## If you plan to submit a bid directly to the Department of Transportation

### PREQUALIFICATION

Any contractor who desires to become pre-qualified to bid on work advertised by IDOT must submit the properly completed pre-qualification forms to the Bureau of Construction no later that 4:30 p.m. prevailing time twenty-one days prior to the letting of interest. This pre-qualification requirement applies to first time contractors, contractors renewing expired ratings, contractors maintaining continuous pre-qualification or contractors requesting revised ratings. To be eligible to bid, existing pre-qualification ratings must be effective through the date of letting.

### REQUESTS FOR AUTHORIZATION TO BID

Contractors wanting to bid on items included in a particular letting must submit the properly completed "Request for Authorization to Bid/or Not For Bid Status" (BDE 124INT) and the ORIGINAL "Affidavit of Availability" (BC 57) to the proper office no later than 4:30 p.m. prevailing time, three (3) days prior to the letting date.

### WHO CAN BID ?

Bids will be accepted from only those companies that request and receive written **Authorization to Bid** from IDOT's Central Bureau of Construction.

**WHAT CONSTITUTES WRITTEN AUTHORIZATION TO BID?**: When a prospective prime bidder submits a "Request for Authorization to Bid/or Not For Bid Status"(BDE 124INT) he/she must indicate at that time which items are being requested For Bidding purposes. Only those items requested For Bidding will be analyzed. After the request has been analyzed, the bidder will be issued an **Authorization to Bid or Not for Bid Report**, approved by the Central Bureau of Construction that indicates which items have been approved For Bidding. If **Authorization to Bid** cannot be approved, the **Authorization to Bid or Not for Bid Report** will indicate the reason for denial.

**ABOUT AUTHORIZATION TO BID:** Firms that have not received an authorization form within a reasonable time of complete and correct original document submittal should contact the department as to status. This is critical in the week before the letting. These documents must be received three days before the letting date. Firms unsure as to authorization status should call the Prequalification Section of the Bureau of Construction at the number listed at the end of these instructions.

**ADDENDA AND REVISIONS:** It is the contractor's responsibility to determine which, if any, addenda or revisions pertain to any project they may be bidding. Failure to incorporate all relevant addenda or revisions may cause the bid to be declared unacceptable.

Each addendum will be placed with the contract number. Addenda and revisions will also be placed on the Addendum/Revision Checklist and each subscription service subscriber will be notified by e-mail of each addendum and revision issued.

The Internet is the Department's primary way of doing business. The subscription server e-mails are an added courtesy the Department provides. It is suggested that bidders check IDOT's website at http://www.dot.il.gov/desenv/delett.html before submitting final bid information.

***IDOT IS NOT RESPONSIBLE FOR ANY E-MAIL FAILURES.***

Addenda Questions may be directed to the Contracts Office at (217)782-7806 or D&Econtracts@dot.il.gov

Technical Questions about downloading these files may be directed to Tim Garman (217)524-1642 or Timothy.Garman@illinois.gov.

**WHAT MUST BE INCLUDED WHEN BIDS ARE SUBMITTED?**: Bidders need not return the entire proposal when bids are submitted. That portion of the proposal that must be returned includes the following:

1. All documents from the Proposal Cover Sheet through the Proposal Bid Bond
2. Other special documentation and/or information that may be required by the contract special provisions

All proposal documents, including Proposal Guaranty Checks or Proposal Bid Bonds, should be stapled together to prevent loss when bids are processed by IDOT personnel.

**ABOUT SUBMITTING BIDS**: It is recommended that bidders deliver bids in person to insure they arrive at the proper location prior to the time specified for the receipt of bids. Any bid received at the place of letting after the time specified will not be accepted.

**WHO SHOULD BE CALLED IF ASSISTANCE IS NEEDED?**

| **Questions Regarding** | **Call** |
|---|---|
| Prequalification and/or Authorization to Bid | 217/782-3413 |
| Preparation and submittal of bids | 217/782-7806 |
| Mailing of plans and proposals | 217/782-7806 |

## ADDENDUMS AND REVISIONS TO THE PROPOSAL FORMS

Planholders should verify that they have received and incorporated any addendum and/or revision prior to submitting their bid. Failure by the bidder to include and addendum or revision could result in a bid being rejected as irregular.

**RETURN WITH BID**

| Proposal Submitted By |
| --- |
| Name |
| Address |
| City |

92

**Letting May 14, 2010**

**BIDDERS NEED NOT RETURN THE ENTIRE PROPOSAL**
**(See instructions inside front cover)**

**NOTICE TO PROSPECTIVE BIDDERS**
**This proposal can be used for bidding purposes by only those companies that request and receive written AUTHORIZATION TO BID from IDOT's Central Bureau of Construction.**
**(SEE INSTRUCTIONS ON THE INSIDE OF COVER)**

# Notice To Bidders, Specifications, Proposal, Contract and Contract Bond

Illinois Department of Transportation

**Springfield, Illinois 62764**

**Contract No. 76D61**
**ST CLAIR County**
**Section 82-1B-2**
**Route FAP 999**
**Project PNRS-0999(004)**
**District 8 Construction Funds**

PLEASE MARK THE APPROPRIATE BOX BELOW:

☐ A Bid Bond is included.

☐ A Cashier's Check or a Certified Check is included

Prepared by

F

Checked by

(Printed by authority of the State of Illinois)

## INSTRUCTIONS

**ABOUT IDOT PROPOSALS**: All proposals issued by IDOT are potential bidding proposals. Each proposal contains all Certifications and Affidavits, a Proposal Signature Sheet and a Proposal Bid Bond required for Prime Contractors to submit a bid after written **Authorization to Bid** has been issued by IDOT's Central Bureau of Construction.

**WHO CAN BID**?: Bids will be accepted from only those companies that request and receive written **Authorization to Bid** from IDOT's Central Bureau of Construction. To request authorization, a potential bidder must complete and submit Part B of the Request for Authorization to Bid/or Not For Bid Status form (BDE 124 INT) and submit an original Affidavit of Availability (BC 57).

**WHAT CONSTITUTES WRITTEN AUTHORIZATION TO BID**?: When a prospective prime bidder submits a "Request for Authorization to Bid/or Not For Bid" form, he/she must indicate at that time which items are being requested For Bidding purposes. Only those items requested For Bidding will be analyzed. After the request has been analyzed, the bidder will be issued an **Authorization to Bid or Not for Bid Report**, approved by the Central Bureau of Construction that indicates which items have been approved For Bidding. If **Authorization to Bid** cannot be approved, the **Authorization to Bid or Not for Bid Report** will indicate the reason for denial. If a contractor has requested to bid but has not received a **Authorization to Bid or Not for Bid Report**, they should contact the Central Bureau of Construction in advance of the letting date.

**WHAT MUST BE INCLUDED WHEN BIDS ARE SUBMITTED**?: Bidders need not return the entire proposal when bids are submitted. That portion of the proposal that must be returned includes the following:

1. All documents from the Proposal Cover Sheet through the Proposal Bid Bond

2. Other special documentation and/or information that may be required by the contract special provisions

All proposal documents, including Proposal Guaranty Checks or Proposal Bid Bonds, should be stapled together to prevent loss when bids are processed by IDOT personnel.

**ABOUT SUBMITTING BIDS**: It is recommended that bidders deliver bids in person to insure they arrive at the proper location prior to the time specified for the receipt of bids. Any bid received at the place of letting after the time specified will not be accepted.

**WHO SHOULD BE CALLED IF ASSISTANCE IS NEEDED?**

| Questions Regarding | Call |
|---|---|
| Prequalification and/or Authorization to Bid | 217/782-3413 |
| Preparation and submittal of bids | 217/782-7806 |

**RETURN WITH BID**

Illinois Department of Transportation

# PROPOSAL

TO THE DEPARTMENT OF TRANSPORTATION

1. Proposal of _____

   _____

Taxpayer Identification Number (Mandatory) _____

for the improvement identified and advertised for bids in the Invitation for Bids as:

**Contract No. 76D61**
**ST CLAIR County**
**Section 82-1B-2**
**Project PNRS-0999(004)**
**Route FAP 999**
**District 8 Construction Funds**

**Construction of new structures on new alignment, aggregate access roads, clearing, grading and other work for the new I-70 Mississippi River Bridge at St. Louis, the project limits encompass an area with the north limit being the south end of Main Street in Venice, IL just south of the McKinley Bridge and the south limit being the intersection of N. Front Street and the levee road intersection just north of Winter Street in East St. Louis, the project east limit is the west end of the proposed I-70 curved bridge just east of Route 3 south of Brooklyn, IL, the project west limit is the east anchor pier of the proposed I-70 Mississippi River Bridge located on the east bank of the Mississippi River south of Brooklyn, IL.**

2. The undersigned bidder will furnish all labor, material and equipment to complete the above described project in a good and workmanlike manner as provided in the contract documents provided by the Department of Transportation. This proposal will become part of the contract and the terms and conditions contained in the contract documents shall govern performance and payments.

3. **ASSURANCE OF EXAMINATION AND INSPECTION/WAIVER.** The undersigned further declares that he/she has carefully examined the proposal, plans, specifications, form of contract and contract bond, and special provisions, and that he/she has inspected in detail the site of the proposed work, and that he/she has familiarized themselves with all of the local conditions affecting the contract and the detailed requirements of construction, and understands that in making this proposal he/she waives all right to plead any misunderstanding regarding the same.

4. **EXECUTION OF CONTRACT AND CONTRACT BOND.** The undersigned further agrees to execute a contract for this work and present the same to the department within fifteen (15) days after the contract has been mailed to him/her. The undersigned further agrees that he/she and his/her surety will execute and present within fifteen (15) days after the contract has been mailed to him/her contract bond satisfactory to and in the form prescribed by the Department of Transportation, in the penal sum of the full amount of the contract, guaranteeing the faithful performance of the work in accordance with the terms of the contract.

5. **PROPOSAL GUARANTY.** Accompanying this proposal is either a bid bond on the department form, executed by a corporate surety company satisfactory to the department, or a proposal guaranty check consisting of a bank cashier's check or a properly certified check for not less than 5 per cent of the amount bid or for the amount specified in the following schedule:

| Amount of Bid | | | Proposal Guaranty | Amount of Bid | | | Proposal Guaranty |
|---|---|---|---|---|---|---|---|
| Up to | | $5,000 | $150 | $2,000,000 | to | $3,000,000 | $100,000 |
| $5,000 | to | $10,000 | $300 | $3,000,000 | to | $5,000,000 | $150,000 |
| $10,000 | to | $50,000 | $1,000 | $5,000,000 | to | $7,500,000 | $250,000 |
| $50,000 | to | $100,000 | $3,000 | $7,500,000 | to | $10,000,000 | $400,000 |
| $100,000 | to | $150,000 | $5,000 | $10,000,000 | to | $15,000,000 | $500,000 |
| $150,000 | to | $250,000 | $7,500 | $15,000,000 | to | $20,000,000 | $600,000 |
| $250,000 | to | $500,000 | $12,500 | $20,000,000 | to | $25,000,000 | $700,000 |
| $500,000 | to | $1,000,000 | $25,000 | $25,000,000 | to | $30,000,000 | $800,000 |
| $1,000,000 | to | $1,500,000 | $50,000 | $30,000,000 | to | $35,000,000 | $900,000 |
| $1,500,000 | to | $2,000,000 | $75,000 | over | | $35,000,000 | $1,000,000 |

Bank cashier's checks or properly certified checks accompanying proposals shall be made payable to the Treasurer, State of Illinois, when the state is awarding authority; the county treasurer, when a county is the awarding authority; or the city, village, or town treasurer, when a city, village, or town is the awarding authority.

If a combination bid is submitted, the proposal guaranties which accompany the individual proposals making up the combination will be considered as also covering the combination bid.

The amount of the proposal guaranty check is _____ $(  ). If this proposal is accepted and the undersigned shall fail to execute a contract bond as required herein, it is hereby agreed that the amount of the proposal guaranty shall become the property of the State of Illinois, and shall be considered as payment of damages due to delay and other causes suffered by the State because of the failure to execute said contract and contract bond; otherwise, the bid bond shall become void or the proposal guaranty check shall be returned to the undersigned.

**Attach Cashier's Check or Certified Check Here**

In the event that one proposal guaranty check is intended to cover two or more proposals, the amount must be equal to the sum of the proposal guaranties which would be required for each individual proposal. If the guaranty check is placed in another proposal, state below where it may be found.

The proposal guaranty check will be found in the proposal for: Item _____

Section No. _____

County _____

**Mark the proposal cover sheet as to the type of proposal guaranty submitted.**

6. **COMBINATION BIDS.** The undersigned further agrees that if awarded the contract for the sections contained in the following combination, he/she will perform the work in accordance with the requirements of each individual proposal comprising the combination bid specified in the schedule below, and that the combination bid shall be prorated against each section in proportion to the bid submitted for the same. If an error is found to exist in the gross sum bid for one or more of the individual sections included in a combination, the combination bid shall be corrected as provided in the specifications.

**When a combination bid is submitted, the schedule below must be completed in each proposal comprising the combination.**

**If alternate bids are submitted for one or more of the sections comprising the combination, a combination bid must be submitted for each alternate.**

**Schedule of Combination Bids**

| Combination No. | Sections Included in Combination | Combination Bid Dollars | Cents |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

7. **SCHEDULE OF PRICES.** The undersigned bidder submits herewith, in accordance with the rules and instructions, a schedule of prices for the items of work for which bids are sought. The unit prices bid are in U.S. dollars and cents, and all extensions and summations have been made. The bidder understands that the quantities appearing in the bid schedule are approximate and are provided for the purpose of obtaining a gross sum for the comparison of bids. If there is an error in the extension of the unit prices, the unit prices shall govern. Payment to the contractor awarded the contract will be made only for actual quantities of work performed and accepted or materials furnished according to the contract. The scheduled quantities of work to be done and materials to be furnished may be increased, decreased or omitted as provided elsewhere in the contract.

8. **CERTIFICATE OF AUTHORITY.** The undersigned bidder, if a business organized under the laws of another State, assures the Department that it will furnish a copy of its certificate of authority to do business in the State of Illinois with the return of the executed contract and bond. Failure to furnish the certificate within the time provided for execution of an awarded contract may be cause for cancellation of the award and forfeiture of the proposal guaranty to the State.

**ILLINOIS DEPARTMENT OF TRANSPORTATION**
**SCHEDULE OF PRICES**
**CONTRACT NUMBER - 76D61**

**State Job # -** C-98-041-10
**PPS NBR -** 8-98000-1000
**County Name -** ST CLAIR- -
**Code -** 163 - -
**District -** 8 - -
**Section Number -** 82-1B-2

**Project Number**
PNRS-0999/004/

**Route**
FAP 999

| Item Number | Pay Item Description | Unit of Measure | Quantity | x | Unit Price | = | Total Price |
|---|---|---|---|---|---|---|---|
| MD000010 | CL 1 EXCAVATION | CU YD | 105.000 | | | | |
| MD000020 | DRILLED SHAFTS 6'6" | FOOT | 4,694.000 | | | | |
| MD000030 | ROCK SOCKETS 6'0" | FOOT | 828.000 | | | | |
| MD000040 | SUPP TV CAMERA INSPEC | EACH | 20.000 | | | | |
| MD000050 | FOUNDATN INSPEC HOLES | FOOT | 1,228.000 | | | | |
| MD000060 | CONCRETE CORING | FOOT | 556.000 | | | | |
| MD000070 | SONIC LOGGING TESTING | EACH | 40.000 | | | | |
| MD000080 | CL B CONCRETE SUBSTR | CU YD | 4,049.500 | | | | |
| MD000090 | SLAB ON STEEL | SQ YD | 24,113.000 | | | | |
| MD000100 | BARRIER CURB TY D | FOOT | 10,169.000 | | | | |
| MD000110 | REINF STEEL BR | POUND | 3,359,440.000 | | | | |
| MD000120 | MECHANICAL BAR SPLICE | EACH | 5,200.000 | | | | |
| MD000130 | REINF STEEL EC | POUND | 177,290.000 | | | | |
| MD000140 | PR CTG CON BNT PIER E | L SUM | 1.000 | | | | |
| MD000150 | TEMP CTG CONC B P WS | L SUM | 1.000 | | | | |

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**Project Number** PNRS-0999/004/

**Route** FAP 999

| Item Number | Pay Item Description | Unit of Measure | Quantity | x | Unit Price | = | Total Price |
|---|---|---|---|---|---|---|---|
| MD000160 | FAB LOW ALLY ST M | POUND | 595,560.000 | | | | |
| MD000170 | F L A S PL G A709 50W | POUND | 9,099,470.000 | | | | |
| MD000180 | F L A S PL G A709 70W | POUND | 2,116,700.000 | | | | |
| MD000200 | DRAINAGE SYS ON STR | L SUM | 1.000 | | | | |
| MD000210 | POT BRG | EACH | 96.000 | | | | |
| MD000220 | MOD EXP JT | FOOT | 80.000 | | | | |
| MD000240 | TEMP SHORING | L SUM | 1.000 | | | | |
| MD000250 | STANDPIPE | L SUM | 1.000 | | | | |
| X0325445 | ROW/PROPERTY CORNERS | EACH | 5.000 | | | | |
| X0326890 | ROCK BASE 24 | SQ YD | 26,030.000 | | | | |
| X0326891 | TEMP ACCESS RD SP | SQ YD | 4,241.000 | | | | |
| X0326892 | TEMP ACCESS RD SP MNT | FOOT | 970,000.000 | | | | |
| X0326893 | FULL DPTH RUBBER CRSS | EACH | 2.000 | | | | |
| X0326894 | TUB GATE 4.5 X 16 SNG | EACH | 3.000 | | | | |
| X0326895 | FENCE CORNER POST | EACH | 4.000 | | | | |

**ILLINOIS DEPARTMENT OF TRANSPORTATION**
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**Project Number** PNRS-0999/004/

**Route** FAP 999

| Item Number | Pay Item Description | Unit of Measure | Quantity | x | Unit Price | = | Total Price |
|---|---|---|---|---|---|---|---|
| X0326896 | IL 3 WKEND CLOSE SP | L SUM | 1.000 | | | | |
| X2010505 | CLEARING SPECIAL | L SUM | 1.000 | | | | |
| Z0013798 | CONSTRUCTION LAYOUT | L SUM | 1.000 | | | | |
| Z0015500 | DEBRIS REMOVAL | L SUM | 1.000 | | | | |
| Z0022800 | FENCE REMOVAL | FOOT | 583.000 | | | | |
| Z0048665 | RR PROT LIABILITY INS | L SUM | 1.000 | | | | |
| Z0064505 | SECTION CORNER MKRS | EACH | 5.000 | | | | |
| Z0076600 | TRAINEES | HOUR | 3,500.000 | | 0.800 | | 2,800.000 |
| 20100110 | TREE REMOV 6-15 | UNIT | 54.000 | | | | |
| 20100210 | TREE REMOV OVER 15 | UNIT | 87.000 | | | | |
| 20100500 | TREE REMOV ACRES | ACRE | 2.800 | | | | |
| 20200100 | EARTH EXCAVATION | CU YD | 6,133.000 | | | | |
| 20600110 | GRAN EMBANK SPEC | TON | 797.000 | | | | |
| 20800150 | TRENCH BACKFILL | CU YD | 27.000 | | | | |
| 25000312 | SEEDING CL 4A | ACRE | 20.200 | | | | |

**ILLINOIS DEPARTMENT OF TRANSPORTATION**
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**County Name -** ST CLAIR- -
**Code -** 163 - -
**District -** 8 - -
**Section Number -** 82-1B-2

**Project Number** PNRS-0999/004/

**Route** FAP 999

| Item Number | Pay Item Description | Unit of Measure | Quantity | x | Unit Price | = | Total Price |
|---|---|---|---|---|---|---|---|
| 25000400 | NITROGEN FERT NUTR | POUND | 1,818.000 | | | | |
| 25000500 | PHOSPHORUS FERT NUTR | POUND | 1,818.000 | | | | |
| 25000600 | POTASSIUM FERT NUTR | POUND | 1,818.000 | | | | |
| 25000700 | AGR GROUND LIMESTONE | TON | 40.400 | | | | |
| 25100115 | MULCH METHOD 2 | ACRE | 40.400 | | | | |
| 28000250 | TEMP EROS CONTR SEED | POUND | 2,020.000 | | | | |
| 28000315 | AGG DITCH CHECKS | TON | 58.000 | | | | |
| 28000400 | PERIMETER EROS BAR | FOOT | 36,906.000 | | | | |
| 28100112 | STONE RIPRAP CL A6 SP | SQ YD | 154.000 | | | | |
| 30201500 | LIME | TON | 50.000 | | | | |
| 40200100 | AGG SURF CSE A | TON | 11,000.000 | | | | |
| 40800050 | INCIDENTAL HMA SURF | TON | 22.000 | | | | |
| 44000200 | DRIVE PAVEMENT REM | SQ YD | 32.000 | | | | |
| 50800105 | REINFORCEMENT BARS | POUND | 140.000 | | | | |
| 542A1057 | P CUL CL A 2 12 | FOOT | 208.000 | | | | |

ILLINOIS DEPARTMENT OF TRANSPORTATION
SCHEDULE OF PRICES
CONTRACT NUMBER - 76D61

State Job # - C-98-041-10
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County Name - ST CLAIR- -
Code - 163 - -
District - 8 - -
Section Number - 82-1B-2

Project Number: PNRS-0999/004/
Route: FAP 999

| Item Number | Pay Item Description | Unit of Measure | Quantity | x | Unit Price | = | Total Price |
|---|---|---|---|---|---|---|---|
| 54248510 | CONCRETE COLLAR | CU YD | 0.400 | | | | |
| 66400565 | CH LK FENCE 7 SPL | FOOT | 408.000 | | | | |
| 66600105 | FUR ERECT ROW MARKERS | EACH | 19.000 | | | | |
| 66900200 | NON SPL WASTE DISPOSL | CU YD | 19,077.000 | | | | |
| 66900210 | HAZARD WASTE DISPOSAL | CU YD | 537.000 | | | | |
| 66900450 | SPL WASTE PLNS/REPORT | L SUM | 1.000 | | | | |
| 66900530 | SOIL DISPOSAL ANALY | EACH | 9.000 | | | | |
| 67000400 | ENGR FIELD OFFICE A | CAL MO | 48.000 | | | | |
| 67000600 | ENGR FIELD LAB | CAL MO | 48.000 | | | | |
| 67100100 | MOBILIZATION | L SUM | 1.000 | | | | |
| 70101800 | TRAF CONT & PROT SPL | L SUM | 1.000 | | | | |
| 70400100 | TEMP CONC BARRIER | FOOT | 200.000 | | | | |

**CONTRACT NUMBER** **76D61**

**THIS IS THE TOTAL BID** **$** _____

**NOTES:**

1. **Each PAY ITEM should have a UNIT PRICE and a TOTAL PRICE.**
2. **The UNIT PRICE shall govern if no TOTAL PRICE is shown or if there is a discrepancy between the product of the UNIT PRICE multiplied by the QUANTITY.**
3. **If a UNIT PRICE is omitted, the TOTAL PRICE will be divided by the QUANTITY in order to establish a UNIT PRICE.**
4. **A bid may be declared UNACCEPTABLE if neither a unit price nor a total price is shown.**

## RETURN WITH BID

## STATE REQUIRED ETHICAL STANDARDS GOVERNING CONTRACT PROCUREMENT: ASSURANCES, CERTIFICATIONS AND DISCLOSURES

### I. GENERAL

**A.** Article 50 of the Illinois Procurement Code establishes the duty of all State chief procurement officers, State purchasing officers, and their designees to maximize the value of the expenditure of public moneys in procuring goods, services, and contracts for the State of Illinois and to act in a manner that maintains the integrity and public trust of State government. In discharging this duty, they are charged by law to use all available information, reasonable efforts, and reasonable actions to protect, safeguard, and maintain the procurement process of the State of Illinois.

**B.** In order to comply with the provisions of Article 50 and to carry out the duty established therein, all bidders are to adhere to ethical standards established for the procurement process, and to make such assurances, disclosures and certifications required by law. By execution of the Proposal Signature Sheet, the bidder indicates that each of the mandated assurances has been read and understood, that each certification is made and understood, and that each disclosure requirement has been understood and completed.

**C.** In addition to all other remedies provided by law, failure to comply with any assurance, failure to make any disclosure or the making of a false certification shall be grounds for termination of the contract and the suspension or debarment of the bidder.

### II. ASSURANCES

**A.** The assurances hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. The Department may terminate the contract if it is later determined that the bidder rendered a false or erroneous assurance, and the surety providing the performance bond shall be responsible for the completion of the contract.

**B. Felons**

1. The Illinois Procurement Code provides:

Section 50-10. Felons. Unless otherwise provided, no person or business convicted of a felony shall do business with the State of Illinois or any state agency from the date of conviction until 5 years after the date of completion of the sentence for that felony, unless no person held responsible by a prosecutorial office for the facts upon which the conviction was based continues to have any involvement with the business.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-10.

**C. Conflicts of Interest**

1. The Illinois Procurement Code provides in pertinent part:

Section 50-13. Conflicts of Interest.

(a) Prohibition. It is unlawful for any person holding an elective office in this State, holding a seat in the General Assembly, or appointed to or employed in any of the offices or agencies of state government and who receives compensation for such employment in excess of 60% of the salary of the Governor of the State of Illinois, or who is an officer or employee of the Capital Development Board or the Illinois Toll Highway Authority, or who is the spouse or minor child of any such person to have or acquire any contract, or any direct pecuniary interest in any contract therein, whether for stationery, printing, paper, or any services, materials, or supplies, that will be wholly or partially satisfied by the payment of funds appropriated by the General Assembly of the State of Illinois or in any contract of the Capital Development Board or the Illinois Toll Highway authority.

(b) Interests. It is unlawful for any firm, partnership, association or corporation, in which any person listed in subsection (a) is entitled to receive (i) more than 7 1/2% of the total distributable income or (ii) an amount in excess of the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(c) Combined interests. It is unlawful for any firm, partnership, association, or corporation, in which any person listed in subsection (a) together with his or her spouse or minor children is entitled to receive (i) more than 15%, in the aggregate, of the total distributable income or (ii) an amount in excess of 2 times the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(d) Securities. Nothing in this Section invalidates the provisions of any bond or other security previously offered or to be offered for sale or sold by or for the State of Illinois.

(e) Prior interests. This Section does not affect the validity of any contract made between the State and an officer or employee of the State or member of the General Assembly, his or her spouse, minor child or any combination of those persons if that contract was in existence before his or her election or employment as an officer, member, or employee. The contract is voidable, however, if it cannot be completed within 365 days after the officer, member, or employee takes office or is employed.

The current salary of the Governor is $177,412.00. Sixty percent of the salary is $106,447.20.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-13, or that an effective exemption has been issued by the Board of Ethics to any individual subject to the Section 50-13 prohibitions pursuant to the provisions of Section 50-20 of the Code and Executive Order Number 3 (1998). Information concerning the exemption process is available from the Department upon request.

**D. Negotiations**

1. The Illinois Procurement Code provides in pertinent part:

Section 50-15. Negotiations.

(a) It is unlawful for any person employed in or on a continual contractual relationship with any of the offices or agencies of State government to participate in contract negotiations on behalf of that office or agency with any firm, partnership, association, or corporation with whom that person has a contract for future employment or is negotiating concerning possible future employment.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-15, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

**E. Inducements**

1. The Illinois Procurement Code provides:

Section 50-25. Inducement. Any person who offers or pays any money or other valuable thing to any person to induce him or her not to bid for a State contract or as recompense for not having bid on a State contract is guilty of a Class 4 felony. Any person who accepts any money or other valuable thing for not bidding for a State contract or who withholds a bid in consideration of the promise for the payment of money or other valuable thing is guilty of a Class 4 felony.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-25, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

**F. Revolving Door Prohibition**

1. The Illinois Procurement Code provides:

Section 50-30. Revolving door prohibition. Chief procurement officers, associate procurement officers, State purchasing officers, their designees whose principal duties are directly related to State procurement, and executive officers confirmed by the Senate are expressly prohibited for a period of 2 years after terminating an affected position from engaging in any procurement activity relating to the State agency most recently employing them in an affected position for a period of at least 6 months. The prohibition includes, but is not limited to: lobbying the procurement process; specifying; bidding; proposing bid, proposal, or contract documents; on their own behalf or on behalf of any firm, partnership, association, or corporation. This Section applies only to persons who terminate an affected position on or after January 15, 1999.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-30, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

**G. Reporting Anticompetitive Practices**

1. The Illinois Procurement Code provides:

Section 50-40. Reporting anticompetitive practices. When, for any reason, any vendor, bidder, contractor, chief procurement officer, State purchasing officer, designee, elected official, or State employee suspects collusion or other anticompetitive practice among any bidders, offerors, contractors, proposers, or employees of the State, a notice of the relevant facts shall be transmitted to the Attorney General and the chief procurement officer.

2. The bidder assures the Department that it has not failed to report any relevant facts concerning the practices addressed in Section 50-40 which may involve the contract for which the bid is submitted.

**H. Confidentiality**

1. The Illinois Procurement Code provides:

Section 50-45. Confidentiality. Any chief procurement officer, State purchasing officer, designee, or executive officer who willfully uses or allows the use of specifications, competitive bid documents, proprietary competitive information, proposals, contracts, or selection information to compromise the fairness or integrity of the procurement, bidding, or contract process shall be subject to immediate dismissal, regardless of the Personnel code, any contract, or any collective bargaining agreement, and may in addition be subject to criminal prosecution.

2. The bidder assures the Department that it has no knowledge of any fact relevant to the practices addressed in Section 50-45 which may involve the contract for which the bid is submitted.

## RETURN WITH BID

**I. Insider Information**

1. The Illinois Procurement Act provides:

Section 50-50. Insider information. It is unlawful for any current or former elected or appointed State official or State employee to knowingly use confidential information available only by virtue of that office or employment for actual or anticipated gain for themselves or another person.

2. The bidder assures the Department that it has no knowledge of any facts relevant to the practices addressed in Section 50-50 which may involve the contract for which the bid is submitted.

**III. CERTIFICATIONS**

**A.** The certifications hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. The Department may terminate the contract if it is later determined that the bidder rendered a false or erroneous certification, and the surety providing the performance bond shall be responsible for completion of the contract.

**B. Bribery**

1. The Illinois Procurement Code provides:

Section 50-5. Bribery.

(a) Prohibition. No person or business shall be awarded a contract or subcontract under this Code who:

(1) has been convicted under the laws of Illinois or any other state of bribery or attempting to bribe an officer or employee of the State of Illinois or any other state in that officer's or employee's official capacity; or

(2) has made an admission of guilt of that conduct that is a matter of record but has not been prosecuted for that conduct.

(b) Businesses. No business shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of the business if the employee or agent is no longer employed by the business and:

(1) the business has been finally adjudicated not guilty; or

(2) the business demonstrates to the governmental entity with which it seeks to contract, and that entity finds that the commission of the offense was not authorized, requested, commanded, or performed by a director, officer, or high managerial agent on behalf of the business as provided in paragraph (2) of subsection (a) of Section 5-4 of the Criminal Code of 1961.

(c) Conduct on behalf of business. For purposes of this Section, when an official, agent, or employee of a business committed the bribery or attempted bribery on behalf of the business and in accordance with the direction or authorization of a responsible official of the business, the business shall be chargeable with the conduct.

(d) Certification. Every bid submitted to and contract executed by the State shall contain a certification by the contractor that the contractor is not barred from being awarded a contract or subcontract under this Section. A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

2. The bidder certifies that it is not barred from being awarded a contract under Section 50.5.

**C. Educational Loan**

1. Section 3 of the Educational Loan Default Act provides:

§ 3. No State agency shall contract with an individual for goods or services if that individual is in default, as defined in Section 2 of this Act, on an educational loan. Any contract used by any State agency shall include a statement certifying that the individual is not in default on an educational loan as provided in this Section.

2. The bidder, if an individual as opposed to a corporation, partnership or other form of business organization, certifies that the bidder is not in default on an educational loan as provided in Section 3 of the Act.

**D. Bid-Rigging/Bid Rotating**

1. Section 33E-11 of the Criminal Code of 1961 provides:

§ 33E-11. (a) Every bid submitted to and public contract executed pursuant to such bid by the State or a unit of local government shall contain a certification by the prime contractor that the prime contractor is not barred from contracting with any unit of State or local government as a result of a violation of either Section 33E-3 or 33E-4 of this Article. The State and units of local government shall provide the appropriate forms for such certification.

(b) A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

A violation of Section 33E-3 would be represented by a conviction of the crime of bid-rigging which, in addition to Class 3 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be barred for 5 years from the date of conviction from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

A violation of Section 33E-4 would be represented by a conviction of the crime of bid-rotating which, in addition to Class 2 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be permanently barred from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

2. The bidder certifies that it is not barred from contracting with the Department by reason of a violation of either Section 33E-3 or Section 33E-4.

**E. International Anti-Boycott**

1. Section 5 of the International Anti-Boycott Certification Act provides:

§ 5. State contracts. Every contract entered into by the State of Illinois for the manufacture, furnishing, or purchasing of supplies, material, or equipment or for the furnishing of work, labor, or services, in an amount exceeding the threshold for small purchases according to the purchasing laws of this State or $10,000.00, whichever is less, shall contain certification, as a material condition of the contract, by which the contractor agrees that neither the contractor nor any substantially-owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the U.S. Export Administration Act of 1979 or the regulations of the U.S. Department of Commerce promulgated under that Act.

2. The bidder makes the certification set forth in Section 5 of the Act.

**F. Drug Free Workplace**

1. The Illinois “Drug Free Workplace Act” applies to this contract and it is necessary to comply with the provisions of the “Act” if the contractor is a corporation, partnership, or other entity (including a sole proprietorship) which has 25 or more employees.

2. The bidder certifies that if awarded a contract in excess of $5,000 it will provide a drug free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance, including cannabis, is prohibited in the contractor’s workplace; specifying the actions that will be taken against employees for violations of such prohibition; and notifying the employee that, as a condition of employment on such contract, the employee shall abide by the terms of the statement, and notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction.

(b) Establishing a drug free awareness program to inform employees about the dangers of drug abuse in the workplace; the contractor’s policy of maintaining a drug free workplace; any available drug counseling, rehabilitation, and employee assistance programs; and the penalties that may be imposed upon employees for drug violations.

(c) Providing a copy of the statement required by subparagraph (1) to each employee engaged in the performance of the contract and to post the statement in a prominent place in the workplace.

(d) Notifying the Department within ten (10) days after receiving notice from an employee or otherwise receiving actual notice of the conviction of an employee for a violation of any criminal drug statute occurring in the workplace.

(e) Imposing or requiring, within 30 days after receiving notice from an employee of a conviction or actual notice of such a conviction, an appropriate personnel action, up to and including termination, or the satisfactory participation in a drug abuse assistance or rehabilitation program approved by a federal, state or local health, law enforcement or other appropriate agency.

(f) Assisting employees in selecting a course of action in the event drug counseling, treatment, and rehabilitation is required and indicating that a trained referral team is in place.

(g) Making a good faith effort to continue to maintain a drug free workplace through implementation of the actions and efforts stated in this certification.

**G. Debt Delinquency**

1. The Illinois Procurement Code provides:

Section 50-11 and 50-12. Debt Delinquency.

The contractor or bidder certifies that it, or any affiliate, is not barred from being awarded a contract under 30 ILCS 500. Section 50-11 prohibits a person from entering into a contract with a State agency if it knows or should know that it, or any affiliate, is delinquent in the payment of any debt to the State as defined by the Debt Collection Board. Section 50-12 prohibits a person from entering into a contract with a State agency if it, or any affiliate, has failed to collect and remit Illinois Use Tax on all sales of tangible personal property into the State of Illinois in accordance with the provisions of the Illinois Use Tax Act. The contractor further acknowledges that the contracting State agency may declare the contract void if this certification is false or if the contractor, or any affiliate, is determined to be delinquent in the payment of any debt to the State during the term of the contract.

