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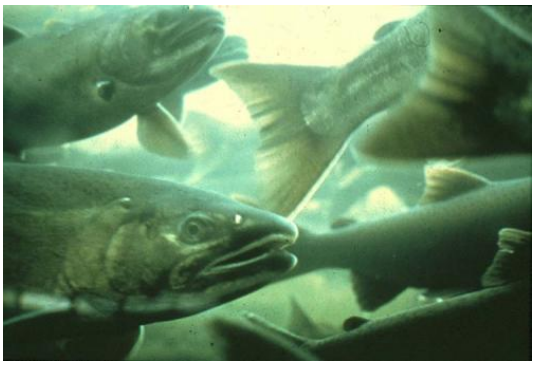

TENDERFOOT CREEK HATCHERY
CONTRACT NO. FP802-150055

CONCRETE RACEWAY RESURFACING
WITH ELASTOMERIC
POLYURETHANE SYSTEM

SPECIFICATIONS
JUNE 2015

Fisheries and Oceans Canada | Pêches et Océans Canada

Canada

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DRAWING LIST

APPENDICIES

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Not Used

1.2 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises of abrasive blast cleaning embedded metal, mechanical equipment (pipes and valves) and random patches of cement grout repairs in each channel, power washing each channel, cutting reglets at all coating terminations in each channel, preparing joints in each channel, priming surfaces as required and lining the ponds to resurface eight concrete raceways, using an elastomeric polyurethane based resurfacing system. The elastomeric polyurethane is intended to form a seamless liner over each of the 8 concrete raceways.

Scope of Work

.1 Power wash each channel
.2 Cut reglets.
.3 Abrasive blast clean miscellaneous metal and grout repairs in each channel.
.4 Vacuum all surfaces to be coated.
.5 Prime prepared surfaces as required.
.6 Prepare and rebuild the expansion joints.
.7 Line the ponds using elastomeric polyurethane resurfacing/lining system.
.8 Create mottled, camouflage pattern using tinted elastomeric polyurethane.

.2 This is an operational production hatchery that must remain in operation during the entire construction project.

1.3 LOCATION AND CONTACT

.1 Tenderfoot Creek Hatchery

Address: - 1000 Midnight Way. Brackendale BC, V0N 1H0

.2 The Tenderfoot Creek Hatchery is located Fifteen (15) kilometers North of Squamish, British Columbia, Canada. Located adjacent to Tenderfoot Lake, east of the Cheakamus River.

1.4 WORK SEQUENCE

.1 Construct Work in stages to accommodate Department Representative’s continued use of premises during construction.

.2 Co-ordinate Progress Schedule with Fisheries and Oceans Canada occupancy during construction.

1.5 CONTRACTOR USE OF PREMISES

.1 Limit use of premises for work, storage, and for access, to allow:

.1 Fisheries and Oceans Canada occupancy of adjacent areas that will remain in use.

.2 Work by other contractors.

.2 Co-ordinate use of premises under direction of Departmental Representative.

.3 Contractor to obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.4 Prevent injury or damage to portions of existing work which remain.

.5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

.6 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.6 OWNER OCCUPANCY

.1 Owner will occupy premises during entire construction period for execution of normal operations.

.2 Co-operate with Departmental Representative in scheduling operations to minimize conflict and to facilitate Fisheries and Oceans Canada usage.

1.7 EXISTING SERVICES

.1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permissions.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours notice, in writing, for necessary interruption of mechanical, electrical, or alarm system service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to hatchery operations.

.3 Provide alternative routes for personnel and vehicular traffic.

.4 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.5 Construct temporary barriers and enclosures as required.

1.8 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.
.4 Change Orders.
.5 Other Modifications to Contract.
.6 Copy of Approved Work Schedule.
.7 Health and Safety Plan and Other Safety Related Documents.
.8 Other documents as specified.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Not Used.

1.2 ADMINISTRATIVE

.1 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 PRETENDER SITE INSPECTION

.1 Where existing conditions are evident during the tendering period and will affect the work, it will be assumed that the Contractor's price includes the costs to implement the work and make a complete and operational system.

