



STATE OF MAINE
 DEPARTMENT OF TRANSPORTATION
 16 STATE HOUSE STATION
 AUGUSTA, MAINE
 04333-0016

JOHN ELIAS BALDACCI
 GOVERNOR

DAVID A. COLE
 COMMISSIONER

March 19, 2009
 Subject: **Auburn**
 Federal Project No. BR-A560(000)X
 State Pin No.015600.00
Amendment No. 1

Dear Sir/Ms:

Make the following changes to the Bid Documents:

In the bid Book (pages 3 through 8), **REMOVE** the “SCHEDULE OF ITEMS”, 6 pages dated 090303 and **REPLACE** with the attached new “SCHEDULE OF ITEMS” 6 pages dated 090319.

In the Bid Book, at the end of “SPECIAL PROVISION, PROTECTION OF RAILROAD TRAFFIC AND STRUCTURES” (after page 35), **ADD** the attached two sections; “**ERECTION, HOISTING AND DEMOLITION REQUIREMENTS**”, 2 pages undated and “**SHEETING AND SHORING REQUIREMENTS**”, 5 pages undated.

In the Bid Book, after page 90, **ADD** the attached "SECTION 506, SHOP APPLIED PROTECTIVE COATING - STEEL", 13 pages dated June 5, 2006.

In the Plans, Plan Sheet 2 of 25; **ADD** the following item to the “ESTIMATED QUANTITIES” in pen and ink.

Item No.	Description	Quantity	Unit
506.9101	GALVANIZING	1	LUMP SUM

In the Plans, Plan Sheet 18 of 25; **ADD** the following note under "PIPE PILE SECTION" (lower left corner of the plan sheet); "**THE PILE REBAR BOTTOM ELEVATION IS 188.00**". Make this change in pen and ink.

In the Plans, Plan Sheet 19 of 25; **ADD** the following note under “PIER PILE NOTES” **"7. The portion of the pier pipe piles above elevation 219.00 will be hot dipped galvanized in accordance with Section 506, Shop Applied Protective Coating – Steel."** Make this change in pen and ink.

The following question has been received:



PRINTED ON RECYCLED PAPER

Question: Are the pipe piles at the piers driven open or closed ended? If open, what is the limit of excavation, reinforcing steel and concrete in the pipe pile?

Response: All piles shall be equipped with a tip in accordance with Standard Specifications Section 501.10, Prefabricated Pile Tips. The lower limit of the Rebar Cage is at elevation 188.00. Please see the above Plan note.

Consider these changes and information prior to submitting your bid on March 25, 2009.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott Bickford". The signature is written in a cursive style with some capital letters.

Scott Bickford
Contracts & Specifications Engineer

SCHEDULE OF ITEMS

CONTRACT ID: 015600.00

PROJECT(S): BR-A560(000)X

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS

SECTION 0001 PROJECT ITEMS

0010	202.19 REMOVING EXISTING BRIDGE	LUMP	LUMP				
0020	202.203 PAVEMENT BUTT JOINTS	SY	775.000				
0030	203.20 COMMON EXCAVATION	CY	850.000				
0040	203.25 GRANULAR BORROW	CY	430.000				
0050	206.082 STRUCTURAL EARTH EXCAVATION - MAJOR STRUCTURES	CY	530.000				
0060	206.10 STRUCTURAL EARTH EXCAVATION - PIERS	CY	75.000				
0070	304.10 AGGREGATE SUBBASE COURSE - GRAVEL	CY	860.000				
0080	403.207 HOT MIX ASPHALT 19.0 MM HMA	T	200.000				
0090	403.210 HOT MIX ASPHALT 9.5 MM HMA	T	420.000				
0100	403.213 HOT MIX ASPHALT 12.5 MM HMA BASE	T	130.000				

SCHEDULE OF ITEMS

CONTRACT ID: 015600.00

PROJECT(S): BR-A560(000)X

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0110	409.15 BITUMINOUS TACK COAT - APPLIED	75.000 G				
0120	501.231 DYNAMIC LOADING TEST	4.000 EA				
0130	501.46 STEEL H-BEAM PILES 73 LBS/FT, DELIVERED	1170.000 LF				
0140	501.461 STEEL H-BEAM PILES 73 LBS/FT, IN PLACE	1170.000 LF				
0150	501.70 STEEL PIPE PILES, DELIVERED	796.000 LF				
0160	501.701 STEEL PIPE PILES, IN PLACE	796.000 LF				
0170	501.90 PILE TIPS	24.000 EA				
0180	501.91 PILE SPLICES	56.000 EA				
0190	501.92 PILE DRIVING EQUIPMENT MOBILIZATION	LUMP	LUMP			
0200	502.219 STRUCTURAL CONCRETE, ABUTMENTS AND RETAINING WALLS	LUMP	LUMP			
0210	502.239 STRUCTURAL CONCRETE PIERS	LUMP	LUMP			

SCHEDULE OF ITEMS

CONTRACT ID: 015600.00

PROJECT(S): BR-A560(000)X

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0220	502.25 STRUCTURAL CONCRETE SUPERSTRUCTURE SLABS	LUMP	LUMP			
0230	502.31 STRUCTURAL CONCRETE APPROACH SLABS	LUMP	LUMP			
0240	502.49 STRUCTURAL CONCRETE CURBS AND SIDEWALK	LUMP	LUMP			
0250	503.12 REINFORCING STEEL, FABRICATED AND DELIVERED	24350.000 LB				
0260	503.13 REINFORCING STEEL, PLACING	24350.000 LB				
0270	506.9101 GALVANIZING (AND TOP COATING)	LUMP	LUMP			
0280	507.0811 STEEL BRIDGE RAILING, 2 BAR	LUMP	LUMP			
0290	508.14 HIGH PERFORMANCE WATERPROOFING MEMBRANE	LUMP	LUMP			
0300	514.06 CURING BOX FOR CONCRETE CYLINDERS	1.000 EA				
0310	515.21 PROTECTIVE COATING FOR CONCRETE SURFACES	LUMP	LUMP			
0320	526.301 TEMPORARY CONCRETE BARRIER TYPE I	LUMP	LUMP			

MAINE DEPARTMENT OF TRANSPORTATION

PAGE: 4

SCHEDULE OF ITEMS

DATE: 090319

REVISED:

CONTRACT ID: 015600.00

PROJECT(S): BR-A560(000)X

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0330	526.34 PERMANENT CONCRETE TRANSITION BARRIER	4.000 EA				
0340	535.60 PRESTRESSED STRUCTURAL CONCRETE SLAB	LUMP	LUMP			
0350	606.1721 BRIDGE TRANSITION - TYPE 1	4.000 EA				
0360	606.23 GUARDRAIL TYPE 3C - SINGLE RAIL	700.000 LF				
0370	606.353 REFLECTORIZED FLEXIBLE GUARDRAIL MARKER	2.000 EA				
0380	606.79 GUARDRAIL 350 FLARED TERMINAL	1.000 EA				
0390	609.31 CURB TYPE 3	205.000 LF				
0400	610.08 PLAIN RIPRAP	910.000 CY				
0410	610.18 STONE DITCH PROTECTION	10.000 CY				
0420	613.319 EROSION CONTROL BLANKET	250.000 SY				
0430	615.07 LOAM	30.000 CY				

