



Coating Specification

Glebe Road Overpass

Prepared for:

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I. General

A. Introduction

1. The Bermuda Government, Ministry of Public Works – Structures Department wish to address the deterioration of the existing protective coating on the main girders of the Glebe Road overpass. The existing coating system has failed; this project aims to replace the compromised protective layer with a suitable coating system to ensure the longevity and reliability of this vital transportation link.

This document will outline the scope, project requirements and coating specification for this project.

B. Existing Structure

1. The overpass has a span of approximately 40 feet and is approximately 32 feet wide.
2. The existing overpass is a steel girder bridge, with the bottom flange encased in 6-inch-deep prestressed concrete. There are 7no. girders spanning the length of the bridge, with an approximate depth of 20 inches and an approximate width of 8 inches. The bridge deck is reinforced concrete, which spans between the girders spaced at approximately 5 feet 4 inches.
3. The original girders appear to have been galvanized. The specification and thickness of the original galvanizing is unknown.

C. Bridge Location

Figure 1. Glebe Road Overpass Location Plan



II. Terms and Definitions

A. Definitions

1. Owner – The term owner is used to refer to either the owner or an appointed owner’s representative such as an engineer or coating inspector.
2. Specifier – Project specifier, which may refer to either the Owner or the owner’s representative.
3. Contractor – Contractor who is awarded the project. This term also includes all subcontractors working under the Contractor, who perform the surface preparation or application of coatings.
4. Manufacturer – Coating manufacturer or manufacturer’s authorized representative.
5. Paint and Coating – The words “Paint” and “Coating” are used interchangeably in the following documents/specification to refer to high-performance coatings.

B. Abbreviations

1. DFT – Dry film thickness
2. Mills – all listed mills are dry film thicknesses.
3. AMPP – Association for Materials Protection and Performance, effective as of June 2021 following the merger of SSPC and NACE.
4. SSPC – AMPP, formerly known as the Society for Protective Coatings.
5. NACE – AMPP, formerly known as the National Association of Corrosion Engineers

III. Reference Standards and Codes

A. SSPC Standards

1. SSPC-SPI: Solvent Cleaning: Remove all grease, oil, salt, acid, alkali, dirt, dust, wax, fat, foreign matter and contaminates etc., by one of the following methods: steam cleaning, alkaline cleaning or solvent cleaning.

2. SSPC-SP3: Power Tool Cleaning: Remove loose rust, mill scale, and other contaminants from the substrate using approved power tools.
3. SSPC-SP10 – Near-white blast cleaning: Removing of all rust scale, mill scale, previous coating etc., leaving only light stains from rust and mill scale. At least 95% of each square inch of surface area is to be free of all visible residues and the remainder shall be limited to slight discoloration.
4. SSPC-AB1 – Mineral and Slab Abrasives : Abrasive material and grades approved by the AMPP.
5. SSPC-AB3 – Newly Manufactured or Re-Manufactured Steel Abrasives: Abrasive materials and grades approved by the AMPP.
6. SSPC-PA2 – Procedure for Determining Conformance to Dry Coating Thickness Requirements.
7. SSPC-VIS 1 – Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning.

IV. Scope of Work

A. Scope Summary

1. The Contractor is to carry out the works in strict accordance with the enclosed specifications/manufacturer's instructions/documents including:
 - a) Project Mobilization
 - (1) Establish project management team and communication channels.
 - (2) Inspect the site.
 - (3) Mobilize equipment, machinery and personnel to the project site.
 - (4) Set up temporary site facilities, including office space, storage, and utilities as required.
 - b) Site Preparation
 - (1) Install safety barricades and hoarding to restrict unauthorized access to the construction site.
 - (2) Implement a one-lane traffic management system to ensure traffic disruption to Palmetto Road is minimized.
 - (3) Erect signage and warning lights for public awareness and safety.