**H. Sarbanes-Oxley Act of 2002**

1. The Illinois Procurement Code, Section 50-60(c), provides:

The contractor certifies in accordance with 30 ILCS 500/50-10.5 that no officer, director, partner or other managerial agent of the contracting business has been convicted of a felony under the Sarbanes-Oxley Act of 2002 or a Class 3 or Class 2 felony under the Illinois Securities Law of 1953 for a period of five years prior to the date of the bid or contract. The contractor acknowledges that the contracting agency shall declare the contract void if this certification is false.

**I. Addenda**

The contractor or bidder certifies that all relevant addenda have been incorporated in to this contract. Failure to do so may cause the bid to be declared unacceptable.

**J. Section 42 of the Environmental Protection Act**

The contractor certifies in accordance with 30 ILCS 500/50-12 that the bidder or contractor is not barred from being awarded a contract under this Section which prohibits the bidding on or entering into contracts with the State of Illinois or a State agency by a person or business found by a court or the Pollution Control Board to have committed a willful or knowing violation of Section 42 of the Environmental Protection Act for a period of five years from the date of the order. The contractor acknowledges that the contracting agency may declare the contract void if this certification is false.

**K. Apprenticeship and Training Certification (Does not apply to federal aid projects)**

In accordance with the provisions of Section 30-22 (6) of the Illinois Procurement Code, the bidder certifies that it is a participant, either as an individual or as part of a group program, in the approved apprenticeship and training programs applicable to each type of work or craft that the bidder will perform with its own forces. The bidder further certifies for work that will be performed by subcontract that each of its subcontractors submitted for approval either (a) is, at the time of such bid, participating in an approved, applicable apprenticeship and training program; or (b) will, prior to commencement of performance of work pursuant to this contract, begin participation in an approved apprenticeship and training program applicable to the work of the subcontract. The Department, at any time before or after award, may require the production of a copy of each applicable Certificate of Registration issued by the United States Department of Labor evidencing such participation by the contractor and any or all of its subcontractors. Applicable apprenticeship and training programs are those that have been approved and registered with the United States Department of Labor. The bidder shall list in the space below, the official name of the program sponsor holding the Certificate of Registration for all of the types of work or crafts in which the bidder is a participant and that will be performed with the bidder's forces. Types of work or craft work that will be subcontracted shall be included and listed as subcontract work. The list shall also indicate any type of work or craft job category that does not have an applicable apprenticeship or training program. **The bidder is responsible for making a complete report and shall make certain that each type of work or craft job category that will be utilized on the project as reported on the Construction Employee Workforce Projection (Form BC-1256) and returned with the bid is accounted for and listed.**

**NA - FEDERAL**

The requirements of this certification and disclosure are a material part of the contract, and the contractor shall require this certification provision to be included in all approved subcontracts. In order to fulfill this requirement, it shall not be necessary that an applicable program sponsor be currently taking or that it will take applications for apprenticeship, training or employment during the performance of the work of this contract.

**L. Executive Order Number 1 (2007) Regarding Lobbying on Government Procurements**

The bidder hereby warrants and certifies that they have complied and will comply with the requirements set forth in this Order. The requirements of this warrant and certification are a material part of the contract, and the contractor shall require this warrant and certification provision to be included in all approved subcontracts.

**M. Disclosure of Business Operations in Iran**

Section 50-36 of the Illinois Procurement Code, 30ILCS 500/50-36 provides that each bid, offer, or proposal submitted for a State contract shall include a disclosure of whether or not the Company acting as the bidder, offer or, or proposing entity, or any of its corporate parents or subsidiaries, within the 24 months before submission of the bid, offer, or proposal had business operations that involved contracts with or provision of supplies or services to the Government of Iran, companies in which the Government of Iran has any direct or indirect equity share, consortiums or projects commissioned by the Government of Iran, or companies involved in consortiums or projects commissioned by the Government of Iran and either of the following conditions apply:

(1) More than 10% of the Company's revenues produced in or assets located in Iran involve oil-related activities or mineral-extraction activities; less than 75% of the Company's revenues produced in or assets located in Iran involve contracts with or provision of oil-related or mineral-extraction products or services to the Government of Iran or a project or consortium created exclusively by that government; and the Company has failed to take substantial action.

(2) The Company has, on or after August 5, 1996, made an investment of $20 million or more, or any combination of investments of at least $10 million each that in the aggregate equals or exceeds $20 million in any 12-month period, which directly or significantly contributes to the enhancement of Iran's ability to develop petroleum resources of Iran.

The terms “Business operations”, “Company”, “Mineral-extraction activities”, “Oil-related activities”, “Petroleum resources”, and “Substantial action” are all defined in the Code.

Failure to make the disclosure required by the Code shall cause the bid, offer or proposal to be considered not responsive. The disclosure will be considered when evaluating the bid, offer, or proposal or awarding the contract. The name of each Company disclosed as doing business or having done business in Iran will be provided to the State Comptroller.

Check the appropriate statement:

/___/ Company has no business operations in Iran to disclose.

/___/ Company has business operations in Iran as disclosed the attached document.

**N. Political Contributions and Registration with the State Board of Elections**

Sections 20-160 and 50-37 of the Illinois Procurement Code regulate political contributions from business entities and any affiliated entities or affiliated persons bidding on or contracting with the state. Generally under Section 50-37, any business entity, and any affiliated entity or affiliated person of the business entity, whose current year contracts with all state agencies exceed an awarded value of $50,000, are prohibited from making any contributions to any political committees established to promote the candidacy of the officeholder responsible for the awarding of the contracts or any other declared candidate for that office for the duration of the term of office of the incumbent officeholder or a period 2 years after the termination of the contract, whichever is longer. Any business entity and affiliated entities or affiliated persons whose state contracts in the current year do not exceed an awarded value of $50,000, but whose aggregate pending bids and proposals on state contracts exceed $50,000, either alone or in combination with contracts not exceeding $50,000, are prohibited from making any political contributions to any political committee established to promote the candidacy of the officeholder responsible for awarding the pending contract during the period beginning on the date the invitation for bids or request for proposals is issued and ending on the day after the date of award or selection if the entity was not awarded or selected. Section 20-160 requires certification of registration of affected business entities in accordance with procedures found in Section 9-35 of The Election Code.

By submission of a bid, the contractor business entity acknowledges and agrees that it has read and understands Sections 20-160 and 50-37 of the Illinois Procurement Code, and that it makes the following certification:

**The undersigned business entity certifies that it has registered as a business with the State Board of Elections and acknowledges a continuing duty to update the registration in accordance with the above referenced statutes. A copy of the certificate of registration shall be submitted with the bid. The bidder is cautioned that the Department will not award a contract without submission of the certificate of registration.**

These requirements and compliance with the above referenced statutory sections are a material part of the contract, and any breach thereof shall be cause to void the contract under Section 50-60 of the Illinois Procurement Code. This provision does not apply to Federal-aid contracts.

## TO BE RETURNED WITH BID

**IV. DISCLOSURES**

**A.** The disclosures hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. The Department may terminate the contract if it is later determined that the bidder rendered a false or erroneous disclosure, and the surety providing the performance bond shall be responsible for completion of the contract.

**B. Financial Interests and Conflicts of Interest**

1. Section 50-35 of the Illinois Procurement Code provides that all bids of more than $10,000 shall be accompanied by disclosure of the financial interests of the bidder. This disclosed information for the successful bidder, will be maintained as public information subject to release by request pursuant to the Freedom of Information Act.

The financial interests to be disclosed shall include ownership or distributive income share that is in excess of 5%, or an amount greater than 60% of the annual salary of the Governor, of the bidding entity or its parent entity, whichever is less, unless the contractor or bidder is a publicly traded entity subject to Federal 10K reporting, in which case it may submit its 10K disclosure in place of the prescribed disclosure. If a bidder is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. The disclosure shall include the names, addresses, and dollar or proportionate share of ownership of each person making the disclosure, their instrument of ownership or beneficial relationship, and notice of any potential conflict of interest resulting from the current ownership or beneficial interest of each person making the disclosure having any of the relationships identified in Section 50-35 and on the disclosure form.

In addition, all disclosures shall indicate any other current or pending contracts, proposals, leases, or other ongoing procurement relationships the bidding entity has with any other unit of state government and shall clearly identify the unit and the contract, proposal, lease, or other relationship.

2. Disclosure Forms. Disclosure Form A is attached for use concerning the individuals meeting the above ownership or distributive share requirements. Subject individuals should be covered each by one form. In addition, a second form (Disclosure Form B) provides for the disclosure of current or pending procurement relationships with other (non-IDOT) state agencies. **The forms must be included with each bid or incorporated by reference.**

**C. Disclosure Form Instructions**

**Form A: For bidders that have previously submitted the information requested in Form A**

The Department has retained the Form A disclosures submitted by all bidders responding to these requirements for the April 24, 1998 or any subsequent letting conducted by the Department. The bidder has the option of submitting the information again or the bidder may check the following certification statement indicating that the information previously submitted by the bidder is, as of the date of submission, current and accurate. Before checking this certification, the bidder should carefully review its prior submissions to ensure the Certification is correct. If the Bidder checks the Certification, the Bidder should proceed to Form B instructions.

## CERTIFICATION STATEMENT

**I have determined that the Form A disclosure information previously submitted is current and accurate, and all forms are hereby incorporated by reference in this bid. Any necessary additional forms or amendments to previously submitted forms are attached to this bid.**

_____
(Bidding Company)

☐ _____ _____
Signature of Authorized Representative Date

**Form A: For bidders who have NOT previously submitted the information requested in Form A**

If the bidder is a publicly traded entity subject to Federal 10K reporting, the 10K Report may be submitted to meet the requirements of Form A. If a bidder is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. If a bidder is not subject to Federal 10K reporting, the bidder must determine if any individuals are required by law to complete a financial disclosure form. To do this, the bidder should answer each of the following questions. A "YES" answer indicates Form A must be completed. If the answer to each of the following questions is "NO", then the NOT APPLICABLE STATEMENT on the second page of Form A must be signed and dated by a person that is authorized to execute contracts for the bidding company. Note: These questions are for assistance only and are not required to be completed.

1. Does anyone in your organization have a direct or beneficial ownership share of greater than 5% of the bidding entity or parent entity? YES ___ NO___
2. Does anyone in your organization have a direct or beneficial ownership share of less than 5%, but which has a value greater than $102,600.00? YES ___ NO___
3. Does anyone in your organization receive more than $106,447.20 of the bidding entity's or parent entity's distributive income? (Note: Distributive income is, for these purposes, any type of distribution of profits. An annual salary is not distributive income.) YES ___ NO ___
4. Does anyone in your organization receive greater than 5% of the bidding entity's or parent entity's total distributive income, but which is less than $106,447.20? YES ___ NO ___

   (Note: Only one set of forms needs to be completed per person per bid even if a specific individual would require a yes answer to more than one question.)

A "YES" answer to any of these questions requires the completion of Form A. The bidder must determine each individual in the bidding entity or the bidding entity's parent company that would cause the questions to be answered "Yes". Each form must be signed and dated by a person that is authorized to execute contracts for your organization. **Photocopied or stamped signatures are not acceptable**. The person signing can be, but does not have to be, the person for which the form is being completed. The bidder is responsible for the accuracy of any information provided.

If the answer to each of the above questions is "NO", then the NOT APPLICABLE STATEMENT on page 2 of Form A must be signed and dated by a person that is authorized to execute contracts for your company.

**Form B**: **Identifying Other Contracts & Procurement Related Information** Disclosure Form B must be completed for each bid submitted by the bidding entity. *Note: Checking the NOT APPLICABLE STATEMENT on Form A does not allow the bidder to ignore Form B. Form B must be completed, checked, and dated or the bidder may be considered nonresponsive and the bid will not be accepted.*

The Bidder shall identify, by checking Yes or No on Form B, whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other (non-IDOT) State of Illinois agency. If "No" is checked, the bidder only needs to complete the check box on the bottom of Form B. If "Yes" is checked, the bidder must do one of the following:

Option I: If the bidder did not submit an Affidavit of Availability to obtain authorization to bid, the bidder must list all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. These items may be listed on Form B or on an attached sheet(s). Do not include IDOT contracts. Contracts with cities, counties, villages, etc. are not considered State of Illinois agency contracts and are not to be included. Contracts with other State of Illinois agencies such as the Department of Natural Resources or the Capital Development Board must be included. Bidders who submit Affidavits of Availability are suggested to use Option II.

Option II: If the bidder is required and has submitted an Affidavit of Availability in order to obtain authorization to bid, the bidder may write or type "See Affidavit of Availability" which indicates that the Affidavit of Availability is incorporated by reference and includes all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. For any contracts that are not covered by the Affidavit of Availability, the bidder must identify them on Form B or on an attached sheet(s). These might be such things as leases.

**D. Bidders Submitting More Than One Bid**

Bidders submitting multiple bids may submit one set of forms consisting of all required Form A disclosures and one Form B for use with all bids. Please indicate in the space provided below the bid item that contains the original disclosure forms and the bid items which incorporate the forms by reference.

- The bid submitted for letting item _____ contains the Form A disclosures or Certification Statement and the Form B disclosures. The following letting items incorporate the said forms by reference:

_____

_____

**RETURN WITH BID/OFFER**

# ILLINOIS DEPARTMENT OF TRANSPORTATION

## Form A
## Financial Information & Potential Conflicts of Interest Disclosure

| | | |
|---|---|---|
| Contractor Name | | |
| Legal Address | | |
| City, State, Zip | | |
| Telephone Number | Email Address | Fax Number (if available) |

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Code (30 ILCS 500). Vendors desiring to enter into a contract with the State of Illinois must disclose the financial information and potential conflict of interest information as specified in this Disclosure Form. This information shall become part of the publicly available contract file. This Form A must be completed for bids in excess of $10,000, and for all open-ended contracts. **A publicly traded company may submit a 10K disclosure (or equivalent if applicable) in satisfaction of the requirements set forth in Form A. See Disclosure Form Instructions.**

**DISCLOSURE OF FINANCIAL INFORMATION**

**1. Disclosure of Financial Information.** The individual named below has an interest in the BIDDER (or its parent) in terms of ownership or distributive income share in excess of 5%, or an interest which has a value of more than $106,447.20 (60% of the Governor's salary as of 3/1/09). **(Make copies of this form as necessary and attach a separate Disclosure Form A for each individual meeting these requirements)**

**FOR INDIVIDUAL (type or print information)**

**NAME:** _____

**ADDRESS** _____

_____

**Type of ownership/distributable income share:**

stock _____ sole proprietorship _____ Partnership _____ other: (explain on separate sheet):

% or $ value of ownership/distributable income share: _____

**2. Disclosure of Potential Conflicts of Interest.** Check "Yes" or "No" to indicate which, if any, of the following potential conflict of interest relationships apply. If the answer to any question is "Yes", please attach additional pages and describe.

(a) State employment, currently or in the previous 3 years, including contractual employment of services.
Yes ___ No __

If your answer is yes, please answer each of the following questions.

1. Are you currently an officer or employee of either the Capitol Development Board or the Illinois Toll Highway Authority? Yes ___ No __

2. Are you currently appointed to or employed by any agency of the State of Illinois? If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds $106,447.20, (60% of the Governor's salary as of 3/1/09) provide the name the State agency for which you are employed and your annual salary. _____
_____

3. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds $106,447.20, (60% of the Governor's salary as of 3/1/09) are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes ___ No __

4. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds $106,447.20, (60% of the Governor's salary as of 3/1/09) are you and your spouse or minor children entitled to receive (i) more than 15% in aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor? Yes ___ No __

---

(b) State employment of spouse, father, mother, son, or daughter, including contractual employment for services in the previous 2 years.

Yes ___No __

If your answer is yes, please answer each of the following questions.

1. Is your spouse or any minor children currently an officer or employee of the Capitol Development Board or the Illinois Toll Highway Authority? Yes ___No __

2. Is your spouse or any minor children currently appointed to or employed by any agency of the State of Illinois? If your spouse or minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds $106,447.20, (60% of the Governor's salary as of 3/1/09) provide the name of the spouse and/or minor children, the name of the State agency for which he/she is employed and his/her annual salary. _____
_____

3. If your spouse or any minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds $106,447.20.00, (60% of the salary of the Governor as of 3/1/09) are you entitled to receive (i) more than 71/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes ___ No __

4. If your spouse or any minor children are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds $106,447.20, (60% of the Governor's salary as of 3/1/09) are you and your spouse or any minor children entitled to receive (i) more than 15% in the aggregate of the total distributable income from your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor?

Yes ___ No __

---

(c) Elective status; the holding of elective office of the State of Illinois, the government of the United States, any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois currently or in the previous 3 years. Yes ___No __

---

(d) Relationship to anyone holding elective office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes ___No __

---

(e) Appointive office; the holding of any appointive government office of the State of Illinois, the United State of America, or any unit of local government authorized by the Constitution of the State of Illinois or the statues of the State of Illinois, which office entitles the holder to compensation in excess of the expenses incurred in the discharge of that office currently or in the previous 3 years. Yes ___No __

---

(f) Relationship to anyone holding appointive office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes ___No __

---

(g) Employment, currently or in the previous 3 years, as or by any registered lobbyist of the State government. Yes ___No __

---

(h) Relationship to anyone who is or was a registered lobbyist in the previous 2 years; spouse, father, mother, son, or daughter. Yes ___ No __

---

(i) Compensated employment, currently or in the previous 3 years, by any registered election or reelection committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections.
Yes ___ No __

---

(j) Relationship to anyone; spouse, father, mother, son, or daughter; who was a compensated employee in the last 2 years by any registered election or re-election committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections.
Yes ___ No __

---

**APPLICABLE STATEMENT**

**This Disclosure Form A is submitted on behalf of the INDIVIDUAL named on previous page.**

Completed by: ☐ _____ _____
Signature of Individual or Authorized Representative Date

**NOT APPLICABLE STATEMENT**

**I have determined that no individuals associated with this organization meet the criteria that would require the completion of this Form A.**

**This Disclosure Form A is submitted on behalf of the CONTRACTOR listed on the previous page.**

☐ _____ _____
Signature of Authorized Representative Date

**RETURN WITH BID/OFFER**

# ILLINOIS DEPARTMENT OF TRANSPORTATION

## Form B
## Other Contracts & Procurement Related Information Disclosure

| | | |
|---|---|---|
| Contractor Name | | |
| Legal Address | | |
| City, State, Zip | | |
| Telephone Number | Email Address | Fax Number (if available) |

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Act (30 ILCS 500). This information shall become part of the publicly available contract file. This Form B must be completed for bids in excess of $10,000, and for all open-ended contracts.

**DISCLOSURE OF OTHER CONTRACTS AND PROCUREMENT RELATED INFORMATION**

**1. Identifying Other Contracts & Procurement Related Information.** The BIDDER shall identify whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other State of Illinois agency: Yes ___ No __
**If "No" is checked,** the bidder only needs to complete the signature box on the bottom of this page.

**2. If "Yes" is checked.** Identify each such relationship by showing State of Illinois agency name and other descriptive information such as bid or project number (attach additional pages as necessary). SEE DISCLOSURE FORM INSTRUCTIONS:

**THE FOLLOWING STATEMENT MUST BE CHECKED**

☐ _____ _____
Signature of Authorized Representative Date

## RETURN WITH BID

### SPECIAL NOTICE TO CONTRACTORS

The following requirements of the Illinois Department of Human Rights' Rules and Regulations are applicable to bidders on all construction contracts advertised by the Illinois Department of Transportation:

### CONSTRUCTION EMPLOYEE UTILIZATION PROJECTION

(a) All bidders on construction contracts shall complete and submit, along with and as part of their bids, a Bidder's Employee Utilization Form (Form BC-1256) setting forth a projection and breakdown of the total workforce intended to be hired and/or allocated to such contract work by the bidder including a projection of minority and female employee utilization in all job classifications on the contract project.

(b) The Department of Transportation shall review the Employee Utilization Form, and workforce projections contained therein, of the contract awardee to determine if such projections reflect an underutilization of minority persons and/or women in any job classification in accordance with the Equal Employment Opportunity Clause and Section 7.2 of the Illinois Department of Human Rights' Rules and Regulations for Public Contracts adopted as amended on September 17, 1980. If it is determined that the contract awardee's projections reflect an underutilization of minority persons and/or women in any job classification, it shall be advised in writing of the manner in which it is underutilizing and such awardee shall be considered to be in breach of the contract unless, prior to commencement of work on the contract project, it submits revised satisfactory projections or an acceptable written affirmative action plan to correct such underutilization including a specific timetable geared to the completion stages of the contract.

(c) The Department of Transportation shall provide to the Department of Human Rights a copy of the contract awardee's Employee Utilization Form, a copy of any required written affirmative action plan, and any written correspondence related thereto. The Department of Human Rights may review and revise any action taken by the Department of Transportation with respect to these requirements.

**RETURN WITH BID**

Illinois Department of Transportation

**Contract No. 76D61**
**ST CLAIR County**
**Section 82-1B-2**
**Project PNRS-0999(004)**
**Route FAP 999**
**District 8 Construction Funds**

**PART I. IDENTIFICATION**

Dept. Human Rights # _____ Duration of Project: _____

Name of Bidder: _____

**PART II. WORKFORCE PROJECTION**

A. The undersigned bidder has analyzed minority group and female populations, unemployment rates and availability of workers for the location in which this contract work is to be performed, and for the locations from which the bidder recruits employees, and hereby submits the following workforce projection including a projection for minority and female employee utilization in all job categories in the workforce to be allocated to this contract:

TABLE A

| TOTAL Workforce Projection for Contract | | | | | | | | | | | | | TABLE B: CURRENT EMPLOYEES TO BE ASSIGNED TO CONTRACT | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MINORITY EMPLOYEES | | | | | | TRAINEES | | | | TOTAL EMPLOYEES | | MINORITY EMPLOYEES | |
| JOB CATEGORIES | TOTAL EMPLOYEES | | BLACK | | HISPANIC | | *OTHER MINOR. | | APPREN-TICES | | ON THE JOB TRAINEES | | | | | |
| | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F |
| OFFICIALS (MANAGERS) | | | | | | | | | | | | | | | | |
| SUPERVISORS | | | | | | | | | | | | | | | | |
| FOREMEN | | | | | | | | | | | | | | | | |
| CLERICAL | | | | | | | | | | | | | | | | |
| EQUIPMENT OPERATORS | | | | | | | | | | | | | | | | |
| MECHANICS | | | | | | | | | | | | | | | | |
| TRUCK DRIVERS | | | | | | | | | | | | | | | | |
| IRONWORKERS | | | | | | | | | | | | | | | | |
| CARPENTERS | | | | | | | | | | | | | | | | |
| CEMENT MASONS | | | | | | | | | | | | | | | | |
| ELECTRICIANS | | | | | | | | | | | | | | | | |
| PIPEFITTERS, PLUMBERS | | | | | | | | | | | | | | | | |
| PAINTERS | | | | | | | | | | | | | | | | |
| LABORERS, SEMI-SKILLED | | | | | | | | | | | | | | | | |
| LABORERS, UNSKILLED | | | | | | | | | | | | | | | | |
| TOTAL | | | | | | | | | | | | | | | | |

TABLE C

| TOTAL Training Projection for Contract | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| EMPLOYEES IN TRAINING | TOTAL EMPLOYEES | | BLACK | | HISPANIC | | *OTHER MINOR. | |
| | M | F | M | F | M | F | M | F |
| APPRENTICES | | | | | | | | |
| ON THE JOB TRAINEES | | | | | | | | |

*Other minorities are defined as Asians (A) or Native Americans (N).
Please specify race of each employee shown in Other Minorities column.

FOR DEPARTMENT USE ONLY

BC 1256 (Rev. 12/11/08)

**Note: See instructions on page 2**

**PART II. WORKFORCE PROJECTION -** continued

B. Included in "Total Employees" under Table A is the total number of **new hires** that would be employed in the event the undersigned bidder is awarded this contract.

The undersigned bidder projects that: (number) _____ new hires would be recruited from the area in which the contract project is located; and/or (number) _____ new hires would be recruited from the area in which the bidder's principal office or base of operation is located.

C. Included in "Total Employees" under Table A is a projection of numbers of persons to be employed directly by the undersigned bidder as well as a projection of numbers of persons to be employed by subcontractors.

The undersigned bidder estimates that (number) _____ persons will be directly employed by the prime contractor and that (number) _____ persons will be employed by subcontractors.

**PART III. AFFIRMATIVE ACTION PLAN**

A. The undersigned bidder understands and agrees that in the event the foregoing minority and female employee utilization projection included under **PART II** is determined to be an underutilization of minority persons or women in any job category, and in the event that the undersigned bidder is awarded this contract, he/she will, prior to commencement of work, develop and submit a written Affirmative Action Plan including a specific timetable (geared to the completion stages of the contract) whereby deficiencies in minority and/or female employee utilization are corrected. Such Affirmative Action Plan will be subject to approval by the contracting agency and the **Department of Human Rights**.

B. The undersigned bidder understands and agrees that the minority and female employee utilization projection submitted herein, and the goals and timetable included under an Affirmative Action Plan if required, are deemed to be part of the contract specifications.

Company _____ Telephone Number _____

_____

Address _____

**NOTICE REGARDING SIGNATURE**

The Bidder's signature on the Proposal Signature Sheet will constitute the signing of this form. The following signature block needs to be completed only if revisions are required.

Signature: ☐ _____ Title: _____ Date: _____

Instructions: All tables must include subcontractor personnel in addition to prime contractor personnel.

Table A - Include both the number of employees that would be hired to perform the contract work and the total number currently employed (Table B) that will be allocated to contract work, and include all apprentices and on-the-job trainees. The "Total Employees" column should include all employees including all minorities, apprentices and on-the-job trainees to be employed on the contract work.

Table B - Include all employees currently employed that will be allocated to the contract work including any apprentices and on-the-job trainees currently employed.

Table C - Indicate the racial breakdown of the total apprentices and on-the-job trainees shown in Table A.

**RETURN WITH BID**

## ADDITIONAL FEDERAL REQUIREMENTS

In addition to the Required Contract Provisions for Federal-Aid Construction Contracts (FHWA 1273), all bidders make the following certifications.

A. By the execution of this proposal, the signing bidder certifies that the bidding entity has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action, in restraint of free competitive bidding in connection with the submitted bid. This statement made by the undersigned bidder is true and correct under penalty of perjury under the laws of the United States.

B. CERTIFICATION, EQUAL EMPLOYMENT OPPORTUNITY:

1. Have you participated in any previous contracts or subcontracts subject to the equal opportunity clause. YES _____ NO _____

2. If answer to #1 is yes, have you filed with the Joint Reporting Committee, the Director of OFCC, any Federal agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements of those organizations? YES _____ NO _____

**RETURN WITH BID**

**Contract No. 76D61**
**ST CLAIR County**
**Section 82-1B-2**
**Project PNRS-0999(004)**
**Route FAP 999**
**District 8 Construction Funds**

PROPOSAL SIGNATURE SHEET

The undersigned bidder hereby makes and submits this bid on the subject Proposal, thereby assuring the Department that all requirements of the Invitation for Bids and rules of the Department have been met, that there is no misunderstanding of the requirements of paragraph 3 of this Proposal, and that the contract will be executed in accordance with the rules of the Department if an award is made on this bid.

Firm Name _____

(IF AN INDIVIDUAL) Signature of Owner _____

Business Address _____

_____

---

Firm Name _____

By _____

(IF A CO-PARTNERSHIP) Business Address _____

_____

Name and Address of All Members of the Firm:

_____ _____

---

Corporate Name _____

By _____
Signature of Authorized Representative

(IF A CORPORATION)

_____
Typed or printed name and title of Authorized Representative

Attest _____
Signature

(IF A JOINT VENTURE, USE THIS SECTION FOR THE MANAGING PARTY AND THE SECOND PARTY SHOULD SIGN BELOW) Business Address _____

---

Corporate Name _____

By _____
Signature of Authorized Representative

(IF A JOINT VENTURE)

_____
Typed or printed name and title of Authorized Representative

Attest _____
Signature

Business Address _____

_____

If more than two parties are in the joint venture, please attach an additional signature sheet.

Illinois Department of Transportation

**Return with Bid**

**Division of Highways**
**Proposal Bid Bond**
(Effective November 1, 1992)

Item No. _____

Letting Date _____

KNOW ALL MEN BY THESE PRESENTS, That We _____

_____

as PRINCIPAL, and _____

_____ as SURETY, are held jointly, severally and firmly bound unto the STATE OF ILLINOIS in the penal sum of 5 percent of the total bid price, or for the amount specified in Article 102.09 of the "Standard Specifications for Road and Bridge Construction" in effect on the date of invitation for bids, whichever is the lesser sum, well and truly to be paid unto said STATE OF ILLINOIS, for the payment of which we bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH, that whereas, the PRINCIPAL has submitted a bid proposal to the STATE OF ILLINOIS, acting through the Department of Transportation, for the improvement designated by the Transportation Bulletin Item Number and Letting Date indicated above.

NOW, THEREFORE, if the Department shall accept the bid proposal of the PRINCIPAL; and if the PRINCIPAL shall, within the time and as specified in the bidding and contract documents, submit a DBE Utilization Plan that is accepted and approved by the Department; and if, after award by the Department, the PRINCIPAL shall enter into a contract in accordance with the terms of the bidding and contract documents including evidence of the required insurance coverages and providing such bond as specified with good and sufficient surety for the faithful performance of such contract and for the prompt payment of labor and material furnished in the prosecution thereof; or if, in the event of the failure of the PRINCIPAL to make the required DBE submission or to enter into such contract and to give the specified bond, the PRINCIPAL pays to the Department the difference not to exceed the penalty hereof between the amount specified in the bid proposal and such larger amount for which the Department may contract with another party to perform the work covered by said bid proposal, then this obligation shall be null and void, otherwise, it shall remain in full force and effect.

IN THE EVENT the Department determines the PRINCIPAL has failed to comply with any requirement as set forth in the preceding paragraph, then Surety shall pay the penal sum to the Department within fifteen (15) days of written demand therefor. If Surety does not make full payment within such period of time, the Department may bring an action to collect the amount owed. Surety is liable to the Department for all its expenses, including attorney's fees, incurred in any litigation in which it prevails either in whole or in part.

In TESTIMONY WHEREOF, the said PRINCIPAL and the said SURETY have caused this instrument to be signed by

their respective officers this _____ day of _____ A.D., _____ .

| **PRINCIPAL** | **SURETY** |
|---|---|
| _____ (Company Name) | _____ (Company Name) |
| By _____ (Signature & Title) | By: _____ (Signature of Attorney-in-Fact) |

**Notary Certification for Principal and Surety**

STATE OF ILLINOIS,
County of _____

I, _____ , a Notary Public in and for said County, do hereby certify that

_____ and _____
(Insert names of individuals signing on behalf of PRINCIPAL & SURETY)

who are each personally known to me to be the same persons whose names are subscribed to the foregoing instrument on behalf of PRINCIPAL and SURETY, appeared before me this day in person and acknowledged respectively, that they signed and delivered said instrument as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal this _____ day of _____ A.D. _____

My commission expires _____ _____
Notary Public

In lieu of completing the above section of the Proposal Bid Form, the Principal may file an Electronic Bid Bond. By signing the proposal and marking the check box next to the Signature and Title line below, the Principal is ensuring the identified electronic bid bond has been executed and the Principal and Surety are firmly bound unto the State of Illinois under the conditions of the bid bond as shown above.

_____ _____ ☐ _____
Electronic Bid Bond ID# Company / Bidder Name Signature and Title

# PROPOSAL ENVELOPE

Illinois Department of Transportation

# PROPOSALS

for construction work advertised for bids by the
Illinois Department of Transportation

| Item No. | Item No. | Item No. |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

Submitted By:

| |
|---|
| Name: |
| Address: |
| |
| |
| Phone No. |

Bidders should use an IDOT proposal envelope or affix this form to the front of a 10” x 13” envelope for the submittal of bids. If proposals are mailed, they should be enclosed in a second or outer envelope addressed to:

Engineer of Design and Environment - Room 326
Illinois Department of Transportation
2300 South Dirksen Parkway
Springfield, Illinois 62764

**NOTICE**

**Individual bids, including Bid Bond and/or supplemental information if required, should be securely stapled.**

# CONTRACTOR OFFICE COPY OF CONTRACT SPECIFICATIONS

**NOTICE**

None of the following material needs to be returned with the bid package unless the special provisions require documentation and/or other information to be submitted.

**Contract No. 76D61**
**ST CLAIR County**
**Section 82-1B-2**
**Project PNRS-0999(004)**
**Route FAP 999**
**District 8 Construction Funds**

Illinois Department of Transportation

Illinois Department of Transportation

# NOTICE TO BIDDERS

1. **TIME AND PLACE OF OPENING BIDS.** Sealed proposals for the improvement described herein will be received by the Department of Transportation at the Harry R. Hanley Building, 2300 South Dirksen Parkway, in Springfield, Illinois until 10:00 o'clock a.m., May 14, 2010. All bids will be gathered, sorted, publicly opened and read in the auditorium at the Department of Transportation's Harry R. Hanley Building shortly after the 10:00 a.m. cut off time.

2. **DESCRIPTION OF WORK**. The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

   **Contract No. 76D61**
   **ST CLAIR County**
   **Section 82-1B-2**
   **Project PNRS-0999(004)**
   **Route FAP 999**
   **District 8 Construction Funds**

**Construction of new structures on new alignment, aggregate access roads, clearing, grading and other work for the new I-70 Mississippi River Bridge at St. Louis, the project limits encompass an area with the north limit being the south end of Main Street in Venice, IL just south of the McKinley Bridge and the south limit being the intersection of N. Front Street and the levee road intersection just north of Winter Street in East St. Louis, the project east limit is the west end of the proposed I-70 curved bridge just east of Route 3 south of Brooklyn, IL, the project west limit is the east anchor pier of the proposed I-70 Mississippi River Bridge located on the east bank of the Mississippi River south of Brooklyn, IL.**

3. **INSTRUCTIONS TO BIDDERS**. (a) This Notice, the invitation for bids, proposal and letter of award shall, together with all other documents in accordance with Article 101.09 of the Standard Specifications for Road and Bridge Construction, become part of the contract. Bidders are cautioned to read and examine carefully all documents, to make all required inspections, and to inquire or seek explanation of the same prior to submission of a bid.

   (b) State law, and, if the work is to be paid wholly or in part with Federal-aid funds, Federal law requires the bidder to make various certifications as a part of the proposal and contract. By execution and submission of the proposal, the bidder makes the certification contained therein. A false or fraudulent certification shall, in addition to all other remedies provided by law, be a breach of contract and may result in termination of the contract.

4. **AWARD CRITERIA AND REJECTION OF BIDS**. This contract will be awarded to the lowest responsive and responsible bidder considering conformity with the terms and conditions established by the Department in the rules, Invitation for Bids and contract documents. The issuance of plans and proposal forms for bidding based upon a prequalification rating shall not be the sole determinant of responsibility. The Department reserves the right to determine responsibility at the time of award, to reject any or all proposals, to readvertise the proposed improvement, and to waive technicalities.

By Order of the
Illinois Department of Transportation

Gary Hannig,
Secretary

# INDEX
# FOR
# SUPPLEMENTAL SPECIFICATIONS
# AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2010

This index contains a listing of SUPPLEMENTAL SPECIFICATIONS and frequently used RECURRING SPECIAL PROVISIONS.

ERRATA Standard Specifications for Road and Bridge Construction (Adopted 1-1-07) (Revised 1-1-10)

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# STATE OF ILLINOIS

# SPECIAL PROVISIONS

The following Special Provisions supplement the "Standard Specifications for Road and Bridge Construction," adopted January 1, 2007, the "Supplemental Specifications and Recurring Special Provisions," adopted January 1, 2010 (as indicated on the check sheet included herein), and the latest edition of the "Illinois Manual on Uniform Traffic Control Devices for Streets and Highways" in effect on the date of invitation for bids. These special provisions included herein apply to and govern the construction of the Illinois Approach Structure for New I-70 Mississippi River Bridge at St. Louis to Illinois Route 3, FAP Route 999 (Relocated I-70), Project PNRS-0999 (004), Section 82-1B-2, in St. Clair County, Contract No. 76D61, and in case of conflict with any part or parts of said Specifications, the said Special Provisions shall take precedence and shall govern.