SCHEDULE OF ITEMS

CONTRACT ID: 015600.00

PROJECT(S): BR-A560(000)X

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0440	618.1401 SEEDING METHOD NUMBER 2 - PLAN QUANTITY	1.000 UN				
0450	620.58 NON WOVEN GEOTEXTILE	910.000 SY				
0460	620.604 GEOCELL CONFINEMENT SYSTEM	4500.000 SF				
0470	627.711 WHITE OR YELLOW PAINTED PAVEMENT MARKING LINE (PLAN QUANTITY)	1800.000 LF				
0480	629.05 HAND LABOR, STRAIGHT TIME	40.000 HR				
0490	631.12 ALL PURPOSE EXCAVATOR (INCLUDING OPERATOR)	20.000 HR				
0500	631.14 GRADER (INCLUDING OPERATOR)	20.000 HR				
0510	631.172 TRUCK - LARGE (INCLUDING OPERATOR)	20.000 HR				
0520	631.22 FRONT END LOADER (INCLUDING OPERATOR)	20.000 HR				
0530	637.071 DUST CONTROL	LUMP	LUMP			
0540	639.18 FIELD OFFICE TYPE A	1.000 EA				

SCHEDULE OF ITEMS

CONTRACT ID: 015600.00

PROJECT(S): BR-A560(000)X

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0550	652.30 FLASHING ARROW BOARD	1.000 EA				
0560	652.35 CONSTRUCTION SIGNS	240.000 SF				
0570	652.38 FLAGGER	400.000 HR				
0580	652.39 WORK ZONE TRAFFIC CONTROL	LUMP	LUMP			
0590	656.75 TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL	LUMP	LUMP			
0600	659.10 MOBILIZATION	LUMP	LUMP			
	SECTION 0001 TOTAL					
	TOTAL BID					

ERECTION, HOISTING AND DEMOLITION REQUIREMENTS

The following items are to be included in the design and construction procedures for all erection, hoisting, and demolition on, over, or adjacent to railroad tracks.

1. A plan showing the locations of cranes, horizontally and vertically, operating radii, with delivery or disposal locations shown. The location of all tracks and other railroad facilities shall also be shown.
2. Crane rating sheets showing cranes to be adequate for 150% of the actual weight of the pick. A complete set of crane charts, including crane, counterweight, and boom nomenclature is to be submitted.
3. Plans and computations showing weight of picks must be submitted. The weight shall include the weight of material and rigging that will be included in each pick. Calculations shall be made from plans of the existing and/or proposed structure showing complete and sufficient details with supporting data for the demolition or erection of the structure.
4. If the sponsor can prove to the Railroad that plans do not exist and weights must be calculated from field measurements, the field measurements are to be made under the supervision of the Licensed Professional Engineer submitting the procedure and he shall include sketches and estimated weight calculations with his procedure. If possible, field measurements shall be taken with a Railroad representative present. Weights shall include the weight of concrete, or other material, that will be included in the lifts.
5. If the procedure involves either the cutting of steel or the bolting of joints which would affect Railroad operations, a detailed staging plan with estimated durations will be required.
6. A location plan showing all obstructions such as wires, poles, adjacent structures, etc., must be provided to show that the proposed lifts are clear of these obstructions.
7. A data sheet shall be prepared listing the type, size, and arrangements of slings, shackles, or other connecting equipment. Include copies of catalog or information sheets for specialized equipment.
8. A complete procedure is to be included, indicating the order of lifts and any repositioning or re-hitching of the crane or cranes.
9. Demolition shield submittals must include a plan showing the details of the shield, a written installation and removal procedure and design calculations verifying the capacity of the shield. The shield should be designed for a minimum load of fifty (50) psf. plus the weight of the equipment, debris and any other load to be carried.
10. Temporary support of any components (overhead or under grade) or intermediate stages is to be shown and detailed. A guardrail (railroad) will be required to be installed in a track where a temporary bent is located within twelve (12) feet from the centerline of that track.

11. A time schedule of the various stages must be shown as well as a schedule for the entire lifting procedure.
12. All bridge erection or demolition procedures submitted will be prepared, signed and sealed by a Licensed Professional Engineer.
13. Three (3) copies of the lifting procedures are to be sent to the Railroad's Engineer. The sponsor is to expect a minimum thirty (30) day review period from the day the submission is received by the Engineer.
14. The Railroad's representative must be present at the site during the entire demolition and erection procedure period. The sponsor must notify the Railroad representative at least seventy-two (72) hours in advance of the work. No changes will be accepted after that time.
15. The name and experience of the employee supervising the operation must be supplied to the Railroad.

SHEETING AND SHORING REQUIREMENTS

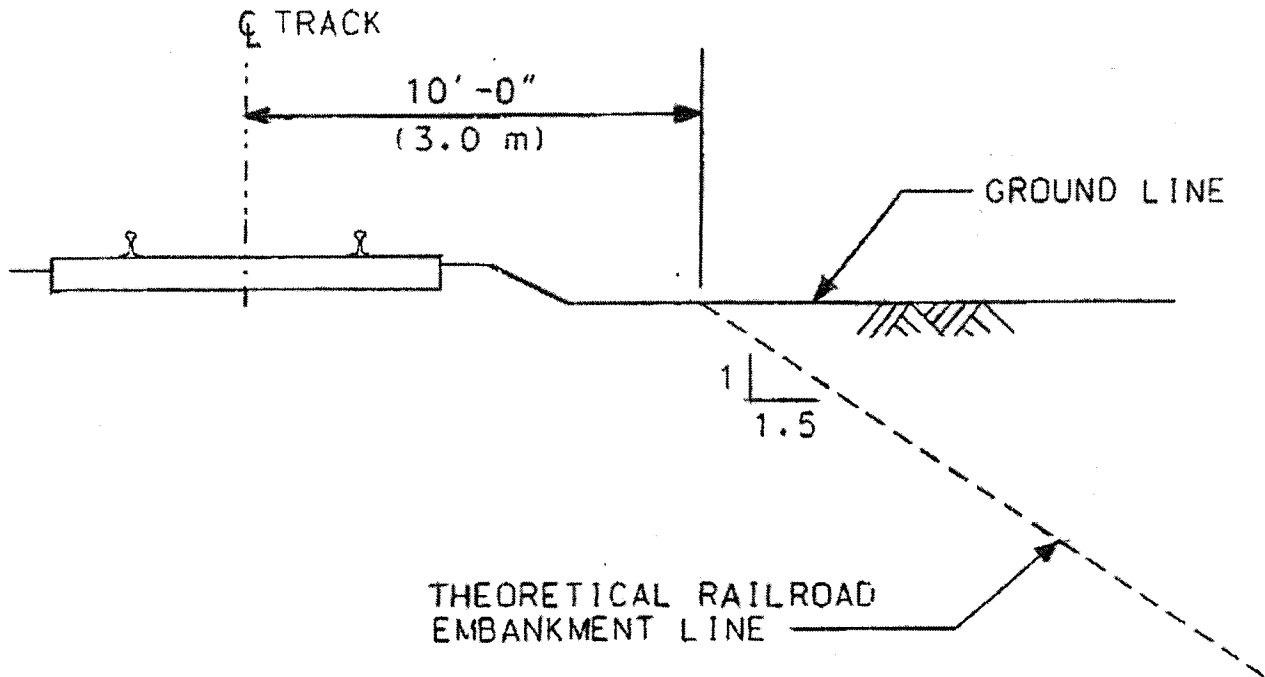
The following items are to be included in the design and construction procedures for all permanent and temporary facilities adjacent to railroad tracks.