- c) Scaffolding Set Up
 - (1) Design and erect scaffolding to access the required areas of the bridge structure. Ensure that one traffic lane on Palmetto Road is open at all given times.
 - (2) Ensure compliance with safety regulations and standards are upheld for the scaffolding.
- d) Encapsulate the Work Area
 - (1) Work area shall be encapsulated to contain abrasive materials and prevent environmental contamination.
 - (2) Ensure that one traffic lane on Palmetto Road is always open.
 - (3) Designate specific access points in the encapsulation with zipper doors or flaps.
 - (4) Install an adequate ventilation system to meet the required safety standards.
 - (5) Regularly inspect and maintain the encapsulation system.
 - (6) Ensure compliance with regulations.
 - (7) Obtain all necessary permits.
 - (8) Communicate encapsulation plans and updates to all relevant stakeholders.
- e) Material and Equipment Procurement
 - (1) Source and procure all necessary coating materials and abrasives.
 - (2) Acquire specialized equipment for blasting, coating application and quality control.
 - (3) Ensure that all materials and equipment meet the specifications and standards.
- f) Surface Preparation
 - (1) Clean all surfaces of the bridge structure thoroughly using approved methods.
 - (2) Remove existing coatings, rust and contaminants as per the coating specification.
 - (3) Conduct surface inspections to identify and address any coating defects.

- g) Quality Control and Inspection
 - (1) Implement a comprehensive quality control plan.
 - (2) Conduct regular inspections to ensure compliance with the project and coating specifications.
 - (3) Provide the Owner with daily coating inspection log results.

- h) Site Cleanup
 - (1) Remove debris and waste generated during the recoating process.
 - (2) Dispose of hazardous material in accordance with the local environmental regulations.
 - (3) Leave the site in a clean and safe condition.

- i) Final Inspection and Documentation
 - (1) Perform a final inspection to verify the quality and completeness of the coating work.
 - (2) Combine coating records for distribution to client.
 - (3) Obtain client acceptance and sign-off on the substantially completed project.
 - (4) Identify punch list items with the Owner.

- j) Demobilization
 - (1) Dismantle scaffolding and temporary structures.
 - (2) Remove equipment and materials from the site.

- k) Project Closeout
 - (1) Submit all required project documentation to the Owner.
 - (2) Conduct a project closeout meeting to review lessons learned and address any outstanding issues.
 - (3) Close out outstanding punch list items.
 - (4) Obtain final project acceptance and approval.

B. Coating Schedule

1. Steel girders to be stripped and recoated are shown in the image below:



Figure 2. View of Glebe Road Overpass Bridge Soffit. Showing Beams to Be Recoated.

