Good Painting Practices, Volume 1, 4th Edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 11 01.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for painting exterior metal surfaces and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS.
- .3 Samples:

- .1 Upon request, Departmental Representative will furnish qualified products list of paints.
- .2 Submit for review and acceptance 1 L of each unit to the Department Representative for analysis and acceptance prior to commencing work.
- .3 Mark samples with name of project, its location, paint manufacturer's name and address, name of paint, MPI standard number and manufacturers paint code number.
- .4 Enable Departmental Representative to take 1 L samples of each paint delivered to site, one sample from manufacturer's containers and one sample from painters' pot.
- .4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .5 Test Reports:
 - .1 Submit test reports showing compliance with specified performance characteristics and physical properties.

1.4 QUALITY ASSURANCE

- .1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

Part 2 Products

2.1 MATERIALS

- .1 Paint:
 - .1 Primer shall be a urethane modified two components epoxy. The coating shall be aluminum pigmented and of low temperature curing mastic design for cold weather applications down to 0 °F (-18 °C). The Primer shall comply with the following performance characteristics:

Parameter	Test Method	Result
Adhesion	ASTM D 4541	> 1500 psi
Elongation	ASTM D 522 Conical (73 °F)	½ inch (40%)
Salt Spray	ASTM B117	2000 Hours No blistering
Dry film thickness		125-200 microns

Carbomastic 242 Epoxy - Urethane Hybrid manufactured by the Carboline Company satisfies these requirements.

- .2 Intermediate Coat: Same as Primer
- .3 Top Coat shall be an aliphatic acrylic polyurethane high gloss coating. The coating shall offer a smooth and durable finish that offer excellent resistance to corrosion, abrasion and chemical exposure. The coating system shall comply with the requirements of SSPC Paint Specification No. 36 Level 3. The Top Coat shall comply with the following performance characteristics:

Parameter	Test Method	Result
Adhesion	ASTM D 4541	> 2500 psi
Abrasion	ASTM D4060	70 mg. loss after 1000 cycles, CS17
Accelerated Weathering	ASTM D4587	No rusting, blistering or loss of adhesion; less than 5% gloss loss after 3000 hours
Salt Fog	ASTM B117	No rusting, blistering, loss of bond after 3000 hours.
Dry film thickness	Single Coat	50-100 microns

Carbothane 134HG Aliphatic Polyurethane manufactured by the Carboline Company satisfies these requirements.

- .4 Paint components shall comprise a coating system from a single manufacturer, suitable for cold weather application to steel surfaces.
- .5 Colours: Grey on the top of stringer top flanges, match existing paint colour where painting of sides/underside of stringer top flange is required.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for painting exterior metal surfaces installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

- .1 Remove existing loose and rusted paint from exterior metal surfaces.
- .2 Metal surfaces to be repainted:
 - .1 Clean surfaces by removing loose, cracked, brittle or non-adherent paint, rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with following.

- .1 Power tool cleaning with vacuum shrouding: to SSPC-SP 3.
- .2 Scrape edges of old paint back to sound material where remaining paint is thick and sound, feather exposed edges.
- .3 Compressed air to be free of water and oil before reaching nozzle.
- .4 Remove traces of loose paint after cleaning from surfaces, pockets and corners to be painted by: brushing with clean brushes, by blowing with clean dry compressed air, or by vacuum cleaning.
- .5 Apply paint after prepared surfaces have been accepted by Departmental Representative.
- .6 Prior to starting paint application ensure degree of cleanliness of surfaces is to SSPC-Vis3.
 - .1 Apply primer, paint, or pre-treatment after surface has been cleaned and before deterioration of surface occurs.
 - .2 Clean surfaces again if rusting occurs after completion of surface preparation.
- .7 Mixing paint:
 - .1 Do not dilute or thin paint for brush application.
 - .2 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.
 - .3 Do not mix or keep paint in suspension by means of air bubbling through paint.
 - .4 Thin paint for spraying according to manufacturer's written instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.
- .8 Number of paint coats:
 - .1 One primer coat to minimum dry film thickness of 125 microns to bare and power tool cleaned areas.
 - .2 One intermediate coat to minimum dry film thickness of 125 microns per coat.
 - .3 One top coat to a minimum dry film thickness of 50 microns.

