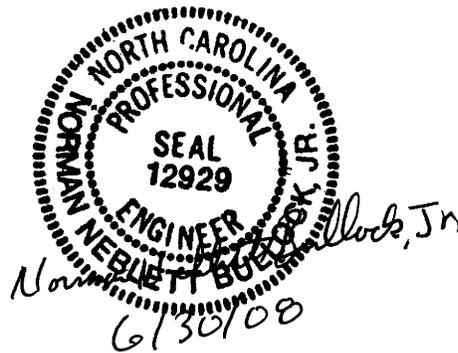


Project Special Provisions
Structure

Table of Contents

	Page
	#
Securing of Vessels (10-12-01)	1
Submittal of Working Drawings (7-12-07)	1
Crane Safety (8-15-05)	8
High Strength Bolts (11-17-06)	8
Scope of Work (SPECIAL)	9
Cleaning and Painting the Existing Lift Bents (SPECIAL)	9
Cleaning and Painting the Existing Ramps (SPECIAL)	10
Replacement of Existing Steel Beam (SPECIAL)	11
Repair of Existing Ramp End (SPECIAL)	12
Sealing the Joints (SPECIAL)	12
Installation of Work Platform (SPECIAL)	13
Lift System (SPECIAL)	13



PROJECT SPECIAL PROVISIONS
STRUCTURE

PROJECT F-5002**BRUNSWICK-NEW HANOVER COUNTIES****SECURING OF VESSELS****(10-12-01)**

Secure vessels in accordance with Section 107 of the Standard Specifications and the following provision.

When utilizing barges, tugboats or other vessels, take all necessary precautions to ensure that such vessels are securely anchored or moored when not in active operation. Take all necessary measures to ensure that the vessels are operated in a manner that avoids damage to or unnecessary contact with bridges and other highway structures and attachments. If severe weather conditions are anticipated, or should be anticipated through reasonable monitoring of weather forecasts, take additional measures to protect bridges and other highway structures and attachments from extreme conditions. The Contractor is strictly liable for damages to any bridge or other highway structure or attachment caused by a vessel owned or controlled by the Contractor. The Contractor is also liable to third parties for property damages and loss of revenue caused by vessels under the Contractor's control.

SUBMITTAL OF WORKING DRAWINGS**(7-12-07)****1.0 GENERAL**

Submit working drawings in accordance with Article 105-2 of the Standard Specifications and the requirements of this special provision. For the purposes of this provision, "submittals" refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required submittals for this project. Submittals are only necessary for those items as required by the Standard Specifications, other Special Provisions or contract plans. Make submittals that are not specifically noted in this Special Provision directly to the Resident Engineer. Either the Structure Design Unit or the Geotechnical Engineering Unit or both units will jointly review submittals.

If a submittal contains variations from plan details or specifications or significantly affects project cost, field construction or operations, discuss the submittal with and submit all copies to the Resident Engineer. State the reason for the proposed variation in the submittal. To minimize review time, make sure all submittals are complete when initially submitted. Provide a contact name and information with each submittal. Direct any questions regarding submittal requirements to the Resident Engineer, Structure Design Unit contacts or the Geotechnical Engineering Unit contacts noted below.

In order to facilitate in-plant inspection by NCDOT and approval of working drawings, provide the name, address and telephone number of the facility where fabrication will actually be done if different than shown on the title block of the submitted working drawings. This includes, but is not limited to, precast concrete items, prestressed concrete items and fabricated steel or aluminum items.

2.0 ADDRESSES AND CONTACTS

For submittals to the Structure Design Unit, use the following addresses:

Via US mail:

Mr. G. R. Perfetti, P. E.
State Bridge Design Engineer
North Carolina Department
of Transportation
Structure Design Unit
1581 Mail Service Center
Raleigh, NC 27699-1581

Attention: Mr. P. D. Lambert, P. E.

Via other delivery service:

Mr. G. R. Perfetti, P. E.
State Bridge Design Engineer
North Carolina Department
of Transportation
Structure Design Unit
1000 Birch Ridge Drive
Raleigh, NC 27610

Attention: Mr. P. D. Lambert, P. E.

For submittals to the Geotechnical Engineering Unit, use the following addresses:

For projects in Divisions 1-7, use the following Eastern Regional Office address:

Via US mail:

Mr. K. J. Kim, Ph. D., P. E.
Eastern Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
1570 Mail Service Center
Raleigh, NC 27699-1570

Via other delivery service:

Mr. K. J. Kim, Ph. D., P. E.
Eastern Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
3301 Jones Sausage Road, Suite 100
Garner, NC 27529

For projects in Divisions 8-14, use the following Western Regional Office address:

Via US mail:

Mr. John Pilipchuk, L. G., P. E.
Western Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Western Regional Office
5253 Z Max Boulevard
Harrisburg, NC 28075

Via other delivery service:

Mr. John Pilipchuk, L. G., P. E.
Western Region Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Western Regional Office
5253 Z Max Boulevard
Harrisburg, NC 28075

Direct any questions concerning submittal review status, review comments or drawing markups to the following contacts:

Primary Structures Contact:

Paul Lambert
(919) 250 – 4041
(919) 250 – 4082 facsimile
plambert@dot.state.nc.us

Secondary Structures Contacts:

James Gaither
(919) 250 – 4042

David Stark
(919) 250 – 4044

Eastern Regional Geotechnical Contact (Divisions 1-7):

K. J. Kim
(919) 662 – 4710
(919) 662 – 3095 facsimile
kkim@dot.state.nc.us

Western Regional Geotechnical Contact (Divisions 8-14):

John Pilipchuk
(704) 455 – 8902
(704) 455 – 8912 facsimile
jpilipchuk@dot.state.nc.us

3.0 SUBMITTAL COPIES

Furnish one complete copy of each submittal, including all attachments, to the Resident Engineer. At the same time, submit the number of hard copies shown below of the same complete submittal directly to the Structure Design Unit and/or the Geotechnical Engineering Unit.