THE TERM "SEC" REFERS TO SECTIONS IN THESE SPECIAL PROVISIONS.

REGARDLESS OF ANY FAMILIARITY OF TEXT, NO REFERENCE IS MADE TO ANY PART OR SECTION OF THE MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION DATED JANUARY, 2004 AND REVISIONS IN EFFECT AT THE TIME OF LETTING.

THE TERMS "ART" AND "ARTICLE" REFER TO ARTICLES IN THE IDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, ADOPTED JANUARY 1, 2007 AND THE SUPPLEMENTAL SPECIFICATIONS AND RECURRING SPECIAL PROVISIONS, ADOPTED JANUARY 1, 2010.

THE TERM "DEPARTMENT" REFERS TO THE DEPARTMENT OF TRANSPORTATION OF THE STATE OF ILLINOIS WITH PRINCIPAL OFFICES OF BUSINESS IN SPRINGFIELD, ILLINOIS.

## LOCATION OF PROJECT

The project limits encompass an area with the north limit being near the south end of Main Street in Venice, IL just south of the McKinley Bridge and the south limit being the intersection of N. Front Street and the levee road intersection just north of Winter St. in East St. Louis. The project east limit is the west end of the proposed I-70 curved bridge just east of Route 3 south of Brooklyn, IL. The project west limit is the east anchor pier of the proposed I-70 Mississippi River Bridge located on the east bank of the Mississippi River south of Brooklyn, IL.

## DESCRIPTION OF PROJECT

This project consists of the construction of the Illinois approach bridge to the proposed Mississippi River Bridge as well as the construction of aggregate Access Roads used for DOT maintenance operations.

The work includes construction layout, temporary erosion control, traffic control and protection, removals and adjustments, earthwork, tree removal, seeding, removal of miscellaneous items and debris, and various other items to complete the construction of the bridge and access roads.

**FAILURE TO COMPLETE THE WORK ON TIME**

This Special Provision amends Section 108.09 (FAILURE TO COMPLETE THE WORK ON TIME) of the Standard Specifications for Road and Bridge Construction as follows:

This contract is one of several projects essential to the overall improvements along Relocated I-70. Each of the contracts depends on certain portions of the work to be completed by others in order to complete the program on schedule.

Completion dates applicable to this contract include:

- Access Road 1 completed by Dec. 1, 2010
- Pier 14 completed by Feb. 1, 2011
- Pier 23 completed by Feb 1, 2011
- Deck Between Pier 22 and 23 with Barrier Rebar near Pier 23 EB/WB by June 29, 2012
- Deck from Pier 13 to Pier 22 EB/WB and Barriers from Pier 13 to Pier 23 EB/WB completed by June 13, 2013

The Contractor shall conduct and coordinate the construction activities in a manner so as to complete all work required for the improvement except as herein specified on or before June 13, 2013. The Contractor will be allowed twenty (20) working days for the completion of the removal of bridge forms, painting of structural steel, the restoration of access roads to near new condition, seeding, and the final clean-up of the project.

In the event the Contractor fails to complete the work by any of the completion dates listed above, or the project within the 20 working days allowed after June 13, 2013, or within such extended time as may have been allowed, the Contractor shall pay the Department liquidated damages as specified in Art. 108.09 of the Standard Specifications for each day of overrun, and the original contract amount will be used to establish the daily charges. In the event the Contractor fails to complete the work by any of the completion dates listed above, or the project within the 20 working days allowed after June 13, 2013, or within such extended time as may have been allowed the liquidated damages will be charged for every day shown on the calendar including Saturdays, Sundays and legal holidays until the completion of the required work.

**MONTHLY LABOR SUMMARY AND ACTIVITY REPORTING SYSTEM**
Effective: 1-1-1995 Revised June 2001

I. Monthly Labor Summary Report, Form SBE 148

The prime Contractor and each first and second tier sub-Contractor, (hereinafter referred to as "subContractor") shall submit a certified Monthly Labor Summary Report directly to the District Engineer.

This report is in lieu of submittal of the Monthly Workforce Analysis Report, Form SBE 956.

This report must be received in District Eight no later than the tenth day of the next month.

This Report shall be submitted by the prime Contractor and each subContractor, for each consecutive month, from the start, to the completion of their work on the contract.

The data source for this Report will be a summation of all personnel and hours worked on each subject contract for the month based on weekly payrolls for that month.

The Monthly Labor Summary Report is required to be submitted in one of the following formats:

a.) For Contractors having IDOT contracts valued in the aggregate at $250,000 or less, the report may be typed or clearly handwritten using Form SBE 148 for submittal to the District Engineer for District Eight.

b.) For Contractors having IDOT contracts valued in the aggregate at more than $250,000, the report must be submitted in a specific “Fixed Length Comma Delimited ASCII Text File Format”. The subject file format is detailed on the next page. Submittal of this file may be by 3.5 inch disk, modem, or by e-mail.

II. Monthly Contract Activity Report, Form SBE 248

The prime Contractor and each subContractor shall submit a monthly report directly to the District Engineer reflecting their contract activity on all Illinois Department of Transportation contracts they have in force in District Eight.

This report shall be submitted for each consecutive month, from the start, to the completion of all contracts in District Eight.

The report must be received in the District Office no later than the tenth day of the next month.

Monthly Labor Summary and Activity Reporting System Codes and Formats

Indicated below for your reference are the Employee Codes and File Formats required for this system.

I.) Monthly Labor Summary Report, Form SBE 148

The following employee codes are to be used to identify each individual on the Summary Report:

**1. Gender:** **M** - Male **F** - Female

**2. Ethnic Group**: **1** - White **2** - Black **3** - Hispanic
**4** - American Indian/Alaskan Native **5** - Asian/Pacific Islander

**3.** **Work Classification**: **OF** - Official **SU** - Supervisor **FO** - Foremen
**CL** - Clerical **CA** - Carpenter **EO** – Operator **ME** - Mechanic
**TD** - Truck Driver **IW** - Ironworker **PA** - Painter **OT** - Other
**EL** - Electrician **PP** - Pipefitter **TE** – Technical **LA** – Laborer
**CM** - Cement Mason

**4.** **Employee Status**: **O** - Owner Operator **J** - Journeyman
**C** - Company **A** – Apprentice **T** - Trainee

Specific "Fixed Length Comma Delimited ASCII File Format"

| Order | Field Name | Type | Size |
|---|---|---|---|
| 1 | Contractor Number | A | 4 |
| 2 | Contractor Reference Number | A | 6 |
| 3 | Contract Number | A | 5 |
| 4 | Period (07/28/2000) | D | 10 |
| 5 | SSN (111-11-1111) | A | 11 |
| 6 | Name | A | 40 |
| 7 | Gender | A | 1 |
| 8 | Ethnic Group | A | 1 |
| 9 | Work Classification | A | 1 |
| 10 | Employee Status | A | 1 |
| 11 | Total Hours (0000060.00) | N | 10 |

File Name Conventions: (Contractor Number + Report Month/Year).Txt
i.e. 20001298.Txt

II.) Monthly Contract Activity Report, Form SBE 248

The following activity codes are to be used to identify the Contractor's contract status each month on the Monthly Activity Report, Form SBE 248:

A. Contract Status: 1 - Not Started 2 - Active 3 - No Work
4 - Suspended 5 - Complete

Failure to comply with this special provision may result in the withholding of payments to the Contractor, and/or cancellation, termination, or suspension of the contract in whole or part.

Compliance with this Special Provision shall be considered incidental to the cost of the contract and no additional compensation will be allowed for any costs incurred.

All prime and subContractors having contracts in the aggregate exceeding $250,000 must provide a "Fixed Length Comma Delimited ASCII File" for approval prior to the start of construction.

This Special Provision must be included in each subcontract agreement.

The Department of Transportation is requesting disclosure of information necessary to accomplish the statutory purpose as outlined under 23CFR part 230 and 41CFR part 60.4 and the Illinois Human Rights Act. Disclosure of this information is REQUIRED.

Failure to comply with this special provision may result in the withholding of payments to the Contractor, and/or cancellation, termination, or suspension of the contract in whole or part.

Compliance with this Special Provision shall be considered incidental to the cost of the contract and no additional compensation will be allowed for any costs incurred.

This Special Provision must be included in each subcontract agreement.

**COORDINATION WITH ADJACENT CONTRACTS**

Coordination with adjacent Contracts will be required for the Contractor to develop and maintain project schedule.

The adjacent Contracts will be:

- IDOT Contract 76C44 (Proposed I-70 Curved Bridge over NS, TRRA, MCT, and Industrial Drive and Proposed MSE Retaining Wall)

- MoDOT Job No. J6I0984 (Proposed I-70 St. Louis Main Span Mississippi River Bridge Project)

No adjustments will be made for delay or suspension of work due to the fault of the Contractor in coordinating project schedule, staging and work items with adjacent Contracts.

This contract is one of several projects essential to the overall improvements along Relocated I-70. Each of the contracts depends on certain portions of the work to be completed by others in order to complete the program on schedule.

The following table indicates all such items of the work which have specific completion dates. It is essential that the Contractor responsible for the work complete these items on or before the date indicated so that other contracts may plan and execute their work accordingly.

| | Must Complete Work | Completion Date | To Allow Work: Main Span: Main Span Superstructure | Anchor Pier 13 | Pier 10 Modular Joint & Barrier Slider Plates | MO Appr Overhead Sign Truss | MO Appr Striping | MO Appr Electrical | MO Appr Misc. Signing | Pier 13 Modular Joint & Barrier Slider Plates | IL Appr Striping | IL Appr Electrical | IL Appr DMS Sign & Hookup @ Pier 19 WB | IL Appr Misc. Signing | Conduit and Power to DMS @ Pier 19 EB | Other: MO Appr Girders | IL Appr Girders | IL Connector Girders | IL Connector - Pier 23 Modular Joint, Barrier & Barrier Slide Plates | IL Connector DMS Board @ Pier 19 EB | MO Interchange Roadway Fill | Relocate Overhead Power Lines over Pier 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Main Span (J6I0984) | Anchor Pier 10 | Jan. 1, 2011 | | | | | | | | | | | | | | x | | | | | | |
| | Anchor Pier 13 | Dec. 1, 2011 | | | | | | | | | | | | | | | x | | | | | |
| | Conduit and Power to DMS @ Pier 19 EB | July 1, 2013 | | | | | | | | | | | | | | | | | | x | | |
| MO Appr (J6I0984B) | MSE Wall & Fill | Nov. 1, 2011 | | | | | | | | | | | | | | | | | | | x | |
| | Pier 6 | Nov. 1, 2011 | | | | x | | | | | | | | | | | | | | | | |
| | Deck & Barriers | Nov. 1, 2011 | | | x | | x | x | x | | | | | | | | | | | | | |
| IL Appr (J6I0984C IDOT Contract 76D61) | Access Road #1 | Dec. 1, 2010 | | x | | | | | | | | | | | | | | | | | | |
| | Pier 14 | Feb. 1, 2011 | | | | | | | | | | | | | | | | | | | | x |
| | Pier 23 | Feb. 1, 2011 | | | | | | | | | | | | | | | | x | | | | |
| | Deck betw. Pier 22 & 23 w/ barrier rebar near Pier 23 EB/WB | June 29, 2012 | | | | | | | | | | | | | | | | | x | | | |
| | Deck from Pier 13 to Pier 22 EB/WB; Barriers from Pier 13 to Pier 23 EB/WB | June 13, 2013 | | | | | | | | x | x | x | x | x | x | | | | | | | |
| Ameren Power | Relocate Overhead Power Lines over Pier 14 | Mar. 1, 2011** | x | | | | | | | | | | | | | | | | | | | |

** Line can be de-energized during setting of girders.

Shared Access

When necessary for proper prosecution of work, each Contractor shall permit the other access through the overlapping construction areas and the use of any access or haul roads constructed by others.

Basis of Payment.

All expenses incurred by the Contractor by reason of compliance with these requirements shall be considered as included in and completely covered by the contract unit prices for the various items included in the contract.

**DBE RECIPROCITY**

Both Missouri and Illinois desire to maximize the opportunity for DBE firms certified in their states to participate in this project. The States also desire to make it easier for Contractors bidding on these projects work to locate and provide sufficient certified DBE firms to achieve the project goal set by IDOT.

The Contractors bidding this project shall be entitled to use DBE firms certified by either or both IDOT or MoDOT, to fulfill the DBE project and contract goals established by IDOT for this work.

FHWA/USDOT has approved DBE reciprocity on this Bi-state project.

**ACCESS ROADS**

The access roads were designed for use by MoDOT and IDOT for bridge inspections and maintenance. Space is limited on the access roads for material and equipment delivery. The Contractor shall use caution to avoid fouling any railroad tracks. In addition, if the Contractor needs additional space for material delivery, equipment delivery, working room, or for any other reason the Contractor shall obtain the necessary agreements with the affected property owners. Any costs associated with obtaining additional space for material and equipment delivery, working room, or for any other reason shall be at the Contractor's own expense.

With the exception of Access Road 1 from Sta. 22+00 to Sta. 46+40, aggregate 2' in depth has been provided and will be paid for one time on proposed Access Roads 1, 2, and 3. The Contractor shall maintain the access roads to the satisfaction of the Engineer throughout the duration of the project. The Contractor shall keep the access roads free of ruts and potholes and shall keep the access roads graded to ensure positive drainage at all times.

Access Road 1 from Sta. 22+00 to Sta. 46+40 is located on an ash pond berm owned by AmerenUE. This portion of Access Road 1 is being constructed and maintained per the requirements found in the TEMPORARY ACCESS ROAD (SPECIAL) special provision and the TEMPORARY ACCESS ROAD (SPECIAL), MAINTENANCE special provision.

Upon completion of the project the Contractor shall provide access roads that are true to the proposed plan grades and cross sections with a surface that is in near new condition to the satisfaction of the Engineer. If necessary the Contractor will be required to add material to the access roads to meet the intent of this special provision. The Contractor shall investigate the site conditions. Any additional material, labor, and equipment expense required to use, maintain, and restore the Access Roads to near new condition will not be reimbursed and will be at the Contractor's expense with the exception of the maintenance on Access Road 1 from Sta. 22+00 to Sta. 46+40 as described in the TEMPORARY ACCESS ROAD (SPECIAL), MAINTENANCE special provision.

Access Road 7 from Sta. 57+28.95 to Sta. 62+40.72 is a permanent easement on an existing bituminous roadway with no proposed improvements. The Contractor may use the Access Road 7 permanent easement for access; however, the permanent easement shall be restored to the original condition upon completion of the project to the satisfaction of the Engineer. In addition, the Contractor shall maintain the Access Road 7 permanent easement in an operational condition to the satisfaction of the Engineer throughout the duration of the contract. The Contractor shall investigate the site conditions and any additional material, labor, or equipment expense required to use, maintain, and restore the Access Road 7 permanent easement to the original condition to the satisfaction of the Engineer will not be reimbursed and will be at the Contractor's expense.

A railroad crossing is being installed by Norfolk Southern Railway Company on Access Road 3 at Sta. 47+36.90. In addition, two railroad crossings are being installed by the Contractor on this project across Terminal Railroad Association of St. Louis tracks on Access Road 2 at Sta. 12+28.00 and Sta. 51+86.00.

Any damage resulting from the use of the railroad crossings by the Contractor shall be reported immediately to the Railroad Company and IDOT. The cost of any required repairs shall be at the Contractor's expense regardless of whether the Railroad Company or the Contractor completes the repairs. The repairs shall meet the satisfaction of the Railroad Company and IDOT.

**TEMPORARY ACCESS ROAD (SPECIAL)**

Description. This work shall consist of constructing Access Road 1 from Sta. 22+00 to Sta. 46+40. The Contractor will not be allowed to use Access Road 1 from Sta. 22+00 to Sta. 46+40 until the planned improvements in the aforementioned station range are completed. Access Road 1 from Sta. 22+00 to Sta. 46+40 is located on an ash pond berm owned by AmerenUE. A nominal 2-ft. deep by 15-ft. wide excavation shall be made into the top of the existing berm, as indicated on the plans and cross sections. The excavation shall be backfilled with crushed limestone to provide a granular base to support the proposed construction traffic. In conjunction with the crushed stone, a geomembrane, geotextile, and two layers of geogrid shall be installed. In addition, PVC pipes shall be installed along the outside edges of the excavation to promote internal drainage of the crushed stone backfill. Details of the materials and construction requirements are provided below.

MATERIALS

Aggregates. All aggregates used shall be in accordance with Section 1004 of the Standard Specifications except the aggregates specified shall be crushed limestone.

Geomembrane. The geomembrane shall be a high quality, high density polyethylene (HDPE) geomembrane with two textured surfaces, and consisting of approximately 97.5% polyethylene, 2.5% carbon black. The product specifications shall meet or exceed GRI GM13.

| TESTED PROPERTY | TEST METHOD | FREQUENCY | MINIMUM VALUE |
|---|---|---|---|
| Product Specifications | | | |
| Thickness, (minimum average) mil (mm)<br>Lowest individual for 8 out of 10 values<br>Lowest individual for any of the 10 values | ASTM D 5994 | every roll | 57 (1.45)<br>54 (1.40)<br>51 (1.30) |
| Density, g/cm$^3$ | ASTM D 1505 | 200,000 lb | 0.94 |
| Tensile Properties (each direction)[(1)]<br>Strength at Break, lb/in-width (N/mm)<br>Strength at Yield, lb/in-width (n/mm)<br>Elongation at Break, %<br>Elongation at Yield, % | ASTM D 6693, Type IV Dumbell, 2 ipm<br>G.L. = 2.0 in (51 mm)<br>G.L. = 1.3 in (33 mm) | 20,000 lb | <br>90 (16)<br>126 (22)<br>100<br>12 |
| Tear Resistance, lb (N) | ASTM D 1004 | 45,000 lb | 42 (187) |
| Puncture Resistance, lb (N) | ASTM D 4833 | 45,000 lb | 90 (400) |
| Carbon Black Content, % | ASTM D 1603*/4218 | 20,000 lb | 2.0 |
| Carbon Black Dispersion | ASTM D 5596 | 45,000 lb | +Note 1 |
| Asperity Height | GRI GM 12 | second roll | +Note 2 |
| Notched Constant Tensile Load[(2)], hr | ASTM D 5397, Appendix | 200,000 lb | 300 |
| **REFERENCE PROPERTY** | **TEST METHOD** | **FREQUENCY** | **NOMINAL VALUE** |
| Oxidative Induction Time, min | ASTM D 3895, 200˚C; $O_2$, 1 atm | 200,000 lb | >100 |

NOTES:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- +Note 2: 10 mil average. 8 of 10 readings $\geq$ 7 mils. Lowest individual $\geq$ 5 mils.
- [(1)]The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variation of test results. Therefore, these tensile properties are minimum average values.
- [(2)]NCTL for HD Textured is conducted on representative smooth membrane samples.
- *Modified.

Acceptance of the geomembrane will be based on a manufacturer's certification indicating the materials provided are in compliance with the product specifications in this special provision. The Contractor shall supply the manufacturer's certification and obtain approval from the engineer prior to incorporating the material into the work.

Geotextile. The 10 ounce, nonwoven geotextile shall be a polypropylene, staple fiber, nonwoven, needle punched geotextile. The product specifications shall meet or exceed GRI GT12, GRI GT13 and AASHTO M288.

| TESTED PROPERTY | TEST METHOD | FREQUENCY | MINIMUM VALUE |
|---|---|---|---|
| Product Specifications | | | |
| AASHTO M288 Class | | | >1 |
| Mass per Unit Area, oz/yd$^2$ (g/m$^2$) | ASTM D 5261 | 90,000 ft $^2$ | 10 (335) |
| Grab Tensile Strength, lb (N) | ASTM D 4632 | 90,000 ft $^2$ | 260 (1,155) |
| Grab Elongation, % | ASTM D 4632 | 90,000 ft $^2$ | 50 |
| Puncture Strength, lb (N) | ASTM D 4833 | 90,000 ft $^2$ | 165 (725) |
| Trapezoidal Tear Strength, lb (N) | ASTM D 4533 | 90,000 ft $^2$ | 100 (445) |
| Apparent Opening Size, Sieve No. (mm) | ASTM D 4751 | 540,000 ft $^2$ | 100 (0.150) |
| Permittivity, sec$^{-1}$ | ASTM D 4491 | 540,000 ft $^2$ | 1.20 |
| Permeability, cm/sec | ASTM D 4491 | 540,000 ft $^2$ | 0.30 |
| Water Flow Rate, gpm/ft$^2$ (l/min/m$^2$) | ASTM D 4491 | 540,000 ft $^2$ | 85 (3,460) |
| UV Resistance (%retained after 500 hours) | ASTM D 4355 | per formulation | 70 |

NOTES:

- The property values listed are in weaker principal direction. All values listed are Minimum Average Roll Values (MARV) except apparent opening size in mm and UV resistance. Apparent opening size (mm) is a maximum Average Roll Value. UV is a typical value.

Acceptance of the geotextile will be based on a manufacturer's certification indicating the materials provided are in compliance with the product specifications in this special provision. The Contractor shall supply the manufacturer's certification and obtain approval from the engineer prior to incorporating the material into the work.

Heavy Duty Geogrid. The heavy duty geogrid shall meet or exceed the material properties listed below.

General:

1. The geogrid shall be manufactured from a punched polypropylene sheet, which is then oriented in three substantially equilateral directions.
2. The geogrid shall meet or exceed the following properties:

| Index Properties | Longitudinal | Diagonal | Transverse | General |
|---|---|---|---|---|
| • Rib Pitch[2], mm (in) | 40 (1.60) | 40 (1.60) | - | |
| • Mid-rib depth[2], mm (in) | - | 1.8 (0.07) | 1.5 (0.06) | |
| • Mid-rib width[2], mm (in) | - | 1.1 (0.04) | 1.3 (0.05) | |
| • Nodal thickness[2], mm (in) | | | | 3.1 (0.12) |
| • Rib shape | | | | Rectangular |
| • Aperture shape | | | | Triangular |

| Structural Integrity | |
|---|---|
| • Junction efficiency[3], % | 93 |
| • Aperture stability[4], kg-cm/deg @ 5.0kg-cm | 3.6 |
| • Radial stiffness at low strain[5], kN/m @ 0.5% strain | 300 |
| (lb/ft @ 0.5% strain) | (20,580) |

| Durability | |
|---|---|
| • Resistance to chemical degradation[6] | 100% |
| • Resistance to ultra-violet light and weathering[7] | 100% |

Dimensions and Delivery

The geogrid shall be delivered to the jobsite in roll form with each roll individually identified. The minimum width of an individual roll shall not be less than 15 feet.

Notes

1. Unless indicated otherwise, values shown are minimum average roll values determined in accordance with ASTM D4759-02. Brief descriptions of test procedures are given in the following notes.
2. Nominal dimensions.
3. Load transfer capability determined in accordance with GRI-GG2-87 and GRI-GG1-87 and expressed as a percentage of ultimate tensile strength.
4. In-plane torsional rigidity measured by applying a moment to the central junction of a 225mm x 225mm specimen restrained at its perimeter in accordance with U.S. Army Corps of Engineers Methodology for measurement of Torsional Rigidity, (Kinney, T.C. Aperture stability Modulus ref 3,3.1.2000).
5. Radial stiffness is determined from tensile stiffness measured in any in-plane axis from testing in accordance with ASTM D6637-01.
6. Resistance to loss of load capacity or structural integrity when subjected to chemically aggressive environments in accordance with EPA 9090.
7. Resistance to loss of load capacity or structural integrity when subjected to 500 hours of ultra-violet light and aggressive weathering in accordance with ASTM D4355-05.

Acceptance of the heavy duty geogrid will be based on a manufacturer's certification indicating the materials provided are in compliance with the product specifications in this special provision. The Contractor shall supply the manufacturer's certification and obtain approval from the Engineer prior to incorporating the material into the work.

Standard Duty Geogrid. The standard duty geogrid shall meet or exceed the material properties listed below.

General:

1. The geogrid shall be manufactured from a punched polypropylene sheet, which is then oriented in three substantially equilateral directions.
2. The geogrid shall meet or exceed the following properties:

| Index Properties | Longitudinal | Diagonal | Transverse | General |
|---|---|---|---|---|
| • Rib Pitch[2], mm (in) | 40 (1.60) | 40 (1.60) | - | |
| • Mid-rib depth[2], mm (in) | - | 1.2 (0.05) | 1.2 (0.05) | |
| • Mid-rib width[2], mm (in) | - | 1.1 (0.04) | 1.1 (0.04) | |
| • Nodal thickness[2], mm (in) | | | | 3.1 (0.12) |
| • Rib shape | | | | Rectangular |
| • Aperture shape | | | | Triangular |

| Structural Integrity | |
|---|---|
| • Junction efficiency[3], % | 93 |
| • Aperture stability[4], kg-cm/deg @ 5.0kg-cm | 3.0 |
| • Radial stiffness at low strain[5], kN/m @ 0.5% strain | 225 |
| (lb/ft @ 0.5% strain) | (15,430) |

| Durability | |
|---|---|
| • Resistance to chemical degradation[6] | 100% |
| • Resistance to ultra-violet light and weathering[7] | 100% |

Dimensions and Delivery

The geogrid shall be delivered to the jobsite in roll form with each roll individually identified. The minimum width of an individual roll shall not be less than 15 feet.

Notes

1. Unless indicated otherwise, values shown are minimum average roll values determined in accordance with ASTM D4759-02. Brief descriptions of test procedures are given in the following notes.
2. Nominal dimensions.
3. Load transfer capability determined in accordance with GRI-GG2-87 and GRI-GG1-87 and expressed as a percentage of ultimate tensile strength.
4. In-plane torsional rigidity measured by applying a moment to the central junction of a 225mm x 225mm specimen restrained at its perimeter in accordance with U.S. Army Corps of Engineers Methodology for measurement of Torsional Rigidity, (Kinney, T.C. Aperture stability Modulus ref 3,3.1.2000).
5. Radial stiffness is determined from tensile stiffness measured in any in-plane axis from testing in accordance with ASTM D6637-01.
6. Resistance to loss of load capacity or structural integrity when subjected to chemically aggressive environments in accordance with EPA 9090.

7. Resistance to loss of load capacity or structural integrity when subjected to 500 hours of ultra-violet light and aggressive weathering in accordance with ASTM D4355-05.

Acceptance of the standard duty geogrid will be based on a manufacturer's certification indicating the materials provided are in compliance with the product specifications in this special provision. The Contractor shall supply the manufacturer's certification and obtain approval from the engineer prior to incorporating the material into the work.

PVC Pipe and Perforated PVC Pipe. The PVC pipe and perforated PVC pipe specified for underdrains and underdrain outlets shall meet the requirements in Article 1040.03.

CONSTRUCTION REQUIREMENTS

As the nominal 2-ft. by 15-ft. excavation is made, 1-ft. deep by 1-ft. wide internal drainage features (slots) shall be made along the outside edges of the excavation.

Once the excavation is made to the proper grade:
1. a 60-mil, heavy duty, textured (on both sides) geomembrane shall be installed over the bottom and sides of the exposed subgrade,
2. a 10-once nonwoven geotextile shall then be placed directly over the entire geomembrane,
3. 4-in. diameter, perforated PVC pipe (approximately 3/8-in. diameter perforations) shall be installed in the drainage features on both sides of the excavation, as detailed on the project plans and cross sections,
4. the 1-ft. by 1-ft. drainage features shall be backfilled with crushed limestone CA 7
5. a continuous layer of heavy duty geogrid shall be placed over the backfilled drainage features and the exposed geotextile on the remaining 13-ft. bottom width of the excavation,
6. 12 in. of crushed limestone CA 5, shall be placed in a single lift over the heavy duty geogrid,
7. a continuous layer of standard duty geogrid shall be placed over the 15-ft width of crushed limestone CA 5,
8. 10 in. of crushed limestone CA 7, shall be placed in a single lift over the second layer of geogrid, and
9. the crushed limestone CA 7 shall be capped with 2 in of crushed limestone CA 6.

The construction activities shall be performed in accordance with the current IDOT Standard Specifications for Road and Bridge Construction except as noted in this special provision. More specific construction requirements and sequencing are included below.

No construction traffic is permitted to be in the excavation including the equipment used to perform the excavation until the underdrains, geomembrane, geotextile, heavy duty geogrid, and the 12 in. of crushed limestone CA 5 are in place. The excavation shall be kept dry at all times. Any water ponded in the area shall be managed so it does not enter the excavation. The excavation shall not be performed when precipitation is falling and if precipitation begins to fall the excavation should be covered immediately with the geomembrane.

It is anticipated that some soft areas may be encountered in the excavation. In these areas lime shall be incorporated into the subgrade as directed by the engineer. The materials shall be in accordance with Section 1012 of the Standard Specifications. The soft areas shall be opened up and roughed up using the teeth of an excavator bucket to a depth as directed by the Engineer.

Lime, at a rate approved by the Engineer, shall be applied and the material mixed with an excavator bucket to the satisfaction of the engineer. Other methods will be considered by the Engineer but no equipment will be allowed to operate directly on the subgrade. The lime shall only be applied when the temperature of the soil measured 6 in. below the surface is above 50 degrees Fahrenheit and the ambient air temperature in the shade is above 45 degrees Fahrenheit. The lime shall be applied uniformly on the soil. The application of lime shall be limited to that area where the mixing operations can be completed during the same working day. Dry lime shall not be applied when wind conditions are such that blowing lime becomes objectionable to adjacent property owners. Lime that has been exposed to the open air for a period of six hours or more shall be replaced. Lime which has been damaged by hydration due to rain prior to or during the mixing operations, or has been displaced after application shall be replaced. Once the lime and soil is mixed to the satisfaction of the Engineer the subgrade shall be compacted by tamping with the trackhoe bucket to the satisfaction of the Engineer. The quantity of lime included in the plans is for bidding purposes only and may or may not be incorporated into the project. The quantity of lime used shall be at the discretion of the Engineer and the Contractor shall supply lime only as directed by the Engineer. If the Contractor utilizes lime, other than as directed by the Engineer on Access Road 1 between Sta. 22+00 and Sta. 46+40, it shall be at the Contractor's expense.

Once a stable subgrade is established, the geomembrane shall be installed as the excavation is advanced. The geomembrane shall be placed smoothly over the subgrade without folds or wrinkles. Joints in the geomembrane shall have a minimum 4-ft. overlap, unless the manufacturer requires a greater overlap. Double-sided mastic tape shall be used on all joints, unless specified otherwise by the manufacturer. Joints shall be overlapped with the downslope section beneath the upslope section. Water-tight seals shall be provided at all penetrations though the goomembrane, such as the PVC drain pipes. No section of the excavated subgrade shall be left open overnight without the geomembrane being installed.

Once the geomembrane is in place, the geotextile shall be installed directly over the geomembrane. The geotextile shall be placed smoothly over the geomembrane without folds or wrinkles. Joints in the geotextile shall have a minimum 2-ft. overlap, unless the manufacturer requires a greater overlap. Joints shall be overlapped with the downslope section beneath the upslope section. Joints in the geotextile should not be within 5 ft. horizontally of the joints in the geomembrane.

Once the geotextile is in place, the PVC drains shall be installed. The PVC pipe and perforated PVC pipe shall be installed per the requirements in Article 601 except as noted in this special provision. Crushed limestone CA 7 shall be used to backfill around the PVC pipe, filling the 1-ft. by 1-ft. drainage features up to the level of the adjacent excavation, resulting in a flat, 15-ft. wide surface at a nominal depth of 2 ft. below the original ground surface. The PVC pipe grades shall be as shown on the project plans. The PVC pipe drains included from Sta. 22+00 to Sta. 21+80 were included to provide an outlet for the underdrains on the north end of the TEMPORARY ACCESS ROAD (SPECIAL) limits and shall be considered included in the payment for TEMPORARY ACCESS ROAD (SPECIAL) between Sta. 22+00 and Sta. 46+40.

The heavy duty layer of geogrid shall then be installed directly onto the 13-ft. wide section of geotextile in the center of the excavation, and the 2, 1-ft. wide sections of crushed limestone CA 7 (backfilled drainage features) along the edges of the excavation. The heavy duty geogrid shall be placed smoothly over the geotextile and CA 7 without folds or wrinkles.

The geogrid only needs to be placed along the bottom of the excavation. It does not need to extend up the sides. Joints in the geogrid shall have a minimum 2-ft. overlap, unless the manufacturer requires a greater overlap. Joints shall be overlapped with the downslope section beneath the upslope section. Joints in the heavy duty geogrid shall not be within 5 ft. horizontally of the joints in the geotextile.

Once the heavy duty geogrid is in place, 12 in. of clean crushed limestone CA 5 shall be placed in a single lift.

Construction traffic shall not be allowed directly in the excavation or onto the geomembrane, geotextile, or geogrid. Low pressure equipment will be required on the 12 in. layer of crushed stone CA 5 backfill. This layer of crushed stone shall be placed in a single lift. It may be spread with a low pressure bulldozer or tracked skid steer, but twisting and turning shall be avoided. If dump trucks are to back over the installed 12 in. of crushed limestone CA 5, then the trucks shall be half-loaded to maintain a maximum axle load of 10 kips.

Once the full 12 in. of crushed limestone CA 5 has been placed and spread smooth, a 10-ton, smooth drum roller shall be used to compact the exposed stone surface. The roller shall be operated in static mode, with no vibration.

Once the surface has been compacted, the standard duty layer of geogrid shall be installed. The standard duty geotextile shall be placed smoothly over the crushed limestone CA 5 without folds or wrinkles. Joints in the geogrid shall have a minimum 2-ft. overlap, unless the manufacturer requires a greater overlap. Joints shall be overlapped with the downslope section beneath the upslope section. Joints in the standard duty layer of geogrid should not be within 5 ft. horizontally of the joints in the underlying heavy duty geogrid.

The 10 in. of crushed limestone CA 7 shall then be placed over the standard duty geogrid, in a single lift. Fully loaded dump trucks are allowed to back over the 10-in. lift of crushed limestone CA 7. Once the full 10 in. of crushed limestone CA 7 has been placed and spread smooth, a 10-ton, smooth drum roller shall be used to compact the exposed stone surface. The roller shall be operated in static mode, with no vibration.

The crushed limestone CA 7 shall then be capped with 2 in of crushed limestone CA 6 and graded to a smooth surface. A 10-ton, smooth drum roller shall then be used to compact the exposed crushed limestone CA 6 surface. The roller shall be operated in static mode, with no vibration.

Wheel loads shall not be allowed on the outer 2 ft. of the aggregate during and following the construction of the access road to reduce the potential for damage.

General. The Contractor is advised that an AmerenUE 345 KV transmission line parallels Access Road 1. The Contractor will be required to comply with requirements set forth by AmerenUE and the Engineer including radial clearance requirements associated with the 345 KV transmission line when constructing or utilizing Access Road 1. The Contractor is further advised that there are transmission towers in close proximity to Access Road 1 which the Contractor is required to protect.

AmerenUE has monitoring wells located within the limits of the TEMPORARY ACCESS ROAD (SPECIAL) construction limits, as noted on the plans, which AmerenUE will abandon or protect with a concrete apron. The Contractor will be required to coordinate the construction of the access road with AmerenUE and construct the access road without causing any damage to the abandoned monitoring well or the monitoring well protection provided by AmerenUE. The cost of any required repairs to the abandoned monitoring well or the monitoring well protection caused by the Contractor's operation shall be at the Contractor's expense regardless of whether AmerenUE or the Contractor completes the repair.

Maintenance. See the TEMPORARY ACCESS ROAD (SPECIAL), MAINTENANCE special provision.

Method of Measurement.
Measurement for TEMPORARY ACCESS ROAD (SPECIAL) shall be made per square yard at the surface and any material required outside the planned edge of the aggregate surface will be incidental to the TEMPORARY ACCESS ROAD (SPECIAL) pay item.

LIME will be measured for payment in tons. The lime will be measured in trucks or freight cars. The Contractor shall furnish or arrange for use of scales of a type approved by the Engineer. When the lime is shipped in trucks, it will be measured at the place of loading, at the place of unloading, or at such other place as the Engineer may designate. The Engineer may accept original signed freight bills in lieu of determining the weight.