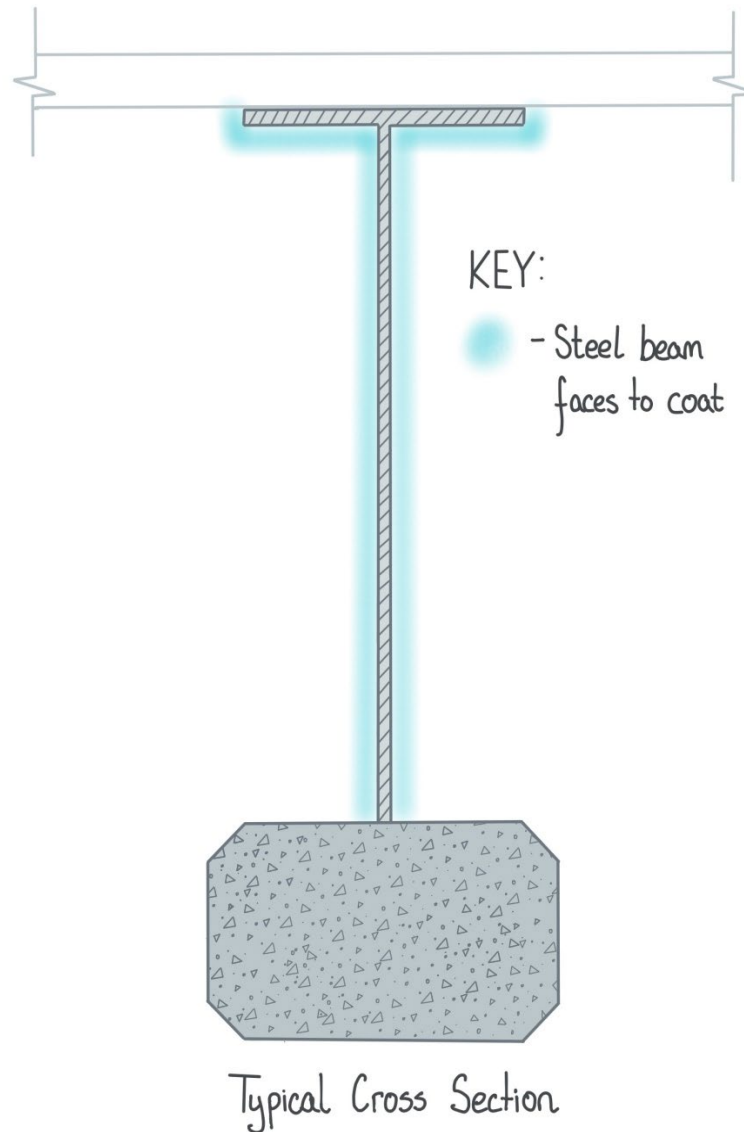


Figure 3. Typical Beam Cross Section – Showing Faces to be Coated.

2. For initial bid pricing purposes only, assume steel surface area to be coated = 1155 ft².
3. Contractor to confirm surface area quantities prior to ordering coating material.
4. Contractor to include a suitable overspray allowance and to list this in their bid documents.

V. Pre -Job Conference

A. Timeline

1. A pre-job conference shall be held at least two (2) weeks before the start of the application of the coating system. All parties who directly affect the project shall attend, including the Contractor, Owner/Owner's Representative and those responsible for the quality assurance/inspection.

B. Agenda

2. The pre-job conference shall include a review of any circumstances which may impact the project, including but not limited to the following:
 - a) Environmental requirements
 - b) Protection of surfaces not scheduled to be coated
 - c) Surface preparation
 - d) Ventilation
 - e) Application
 - f) Cleaning
 - g) Repair
 - h) Field quality control
 - i) Protection of coating systems
 - j) Hold points for inspections
 - k) Coordination with other government departments as required

VI. Site Conditions

A. Safety

1. All work must be carried out in strict accordance with the Bermuda Occupational Safety & Health Act 1982 and Occupational Safety and Health Regulations 2009.
2. The Contractor shall implement necessary safety measures to safeguard the public and employees from potential work-related injuries. This shall involve the supply and installation of fencing, barricades, warning signs, flashing lights and other safety tools as required to alert both motorists and pedestrians to prevent hazardous situations. The expenses associated with procuring and installing these safety measures shall form part of the Contractors bid.

3. The Contractor shall retain copies of the coating product Material Safety Data Sheets (MSDS) on site at all times.
 - a) Prior to using the product, Owner and Contractor shall meet on site to review MSDS sheets.
4. Training requirements for all Contractors personnel:
 - a) Working at Height
 - b) Working in Confined Spaces
5. The Contractor shall provide the Owner with an Occupational Health and Safety plan that reflects:
 - a) The construction method statement
 - b) Temporary works
 - c) Hazard identification
 - d) Hazard controls
 - e) Emergency and accident response protocols
 - f) Communication and reporting procedures
 - g) Air sampling/breathing space monitoring/ventilation
 - h) Fire procedures
6. Contractor's Health and Safety plan to be reviewed and approved by the Owner's Health and Safety Officer prior to work commencing.

VII. Coating Surface Preparation Requirements

A. Pre-cleaning

1. All steel to be coated shall be pre-cleaned.
 - a) The Contractor is required to remove all areas of oil, grease, dirt and dust prior to blast cleaning. Pre-cleaning to be done with a solvent according to SSPC-SPI, Solvent Cleaning. The Contractor shall supply copies of the applicable solvent MSDS sheets to the Owner's representative prior to using the material.
 - b) The Contractor is required to remove organic substances, such as bird droppings, nests and any other non-structural items or pollutants adhered to the steel.