The first table below covers “Structure Submittals”. The Resident Engineer will receive review comments and drawing markups for these submittals from the Structure Design Unit. The second table in this section covers “Geotechnical Submittals”. The Resident Engineer will receive review comments and drawing markups for these submittals from the Geotechnical Engineering Unit.

Unless otherwise required, submit one set of supporting calculations to either the Structure Design Unit or the Geotechnical Engineering Unit unless both units require submittal copies in which case submit a set of supporting calculations to each unit. Provide additional copies of any submittal as directed by the Engineer.

STRUCTURE SUBMITTALS

Submittal	Copies Required by Structure Design Unit	Copies Required by Geotechnical Engineering Unit	Contract Reference Requiring Submittal ¹
Arch Culvert Falsework	5	0	Plan Note, SN Sheet & "Falsework and Formwork"
Box Culvert Falsework ⁷	5	0	Plan Note, SN Sheet & "Falsework and Formwork"
Cofferdams	6	2	Article 410-4
Evazote Joint Seals ⁶	9	0	"Evazote Joint Seals"
Expansion Joint Seals (hold down plate type with base angle)	9	0	"Expansion Joint Seals"
Expansion Joint Seals (modular)	2, then 9	0	"Modular Expansion Joint Seals"
Expansion Joint Seals (strip seals)	9	0	"Strip Seals"
Falsework & Forms ² (substructure)	8	0	Article 420-3 & "Falsework and Formwork"
Falsework & Forms (superstructure)	8	0	Article 420-3 & "Falsework and Formwork"
Girder Erection over Railroad	5	0	Railroad Special Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	8	0	"Maintenance and Protection of Traffic Beneath Proposed Structure at Station ____"
Metal Bridge Railing	8	0	Plan Note
Metal Stay-in-Place Forms	8	0	Article 420-3
Metalwork for Elastomeric Bearings ^{4,5}	7	0	Article 1072-10

F-5002

Miscellaneous Metalwork ^{4,5}	7	0	Article 1072-10
Optional Disc Bearings ⁴	8	0	“Optional Disc Bearings”
Overhead Signs	13	0	Article 903-3(C) & Applicable Project Special Provisions
Pile Splicer	7	2	Subarticle 450-7(C)
Placement of Equipment on Structures (cranes, etc.)	7	0	Article 420-20
Pot Bearings ⁴	8	0	“Pot Bearings”
Precast Concrete Box Culverts	2, then 1 reproducible	0	“Optional Precast Reinforced Concrete Box Culvert at Station ____”
Precast Retaining Wall Panels	10	1	Article 1077-2
Prestressed Concrete Cored Slab (detensioning sequences) ³	6	0	Article 1078-11
Prestressed Concrete Deck Panels	6 and 1 reproducible	0	Article 420-3
Prestressed Concrete Girder (strand elongation and detensioning sequences)	6	0	Articles 1078-8 and 1078- 11
Removal of Existing Structure over Railroad	5	0	Railroad Special Provisions
Revised Bridge Deck Plans (adaptation to prestressed deck panels)	2, then 1 reproducible	0	Article 420-3
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	2, then 1 reproducible	0	“Modular Expansion Joint Seals”
Sound Barrier Wall Casting Plans	10	0	Article 1077-2 & “Sound Barrier Wall”
Sound Barrier Wall Steel Fabrication Plans ⁵	7	0	Article 1072-10 & “Sound Barrier Wall”
Structural Steel ⁴	2, then 7	0	Article 1072-10

Temporary Detour Structures	10	2	Article 400-3 & “Construction, Maintenance and Removal of Temporary Structure at Station _____”
Temporary Shoring ⁸	7	2	“Temporary Shoring”
TFE Expansion Bearings ⁴	8	0	Article 1072-10

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the Project Special Provision by that name. Articles or subarticles refer to the Standard Specifications.
2. Submittals for these items are necessary only when required by a note on plans.
3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials and Tests Unit.
4. The fabricator may submit these items directly to the Structure Design Unit.
5. The two sets of preliminary submittals required by Article 1072-10 of the Standard Specifications are not required for these items.
6. Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced Project Special Provision.
7. Submittals are necessary only when the top slab thickness is 18 inches or greater.
8. Electronic copies of submittals are required. See referenced Project Special Provision.