3.3 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Apply paint by brushing or spraying. Use sheepskins or daubers when no other method is practical in places of difficult access.
- .3 Use dipping or roller coating method of application when specifically authorized by Departmental Representative in writing.
- .4 The Contractor shall provide enclosures and indirect (dry) heat to maintain air and surface temperatures within the manufacturer's prescribed limits during painting and curing operations both to maintain adequate conditions for coating / curing and to ensure curing is completed within the available working time.
- .5 Do not apply paint when:

- .1 Fog or mist occur at site; it is raining or snowing; there is danger of rain or snow; relative humidity is above 85%.
- .2 Surface to be painted is wet, damp, frosted, or contaminated with dirt or chlorides.
- .3 Previous coat is not dry.
- .6 Adequate ventilation shall be provided to ensure proper curing and a safe working environment.
- .7 Supply cover when paint must be applied in damp or cold weather. Supply, shelter, or heat surface and surrounding air to comply with temperature and humidity conditions specified. Protect until paint is dry or until weather conditions are suitable.
- .8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
- .9 Apply each coat of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .10 Brush application:
 - .1 Work paint into cracks, crevices and corners and paint surfaces not accessible to brushes by spray, daubers or sheepskins.
 - .2 Brush out runs and sags.
 - .3 Remove runs, sags and brush marks from finished work and repaint.
- .11 Spray application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Provide traps or separators to remove oil and water from compressed air and drain periodically during operations.
 - .3 Keep paint ingredients properly mixed in spray pots or containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .4 Apply paint in uniform layer, with overlapping at edges of spray pattern.
 - .5 Brush out immediately runs and sags.
 - .6 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray. In areas not accessible to spray gun, use brushes, daubers or sheepskins.
 - .7 Remove runs, sags and brush marks from finished work and repaint.
- .12 Field painting:
 - .1 Paint steel structures as soon as practical after erection.
 - .2 Touch up metal which has been shop coated with same type of paint and to same thickness as shop coat. This touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.
 - .3 Field paint surfaces (other than joint contact surfaces) which are accessible before erection but which are not to be accessible after erection.

- .4 Apply final coat of paint after concrete work is completed or as directed by Departmental Representative. If concreting or other operations damage paint, clean and repaint damaged area. Remove concrete spatter and droppings before paint is applied.
- .5 Where painting does not meet with requirements of specifications, and when so directed by Departmental Representative remove defective paint, thoroughly clean affected surfaces and repaint in accordance with these specifications.
- .13 Handling painted metal:
 - .1 Handle painted metal after paint has dried, or when necessary for handling for painting or stacking for drying.
 - .2 Scrape off and touch up paint which is damaged in handling, with same number of coats and kinds of paint as were previously applied to metal.

3.4 FIELD QUALITY CONTROL

- .1 Site Tests, Inspections:
 - .1 Measure the wet film thickness of each coat during application
 - .2 Upon completion of the painting procedures test for dry film reading and evaluate the results as per SSPC-PA 2. Submit results to the Department Representative within 72 hours.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 11 01.
- .2 Cleaning of top surface of grating: Prior to permitting traffic on the new grating panel, the Contractor shall remove all paint and paint residue from the top surface of the grating panel to bare steel.
- .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 11 01.
- .4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 11 01
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

- .1 Protect painted surfaces from damage during construction.
- .2 Protection of surfaces:
 - .1 Protect surfaces not to receive paint.
 - .2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.
 - .3 Protect cleaned and freshly painted surfaces from dust to approval of Departmental Representative.

- .3 Repair damage to adjacent materials caused by painting exterior metal surface application installation.

END OF SECTION