B. Surface Preparation

1. Prior to applying the primer, steel surface to be prepared with a near white metal blast clean, according to SSPC-SP10. The standard used for acceptance of the surface preparation shall be SSPC-VIS1, Visual Standard for Abrasive Blast Cleaned Steel.
 - a) Abrasive materials for dry blast cleaning shall be in accordance with SSPC-AB 1, Mineral and Slag Abrasives or SSPC-AB 3, Newly Manufactured or Re-Manufactured Steel Abrasives. Abrasives shall be clear of matter that could result in contamination.
 - b) Angular abrasive surface profile to meet the requirements set forth in the applicable coating manufacturer's product data sheets.
 - c) The collection, storage and disposal of blasting residue/spoil shall be in accordance with the Bermuda Government Waste Management section's requirements.
2. All sources of compressed air must be equipped with functional oil and moisture separators, designed and sized appropriately. These separators should ensure that the air delivered through the blasting or painting nozzle is free from oil and moisture, while maintaining sufficient pressure for the work.
3. The tanks on air compressors and moisture separators should be drained at the end of each working shift.
4. Following blast cleaning, the blasted surface shall be further cleaned to remove residual dust and abrasive material. Cleaning methods may include blowing down with a high-pressure jet of clean dry air, vacuum cleaning or brushing with a clean dry brush.
5. Immediately before application of each coat of paint, the Contractor shall ensure that the surfaces:
 - a) Meet the standard of surface preparation stipulated in the applicable SSPC-SP10 and SSPC-SP1 standards/coating manufacturers requirements. Including but not limited to ensuring that:
 - i. Surfaces are free from harmful residues such as: concrete, dust, abrasives, paint, oil, and grease etc. prior to coating application.
 - ii. Surfaces are free from moisture/condensation or any other detrimental contaminants.
 - iii. Surface profile requirements are met.

6. Unless otherwise specified, fasteners shall be prepared and painted to the same standard as the adjacent main surfaces.
7. Weld flux and weld spatter shall be removed by a minimum of SSPC-SP3 Power Tool Cleaning to the satisfaction of the Owner's representative.
8. Weld seams, sharp protrusions and edges shall be ground smooth prior to the surface preparation or application of any coatings.
9. The Contractor is expected to prepare a surface area that corresponds to the amount that can be primed on the same day.
10. All prepared surfaces shall be coated as soon as possible in order to prevent re-contamination/flash rusting of the substrate. Coating to be applied no more than 4 hours following the surface preparation. Areas which are re-contaminated shall be re-cleaned to the proper level of cleanliness prior to application of coatings. If necessary, this may also involve re-blast cleaning, which will be performed at no additional cost to the Owner.
11. The Contractor is expected to ensure that prepared surfaces are kept clean at all times, prior to applying the coating and in the intervals between successive coats.

VIII. Coating System

A. Atmospheric Conditions

1. The atmospheric conditions present during the application of coatings must ensure that the surface being coated is entirely devoid of moisture.
2. No coating shall be applied if:
 - a) The ambient temperature is below 5C or above 35C, unless otherwise permitted by the coating manufacturer's product data sheet.
 - b) The relative humidity is above 85%.
 - c) It is raining.
3. Measurements of the atmospheric conditions shall be documented at the beginning and end of each coating each day and at three-hour intervals throughout the coating process. The daily records shall be submitted to the Owner's representative daily.

B. Striping

1. Stripe coats shall be applied to welds, edges, outside corners, crevices and bolt heads/treads before or after the first full coat (prime) is applied to the entire surface.
2. Stripe coats shall be applied by brush.
3. Stripe coat brush strokes shall run parallel to edges and crevices.
4. Stripe coat on bolt heads and nuts shall be applied in a circular motion.
5. Striping shall extend at least 1" from irregular surfaces/edges.
6. If the stripe coat is applied after the prime coat, the stripe coat shall be a different tint to contrast with the underlying coat color.
7. Stripe coat drying times and recoat conditions shall be complied with.

C. Application of Paint

1. Coatings shall be applied by airless or conventional spray in accordance with the coating manufacturer's product datasheet guidelines.
2. The Contractor shall only open containers of the paint that they expect to use on the same respective day. Any remaining paint must be securely sealed to prevent exposure to air.
3. The Contractor shall dispose of any paint that undergoes oxidation, thickening or develops a lumpy texture.