GEOTECHNICAL SUBMITTALS¹

Submittal	Copies Required by Geotechnical Engineering Unit	Copies Required by Structure Design Unit	Contract Reference Requiring Submittal ²
Anchored Retaining Walls	8	2	“Anchored Retaining Walls”
Crosshole Sonic Logging (CSL) Reports	1	0	“Crosshole Sonic Logging”
Drilled Pier Construction Sequence Plans	1	0	“Drilled Piers”
Mechanically Stabilized Earth (MSE) Retaining Walls	8	2	“Mechanically Stabilized Earth Retaining Walls”
Pile Driving Analyzer (PDA) Reports	2	0	“Pile Driving Analyzer”
Pile Driving Equipment Data ³	1	0	Article 450-5
Proprietary Retaining Walls	8	2	Applicable Project Special Provision
Soil Nail Retaining Walls	8	2	“Soil Nail Retaining Walls”
Temporary Mechanically Stabilized Earth (MSE) Walls	9	0	“Temporary Shoring”

FOOTNOTES

1. With the exception of “Pile Driving Equipment Data”, electronic copies of geotechnical submittals are required. See referenced Project Special Provision.
2. References are provided to help locate the part of the contract where the working drawing submittals are required. References in quotes refer to the Project Special Provision by that name. Articles refer to the Standard Specifications.
3. Download Pile Driving Equipment Data Form from following link:
<http://www.ncdot.org/doh/preconstruct/highway/geotech/>

Submit one hard copy of the completed form to the Resident Engineer. Submit a second copy of the completed form electronically, by facsimile or via US Mail or other delivery service to the Geotechnical Engineering Unit. Electronic submission is preferred. See second page of form for submittal instructions.

CRANE SAFETY

(8-15-05)

Comply with the manufacturer specifications and limitations applicable to the operation of any and all cranes and derricks. Prime contractors, sub-contractors, and fully operated rental companies shall comply with the current Occupational Safety and Health Administration regulations (OSHA).

Submit all items listed below to the Engineer prior to beginning crane operations involving critical lifts. A critical lift is defined as any lift that exceeds 75 percent of the manufacturer's crane chart capacity for the radius at which the load will be lifted or requires the use of more than one crane. Changes in personnel or equipment must be reported to the Engineer and all applicable items listed below must be updated and submitted prior to continuing with crane operations.

CRANE SAFETY SUBMITTAL LIST

- A. **Competent Person:** Provide the name and qualifications of the "Competent Person" responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.
- B. **Riggers:** Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.
- C. **Crane Inspections:** Inspection records for all cranes shall be current and readily accessible for review upon request.
- D. **Certifications:** By July 1, 2006, crane operators performing critical lifts shall be certified by NC CCO (National Commission for the Certification of Crane Operators), or satisfactorily complete the Carolinas AGC's Professional Crane Operator's Proficiency Program. Other approved nationally accredited programs will be considered upon request. All crane operators shall also have a current CDL medical card. Submit a list of anticipated critical lifts and corresponding crane operator(s). Include current certification for the type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

HIGH STRENGTH BOLTS

(11-17-06)

In Section 440-8(A) of the Standard Specifications, revise the third paragraph and insert a new paragraph four, respectively, as follows:

"Make sure that plain bolts and washers have a thin coat of lubricant at the time of installation."

"Use nuts that are pre-waxed by the producer/supplier prior to shipping to the project."

SCOPE OF WORK**(SPECIAL)**

The work on both the Southport and Fort Fisher Ferry Basins consists of the following at each location: spot clean and paint, both the structural steel of the existing ramp and the steel of the existing lift bent, remove and replace the top beam of the lift bent with new steel beams, remove and replace the electrical, hydraulic, lift, and lubrication systems, install a work platform around the existing hydraulic power unit enclosure, repair the existing 1'-6" ramp end, and seal the joints of the existing cored slab bridge approaching the ramp. The Ferry Division will provide a ferry moored as shown in the plans to support the ramp during the project. The contractor may temporarily attach scaffolding to the existing steel or concrete. This attachment shall not permanently mark or deform any part of the structure.

The field painting shall be in accordance with section 442-11 of the Standard Specifications and shall be performed by a SSPC QP1 certified contractor.

For cleaning and painting the existing ramps and lift bents, any edges shall be brushed or rolled. All other surfaces shall be brushed, rolled or sprayed. The contractor shall prevent any coating from entering the water. If the contractor erects a containment system for the containment of any overspray or heat enclosure it shall meet the requirements of SSPC Guide 6 class 4.

The contractor shall test the chloride content on the cleaned surface of the steel. A minimum of 1 test per 1,000 square feet of cleaned area shall be performed in the presence of the Engineer or designated representative. The test will demonstrate a chloride content of 10 parts per million or less before any other surface preps or painting is conducted in this area.

The contractor shall power wash all existing steel with a low pressure power wash before any other surface preparation is conducted or surface painted. All steel surfaces shall be power washed to remove all surface contaminants such as organic material, loose paint, oil, grease, or soluble salts.

As part of the power washing operation, a filter system shall be installed to filter the solid debris from the water of the power washing operation. The water shall pass through a filter fabric with an apparent opening size of a number 30 sieve before being allowed to be discharged into the Cape Fear River. A fabric meeting the requirements of section 1056 of the Standard Specifications Table 1056-1, Class A Temporary Silt Fence is acceptable.

The contractor shall locate areas of rust to be spot cleaned and painted. The surface preparation shall be according to 442-8 (SSPC – SP3) of the standard specifications.