.2 At least one of the channels of each type will be empty for inspection before tender closes.

1.4 PRECONSTRUCTION MEETING

.1 Within fifteen (15) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental Representative, Contractor, field inspectors will be in attendance.

.3 Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedule.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Not Used.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit Project Schedule to Departmental Representative within 10 working days of Notice to Proceed.

1.3 PROJECT MILESTONES

.1 Concrete Ponds will be available for resurfacing from July 1st, 2015 – September 1st , 2015.

1.4 PROJECT SCHEDULE

.1 The Contractor and Departmental Representative will arrange a suitable construction schedule after award of the contract.

.2 Project must be completed by September 1, 2015.

1.5 PROJECT MEETINGS

.1 Discuss Project Schedule, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Not Used.

1.2 REFERENCES

.1 Not Used.

1.3 ADMINISTRATIVE

.1 Do not proceed with Work affected by submittal until review is complete.

.2 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.3 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.4 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.5 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.6 Keep one reviewed copy of each submission on site.

1.4 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

Part 2 Products

2.1 PRODUCT SUBMITTALS

.1 The contractor will be required to produce submittals for the following

.1 Submit selected material manufacturers technical data sheets along with specific manufacturer’s instructions pertaining to installation of selected system over concrete for immersion service for approval.

.2 Submit WHIMIS MSDS – Material Safety Data Sheets

.3 Submit valid training and “approved applicator” certificates or documents from material manufacturer demonstrating proficiency in application of specified

products for all workers handing elastomeric polyurethane materials and equipment.

.4 Submit documents attesting to proficiency in previous applications of the specified products.

.5 Submit a work plan and inspection plan with associated schedule for the pond lining work.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Not Used.

1.2 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC 2- [94], Stipulated Price Contract.

.2 Steel Structures Painting Council

.1 SSPC Volume 1 Good Painting Practice
.2 SSPC Volume 2 Systems and Specifications
.3 SSPC PA 9 Measurement of Dry Coating Thickness on Cementitious Substrates Using Ultrasonic Thickness Gages
.4 SSPC SP 10 - Near-White Metal Blast Cleaning
.5 SSPC SP 13 - Surface Preparation of Concrete
.6 SSPC PA 14 Application of Thick Film Polyurea and Polyurethane Coatings to Concrete and Steel Using Plural-Component Equipment

.3 National Association of Corrosion Engineers (NACE International)

.1 NACE RP0892 Coatings and Linings over Concrete for Chemical Immersion and Containment Service

.4 American Society for Testing and Materials

.1 ASTM D7234, Standard Test Method for Pull-Off Adhesion Strength of Coatings Using Portable Pull-Off Adhesion Testers
.2 ASTM D4787 Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.

.2 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents. The contractor shall designate a Quality Assurance person to monitor and record all pertinent project Quality Assurance processes including but not limited to:

.1 Ambient conditions
.2 Surface temperature
.3 Material lot numbers and date of manufacture
.4 Material Temperature
.5 Pump and equipment type and settings

.6 Wet Film Thickness

.7 Volume of material used

.8 Dry Film Thickness

.9 Shore D Hardness

.3 The contractors designated Quality Assurance person shall hold valid NACE Level 2 certification as a minimum.

.4 The contractor shall maintain Quality Assurance documents and logs on site and shall make all such records available to the Departmental Representative upon request.

.5 Costs incurred due to repeat inspections of deficient work will be back-charged to the contractor.

1.4 Surface Preparation

.1 Inspection shall verify that surfaces are prepared per coating manufacturer's recommendations.

1.5 Ambient conditions

.1 Ambient conditions shall be monitored and maintained within recommended parameters. Dew points shall be monitored per ASTM E-337 "Measuring Humidity with Psychrometer", to determine wet and dry-bulb temperatures. Thermometers shall be used to measure temperatures of coating materials, and surfaces to be coated. Alternately, an electronic psychrometer with current calibration certificate may be used.

1.6 Primer application

.1 Inspection shall verify that primer is mixed at proper volume ratio, and applied with no evidence of streaks or uneven coloring. Film thickness shall be verified by logging volumes of material applied to pre-measured areas. Inspection shall verify that applied primer is protected from contamination, and topcoated with the Elastomeric Polyurethane within recommended recoat time.