Basis of Payment.
This work shall be paid for at the contract unit price per SQUARE YARD for TEMPORARY ACCESS ROAD (SPECIAL). The SQUARE YARD price for TEMPORARY ACCESS ROAD (SPECIAL) shall include all equipment, labor, and materials necessary to construct Access Road 1 from Sta. 22+00 to Sta. 46+40 as described in this special provision.

Any LIME used on Access Road 1 between Sta. 22+00 and Sta. 46+40 as approved by the Engineer shall be paid for at the contract unit price per TON for LIME. The TON price for LIME shall include all equipment, labor, and materials necessary to incorporate lime on Access Road 1 from Sta. 22+00 to Sta. 46+40 as described in this special provision and as directed by the Engineer.

## TEMPORARY ACCESS ROAD (SPECIAL), MAINTENANCE

This Special Provision includes the maintenance of Access Road 1 from Sta. 22+00 to Sta. 46+40.

Access Road 1 from Sta. 22+00 to Sta. 46+40 is located on an ash pond berm owned by AmerenUE. The construction and materials requirements for Access Road 1 from Sta. 22+00 to Sta. 46+40 are included in the TEMPORARY ACCESS ROAD (SPECIAL) special provision.

With an anticipated usage of 3 years, through all weather seasons, the proper maintenance of Access Road 1 from Sta. 22+00 to Sta. 46+40 is critical. The Contractor shall maintain the access road to the satisfaction of the Engineer throughout the duration of the project. The Contractor shall keep the access road free of ruts, and potholes and shall keep the access road graded to ensure positive drainage at all times.

Regular maintenance shall be planned, including grading and rolling to provide smooth travel for the construction traffic. Depending upon the weather that occurs, it may be necessary to limit the speed of the construction traffic, to on the order of 10 miles per hour, to reduce the effects of dynamic impact on the granular base. The Contractor will be required to maintain the access road to the satisfaction of the Engineer until the access road is no longer needed for the construction of this project and the adjacent contract for the I-70 St. Louis Main Span Mississippi River Bridge Project

Any aggregate required to maintain the access road to the satisfaction of the engineer shall be in accordance with Sections 402 and 1004 of the Standard Specifications except as noted in this special provision. The AGGREGATE SURFACE COURSE, TYPE A used for maintaining the access road shall be crushed limestone CA 6. The material shall be placed within the limits and to the thickness as directed by the Engineer. Compaction shall be performed using a 10-ton, smooth drum roller and the roller shall be operated in static mode, with no vibration.

Pipe underdrains have been provided in the plans and shall be installed as shown on Access Road 1 from Sta. 21+80 to Sta. 45+50. The Contractor will be required to maintain the pipe underdrains in an operational condition to the satisfaction of the Engineer until the access road is no longer needed for the construction of this project and the adjacent contract for the I-70 St. Louis Main Span Mississippi River Bridge Project. Any cost associated with keeping the pipe underdrains operational shall be at the Contractor's expense.

Wheel loads shall be maintained at least 2 ft. from the edge of the granular base to fully engage the geogrid and reduce the potential for damage to the granular base section. With the granular base section width of 15 ft., this will require the Contractor to maintain one-way traffic on the Access Road from Sta. 22+00 to Sta. 46+40. A widened area has been provided from Sta. 37+75 to Sta. 39+25 to allow trucks and equipment to pull over to allow other trucks and equipment to pass. The Contractor shall notify all project personnel including material and equipment delivery drivers that this portion of Access Road 1 is a one-way road. The Contractor shall provide any delineation or flagging that is necessary to ensure that the road is used as a one-way road and to ensure the equipment wheel loads are kept a minimum of 2 ft. from the edge of the granular base. Any cost associated with keeping this portion of the Access Road one-way and keeping the wheel loads a minimum of 2 ft. from the limits of the geogrid shall be at the Contractor's expense.

Method of Measurement.

Measurement for maintenance including but not limited to, grading and rolling, on Access Road 1 from Sta. 22+00 to Sta. 46+40 shall be made per FOOT as TEMPORARY ACCESS ROAD (SPECIAL), MAINTENANCE. The per FOOT measurement is measured on the centerline of the access road and includes the full width of the access road. The per FOOT measurement will be made each time the Contractor is required to bring the access road back to a condition acceptable to the engineer. The measurement will include only the portion of Access Road 1 requiring maintenance between Sta. 22+00 and Sta. 46+40. The measurement is only made once per maintenance event regardless of the number of passes or level of effort required to bring the road back to a condition acceptable to the Engineer.

Basis of Payment.

This work shall be paid for at the contract unit price per FOOT for TEMPORARY ACCESS ROAD (SPECIAL), Maintenance.

Any aggregated used at the direction of the engineer to maintain Access Road 1 between Sta. 22+00 and Sta. 46+40 shall be paid per TON for AGGREGATE SURFACE COURSE, TYPE A.

**ITEMS BY OTHERS**

Following is a list of items associated with the Illinois Approach Bridges which are by others and included in other contracts:

- Pavement marking on the bridge deck
- The DMS sign on the Eastbound Illinois Approach Bridge
- The DMS sign on the Westbound Illinois Approach Bridge
- The light poles in Unit 1 Eastbound and Unit 1 Westbound on the Illinois Approach Bridges
- Electrical wiring and conduit for supplying power to the Unit 1 Eastbound and Unit 1 Westbound light poles
- The electric meter, ground rods, and transformer pad
- Regulatory signs, directional signs, mile markers, delineators, reflectors, informational sign and all other related signing

**STATUS OF UTILITIES TO BE ADJUSTED**

| Name & Address of Utility | Type | Location | Estimated Date Adjustment Completed |
|---|---|---|---|
| Mr. Jason Klein<br>AmerenCIPS (Power)<br>1050 W. Boulevard, MC P10<br>Belleville, IL 62221<br>Telephone: (618) 236-4309<br>Email: JKlein@ameren.com | Overhead power lines | (1) Along Route 3 under bridge structure.<br><br>(2) Access Road #3 | August 1, 2010 |
| Mr. Andrew Parker<br>AmerenIP (Power)<br>2600 North Center Street<br>P.O. Box 378 MC Q-10<br>Maryville, IL 62062-0378<br>Telephone: (618) 346-1270<br>Email: AParker@ameren.com | Overhead Power lines | Route 3 – South of bridge structure. | August 1, 2010 |
| Mr. Jim Jaksetic<br>AmerenUE (Transmission)<br>One Ameren Plaza<br>PO Box 66149, MC 658<br>St. Louis, MO 63115<br>Telephone: (314) 554-2703<br>Email: jjaksetic@ameren.com | Overhead power transmission lines | (1) Proposed crossing over Pier 14<br><br>(2) Raise existing transmission lines crossing between Pier 19 & 20.<br><br>(3) Access Road #1 | (1) Lines crossing Pier 14 to be strung after Pier 14 is completed, March 1, 2011. SEE TRAFFIC CONTROL SPECIAL PROVISION TABLE.<br><br>(2) Relocation for lines between Pier 19 & 20 planned to be completed by March 1, 2011.<br><br>(3) No conflict. SEE AMEREN REQUIREMENTS SPECIAL PROVISION. |

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|---|---|---|---|
| Mr. Mark Statler<br>AmerenUE – Venice Power Station<br>Plant Superintendent<br>Combustion Turbine Generator Group<br>One Ameren Plaza<br>PO Box 66149<br>St. Louis, MO 63115<br>Telephone: (314) 992-8032<br>Email: mstatler@ameren.com | AmerenUE property – Venice Power Station<br><br>(Monitoring Wells) | Access Road #1 | Monitoring wells at Sta. 43+00+/- to be protected/adjusted to grade by June 15, 2010.<br>Monitoring well at Sta. 33+00+/- to be abandoned by June 15, 2010. |
| Mr. Bob Shipley<br>Metro East Sanitary District<br>1801 Madison Ave<br>Granite City, IL 62040<br>Telephone: (618) 452-9400 | Sanitary Sewer | Route 3, East of Pier 23 | Complete |
| Mr. Jim Heggar<br>Illinois American Water Company<br>100 Water Works Drive<br>Belleville, IL 62223<br>Telephone: (618) 239-3261<br>Email: Jim.heggar@amwater.com | Water main-Route 3, Access Road # 1,2 & 3<br><br>Sanitary Sewer main – Access Road #2<br><br>Buried Electric line-Access Road #2 | (1) East of Pier 22. – Install new fire hydrant adjacent to proposed dry stand pipe.<br>(2) Access Road #1<br><br>(3) Access Road #2<br><br>(4) Access Road #3 | (1) After installation of dry stand pipe.<br><br>(2) No conflict.<br><br>(3) No conflict.<br><br>(4) No conflict. |
| James M. Burton<br>Sprint/Nextel<br>5600 N. River Road<br>Suite 300<br>Rosemont IL 60018<br>Telephone: (847) 318-3437<br>Email:<br>James.m.burton@sprint.com | Communi-cation lines | (1) Access Road #1<br><br>(2) East of Pier 18 | (1) August 1, 2010<br><br>(2) None anticipated. |
| Mr. Tom Lang<br>AT&T<br>2250 N. Jasper Street<br>Decatur, IL 62526<br>Telephone: (217) 429-8596<br>Email: tl1636@att.com | Communi-cation lines | Project area. | None anticipated. |
| Mr. Steve Hendel<br>360Network<br>4024 Hounds Hill Drive<br>Florissant, MO 63034<br>Telephone: (314) 753-8213<br>Email:<br>Steve.Hendel@LTSCompany.com | Communi-cation lines | Access Road #3 | August 1, 2010 |

| | | | |
|---|---|---|---|
| Mr. Tom Buher<br>MCI Communication Services, Inc.<br>Verizon Services Operations<br>OSP Const. Manager<br>Midwest Region<br>P.O. Box 387<br>7719 West 60th Place<br>Summit, IL 60501<br>Telephone: (708) 458-6410<br>Email:<br>thomas.buher@Verizonbusiness.com | Communi-cation lines | (1) Access Road #1<br><br>(2) East of Pier 18<br><br>(3) West of Pier 20<br><br>(4) Access Road #2 | (1) August 1, 2010<br><br>(2) None anticipated.<br><br>(3) None anticipated.<br><br>(4) None anticipated. |
| Mr. Jason Johns<br>Qwest<br>16141 Swingley Ridge Road, Suite 200<br>Chesterfield, Mo 63017<br>Telephone: (916) 296-8520<br>Email: Jason.johns@qwest.com | Communi-cation lines. | (1) Access Road #1<br><br>(2) East of Pier 18<br><br>(3) West of Pier 20<br><br>(4) Access Road #2 | (1) August 1, 2010<br><br>(2) None anticipated.<br><br>(3) None anticipated.<br><br>(4) None anticipated. |
| Bruce Schrama<br>Laclede Gas<br>Superintendent-Plants & Stations<br>4118 Shrewsbury Ave.<br>St. Louis MO. 63119<br>Ph. (314) 768-7750<br>Cell -(314) 575-5432<br>Email:<br>BSchrama@lacledegas.com | Propane Pipeline. | None. – West of Pier 13 on adjacent project. | None anticipated. |
| Mr. Patrick Nwakoby<br>Explorer Pipeline<br>6846 South Canton<br>Tulsa, OK 74136<br>Telephone: (918) 493-5172<br>Email: pnwakoby@expl.com | Petroleum pipeline. | None. – West of Pier 13 on adjacent project. | None anticipated. |
| Mr. Rick Hardester<br>CenterPoint Energy (MRT Pipeline)<br>4500 W. 61st Street<br>Little Rock, AR 72209<br>Telephone: (501) 377-4614<br>Email:<br>rhardester@centerpointenergy.com | Gas Pipeline | Access Road #1 | None anticipated. |
| Mr. Brian Kelly<br>AmerenIP (Gas)<br>1050 W. Boulevard, MC P10<br>Belleville, IL 62221<br>Telephone: (618) 236-4338<br>Email: Bkelly@ameren.com | Gas. | Access Road #3 | None anticipated. |
| **Toll Free J.U.L.I.E. Telephone Number (800) 892-0123** | | | |

The above represents the best information of the Department and is only included for the convenience of the bidder. The applicable provisions of Section 102 and Articles 105.07 and 107.20 of the Standard Specifications for Road and Bridge Construction shall apply.

If any utility adjustment or removal has not been completed when required by the Contractor's operation, the Contractor should notify the Engineer in writing. A request for an extension of time will be considered to the extent the Contractor's operations were affected.

## METRO EAST SANITARY DISTRICT (MESD) REQUIREMENTS

Indemnification

The Contractor shall indemnify, defend and hold harmless the Metro East Sanitary District (MESD), its Officers, Boards, Commissions and Commissioners, agents and employees, from and against any and all claims, suits, judgments, costs, attorney fees, damages or other relief arising out of or resulting from, existing out of or through, or alleged to arise out of work performed on MESD properties which fall within the project limits. The Contractor shall not be required to indemnify MESD for negligence or willful misconduct on the part of the Officials, Boards, Commissions, agents or employees of the MESD and nothing herein shall affect the duty of said Contractors in the State of Illinois to defend the MESD.

The Contractor is also required to add MESD as an additional insured to the Contractor's General Liability Insurance policy for this project.

Compliance with this special provision shall be included as part of the contract, and no additional compensation will be permitted.

## TRAFFIC CONTROL AND PROTECTION, (SPECIAL)

Specific traffic control plan details and Special Provisions have been prepared for this contract. This work shall include all labor, materials, transportation, handling and incidental work necessary to furnish, install, maintain and remove all traffic control devices required as indicated in the plans and as approved by the Engineer.

At least one lane of traffic in each direction on Illinois 3 (St. Clair Ave.) shall be maintained at all times except for brief intervals of time required when the movement of the Contractor's equipment will seriously hinder the safe movement of traffic and during temporary closures on Illinois Route 3 (St. Clair Ave.) while erecting girders. See ILLINOIS ROUTE 3 WEEKEND ROAD CLOSURE, SPECIAL Special Provision for additional details. Periods during which the Contractor will be allowed to halt traffic will be designated by the Engineer.

The Contractor shall be allowed to close a lane on Illinois Route 3 (St. Clair Avenue) for the improvements to the approach at Access Road 3. The lane closure will be restricted to 9:00 a.m. to 3:00 p.m. or during night time operations.

The Contractor shall notify the Resident Engineer at least 3 days in advance of any lane closures.

Lane closures will not be allowed during the holiday periods specified in article 107.09. In addition, lane closures will not be allowed if it would be detrimental to public transportation during major events in the metropolitan area. These events include, but are not limited to, St. Louis Cardinals baseball home games, St. Louis Rams football home games, St. Louis Blues hockey home games, the Fair St. Louis Celebration, the Mardi Gras Parade, the Big Muddy Blues Festival, Gateway International Raceway Events, and other possible events not listed here. The final determination on the acceptability of a lane closure will rest with the Resident Engineer.

Method of Measurement.

All traffic control indicated on the traffic control plan details, standards and specified in the Special Provisions, except for traffic control included in IL ROUTE 3 WEEKEND ROAD CLOSURE, SPECIAL, will be measured for payment on a lump sum basis as TRAFFIC CONTROL AND PROTECTION, (SPECIAL).

Basis of Payment.

All traffic control and protection, except for traffic control included in IL ROUTE 3 WEEKEND ROAD CLOSURE, SPECIAL, will be paid for at the contract lump sum price for TRAFFIC CONTROL AND PROTECTION, (SPECIAL).

**IL ROUTE 3 WEEKEND CLOSURE, SPECIAL**

This work shall consist of furnishing, installing, maintaining, monitoring, and complete removal of all traffic control devices necessary to successfully and safely detour traffic around the proposed closure of IL Route 3.

The closure will not be allowed if the proposed weekend includes, or is adjacent to the 7 major holiday periods specified in section 107.09. These holidays include New Year's Day, Easter, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.

The closure will not be allowed if it would be detrimental to public transportation during major events in the metropolitan area. These events include, but are not limited to, St. Louis Cardinal's baseball home games, St. Louis Rams' football home games, St. Louis Blues home games, the Fair St. Louis Celebration, the Mardi Gras Parade, the Big Muddy Blues Festival, Gateway International Raceway Events, and other possible events not listed here. The final determination on the acceptability of a weekend to do the closure will rest with the Resident Engineer.

The Contractor shall notify the Resident Engineer 3 weeks (21 days) prior to the anticipated weekend closure. 2 weeks (14 days) prior to the proposed closure, the Contractor shall have Changeable Message Signs (CMS) in place according to the IL Route 3 Weekend Closure Plan Sheets to alert the motoring public to the upcoming closure. These messages shall be coordinated with IDOT's Traffic Management Center (TMC) at 618-346-3279. IDOT will be responsible for all media releases regarding the closure.

Resident Engineer will be responsible for contacting the agencies listed below 2 weeks (14 days) prior to the weekend closure.

1. St. Clair County Transit District, (618) 628-8090, Attn: Bill Grogan
2. Madison County Transit District, Fax (618) 797-7547
3. Brooklyn Police Department, (618) 874-8204
4. Brooklyn Fire Department, (618) 482-2977
5. Fairmont City Police Department, (618) 274-4504, Attn: Scott Penny
6. Fairmont City Fire Department, (618) 274-4504, Attn: Bob Belba
7. Madison Police Department (618) 876-4300
8. Madison Fire Department, (618) 876-7287
9. St. Clair County Emergency Telephone System Board, Fax (618) 277-7668, Attn: Carolyn Ligon

IL Route 3 will be completely closed to traffic from Industrial Avenue (just north of the stockyards area) to Adams Street (the most southern street in Brooklyn) as shown on the drawings titled “IL Route 3 Weekend Closure” in the plan set. These drawings show the appropriate traffic control standards to be used. Any variation from the plans shown shall be approved by the Resident Engineer.

IL Route 3 may be completely closed to traffic from 6:00 AM Saturday morning to 8:00 PM Saturday evening, and 6:00 AM Sunday morning to 5:00 AM Monday morning. The Contractor will be allowed to begin traffic control set up at 5:00 AM Saturday morning and 5:00 AM Sunday morning according to the IL Route 3 Weekend Closure Plan Sheets, but the full closure may not begin until 6:00 AM on either morning.

If at any point during the closure a break in continuous activity is anticipated to exceed 2 hours, the road closure shall be removed and re-installed when work is ready to commence. No special payment will be made for the intermittent removal and re-installation of detour signage.

The Contractor shall field-mark proposed locations of signs a minimum of 7 days prior to the scheduled closure. The Resident Engineer must approve the marked locations before the Contractor begins to install the signs. Signs that are installed prior to 5:00 AM of the Saturday morning of the scheduled closure must be completely covered until needed.

All traffic control devices shall be NCHRP 350 Compliant.

The Contractor shall designate a representative that is solely responsible for traffic control. This representative shall be available and respond accordingly at all times during the closure. Due to the continuous work schedule, it is anticipated the appointed representative may experience shift change. This is acceptable, as long as the Resident Engineer is notified of the representative’s shift schedule before the closure begins.

Dynamic Message Signs (DMS) are part of the existing ITS system owned and maintained by IDOT. The IL Route 3 Weekend Closure Plan Sheets detail messages that the Contractor shall coordinate with IDOT’s Traffic Management Center during the weekend closure. The Contractor is not responsible for providing or maintaining the DMS during the weekend closure.

**Liquidated Damages.** Should the Contractor, or in case of default, the surety, fail to open IL Route 3, both northbound and southbound, by 8:00 PM on Saturday night, or 5:00 AM the first Monday following the weekend closure required for the bridge beam erection, the Department, the traveling public, state and local police and governmental authorities will be damaged in various ways, including but not limited to increased construction administration cost, potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delay, with its resulting cost to the traveling public. These damages are not reasonably capable of being computed or quantified. Therefore, the Contractor will be charged with liquidated damages specified in the amount of $2,500.00 for every fifteen (15) minute increment beginning strictly at 5:00 a.m. on the first Monday morning following the weekend closure, with liquidated damages continuing at 5:15 a.m., 5:30 a.m. and so on. It shall be the responsibility of the Resident Engineer to determine the quantity of excess closure time.

**Basis of Payment:** This work shall be paid for at the contract unit price per LUMP SUM for IL ROUTE 3 WEEKEND CLOSURE, SPECIAL, which will be payment in full for furnishing, installing, maintaining, and removing traffic control for the closure described. No special payment will be made for Changeable Message Signs utilized during and prior to this closure of IL Route 3.

**PORTABLE CHANGEABLE MESSAGE SIGN**

This work shall be according to Section 701 and the following:

Each portable changeable message sign shall be equipped with a cellular – Ethernet/IP-based digital modem meeting the following specifications:

PHYSICAL CHARACTERISTICS:

- Weight: < 1 lb.
- Size: 3” wide x 1.1” high x 5.1" long
- Status LEDs
- RF Primary Antenna Connector: 50 Ohm SMA
- RF Receive Diversity Antenna Connector: 50 Ohm SMA
- Ethernet 10/100 Mbps Interface: RJ-45 Connector
- RS-232: DB9 DCE (1200-230400 baud)

DATA SERVICES:

- CDMA EV-DO Rev A
- CDMA 1xEVDO Release 0
- CDMA 1xRTT
- CDMS IS-95

ENVIRONMENTAL:

- Operating ranges: -30°C to 70°C
- Humidity: 5%-95% Non-condensing

RF FEATURES:

- Full duplex transceiver
- Dual-band support for both 800 MHz cellular and 1.9 GHz PCS bands
- Dual band Receive Diversity

POWER MANAGEMENT FEATURES:

- Transmit/Receive (Typ/Max) 239/270 mA
- Low power consumption
- Dormant connection: 85 ma at 12 VDC

The Contractor shall acquire the cellular carrier data plan needed to communicate to each portable changeable message sign. The Contractor shall be responsible for all fees associated with the cellular service plan.

The ethernet cellular modem shall be configured by the Contractor in order to maximize the data transmission for the area where the modem is being installed. The modem shall communicate to the Department's local area network over the public internet protocol (IP) address procured with the modem. The Contractor shall provide the Department the IP address and communication data port of each modem one week in advance of delivering the portable changeable message sign. The IP address configuration shall be static, non-changing, and only one IP address shall be provided for the modem. All necessary cabling, antennas, and ancillary equipment shall be included in the cost of this pay item. The device's necessary configuration software shall be made available to the Department and up to three licenses shall be included in the cost of this item. The licenses shall be valid for a minimum of 1 year.

The Department owns and utilizes NTCIP-compliant sign control software at its Traffic Management Center (TMC) at 1102 Eastport Plaza Drive in Collinsville, IL 62234. All portable changeable message signs for this contract shall be compatible and fully operational with the Department's existing NTCIP-compliant sign control software.

Basis of Payment

Portable Changeable Message Signs used during and prior to the closure or closures on IL Rte 3 will not be paid for separately but shall be considered as included in the lump sum payment for IL ROUTE 3 WEEKEND CLOSURE, SPECIAL.

**KEEPING ROADS AND STREETS OPEN TO TRAFFIC**

The Contractor shall conduct and coordinate the construction operations for this project in such a manner so as to keep all roads and streets open to two-way traffic at all times except when construction operations require the closure of a lane of traffic and traffic control and protection is installed meeting the approval of the Engineer. No overnight lane closures will be permitted.

Any and all stage and/pr phase changes shall be coordinated between the Contractors of adjacent Contracts for the different projects so that the appropriate number of lanes and safe transitions are maintained in each direction on all roadways between Contracts.

The adjacent Contracts are noted in the special provision for COORDINATION WITH ADJACENT CONTRACTS.

Basis of Payment.

This work will not be paid for separately, but will be included in the cost of TRAFFIC CONTROL AND PROTECTION (SPECIAL).

**TRAFFIC CONTROL PLAN**
*Effective: July 12, 1993* *Revised: May 12, 1997*

Traffic control shall be in accordance with the applicable sections of the "Standard Specifications for Road and Bridge Construction", the applicable guidelines contained in the "National Manual on Uniform Traffic Control Devices for Streets and Highways", Illinois Supplement to the National Manual of Uniform Traffic Control Devices, these Special Provisions, and any special details and Highway Standards contained herein and in the plans.

Special attention is called to Articles 107.09 and 107.14 of the "Standard Specifications for Road and Bridge Construction" and the following Highway Standards relating to traffic control:

701001 701006 701011 701301 701501 701901

In addition, the following Special Provision(s) will also govern traffic control for this project:

Construction and Maintenance Sign Supports
Keeping Roads and Streets Open to Traffic
Traffic Control and Protection, (Special)
Portable Changeable Message Sign
Reflective Sheeting on Channelizing Devices
Personal Protective Equipment
Flagger at Side Roads and Entrances

**CONSTRUCTION AND MAINTENANCE SIGN SUPPORTS**
*Effective: April 21, 1981* *Revised: November 1, 2006*

This work shall be done according to Section 1106 of the Standard Specifications and Highway Standard 701901 except as herein modified.

All construction signs mounted on permanent support for use in temporary traffic control having an area of 10 square feet (1 square meter) or more shall be mounted on two 4 in x 4 in (100 mm x 100 mm) or two 4 in x 6 in (100 mm x 150 mm) wood posts.

Type A metal post (two for each sign) conforming to Article 1006.29 of the Standard Specifications may be used in lieu of wood posts. Type A metal posts used for these signs may be unfinished.

This work shall not be paid for separately; but shall be considered included in the cost of the traffic control items in this contract.

**RIGHT-OF-WAY AND PROPERTY CORNERS**
Effective: April 15, 2006

Description. This work shall consist of resetting right-of-way and property corners that are disturbed prior to or during construction.

Materials. For right-of-way and permanent easement corners, a 5/8" X 30" rebar with a Division of Highways aluminum cap bearing the surveyor's license number shall be used. The aluminum cap design shall be as shown on the plans.

For the intersection of property lines with proposed right-of-way lines and permanent easement lines, a 5/8" X 30" rebar with a plastic cap bearing the surveyor's license number shall be used.

CONSTRUCTION REQUIREMENTS

General. Upon completion of the construction operations, the Contractor and Engineer shall locate and inventory the right-of-way and property corners. A written report of any missing right-of-way and property corners shall be submitted to the District Chief of Plats and Plans.

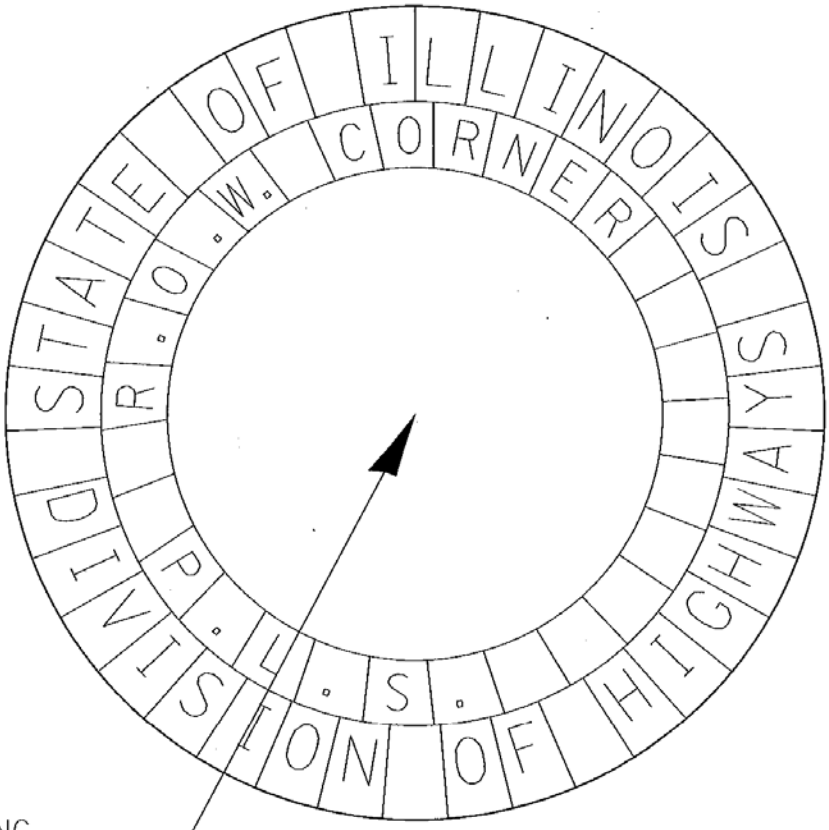
An Illinois Professional Land Surveyor, with a Department prequalification in "Special Services – Land Survey", shall be obtained by the Contractor to set the right-of-way and property corners.

The right of way and property corners shall be set after the construction work is complete, and there is no possibility of disturbance of the marker. Corners shall be set in compliance with the "Minimum Standards of Practice" for a Boundary Survey as prescribed under the "Rules for the Administration of the Illinois Professional Land Surveyor's Act of 1989" as set forth by the Illinois Department of Professional Regulation, amended at 28 Ill. Reg. 15297, effective November 10, 2004.

Method of Measurement. Resetting of right-of-way and property corners that are disturbed through no fault of the Contractor will be measured for payment as each. Resetting of corners that are not protected and carefully preserved according to Article 107.20 of the Standard Specifications will not be measured for payment.

Basis of Payment. This work will be paid for at the contract unit price per each for RIGHT-OF-WAY AND PROPERTY CORNERS.

ALUMINUM CAP DESIGN
DETAIL FOR RIGHT-OF-WAY
AND PERMANENT EASEMENT CORNERS




AFTER SETTING
SURVEYOR SHALL USE
PUNCH TO MARK
CENTER LOCATION

**SECTION CORNER MARKERS**
Effective: April 15, 2006

Description. This work shall consist of resetting section corner markers and reference markers that are disturbed prior to or during construction.

CONSTRUCTION REQUIREMENTS

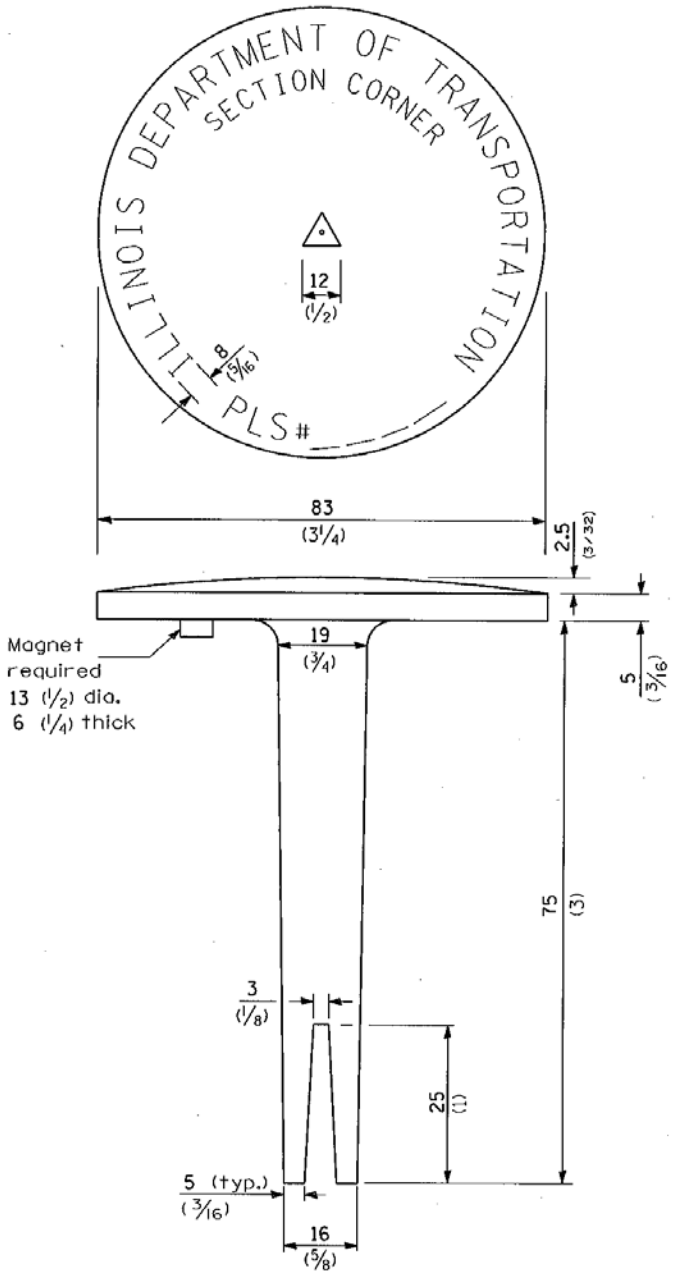
General. An Illinois Professional Land Surveyor, with a Department prequalification in "Special Services – Land Survey", shall be obtained by the Contractor to set reference markers and section corner markers. Monument records of the section corners shall be filed with the St. Clair County Recorder of Deeds in accordance with the Land Survey Monuments Act (765 ILCS 220/0.01 et seq) of the Revised Illinois Statutes.

Section Corner Markers. The section corner markers shall consist of a Type I aluminum tablet with magnet as shown on Highway Standard 667101, except as modified by the detail in the plans. Said corners shall be set after the construction work is complete, and there is no possibility of disturbance of the corner. Section corners shall be set in accordance with the Land Survey Monuments Act (765 ILCS 220/0.01 et seq) of the Revised Illinois Statutes and as prescribed by U. S. Public Act 79-649.

Reference Markers. Reference markers shall be set clear of proposed ditch bottoms, side slopes, back slopes, and utility lines.

Method of Measurement. Resetting of markers that are disturbed through no fault of the Contractor will be measured for payment as each. Resetting of markers that are not protected and carefully preserved according to Article 107.20 of the Standard Specifications will not be measured for payment.

Basis of Payment. This work will be paid for at the contract unit price per each for SECTION CORNER MARKERS.




**ALUMINUM TABLET**

TYPE I INSTALLATION REQUIRED

SECTION CORNER MARKER DETAIL

SEE HWY STD 667101 FOR
ADDITIONAL INFORMATION

**OFFICE COPY MACHINE**
*Effective: January 1, 1987* *Revised: November 1, 2006*

The copier specified in Article 670.02 shall meet the following specifications:

(1) Edge-to-edge copying.
(2) Up to 11 in x 17 in (275 mm x 425 mm) size for copy-size capabilities.
(3) A detachable platen cover in order to copy portions of large-bound documents.
(4) A cabinet stand for the copier.

**TELEPHONE ANSWERING MACHINE**
*Effective: January 11, 1990* *Revised: November 1, 2006*

The telephone answering machine specified in Article 670.02 shall meet the following minimum specifications:

(1) Time/Day Indication - A computerized voice records the date and time that each message is received.

(2) Beeperless Remote - Any remote touch-tone phone can be used to review all messages by the use of an access code.

(3) Digital System - Pre-recorded and received messages are managed on separate cassettes.

(4) Conversation Record - The operator can record any phone call.

(5) Remote Turn-On - Any remote touch-tone phone can be used to turn on the answering machine by the use of an access code.

(6) Full Message - The Caller is advised if the memory is insufficient to record the call.

(7) Battery Back-Up - The settings and messages are protected from power failures.

(8) Two-Line Capacity - Projects that have a second phone line through the provision of a 670.05 Engineer's Field Laboratory shall provide a single phone answering machine that services both lines.

Prior to the purchase of this item, the Contractor shall submit specifications for the proposed machine to the Engineer for his approval.

**EMBANKMENT**

Revised November 1, 2006

Material which is proposed for use by the Contractor to be used for embankment construction must be inspected and approved by the District Geotechnical Engineer.

In order to be approved for use as embankment material, it must meet all applicable requirements of Sections 202, 203, 204, 205, and 502 of the Standard Specifications and meet the following requirements:

1. It must fall in one of the following Highway Research Board Classifications: A-1, A-2, A-3, A-4, A-6, or A-7-6.
2. It shall have a Liquid Limit of 49 or less.
3. Any A-4, A-6 or A-7-6 material to be used as borrow for embankment construction shall not have an organic content greater than 7%.
4. Classification of the material for points 1 and 2 shall be determined in accordance with the latest AASHTO Designation: M 145.
5. When tested for density in place, any soil classified as an A-4 shall not contain more than 100% of optimum moisture content determined according to AASHTO T-99.