1. Footings for all piers, columns, walls, or other facilities shall be located and designed so that any temporary sheeting and shoring for support of adjacent track or tracks during construction shall not be closer than ten (10) feet from the centerline of the nearest track.
2. When excavation for construction of the above mentioned facilities is within the theoretical embankment line (see drawing SK-1), interlocking steel sheet piling, driven prior to excavation, must be used to protect track stability. The use of trench boxes or similar devices is not acceptable. Soldier piling and lagging will be considered for supporting adjacent track(s) only when its use is approved by the Railroad's Engineer. Consideration for the use of soldier piling and lagging will be made if the required penetration of steel sheet piling cannot be obtained and when dry, non-running, stable material will be encountered.
3. The sheeting shall be designed to support all lateral forces caused by the earth, water, railroad and other surcharge loads. The railroad loading to be applied is an E-80 loading. This loading consists of 80 Kip axles spaced five (5) feet on centers. The lateral forces acting on the sheeting shall be computed as follows.
 - a. The Boussinesq analysis shall be used to determine the lateral pressure caused by the railroad loading. The load on the track shall be taken as a strip load with a width equal to the length of the ties (8'-6"). The vertical surcharge, q (psf), caused by each axle, shall be uniform and equal to the axle weight divided by the tie length and the axle spacing (5'-0"). For an E-80 loading, this results in: $q=80,000 / (8.5 \times 5) = 1882$ psf. The horizontal pressure due to the live load surcharge at any point on the sheet piling wall is P_h and can be calculated by the following: $P_h=(2q/\pi)(\beta-\sin \beta \cos 2\alpha)$ (see drawing SK-2).
4. The Engineer responsible for design of the sheeting and shoring shall provide estimated lateral deflection of the proposed system along with supporting calculations.
5. In order to maintain safe operation of the railroad, the Railroad's Engineer may recommend that the Contractor monitor the railroad tracks for movement. When requested, the Contractor will be required to submit survey data taken at specified locations and according to a schedule to be established by the Railroad's Engineer.
6. The allowable stresses for the sheet piling and other steel members (wales, struts, etc.) shall be in accordance with AREMA Chapter 15, Parts 1 and 2. These allowable stresses may be increased ten percent (10%) due to the temporary nature of the installations.
7. Where soil or rock anchors are used, all anchors must be tested. Testing shall be in accordance with industry standards with ten percent (10%) of the anchors "Performance Tested" and all other "Proof Tested." Design of soil and rock anchors shall conform to

“Recommendations for Prestressed Rock and Soil Anchors,” Post Tensioning Institute, Current Edition.

8. Exploratory trenches, three (3) feet deep and fifteen (15) inches wide in the form of an “H” with outside dimensions matching the outside of sheeting dimensions are to be hand dug, prior to placing and driving steel sheeting, in areas where railroad underground installations are known to exist. These trenches are for exploratory purposes only and are to be backfilled with the backfill compacted immediately. This work must be done in the presence of a Railroad representative.
9. All applicable laws and regulations governing excavations and pile driving operations shall be adhered to including notifications to Pennsylvania One Call (800) 242-1776 or New York Underground Facilities Protective Organization (800) 962-7962 as applicable. The Railroad makes no warranty as to the location of underground utilities located on or near their rights-of-way and shall be held blameless in the event of damage to them. Damage to underground utilities shall be reported immediately to the proper authority and repaired at no expense to the Railroad.
10. Absolute use of track is required while driving sheeting within fifteen (15) feet from centerline of a live track. The procedure for arranging the use of track shall be as outlined in the railroad service agreement.
11. Cavities adjacent to the sheet piling, created by the driving of sheet piling, shall be filled with sand and any disturbed ballast must be restored and tamped immediately.
12. Sheet piling shall be cut off at the top of tie during construction. After construction and backfilling has been completed, piling within ten (10) feet from centerline of track or when bottom of excavation is below a line extending at a 1:1 slope from the end of tie to point of intersection with sheeting, shall be cut off eighteen (18) inches below existing ground line and left in place.
13. Any excavation adjacent to track shall be covered, ramped and provided with barricades as required by the Railroad. A lighted walkway with a handrail must be provided adjacent to the track for any excavation within ten (10) feet of the centerline.
14. Final backfilling of excavation shall be as required by project specifications.
15. The Contractor is to advise the Railroad of the time schedule of each operation and obtain approval for all work to be performed adjacent to tracks so that it may be properly supervised by Railroad personnel.
16. All drawings and design computations for temporary sheeting and shoring shall be prepared in English units, stamped by a Licensed Professional Engineer, and submitted for the Railroad’s approval. The submitting Engineer will be responsible for the accuracy for all controlling dimensions as well as the selection of soil and groundwater design values which will accurately reflect the actual field conditions. Approval of the submitted materials by the Railroad’s Engineer does not relieve the submitting Engineer or the Contractor from that responsibility.