D. Coating Materials

- All full coating systems shall be the product of one manufacturer as specified in Table 1 below.

Table 1. Approved Coating Systems

Option 1: TNEMEC Coating System (Zinc-Rich Urethane/Polyamidoamine Epoxy/Polysiloxane)						
Surface Preparation		1 st Coat/Primer	Stripe Coat	2 nd Coat	3 rd Coat	Minimum total dry film thickness (mils) of the paint system (excluding stripe coat thickness)
SSPC-SPI0 (Near White Metal Blast Clean)	Product Description	TNEMEC Series 93-H2O	TNEMEC Series N69 Hi-Build Epoxoline II	TNEMEC Series N69 Hi-Build Epoxoline II	TNEMEC Series 690 Siloxilon	11.5 to 17.5 mils
Angular abrasive profile of 1.5 mils.	Min dry film thickness (mils)	2.5 to 3.5 mils	5.0-8.0 mils	5.0-8.0 mils	4.0 to 6.0 mils	
Option 2: Sherwin Williams Coating System (Zinc-Rich Polyamide Epoxy/Polyamide Epoxy/Polysiloxane)						
Surface Preparation		1 st Coat/Primer	Stripe Coat	2 nd Coat	3 rd Coat	Minimum total dry film thickness (mils) of the paint system (excluding stripe coat thickness)
SSPC-SPI0 (Near White Metal Blast Clean)	Product Description	Zinc Clad 4100 Organic Zinc Rich Primer	Macropoxy 646 FC Epoxy	Macropoxy 646 FC Epoxy	Sher-Loxane 800	12 mils to 21 mils
Angular abrasive profile of 2 mils	Min dry film thickness (mils)	3.0-5.0 mils	5.0-8.0 mils	5.0-10.0 mils	4.0-6.0 mils	
Aesthetic Color :						
Top coat color to be either RAL: 1035, 7000, 7001, 7040, 7045, 9006, 9007, 9018 or 9022 (or alternative color code specified by the Owner).						
Coating System Service Life for C5M Environment (Marine – coastal and offshore areas with high salinity) :						
Spot/Touch Up Repair – Year 15 Maintenance Repaint (spot prime and full coat) – Year 20 Full Repaint (total coating removal and replacement) – Year 27						

E. Coating Defects

1. Coating adhesion shall be sound throughout. All coatings shall be free of defects, including but not limited to pinholes, sagging, cracking, bubbling, dry overspray etc.
2. The Contractor shall mark defective areas with a marker compatible with the coating system that it is applied to and repair defective area accordingly.

F. Surfaces That Shall Not Be Coated

1. The following surfaces shall not be coated unless instructed by the Owner's Representative.
 - a) Electrical Cables and Conduit
 - b) Piping under the bridge
 - c) Other surfaces nominated by the Owner's Representative whilst on site.

G. Touch-up and touch-up materials

1. Strict adherence to the manufacturer's complete touch-up recommendations shall be followed by the Contractor. Any questions relative to compatibility of products shall be brought to the Owner's Representative and Manufacturer's attention. Otherwise, Contractor assumes full responsibility.
2. The Contractor shall provide (at no additional cost to the Owner), at the end of the Project, at least one (1) gallon of the topcoat in the specified color for future touch-up work.

H. Delivery, Storage and Handling

1. Delivery
 - a) Deliver coatings to the construction site in their original, unopened containers, displaying the manufacturer's label. The Contractor is to obtain and provide Product Data Sheets and Safety Data Sheets for every shipment from the manufacturer.
2. Storage
 - a) Contractor to store coatings in a dry, well-ventilated area, elevated above the ground, and maintain the temperature within the limits recommended by the manufacturer.
 - b) The Contractor is accountable for on-site storage conditions of coatings, following the manufacturer's most recent written guidelines.
 - c) Laydown/work areas shall be designated by the Owner.
 - d) Materials and storage shall be in full compliance with the requirements of local codes and fire regulations.