CLEANING AND PAINTING THE EXISTING LIFT BENTS**(SPECIAL)**

This work consists of removing all existing rigging, lubrication systems, hydraulic systems, and electrical systems as directed by the Engineer from the existing lift bents, removing the guide beams, powerwashing, spot cleaning and painting any rust spots, to prep the entire surface, performing chloride content tests, and apply a coat of paint to each lift bent. The guide beams are to be removed from the lift bent and shall be cleaned, painted, and reattached according to

this special provision. The existing electrical, hydraulic, and lift systems removed from the lift bents shall become property of the Ferry Division. The contractor shall remove the existing hardware on the lift bent carefully without damage to the elements and shall be salvaged for the Ferry Division except for the stainless steel hydraulic enclosure which shall be retained and reused. The contractor may support the existing counterweights on the lift bents and reposition the weights to gain access to the entire surface of the lift bent.

Surface Preparation

All steel shall be power washed and all rust areas spot cleaned and painted in accordance with Section 442 of the Standard Specifications for Roads and Structures.

The entire surface of the existing paint system of the lift bent shall be cleaned as above and properly prepared before the appearance coat is applied. The Contractor shall submit for approval by the Engineer the procedure to prepare the surface of the lift bent for the appearance coat of coal tar epoxy paint.

Painting

Section 442 of the Standard Specifications shall govern the field painting activities unless otherwise indicated in this special provision. The paint shall be mixed according to the paint manufacturers' product data sheet. The coal tar epoxy paints shall meet the requirements of Section 1080-8 of the Standard Specifications. The primer coat for the spot cleaned areas shall be an organic zinc primer meeting the requirements of 1080-9 with a 3-5 mil DFT. After the primer coat has cured, a second coat of paint shall be applied to the area. This coat shall be Red Coal Tar Epoxy paint with a minimum thickness of 8 - 12 mils DFT. An appearance coat of Black Coal Tar Epoxy paint shall be applied to the entire lift bent when the spot painted areas are still tacky. The thickness of the appearance coat shall be a minimum of 4 mils DFT. No thinners or special solvents may be used unless written permission from the Engineer is acquired unless approved by the Engineer. The minimum ASTM D3359 adhesion shall be 3A.

Measurement and Payment

The pay item "Cleaning and Painting the Existing Lift Bent at _____" will be paid at the lump sum price bid. This price shall be full compensation for furnishing all labor, materials, equipment, paint, staging, and incidentals required to remove the hardware, powerwash, filter the debris, test for salt content, spot clean and paint, roughen the surface, and to apply all paint to the lift bent.

CLEANING AND PAINTING THE EXISTING RAMPS

(SPECIAL)

This work shall consist of powerwashing, spot cleaning and painting any rust spots, performing chloride content tests, applying a primer coat of paint to the cleaned rust spots, and 2 coats of paint to the entire existing ramp steel. No work shall be performed on the existing 3½ inch open steel grid floor.

F-5002

Surface Preparation

All steel shall be power washed and the rust areas spot cleaned and painted in accordance with Section 442 of the Standard Specifications for Roads and Structures.

Painting

Section 442 of the Standard Specifications shall govern the field painting activities unless otherwise indicated in this Special Provision. A primer coat of 3-5 mils DFT organic zinc primer meeting the requirements of 1080-9 shall be applied to the spot cleaned areas and shall completely cure before the appearance coats are applied. Special attention to proper paint coverage shall be given to the edges and bottom surface of the structural elements of the ramp. The contractor shall then apply 2 coats of aluminum mastic epoxy paint meeting the requirements of the Virginia Department of Transportation approved material products list no. (21) Qualified #14 Aluminum Epoxy Mastic. Coatings shall be applied to a 4-6 mils DFT according to the manufacturer's recommendations.

Compensation

The pay item "Cleaning and Painting Existing Ramp _____" will be paid at the lump sum price bid. This price shall be full compensation for furnishing all labor, materials, equipment, paint, staging, and incidentals required to powerwash and filter the debris, test the chloride content, spot clean and paint rust areas, and to apply two coats of paint to the existing ramp.

REPLACEMENT OF EXISTING STEEL BEAM**(SPECIAL)**Description

The work covered by this special provision consists of furnishing all equipment, materials and operations necessary for the removal and replacement of the steel beams as detailed in the plans. The dimensions and locations of the connectors, hangers, sheaves, and hardware are for the Contractor's convenience. The Contractor shall have no claim whatsoever against the Department of Transportation for any delays or additional costs incurred based on the differences between the existing lift bent information indicated on the plans and the actual conditions at the project site. The Contractor is responsible for the proper fit and operation of the ramp after the installation of the new steel beam, lubrication system, lift system, hydraulic system, and electrical system. The Contractor is encouraged to check all existing dimensions to insure a proper fit and function.

Materials

The steel shall be M270 Gr 50 and shall be painted with a System 2 paint system as described in the Standard Specifications.

Payment

The entire cost of the above work including all materials, equipment, tools, paint, labor, and incidentals necessary to complete the work shall be paid for at the lump sum contract price bid for "Replacement of Existing Steel Beam at _____".

REPAIR OF EXISTING RAMP END**(SPECIAL)**General

The work covered in this special provision consists of repairing the 1-foot 6-inch ramp end. The holes for the existing 1 inch diameter rod in the existing ¼-inch gusset plate have enlarged and a proposed ¼-inch plate shall be welded to the existing ¼-inch gusset plate as detailed in the plans. The proposed plate may be field welded according to Section 440-7 of the Standard Specifications. The welded plates shall then be painted with a coat of organic zinc primer meeting the requirements of 1080-8 of the Standard Specifications with a 3-5 mil DFT. The ramp end shall have 2 coats of aluminum mastic epoxy paint to match the completed ramp. The repair shall in no way impede the intended function of the ramp. The Contractor is responsible for proper operation of the completed ramp.