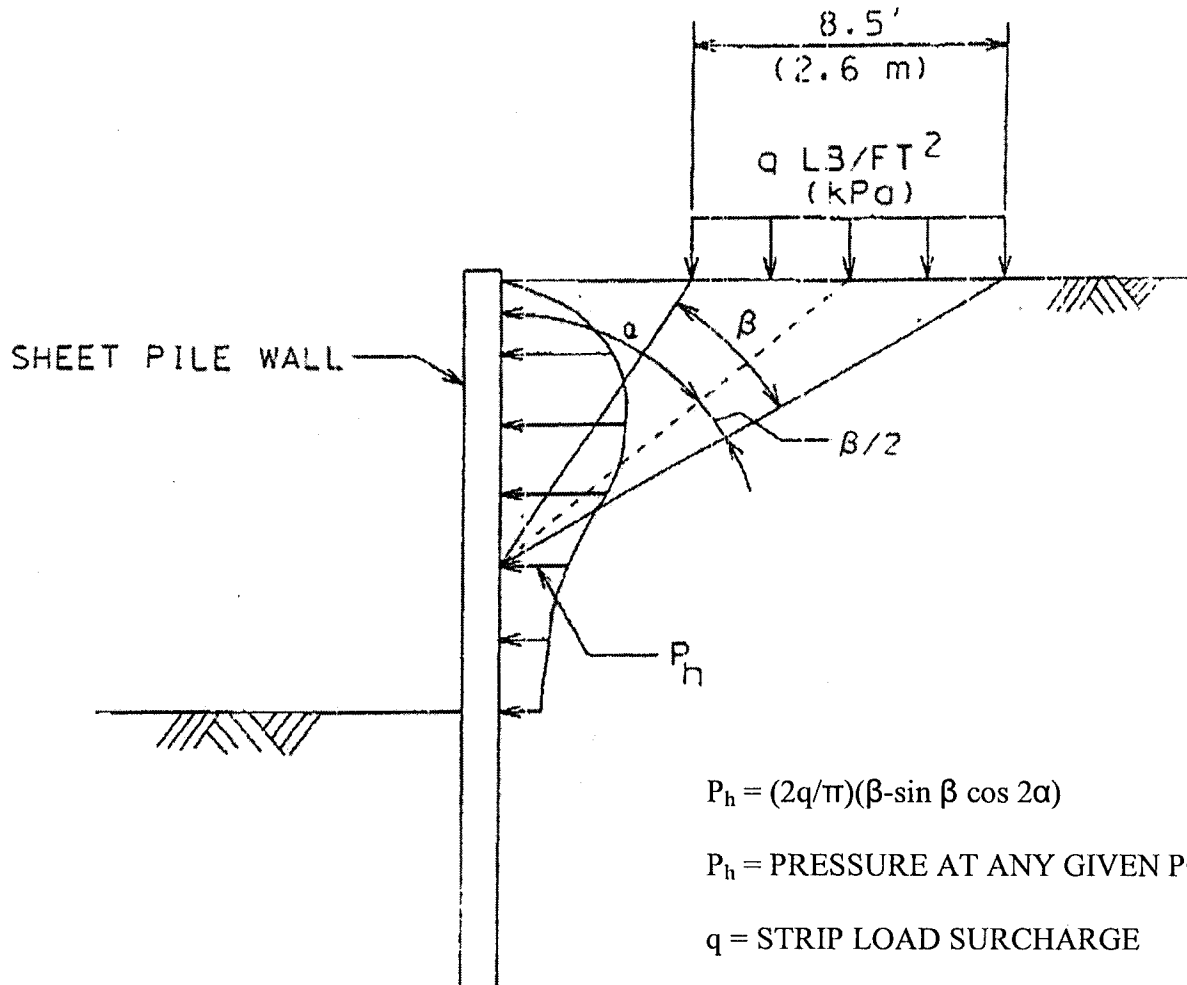
17. The drawings shall contain details of the temporary sheeting and shoring system showing sizes of all structural members, details of connections, and embedment depth. The drawings shall include a plan view showing all the proposed excavations and distances from centerline of track to face of excavation. Drawings shall include a section normal to the track showing the shoring location relative to the centerline of track and showing the height of sheeting, anchorage systems, and railroad track elevation, relative to the bottom of excavation. The plans must be complete and accurately describe the nature and sequence of the work.
18. Five (5) copies of the submission are to be sent to the Railroad's Engineer. The sponsor is advised to expect a minimum thirty (30) day review period from the day the submission is received by the Engineer.
19. The Railroad's representative must be present at the site during the entire sheeting and shoring procedure period. The sponsor must notify the railroad representative at least seventy-two (72) hours in advance of the work. No changes will be accepted after that time.



REQUIREMENTS FOR TEMPORARY SHEET PILING ADJACENT TO TRACK

1. Steel sheet piling for track support is not required for excavation outside the theoretical railroad embankment line. Shoring in accordance with OSHA requirements shall be used in this area.
2. Steel sheet piling driven prior to excavation is required when excavation is within the theoretical railroad embankment line.
3. All sheet piling is to be designed for an E-80 loading. The Boussinesq analysis is to be used to determine the lateral pressure caused by the railroad loading.

DWG. NO. SK-2
LATERAL PRESSURE DIAGRAM



$$P_h = (2q/\pi)(\beta - \sin \beta \cos 2\alpha)$$

P_h = PRESSURE AT ANY GIVEN POINT

q = STRIP LOAD SURCHARGE

α = ANGLE IN DEGREES

β = ANGLE IN RADIANS

LATERAL PRESSURE DUE TO STRIP LOAD

SUPPLEMENTAL SPECIFICATION
SECTION 506
PROTECTIVE COATING - STEEL

506.01 Description This work shall consist of applying protective coating to steel substrate in accordance with the Plans and this Specification.

506.02 Materials Materials shall comply with the requirements of the respective Subsections of this Specification.

506.03 Submittals The Contractor shall submit for review by the Department the following:

- The manufacturers' published data sheet(s) for the specified protective coating system.
- The Quality Control Plan.
- Containment details/design.
- The Contractor's qualifications.
- Material Safety Data Sheets.
- All other documentation specified herein.

506.04 General Requirements Requirements for the protective coating/protective coating system or containment system are:

Galvanizing (and top coating)	Subsections 506.10 through 506.19
Zinc Rich Coating System	Subsections 506.20 through 506.29
Thermal Spray Coating	Subsections 506.30 through 506.39
Fusion Bonded Epoxy	Subsections 506.40 through 506.49
Dry Powder (Polyester) Coating	Subsections 506.50 through 506.59
Containment System	Subsections 506.60 through 506.69

506.05 Inspection. For the purpose of this specification, the following definitions apply:

Engineer – The Resident for coating that is applied in the field, at the job site.

The Fabrication Engineer for coating that is applied in a facility away from the job site.

Quality Control (QC) is the responsibility of the Contractor. The Quality Control Inspector (Q.C.I.), the Contractor's authorized representative, shall inspect all aspects of the work and shall supervise required testing. The Q.C.I. shall record measurements and test results in a Job Control Record (JCR). The Q.C.I. shall reject materials and workmanship that do not meet contract requirements. The results of all testing shall be documented and a copy made available to the Department's Quality Assurance Inspector (Q.A.I.) on a daily basis or as requested by the Q.A.I.

Typical results will include, but not be limited to:

- Cleanliness and anchor profile-before application of the first or primer coat.
- Corner preparation-before application of the first or primer coat.

- Environmental conditions-prior to the application of each coat.
- Dry film thickness (DFT)-after the coating has cured and before the application of subsequent coating.
- Type of equipment, model, serial number and calibration data, if applicable.

Other job-specific test requirements specified on the plans or by The Department shall be included in the JCR.