3. Handling
 - a) The Contractor shall not use damaged materials or those that have exceeded their shelf life.
 - b) Contractor to mix coatings in appropriate containers with sufficient capacity, following the manufacturer's latest written instructions. Do not add unauthorized thinners or other substances. Avoid using air directly for agitation. Strain pigmented materials after mixing. Catalyzed materials should not be used beyond the recommended pot life.
 - c) The Contractor shall be responsible for the disposal and drop off of all waste associated with the project, including empty paint containers etc. to the Tynes Bay public drop off.
 - d) Personal Protective Equipment (PPE) shall be worn in accordance with the product safety data sheet requirements.

I. Examination & Quality Control/Quality Assurance

1. Third Party Inspection
 - a) The Owner retains the right to employ a third-party coating inspector or testing agency for this project. Should a third-party inspector or testing agency be used, this will come at no extra expense to the Contractor.
 - (1) If a testing agency is retained, prior to them collecting samples, the Contractor will be notified in advance and may be present when samples are taken. Samples will be identified, sealed and certified by the testing agency.
 - (2) Testing agency will perform tests for compliance with product requirements.
 - (3) Owner may direct the Contractor to stop applying coatings if the test results prove non compliance with the product requirements. If this is the case, Contractor shall remove non-complying coatings from project site, pay for testing and repaint any surfaces that were coated with rejected materials.
2. The Contractor shall not apply a successive coat until the preceding coat or coats has been approved by the Owner.
3. Coatings not in compliance with the specifications will not be acceptable and shall be replaced and re-inspected at Contractor's expense until the specifications are met.
4. Measuring Film Thickness:

- a) The Contractor shall conduct wet film thickness measurements and shall recoat and repair as necessary for compliance with the specifications.
 - b) On metal substrates, the coating thickness shall be determined by use of properly calibrated coating thickness gauge. Measurement of DFT shall be performed in accordance with SSPC-PA 2 Level 3.
 - c) After each coat has been allowed to dry, the DFT shall be measured and recorded in all applicable daily inspection reports.
5. Hold points are those items which need to receive the Owner's approval before the contractor can proceed. The hold points will include :
- a) Ambient conditions during surface preparation
 - b) General surface condition after cleaning
 - c) Surface preparation equipment operation and abrasive size/type
 - d) Abrasive cleanliness
 - e) Ambient conditions during the paint application
 - f) Striping
 - g) Wet film/dry film thickness
 - h) Repairs

J. Certifications

1. Contractor must have a minimum of an AMPP Level 2 Certified Coatings Inspector or NACE CIP2 on staff and must submit proof of their credential in their bid.
2. Contractor shall have a minimum of 3 years experience in the application of high-performance coatings on projects of similar size and complexity.
3. Contractor shall have knowledge of best practices to carry out corrosion prevention activities in the field, have knowledge of best practices in environmental protection and experience in handling hazardous materials.
4. The Contractor shall submit with their bid, a list of 3 minimum projects that they have completed with a similar size and complexity to this work.

K. Documentation and Submittals

1. The Contractor shall furnish the Owner with the following submittals in accordance with the Owner's submittal procedures:
 - a) Project schedule
 - b) Daily work sheets showing the work done each day
 - (1) To be submitted daily.

- c) Daily inspection logs signed off by the AMPP Certified Coatings Inspector
 - (1) To be submitted daily.
- d) Product Data Sheets/Material Safety Data Sheets
- e) Work safety plans
- f) Contractor points of contact
- g) Certifications of workers
- h) Containment (hoarding/drop sheet/encapsulation) and scaffolding design
- i) Inspection plans

L. Conflict Resolution

1. In instances where the instructions are unclear, conflicts arise in the Specification, or the procedure seems inappropriate, the Contractor must promptly seek clarification from the Owner.

2. The Contractor is to provide the Owner with copies of all manufacturer's instructions and recommendations.

IX. Appendix I (Photographs)



Photograph 1 – Corrosion of girders



Photograph 2 – Bridge Soffit



Photograph 3 – Corrosion of girders



Photograph 4 – Corrosion of girders



Photograph 5 – Corrosion of girders



Photograph 6 – Corrosion of girders



Photograph 7 – Corrosion of girders



Photograph 8 – West facing view