1.7 Coating application

.1 Inspection shall verify that coating is applied using spray-equipment approved by coatings manufacturer, monitoring its operation to verify that materials are applied with no evidence of streaks or uneven coloring. Final Film Thickness shall be verified by use of Ultrasonic Dry Film Thickness Gauges in accordance with SSPC-PA 9, Measurement of Dry Coating Thickness on Cementitious Substrates Using Ultrasonic Gages.

.2 Inspection shall verify that any recoating is accomplished within recommended recoat times. Inspection shall verify that no fresh material is applied to glossy or improperly prepared surfaces, and that any material so applied is completely removed.

.3 The coating shall be visually inspected for blisters, poor adhesion, or improper cure. Deficiencies shall be marked and repaired per coating manufacturer's recommendations.

.4 The finish elastomeric polyurethane shall achieve Shore D hardness of 61or greater.

.5 Verification of coating system adhesion will be performed in accordance with ASTM D7234, Standard Test Method for Pull-Off Adhesion Strength of Coatings Using Portable Pull-Off Adhesion Testers. The mode of failure shall be cohesive failure of the concrete substrate at >300psi in any location tested. Repair of adhesion test sites shall be the responsibility of the contractor at the contractors' expense.

1.8 Holiday Detection

.1 The coating shall be inspected per ASTM D-4787 "Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates", using high-voltage spark testing equipment with variable settings. Test voltage shall be set at an initial 100 volts per mil (4,000 volts per mm) of specified film thickness, then increased as needed to compensate for relative conductivity of the concrete substrate by spark testing an induced holiday at furthest extension of test probe from grounding location. Once test voltage is determined, it shall be used throughout that area, then re-determined again every time a new ground is made.

.2 For bonded geomembranes, test voltage shall be set at an initial 100 volts per mil (4,000 volts per mm) of total system thickness – including the geotextile fabric.

.3 Where the use of conductive primer is not feasible and the concrete substrate is determined to be non-conductive a very thorough visual inspection shall be conducted.

.4 Detected holidays shall be marked and repaired per coating manufacturer's recommendations.

1.9 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.10 REJECTED WORK

.1 Refer to CCDC, GC 2.4.

.2 Remove defective Work, whether result of poor workmanship, application during unsuitable environmental conditions, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Not Used.

1.2 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC 2- (latest), Stipulated Price Contract.

.2 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2- (latest), Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-0121- (latest), Douglas Fir Plywood.

.3 CAN/CSA-Z321- (latest), Signs and Symbols for the Occupational Environment.

.3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: May 14, 2004.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures

1.4 SITE CONDITIONS

.1 The concrete ponds are at ground level. The contractor must work through the available entrances unless alternate arrangements are made with the Departmental Representative.

.2 The concrete ponds are drained, but they are below grade and the amount of moisture in the surrounding ground will be weather dependant.

.3 The concrete ponds are outdoors and are not covered. Frame work for temporary covering is available on site. The contractor must provide and install tarping, shrink-wrap or other material suitable for service as temporary covering.

1.5 SITE STORAGE/LOADING

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.6 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work or ongoing hatchery operations.

.2 Provide and maintain adequate access to project site.

1.7 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

.5 Prior to completion of the contract the contractor shall completely clean the work site and dispose of all wasted materials in the correct manner.

Part 2 Products

2.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Not Used.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA-O121- [M1978(R2003)], Douglas Fir Plywood.

.2 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as Of: May 14, 2004.

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.4 HOARDING

.1 Erect temporary enclosure to contain debris from abrasive blast cleaning and prevent airborne contaminants from entering fish rearing and holding ponds currently in use.

.2 Hoard area to control elastomeric polyurethane curing conditions.

.3 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

.4 Hording forms will be supplied by Fisheries & Oceans Canada. The contactor will be responsible for supplying and installing tarps or shrink-wrap suitable for providing required protection for the duration of relining work. Refer to Appendix A for pictures of hoarding forms.

1.5 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.6 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.