Quality Assurance (QA) is the prerogative of The Department. The Q.A.I. will ensure that the QC department is being performed properly, verify documentation, periodically inspect workmanship and witness testing. QA testing deemed necessary by the Engineer in addition to the minimum test requirements shall be scheduled to minimize interference with the production schedule.

The JCR shall include the following, as applicable:

- Type of application equipment.
- Type of containment, when required.
- Surface preparation - cleanliness and anchor profile.
- Environmental conditions – ambient temperature, surface temperature, relative humidity, dew point.
- Coating batch and/or lot number, date of manufacture and shelf life.
- Manufacturer's certification of conformance.
- Name(s) of applicator(s).
- Dry Film Thickness (DFT) required/DFT measured.
- Cure data-time/temperature/relative humidity.
- Final inspection by the Q.C.I. and acceptance by The Department's authorized representative.

506.06 Quality Assurance Inspector's Authority The Q.A.I. will have the authority to reject material or workmanship that does not meet the contract requirements. The acceptance of material or workmanship by the Q.A.I. will not preclude subsequent rejection, if found unacceptable by other authorized representatives of The Department.

506.07 Rejections Rejected material or workmanship, as described above, shall be corrected or replaced by the Contractor at no additional cost to The Department.

506.08 Facilities for Inspection For projects that have protective coating application in the shop or off-site, the Contractor shall provide a private office at the coating site for inspection personnel authorized by the Department. The office shall have an area not less than 100 ft² and shall be in close proximity to the work. The office shall be climate controlled to maintain the temperature between 70° F and 80° F. All exit(s) to the office shall have door(s) equipped with a lock and two keys, which shall be furnished to the Inspector(s). The office shall be equipped with a desk or table having a minimum size of 48 in. by 30 in, two chairs, a telephone, telephone answering machine, separate line data port, plan rack and 2-drawer letter size file cabinet with a lock and two keys that shall be furnished to the Inspector(s). When applying protective coating

in the field, the field office shall meet the requirements of the pay item as described in the Standard Specifications.

The facilities and all furnishings shall remain the property of the Contractor upon completion of the work. Payment for the facilities, climate control, lighting, telephone installation, basic monthly telephone charges and all furnishings shall be incidental to the contract.

506.09 Applicator Qualification Shop-applied coating systems shall be applied by applicators that hold a current AISC Sophisticated Paint Endorsement (SPE) or are qualified in accordance with SSPC QP3-*Standard Procedure for Evaluating Qualifications of Shop Painting Applicators*. For specialty items, the Engineer may accept other shop qualifications based on experience and/or an audit by The Department.

Field applicators shall be qualified in accordance with SSPC QP 1 and SSPC QP 2 as applicable.

Thermal Spray Coating (TSC), including sealers and top coating, fusion bonded coatings and hot-dip galvanizing shall be applied in facilities with a minimum of five years documented experience of satisfactory performance. The applicator shall provide documentation (including Quality Control records) and references of successful application that are acceptable to the Engineer.

HOT-DIP GALVANIZING

506.10 Description Hot-dip galvanizing shall meet the requirements of AASHTO M 111M/M 111 (ASTM A 123/A 123M) including any applicable requirements from AASHTO M 111M/M 111 (ASTM A 123/A 123M) Section 2-Referenced Documents. The minimum average coating thickness grade shall conform to Table 1. The Quality Assurance Inspector shall verify Quality Control thickness test results using the same test method used by the Quality Control Inspector.

Certification of compliance and written test results shall be provided to The Department in accordance with AASHTO M 111M/M 111 (ASTM A 123/A 123M).

506.11 Surface Preparation Steel substrate shall be abrasive blast cleaned to a minimum of SSPC SP 6/NACE 3-Commercial Blast Cleaning prior to galvanizing.

506.12 Repairs Repairs to galvanizing shall be in accordance with Annex A1 or A3 of ASTM A 780. Zinc-rich paints for repairs may only be used with approval of the Engineer.

506.13 Top-coating Galvanized Surfaces Areas of galvanized surfaces to be top-coated will be described on the plans or in the Special Provisions.

Chromate quenching and other types of quenching after galvanizing are not permitted.

Hot Dip Galvanized surfaces to be painted shall be smooth and have a uniform zinc thickness that is free of runs, sags and heavy buildup.

Surfaces to be top-coated shall be cleaned in accordance with SSPC-Special Provision 1 (SP-1) using either solvent or steam cleaning alternatives; an alkali alternative may be used provided the PH is 11 or less. After solvent cleaning, all surfaces shall be prepared in accordance with SSPC-Special Provision 7/NACE No.4-Brush-Off Blast Cleaning. The surface shall have an anchor profile that corresponds with the manufacturer's published data sheet. The blast media shall be a mineral or mineral slag that meets the requirements of SSPC AB-1-Mineral and Slag Abrasives. Steel shot or grit is not allowed.

Coatings for topcoat shall be from the current NEPCOAT QPL-list A, B or C. The topcoat color shall be green, Federal Standard 595B, color No. 14272 unless otherwise specified.

Surfaces to be top-coated shall be prepared and coated in an enclosed facility. Paint shall be stored and handled in accordance with the manufacturer's published data sheet and SSPC-PA 1. Primer shall be an epoxy coating as recommended by the topcoat manufacturer. Touch-up shall be in accordance with the coating manufacturer's recommendations. If the repair area of the topcoat is greater than six in.², the entire piece shall be re-coated.

506.14 Thru 506.19 Vacant

COATING SYSTEMS-PAINT

506.20 Description Work shall consist of the application of coating systems in accordance with the Plans and this Specification. When a coating system is applied in a shop or off site, the Contractor shall have the option of determining which coats are applied prior to and after steel erection. Each coat, whether shop-applied or field-applied shall be applied in accordance with the manufacturer's published data sheet and this Specification.

506.21 Materials Coatings systems shall be from the Northeast Protective Coating Committee (NEPCOAT) Qualified Products List (QPL), list A or B. The list may be found through NEPCOAT's Web page: <http://www.nepcoat.org>.

The Contractor shall provide the paint batch description, lot number, date of manufacture, shelf life and the manufacturer's published storage requirements to The Department's authorized representative.. The Contractor shall provide the manufacturer's published data sheet for application of each coat of the coating system including equipment, surface cleanliness, anchor profile, mixing, thinning, application, cure time for the entire range of allowable environmental conditions and dry film thickness (DFT).

506.22 Limits of work All surfaces exposed in the assembled product shall be coated. Surfaces to be embedded in concrete shall receive a mist coat 0.5 to 1.0 mils of primer only.

Faying surfaces of bolted connections shall be primed only and develop a class B slip coefficient in accordance with the "*Specification for Structural Joints Using ASTM A325 or A 490 Bolts*" by the Research Council of Structural Connections (RCSC). The Contractor shall provide documentation to demonstrate that the coating was tested and all requirements were met. The documentation shall indicate the maximum DFT allowable to meet the class B slip coefficient.