Payment

The work covered by this provision shall be paid for at the lump sum contract price for "Repair of Existing Ramp End at _____". This price and payment shall be full compensation for furnishing all materials, equipment, labor, tools, primer paint, and incidentals required to repair the ramp end as detailed in the plans and in a workman like manner and to the satisfaction of the Engineer.

SEALING THE JOINTS**(SPECIAL)**General

The contractor shall seal the joints on the cored slab bridge approaching the ramp. The joint sealer material shall meet the requirements of Type SL Low Modulus Silicone Sealant according to Section 1028 of the Standard Specifications. The contractor shall remove all loose material and any debris from the joint to the satisfaction of the Engineer before the sealer is applied.

Payment

No separate measurement on payment will be made for preparing, furnishing and applying the sealer to the joints.

The entire cost of the above work including all materials, equipment, tools, labor, and incidentals necessary to complete the work shall be included in the unit contract price bid for the several pay items.

INSTALLATION OF WORK PLATFORM**(SPECIAL)****Description**

The contractor shall construct the work platform around the existing hydraulic power unit housing on the lift bent in accordance with the plans, Standard specifications and this special provision. The steel shall be M270 Gr. 50 and shall be painted with system 2 paint system as described in the Standard Specifications. All field connections are to be high strength bolts unless otherwise noted. The open steel grid floor shall have a minimum section modulus of 0.211 in.³ per ft. with a safe concentrated load of 400 lbs. per ft. of steel grid floor.

Basis of Payment

Payment for the work platform shall be at the lump sum contract price for "Installation of Work Platform _____." This price and payment shall be full compensation for furnishing all materials, equipment, labor, tools, paint, surface preparation, and incidentals to build and install the work platform complete and functional as detailed on the plans in a workman like manner and satisfactory to the engineer.

LIFT SYSTEM**(SPECIAL)****Description**

The work covered in this special provision consists of furnishing all materials, labor, equipment, and incidentals necessary for installing a complete and operable ramp lift system in accordance with the applicable parts of the Standard Specifications, details on the plans, and these special provisions. This system will replace the existing system that will be removed during lift bent repair.

The ramp lift system consist of two (2) hydraulic cylinders, interconnecting tubing, hydraulic pump with reservoir and controls (electrical and hydraulic), chain, chain shackles, 2- existing counter weights (to be reused) with hardware, wire rope, wire rope clamps, thimbles, wire rope sheaves, lubricating system for wire rope sheaves. See plans and special provisions for details. The existing electrical controls will be reused. See special provisions and plans for "Electrical System".

The ramp hydraulic power unit will be mounted in the existing enclosure mounted on the lift bent. Installation of the flow integrator will be at the power unit requiring two return lines to the power unit from the cylinders. The flow integrator and the flow control valve will be piped with ½" stainless steel tubing at the power unit. Two return lines are to be brought from the lift bent to the flow integrator at the power unit. Three lines from the enclosure to the lift bent are required. ¾" hose will be installed from the power unit to the transition to ¾" stainless steel tubing at the attachment point on the ramp support structure. All tubing installed on the ramp support structure will be ¾" stainless steel. ¾" flexible hose will transition from the hard mounted tubing to the hoist cylinders.

The new power unit must have a footprint compatible with mounting within the existing enclosure. See the plans for enclosure dimensions.

GENERAL

All ramp support and lift systems for the ramp are to be furnished new and complete as covered on the plans and in these special provisions.

Place the ramp in a horizontal position with chains attached to hydraulic cylinders, extend the hydraulic cylinders as recommended by the Ferry Division, and attach chain to the ramp lift beam with shackles. Each chain should have a minimum of 4 feet excess length from the point of attachment to ramp lift beam.

RAMP HOISTING SYSTEM

All material specified under this section of the contract shall require the contractor to submit to the Resident Engineer for approval eight (8) copies of catalog cuts, descriptive bulletins, literature and/or drawings for each item, shop drawings, and assembled drawings with specific dimensions, data, flow rates, and manufacturers part numbers to allow determination of plans and special provision compliance. Thirty days shall be allowed for the engineer's review of each submittal. Materials which have not been approved shall not be delivered to the project. The Department of Transportation will not be responsible for any costs (fabrication, etc.) prior to approval of submittals. Eight copies of each catalog cut, bulletin literature and drawings shall be submitted and each shall show the material description, brand name, stock number, size, rating, manufacturing specifications, and the use for which it is intended.

HYDRAULIC HOIST AND LUBRICATION SYSTEM

The hoist system for the ramp shall be furnished complete and operational. The system shall consist of a hydraulic power unit composed of the components listed below, two hydraulic cylinders with related mounting hardware, and all interconnecting tubing and hose.

The system shall provide for full extension and retraction of the cylinders in 45seconds under rated load. The system is to be as previously furnished to the Ferry Division by Livingston and Haven or an approved equal.

The lubricating system for the cable blocks shall be accomplished by the installation of hose and tubing from each sheave terminating at a location as shown on the plans.