The outside 9 feet (3 meters) of those portions of the embankment which will be permanently exposed in the completed roadway shall be constructed using native materials of a classification that will support vegetation and contain a plasticity index of 12 or greater as directed by the Engineer.

The lime modified soil layer shall be constructed with a minimum of 18 inches (450 mm) of "reactive" soil as defined by Article 1009.02 of the Standard Specifications.

**SEEDING**
Effective: January 1, 2009

Revise the following seeding mixtures shown in Table 1 of Article 250.07 of the Standard Specifications to read:

"Table 1 - SEEDING MIXTURES

| Class – Type | Seeds | lb/acre (kg/hectare) |
|---|---|---|
| 2 Roadside Mixture 7/ | Tall Fescue (Inferno, Tarheel II, Quest, Blade Runner, or Falcon IV) | 100 (110) |
| | Perennial Ryegrass | 50 (55) |
| | Creeping Red Fescue | 40 (50) |
| | Red Top | 10 (10) |
| 2A Salt Tolerant Roadside Mixture 7/ | Tall Fescue (Inferno, Tarheel II, Quest, Blade Runner, or Falcon IV) | 60 (70) |
| | Perennial Ryegrass | 20 (20) |
| | Red Fescue (Audubon, Sea Link, or Epic) | 30 (20) |
| | Hard Fescue (Rescue 911, Spartan II, or Reliant IV) | 30 (20) |
| | Fults Salt Grass 1/ | 60 (70)" |

Revise Note 7 of Table 1 – Seeding Mixtures of Article 250.07 of the Standard Specifications to read:

"7/ In Districts 1 through 6, the planting times shall be April 1 to June 15 and August 1 to November 1. In Districts 7 through 9, the planting times shall be March 1 to June 1 and August 1 to November 15. In District 8 when Class 2 seeding is done between March 1st and June 1st, the seed mixture shall also include 48 pounds per acre (55kg/ha) of Spring Oats. When Class 2 seeding is done between August 1st and November 15th, the seed mixture shall also include 56 pounds per acre (63kg/ha) of Balboa Farm Rye or 60 pounds per acre (67kg/ha) of Winter Wheat. Seeding may be performed outside these dates provided the Contractor guarantees a minimum of 75 percent uniform growth over the entire seeded area(s) after a period of establishment. Inspection dates for the period of establishment will be as follows: Seeding conducted in Districts 1 through 6 between June 16 and July 31 will be inspected after April 15 and seeding conducted between November 2 and March 31 will be inspected after September 15. Seeding conducted in Districts 7 through 9 between June 2 and July 31 will be inspected after April 15 and seeding conducted between November 16 and February 28 will be inspected after September 15. The guarantee shall be submitted to the Engineer in writing prior to performing the work. After the period of establishment, areas not exhibiting 75 percent uniform growth shall be interseeded or reseeded, as determined by the Engineer, at no additional cost to the Department."

Revise Table II of Article 1081.04(c)(6) of the Standard Specifications to read:

TABLE II

| Variety of Seeds | Hard Seed % Max. | Purity % Min. | Pure Live Seed % Min. | Weed % Max. | Secondary * Noxious Weeds No. per oz (kg) Max. Permitted | Notes |
|---|---|---|---|---|---|---|
| Alfalfa | 20 | 92 | 89 | 0.50 | 6 (211) | 1/ |
| Clover, Alsike | 15 | 92 | 87 | 0.30 | 6 (211) | 2/ |
| Red Fescue, Audubon | 0 | 97 | 82 | 0.10 | 3 (105) | - |
| Red Fescue, Creeping | - | 97 | 82 | 1.00 | 6 (211) | - |
| Red Fescue, Epic | - | 98 | 83 | 0.05 | 1 (35) | - |
| Red Fescue, Sea Link | - | 98 | 83 | 0.10 | 3 (105) | - |
| Tall Fescue, Blade Runner | - | 98 | 83 | 0.10 | 2 (70) | - |
| Tall Fescue, Falcon IV | - | 98 | 83 | 0.05 | 1 (35) | - |
| Tall Fescue, Inferno | 0 | 98 | 83 | 0.10 | 2 (70) | - |
| Tall Fescue, Tarheel II | - | 97 | 82 | 1.00 | 6 (211) | - |
| Tall Fescue, Quest | 0 | 98 | 83 | 0.10 | 2 (70) | |
| Fults Salt Grass | 0 | 98 | 85 | 0.10 | 2 ( 70) | - |
| Kentucky Bluegrass | - | 97 | 80 | 0.30 | 7 (247) | 4/ |
| Oats | - | 92 | 88 | 0.50 | 2 ( 70) | 3/ |
| Redtop | - | 90 | 78 | 1.80 | 5 (175) | 3/ |
| Ryegrass, Perennial, Annual | - | 97 | 85 | 0.30 | 5 (175) | 3/ |
| Rye, Grain, Winter | - | 92 | 83 | 0.50 | 2 ( 70) | 3/ |
| Hard Fescue, Reliant IV | - | 98 | 83 | 0.05 | 1 (35) | - |
| Hard Fescue, Rescue 911 | 0 | 97 | 82 | 0.10 | 3 (105) | - |
| Hard Fescue, Spartan II | - | 98 | 83 | 0.10 | 3 (105) | - |
| Timothy | - | 92 | 84 | 0.50 | 5 (175) | 3/ |
| Wheat, hard Red Winter | - | 92 | 89 | 0.50 | 2 ( 70) | 3/" |

Revise the first sentence of the first paragraph of Article 1081.04(c)(7) of the Standard Specifications to read:

"The seed quantities indicated per acre (hectare) for Prairie Grass Seed in Classes 3, 3A, 4, 4A, 6, and 6A in Article 250.07 shall be the amounts of pure, live seed per acre (hectare) for each species listed."

**CLEARING, SPECIAL**

The Contractor is advised that it is the intent of the provision that each parcel within the limits of this Contract right-of-way, and as specified in the contract plans, be clear of all real property, chattel, debris and all rubbish such that the property can be site graded, seeded with Seeding, Class 4A, and present a neat and clean appearance to the approval of the Engineer on completion of this project. The Contractor will be required to remove all piles of rubbish, piles of broken concrete, miscellaneous building debris, abandoned railroad tracks and ballasts, non-utilized sign posts and foundations, existing metal catwalks, steel posts, and all other remaining miscellaneous items remaining above ground including debris and rubbish not already specified in DEBRIS REMOVAL, to the satisfaction and approval of the Engineer.

The Contractor is advised that it is the intent of the provision that each parcel also be clear of all shrubbery and landscape items such that the property can be site graded, seeded with Seeding, Class 4A, and present a neat and clean appearance to the approval of the Engineer on completion of this project. The removal items will include, but not be limited to, all tree stumps, logs, shrubs, bushes, saplings, grass, weeds, other vegetation of a diameter less than 6 inches per Section 201 of the Standard Specifications.

The Contractor will be required to remove and dispose of all such shrubs and brush as outlined herein to the satisfaction and approval of the Engineer.

The removal of these items specified herein does NOT include the removal of items already covered under the provision for DEBRIS REMOVAL, or other items measured and paid for individually per the Contract Plan Summary of Quantities and/ or per the Special Provisions.

The Contractor is advised to inspect the various items and quantities of clearing required on the parcels involved prior to bidding. Any quantities shown on the contract plans covered for removal under CLEARING, SPECIAL is for Contractor information only, and not for bid. The piles of debris and other non-quantified removal items noted on the plans are also for Contractor information only, and are not comprehensive. No additional compensation will be allowed for variations in removal items required to complete the CLEARING, SPECIAL as specified in this Special Provision for the subject parcels.

Existing utilities, including (but not limited to) utility structures, fire hydrants, water main, and sewers, unless specifically noted on the plans, shall be removed BY OTHERS, and shall not be included in the removal items for CLEARING, SPECIAL. The Contractor shall note any such existing utilities which conflict with items to be cleared, and request direction from the Engineer prior to clearing at these locations. Any damage to existing utilities by the Contractor shall be repaired by the Contractor at his own expense to the satisfaction of the Engineer.

The Contractor shall use caution when working around monitoring wells to remain in place or be abandoned by others on Access Road 1.

Materials resulting from the clearing operations as herein specified shall be disposed of according to Article 202.03 at no additional cost to the contract.

Prior to beginning any clearing work, the Contractor shall notify the property owners of the material that is to be cleared. The property owners shall be allowed two weeks to salvage any of the material to be cleared. The Contractor shall dispose of the entire surplus clearing material not claimed by the property owners. Contact information for the known property owners is as follows:

Mark S. Statler, P.E.
Ameren, Combustion Turbine Generator Group
Plant Superintendent, Venice Power Station
(314) 992-8032 Work
(314) 952-8733 Mobile
MStatler@ameren.com

Mr. C. R. McQueen, Jr.
Director Engineering Services & Administration
Terminal Railroad Association of St. Louis
1000 St. Louis Union Station, Suite 200
St. Louis, Missouri 63103
Office: (314)-539-4724
Fax: (314) 621-3673

James R. Kazmierczak
Engineer Public Improvements
Norfolk Southern Corporation
1200 Peachtree Street
Atlanta, Georgia 30309
Work: (404) 529-1256
James.Kazmierczak@nscorp.com

Mr. Paul Fetterman
Engineering Consultant
Kansas City Southern Railway
9200 NW 78th Street
Weatherby Lake, MO 64152
Cell: 816-305-6017
pfetterman@kcsouthern.com

Dave McKernan
Manager Industry and Public Projects
Union Pacific Railroad Company
100 North Broadway, Suite 1500
St. Louis, Missouri 63102
Phone: 314-331-0682
Fax: 402-501-2520

Removal of the clearing items as herein specified and incidental site grading as directed by the Engineer, will not be paid for separately, but considered as included in the contract lump sum price bid for CLEARING, SPECIAL.

Method of Measurement.

The removal and clearing items for CLEARING, SPECIAL shall not be measured for payment individually. The removal and clearing items for CLEARING, SPECIAL shall be measured for payment as a LUMP SUM for clearing of the entire contract project limits.

Basis of Payment.

This work shall be paid for at the contract unit price LUMP SUM for CLEARING, SPECIAL.

**DEBRIS REMOVAL**

This work shall consist of the removal of and satisfactory disposal of the various types of items/ materials from the project limits and State Right of Way as specified herein, on the contract plans, and the attached Inventory.

This work shall be paid for separately, and does NOT include the removal of items already specified for removal under the provision for CLEARING, SPECIAL, or other removal items measured and paid for individually per the Contract Plan Summary and Schedule of Quantities and per the Special Provisions.

The Contractor shall be aware that Inventory of the Access Roads and Approach Bridge revealed the presence of the following items. Appropriate consideration should be given to the disposal of possible hazardous materials such as railroad ties, asphalt pavement, old utility posts, and materials that can be recycled as scrap metal.

- Concrete piles
- Asphalt piles
- Old utility posts
- Scrap metal
- Junk PVC pipe
- Rubber crossing material
- Railroad ties
- General demolition debris

An Inventory of the items found on the project site is included in this Special Provision. The locations of these solid waste items are also identified on the Contract Plans on the Sheet titled DEBRIS INVENTORY LOCATIONS.

It shall be the Contractor’s responsibility to ensure that the materials are disposed of in an appropriate manner, and to provide the Resident Engineer with documentation verifying the removal method and final destination of the various items prior to removal.

The Contractor shall be solely and entirely responsible for compliance with all Federal, State and local laws, ordinances, regulations and directives with respect to the disposal of waste materials. In connection therewith the Contractor shall be solely and entirely responsible for obtaining all necessary permits, licenses or other authorizations so as not to delay the project and shall be responsible for the payment of all required fees and costs therefore, all without additional cost to the Department.

The following tables list the items found during the debris inventory:

| ACCESS ROAD 1 | | | | | |
|---|---|---|---|---|---|
| ITEM LOCATION IDENTIFIER | DESCRIPTION OF ITEMS AT LOCATION | QUANTITY | CONDITION | CATEGORY | STATION AND OFFSET |
| 1A | Concrete chunk (possible fence foundation) | 1 | Poor | Demolition debris | Sta 14+50, 0' Rt |
| 1B | Numerous piles of concrete and ashalt debris with embedded steel beams. (Full width of easement, 5' H) | - | Poor | Demolition debris/ scrap metal | Sta 19+75 to Sta 21+00 |
| 1C | Railroad ties (Full width of easement, 5' H) | - | Poor | Demolition debris | Sta 21+00 to Sta 21+50 |
| 1D | Railroad ties (35' L x 35' W x 6' H) | - | Poor | Demolition debris | Sta 23+30 |
| 1E | Scattered railroad ties | 15-20 | Poor | Demolition debris | Sta 25+57, 15' Lt to Sta 26+00, 15' Lt |
| 1F | Railroad rails | 2 | Fair | Scrap metal | Sta 26+40, 17' Lt |
| 1G | Pile of railroad ties (15' W x 6' H) | - | Poor | Demolition debris | Sta 46+45, 8' Rt to Sta 46+95, 8' Rt |
| 1H | Pile of rock and metal scrap (8' L x 8' W x 2' H) | - | Poor | Demolition debris/ scrap metal | Sta 47+82, 0' Rt |
| 1I | Railroad tie | 1 | Poor | Demolition debris | Sta 47+97, 10' Lt |
| 1J | Pile of scrap metal and brush (20' L x 20' W x 7' H) | - | Poor | Demolition debris/ scrap metal | Sta 56+00, 10' Rt to Sta 56+20, 10' Rt |
| 1K | Boring ILC 5A | 1 | New | Plastic | Sta 60+78, 6' Lt |
| 1L | Boring ILC 5A | 1 | New | Plastic | Sta 60+85, 3' Lt |
| 1M | Boring EA4 | 1 | New | Plastic | Sta 70+70, 7' Lt |

| ACCESS ROAD 2 | | | | | |
|---|---|---|---|---|---|
| ITEM LOCATION IDENTIFIER | DESCRIPTION OF ITEMS AT LOCATION | QUANTITY | CONDITION | CATEGORY | STATION AND OFFSET |
| 2A | Buried railroad ties | 12 | Poor | Demolition debris | Sta 11+80, 0' Rt |
| 2B | Pile of railroad ties (20' L x 20' W x 4' H) | - | Poor | Demolition debris | Sta 43+75, 10' Rt |
| 2C | Intermittent small piles of debris with concrete (10' W) | - | Poor | Demolition debris | Sta 43+79, 5' Rt to Sta 44+50, 5' Rt |
| 2D | Railroad rail | 1 | Fair | Scrap metal | Sta 44+00, 12' Rt |
| 2E | Railroad ties | 6 | Poor | Demolition debris | Sta 44+00, 12' Rt |
| 2F | Dirt and debris pile, some concrete and railroad ties (20' L x 10' W x 6' H) | - | Poor | Demolition debris | Sta 48+80, 0' Rt |
| 2G | Conc. foundation for structure (5' L x 5' W x 2' H exposed) | 1 | Fair | Demolition debris | Sta 50+75, 20' Rt |
| 2H | ILC 8 boring | 1 | New | Plastic | Sta 51+25, 5' Lt |
| 2I | ILC 8A boring | 1 | New | Plastic | Sta 51+25, 5' Rt |

| ACCESS ROAD 3 | | | | | |
|---|---|---|---|---|---|
| ITEM LOCATION IDENTIFIER | DESCRIPTION OF ITEMS AT LOCATION | QUANTITY | CONDITION | CATEGORY | STATION AND OFFSET |
| 3A | Mostly railroad ties with rubber crossing material. (20'-40' W x 2'-10' H) (Only approx. 2' of pile encroaches into easement limits.) | - | Poor | Demolition debris | Sta 20+40, 25' Rt to Sta 25+00, 25' Rt |
| 3B | Asphalt pile (10' L x 11' W x 3' H) | - | Poor | Demolition debris | Sta 24+89, 6' Rt |
| 3C | Mostly railroad ties, concrete, rebar, steel rails (10'-20' W x 3'-4' H) | - | Poor | Demolition debris/ scrap metal | Sta 25+30 to Sta 26+00 |
| 3D | Mostly railroad ties, concrete, rebar, steel rails (25' W x 5' H) | - | Poor | Demolition debris/ scrap metal | Sta 26+00 to Sta 28+00 |
| 3E | Mostly railroad ties, concrete, rebar, steel rails (25' W x 5' H) | - | Poor | Demolition debris/ scrap metal | Sta 28+00 to Sta 31+00 |
| 3F | Mostly railroad ties, concrete, rebar, steel rails (15' W x 5' H) | - | Poor | Demolition debris/ scrap metal | Sta 31+00 to Sta 32+00 |
| 3G | Mostly railroad ties, concrete, rebar, steel rails (15' W x 2' H) | - | Poor | Demolition debris/ scrap metal | Sta 32+00 to Sta 35+00 |
| 3H | Pile of railroad ties (21' L x 15' W x 3' H) | - | Poor | Demolition debris | Sta 36+00, 15' Rt |
| 3I | Pile of railroad rails (25' W x single H) | - | Fair | Scrap metal | Sta 41+71 to 42+47 |
| 3J | Railroad rails with ties attached (20' W) | - | Fair | Demolition debris/ scrap metal | Sta 45+20, 0' Rt to Sta 46+48, 20' Rt |
| 3K | Piles of concrete, asphalt, and railroad ties | - | Poor | Demolition debris | Sta 45+75, 18' Lt to Sta 47+25, 18' Lt |
| 3L | Railroad rails single high stacked on rubber expansion material (7' W) | - | Fair | Demolition debris/ scrap metal | Sta 46+79 to Sta 47+22 |
| 3M | Chunk of concrete | 1 | Poor | Demolition debris | Sta 48+30, 12' Rt |
| 3N | Mound of dirt with ties and debris (20' W x 30' L) | - | Poor | Demolition debris | Sta 50+65, 25' Rt |
| 3O | Railroad ties | 6 | Poor | Demolition debris | Sta 53+50, 22' Rt |
| 3P | Railroad ties | 5 | Poor | Demolition debris | Sta 54+00, 22' Rt |
| 3Q | Concrete Foundation (25' W x 60' L) | - | Poor | Demolition debris | Sta 71+41, 10' Lt to Sta 72+01, 10' Lt |
| 3R | Power Pole on ground | 1 | Poor | Demolition debris | Sta 72+20, 13' Lt |
| 3S | Abandoned railroad pole, metal base, and 10'x10' concrete foundation | - | Poor | Demolition debris/ scrap metal | Sta 72+31, 13' Lt |
| 3T | Small pile of railroad ties and scrap metal | 5 | Poor | Demolition debris/ scrap metal | Sta 73+50, 22' Rt |
| 3U | Abandoned railroad pole | 1 | Poor | Demolition debris/ scrap metal | Sta 74+99, 20' Lt |
| 3V | Pile of railroad ties (15' W x 31' L) | - | Poor | Demolition debris | Sta 75+25, 18' Rt |
| 3W | Pile of earth and railroad ties (10' W x 10' L x 4' H) | - | Poor | Demolition debris | Sta 80+40, 20' Rt |
| 3X | Empty metal barrel | 1 | Poor | Demolition debris/ scrap metal | Sta 81+40, 15' Rt |

| RELOCATED I-70 | | | | | |
|---|---|---|---|---|---|
| ITEM LOCATION IDENTIFIER | DESCRIPTION OF ITEMS AT LOCATION | QUANTITY | CONDITION | CATEGORY | STATION AND OFFSET |
| 70A | Power pole | 1 | Fair | Demolition debris | Sta 116+65, 116' Rt |
| 70B | Power Pole | 1 | Fair | Demolition debris | Sta 117+48, 40' Rt |

Basis of Payment.
This work shall be paid for at the contract unit price L SUM for DEBRIS REMOVAL.

Only the items within the project limits of this Contract shall be included in the cost of DEBRIS REMOVAL.

## REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES

This work shall be according to Article 669 of the Standard Specifications and the following:

Qualifications. The term environmental firm shall mean an environmental firm that is pre-qualified in hazardous waste by the Department. The environmental firm selected shall not be a former or current consultant or have any ties with any of the properties contained within and/or adjacent to this construction project.

General. Implementation of this Special Provision will likely require the Contractor to subcontract for the execution of certain activities. It will be the Contractor's responsibility to assess the working conditions and adjust anticipated production rates accordingly.

All contaminated materials shall be managed as non-special waste or hazardous waste. This work shall include monitoring and potential sampling, analytical testing, and management of a material contaminated by regulated substances.

Any soil classified as a non-special waste or hazardous waste shall be excavated and disposed of as directed by this project or the Engineer. Any excavation or disposal beyond what is required by this project or the Engineer will be at no additional cost to the Department. The preliminary site investigation (PSI) report, available through the District's Environmental Studies Unit, estimated the excavation quantity of non-special waste or hazardous waste at the following locations. The information available at the time of plan preparation determined the limits of the contamination and the quantities estimated were based on soil excavation for construction purposes only. The lateral distance is measured from centerline and the farthest distance is the offset distance or construction limit whichever is less. Any soil samples or analysis without the approval of the Engineer will be at no additional cost to the Department.

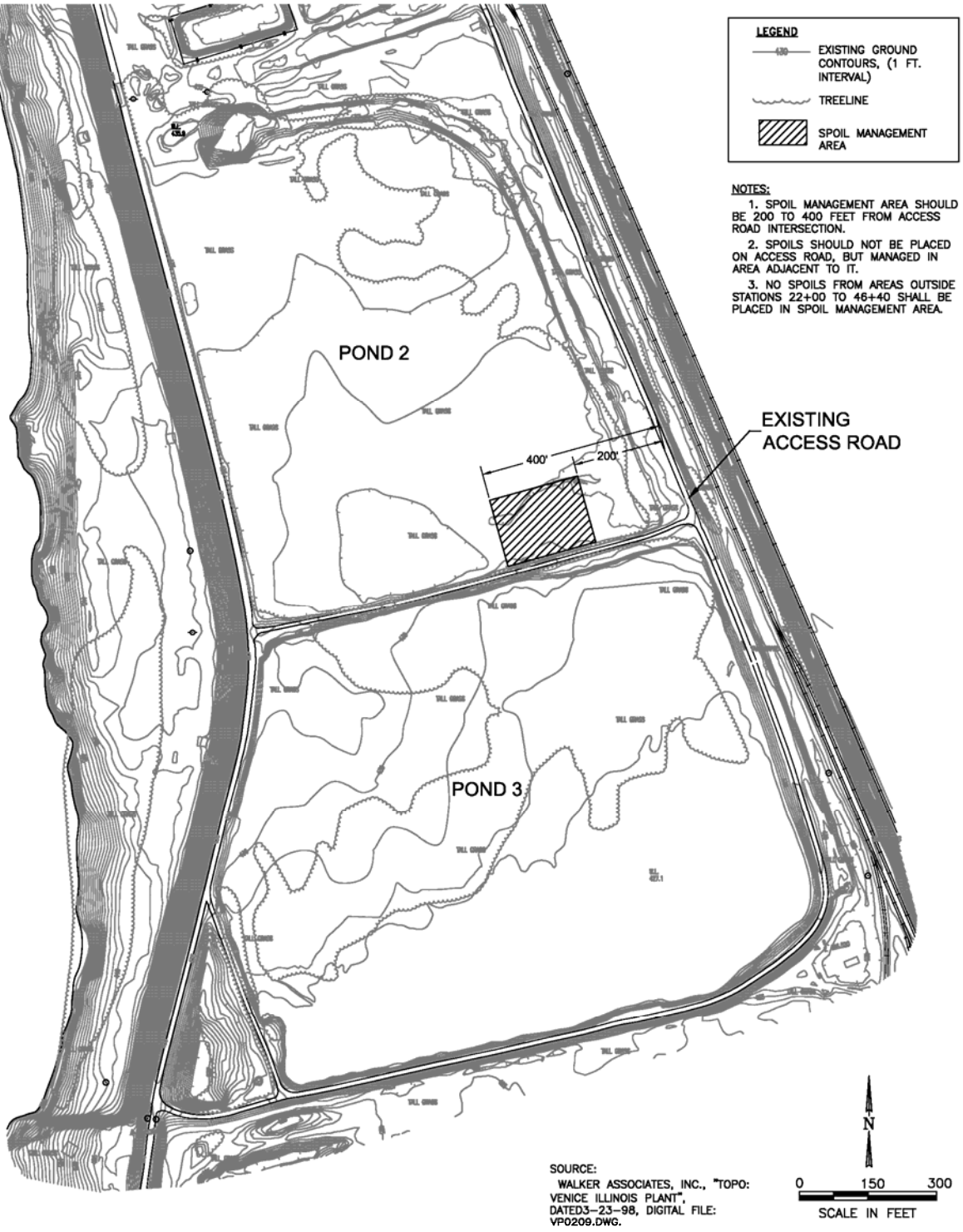
A. The Environmental Firm shall continuously monitor for worker protection and the Contractor shall manage and dispose of all soils excavated within the following areas as classified below.

1. Station 10+24 to Station 14+00 LT and RT offset 0 to 50 feet (Access Road #1 North) – non-special waste. Contaminants of concern sampling parameters: BETX, PAHs, Lead, Mercury, Arsenic, and Dieldrin.
2. Station 14+00 to Station 22+00 LT and RT offset 0 to 50 feet (Access Road #1 North) – non-special waste. Contaminants of concern sampling parameters: BETX, PAHs, Lead, Mercury, Arsenic, and Dieldrin.
3. Station 46+40 to Station 59+00 LT and RT offset 0 to 50 feet (Access Road #1 North) – non-special waste. Contaminants of concern sampling parameters: BETX, PAHs, Lead, Mercury, Arsenic, and Dieldrin.
4. Station 14+00 to Station 40+00 LT and RT offset 0 to 50 feet (Access Road #2 South) – non-special waste. Contaminants of concern sampling parameters: PAHs, Lead, Mercury, Arsenic, PCBs, and Dieldrin.
5. Station 40+00 to Station 43+00 LT and RT offset 0 to 50 feet (Access Road #2 South) - **hazardous waste**. Contaminants of concern sampling parameters: Cadmium (D006), PAHs, Lead, Arsenic, and Mercury.
6. Station 43+00 to Station 52+00 LT and RT offset 0 to 50 feet (Access Road #2 South) - non-special waste. Contaminants of concern sampling parameters: PAHs, Lead, Mercury, Arsenic, PCBs, and Dieldrin.
7. Station 10+00 to Station 83+00 LT and RT offset 0 to 50 feet (Access Road #3) - non-special waste. Contaminants of concern sampling parameters: BETX, PAHs, Lead, Arsenic, Mercury, PCBs, and Dieldrin.

8. All soil associated with the excavation of Pier 18, 19, 20, 21, 22, and 23 from 0 to 5 feet in depth - non-special waste. Contaminants of concern sampling parameters: BETX, PAHs, Lead, Arsenic, Mercury, PCBs, and Dieldrin.

B) The Environmental Firm shall continuously monitor for worker protection. The Contractor shall manage any excavated soils on Access Road 1 from Sta. 22+00 to Sta. 46+40 **back on Ameren's property** to the disposal location designated on the Spoils Management Area for Access Road 1 drawing below. The following areas can be managed back on Ameren's property to the designated Spoils Management Area.

1. Station 22+00 to Station 46+40 LT and RT offset 0 to 50 feet (Access Road #1 North) – non-special waste. Contaminants of concern sampling parameters: BETX, PAHs, Lead, Mercury, Arsenic, and Dieldrin.




NATURAL RESOURCE TECHNOLOGY

# SPOILS MANAGEMENT AREA FOR ACCESS ROAD 1 FROM STATION 22+00 TO 46+40

VENICE POWER STATION
AMEREN
VENICE, ILLINOIS

DRAWN: RLH 02/22/10 CHK'D: RJG APP'D: RJG DATE: 02/22/10

PROJECT NO. 1949/2.1

DRAWING NO. 1949-21-A01

FIGURE NO. 1

**STONE RIPRAP, CLASS A6 (SPECIAL)**

This Special Provision amends Section 281 (RIPRAP) of the Standard Specifications for Road and Bridge Construction as follows:

STONE RIPRAP, CLASS A6 (SPECIAL) shall have a minimum full course thickness of 12 inches. Bedding material will not be required.

Filter fabric shall be placed beneath the stone riprap according to Section 282 of the Standard Specifications. Filter fabric will not be paid for separately, but shall be considered incidental to the cost of STONE RIPRAP, CLASS A6 (SPECIAL).

Method of Measurement
STONE RIPRAP, CLASS A6 (SPECIAL) shall be measured as specified in Article 281.06 of the Standard Specifications as modified herein and no additional compensation will be allowed.

Basis of Payment
This work will be paid for at the contract unit price per square yard for STONE RIPRAP, CLASS A6 (SPECIAL)

**CHAIN LINK FENCE, 7' (SPECIAL)**

This Special Provision amends Section 664 (CHAIN LINK FENCE) of the Standard Specifications for Road and Bridge Construction as follows:

This item shall consist of installing a chain link fence with barbed wire top according to Section 664.

The following shall be provided by the Contractor.

a. The chain link fence shall be 7 feet tall. All materials and methods of installation shall be according to Section 664 of the Standard Specifications, and Highway Standard 664001.

b. The chain link fence shall have 3-strands of barbed wire along the top length of the fence. Galvanized brackets shall fasten to the top of the fence posts and equally space the 3 barbed wire strands above and outward from the fence fabric on approximately a 45 degree angle. The additional height of the barbed wire shall be above the specified 7 foot chain link fence height.

c. The barbed wire shall be as specified in Section 1006.28 of the Standard Specifications.

Method of Measurement.
Chain link fence will be measured for payment in feet along the top of the fence from center to center of end posts, excluding the length occupied by gates.

Basis of Payment.
This work will be paid for at the contract unit price per foot for CHAIN LINK FENCE, 7 FT (SPECIAL).

**WATER WELL SEALING FORM**

In the event water wells are encountered and impede construction operations the following information should be used:

This work shall consist of the Contractor, Licensed Well Driller, or the Contractor's Representative completing the attached form correctly and sending copies to St. Clair County Health Department. An additional copy of this form shall be given to the Resident Engineer upon completion for the project file. The following information has been attached for their use.

St. Clair County Health Department
19 Public Square, Suite 150
Belleville, IL 62220-1624
Contact/ Questions: Joe Morin 618-233-7769

Illinois Department of Public Health
Environmental Health
525 W. Jefferson Street, 2nd floor
Springfield, IL 62761
Contact/Questions: Allen Biggerstaff 217-782-3984

All abandoned wells must be sealed according to Section 920.120 of the Illinois Water Well Construction Code.

If any water wells are encountered during construction which require sealing, the work shall be paid for according to Article 109.04 of the Standard Specifications for extra work, which price shall be payment in full to complete this work to the satisfaction of the Resident Engineer. The work associated with completing the Water Well Sealing Forms shall not be paid for separately but shall be included in the extra work price. Final payment shall not be made for this item of work until that form has been completed and verified by the county that it has been correctly completed.

St. Clair County Health Department
19 Public Square, Suite 150
Belleville, IL 62220-1624
(618) 233-7769 FAX (618) 236-0676

## Approval Request for Sealing Water Well by Property Owner

**RETURN THIS FORM TO LOCAL HEALTH DEPARTMENT FOR APPROVAL**

The following plan to seal a water well shall be in accordance with the requirements of the Illinois Water Well Construction Code:

Original Water Well Permit Number (if known)_____

Property Owner_____ Telephone Number(include area code)_____

Mailing Address_____
Street Address City State Zip Code

Well Location_____
Address-Lot Number City County

GENERAL DESCRIPTION: Township_____(N)(S) Range_____(E)(W) Section_____

_____Quarter of the _____Quarter of the _____Quarter

TYPE OF WELL: Bored_____ Drilled_____ Other_____

Total Depth_____ Diameter_____

Obstructions to remove from well (pump, pipe, etc)_____

Well will be disinfected before sealing commences in the following manner:_____

_____

CASING RECORD: Upper 2 feet of casing removed? [YES] [NO]

PLUGGING DETAILS: Filled with_____ From_____to_____ft
(cement or other materials)
Kind of plug_____ From_____to_____ft
Filled with_____ From_____to_____ft
(cement or other materials)
Kind of Plug_____From_____to_____ft
Filled with_____ From_____to_____ft
(cement or other materials)
Kind of Plug_____From_____to_____ft

Well sealing will not commence until the above plan has been granted approval by the local health department. The local health department will be notified by telephone or in writing at least 48 hours prior to the commencement of any work to seal the above well. After the water well sealing is finished, a completed sealing form will be submitted to the local health department.
I certify that the attached information is complete and correct and that, if approved, the work will conform with the current Illinois Water Well Construction Code

_____ _____
(Applicant) Signature of Property Owner Date

**FOR OFFICE USE ONLY**

_____ _____
Approved by Date

# DRINKING WATER FACTS

## Abandoned Wells

An estimated 400,000 private water wells in Illinois provide drinking water to approximately 1.3 million people. Each year, many of these wells are abandoned when they are replaced with new wells or when homes are connected to community water systems. A large number of these abandoned wells are large diameter wells constructed with brick or stone casings, and ranging in depth from 20 to 50 feet. An abandoned well can pose a health and safety hazard if it is improperly sealed or not sealed at all.

### Abandoned Wells as Safety Hazards

When abandoned wells are left open, children, animals or even adults can fall into them, causing injury or death. To prevent such accidents, all abandoned wells must be properly sealed.

### Abandoned Wells as Sources of Pollution

If improperly sealed, an abandoned well can serve as a route for contaminating groundwater. Contaminated surface water, agricultural runoff and effluent from private sewage disposal systems can enter the groundwater through such wells and cause pollution of other wells in the area used for dinking water.

### Legal Requirement

The Illinois Water Well Construction Code requires the owner of water well, boring or monitoring the well to properly seal the well within 30 days after it is abandoned and no longer used to supply water. If a well or boring is in such a state of disrepair that it has the potential for transmitting contaminants into the groundwater or otherwise threatens the pubic health or safety, it also must be sealed. Where an abandoned well is found to contaminate another potable water well, the owner of the abandoned well is responsible for providing a safe and sufficient supply of water to the owner of the well that has been contaminated.

### Sealing Abandoned Wells

The basic concept in sealing an abandoned well is restoring the geological conditions that existed before the well was drilled. Therefore, the particular method for sealing a well depends on the typed of water well and the local geological features.

The licensed water well driller must seal an abandoned well. A homeowner may seal his/her own well for his/her own residence if a written request is made to the St. Clair County Health Department describing procedures and materials, all of which must comply with the well code. The St. Clair County Health Department must be notified at least 48 hours prior to the start of the work to seal such wells and, after the sealing is finished, a completed sealing form must be submitted to St. Clair County Health Department.

Most dug or bored wells can be sealed by filling them with clean clay ~~or sand~~. Drilled wells are somewhat more complex to seal and require pea gravel or limestone chips (fill material) and neat cement or bentonite (sealing material). The depth, geology and construction of the particular abandoned well to be sealed determines the appropriate levels at which these material must be placed. For all types of well, the well casing must be removed at least 2 feet below the final grade and the well must be disinfected.

### For More Information

More detailed information can be found in the Illinois Water Well Construction Code, which can be obtained from St. Clair County Health Department, 19 Public Square, Suite 150, Belleville, IL 62220, or call (618) 233-7769.

## Illinois Water Well Construction Code
## 415 ILCS 30/920.120

a) **Abandonment of Wells.**

1) The owner of a water well, boring, or monitoring well shall assure that such well is sealed within 30 days after it is abandoned and when the well is no longer used to supply water or is in such a state of disrepair that the well or boring has the potential for transmitting contaminants into an aquifer or otherwise threatens the public health or safety. The Department shall grant an extension of this time provided the owner submits a written request to the Department indicating the reasons for the request and an estimate of time in which the well will be either sealed or reused. In granting an extension, the Department must be assured that applicable protective measures will be taken and the methods and materials will be incompliance with the Act and this Part. Applicable protective measures may include ensuring that sources of contamination are down grade from the water source, ensuring isolation of the potential source of contamination in such a manner as to prevent a route of contamination of the ground water, or isolating the potential source of contamination to prevent accidental introduction of contaminants into ground water.