.4 Contractor to be responsible for damage incurred due to lack of or improper protection.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling. The contractor will be responsible for waste management and disposal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Not Used.

1.2 REFERENCES

.1 ASTM C778-06 - Standard Sand.

.2 ASTM C1059-99(2008) - Latex Agents for Bonding Fresh To Hardened Concrete.

.3 ASTM D4381-06 - Test Method for Sand Content by Volume of Bentonitic Slurries.

.4 CSA-A23.1-04/A23.2-04 - Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.

.5 SSPC-SP 13 /NACE No. 6 - Surface Preparation of ConcreteProducts

.6 ASTM D 4263 – Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

1.3 MATERIALS

.1 Approved Abrasive Blast Cleaning Materials

- .1 OCL recycled glass abrasive (white only)
- .2 Green Diamond (Nickel Slag)
- .3 Barshot #50
- .4 Emerald Creek Garnet (OCL)
- .5 Black Pearl Slag Abrasive (Target)
- .6 Lane Mountain 20/30 Silica Sand (in total containment)
- .7 Ruby Garnet (Target)
- .8 Other abrasives may be approved if submitted

.2 Use of Copper Slag abrasives will not be permitted

Part 2 Execution

2.1 EXAMINATION

.1 Departmental Representative to verify that surfaces are ready to receive work.

2.2 LOCAL DEWATERING

.1 The channels to be resurfaced will be drained and the water supplies shut off. The surrounding grounds around the concrete channels may be saturated with water. All the channels share a common drain channel and this will be stop-logged off but some seepage

onto the slab may occur. Some valves may be not be water tight and have been known to leak slightly. The contractor may have to do some local dewatering during the resurfacing operation. It is understood that the slab resurfacing may be compromised by water. The Contractor and Departmental Representative shall observe and discuss the site condition prior to the resurfacing.

.2 Channels that are still in operation will contain rearing salmon. It is important not to allow any contaminants from either the surface preparation or coating operations to enter the operational ponds.

2.3 ABRASIVE BLAST CLEANING

.1 All ferrous metal surfaces shall be abrasive blast cleaned in accordance with SSPC SP10, Near-White Metal with a jagged surface profile of 2-3mils. Nonferrous metals shall be abrasive blasted to impart a jagged surface profile of 2-3mils.

.2 Random areas will have been recently repaired using cementitious grouting materials. All such areas shall be abrasive blasted in accordance with SSPC SP13/NACE No 6. A minimum surface texture similar to medium course (60 grit) sandpaper shall be achieved. A list of approved abrasives is included in this specification.

.3 Protect attached metalwork that is not to be coated from the damage of abrasive blast cleaning.

.4 Remove existing joint filler and foam backer rod from the expansion joints. Such areas shall be included with the abrasive blast cleaning.

.5 Cut 5mm x 5mm Reglet at all termination points of liner. Reglet shall be included with the abrasive blast cleaning.

.6 Cut 5mm x 5mm Reglet 20mm either side of, and adjacent to, joints. Reglet shall be included with the abrasive blast cleaning.

.7 Cut 5mm x 5mm Reglet 20mm around pipe brackets not being removed. Reglet shall be included with the abrasive blast cleaning.

.8 The compressed air supply shall be completely free of all oil, water and other contaminants and provide the required volume of air at 100 psi or greater.

.9 Abrasives used shall be clean, a uniform grade and of an appropriate size to obtain the specified surface finish and profile. Do not use contaminated abrasive.

.10 Thoroughly clean all blasted surfaces to remove all dust and debris after dry blasting, or to remove all water, sludge and debris after wet blasting.

.11 Grind all form ties or other metallic protrusions to below the surface.

.12 After abrasive blast cleaning the Inspector will inspect the surface and must approve the results prior to proceeding.

.13 Immediately prior to application of primer, coatings or fillers thoroughly vacuum-clean all surfaces to be coated, effectively removing all remaining dust. Vacuum cleaning a roughened concrete surface is the only known effective method of removing dust from deep pits, cracks, crevices, bug holes, etc. and is considered a mandatory procedure.