HYDRAULIC SYSTEM

General

Hydraulic power unit and components necessary to raise and lower ferry ramp shall be as follows:

Hydraulic Fluid

Hydraulic fluid shall be Texaco #RANDO HD32

Reservoir

Capacity	25 gallons
Material	Steel
Paint	Marine Enamel

Note: The following is a list of components that are to be contained in the reservoir and compromise the power unit which is to be painted with marine enamel.

Pump Mounting Bracket

Material	Steel
Size	Must accommodate 5 HP TEFC "C" face motor and SAE "A" pump Mounting pad

Coupling

Material	Steel
Size	Bore/motor 1 1/8" w 1/4" keyway Bore/pump 5/8" w 5/32" keyway

Pump

Positive Displacement	1.0in ³ /rev. gear type
Working Pressure	3,000psi
Mat. Surge Press.	3,500psi
Mounting	SAE 2 bolt
Port Size	SAE12
Port Location	Rear Inlet and Outlet
Shaft	5/8" dia. woodruff key hardened steel
Gears	Sintered Metal
Seals	Buna N
Bearings	Pressure lubricated Teflon impregnated sleeve
Body and End Covers	Die Cast Aluminum

Electric Motor

Totally Enclosed Fan Cooled
5 HP, 1750 RPM, Single Phase service factor 1.1
Rated for operations on 208/230v 60 Hz system

Directional Control Valve

4 way 3 position direct operated solenoid valve with manual overrides

Mounting Subplate
 Size ¼" ANSI DO3 standard
 Electrical Connection Central Terminal box
 Solenoid wet pin type 120 volt coil, 60 Hz
 Spool all ports connected to tank in center and cross over positions
 Max Press. @ P, A, and B ports 4,600psi
 Max Tank Press. 1,450psi

Flow Integrator

Type Proportional nonadjustable with free reverse flow
 Pressure 3,000psi
 Rated Flow 8 to 16 GPM
 Port Size ½"
 Ratio 50:50
 Manufacturer Brand #B-300

Filter

Type - Full flow inline return with bypass and spin-on throw away element
 Rated Flow 20 GPM
 Rated Pressure 2 psi
 Filtration 10 micron
 By Pass Press. 15 psi
 Port Size ¾" NPTF

Breather Cap

Air Displacement 500 GPM
 Strainer Nylon
 Cap Nickel Chrome plated
 Air Filtration 15 micron

Relief Valve

Type Direct Operated Cartridge
 Pressure 3,000 psi
 Operator Handknob
 Response 20 milliseconds
 Seals Buna N

Manifold

Type	Inline bar
Pattern	N.F.P.A. DO3 (DO1)
Material	6061-T6 Aluminum
Thread Size	Pressure and tank ports SAE 7/8-14, A & B ports SAE 3/4-16, Gauge Port 1/4 NPT

Check Valve

Type	Pilot operated Sandwich plate design
Pattern	A.N.S.I. DO3
No. of Service Ports	2
Cartridge Type	Poppet/seat
Cracking Press	22 psi
Seals	Buna N
Max Press	4,600 psi
Flow Rating	16 GPM

Fluid Level Indicator

Size	127 mm Center Line Distance between screws
Pressure	Capable of 29 psi
Seals	Perbunan
Thermometer Registration	Fahrenheit
Body Material	Galvanized Steel

Flow Control Valve

Type	Full flow one direction, metered flow opposite direction with Knurled knob option
Max Pressure	5,000 psi
Size	1/2" NPT
Material	416 Stainless
Maximum Flow	12 GPM

Pressure gage

Design	Liquid filled with over pressure valve
Case Material	Stainless steel
Case Diameter	2 1/2"
Max Temp	50C
Connection	1/4" NPT
Accuracy	1.6%

F-5002

THE FOLLOWING IS A LIST OF COMPONENTS TO BE SHIPPED SEPARATE FROM THE POWER UNITHydraulic Cylinders

Bore	3 ½"
Stroke	96"
Mounting Style	MP1
Rod Size	1 ¾" diameter
Stop Type	1"
Piston Seals	Lip Type
Rod Material	316 Stainless steel
Rod End Style	#1
Pressure	3,000 psi
Paint	Marine Enamel

Rod Clevis

Thread Size	Compatible with cylinder rod
Pin Size	1"
Load Rating	12,000 lbs
Material	316 stainless steel

Rod Clevis Pin and Fixed Clevis Pin

Diameter	1"
Load Rating	12,000 lbs
Material	316 stainless steel

Tubing

Nominal Size	½" OD
Wall Thickness	0.49"
Nominal Size	¾" OD
Wall Thickness	0.72"
Material	Stainless steel seamless tubing
Specifications	ASTM A-269, Mil Specs 8808
Rockwell Hardness	80 or less for use w/ 37 degree JIC adaptors
Rating	3,000 psi

Adaptors

Nominal Size	½" and ¾"
Type Connection	37 degree JIC
Material	Stainless steel
Rating	3,000 psi

Note: Terminations are to be made with manufacturer procedures and equipment

F-5002Flexible Hose

Flexible high pressure hose shall be used to connect hard mounted stainless steel tubing to the hydraulic hoist cylinders and power unit

Nominal Size	½" and ¾"
Material	Stainless steel braid with outer non-metallic sunlight resistant Outer jacket
Fittings	Stainless Steel
Rating	3,000 psi

Straps and Hardware

Stainless steel tubing is to be strapped to the steel support structure at intervals not to exceed 4 feet. Straps are to be stainless steel. All mounting hardware including plates, angle, and fasteners is to be stainless steel.