Documentation does not need to be submitted for NEPCOAT systems that comply with class B slip coefficient.

506.23 Surface Preparation Surface preparation shall be a minimum of SSPC SP-10 unless a higher standard of surface cleanliness is required by the manufacturer's published data sheet. SSPC VIS. 1 shall be used to determine acceptable surface cleanliness.

Prior to abrasive blast cleaning new steel, all corners exposed in the assembled product shall be rounded to approximately a 1/8 inch radius. A series of tangents to the approximate radius will be considered as a rounded. The Contractor shall prepare a plate approximately 3 inches by 12 inches with the appropriate rounded corner. The plate shall become the Job Standard for corner preparation. The plate shall remain the property of the Contractor. In lieu of rounding the corners, the Contractor may provide an application process that ensures minimum coating thickness build-up on the corners. The process must be demonstrated in advance of application and during production.

After abrasive blast cleaning, the surface shall be visually inspected by the Q.C.I. and Q.A.I. for fins, tears, delaminations and other unacceptable discontinuities. Unacceptable discontinuities shall be removed with a grinder or other suitable power tool and the area shall be blended at a slope of approximately 1:20. The affected area(s) shall be abrasive blast cleaned to develop an acceptable anchor profile.

The Contractor may propose an alternative method of developing an acceptable anchor profile on the substrate. The Contractor shall demonstrate the effectiveness of the proposed method by preparing a 12 inch by 12 inch plate using the proposed method and coating the plate with primer in a manner that duplicates production application technique. The plate shall be divided into four equal quadrants. After the primer has cured, an adhesion test shall be performed in the center of each quadrant in accordance with ASTM D 4541. The minimum tensile bond shall be 725-psi unless a higher tensile bond is required in the manufacturer's published literature. If all four adhesion tests meet or exceed the specified requirements, the proposed method will be acceptable. The proposed alternative method of developing an acceptable anchor profile shall be limited to areas no greater than 6 in.².

The anchor profile shall meet the requirements of the manufacturer's published data sheet. The anchor profile shall be measured in accordance with ASTM D 4417 Method C. If the anchor profile fails to meet the minimum requirements, the Contractor shall re-blast the substrate until the minimum required anchor profile is achieved. If the anchor profile exceeds the maximum allowed in the manufacturer's published data sheet, the substrate may be coated only with the prior approval of the Engineer.

The Q.C.I. shall measure the anchor profile of the substrate on each plane of the first piece and each additional piece with a significant change in size or geometry. The Q.A.I. will witness the testing. After it has been established to the satisfaction of the Engineer that the abrasive blast equipment is capable of providing uniform, acceptable surface preparation, a diminished degree of testing shall be agreed upon by the Q.C.I. and Q.A.I. but shall not be less than one set of tests per shift.

Material that has been contaminated after blasting by handling, storage or other means shall be solvent cleaned and re-blasted prior to primer application.

If compressed air is used for abrasive blast cleaning, a blotter test shall be performed in accordance with ASTM D 4285 at the beginning of each shift. The Q.A.I. shall be present to witness the blotter test.

The allowable time between abrasive blast cleaning and primer application shall not exceed the manufacturer's published recommendations or eight hours, whichever is less.

506.24 Application

The Q.A.I. shall witness the mixing and thinning of the coatings. Failure to notify the Q.A.I. shall result in the coating being rejected.

Thinning and mixing of coatings shall be in conformance with the manufacturer's published data sheet. Thinner shall be measured using a graduated cup or other container that clearly indicates the amount of thinner being added. Mixing shall be done using the method, equipment, and time recommended by the coating manufacturer.

The Q.C.I. shall record the batch and lot numbers of the coating, the type and amount of thinner used, the time and pot life of the coating. The Q.A.I. shall confirm that the record is correct.

Coating equipment including mixers, hoses, tip size and guns shall meet the recommendations of the manufacturer's published data sheet.

The environmental conditions in the immediate vicinity of the steel to be coated shall be within the ranges in the manufacturer's published data sheet during the coating operation and during the cure period. Ambient temperature, surface temperature, relative humidity and dew point shall be measured and recorded by the Q.C.I.. The Q.A.I. may perform environmental testing in addition to the testing performed by the Q.C.I... If there are differences between the test results, the differences shall be resolved or explained to the satisfaction of the Engineer prior to coating application. The results of the environmental testing shall be recorded in the JCR.

Corners, fasteners, welds, and inaccessible locations shall be striped in accordance with SSPC PA 1. The striping shall extend a minimum of 1 inch from each edge. Striping will not be required on intermediate and topcoat; however, the Contractor shall meet the minimum DFT requirements on all surfaces.

Cure and recoat time shall be in accordance with the manufacturer's published data sheet for the environmental conditions at the time of application and cure. The Contractor shall provide the cure and recoat times for the environmental conditions in the immediate vicinity of the coated product. The cure and recoat times shall be provided on the coating manufacturer's letterhead and shall be authorized by a technical representative of the company.

If the coating is contaminated with dust, debris, over spray, or other deleterious material, the surface shall be solvent cleaned in accordance with SSPC SP 1 prior to recoating. Other methods of cleaning may be used if approved by the Engineer.

The Q.A.I. shall be given ample notice in order to inspect the product prior to coating, recoating or removal of paint from unacceptable areas. Substrates that are primed or surfaces that are recoated without notification of the Q.A.I. shall be rejected and no further coating shall be done on the piece. Coating applied without notification of the Q.A.I. will be investigated by destructive and non-destructive testing as directed by the Engineer and by a review of the JCR. The Engineer may reject, conditionally accept, or accept the coating based on documentation and test results. Rejected coating shall be removed and re-applied. Conditionally accepted coatings shall be made acceptable as directed by the Engineer. The cost of additional testing and repairs shall be borne by the Contractor.

506.25 Dry Film Thickness DFT shall be measured in accordance with SSPC PA 2. The results shall be documented in the JCR. The JCR documentation shall include the actual gage readings, spot average and the location(s). Each piece or area presented for acceptance, regardless of size shall be considered a separate structure for purposes of determining the number of spot measurements to be taken except that large quantities of small parts and/or secondary framing members coated at the same time may be measured at a lesser frequency as directed by the Engineer. When random DFT testing of a large quantity of small parts and/or secondary framing members results in unacceptable DFTs, the Contractor shall have the option of measuring and documenting the DFT of each piece or removing the coating and/or recoating all pieces represented in the production lot.

506.26 Touch-up and Repairs Touch-up shall be done in accordance with the manufacturer's published data sheet and this Specification. Areas to be touched up shall be prepared to assure proper adhesion of each coat. Each existing coat shall be feathered back to assure that each touch-up coat is continuous with each corresponding existing coat. The top-coat shall be smooth and uniform in appearance.