2) Water wells shall be sealed by a licensed water well driller pursuant to the Water Well and Pump Installation Contractor's License Act. An Individual who is not so licensed may seal a well, provided the well is located on land which is owned or leased by such individual for farming purposes or as such individual's place of abode and provided a request is made to the Department or local health department prior to the commencement of sealing indicating how the water well is to be sealed and the materials to be used. The Department br local health department shall grant approval when requested prior to the commencement of sealing if the methods and materials are in compliance with this Section.

b) **Sealing Requirements.** Where geologic data does not exist for a particular abandoned drilled water well, such water well shall be sealed, from the bottom up to where the well casing is removed, with neat cement grout or any bentonite product manufactured for water well sealing. Water wells, borings, or monitoring wells which are abandoned shall be disinfected by introducing a sufficient amount of chlorine to produce 100 parts per million of chlorine in the water in the well and shall be sealed by placing the sealing materials from the bottom of the well to the surface by methods that well avoid segregation or dilution of material in accordance with the following requirements:

1) **Non-creviced, consolidated formations.** Wells extending into non-creviced sandstone, or other water bearing consolidated formations shall be sealed by filling the well with disinfected clean pea gravel or limestone chips to within 10 feet below the top of the water bearing formation or to within 10 feet of the bottom of the casing, whichever is less. Neat cement grout or any bentonite product manufactured for water well sealing shall be placed for a minimum of 20 feet above this point. The upper part of the well to where the well casing is removed shall be sealed by neat cement grout or any bentonite product manufactured for water well sealing. Concrete or cement may be used for such sealing, provided the upper part of the well is dry.

2) **Creviced formations.** Wells extended into creviced formations shall be sealed by filling with disinfected clean pea gravel or limestone chips to within 10 feet below the top of the water bearing formation or to within 10 feet below the bottom of the casing whichever is less. Neat cement grout or any bentonite product manufactured for well sealing shall be placed for a minimum of 20 feet above this point. The upper part of the well to where the well casing is removed shall be sealed by neat cement grout or any bentonite product manufactured for water well sealing. Concrete or cement may be used for such sealing, provided the upper part of the well is dry. Where the earth cover is less than 30 feet, the hole shall be grouted from 10 feet below the creviced formation to where the well casing is removed.

3) **Unconsolidated formations.** In the event the water bearing formation consists of coarse gravel and producing wells are located nearby, the well shall be sealed by filling with disinfected clean pea gravel or limestone chips to 10 feet below the top of the water bearing formation. Neat cement grout or any bentonite product manufactured for water well sealing shall be placed for a minimum of 20 feet above this point. The upper part of the well to where the well casing is removed shall be sealed by neat cement grout or any bentonite product manufactured for water well sealing. Concrete or cement may be used for such sealing, provided the upper part of the well is dry. Abandoned dug and bored wells shall be sealed by using one of the following methods:

i. Filling with disinfected clean pea gravel or limestone chips to within 20 feet below the top of the casing. The upper part of the well to where the well casing is removed shall be sealed for a minimum of 20 feet by filling with neat cement grout, any bentonite product manufactured for

water well sealing, impervious material such as clay. Concrete or cement may be used for such sealing, provided the upper part of the well is dry.

ii. Placing a one foot layer of any bentonite product manufactured for water well sealing at the bottom of the well followed by alternation layer of agricultural limestone (limestone fines and any bentonite product manufactured for water well sealing. The alternating layers of agricultural lime shall be five to seven feet thick and the alternating layers of any bentonite product manufactured for water well sealing shall be six inches thick. The uppermost or top layer shall be agricultural lime.

iii. Completely fill in with concrete, cement grout, or impervious material such as clay.

4) **More than one water bearing formation.** Where wells extend into more than one water bearing formation, each water bearing formation shall be sealed independently in the manner described in this Section. Neat cement grout or any bentonite product manufactured for water well sealing shall be placed a minimum of 10 feet above and below at all intermittent water bearing formation except artesian wells and artesian formations. Disinfected clan pea gravel or limestone chips shall be placed in each water bearing formation between plugs. When the lower formation has an up-flow of water into the upper formation, a pressure seal is required to shut off the up-flow while a neat cement plug at least 50 feet in length is pumped in place and allowed to set. The upper part of the well to where the well casing is removed shall be sealed with neat cement grout or any bentonite product manufactured for water well sealing. Concrete or cement may be used for such sealing provided the upper part of the well is dry.

5) **Artesian wells.** In such wells, a cement retainer shall be used with pressure grouting equipment utilized to place cement grout. Neat cement grout, bentonite or aquajel from 2% to 6% by dry weight shall be placed for a minimum of 10 feet below and 10 feet above the water bearing formation. The upper part of the well to where the well casing is removed shall be filled with neat cement grout or any bentonite product manufactured for water well sealing. Concrete or cement may be used for such sealing, provided the upper part of the well is dry.

6) **Buried slab bored wells.** Such wells shall be sealed by filling with disinfected clean pea gravel or limestone chips to within one foot below the buried slab. The upper part of the well to where the casing is removed shall be sealed with neat cement or any bentonite product manufactured for water well sealing.

7) **In lieu of filling the well with disinfected clean pea gravel or limestone chips** as required in subsection (b) (1) through (6) of this Section, wells may be sealed by grouting from the bottom up by using neat cement grout or any bentonite product manufactured for water well sealing. This material shall be applied the full depth of the well and shall terminate within 2 feet of the ground surface. Concrete grout may be used in the upper part of the well, provided the upper part of the well is dry.

c) **Non-producing well.** Where a water well is drilled and a water bearing formation is not located, the water well shall be filled with clay, or neat cement containing bentonite, aquajel or similar materials from 2% to 6% by weight, or pure bentonite in any form by the water well driller not more than 10 calendar days after the well has been drilled.

d) **The well casing or liner shall be removed to at least 2 feet below final grade,** except where the well terminates with a concrete slab which is part of a building floor. Where the well terminates in a slab which is part of a building floor, the sealing material shall be placed flush with the floor. The pump and drop pipe shall be removed.

e) **Notification.**

1) The Department, approved local health department, or approved unit of local government shall be notified by telephone or in writing at least 48 hours prior to the commencement of any work to seal a water well or monitoring well.

2) When a water, boring or monitoring well is sealed, a sealing form shall be submitted to the Department or approved local health department by the individual performing the sealing not more than 30 days after the well is sealed. The following information shall be submitted on forms provided by the Department:

A) the date the water, boring or monitoring well was drilled
B) depth and diameter of the water, boring or monitoring well;
C) location of the water, boring or monitoring well;
D) type of sealing method used;
E) original water well permit number if available;
F) date the water, boring or monitoring well was sealed;
G) type of water well (bored, dug, driven or drilled);
H) whether the formation is clear of obstructions;
I) casing record (explanation of the required removal); and
J) water well driller's license number and name.

**TEMPORARY CONCRETE BARRIER**

This Special Provision amends Section 704 (TEMPORARY CONCRETE BARRIER) of the Standard Specifications for Road and Bridge Construction as follows:

The barriers shall be new and remain in place after project is completed.

Method of Measurement.
TEMPORARY CONCRETE BARRIER shall be measured as specified in Article 704.05 of the Standard Specifications as modified herein and no additional compensation will be allowed.

Basis of Payment.
This work shall be paid for at the contract unit price per foot for TEMPORARY CONCRETE BARRIER.

**FENCE REMOVAL**

This Special Provision amends Section 201 (CLEARING, TREE REMOVAL AND PROTECTION, CARE AND REPAIR OF EXISTING PLANT MATERIAL) of the Standard Specifications for Road and Bridge Construction as follows:

This work shall consist of removing all existing fencing, posts, supports and associated hardware at the locations shown in the plans or as directed by the Engineer. All materials included with the removal shall be disposed of off-site by the Contractor. The Contractor shall coordinate the fence removal with Mark Statler of Ameren prior to initiating the work. (See contact information below.)

Mark S. Statler, P.E.
Ameren, Combustion Turbine Generator Group
Plant Superintendent, Venice Power Station
(314) 992-8032 Work
(314) 952-8733 Mobile
MStatler@ameren.com

Method of Measurement.
FENCE REMOVAL shall be measured for payment in feet along the top of the fence which price shall include removal and off-site disposal of all existing fence shown for removal in the plans and the schedules.

Basis of Payment.
This work shall be paid for at the contract unit price per foot for FENCE REMOVAL.

**ROCK BASE, 24”**

This work shall consist of furnishing, placing, and compacting rock base material to the lines and grades shown on the plans or as directed by the Engineer.

The bottom 18" nominal thickness of Rock Base material shall conform to the requirements of Article 1004.05 of the IDOT Standard Specifications except the aggregate description and the gradation shall be as follows:

Crushed Stone or Crushed Slag

| Sieve Size | Percent Passing |
|---|---|
| 8 in. (200 mm) | 100 |
| 6 in. (150 mm) | 97 ± 3 |
| 4 in. (100 mm) | 75 ± 10 |
| 2 in. (50 mm) | 45 ± 15 |
| No. 200 (75 µm) | 5 ± 5 |

The rock base material shall be inspected for gradation by the IDOT approved Aggregate Gradation Control System (AGCS) Aggregate Source and shall be inspected per the frequency of a Category III product as specified in the Department's AGCS Policy Memorandum, except washing of the gradation shall not be required, and modification of the stated gradation ranges is not permitted. Gradation verification method shall be to the satisfaction of the inspecting IDOT District. The AGCS source shall coordinate inspection with their responsible inspecting District. The inspecting District shall witness and direct the sampling for the start of production gradation testing and one per every 20 gradations thereafter, or at another frequency as they deem appropriate. The AGCS source shall request approval of their production method through the Materials Engineer of their Inspecting District. Inspection reports and assignments shall use the material code 018CM00.

The Contractor shall submit a letter from the Aggregate Source that certifies all shipments marked as "CN 76D61 Rock Base" have the production method approved by the Aggregate Source's inspecting District and meet the requirements of the special provision titled "Rock Base, 24" of CN 76D61.

The bottom 18" of rock base material shall be placed in one lift or as directed by the Engineer. Each lift of rock base shall be rolled with a vibratory roller meeting the requirements of Article 1101.01 (g) to obtain the desired keying or interlock compaction to the satisfaction of the Engineer. The Engineer shall verify that adequate keying has been obtained.

The top 6" nominal thickness of Rock Base, 24" shall meet the requirements of Aggregate Surface Course of Article 1004.04 except the gradation shall be CA 6 and gravel shall not be used. Inspection shall be per Category III of the AGCS program. The top 6" thickness shall serve as a capping aggregate and driving surface and shall be placed and compacted to the satisfaction of the Engineer.

The excavation required to place the Rock Base, 24" as shown on the plans and cross sections is included in the earth excavation quantities.

Method of Measurement.
Measurement for ROCK BASE, 24" shall be made per square yard at the surface and any wedge required outside the planned edge of pavement will be incidental to the ROCK BASE, 24" pay item.

Basis of Payment.
This work shall be paid for at the contract unit price per square yard for ROCK BASE, 24" which price shall include all materials, equipment and labor necessary to construct full 24" depth.

**GRANULAR EMBANKMENT, SPECIAL**

This Special Provision amends Section 206 (GRANULAR EMBANKMENT, SPECIAL) of the Standard Specifications for Road and Bridge Construction as follows:

The material shall be in accordance with Article 1005.01 and shall meet the RR4 gradation requirements.

Replace the second paragraph of Article 206.04 with, the aggregate shall be placed and compacted according to Article 351.05(b).

Delete Article 206.05 and 206.06.

Method of Measurement.
This work will be measured for payment in tons according to Article 311.08.

Basis of Payment.
This work will be paid for at the contract unit price per ton for GRANULAR EMBANKMENT, SPECIAL.

**TRENCH BACKFILL**

This item shall be constructed according to Section 208 of the Standard Specifications, except as modified herein:

Article 208.02 "Materials" shall be changed to require the use of Coarse Aggregate as specified in Article 1004.05 of the Standard Specifications, and that the coarse aggregate gradation shall be CA11. Fine Aggregate will not be allowed.

Trench backfill material shall be compacted according to Method 1, as specified in Article 550.07 of the Standard Specifications.

Trench backfill shall be placed to a height of at least 1 foot above the top of the pipe. GRANULAR EMBANKMENT, SPECIAL and ROCK BASE, 24" may then be placed above the trench backfill.

Basis of Payment.
This work shall be measured as specified in Article 208.03 of the Standard Specifications as modified herein.

Basis of Payment.
This work shall be paid for at the contract unit price per cubic yard for TRENCH BACKFILL and no additional compensation will be allowed.

**FULL DEPTH RUBBER CROSSING**

This item shall be constructed following the guidelines of Article 107.12 of the Standard Specifications.

The crossing shall be a HiRail Corporation Full Depth Rubber System. The crossing shall be installed as specified in the plans and in accordance with the specifications of the crossing manufacturer.

The layout of the crossings shall be approved the Engineer and TRRA's Engineer. TRRA's Engineer may require the crossing panels to be staggered to fit the access road curve.

Basis of Payment.
This work shall be paid for at the contract unit price per each for FULL DEPTH RUBBER CROSSING which price shall include all materials, equipment and labor necessary to complete the crossing installation.

**TUBULAR GATES, 4.5' X 16' SINGLE**

This work shall consist of furnishing all labor, equipment and materials required to construct the Tubular Gates as indicated in the plans.

Tubular gates shall be constructed of a minimum of 1-5/8", 18 gauge galvanized steel pipe and shall have a minimum of five horizontal rails and one intermediate vertical brace. Height shall be 50 inches.

Latch and gate posts will be constructed of galvanized steel pipe. The minimum size for gate and latch posts will be 4 inch O.D. with a minimum weight of 8.65 lb per foot - if heavier gate than minimum specified above is used, post size may need to be increased per ASTM F-900 requirements. Posts will be galvanized inside and out or capped. Post footing shall consist of Class SI Concrete.

Chain for securing gate must have large enough link opening to accommodate a padlock with a ½ inch shank.

A minimum of two hinges shall be used, each consisting of a galvanized ¾" J-bolt mounted to the gate post and galvanized female hinge with ¾" opening mounted to the gate.

Basis of Payment.
This work shall be paid for at the contract unit price per each for TUBULAR GATES, 4.5' x 16' SINGLE, which price shall include all excavation, concrete, posts, gate, chain, hinges, and hardware.

**FENCE CORNER POST**

This Special Provision amends Section 664 (CHAIN LINK FENCE) of the Standard Specifications for Road and Bridge Construction and the applicable portions of IDOT Standard 664001 as follows:

This work shall consist of providing and installing fence corner posts as shown in the plans where fence removals terminate.

Post type and style shall match the existing fence posts.

Basis of Payment.
This work shall be paid for at the contract unit price per each for FENCE CORNER POST.

**AMEREN REQUIREMENTS**

**EXHIBIT 1**
**to the Utility Agreement**
**between the State of Illinois ("STATE" and/or "DEPARTMENT"), Union Electric Company d/b/a AmerenUE ("COMPANY")**

**Special Provisions Applicable to Project Construction**

STATE and COMPANY agree that the STATE's Contractor shall comply with the terms of this Exhibit with reference to all work to be performed by the Contractor upon COMPANY's property, as a condition to the Contractor's right of access to COMPANY's property which is described in the Temporary Easement Construction Agreement ("Temporary Easement") dated _____, between STATE and COMPANY (hereinafter called "Easement Area"). The STATE agrees that it shall cause the following special provisions to be made part of the PROJECT's Contract (hereinafter "Contract"). Failure to include such provisions in the Contract shall be deemed a breach of STATE's obligations hereunder and will relieve COMPANY of the obligation to grant access to STATE or its contractors to the Easement Area until such time as the breach is cured to the reasonable satisfaction of COMPANY. The term "Contractor", as used in this agreement means the STATE's general or prime contractor awarded the Contract to construct the PROJECT. The Contract shall require the Contractor to incorporate the following provisions into all subcontract agreements or other agreements whereby any third party is allowed access to the Easement Area. Construction engineering consultants and any other inspection consultants engaged by the STATE to provide professional engineering services during construction and gaining access to the Easement Area shall be required by appropriate agreement to comply substantially with the following provisions regarding protection of COMPANY facilities.

In consideration of the contractual obligation on the part of the Contractor to comply with the applicable Special Provisions, the COMPANY shall not demand or require the Contractor to enter into a Right of Entry Agreement, or to comply with any other requirements before allowing the Contractor to enter upon COMPANY's property. However, if at any time the Contractor is not in compliance with any applicable requirement within the Special Provisions, then COMPANY may notify the Contractor, and STATE, in writing, of the specific requirements of the applicable Special Provisions with which the Contractor is not in compliance. The COMPANY shall not deny access on account of any breach of the Special Provisions without written agreement by the STATE. The STATE shall take appropriate action to remedy any actual breach including but not limited to suspension of the work as may be appropriate.

SPECIAL PROVISION FOR PROTECTION OF PROPERTY AND INDEMNIFICATION

*By entering into the Contract, the Contractor certifies that it is aware of, and has been provided with a copy of the Agreement for Reimbursable Utility Adjustment dated _____, 2010, and the Temporary Easement by and between Union Electric Company d/b/a/ AmerenUE ("COMPANY") and the State of Illinois ("STATE") dated _____, 2010 and recorded as Document No.____with the St. Clair County Recorder's office. Contractor agrees to abide by the terms thereof. Contractor further acknowledges that dangerous, high voltage, energized electric lines, which must be avoided, are installed in the vicinity of the Easement Area. Contractor shall warn and alert each of its employees, all subcontractors, and any other person or entity gaining access to the work area by agreement with the Contractor of the existence, location, and nature of the energized electric transmission lines. Any work to be performed by Contractor and any party acting by, through and under Contractor is undertaken with full knowledge and awareness of and assumption of the risk involved in performing work with the existence of the energized lines. Contractor shall take positive steps to alert anyone working within or entering the Easement Area of the dangerous nature of electricity and of the safety precautions required by the Contract to work in the vicinity of the electric transmission facilities.*

*Contractor shall exercise due care and take all appropriate safety precautions necessary or advisable for the prevention of accidents, and shall comply with all laws and regulations applicable to the work to be performed hereunder including without limitation the National Electric Safety Code and OSHA requirements to avoid damage, loss, or injury of any and all kinds or nature whatever to persons and property.*

*Contractor waives all claims against the COMPANY, its affiliates, parents, subsidiaries or successors, their officers, agents and employees for damage to property arising out of the work performed, except to the extent that such damage was caused by or alleged to have been caused by the negligence of COMPANY, its officers, employees, or agents.*

*The provisions of this special provisions are in addition to all other provisions of the Contract providing for the protection of corporate and private property including but not limited to Article 107.20 of the Standard Specifications for Road and Bridge Construction.*

*To the fullest extent permitted by law, in addition to the indemnifications provided the Contractor under Article 107.26 of the Standard Specifications for Road and Bridge Construction, the Contractor shall be responsible for any and all injuries to the COMPANY due to the activities of the Contractor, subcontractors, suppliers, agents or employees arising out of or resulting from performance of the Contract, or any activity in connection therewith. The Contractor shall indemnify and hold harmless the COMPANY, its officers, employees, and agents from any and all claims, lawsuits, actions, costs, and fees (including reasonable attorney fees and expenses) of every nature or description, arising from, growing out of, or connected with the work, or on account of or in consequence of any neglect in safeguarding the property of the COMPANY or on account of or in consequence of using unacceptable materials in protecting the property of the COMPANY or because of any act or omission, neglect or misconduct of the Contractor, its officers, employees, agents, or subcontractors, anyone directly or indirectly employed by them, and/or anyone for whose acts they may be liable.*

*In addition, Contractor shall fully defend, indemnify and hold harmless COMPANY of and from any loss, damage, claim and/or cause of action that COMPANY may sustain and/or that may be brought against COMPANY, including any and all economic losses that COMPANY may sustain, in the event that the construction, maintenance, alteration or use of the improvements to the Easement Area, in any way, interfere with COMPANY's business operations, including, but not limited to, COMPANY's ability to generate and/or deliver electricity.*

*Contractor shall defend, indemnify and hold COMPANY harmless from any and all liens or claims made, recorded or filed related to the work, on payment for the work or on the Easement Area, on account of any labor performed or materials furnished by Contractor and its Subcontractors of any tier, and other persons in connection with the work. Contractor further agrees to keep COMPANY, and the Easement Area, free and clear of all liens, claims or stop notices arising from the performance of any of the work covered by the General Contract Documents. Contractor's obligation hereunder includes paying any reasonable attorneys' fees and court costs incurred by COMPANY in connection with such claims and liens.*

*Contractor is hereby advised that COMPANY reserves to itself, its successors and assigns, the right to maintain and operate COMPANY's facilities in such manner as will best enable it to fulfill its own service requirements provided, except for the closure of the ash pond provisions of this contract, that such uses and purposes are consistent with, and do not interfere with, the STATE's use of the Easement Area. The Contractor shall coordinate its operations with the COMPANY.*

*Contractor agrees to promptly notify COMPANY and DEPARTMENT of any damage caused to the COMPANY's facilities or equipment.*

*The Special Provision For Protection Of Property And Indemnification shall be included in all subcontracts of which the work requires entry into the Easement Area.*

SPECIAL PROVISION FOR INSURANCE

*The insurance required by Article 107.27 of the Standard Specifications for Road and Bridge Construction is amended as follows.*

*Add to Subparagraph (d) of Article 107.27 the following:*

*The Contractor shall maintain commercial general liability (CGL) umbrella insurance to establish a limit of not less than $15,000,000 for each occurrence. Notwithstanding the CGL general aggregate and occurrence limits stated in subparagraph (b) of this article, the Contractor may choose the best combination of primary and excess limits to meet the total limit requirement set herein in order to guarantee that the amount of insurance required by this special provision is available to pay claims arising from the project.*

*Contractor shall have COMPANY (Union Electric Company d/b/a AmerenUE), Ameren Services Company and Central Illinois Public Service Company d/b/a AmerenCIPS named as additional insured on a primary and non-contributory basis and include a severability of interest provision.*

SPECIAL PROVISION FOR LINE AND TOWER CLEARANCES

*Transmission towers and high voltage electrical lines are located on the Property and adjacent to the easement area. Contractor shall design and install concrete barriers at the base of each tower at the following locations:*

*Approximate Station 26+00 RT*
*Approximate Station 38+00 RT*
*Approximate Station 48+70 RT*

*The Contractor shall submit plans and shop drawings for such barriers to the DEPARTMENT for approval by DEPARTMENT and COMPANY prior to installation. In addition, horizontal and vertical clearances as set forth in the NESC and OSHA requirements shall be maintained at all times during the construction and use of the access road. Contractors and all parties entering the Easement Area by through or under STATE's rights in the Temporary Easement shall be required to comply with all safety clearances, including but not limited to providing no less than fifteen (15) feet radial clearance from all of COMPANY's utility lines and facilities (including towers, poles and overhead distribution lines) and twenty five (25) feet from all overhead 345kV transmission lines when operating equipment in the area of the utility lines and facilities. Contractor shall take all precautions to warn and instruct each and every person engaged in or in any way connected with such work as to the existence, location and nature of COMPANY's electric and utility lines and facilities. The COMPANY shall post and maintain visible signage of electrical and other hidden dangers on the Easement Area. As and to the extent applicable, the Contractor and all parties entering the Easement Area by through or under STATE's rights in the Temporary Easement shall comply with, 220 ILCS 20 ("Illinois Gas Pipeline Safety Act"); 220 ILCS 50 ("Illinois Underground Facilities Damage Prevention Act"); 220 ILCS 725 ("Illinois Oil and Gas Act"); 765 ILCS 140 ("Adjacent Landowners Excavation Protection Act"; and the National Electrical Safety Code (collectively, the "Law"), as such Laws may be amended from time to time. Nothing contained in this special provision shall be construed to relieve the Contractor from the duty to comply with Law; but if and to the extent that this special provision provides for precautions, approvals or specific clearances which are greater than those imposed by Law, such greater precautions, approvals and/or clearances provided for in this instrument shall be binding on the Contractor.*

SPECIAL PROVISION FOR ASH POND CLOSURE

*The Easement Area is located adjacent to an ash pond impoundment system associated with the COMPANY's Venice Power Plant. COMPANY intends to close such impoundments by installing a synthetic liner and re-grading or moving ash materials in the area near the proposed access road. Contractor shall cooperate fully with COMPANY in the construction of the road so as to not interfere or impede with COMPANY's closure activities. While constructing the access road, in the event Contractor removes material from the existing ash berm, COMPANY shall provide a location within the ash impoundment basin for disposal of such removed material at no additional cost to STATE or the Contractor. The Contractor agrees that nothing contained in the Temporary Easement or the Contract shall be construed so as to limit in any way COMPANY's right to build, close, maintain and secure the ash ponds and tie into the eastern berm for purposes of capping the ponds, or to maintain the groundwater monitoring network associated with such ash pond system.*

*Contractor shall at all times fully cooperate with COMPANY to facilitate the ash pond work and shall defer to all rights of COMPANY to complete the closure and monitoring activities. Should the COMPANY's work prohibit the Contractor from accessing or utilizing the Temporary Easement, the COMPANY shall provide, at no cost or expense to the DEPARTMENT or Contractor, an alternate access route that allows the Contractor to continue operations.*

*The cost of all material and equipment required and all labor necessary to comply with the* SPECIAL PROVISION FOR LINE AND TOWER CLEARANCES *and* SPECIAL PROVISION FOR ASH POND CLOSURE *will not be paid for separately, but shall be considered as included in the unit bid prices of the contract, and no additional compensation will be allowed.*

**PROTECTION OF RAILROAD TRAFFIC AND PROPERTY**

This Special Provision amends Article 107.12 (Protection of Railroad Traffic and Property) of the Standard Specifications for Road and Bridge Construction as follows:

Replace the fifth paragraph with:

"All flagger costs for the Norfolk Southern Railway Company, Union Pacific Railway Company, and Terminal Railroad Association of St. Louis Railroad, including flaggers required for transporting material or equipment across tracks at crossing locations shown on the plans and at additional locations as agreed upon by IDOT and the Railroads, will be incurred by the Department through a separate agreement with the affected railroad.

If the Contractor elects to cross the track at a location not shown on the plans or agreed to between IDOT and the Railroads, the Contractor shall pay the costs of Railroad flaggers required for transporting material and equipment across the track. These costs shall be considered as included in the contract unit prices bid for the various items of work involved.

Flagger costs for the Kansas City Southern Railway Company Railroad shall not be included in the contract unit prices bid for the various items of work involved but shall be paid in accordance with Article 109.05. Should the contractor elect to cross a KCS track, the Contractor shall pay the costs of Railroad flaggers required for transporting material and equipment across the track. These costs shall be considered as included in the contract unit prices bid for the various items of work involved.

The Contractor shall submit a Railroad Flagger Schedule to the Engineer and the Railroads which shall include the anticipated dates and locations when Railroad flagging will be required on the project. The Contractor shall maintain and update the flagger schedule as the work progresses. The Contractor shall schedule the work in such a manner to avoid inefficient utilization of Railroad flaggers. "

**TRRA RAILROAD CROSSING INSTALLATION**

The Contractor shall install the TRRA railroad crossings shown in the plans for this project. The Contractor shall cooperate with the railroad to determine the best times of day or days of the week to perform the work.

The Department will reimburse the railroad company for providing inspectors to inspect the installation of the crossings and the crossings shall be completed to the satisfaction of both the railroad and the Department.

The Contractor shall contact TRRA's railroad Engineer to coordinate the crossing installations. The railroad Engineer's name and contact information are as follows:

Mr. C. R. McQueen, Jr.
Director Engineering Services & Administration
Terminal Railroad Association of St. Louis
1000 St. Louis Union Station, Suite 200
St. Louis, Missouri 63103
Office: (314)-539-4724
Fax: (314) 621-3673

**TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS REQUIREMENTS**

**Exhibit 3 to the Grade Separation Construction and Maintenance Agreement between the Illinois Department of Transportation ("IDOT"), the Missouri Highways** and Transportation Commission ("MHTC") and the Terminal Railroad Association of St. Louis and The Wiggins Ferry Company (collectively, "TRRA") for Job No. C-09-041-10

**RAILROAD JOB SPECIAL PROVISIONS APPLICABLE TO PROJECT CONSTRUCTION**

To Report an Emergency on property of the Terminal Railroad Association (hereinafter "TRRA"), call: (618) 451-8478.

**1.0 Authority of Railroad Engineer and Commission's Representative.**

**1.1** TRRA's authorized representative, herein called "Railroad Engineer", shall have final authority in all matters affecting the safe maintenance and operation of railroad traffic including the adequacy of the foundations and structures supporting TRRA's tracks. The Railroad Engineer for this Project is identified below, with current contact information:

Mr. C. R. McQueen, Jr.
Director Engineering Services & Administration
Terminal Railroad Association of St. Louis
1000 St. Louis Union Station, Suite 200
St. Louis, Missouri 63103
Office: (314)-539-4724
Fax: (314) 621-3673

**1.2** IDOT's authorized representative, herein called "Engineer", shall have authority over all other matters as prescribed herein and in the Project specifications.

**2.0 Contractor's Obligations to Comply with Railroad Job Special Provisions and to Indemnify Railroad.**

**2.1** The term "Contractor", as used in these Railroad Job Special Provisions, means IDOT's contractor for the construction or, if applicable, for the maintenance or repair of the proposed grade separation structure (the "Project") and its engineers, design professionals, other consultants and other agents retained in connection with the Project, and includes any and all subcontractors.

**2.2** TRRA and IDOT have agreed that IDOT's Contractor shall comply with these Railroad Job Special Provisions whenever applicable in accordance with subsection 2.3, or shall comply with a later amended version of these Railroad Job Special Provisions whenever applicable in accordance with subsections 2.3 or 2.4 of these Railroad Job Special Provisions, with reference to all work performed or to be performed by the Contractor upon TRRA's property, as a condition to the Contractor's right of access to TRRA's property which is described in the Permanent Easement dated December 1, 2009, and if applicable, the Temporary Easement dated December 1, 2009, between The Wiggins Ferry Company, TRRA, and IDOT (hereinafter called "TRRA's property").

If the Contractor is in compliance with the applicable Railroad Job Special Provisions, then TRRA shall not demand or require the Contractor to enter into a Right of Entry Agreement, or to comply with any other requirements before allowing the Contractor to enter upon TRRA's property and providing flagging services in accordance with these Railroad Job Special Provisions. However, if at any time the Contractor is not in compliance with any applicable requirement within the Railroad Job Special Provisions, then TRRA may refuse to allow the Contractor access to work upon or over TRRA's property, and TRRA may withhold the provision of flagging services for the Contractor, until the Contractor has fully complied with all applicable requirements within the Railroad Job Special Provisions; except that TRRA shall not deny access to or withhold flagging services from the Contractor as provided in this subsection until TRRA has notified the Contractor, and IDOT and MHTC, in writing, of the specific requirements of the applicable Railroad Job Special Provisions with which the Contractor is not in compliance. The Contractor shall bear the costs of any delays in its work resulting from TRRA's denial of access or withholding of flagging services by reason of the Contractor's noncompliance with any applicable requirement within the Railroad Job Special Provisions, and all costs incurred to bring the Contractor into full compliance with the applicable Railroad Job Special Provisions.

**2.3** If IDOT executes this Agreement with the Contractor within forty-two (42) months after the effective date of the Supplemental Grade Separation Construction and Maintenance Agreement executed on _____, 2010, by and between IDOT, MHTC, the Terminal Railroad Association of St. Louis, and The Wiggins Ferry Company concerning this Project (hereinafter referred to as the "Four-Party Agreement"), then the Contractor shall comply with this subsection notwithstanding any provision in subsection 2.4 of these Railroad Job Special Provisions to the contrary. The Contractor shall abide by the present version of these Railroad Job Special Provisions for all work pursuant to this Agreement that the Contractor performs over or upon TRRA's property within four (4) years after the effective date of the Four-Party Agreement. The Contractor shall expressly incorporate the present version of the Railroad Job Special Provisions into every subcontract made pursuant to this Agreement. However, if the Contractor performs any work pursuant to this Agreement more than four (4) years after the effective date of the Four-Party Agreement, then notwithstanding any provision in these Railroad Job Special Provisions to the contrary, the Contractor shall abide by the latest amended version of the Railroad Job Special Provisions that is approved by TRRA, IDOT and MHTC and in force when the Contractor performs that work upon or over TRRA's property.

**2.4** If IDOT executes this Agreement with the Contractor more than forty-two (42) months after the effective date of the Four-Party Agreement, then the Contractor shall comply with this subsection notwithstanding any provision in subsection 2.3 of these Railroad Job Special Provisions to the contrary. The Contractor shall abide by the latest amended version of the Railroad Job Special Provisions that is approved by TRRA, IDOT and MHTC and in force on the effective date of this Agreement, for all work pursuant to this Agreement that the Contractor performs over or upon TRRA's property within three (3) years after the effective date of this Agreement. The Contractor shall expressly incorporate the same version of the Railroad Job Special Provisions into every subcontract made pursuant to this Agreement. However, if the Contractor performs any work pursuant to this Agreement more than three (3) years after the effective date of this Agreement, then notwithstanding any provision in these Railroad Job Special Provisions to the contrary, the Contractor shall abide by the latest amended version of the Railroad Job Special Provisions that is approved by TRRA, IDOT and MHTC and in force when the Contractor performs that work upon or over TRRA's property.

**2.5** The Contractor shall indemnify, defend and hold TRRA harmless from and against any and all loss, damage, claims, demands, causes of action, costs and expenses of any nature arising out of injury to or death of any person, or out of damage to or destruction of any property, including, without limitation, damage to fiber optic, communication and other cable lines and systems, where this injury, death, damage or destruction results from any cause arising out of work performed by the Contractor pursuant to the agreement between TRRA and IDOT for this Project, and shall also release TRRA from, and shall waive any claims for, injury or damage to equipment or other property, which may result from the construction, maintenance and operation of TRRA tracks, wire lines, fiber optic cable, pipe lines and other facilities on TRRA's property by the Contractor. The Contractor's liability will not be affected if any damage or claim was occasioned by or contributed to by the negligence of TRRA, TRRA's agents, servants, employees or otherwise, except to the extent that any damage or claim has been proximately caused by the intentional misconduct or sole or gross negligence of TRRA, or any of TRRA's officers, employees, agents, subcontractors, successors or assigns. The Contractor's indemnity shall include loss of profits or revenue arising from damage or destruction to fiber optic, communication and other cable lines and systems.

**2.6** In addition to the indemnity obligations contained in the preceding paragraph, the Contractor shall indemnify, defend and hold TRRA harmless from any claims, expenses, costs, actions, demands, losses, fines, penalties, and fees, arising from, related to or connected, in whole or in part, with the removal of the Contractor's agents, servants, employees or invitees from TRRA's property for safety reasons, and from any loss or liability proximately resulting from the Contractor's noncompliance with the applicable requirements of any these Railroad Job Special Provisions.

2.7 The Contractor shall also indemnify, defend and hold TRRA harmless with reference to all fines or penalties imposed or assessed by federal, state and local governmental agencies against TRRA as the proximate result of Contractor's work under this contract, including these Railroad Job Special Provisions.

**3.0 Notice of Starting Work.** The Contractor shall not commence any work on TRRA's property until the Contractor has complied with the following conditions:

**3.1** At least thirty (30) days before beginning any work upon or over TRRA's property, the Contractor shall furnish to TRRA and IDOT a schedule for all work required to complete the portion of the Project within TRRA's property, and shall arrange for a job site meeting between the Contractor, the Engineer, and Railroad Engineer. TRRA may withhold providing any flagger until the Contractor has conducted the job site meeting and scheduled the Contractor's work.

**3.2** At least thirty (30) days before the Contractor proposes to begin work on TRRA's property, the Contractor shall give to Railroad Engineer a written notice of intent to begin work on TRRA's property.

**3.3** The Contractor shall obtain written or electronic authorization from TRRA to begin work on TRRA's property. TRRA shall not unreasonably withhold this authorization.

**3.4** The Contractor shall obtain the insurance coverage required in Section 14.0 of these Railroad Job Special Provisions. IDOT shall submit written evidence of such coverage to TRRA prior to commencing any work.