.14 Control the dust during the abrasive blast cleaning operation. All dust control measures must be employed up to but not including negative pressure capture.

2.4 POWER WASHING

.1 All interior concrete surfaces and embedded metalwork to be coated shall be power washed with water after abrasive blast cleaning. Prime coat metalwork and allow to dry prior to power-washing.

.2 The power washing equipment shall be capable of at least 3000 psi at the head. Pressure gauges shall be provided on power-washing equipment.

.3 Power washing shall clean all the dust, fines, dirt, organics and other contaminants from the concrete surface. Surface shall be allowed to dry and inspection prior to coating operation.

.4 Effluent from the power washing operation can exit through the pond drains.

.5 Check for excess moisture in accordance with ASTM D 4263 – Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method. There shall be no evidence of moisture before proceeding to application of coating and resurfacing materials.

2.5 PREPARATION

.1 Prepare and protect adjacent work from damage.

.2 Hoard area before abrasive blast cleaning.

2.6 CLEANING

.1 Clean concrete surfaces of dirt or other contamination; rinse surface and allow to dry.

.2 Flush out cracks and voids with water to remove laitance and dirt.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Not Used.

1.2 REFERENCES

.1 ASTM C150-07 - Portland Cement.

.2 ASTM C856- 04 - Practice for Petrographic Examination of Hardened Concrete.

.3 ASTM C881/C881M-02 - Epoxy-Resin-Base Bonding Systems for Concrete.

.4 ASTM C1059-99(2008) - Latex Agents for Bonding Fresh To Hardened Concrete.

.5 CSA-A23.1-09/A23.2-09 - Concrete Materials and Methods of Concrete Construction / Methods of Test for Concrete.

.6 CAN/CSA-A3001-08 - Cementitious Materials for Use in Concrete.

1.3 ENVIRONMENTAL REQUIREMENTS

.1 Do not apply repair materials during inclement or freezing weather, or if such conditions are anticipated within material curing period.

Part 2 Products

2.1 MATERIALS

.1 Epoxy Prime Coat recommended by the elastomeric polyurethane manufacturer, Carboline Phenoline 311 or approved equivalent.

.2 Finishing Elastomeric Urethane Coat: Polibrid 705 or approved equivalent.

.3 Expansion Joint replacement: Use Ethafoam ‘SB’ 220 followed by application of 75 mils of elastomeric urethane as a joint “bridging” system. This75 mil joint treatment is in addition to the specified elastomeric urethane surface lining thickness.

Part 3 Execution

3.1 PREPARATION

.1 Prepare surfaces in accordance with Section 03 01 32, PREPARATION FOR RESURFACING CONCRETE.

3.2 REPAIR OF CRACKS AND RESURFACING CONCRETE

.1 The existing concrete surface is deteriorated to the point of showing exposed aggregate. The intent of this project is to produce a surface that is sufficiently smooth so as not to harm fish, make cleaning easier and protect the concrete from further degradation.

.2 Use the specified elastomeric polyurethane to provide levelling and resurfacing by applying sufficient material to fill the surface profile of the rough concrete surface, cracks and bug holes. Trowel level with the peaks of the surface profile. This levelling procedure may require multiple steps to make the surface sufficiently smooth.

3.3 TREATMENT OF EMBEDDED METALWORK & PIPING

.1 All Surface mounted metalwork and piping, including gratings, pipes, valves, guides, support brackets and clamps that interfere with the work must be completely removed away from walls and slabs of concrete ponds for resurfacing, and be reinstalled in the original position and condition after the completion of the resurfacing. The contractor is responsible to make repairs of any damages at his cost. Any hardware that need replacing shall be stainless steel.

.2 It is recommended that embedded and non-removable metal is prepared and resurfaced at same time as the ponds.

.3 Abrasive blast clean embedded metal to SSPC SP10, Near-White Metal with a sharp angular profile of 2-3mils

.4 Prime embedded metal before power washing to prevent rusting.

.5 Prime coat embedded metal surfaces with Epoxy Primer at the dry film thickness recommended by the manufacturer.

.6 Power wash embedded metal

.7 There shall be no metal surfaces left uncoated and no coated metal surfaces shall measure less than 80 mils dry film thickness after application of the elastomeric polyurethane.