Damaged or unacceptable shop coating shall be repaired before the piece is removed from the paint area. Damaged areas shall be prepared in accordance with the manufacturer's published instructions or as directed by the Engineer. Damaged or unacceptable coatings shall be repaired using the same coating system. Environmental conditions cure times and DFTs shall be in accordance with manufacturer's published data sheet for the coating being applied. Repairs to topcoat shall result in a uniform gloss and color match. The Engineer shall have final authority concerning acceptable appearance.

If repairs larger than 6 in.² are made to the top coat of fascia beam, the entire beam shall be re-coated after repairs are completed.

506.27 Handling and Storage The coating shall be adequately cured before handling but under no circumstances shall the product be handled before the coating has achieved the manufacturer's published minimum cure and/or handling time. Coated members shall be handled in a manner to avoid damage to the coating. Members shall be lifted and moved using

non-metallic slings, padded chains and beam clamps, softeners, or by other non-injurious methods. Material shall be stored, both at the coating facility and in the field, in a manner that prevents damage to the coating.

Damage to the coating that is discovered after the product is loaded for shipment to the job site shall be documented by the Q.C.I. Minor damage as a result of handling shall be considered field repair unless, in the opinion of the Engineer the damage is the result of negligence or poor handling methods. Damage that is deemed to be the result of negligence or poor handling methods shall be repaired as directed by the Engineer.

THERMAL SPRAY COATING

506.30 Description This work consists of application of Thermal Spray Coatings (TSC) to steel substrate in accordance with the Plans and this Specification. Requirements that are not stated in this specification shall be performed in accordance with Joint Standard *SSPC-CS 23.00/AWS C2.23M/NACE No. 12, Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminum, Zinc, and Their Alloys and Composites for the Corrosion Protection of Steel.*

506.31 Materials Feedstock shall meet the requirements of ASTM B 833, 85/15 Zinc-Aluminum (W-ZnAl-2). The Contractor shall submit a certified analysis of the feedstock to the Engineer.

Seal coat and topcoat shall meet the following requirements:

Seal Coat	As recommended by the Topcoat Manufacturer
Topcoat	A listed topcoat product from the NEPCOAT QPL System A, B or C

The seal coat shall contain pigmentation to indicate uniformity of application.

506.32 Surface Preparation Prior to abrasive blast cleaning, all corners exposed in the assembled product shall be rounded to approximately a 1/16 inch radius. A series of tangents to the approximate radius will be considered as a rounded edge. The Contractor shall prepare a plate approximately 3 inches x 12 inches with the appropriate rounded corner and the plate shall become the Job Standard. The plate shall remain the property of the Contractor.

Surfaces to be coated shall be abrasive blast cleaned to the requirements of SSPC SP 5/NACE No. 1, White Metal Blast Cleaning. SSPC VIS. 1 shall be used to determine acceptable cleanliness. If more than one method of abrasive blast cleaning is used (e.g. centrifugal blast and compressed air), the acceptable Job Standard for each process shall be established.

The anchor profile shall be 2.0-4.0 mils. The anchor profile shall be measured in accordance with ASTM D 4417 Method C. If the anchor profile fails to meet the minimum required profile, the Contractor shall re-blast the substrate until the minimum required anchor profile is achieved.

The Q.C.I. shall measure the anchor profile of the substrate on the first piece blasted at the beginning of each shift and at a frequency not to exceed 4 hours thereafter. A measurement shall consist of one measurement on each plane of structural shapes or at approximately 120° intervals on pipes and round tubes. The Q.A.I. will witness the testing. If there is a significant change in the depth of the anchor profile due to blast media degradation or other cause, the Contractor shall take corrective action before continuing to abrasive blast clean the substrate.

If compressed air is used for abrasive blast cleaning, a blotter test shall be performed in accordance with ASTM D 4285 at the beginning of each shift. The Q.A.I. shall be present to witness the blotter test.

506.33 TSC Requirements The coating thickness shall be between 14 mils and 17 mils. The DFT on faying surfaces shall not exceed the thickness tested for Class B slip coefficient rating.

The TSC shall have a minimum tensile bond of 725 psi. The tensile bond shall be tested in accordance with ASTM D 4541-02. The frequency of testing shall be one test every 500 ft² or once per shift, whichever is less. The test location will be as directed by the Q.A.I. The specified tensile force shall be applied to the TSC and removed. If the test does not reveal a failure of the TSC, the tensile bond shall be considered acceptable. If the test reveals a failure of the TSC, the coating shall be rejected.

A bend test as described in SSPC-CS 23.00/AWS C2.23M/NACE No. 12. Section 6 shall be conducted at the beginning of each shift. If the bend test fails, the Contractor shall take corrective action and perform another test.

The results of the tensile bond test and bend test shall be documented in the JCR.

The TSC shall have a uniform appearance, free from blistering, cracks, loose particles, or exposed steel substrate when examined with 10-X magnification.

506.34 TSC Application The TSC shall be applied by the arc spray process. Thermal spray equipment shall be set up, calibrated, and operated per the manufacturer's instructions and technical manuals or the Thermal Spray Coating Applicator's (TSCA) refinement thereof and as validated by the Job Reference Standard (JRS).

The Q.C.I. shall measure and record in the JCR the ambient temperature, surface temperature, relative humidity and dew point near the pieces being coated immediately prior to application. The substrate shall be 5° F above the dew point at the time of application. The Q.A.I. shall be given adequate notice in order to witness the measurement of the environmental conditions.

The substrate shall be coated with a 1 mil to 2 mil flash/primer coat followed by several thin, overlapping passes to build the required DFT. Top flanges of beams requiring shear connectors shall receive a flash/primer coat only. If shear connectors are shop applied, they shall be applied prior to the TSC.

506.35 Seal Coat and Top Coat Application. The seal coat shall be applied within eight hours of the TSC application. The topcoat shall be applied after the seal coat has cured. The surfaces shall be free from contaminants immediately prior to application of the seal coat and topcoat.

The seal coat and topcoat shall be applied in accordance with SSPC-PA 1, “Shop, Field and Maintenance Painting”, and the coating manufacturer’s published recommendations.

Unless otherwise specified, the topcoat shall be applied to the outside surfaces and bottom flanges of bridge fascia beams. The color shall be as specified on the Plans.

Coating thickness shall be measured in accordance with SSPC-PA 2. The DFT shall conform to the requirements of the manufacturer's published data sheet. For the measurement of coating thickness, each piece coated will be considered a separate structure.

506.36 Repairs Damage to TSC shall be repaired by re-blasting the damaged area and re-applying TSC in accordance with this Specification.

FUSION BONDED EPOXY

506.40 Description The work shall consist of applying fusion-bonded epoxy (FBE) to a steel substrate. The FBE shall be applied to all surface areas indicated on the plans.

Steel pipe pile shall be coated in accordance with ASTM A 972/A 972M as amended herein. Steel H piles and sheet piling shall be coated in accordance with ASTM A 950/A 950M as amended herein. Epoxy-coated steel reinforcing bars shall be coated in accordance with AASHTO M 284M/M 284 (ASTM A 775/A 775M). All other steel products shall be coated in accordance with the plans and/or the direction of the Engineer.