**3.5 Safety Orientation**: The Contractor shall ensure that Contractor's superintendent has obtained certification of completion of the BNSF Railway safety orientation course available on the Internet at www.contractororientation.com (Certification currently costs $11). The Contractor shall certify that each of Contractor's employees, subcontractors or invitees who will be working TRRA's property have received the same safety orientation through sessions conducted by the Contractor or through the Internet before any work shall be done on TRRA's property.

**3.6** TRRA's written authorization to proceed with the work, with a copy to the Engineer, will include the names, addresses and telephone numbers of TRRA's representatives who are to be notified as hereinafter required. Where more than one representative is designated, the area of responsibility of each representative shall be specified.

**4.0 Interference with Railroad Operations.**

**4.1** The Contractor shall arrange and conduct all work so that there shall be no interference with TRRA's operations, including train, signal, telephone and telegraphic services; or damage to TRRA's property; poles, wires and other facilities of tenants, licensees, easement grantees and invitees on TRRA's property. Whenever work may affect the operations or safety of trains, the Contractor shall first submit the method of doing this work to Railroad Engineer for approval, but such approval shall not relieve the Contractor from liability. The Contractor shall defer any of its work that requires flagging service or inspection service until the flagging service required by TRRA is available at the job site.

**4.2** Whenever the Contractor's work within TRRA's property makes an impediment to TRRA's operations unavoidable, such as use of runaround tracks or necessity for reduced speed, the Contractor shall schedule and conduct these operations so that the impediment is reduced to the absolute minimum.

**4.3** If conditions arising from, or in connection with the work require immediate and unusual provisions to protect TRRA's operations and property, the Contractor shall make such provisions. If in the judgment of Railroad Engineer, or the Engineer if Railroad Engineer is absent, such provision is insufficient, Railroad Engineer or Engineer may require or provide such provisions as deem necessary. In any event, such provisions shall be at the Contractor's expense and without cost to TRRA, IDOT or MHTC.

**4.4** The Contractor shall be responsible for any damage to TRRA as a result of the Contractor's work on the Project, which shall include but not be limited to interference with the normal movement of trains caused exclusively by the work performed by the Contractor. The Contractor shall be responsible for damages for TRRA's train delays that are caused exclusively by the Contractor. TRRA agrees not to perform any act to unnecessarily cause any train delay. The damages for train delays per freight hour will be billed at an average rate per hour as determined from TRRA's records. TRRA shall provide these records, upon request, to IDOT or its Contractor.

**5.0 Track Clearances.**

**5.1** The minimum track clearances to be maintained by the Contractor during construction are shown on the Project plans.

However, before Contractor is permitted to undertake any work within TRRA's property, or before placing any obstruction over any track, the Contractor shall first provide notice to TRRA at least forty-eight (48) hours in advance of the time work is to take place and receive a response from TRRA confirming that arrangements have been made for flagging services as may be necessary. If required by the Engineer, Contractor shall also ascertain that the Engineer has received copies of the notice delivered to TRRA and of TRRA's response.

**5.2** The Contractor shall fully comply with any horizontal and vertical clearance requirements imposed in the Project plans in regard to the placement of the structure and shall fully comply with Illinois state statutes and regulations and federal statutes and regulations regarding the placement of structures or equipment near or over railroad tracks.

**6.0 Construction Procedures.**

**6.1 General.** Construction work on TRRA's property shall be:

(a) Subject to TRRA's inspection and review; and

(b) In accordance with these Railroad Job Special Provisions.

**6.2 Excavation.** The subgrade of an operated track shall be maintained with the berm edge at least twelve feet (12') from centerline of track and not more than twenty-six inches (26") below top of the rail. The Contractor will not be required to make existing sections meet this specification if substandard, in which case the existing section will be maintained. The Contractor shall cease all work and notify TRRA immediately before continuing excavation in the work area if obstructions are encountered which do not appear on the drawings. If the obstruction is a utility and the owner of the utility can be identified, then the Contractor shall also notify the owner immediately. If there is any doubt about the location of underground cables or lines of any kind, no work shall be performed until the exact location has been determined. Additionally, all excavations shall be conducted in compliance with applicable Occupational Safety and Health Act regulations and, regardless of depth, shall be shored where there is any danger to tracks, structures or personnel. Any excavations, holes or trenches on TRRA's property shall be covered, guarded and/or protected when not being worked on. When leaving work site areas at night and over weekends, the areas shall be secured and left in a condition that will ensure that TRRA's employees and other personnel who may be working or passing through the area are protected from all hazards. All excavations shall be back filled as soon as possible.

**6.3 Excavation for Structure.** The Contractor shall be required to take special precaution and care in connection with excavating, shoring pits and in driving piles for footings adjacent to tracks to provide adequate lateral support for the tracks and the loads which the tracks carry, without disturbance of track alignment and surface, and to avoid obstructing track clearances with working equipment, tools or other material. The procedure for doing such work, including need of and plans for shoring, shall be approved by Railroad Engineer before work is performed, but such approval shall not relieve the Contractor from liability. Before submission of plans to Railroad Engineer for approval, the Engineer will first review such plans in accordance with the Illinois Standard Specifications for Road and Bridge Construction, hereinafter called "Standard Specifications". The responsibility for the design and construction of the shoring rests solely with the Contractor. The temporary shoring along TRRA tracks shall be designed for the Cooper E80 loading.

The design shall insure that the shoring is braced or substantially secured to prevent movement. The Contractor shall submit plans for the temporary shoring that shall be signed, sealed, and stamped by an Illinois Licensed Structural Engineer and then submitted for review by the Engineer.

**6.4 Demolition of Existing Structures.** The Contractor shall be required to take special precaution and care in connection with demolition of existing structures. The procedure for doing such work, including need of and plans for temporary falsework, shall first be approved by Railroad Engineer before work is performed, but such approval shall not relieve the Contractor from liability. Before submission of plans to Railroad Engineer for approval, the Engineer will first review such plans.

**6.5 Falsework.** The Contractor shall take special precaution and care to prevent any material from falling on TRRA's property. The Railroad Engineer shall first approve all procedures for preventing material from falling on TRRA's property, including need of and plans for temporary falsework, but such approval shall not relieve the Contractor from liability. Before submission of plans to Railroad Engineer for approval, the Engineer will first review such plans.

**6.6 Blasting.**

**6.6.1** The Contractor shall obtain advance approval of Railroad Engineer and the Engineer for use of explosives on or adjacent to TRRA's property, which approval shall be in Railroad Engineer's and Engineer's sole discretion. If permission for use of explosives is granted, the Contractor shall be required to comply with the following:

(a) Blasting shall be done with light charges under the direct supervision of a responsible officer or employee of the Contractor.

(b) Electric detonating fuses shall not be used because of the possibility of premature explosions resulting from operation of two-way train radios.

(c) No blasting shall be done without the presence of Railroad Engineer. At least seventy-two (72) hours advance notice to the person designated in TRRA's notice of authorization to proceed as mentioned in Section 3.2 of these Railroad Job Special Provisions, the contactor shall be required to arrange for the presence of Railroad Engineer and such flagging as TRRA may require.

(d) The Contractor shall have at the job site adequate equipment, labor and materials and allow sufficient time to clean up debris resulting from the blasting without delay to trains, as well as correcting, at Contractor's expense, any track misalignment or other damage to TRRA's property resulting from the blasting as directed by Railroad Engineer. If Contractor's blasting or related activities exclusively cause any delay of trains, the Contractor shall bear the entire cost thereof.

**6.6.2** Railroad Engineer will:

(a) Determine the approximate location of trains and advise the Contractor the approximate amount of time available for the blasting operation and clean-up.

(b) Have the authority to order discontinuance of blasting if blasting is too hazardous or is not in accordance with this special provision.

**6.7 Maintenance of Railroad Facilities.** The Contractor shall be required to maintain all ditches and drainage structures free of silt or other obstructions that may result from Contractor's operations. The Contractor shall promptly repair eroded areas within TRRA's property and repair any other damage to TRRA's property, tenants, licensees, easement grantees and invitees. All such maintenance and repair of damages due to the Contractor's operations shall be done at the Contractor's expense.

**6.8 Storage of Materials.**

**6.8.1** The Contractor shall not store or stockpile construction materials or equipment closer than twenty-five feet (25') to the centerline of the nearest railroad track or on TRRA's property not covered by construction easement, Contractor's permit, lease or agreement. Additionally, the Contractor shall not store or leave materials or equipment within 250 feet of the edge of any highway/rail at-grade crossings. Further, both sides of a main track shall remain unobstructed for a distance of ten feet (10') from the exterior edge of the track at all times to allow for stopped train inspection.

**6.9 Cleanup.** Upon completion of the work, the Contractor shall remove from within the limits of TRRA's property, all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the Contractor, and leave said property in a neat condition satisfactory to Railroad Engineer.

**6.10 Buried Cable and Other Buried Facilities.**

**6.10.1** The Contractor acknowledges that fiber optic, communication and other cable lines and systems, collectively the "Lines", owned by various telecommunications companies may be buried on TRRA's property or right of way. The locations of the buried Lines, pipelines or utility facilities have been included on the plans based on information from the telecommunications companies, pipeline operators, or utilities. The Contractor shall be responsible for contacting Railroad Engineer, the telecommunications companies, pipeline operators and utilities and notifying them of any work that may damage the buried Lines, pipelines, utility facilities and/or interfere with their service. The Contractor shall verify the location of all buried Lines, pipelines and utility facilities shown on the plans or marked in the field in order to establish their exact locations prior to or while doing work on TRRA's property or right of way. The Contractor shall also use all reasonable methods when working on TRRA's property or right of way to determine if any other buried Lines, pipelines or utility facilities exist on TRRA's property or right of way.

**6.10.2** Failure to mark or identify the buried Lines, pipelines or utility facilities will be sufficient cause for Railroad Engineer to stop construction at no cost to MHTC, IDOT or TRRA until these items are completed. The Contractor shall be responsible for the rearrangement of any buried facilities, Lines, pipelines or utility facilities determined to interfere with the construction. The Contractor shall cooperate fully with any telecommunications companies, pipeline operators and utility facility owners in performing such rearrangements.

**7.0 Damages.** Railroad will not assume liability for any damages to the Contractor, Contractor's work, employees, servants, equipment and materials caused by railroad traffic, except to the extent that any damage or claim has been proximately caused by TRRA's intentional misconduct or sole or gross negligence.

Any cost incurred by TRRA for repairing damages to TRRA's property or to property of TRRA's tenants, licensees, easement grantees and invitees caused by or resulting from the Contractor's operations shall be paid directly to TRRA by the Contractor.

**8.0 Flagging Services.**

**8.1 When Railroad Requires Flagging.** TRRA shall have sole authority to determine when flagging is necessary to protect TRRA's operations from the Contractor's activities relating to this Project. Whenever TRRA reasonably determines that flagging is needed, TRRA shall provide all necessary flagging services in accordance with these Railroad Job Special Provisions and the Agreement between MHTC, IDOT and TRRA. The Contractor shall be responsible for arranging flagging services with TRRA, as required by TRRA, to accomplish the highway improvement. TRRA shall not unreasonably withhold or delay providing any flagging service that is needed pursuant to these Railroad Job Special Provisions.

**8.1.1** Without limitation, TRRA may require flagging services in each of the following circumstances :

(a) any work (including the removal of existing structures or the construction of the new bridge) over any active track of TRRA , except when performed after the completion of the bridge decking, entirely upon or over the decks, and within the outer limits of the barriers constructed alongside the decks.

(b) any work on the structures of the new bridge in close proximity with TRRA's tracks , except when performed after the completion of the bridge decking, entirely upon or over the decks, and within the outer limits of the barriers constructed alongside the decks.

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(c) transporting material or equipment over any active track, or any other operations involving the crossing of TRRA's tracks , except when performed after the completion of the bridge decking, entirely upon or over the decks, and within the outer limits of the barriers constructed alongside the decks.

(d) any operations involving close proximity with power lines or TRRA's signal and communication lines, underground cables, fuel or oil facilities or pipelines, which might result in fire or damage to any of such facilities, or endanger TRRA's operations, or endanger the public in the transaction of TRRA business.

(e) any work which potentially impacts or violates operating clearances or which has a reasonable probability of accidental hazard to TRRA's traffic.

(f) at any other times when, in the opinion and discretion of TRRA, conditions warrant the provisions of flagging services, or otherwise upon the request of IDOT or anyone acting through or on behalf of IDOT.

**8.1.2** However, if the Contractor works upon TRRA's property within distances that violate instructions given by Railroad Engineer, or performs work upon TRRA's property that has not been scheduled with Railroad Engineer, then TRRA may reasonably require one (1) or more flagmen to be assigned full time until the Contractor has completed all its work upon TRRA's property relating to this Project.

**8.2 Scheduling and Notification of Flagging.**

**8.2.1** Not less than thirty (30) days before beginning work upon TRRA's property pursuant to this Project, the Contractor shall give Railroad Engineer advance written notice of the Contractor's intent to begin work within TRRA's property in accordance with these Railroad Job Special Provisions. These notices shall include sufficient details of the proposed work to enable the Railroad Engineer to determine if TRRA will require flagging. If TRRA requires flagging, the Contractor shall not perform any work until the flagman or flagmen are present at the job site. Arrangements for flagging shall be confirmed not less than three (3) business days in advance of the need for flagging services. If any notices required to be given by this paragraph are in writing, the Contractor shall furnish the Engineer a copy; if notice is given verbally, the Contractor shall confirm that notice in writing with copy to the Engineer. TRRA may take up to thirty (30) days to provide flagging for this Project in response to the Contractors first request. After flagging begins, TRRA usually assigns the flagman to work at the Project site on a continual basis until no longer needed and cannot provide flagging on a spot basis. If flagging becomes temporarily unnecessary and TRRA suspends flagging services, then TRRA may take up to thirty (30) days after the Contractor's request to resume flagging services for this Project. Due to TRRA labor agreements, TRRA may require the Contractor to give ten (10) working days notice before TRRA discontinues flagging services and ends the Contractor's responsibility for payment. The Contractor should address notification for flagging to:

Mr. C. R. McQueen, Jr.
Director Engineering Services & Administration
Terminal Railroad Association of St. Louis
1000 St. Louis Union Station, Suite 200
St. Louis, Missouri 63103
Office: (314)-539-4724
Fax: (314) 621-3673

**8.2.2** TRRA flagman assigned to the Project shall notify the Engineer upon arrival at the job site on the first day, or as soon thereafter as possible, that flagging services have begun, and on the last day that flagman performs such services for each separate period that TRRA provides flagging services. The Engineer will document such notification in the Project records.

**8.2.3** If, after TRRA assigns a flagman to the Project site, an emergency arises that requires TRRA to reassign the flagman elsewhere, then the Contractor shall delay work on TRRA's property until a flagman is again available. The Contractor, not TRRA, shall bear any additional costs resulting from this delay. TRRA shall resume flagging for this Project as soon as possible after the emergency has ended. As used in these Railroad Job Special Provisions, the word "emergency" means an unforeseen event or combination of circumstances, or the actual results thereof, which call for immediate action by TRRA to render urgently needed assistance or relief, and which TRRA could not have foreseen or avoided in the exercise of ordinary care.

**8.2.4** The Contractor shall provide a temporary structure to provide shelter from weather conditions for the person(s) providing flagging protection service on behalf of TRRA as described herein. The structure shall be provided in an area immediately accessible to TRRA's main track and the construction site, and be equipped with telephone service, lighting and desk.

**8.2.5** Upon request of TRRA, and at Contractor's expense, Contractor shall provide two-way radios for the use by TRRA's personnel engaged in the provision of flagging protection service as contemplated in this Contract.

**8.2.6** Notwithstanding anything contained herein to the contrary, TRRA's providing of flagging protection services hereunder (or the performance of any other act by TRRA) shall not relieve, alter or otherwise modify IDOT's or Contractor's continuing obligations to discharge their duties associated with the Project, and by providing such flagging protective services, TRRA has not assumed any liability associated with IDOT's, Contractor's, their contractors' or subcontractors' actions or omissions in connection with the Project.

**8.3 Payment for Flagging Services During Construction of Project.**

**8.3.1** The Contractor shall pay the costs of Railroad flaggers required for transporting material or equipment across the track at locations other than the crossings to be constructed as part of the final plans or at locations agreed upon by IDOT and TRRA. These costs shall be considered as included in the contract unit prices bid for the various items of work involved. All other Railroad flagger costs, including the costs of Railroad flaggers required for transporting material or equipment across the track at those crossing locations to be constructed as part of the final plans or at such other locations agreed upon by IDOT and TRRA, will be incurred by the IDOT.

**8.3.2** TRRA shall keep an accurate and detailed account of the actual cost and expense as incurred by it, or for its account, in the performance of the work it herein agrees to perform.

**8.3.2.1** TRRA, for performance of its work as outlined in Section 8 hereof, except cost associated with the transporting of materials or equipment across the tracks as noted in 8.3.1, may bill IDOT monthly, for the costs and expenses incurred. After IDOT's representatives have checked the progressive invoices and they have agreed with TRRA's representatives that the costs are reasonable and proper, insofar as they are able to ascertain, IDOT shall promptly reimburse TRRA for one hundred (100) percent of the invoices within sixty (60) days. If TRRA is not in receipt of payment within sixty (60) days, the applicable portions of 30 ILCS 540 (State Prompt Payment Act) shall be enforced. The progressive invoices may be rendered on the basis of an estimated percentage of the work completed.

**8.3.2.2** TRRA, upon the completion of its work, shall, within one hundred twenty (120) calendar days, render to IDOT a detailed statement of the actual cost and expense as incurred by it or for its account. After IDOT's representatives have checked the progressive invoices and they have agreed with TRRA'S representatives that the costs are reasonable and proper, insofar as they are able to ascertain, IDOT shall promptly reimburse TRRA for one hundred (100) percent of the final invoice within sixty (60) days. If TRRA is not in receipt of payment within sixty (60) days, the applicable portions of 30 ILCS 540 (State Prompt Payment Act) shall be enforced.

**8.3.2.3** TRRA shall maintain, for a minimum of three (3) years after the completion of the contract, adequate books, records, and supporting documents to verify the amounts, recipients, and uses of all disbursements of funds passing in conjunction with the contract; the contract and all books, records, and supporting documents related to the contract shall be available for review and audit by the Auditor General and other IDOT auditors or by MHTC's auditors; and TRRA agrees to cooperate fully with any audit conducted by the Auditor General and other IDOT auditors, or MHTC's auditors, and to provide full access to all relevant materials. Failure to maintain the books, records, and supporting documents required by this section shall establish a presumption in favor of IDOT for the recovery of any funds paid by IDOT under the contract for which adequate books, records, and supporting documentation are not available to support their purported disbursement.

**8.3.2.4** After the federal, IDOT or MHTC representatives have audited the expenses as incurred by TRRA, including such amounts as may have been suspended from any previous payment, IDOT shall promptly reimburse TRRA for the suspended amounts, less the deduction of any item(s) of expense as may be found by the auditors as not being eligible for reimbursement. If the total of the item(s) of expense as may be found by the auditors as not being eligible for reimbursement exceeds the retained percentage plus any amounts which may have been suspended, then TRRA shall promptly reimburse IDOT for the overpayment.

**8.3.3** Flagmen are generally classified as switchmen foremen.

**8.3.4** The basic rate of pay for each flagman will be TRRA's prevailing hourly rate in effect at the time TRRA provides the flagging services. The current basic hourly rate of pay for an 8-hour day, Monday through Friday, is $29.28.

**8.3.5** TRRA shall charge one and one-half times the basic rate if overtime is necessary or requested, and two and one-half times the basic rate applies if TRRA provides flagging services on a holiday recognized by TRRA. If the flagman is on overtime duty and the Contractor requires the flagman to work without taking a meal, then TRRA may charge for a second meal period at the current basic hourly rate of pay for an 8-hour day, Monday through Friday (currently $29.28).

**8.3.6** In addition to the above basic hourly rate, TRRA may charge for its related costs (additives) at TRRA's normal additive rate (currently 82.24% = $24.08 per hour) in effect at the time it provides the flagging services.

**8.3.7** Headquarters of employees to be used as flagmen are presently located at 1201 McKinley Street, Venice, Illinois 62090. The location of the headquarters of employees to be used as flagmen may be changed by TRRA in its sole discretion. TRRA shall provide a ten (10) working day written notice to IDOT prior to changing the headquarters location. The headquarters location must be within a radius of fifty (50) miles from the location of this Project.

**8.3.8** The Contractor may furnish travel expenses, such as taxies, meals and accommodations for flagmen.

Otherwise, TRRA will charge an additional amount of $25.00 per hour (or at TRRA's normal rate in effect at the time it provides the flagging services) for transporting the flagmen between the headquarters identified in paragraph 8.3.7 of these Railroad Job Special Provisions and the job site via TRRA vehicle or contract carrier, when necessary in accordance with the applicable provisions in these Railroad Job Special Provisions.

**8.3.9** IDOT shall reimburse TRRA for the full 8-hour day for each day when TRRA provides any flagging services . IDOT shall also reimburse TRRA for providing flagging services on any day when TRRA assigns the flagman to work on this project, and must pay the flagman (even though the Contractor may not be working on that day), if TRRA cannot reasonably reassign the flagman to perform other work.

**8.4 Flagging Complaints.** TRRA and the Contractor shall resolve promptly any complaints about flagging. If the Contractor questions the need for a flagman it should telephone the Railroad Engineer, and TRRA's Manager of Public Projects. The Contractor shall confirm all telephone or oral complaints in writing within five (5) working days, with copies to the Railroad Engineer and IDOT's Engineer.

**9.0 Haul Across Railroads.**

**9.1** Where the plans show or imply that the Contractor or its suppliers must haul materials of any nature across TRRA's tracks, unless the plans clearly show that IDOT has included arrangements for the haul in the agreement with TRRA, the Contractor shall be required to make all necessary arrangements with TRRA regarding means of transporting such materials across TRRA's tracks. The Contractor shall bear all costs incidental to these crossings, including flagging, whether services are performed by Contractor's own forces or by TRRA's personnel.

**9.2** Except for the maintenance and access roadways being constructed in accordance with the separate right of way easements to be acquired by IDOT, the Contractor shall not establish any crossing for transporting materials or equipment across the tracks of TRRA unless specific authority for the installation, maintenance, necessary watching and flagging thereof and removal, all at the expense of the Contractor, is first obtained from the Railroad Engineer.

**10.0 Work for the Contractor's Benefit.** All temporary or permanent changes in wire lines or other facilities which are considered necessary to the Project are shown on the plans, and are included in the agreement between IDOT, MHTC and TRRA, or will be covered by appropriate revisions to those documents, which shall be initiated and approved by IDOT, MHTC and/or TRRA. If the Contractor desires any changes in addition to the above, then the Contractor shall make separate arrangements with TRRA to accomplish those changes at the Contractor's expense.

**11.0 Cooperation and Delays.** The Contractor shall cooperate with TRRA in scheduling any staged construction involving work by TRRA or its tenants, licensees, easement grantees and invitees. TRRA shall cooperate with IDOT's Contractor in scheduling the Contractor's work upon or over TRRA's property. The Contractor shall ascertain in advance, from TRRA, the lead-time required for assembling crews and materials, and include sufficient time for that in its work scheduling.

The Contractor may not assert any charge or claim against IDOT or TRRA resulting from any hindrance or delay the Contractor experiences because of railway traffic relating to any construction work by TRRA, or any other delay that is reasonable or necessary to protect the safety of railway traffic, or any other delay resulting from any person's compliance with these Railroad Job Special Provisions.

**12.0 Trainman's Walkways.** The Contractor shall maintain an unobstructed continuous space suitable for trainman's use in walking along trains, which shall extend to a line not less than twelve feet (12') from centerline of track, along the outer side of each exterior track of multiple operated track and on each side of single operated track. Before the close of each workday, the Contractor shall remove all temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours while Railway's protective service is provided. Beside any excavation near the walkway, the Contractor shall install a handrail with a minimum horizontal clearance of twelve feet (12') from centerline of track.

**13.0 Railroad Percentage of Contractor's Total Project Bid.** The amount of work to be performed upon, over or under TRRA's right of way is estimated to be 65.5% percent of the Contractor's total bid for the Project.

**14.0 Insurance.**

**14.1** In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, the Contractor shall carry the following insurance:

**14.1.1 Commercial General Liability.** Commercial General Liability Insurance having a combined single limit of not less than $5,000,000 per occurrence and $10,000,000 in the aggregate for all loss or liability, including attorneys' fees, arising out of bodily injury liability and property damage liability during the policy period. Said policy shall include "explosion, collapse, and underground hazard" ("XCU") coverage, shall be endorsed to name TRRA as an additional insured, and shall include a severability of interests provision and a waiver of subrogation.

**14.1.2 Railroad Protective Liability.** Railroad Protective Liability Insurance having a combined single limit of not less than Five Million Dollars ($ 5,000,000.00) for each occurrence and Ten Million Dollars ($ 10,000,000.00) in the aggregate applying separately to each annual period. Said policy shall provide coverage for all loss, damage or expense arising from bodily injury and property damage liability, and physical damage to property attributed to acts or omissions at the job site. The standards for the Railroad Protective Liability Insurance are as follows:

(a) The insurer shall be rated A- or better by A.M. Best Company, Inc.

(b) The policy shall be written using one of the following combinations of Insurance Services Office ("ISO") Railroad Protective Liability Insurance Form Numbers:

1) CG 00 35 01 96 and CG 28 31 10 93

2) CG 00 35 07 98 and CG 28 31 07 98.

(c) The named Insured shall be identified as the Terminal Railroad Association of St. Louis.

**14.2 Evidence of Insurance.** The Declarations shall include the description of operations matching the project description in this Contract and shall include the appropriate IDOT project and contract identification numbers. The job number and project location shall appear on the Declarations and shall include the appropriate highway designation:

FAP Route 999 (Relocated I-70)
Section 82-1B-2
St. Clair County
IDOT Contract No. 76D61
IDOT Job No. C-98-041-10

**14.3** The name and address of the Contractor shall appear on the Declarations. The name and address of IDOT shall be identified on the Declarations as the "Involved Governmental Authority or Other Contracting Party".

**14.4** Other endorsements/forms that will be accepted are:

(a) Broad Form Nuclear Exclusion – Form IL 00 21.

(b) thirty (30)-day Advance Notice of Non-renewal or cancellation.

(c) Required State Cancellation Endorsement.

(d) Quick Reference or Index Form CL/IL 240.

**14.5** Endorsements/forms that will NOT be acceptable are:

(a) Any Pollution Exclusion Endorsement except CG 28 31.

(b) Any Punitive or Exemplary Damages Exclusion.

(c) Known injury or Damage Exclusion form CG 00 59.

(d) Any Common Policy Conditions form.

(e) Any other endorsement/form not specifically authorized above.

**14.6** If any part of the work is sublet, similar insurance, and evidence thereof as specified above, shall be provided by or on behalf of the subcontractor to cover the subcontractor's operations on TRRA's property.

**14.7** Prior to entry on TRRA's property, the original Railroad Protective Liability Insurance Policy shall be submitted by the prime Contractor to the IDOT at the address below for review and transmittal to TRRA. In addition, certificates of insurance evidencing the Contractor's and any subcontractor's Commercial General Liability Insurance shall be issued to TRRA and the IDOT at the addresses below, and forwarded to IDOT for review and transmittal to TRRA.

The certificates of insurance shall state that the insurance coverage will not be suspended, voided, canceled, or reduced in coverage or limits without thirty (30) days advanced written notice to TRRA and IDOT. No work will be permitted on TRRA's property until TRRA has reviewed and approved the evidence of insurance required herein.

| TRRA | IDOT |
|---|---|
| Mr. C. R. McQueen, Jr., Director | Mary C. Lamie, P.E. |
| Engineering Services & Administration | Regional Engineer |
| Terminal Railroad Assoc. of St. Louis | Illinois Department of Transportation |
| 1000 St. Louis Union Station, Suite 200 | 1102 Easport Plaza |
| St. Louis, MO 63103 | Collinsville, IL 62234 |

**15.0 Guidelines for Personnel on TRRA's property.**

**15.1** The Contractor's personnel shall wear hard hats, and appropriate eye and hearing protection shall be used. Working in shorts shall be prohibited. Shirts shall cover shoulders, back and abdomen. Working in tennis or jogging shoes, sandals, boots with high heels, cowboy and other slip-on type boots shall be prohibited. Hard-sole, lace-up footwear, zippered boots or boots cinched up with straps which fit snugly about the ankle shall be adequate. Safety boots are strongly recommended.

**15.2** The Contractor's personnel shall not be allowed within twenty-five feet (25') of the centerline of TRRA's track without specific authorization from the flagman.

**15.3** All persons working near TRRA's track while any train is passing shall look out for dragging bands or chains and protruding or shifted cargo.

**15.4** The Contractor's personnel shall not cross TRRA's track without specific authorization from the flagman.

**15.5** All welders and cutting torches working within twenty-five feet (25') of TRRA's track shall stop when any train is passing.

**15.6** The Contractor shall not cross or touch any rail of TRRA's track with any steel tape or chain without permission from the flagman.

**16.0 Guidelines for Equipment on TRRA's property.**

**16.1** The Contractor shall not allow any crane or boom equipment to set up to work or park within boom distance plus twelve feet (12') from centerline of track without specific permission from the Railroad Engineer and flagman.

**16.2** The Contractor shall not allow crane or boom equipment to foul track or to lift a load over the track without flag protection and track time.

**16.3** All crane or boom equipment operators shall stay with their machines whenever crane or boom equipment is pointed toward TRRA's track.

**16.4** All operators of cranes and boom equipment under load shall stop work while train is passing upon TRRA's track, including pile driving.

**16.5** The Contractor shall secure all swinging loads to prevent movement while any train is passing upon TRRA's track.

**16.6** The Contractor shall not allow any load to be suspended above a moving train.

**16.7** The Contractor shall not allow any equipment within 25 feet of centerline of track without specific authorization of the flagman.

**16.8** The Contractor shall not allow any tractors or any other equipment to touch TRRA's ballast line without specific permission from Railroad Engineer and flagman.

**16.9** The Contractor shall not allow any equipment or load movement within twenty-five feet (25') from, or anywhere above, a standing train or TRRA equipment without specific authorization of the flagman.

**16.10** All operating equipment within twenty-five feet (25') of TRRA's track shall halt operations when a train is passing. The flagman may halt all of the Contractor's other operating equipment if the flagman views the operation to be dangerous to the passing train.

**16.11** The Contractor's equipment, loads and cables shall be prohibited from touching rails.

**16.12** While clearing and grubbing, the Contractor shall remove no vegetation from TRRA embankment with heavy equipment without specific permission from the Railroad Engineer and flagman.

**16.13** The Contractor shall not park or store any equipment or materials on TRRA's property unless the Railroad Engineer has granted specific authorization therefor.

**16.14** The Contractor shall effectively immobilize all unattended equipment that is left parked on TRRA's property, so that unauthorized persons cannot move it.

**16.15** The Contractor shall turn all cranes and boom equipment away from TRRA's track after each workday or whenever unattended by an operator.

**17.0 Legal Compliance and Hazardous Materials Reporting.** Contractor shall comply with all applicable federal, state and local governmental laws and regulations—including the Resource Conservation and Recovery Act, the Clean Water Act, the Oil Pollution Act, the Hazardous Materials Transportation Act, the Comprehensive Environmental Response, Compensation and Liability Act, and other environmental, health and safety laws and regulations to the extent these requirements are applicable to the Contractor's work performed under this contract. Notwithstanding the preceding sentence, the Contractor will not be liable for pre-existing hazardous materials or hazardous substances discovered on TRRA's property or right of way so long as the Contractor's work, acts or omissions did not cause them to be there. If the Contractor discovers any hazardous waste, hazardous substance, petroleum or other deleterious material, including any non-containerized commodity or material, on or adjacent to TRRA's property, in or near any surface water, swamp, wetlands or waterways, while performing any work under this special provision, the Contractor shall immediately:

(a) Notify TRRA of such discovery, by telephoning (618) 451-8478.

(b) Take safeguards necessary to protect employees, subcontractors, agents and/or third parties.

(c) Exercise due care with respect to the release, including the taking of any appropriate measure to minimize the impact of the release.

**18.0 Personal Injury Reporting.** TRRA must report certain injuries as a part of compliance with Federal Railroad Administration ("FRA") reporting requirements. The Contractor immediately shall report any personal injury to any employee of the Contractor, subcontractor or Contractor's invitees while on TRRA's property, by phone, mail or preferably in person, to the Railroad Engineer. The Contractor shall complete the Non-Employee Personal Injury Data Collection Form and send it by Fax to Railroad Engineer no later than the close of shift on the date of the injury.

**19.0 Failure to Comply.** If the Contractor violates or fails to comply with any of the requirements of these Railroad Job Special Provisions, TRRA may act as authorized in paragraphs (a) and (b) of this section, until the Contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

(a) The Railroad Engineer may require the Contractor to vacate TRRA's property.

(b) The Engineer may withhold all monies due to the Contractor until the Contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

**20.0 Payment for Cost of Compliance.** Unless specified otherwise in these special provisions, neither IDOT nor MHTC shall separately pay for any extra cost the Contractor or TRRA incurs on account of compliance with these Railroad Job Special Provisions. The Contractor and TRRA shall include all such cost in the contract unit price for other items included in the contract. TRRA will not pay the Contractor for any work it performs to comply with these Railroad Job Special Provisions.

**NORFOLK SOUTHERN RAILWAY COMPANY REQUIREMENTS**

1. AUTHORITY OF RAILROAD ENGINEER AND DEPARTMENT ENGINEER:

The authorized representative of the Railroad Company, hereinafter referred to as Railroad Engineer, shall have final authority in all matters affecting the safe maintenance of Railroad traffic of his Company including the adequacy of the foundations and structures supporting the Railroad tracks.

The authorized representative of the Department, hereinafter referred to as the Department Engineer, shall have authority over all other matters as prescribed herein and in the Project Specifications.

2. NOTICE OF STARTING WORK:

A. The Department's Prime Contractor shall not commence any work on railroad rights-of-way until he has complied with the following conditions:

1. Given the Railroad written notice, with copy to the Department Engineer who has been designated to be in charge of the work, at least ten days in advance of the date he proposes to begin work on Railroad rights-of-way.

   Office of Chief Engineer
   Bridges & Structures
   Norfolk Southern Corporation
   1200 Peachtree Street NE
   Internal Box #142
   Atlanta, Georgia 30309

2. Obtained written approval from the Railroad of Railroad Protective Liability Insurance coverage as required by paragraph 14 herein. It should be noted that Railroad Company does not accept notation of Railroad Protective insurance on a certificate of liability insurance form or Binders as Railroad Company must have the full original countersigned policy. Further, please note that mere receipt of the policy is not the only issue but review for compliance. Due to the number of projects system-wide, it typically takes a minimum of 30-45 days for Railroad Company to review.

3. Obtained Railroad's Flagging Services as required by paragraph 7 herein.

4. Obtained written authorization from the Railroad to begin work on Railroad rights-of-way, such authorization to include an outline of specific conditions with which he must comply.

5. Furnished a schedule for all work within the Railroad rights-of-way as required by paragraph 7,B,1.

B. The Railroad's written authorization to proceed with the work shall include the names, addresses, and telephone numbers of the Railroad's representatives who are to be notified as hereinafter required. Where more than one representative is designated, the area of responsibility of each representative shall be specified.

3. INTERFERENCE WITH RAILROAD OPERATIONS:

A. The Contractor shall so arrange and conduct his work that there will be no interference with Railroad operations, including train, signal, telephone and telegraphic services, or damage to the property of the Railroad Company or to poles, wires, and other facilities of tenants on the rights-of-way of the Railroad Company. Whenever work is liable to affect the operations or safety of trains, the method of doing such work shall first be submitted to the Railroad Engineer for approval, but such approval shall not relieve the Contractor from liability. Any work to be performed by the Contractor which requires flagging service or inspection service shall be deferred by the Contractor until the flagging service or inspection service required by the Railroad is available at the job site.

B. Whenever work within Railroad rights-of-way is of such a nature that impediment to Railroad operations such as use of runaround tracks or necessity for reduced speed is unavoidable, the Contractor shall schedule and conduct his operations so that such impediment is reduced to the absolute minimum.