3.4 TREATMENT OF EXPANSION JOINTS

.1 Bridging Joints with elastomeric polyurethane lining system.

.1 Remove all existing ethafoam and sealant away from expansion joints.

.2 Clean and repair the concrete at expansion joints.

.2 The following steps are intended to be performed at the time of lining installation.

.1 Once Ponds and Channels have been coated with epoxy primer and coating has cured, install new ¾” Ethafoam ‘SB’ 220 to sit at least 5mm below the plane of adjacent surfaces.

.2 Apply 75 mils elastomeric polyurethane over the joint area and 75mm either side of joint. Trowel to fill reglet and ensure material fills joint. Allow to set sufficiently so that full specified thickness of liner can be applied over top of the treated joint area.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Elastomeric Polyurethane coatings.

.2 Related Sections:

.1 Not Used.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C307- [03], Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacings.

.2 ASTM C413- [01], Test Method for Absorption of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacings and Polymer Concretes.

.3 ASTM C79/C79M- [04a], Specification for Gypsum Sheathing Board.

.4 ASTM C580- [02], Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.

.5 ASTM C882- [99], Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete by Slant Shear.

.6 ASTM D638- [03], Test Method for Tensile Properties of Plastics.

.7 ASTM D1044- [99], Test Method for Resistance of Transparent Plastics to Surface Abrasion.

.8 ASTM D2047- [99], Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.

.9 ASTM D4541- [02], Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.

.2 Architectural Painting Specification Manual, Master Painters Institute (MPI)

.3 National Association of Corrosion Engineers (NACE)

.1 NACE RP 0188- [99], Discontinuity (Holiday) Testing of Protective Coatings.

.4 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S102.2- [03], Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous.

1.3 PERFORMANCE REQUIREMENTS

.1 Elastomeric Polyurethane coating components to form integral, seamless wall coating. Fisheries and Oceans Canada has identified an elastomeric polyurethane based resurfacing system that has demonstrated successful application in providing practical long-term immersion service.

1.4 QUALITY ASSURANCE

.1 Health and Safety:

.1 Adhere to construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.2 Installer Qualifications:

.1 Company or person experienced in performing work of this section specializing in installation of work similar to that required for this project, with minimum five years documented experience and approved by elastomeric urethane coating material manufacturer.

.2 Certificates indicating workers specific training and certification by the material supplier shall be kept on hand at the job location and submitted upon request.

.3 Only workers so certified shall handle and apply elastomeric polyurethane materials and equipment.

1.5 DELIVERY, STORAGE AND HANDLING

.1 The batch coating material must be within its shelf life and shall not be older than one year.

.2 All containers shall be labelled showing the exact title of the coating, manufacturer’s name, date of manufacture, the manufactures batch number and the specification number and lot number appropriate.

.3 Precautions concerning the handling and application of coating shall be on the materials container.

.4 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

1.7 WARRANTY

.1 For elastomeric polyurethane wall coating materials the twelve (12) month warranty period prescribed in subsection GC 32.1 of General Conditions "C" is extended to sixty (60) months.

.1 Extended warranty period must include warranty against delamination of elastomeric polyurethane system from substrate, and other failure of system to provide complete, integral, seamless wall covering meeting specified performance requirements, for specified time period.

.2 Project Warranty: refer to CCDC 2 for project warranty provisions.

Part 2 Products

2.1 MANUFACTURER

.1 All materials used in the lining system shall be from the same manufacturer. Ensure compatibility for elastomeric polyurethane materials including primers, resins, hardening agents, finish coats and sealer coats.

2.2 MATERIALS

.1 Materials: as required to achieve specified performance criteria; functionally compatible with adjacent materials and components.

.2 Elastomeric Polyurethane meeting the following criteria is the finishing coat system to be used.

.1 100% solids elastomeric aromatic polyurethane lining system to ASTM D 16 Type V, chemically cured. Minimum Dry Film Thickness 100 mils.

.2 Moisture Resistance: Water vapour transmission to ASTM F 1249: 0.016g/100in²/24 hours for 75 mil thickness, 100% RH gradient.