WIRE ROPE LUBRICATING SYSTEM

Each wire rope sheave is to have individual copper tubing run from a flexible hose connection to the sheave to a central location shown on the plans accessible from the ramp, with each tube terminated with a fitting compatible with the grease fittings on the existing system.

Lubrication Tubing

Construction –	Copper Tubing meeting ACR specifications
Size	¼" OD wall thickness 0.030"
Rating	1250 psi working pressure, 5,000 psi ultimate burst

Flexible Hose

From the wire rope block center pin to tubing hard mounted on the structure, a flexible hose shall be installed.

Construction	Double stainless steel braid with outer sunlight resistant Non-metallic outer jacket
Rating	3,000 psi

RAMP SUPPORT AND COUNTERWEIGHT SYSTEM COMPONENTSWire Rope

The wire rope used in the support and movement of the ramp and counterweights is to meet the following requirements:

Size	¾"
Stranding	6 X 19
Core	IWRC

F-5002

Lay	Right Land Lay
Material	Improved Plow Steel
Breaking Strength (min)	25.6 tons

Thimbles

For all terminations requiring the use of thimbles, the follow requirements are to be met:

Construction	Galvanized Steel
Type	USS Heavy Wire Rope
Size	$\frac{3}{4}$ "
Width of Opening (min)	$2 \frac{3}{4}$ "
Length of Opening (min)	$3 \frac{3}{4}$ "
Depth	$1 \frac{1}{16}$ "
Overall Length	$6 \frac{1}{2}$ "
Overall Width (min)	$3 \frac{3}{4}$ "

Wire Rope Clip

Wire rope clips are to be $\frac{3}{4}$ " for use with $\frac{3}{4}$ " wire rope. Clip is to have a $\frac{5}{8}$ " diameter U-bolt minimum. The base is to be of steel and be drop forged. The clip is to be hot dipped galvanized.

A minimum of four clips is to be used for each termination. The first clip is to be installed tight against the thimble with each additional clip located a minimum of four inches apart. The clips are to be installed with the base against the live end and U-bolt against the dead end. After the wire rope has been placed in tension, the nuts shall be tightened again to compensate for any decrease in rope diameter.

Chain

Chain used with the hydraulic hoists shall be 5.8" trade size grade 28 hot dipped galvanized with a minimum working load of 6,900 pounds. Chain dimensions shall conform to NACM specifications for $\frac{5}{8}$ " chain. Dimensions of the chain link shall allow the passing of a $\frac{3}{4}$ " pin through any link in the chain. The eye of a $\frac{5}{8}$ " screw pin shackle shall be able to pass through an end link.

Screw Pin Shackle

A $\frac{5}{8}$ " dropped forged steel anchor shackle with screw pin is to be furnished at locations shown on the plans. The shackle is to have a minimum working load of 6,500 pounds. Shackle screw pin is to be $\frac{3}{4}$ " screw type. A minimum opening at the pin of $1 \frac{1}{16}$ " is required. Entire assembly is to be hot dipped galvanized.

F-5002

Wire Rope Sheaves and Sheave Pins

Wire rope sheaves are to be furnished in the location and quantities shown on the plans.

The Wire rope sheave is to be 16" in diameter for use with ¾" wire rope with a working load minimum of 10 tons with ultimate load 4 times the working load. The sheave is to be of steel and hot dipped galvanized. Hub width is to be a minimum of 2".

The sheave is to be mounted on a grooved bronze bearing with provisions for pressure lubrication of the bearing through the center pin. It is to be sized for a 2" pin.

The sheave pin is to be 2" in diameter with a 5 ¼" grip, hex nut, key at head to prevent rotation and cotter pin to retain nut. Sheave pin and nut shall be stainless steel type 316 in accordance with ASTM A276. Cotter pin is to be stainless steel. Pin shall be drilled for pressure lubrication with lubrication provided on sheave center line.

Bronze thrust washers are to be provided as shown on the plans to center sheave in mounting assembly. Thrust washer thicknesses are to be adjusted to provide a clearance of 1/8" plus or minus 1/16" to allow free running of sheave with sheave pin tightened.

The sheave and sheave pin shall provide a safe working load of 10 tons with ultimate load 4 times working load.

The contractor must ensure that sheave dimensions are compatible with support structure shown on plans.

Hydraulic Power Unit Enclosure

The existing power unit enclosure is to be reused. The foot print of the new hydraulic power unit is to be compatible with the existing enclosure.

The dimensions are shown on the plans and are to be confirmed in the field. It is the responsibility of the contractor to ensure compatibility of these dimensions with the hydraulic power unit approved to be furnished.

Spare To Be Furnished

The following items are to be furnished as spares for this project:

- 2 Spare hydraulic cylinders filled with hydraulic fluid and plugged.
- 1 Spare hydraulic pump motor.

These items are to be packaged and furnished to the South Port Ferry Operations.

ELECTRICAL INSTALLATION – GENERAL

The electrical installation shall be installed by an Electrical Contractor duly licensed in the State of North Carolina for a project of this size.

The installation shall meet the latest addition of NFPA 70 (National Electrical Code) and any additions or addendum as approved by the North Carolina Building Code Council.