506.41 Materials The FBE coating shall be a one-part, powder coating meeting the following requirements:

Property	Test Method	Value
Impact Resistance	ASTM G 14 3 lb. @ 40° F	80 inch-lb Min.
Abrasion Resistance	ASTM D 4060 (CS 10 wheel, 1000 gr. Load)	<70 mg/ 1000 cycles
Chemical Resistance	ASTM G 20 Modified (30 day immersion)	10 % CaCl no effect 10 % NaOH no effect
Cathodic Disbondment	ASTM G 8, Method A	3/8 in disbondment radius

The Contractor shall supply certified copies of all test results to the Engineer. The test results shall include the lot number tested, date, test method and testing agency. The tests shall have been performed within 12 months of the beginning of work.

The Contractor shall provide to the Engineer Certified Mill Test Reports for the material to be coated prior to beginning the coating process.

Prior to shipment, the applicator shall furnish written certification that the coated pieces meet the requirements of this Specification.

506.42 Notice The Contractor shall notify the Engineer at least ten days prior to beginning coating. Steel coated without the Q.A.I. being present shall be subject to rejection.

506.43 Surface Preparation. All butt welds shall be ground flush prior to abrasive blast cleaning. The steel shall be abrasive blast cleaned to the requirements of SSPC SP10/NACE No.2, Near White Metal Blast. SSPC VIS. 1 shall be used to determine acceptable cleanliness. The Q.C.I. and Q.A.I. shall evaluate the first piece using VIS 1 as a comparator. No further blast cleaning shall be done until the Q.C.I. and Q.A.I. agree upon the acceptable Job Standard for cleanliness. If more than one method of abrasive blast cleaning is used (e.g. centrifugal blast and compressed air), the acceptable Job Standard shall be established for each method.

506.44 Application The FBE powder shall be applied and cured in accordance with the applicable ASTM Standard and the manufacturer's published data sheet.

The DFT of the coating shall average between 10 mils and 18 mils for embedded work or coating exposed to atmosphere. A minimum thickness of 18 mils is required for piles or other items that will be subjected immersion service. The DFT shall be measured in accordance with SSPC PA 2 except that three spots shall be measured on each piece. If the average of three measurements per spot is less than the specified minimum, the piece shall be measured at one meter (3 feet) intervals along the length of the piece.

506.45 Inspection The DFT shall be measured using a fixed-probe or magnetic pull-off gauge that is calibrated and operated in accordance with SSPC PA 2. The testing procedure and reporting shall be in accordance with ASTM G 12. The frequency of testing shall be each piece coated unless a lesser frequency of testing is directed by the Engineer.

Holiday detection shall be performed in accordance with the applicable AASHTO or ASTM Standard.

Holiday repairs shall be done in accordance with the applicable AASHTO or ASTM Standards and the manufacturer's published data sheet. If a conflict between the Standard and manufacturer's published data sheet, the Engineer shall determine which shall apply.

506.46 through 506.49 Vacant

DRY POWDER (POLYESTER) COATING

506.50 Application Requirements The requirements for polyester coating shall be the same as for FBE.

506.51 Through 506.59 vacant

CONTAINMENT SYSTEM

506.70 Protective Measures The Contractor shall use all necessary means to prevent new pollution of the environment (air, soil, and water) in the project area and the areas immediately adjacent to the project area and to prevent exacerbating any pre-existing pollution that may be present in the above areas. The Contractor shall comply with all applicable Federal, State, and local laws, ordinances, rules, and regulations relating to the prevention of and/or abatement of pollution. The Contractor will not be held responsible for the abatement of any pre-existing conditions unless specified otherwise.

Potential pollutants such as fresh paint, old paint chips, blast cleaning debris, chemicals, fuels, lubricants, bitumen, and any other harmful or toxic material shall be contained and disposed of in such manner and in such place as will conform with all applicable regulations governing the disposal of such materials.

It shall be the Contractor's responsibility to provide documentation to the Engineer that all hazardous or toxic materials were disposed of in an acceptable manner. The documentation shall consist of truck manifests, weigh-bills, or such other documentation that may be acceptable to the Engineer. The documentation shall show the method and site used and the quantity of material disposed of.

Prior to starting the surface preparation and/or painting of structures, the Contractor shall submit his proposed containment and pollution control measures for the Engineer's review. The proposal shall be sufficiently detailed to show that conformance with the requirements specified herein or elsewhere in the contract will be achieved.

Draped tarpaulins without any structural supports will not be considered acceptable as a containment system. The minimum containment system that will be considered for review shall consist of platforms and side curtains fully enclosing the work area.

The Contractor's choice of equipment or system used for the collection of the paint removal and cleaning debris will be reviewed by the Engineer to determine its suitability for the intended purpose and its probable environmental impact.

Personnel working in a containment structure may be exposed to health hazards. The Contractor shall be responsible for supplying adequate protection for all personnel required to be in the containment structure.

506.73 through 506.89 Vacant

MEASUREMENT and PAYMENT

506.90 Method of Measurement Protective coating shall be measured by the lump sum method, complete, and accepted. The limits shall be as shown on the plans or as described within the respective subsection.

Containment and pollution control measures will be measured for payment as one lump sum unit, consisting of all work previously described, completed, and accepted.

Disposal of hazardous or toxic materials will be measured for payment as one lump sum unit, consisting of all material satisfactorily disposed of in conformance with these specifications.

506.91 Basis of Payment All work for Protective Coating will be paid for at the lump sum price for the respective item. Payment will be full compensation for all work and materials needed to complete the item; coating and cleaning materials, staging or accessing, testing, labor, surface preparation, cleaning, application, curing and repairs to coating.

Containment and pollution control will be paid for at the contract lump sum price, which price shall be full compensation for furnishing all materials, labor, equipment, and incidentals necessary for the satisfactory performance of the above work.

Disposal of hazardous or toxic materials will be paid at the contract lump sum price, which price shall be full compensation for all permits, tests, transportation, tipping fees, and incidentals necessary for the satisfactory performance of the above work.

<u>Pay Items</u>	<u>Pay Unit</u>
506.9101 Galvanizing (and top coating)	Lump Sum
506.9102 Zinc Rich Coating System (Shop Applied)	Lump Sum
506.9103 Zinc Rich Coating System (Field Applied)	Lump Sum
506.9104 Thermal Spray Coating (Shop Applied)	Lump Sum
506.9105 Thermal Spray Coating (Field Applied)	Lump Sum
506.9106 Fusion Bonded Epoxy Coating	Lump Sum
506.9107 Dry Powder (Polyester) Coating	Lump Sum
506.9108 Containment System and Pollution Control	Lump Sum
506.9109 Disposal of Hazardous or Toxic Material	Lump Sum