.3 Shore D Hardness: 61-65 @ 25°C minimum.

.4 Elongation to ASTM D 412: 41% minimum.

.3 Substrate (concrete) resurfacer: Self, Elastomeric Polyurethane

.4 Identify each coating material container with ULC listed markings stating fire hazard classification.

2.3 PREPARATION

.1 Prepare substrate surfaces in strict accordance with elastomeric polyurethane wall coating material manufacturer's instructions.

.2 Thoroughly vacuum clean all surfaces to be coated, removing all remaining dust.

.3 The temperature and humidity conditions of the concrete and surrounding environment during application and curing shall be within the manufactures specifications.

.4 If temperature and humidity condition do not meet manufactures conditions for application and curing, the area must be hoarded and temperature and humidity must be controlled at Contractors expense.

.5 Concrete surface must be dry before preceding – Departmental Representative to approve before proceeding. ASTM 4263 shall be the method used to verify the moisture content of the surface.

.6 Curing the lining for immersion services is critical. Ensure forced ventilation is in place before application operations commence. Solvent vapour is heavier than air and must be forcibly removed by extracting solvent laden air from ponds at the lowest points and supplying adequate volumes of make-up air. Ventilation set-up shall be approved by the Departmental Representative or his designated inspector prior to application of coatings.

2.4 LINING APPLICATION

.1 Apply coating in accordance with the coating systems specified and with manufacturer's written instructions.

.2 All dry film thickness measurements refer to coating thickness above profile peaks.

.3 Ensure sufficient application of each coat is applied to all corners, welds, bolts, pinholes, reglets and other difficult areas and that all outside edges and corners receive full coverage.

.4 Provide a smooth finish, free of laps, sags, runs, pinholes, brush marks, crawls and skips.

.5 To minimize out-gassing problems all coatings should be applied when the surface temperature of the concrete is declining.

.6 Due to inconsistent nature of concrete, surface porosity can vary greatly causing out-gassing and pinholes.

.7 All concrete surfaces must be dry and free of dust and debris prior to coating.

.8 Primer - Apply one coat of Epoxy primer to achieve manufacturers recommended dry film thickness over all surfaces to be top-coated as recommended by the material manufacturer. Do not exceed manufacturers recommended DFT.

.9 Finish – Apply elastomeric polyurethane to achieve 90-100 mils dry film thickness, trowelling the initial application of elastomeric urethane is required to ensure filling of reglet and to level rough surfaces.

.10 There shall be no coated surfaces measuring less than 90 mills DFT (Dry Film Thickness)

2.5 CAMOUFLAGE MOTTLING

.1 While the elastomeric urethane is within its recoat window apply camouflage mottling effect with factory tinted elastomeric polyurethane to create a random mottling pattern using two additional colours, specifically medium grey and medium green. An example of the desired mottling pattern is contained in Appendix A, figure 6.

2.6 PROTECTION

.1 Protection: protect installed product and finish surfaces from damage during construction.

2.7 EXAMINATION

.1 Site Verification of Conditions: verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

.2 A Departmental Representative reserves the right to inspect construction methods and reserves the right to accept or reject construction methods and results.

.3 The Departmental Representative will approve each stage of work before the contractor will be allowed to proceed to the next stage.

Part 3 Patching and Repairs

3.1 Surface Preparation

.1 Repair area shall be decontaminated and deficient sections shall be removed until properly applied, firmly adhered coating materials are reached. Exposed surfaces shall be treated to satisfy applicable requirements. Coating material surrounding repair area shall be abraded to remove gloss, then solvent-wiped to dust-free condition and allowed to dry, before application of repair materials. Extent of abraded area shall depend on whether repair materials are spray or hand-applied, but in either case, no repair material shall be applied beyond abraded areas.

3.2 Material and application

.1 A maximum 12 fl. oz. (350 ml) of the Elastomeric Polyurethane coating material shall be hand-mixed in manufacturers stipulated volume ratio, then quickly and evenly applied by brush or putty knife, covering the repair area. Repair material shall not extend beyond surrounding abraded area. Any repair material applied to glossy or improperly prepared surfaces shall be removed immediately. Larger repairs may require spray-application.