Eight copies of all catalog cuts for all material and equipment to be used in the electrical installation shall be submitted to the Resident Engineer for approval. Thirty days shall be allowed for the approval process and no material is to be ordered or installed until approval is granted.

All material is to be furnished new and stored in protective conditions. Any deterioration due to improper storage will be grounds for requiring replacement.

All electrical material installed is to be “UL” listed and labeled.

GROUNDING

This installation is to meet the requirements of Article 250 of the NEC. Equipment grounding conductors are to be pulled in all conduit runs both metallic and non-metallic. These conductors are to be sized in accordance with Article 250 of the NEC or as shown on the plans, and are to be color coded green and are to be THWN. All equipment and devices are to be bonded to the equipment grounds including all receptacles, light fixture, messenger cable, motor starter, transfer switch, metallic junction, and pull boxes.

ELECTRICAL SYSTEM

Description:

The existing electrical system is composed of submarine cable feeders that supply power to the electrical hydraulic units and area light on the lift bent.

Power and circuitry for ramp hydraulic unit control, receptacles for back up chain hoists, shore power receptacles, and transfer switch are all mounted on the ramp bridge and fed in aluminum conduit.

Repair of the lift bent will require the removal or temporary support of all electrical items from the lift bent. The submarine cable and stainless steel junction box are to be supported at an elevation to prevent tidal flooding, and installed after repair to the original elevation.

The area light is to be reinstalled in the existing location and fed in new PVC conduit attached with stainless steel hardware.

The electrical installation on the ramp structure may be left in place if the ramp can be adequately painted with them in place.

Any removal must be accomplished by a licensed electrical contractor and documentation of circuitry, conduit locations, and mounting hardware maintained to ensure that reinstallation will be identical to the original.

Any damage to electrical material will require replacement with like kind.

CONDUIT AND FITTINGS

All conduit used in this project shall be schedule 40 PVC except as noted on the plans. The PVC conduit shall be furnished in the sizes indicated. The PVC shall meet commercial standard CS-207-60 with a tensile strength of 5,500 psi at 78 degrees F, flexural strength of 11,000 psi and compressive strength of 8,600 psi. All PVC conduit and fittings are to be UL listed and labeled. Catalog cuts are required on all PVC conduit and fittings.

All PVC fittings used are to be of the same manufacturer as the conduit. Cement is to be as recommended by the manufacturer and applied per manufacturer's instructions with particular attention to minimum temperatures.

Field bending shall be accomplished by use of a heat bender designed for that purpose. No heating of conduit with open flames will be permitted.

All cutting of PVC conduit shall be accomplished with the use of a miter box to ensure square ends. These ends shall be reamed to ensure no restriction of the inside diameter.

FLEXIBLE NON-METALLIC CONDUIT AND FITTINGS

All flexible non-metallic conduit for this project shall be Type A jacketed and nylon reinforced core of PVC as manufactured by Electric-flex Type LNM-P in the appropriate sizes as shown on the plans. The conduit is to be Orange in color, and "UL" listed and labeled

Fittings for the above are to be T & B Type A 6300 series in the appropriate sizes made of fiberglass reinforced thermoplastic. All conduit and its installation shall meet the requirements of article 351 Part B of the NEC.

WIRE AND CABLE

All wire for this project shall be copper with type THWN insulation rated 600 volts. All wire shall be UL listed and labeled and catalog cuts are to be submitted for approval for all sizes. All wire is to be furnished new. No use of existing conductors will be permitted.

All wire used in the ramp electrical circuits to include receptacle and lighting, and hoist electrical system shall be 19 strand copper with THWN insulation. Control wiring shall be #12 AWG except for control wiring on the ramp to the pushbutton stations which can be #14 AWG. Motor conductors for the hydraulic control unit shall be #8AWG. All terminations shall use a NEC approved method for terminating stranded conductors.

HARDWARE

All hardware used in the electrical system for support, attachment, assembly, or mounting shall be corrosion resistant and consistent with the corrosion protection of the devices mounted. All hardware shall be stainless steel unless specified otherwise. All conduit straps and mounting hardware is to be stainless steel.

MAGNETIC COMBINATION STARTER

An existing combination magnetic starter for the hydraulic pump for the ramp lift system will be reused. The starter enclosure is constructed of stainless steel with an electropolished finish with a NEMA rating of 4. The starter is rated 5 horse power at 230 VAC Single Phase. The starter contains a fusible disconnecting device rated 60 amps with two fuses. The coil voltage for the magnetic starter is to rated 120 VAC. Thermal overloads sized for the full load amperage taken from the nameplate of the new pump motor are to be installed. . Starter is Square "D" #8538 SDW-62 series with #9999 Form FF4T13 transformer and fuse modification.

PAINTING

At the discretion of the Engineer, the enclosures for the 200 amp shore power receptacles are to be painted using the same paint system as specified for the ramp. Any metallic electrical device including junction boxes and metallic conduit fittings that are not constructed of aluminum or stainless steel will be painted at the direction of the Engineer.

Basis of Payment

Payment for the ramp lift system and electrical shall be at the lump sum contract price "Ramp Lift, Electrical, and Lubrication System _____." This price and payment shall be full compensation for furnishing all materials, equipment, labor, tools, and incidentals required to install the ramp lift, electrical, and lubrication system complete and operational as detailed on the plans in a workmanlike manner and satisfactory to the Engineer.