Part 4 Controlled environment

4.1 Dehumidification

.1 To prevent delays or unsatisfactory results in coatings application due to excessive ambient moisture or condensation, Applicator shall be equipped and prepared to provide a suitable dehumidification system, to produce an environment conducive to application within material manufacturers recommended parameters. Heating alone shall not substitute for dehumidification. The maximum Relative Humidity shall be 80% with substrate temperature at least 3°C above the dew point temperature.

4.2 Heating

.1 To prevent delays or unsatisfactory results in application or cure of the coatings due to excessive cold, Applicator shall be equipped and prepared to provide a suitable explosion-proof heating system, to elevate substrate temperatures within recommended

parameters. When heating is employed, all precautions shall be taken to prevent formation of dew or condensation on surfaces to be coated.

Part 5 HEALTH, SAFETY AND ENVIRONMENTAL

.1 All pertinent governmental, industry, and in-house regulations and standards, including, but not limited to those concerning painting, flammable/combustible liquids, eye protection, head protection, skin protection, respiratory protection, scaffolding, lighting, ventilation, working in enclosed or confined spaces, air and water quality, VOC emissions, dusts, blasting residues and paint particulates, as well as the containment, handling and disposal of hazardous or toxic substances or wastes, shall be carefully observed and shall supersede any guidelines described herein. Material Safety Data Sheets (MSDS) shall be made available at job-site to all workers who may come in contact with the products used.

END OF SECTION

APPENDIX A

Site Photos & Existing Conditions

Figure 1 - Typical Concrete Raceway Surface Condition 1/3

Figure 2 - Typical Concrete Raceway Surface Condition 2/3

Figure 3 - Typical concrete Raceway Surface Condition 3/3

Figure 4 - Existing hoarding forms provided by DFO

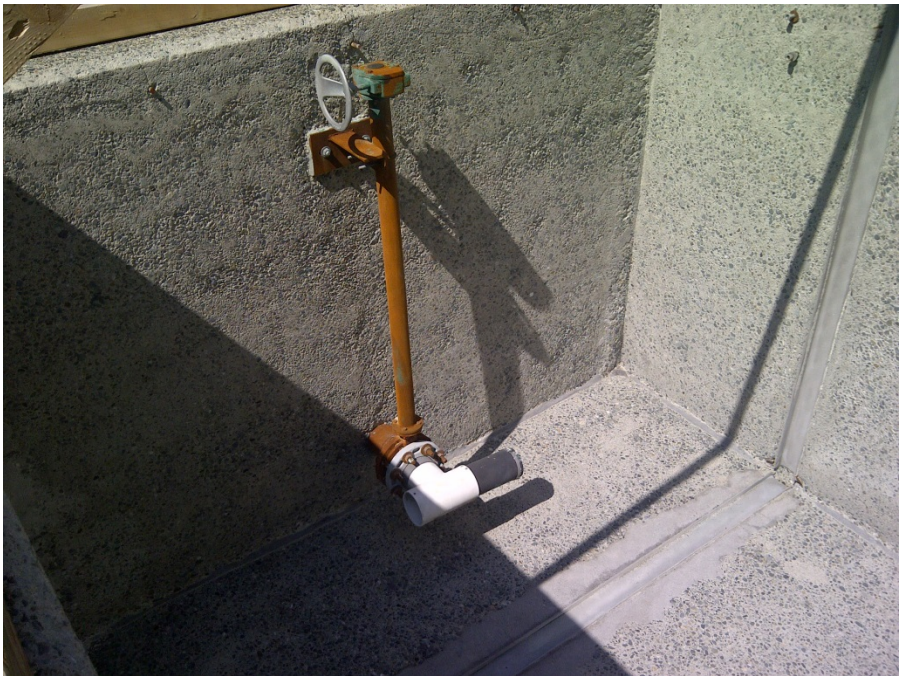

Figure 5 - Embedded metal within channel (inflow piping)

Figure 6 - An example of the desired mottled camouflage pattern

Figure 7 - Additional embedded metal within the channel