C. Should conditions arising from, or in connection with the work, require that immediate and unusual provisions be made to protect operations and property of the Railroad, the Contractor shall make such provisions. If in the judgment of the Railroad Engineer, or in his absence, the Railroad's Division Engineer, such provisions are insufficient, either may require or provide such provisions as he deems necessary. In any event, such unusual provisions shall be at the Contractor's expense and without cost to the Railroad or the Department.

4. TRACK CLEARANCES:

A. The minimum track clearances to be maintained by the Contractor during construction are shown on the Project Plans. However, before undertaking any work within Railroad right-of-way, or before placing any obstruction over any track, the Contractor shall:

1. Notify the Railroad's representative at least 72 hours in advance of the work.

2. Receive assurance from the Railroad's representative that arrangements have been made for flagging service as may be necessary.

3. Receive permission from the Railroad's representative to proceed with the work.

4. Ascertain that the Department Engineer has received copies of notice to the Railroad and of the Railroad's response thereto.

5. CONSTRUCTION PROCEDURES:

A. General:

Construction work and operations by the Contractor on Railroad property shall be:

1. Subject to the inspection and approval of the Railroad.

2. In accord with the Railroad's written outline of specific conditions.

3. In accord with the Railroad's general rules, regulations and requirements including those relating to safety, fall protection and personal protective equipment.

4. In accord with these Special Provisions.

B. Excavation:

The subgrade of an operated track shall be maintained with edge of berm at least 10'-0" from centerline of track and not more than 24- inches below top of rail. Contractor will not be required to make existing section meet this specification if substandard, in which case existing section will be maintained.

Additionally, the Railroad Engineer may require installation of orange construction safety fencing for protection of the work area.

C. Excavation for Structures:

The Contractor will be required to take special precaution and care in connection with excavating and shoring pits, and in driving piles or sheeting for footings adjacent to tracks to provide adequate lateral support for the tracks and the loads which they carry, without disturbance of track alignment and surface, and to avoid obstructing track clearances with working equipment, tools or other material. All plans and calculations for shoring shall be prepared and signed by a Registered Professional Engineer. The Registered Professional Engineer will be responsible for the accuracy for all controlling dimensions as well as the selection of soil design values which will accurately reflect the actual field conditions. The procedure for doing such work, including need of and plans and calculations for shoring, shall first be approved by the Department Engineer and the Railroad Engineer, but such approval shall not relieve the Contractor from liability.

Additionally, walkway with handrail protection may be required as noted in paragraph 11 herein.

D. Demolition, Erection, Hoisting

1. Railroad tracks and other railroad property must be protected from damage during the procedure.

2. The Contractor is required to submit a plan showing the location of cranes, horizontally and vertically, operating radii, with delivery or disposal locations shown. The location of all tracks and other railroad facilities as well as all obstructions such as wire lines, poles, adjacent structures, etc. must also be shown.

3. 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.

4. Plans and computations showing the weight of the pick must be submitted. 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. If plans do not exist, lifting weights must be calculated from field measurements. The field measurements are to be made under the supervision of the Registered Professional Engineer submitting the procedure and calculations.

5. A data sheet must be submitted listing the types, size, and arrangements of all rigging and connection equipment.

6. A complete procedure is to be submitted, including the order of lifts, time required for each lift, and any repositioning or re-hitching of the crane or cranes.

7. All erection or demolition plans, procedures, data sheets, etc. submitted must be prepared, signed and sealed by a Registered Professional Engineer.

8. The Railroad Engineer or his designated representative must be present at the site during the entire demolition and erection procedure period.

9. All procedures, plans and calculations shall first be approved by the Department Engineer and the Railroad Engineer, but such approval does not relieve the Contractor from liability.

E. Blasting:

1. The Contractor shall obtain advance approval of the Railroad Engineer and the Department Engineer for use of explosives on or adjacent to Railroad property. The request for permission to use explosives shall include a detailed blasting plan. If permission for use of explosives is granted, the Contractor will be required to comply with the following:

   (a) Blasting shall be done with light charges under the direct supervision of a responsible officer or employee of the Contractor and a licensed blaster.

   (b) Electric detonating fuses shall not be used because of the possibility of premature explosions resulting from operation of two-way radios.

   (c) No blasting shall be done without the presence of the Railroad Engineer or his authorized representative. At least 72 hours advance notice to the person designated in the Railroad's notice of authorization to proceed (see paragraph 2B) will be required to arrange for the presence of an authorized Railroad representative and such flagging as the Railroad may require.

   (d) Have at the job site adequate equipment, labor and materials and allow sufficient time to clean up debris resulting from the blasting without delay to trains, as well as correcting at his expense any track misalignment or other damage to Railroad property resulting from the blasting as directed by the Railway's authorized representative. If his actions result in delay of trains, the Contractor shall bear the entire cost thereof.

2. The Railroad representative will:

   (a) Determine approximate location of trains and advise the Contractor the appropriate amount of time available for the blasting operation and clean up.

   (b) Have the authority to order discontinuance of blasting if, in his opinion, blasting is too hazardous or is not in accord with these special provisions.

F. Maintenance of Railroad Facilities:

1. The Contractor will be required to maintain all ditches and drainage structures free of silt or other obstructions which may result from his operations and provide and maintain any erosion control measures as required. The Contractor will promptly repair eroded areas within Railroad rights-of-way and repair any other damage to the property of the Railroad or its tenants.

2. All such maintenance and repair of damages due to the Contractor's operations shall be done at the Contractor's expense.

G. Storage of Materials and Equipment:

Materials and equipment shall not be stored where they will interfere with Railroad operations, nor on the rights-of-way of the Railroad Company without first having obtained permission from the Railroad Engineer, and such permission will be with the understanding that the Railroad Company will not be liable for damage to such material and equipment from any cause and that the Railroad Engineer may move or require the Contractor to move, at the Contractor's expense, such material and equipment.

All grading or construction machinery that is left parked near the track unattended by a watchman shall be effectively immobilized so that it cannot be moved by unauthorized persons. The Contractor shall protect, defend, indemnify and save Railroad, and any associated, controlled or affiliated corporation, harmless from and against all losses, costs, expenses, claim or liability for loss or damage to property or the loss of life or personal injury, arising out of or incident to the Contractor's failure to immobilize grading or construction machinery.

H. Cleanup:

Upon completion of the work, the Contractor shall remove from within the limits of the Railroad rights-of-way, all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the Contractor, and leave said rights-of-way in a neat condition satisfactory to the Chief Engineer of the Railroad or his authorized representative.

6. DAMAGES:

A. The Contractor shall assume all liability for any and all damages to his work, employees, servants, equipment and materials caused by Railroad traffic.

B. Any cost incurred by the Railroad for repairing damages to its property or to property of its tenants, caused by or resulting from the operations of the Contractor, shall be paid directly to the Railroad by the Contractor.

7. FLAGGING SERVICES:

A. Requirements:

Flagging services will not be provided until the Contractor's insurance has been reviewed & approved by the Railroad.

Under the terms of the agreement between the Department and the Railroad, the Railroad has sole authority to determine the need for flagging required to protect its operations. In general, the requirements of such services will be whenever the Contractor's personnel or equipment are or are likely to be, working on the Railroad's right-of-way, or across, over, adjacent to, or under a track, or when such work has disturbed or is likely to disturb a railroad structure or the railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging.

Normally, the Railroad will assign one flagman to a project; but in some cases, more than one may be necessary, such as yard limits where three (3) flagmen may be required. However, if the Contractor works within distances that violate instructions given by the Railroad's authorized representative or performs work that has not been scheduled with the Railroad's authorized representative, a flagman or flagmen may be required full time until the project has been completed.

B. Scheduling and Notification:

1. The Contractor's work requiring railroad flagging should be scheduled to limit the presence of a flagman at the site to a maximum of 50 hours per week. The Contractor shall receive Railroad approval of work schedules requiring a flagman's presence in excess of 40 hours per week.

2. Not later than the time that approval is initially requested to begin work on Railroad right-of-way, Contractor shall furnish to the Railroad and the Department a schedule for all work required to complete the portion of the project within Railroad right-of-way and arrange for a job site meeting between the Contractor, the Department, and the Railroad's authorized representative. Flagman or Flagmen may not be provided until the job site meeting has been conducted and the Contractor's work scheduled.

3. The Contractor will be required to give the Railroad representative at least 10 working days of advance written notice of intent to begin work within Railroad right-of-way in accordance with this special provision.

Once begun, when such work is then suspended at any time, or for any reason, the Contractor will be required to give the Railroad representative at least 3 working days of advance notice before resuming work on Railroad right-of-way. Such notices shall include sufficient details of the proposed work to enable the Railroad representative to determine if flagging will be required. If such notice is in writing, the Contractor shall furnish the Engineer a copy; if notice is given verbally, it shall be confirmed in writing with copy to the Engineer. If flagging is required, no work shall be undertaken until the flagman, or flagmen are present at the job site. It may take up to 30 days to obtain flagging initially from the Railroad. When flagging begins, the flagman is usually assigned by the Railroad to work at the project site on a continual basis until no longer needed and cannot be called for on a spot basis. If flagging becomes unnecessary and is suspended, it may take up to 30 days to again obtain from the Railroad. Due to Railroad labor agreements, it is necessary to give 5 working days notice before flagging service may be discontinued and responsibility for payment stopped.

4. If, after the flagman is assigned to the project site, an emergency arises that requires the flagman's presence elsewhere, then the Contractor shall delay work on Railroad right-of-way until such time as the flagman is again available. Any additional costs resulting from such delay shall be borne by the Contractor and not the Department or Railroad.

C. Payment:

1. The Department will be responsible for paying the Railroad directly for any and all costs of flagging which may be required to accomplish the construction.

2. The estimated cost of flagging is current rate per day based on a 10-hour work day. This cost includes the base pay for the flagman, overhead, and includes a per diem charge for travel expenses, meals and lodging. The charge to the Department by the Railroad will be the actual cost based on the rate of pay for the Railroad's employees who are available for flagging service at the time the service is required.

3. Work by a flagman in excess of 8 hours per day or 40 hours per week, but not more than 12 hours a day will result in overtime pay at 1 and 1/2 times the appropriate rate. Work by a flagman in excess of 12 hours per day will result in overtime at 2 times the appropriate rate. If work is performed on a holiday, the flagging rate is 2 and 1/2 times the normal rate.

4. Railroad work involved in preparing and handling bills will also be charged to the Department. Charges to the Department by the Railroad shall be in accordance with applicable provisions of Subchapter B, Part 140, Subpart I and Subchapter G, Part 646, Subpart B of the Federal-Aid Policy Guide issued by the Federal Highway Administration on December 9, 1991, including all current amendments. Flagging costs are subject to change.

*The above estimates of flagging costs are provided for information only and are not binding in any way.*

D. Verification:

1. Railroad's flagman will electronically enter flagging time via Railroad's electronic billing system. Any complaints concerning flagging must be resolved in a timely manner. If need for flagging is questioned, please contact Railroad's System Engineer Public Improvements (404) 529-1641. All verbal complaints will be confirmed in writing by the Contractor within 5 working days with a copy to the Highway Engineer. Address all written correspondence to:

   Office of Chief Engineer
   Attn: System Engineer Public Improvements
   Bridges & Structures
   Norfolk Southern Corporation
   1200 Peachtree Street NE,
   Internal Box 142
   Atlanta, Georgia 30309

2. The Railroad flagman assigned to the project will be responsible for notifying the Department Engineer upon arrival at the job site on the first day (or as soon thereafter as possible) that flagging services begin and on the last day that he performs such services for each separate period that services are provided. The Department Engineer will document such notification in the project records. When requested, the Department Engineer will also sign the flagman's diary showing daily time spent and activity at the project site.

8. HAUL ACROSS RAILROAD:

A. Where the plans show or imply that materials of any nature must be hauled across a Railroad, unless the plans clearly show that the Department has included arrangements for such haul in its agreement with the Railroad, the Contractor will be required to make all necessary arrangements with the Railroad regarding means of transporting such materials across the Railroad. The Contractor will be required to bear all costs incidental to such crossings whether services are performed by his own forces or by Railroad personnel.

B. No crossing may be established for use of the Contractor for transporting materials or equipment across the tracks of the Railroad Company unless specific authority for its installation, maintenance, necessary watching and flagging thereof and removal, until a temporary private crossing agreement has been executed between the Contractor and Railroad. The approval process for an agreement normally takes 90-days.

9. WORK FOR THE BENEFIT OF THE CONTRACTOR:

A. All temporary or permanent changes in wire lines or other facilities which are considered necessary to the project are shown on the plans; included in the force account agreement between the Department and the Railroad or will be covered by appropriate revisions to same which will be initiated and approved by the Department and/or the Railroad.

B. Should the Contractor desire any changes in addition to the above, then he shall make separate arrangements with the Railroad for same to be accomplished at the Contractor's expense.

10. COOPERATION AND DELAYS:

A. It shall be the Contractor's responsibility to arrange a schedule with the Railroad for accomplishing stage construction involving work by the Railroad or tenants of the Railroad. In arranging his schedule he shall ascertain, from the Railroad, the lead time required for assembling crews and materials and shall make due allowance therefore.

B. No charge or claim of the Contractor against either the Department or the Railroad Company will be allowed for hindrance or delay on account of railway traffic; any work done by the Railway Company or other delay incident to or necessary for safe maintenance of railway traffic or for any delays due to compliance with these special provisions.

11. TRAINMAN'S WALKWAYS:

Along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than 10 feet from centerline of track, shall be maintained. Any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours while Railway's protective service is provided shall be removed before the close of each work day. If there is any excavation near the walkway, a handrail, with 10'-0" minimum clearance from centerline of track, shall be placed and must conform to AREMA and/or FRA standards.

12. GUIDELINES FOR PERSONNEL ON RAILROAD RIGHT-OF-WAY:

A. All persons shall wear hard hats. Appropriate eye and hearing protection must be used. Working in shorts is prohibited. Shirts must cover shoulders, back and abdomen. Working in tennis or jogging shoes, sandals, boots with high heels, cowboy and other slip-on type boots is prohibited. Hard-sole, lace-up footwear, zippered boots or boots cinched up with straps which fit snugly about the ankle are adequate. Wearing of safety boots is strongly recommended. In the vicinity of at-grade crossings, it is strongly recommended that reflective vests be worn.

B. No one is allowed within 25' of the centerline of track without specific authorization from the flagman.

C. All persons working near track while train is passing are to lookout for dragging bands, chains and protruding or shifted cargo.

D. No one is allowed to cross tracks without specific authorization from the flagman.

E. All welders and cutting torches working within 25’ of track must stop when train is passing.

F. No steel tape or chain will be allowed to cross or touch rails without permission.

13. GUIDELINES EQUIPMENT ON RAILROAD RIGHT-OF-WAY:

A. No crane or boom equipment will be allowed to set up to work or park within boom distance plus 15’ of centerline of track without specific permission from railroad official and flagman.

B. No crane or boom equipment will be allowed to foul track or lift a load over the track without flag protection and track time.

C. All employees will stay with their machines when crane or boom equipment is pointed toward track.

D. All cranes and boom equipment under load will stop work while train is passing (including pile driving).

E. Swinging loads must be secured to prevent movement while train is passing.

F. No loads will be suspended above a moving train.

G. No equipment will be allowed within 25’ of centerline of track without specific authorization of the flagman.

H. Trucks, tractors or any equipment will not touch ballast line without specific permission from railroad official and flagman.

I. No equipment or load movement within 25’ or above a standing train or railroad equipment without specific authorization of the flagman.

J. All operating equipment within 25’ of track must halt operations when a train is passing. All other operating equipment may be halted by the flagman if the flagman views the operation to be dangerous to the passing train.

K. All equipment, loads and cables are prohibited from touching rails.

L. While clearing and grubbing, no vegetation will be removed from railroad embankment with heavy equipment without specific permission from the Railroad Engineer and flagman.

M. No equipment or materials will be parked or stored on Railroad’s property unless specific authorization is granted from the Railroad Engineer.

N. All unattended equipment that is left parked on Railroad property shall be effectively immobilized so that it cannot be moved by unauthorized persons.

O. All cranes and boom equipment will be turned away from track after each work day or whenever unattended by an operator.

14. INSURANCE:

A. In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, the Prime Contractor will be required to carry insurance of the following kinds and amounts:

1. Commercial General Liability Insurance having a combined single limit of not less than $2,000,000 per occurrence for all loss, damage, cost and expense, including attorneys' fees, arising out of bodily injury liability and property damage liability during the policy period. Said policy shall include explosion, collapse, and underground hazard (XCU) coverage, shall be endorsed to name Railroad specified in item A.2.c. below both as the certificate holder and as an additional insured, and shall include a severability of interests provision.

2. Railroad Protective Liability Insurance having a combined single limit of not less than $2,000,000 each occurrence and $6,000,000 in the aggregate applying separately to each annual period. If the project involves track over which passenger trains operate, the insurance limits required are not less than a combined single limit of $5,000,000 each occurrence and $10,000,000 in the aggregate applying separately to each annual period. Said policy shall provide coverage for all loss, damage or expense arising from bodily injury and property damage liability, and physical damage to property attributed to acts or omissions at the job site.

The standards for the Railroad Protective Liability Insurance are as follows:

a. The insurer must be rated A- or better by A.M. Best Company, Inc.

b. The policy must be written using one of the following combinations of Insurance Services Office (“ISO”) Railroad Protective Liability Insurance Form Numbers:

c.

(1) CG 00 35 01 96 and CG 28 31 10 93; or
(2) CG 00 35 07 98 and CG 28 31 07 98; or
(3) CG 00 35 10 01; or
(4) CG 00 35 12 04.

d. The named insured shall read:

Norfolk Southern Railway Company
Three Commercial Place
Norfolk, Virginia 23510-2191
Attn: Risk Management

e. The description of operations must appear on the Declarations, must match the project description in this agreement, and must include the appropriate Department project and contract identification numbers.

f. The job location must appear on the Declarations and must include the city, state, and appropriate highway name/number. NOTE: Do not include any references to milepost on the insurance policy.

g. The name and address of the prime Contractor must appear on the Declarations.

h. The name and address of the Department must be identified on the Declarations as the "Involved Governmental Authority or Other Contracting Party."

i. Other endorsements/forms that will be accepted are:

(1) Broad Form Nuclear Exclusion – Form IL 00 21
(2) 30-day Advance Notice of Non-renewal or cancellation
(3) Required State Cancellation Endorsement
(4) Quick Reference or Index Form CL/IL 240

j. Endorsements/forms that are NOT acceptable are:

(1) Any Pollution Exclusion Endorsement except CG 28 31
(2) Any Punitive or Exemplary Damages Exclusion
(3) Known injury or Damage Exclusion form CG 00 59
(4) Any Common Policy Conditions form
(5) Any other endorsement/form not specifically authorized in item no. 2.h above.

B. If any part of the work is sublet, similar insurance, and evidence thereof as specified in A.1 above, shall be provided by or on behalf of the subContractor to cover its operations on Railroad's right of way.

C. Prior to entry on Railroad right-of-way, the original Railroad Protective Liability Insurance Policy shall be submitted by the Prime Contractor to the Department at the address below for its review and transmittal to the Railroad. In addition, certificates of insurance evidencing the Prime Contractor's and any subContractors' Commercial General Liability Insurance shall be issued to the Railroad and the Department at the addresses below, and forwarded to the Department for its review and transmittal to the Railroad.

The certificates of insurance shall state that the insurance coverage will not be suspended, voided, canceled, or reduced in coverage or limits without (30) days advance written notice to Railroad and the Department. No work will be permitted by Railroad on its right-of-way until it has reviewed and approved the evidence of insurance required herein.

| DEPARTMENT: | RAILROAD: |
|---|---|
| Mary Lamie<br>Regional Engineer<br>Illinois Department of Transportation<br>1102 Eastport Plaza Drive<br>Collinsville, IL 62234 | Risk Management<br>Norfolk Southern Railway Company<br>Three Commercial Place<br>Norfolk, Virginia 23510-2191 |

D. The insurance required herein shall in no way serve to limit the liability of Department or its Contractors under the terms of this agreement.

15. FAILURE TO COMPLY:

In the event the Contractor violates or fails to comply with any of the requirements of these Special Provisions:

A. The Railroad Engineer may require that the Contractor vacate Railroad property.

B. The Engineer may withhold all monies due the Contractor on monthly statements.

Any such orders shall remain in effect until the Contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

16. PAYMENT FOR COST OF COMPLIANCE:

No separate payment will be made for any extra cost incurred on account of compliance with these special provisions. All such costs shall be included in prices bid for other items of the work as specified in the payment items.

Office of Chief Engineer
Bridges & Structures
Norfolk Southern Corporation
1200 Peachtree Street, N. E.
Internal Box 142
Atlanta, GA 30309

Date: 2/5/10
File: BR0120683, BR0120684
Milepost: 484.28

**NORFOLK SOUTHERN RAILWAY COMPANY PRIVATE CROSSING AGREEMENT**

The Contractor must execute the following Private Crossing Agreement prior to utilizing the Norfolk Southern Railway Company track crossing on Access Road 3 at Sta. 47+36.90. All cost associated with executing the Private Crossing Agreement including the initial and annual fees shall be considered as included in the contract unit prices bid for the various items of work involved.

THIS AGREEMENT, made and entered into by and between

_____, a(n) _____ corporation, hereinafter styled "Railway"; and

_____, a(n) _____ corporation, hereinafter styled "Licensee":

W I T N E S S E T H:

THAT the PARTIES HERETO agree as follows:

1. THAT, for and in consideration of the premises, payment of an initial fee of TWO HUNDRED AND NO/100 DOLLARS ($200.00) and also an annual fee of TWO HUNDRED AND NO/100 DOLLARS ($200.00), payable annually in advance during the continuance of this Agreement, Railway hereby grants unto Licensee, insofar as Railway's title enables it so to do and without warranty, the right to maintain and use a private road crossing, hereinafter called "Crossing," upon and across, at grade, the right of way or property and track (whether more than one track) of Railway, located at Milepost _____, at or near Brooklyn**, St. Clair County, Illinois**, located substantially as shown upon print of Drawing marked _____, dated _____, attached hereto and made a part hereof.

2. Railway will, for the accommodation of and at the expense of Licensee, perform the work of maintaining the portion of the Crossing between the rails in said track and to the outside ends of the crossties on each side thereof, and shall revise, relocate and reconstruct signal facilities and other railway facilities in such manner as may be necessary to this project. Licensee will pay to Railway, promptly upon bill rendered therefor, the actual expenditures incurred by Railway in connection with the maintenance of the Crossing including, but not restricted to, the expenditures herein expressly described.

3. Licensee will, at the expense of Licensee, maintain the Crossing (except the portion to be maintained and removed by Railway as aforesaid), including all necessary drainage, in all respects in accordance with the requirements of Railway looking to the safe and convenient operation and maintenance of its line of railway.

4. No person other than Licensee, its agents, employees, patrons, or invitees, shall be permitted to use the Crossing. Licensee hereby agrees that the Crossing shall be a private crossing only for the use and convenience of Licensee, its agents, employees, patrons, or invitees and shall not be, or be permitted to become, a highway for the use of the public. To the end of preventing the use of the Crossing by the public, Licensee will, at its expense, construct and maintain, at a point to be designated by the Superintendent of Railway or his duly authorized representative, a signboard clearly indicating that the Crossing is for the private purposes of Licensee, its agents, employees, patrons or invitees.

5. In each instance when a vehicle approaches the Crossing, it shall stop and shall not proceed over said track of Railway until the driver has ascertained that no train or other rail equipment of Railway is approaching the Crossing.

To that end, Licensee will, at Licensee's expense, provide for the installation and maintenance of such information, caution, traffic signs and barricades deemed necessary by Railway or required by any authorized public authority. At Railway's option, such protective devices may be installed and maintained by Railway at the expense of Licensee. Railway's failure to require protective signs, barricades or automatic warning devices shall not affect Licensee's liability under the terms of this Agreement.

6. Licensee accepts the privilege hereby granted with full cognizance of the risk of loss of life, personal injury and property loss or damage that may be caused by railway operations at or in the vicinity of the Crossing and by the construction, maintenance, use or removal of the Crossing by the Licensee or others. The Licensee is willing to assume this risk and covenants that the privilege hereby granted shall be used and enjoyed at the sole risk of the Licensee, and that Railway shall not have any responsibility whatever for any such loss, injury or damage. To that end, Licensee hereby agrees to indemnify and save harmless Railway, its officers, agents and employees, from and against all liability, claims, loss, damage, expense (including attorneys' fees) or costs for personal injuries (including death) and/or property damage to whomsoever or whatsoever, occurring or arising in any manner from railway operations at or in the vicinity of the Crossing and by the construction, maintenance, or use of the Crossing by the Licensee or others.

7. In order to contribute toward the safety of train and motor vehicle operations at the Crossing, Licensee will, at all times during the life of this Agreement, keep the vegetation on its property cut in such manner and to such extent as is necessary to permit a person approaching the Crossing from either direction to see approaching trains before such person reaches a position of danger on or near the Crossing. Licensee also will prevent the erection on its premises of any structures that would interfere with the view of approaching trains or other rail equipment operating on said track.

8. (a) Prior to entry on Railway's property or use of the Crossing and during the period of this Agreement, Licensee shall procure and maintain in a form and with an insurance company satisfactory to Railway a policy of Personal Liability Insurance with a combined single limit of not less than $1,000,000 per occurrence for injury to or death of persons and damage to or loss or destruction of property. Such policy shall be endorsed to provide contractual liability coverage for liability assumed by Licensee under this Agreement and shall be of a form that does not deny coverage for operations conducted within 50 feet of any railroad hazard. As evidence of said insurance, a certificate of insurance shall be furnished to and approved by the Risk Manager, Norfolk Southern Corporation, Three Commercial Place, Norfolk, Virginia 235102191 prior to entry on Railway's property or use of the Crossing. The certificate of insurance shall state that thirty (30) days advance written notice will be given to Railway of any material change in, or cancellation of such insurance.

(b) The insurance coverage required herein shall in no way limit Licensee's liability under this Agreement.

9. It is specifically understood that the Crossing shall not be permitted to become a public grade crossing without the written consent of Railway and unless arrangements satisfactory to the Railway are made for the installation and maintenance of protective devices, without cost or expense to Railway. If the Crossing should at any time in the future become a public grade crossing, Licensee shall bear, or shall cause such public authority as may assume responsibility for said public grade crossing to bear, the cost of furnishing, installing and maintaining automatic signals, or such other protective devices deemed necessary by Railway to protect said public grade crossing.

10. Licensee shall not assign this Agreement without the written consent of Railway.

11. The word "Railway" as used herein shall include any other company whose property at the aforesaid location may be leased or operated by Railway. Said term also shall include Railway's officers, agents and employees, and any parent company, subsidiary or affiliate of Railway and their officers, agents and employees.

12. If Licensee shall violate any of its covenants herein, Railway may refuse to allow the Licensee to utilize the Crossing until the Licensee has fully complied with all applicable requirements of this Agreement; except that Railway shall not deny use of the Crossing until Railway has notified the Licensee and the State of Illinois, Department of Transportation, in writing, of the specific requirements of the Agreement with which the Licensee is not in compliance.

13. This Agreement will terminate upon the Licensee's completion of all work associated with the Illinois Department of Transportation's contract #76D61.

14. This Agreement shall take effect as of the _____ day of _____, 20___.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement in duplicate, each part being an original, as of the _____ day of _____, 20____.

Witness: _____

_____ By: _____
As to Railway Title: Real Estate Manager

Witness: _____

_____ By: _____
As to Licensee Title:

Preparer's initials; Date Prepared; Activity #/ iManage #_____v1

**KANSAS CITY SOUTHERN RAILWAY COMPANY REQUIREMENTS**

To report an emergency on the Kansas City Southern Railway right of way call: (800) 892-6295. The project is located near Milepost 279.34 on the East St. Louis Terminal Subdivision [DOT # (To be provided by KCS Railway)].

**1.0** Authority of Railroad Engineer and State Engineer

**1.1** The authorized representative of The Kansas City Southern Railway Company, herein called "Railroad Engineer", shall have final authority in all matters affecting the safety of employees of The Kansas City Southern Railway Company, herein called “Railroad”, the public, and the safe maintenance and operation of railroad traffic including the adequacy of the foundations and structures supporting the railroad tracks.

The Railroad designates the following individual as the Railroad Engineer for this project. Except as otherwise provided in these Railroad Requirements, the Contractor shall address all notices concerning this project to the following person:

Mr. John Jacobsen
Vice President and Chief Engineer
The Kansas City Southern Railway
427 West 12th Street
Kansas City, MO 64105
c/o Mr. Srikanth Honnur, P.E.
Office: (816) 983-1138; Fax: (816) 983-1186
E-mail:SHonnur@KCSouthern.com

**1.2** The authorized representative, herein called “Engineer”, of the Illinois Department of Transportation herein called "Department", shall have authority over all other matters as prescribed herein and in the project plans and specifications.

**1.3** The right of way of Railroad is located within this project and the Contractor shall take care to insure that no debris or material is dropped on the Railroad's tracks. The project involves operations on Railroad’s right of way (“Railroad ROW”) and the Contractor shall coordinate activities with the activities of the Railroad.

**1.4** Indemnification of Railroad by Contractor

The term Contractor as used herein includes any and all subcontractors. The Contractor agrees to defend, indemnify and hold harmless Railroad, its directors, officers, employees, agents, successors and assigns from and against any injury or death of persons whomsoever or from any loss or damage to the Railroad’s property, right of way, tracks and other facilities, herein called “Railroad’s property,” and from the Railroad’s liability or loss incurred for damage to any other property in Railroad’s care, custody or control in or upon Railroad’s property, caused by acts or omissions of the Contractor in performing work on this project, whether on, over, under or in the vicinity of the Railroad’s property.

In the event the Contractor shall fail to restore the Railroad's property immediately to a condition acceptable to the Railroad when any such loss or damage to the Railroad's property is called to the Contractor's attention by the Railroad, then the Railroad may perform such corrective work at the cost of the Contractor. The term "loss or damage" as used herein shall include, but not be limited to, the erosion and silting of, water damage to, and the accidental or intentional placing or dropping of objects on the Railroad's property.

**2.0** Construction Requirements

Prior to entering the Railroad's ROW, outside the Department's easements, the Prime Contractor shall obtain a Right of Entry Permit from the Railroad by paying any and all fees by contacting:

Sylvia Schmidt
Jones Lang Lasalle
3017 Lou Menk Drive, Suite 100
Fort Worth, TX 76131
Ph: 817-230-2688
Email: Sylvia.Schmidt@am.jll.com

The Contractor's work on the Railroad's ROW shall be performed in accordance with these Railroad Requirements. The Contractor shall supply adequate equipment, labor and materials to perform the proposed work at the job site. The Contractor shall take special precaution and care to prevent any debris or material from falling on the Railroad's right of way. The safe operation of the Railroad shall take precedence over all work and nothing shall be done by the Contractor that will endanger the Railroad's operations. The Contractor shall protect the Railroad property from any damage resulting from the Contractor's acts or omissions during the highway project.

**3.0** Contractor Plans and Procedures

Before performing any excavation, demolition, blasting, lifting of structural members or construction of falsework on or over Railroad's ROW or adjacent to the Railroad's ROW that may interfere with the safe operation of the trains, the Contractor shall submit its excavation, shoring, demolition, blasting, lifting of structural members and falsework plans and relevant procedures to the Engineer for review, and to the Railroad Engineer for review and approval. These plans and procedures shall be signed and sealed by a Professional engineer licensed in the State of Illinois. Plans and calculations shall also be submitted demonstrating the adequacy of the Contractor's drilled shaft casing to protect track against subsidence and/or displacements within track surcharge zones. These plans and procedures shall be signed and sealed by a Structural Engineer licensed in the State of Illinois. However, such approval shall not relieve the Contractor from any liability relating to this project. During the course of the project, the Contractor shall submit any proposed changes to the approved plans or procedures to the Engineer for review and to the Railroad Engineer for review and approval. Any clearing and grubbing to increase the sight distance for a safer construction operation, or erection of temporary structures within the Railroad property shall not be done prior to the approval of the Railroad. The Railroad Engineer shall make a decision within 30 days. Should the Railroad Engineer deny the plans and requires a resubmittal, the Railroad Engineer shall provide approval or denial and requirement for resubmittal within 30 days after receipt of the revised plans.

**3.1** The Contractor shall be required to take special precautions and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of OSHA, AREMA and Section IV, Design and Construction of Shoring Adjacent to and on Railroad Right-Of-Way contained within the "KCS Guidelines For The Design and Construction of Railroad Overpasses and Underpasses".

**3.2** The Contractor shall abide by the following minimum temporary clearances during the course of construction:

(A) 12'-0" horizontal from centerline of track

(B) 21'-0" vertical above top of rail.

**3.3** The Contractor shall comply with the Railroad's rules and regulations concerning protection of persons and property and the Contractor shall consult with the Railroad Engineer concerning the Railroad's rules and regulations. Any questions arising about coordination of work between the Contractor and the Railroad Engineer or between the Contractor and others shall be taken up with the Engineer and the Contractor, Railroad Engineer and Engineer shall agree upon a method of coordination before commencing the work.

**3.4** Prior to commencing any work upon, over or under the Railroad's ROW, the Contractor shall furnish to the Railroad Engineer evidence that the Contractor's insurance is in compliance with Section 6 of this special provision.

**3.5** If the Contractor must cross tracks with cleated or crawler type equipment, the track shall be protected with a temporary surfacing as approved by the Railroad Engineer. Except as authorized by the Railroad, neither the Department nor its Contractor(s) or subcontractor(s) will construct a crossing over any track at any location. Where crossings are needed or desired, Department's Contractor shall make arrangements with Railroad and obtain a Permit paying any and all fees.

**3.6** The Contractor shall be required to maintain all ditches and drainage structures free of silt or other obstructions which may result from Contractor's operations; to promptly repair eroded areas within Railroad's right-of-way and to repair any other damage to the property of the Railroad or its tenants which may result from Contractor's operations. All such maintenance and repair of damages due to the Contractor's operations shall be done at the Contractor's expense. If the Contractor's method of erosion control differs from the approved plans, the Contractor must submit a proposed method of erosion control and have the method reviewed by the Railroad and Department prior to beginning any grading work on the Project site. Erosion control methods must comply with all applicable local, state and federal regulations.

**3.7** The Contractor shall, reasonably throughout each work day and at the end of each work day when performing work near the Railroad's tracks, inspect the track area and clean up any debris that may have been dropped on or within ten (10) feet of Railroad's tracks. Upon completion of the Project, the Contractor shall return the Railroad ROW and all other Railroad property to a condition equal to or better than existed prior to commencement of the work. Contractor shall remove all waste, excess materials, false work and other temporary structures, and equipment, leaving the location of the work cleaned to the reasonable satisfaction of Railroad.

The Contractor shall repair to the reasonable satisfaction of Railroad Engineer, and at the Contractor's sole cost and expense, any and all damages to the Railroad's property caused during construction of the Project.

**4.0** Site Inspections By Railroad's Designated Representative

In addition to the office review of construction submittals, site inspections may be performed by Railroad's Designated Representative at milestone events during construction, including but not limited to the following:

(A) Preconstruction meetings.

(B) Excavations, shoring placement/removal, pile driving, drilling of caissons or drilled shafts adjacent to tracks.

(C) Reinforcement and concrete placement for near track piers.

(D) Erection of precast concrete or steel overpass bridge superstructure.

(E) Reinforcement and concrete placement of overpass bridge decks.

(F) Completion of the bridge structure.

The Railroad Designated Representative can either be an employee(s) of the Railroad or hired outside consultants. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.

A detailed construction schedule for work on Railroad ROW, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to be performed, in addition to the project schedule required by the Department, shall be provided to the Engineer for submittal to Railroad's Designated Representative for review prior to the start of the work. This schedule shall also include the anticipated dates when the above listed events will occur. This schedule shall be updated for the above listed events as necessary, but at least monthly, and provided to the Railroad by the Department so that site visits may be scheduled. The Department shall reimburse the Railroad all costs associated with Site Inspection work by the Railroad.

**5.0** Safety and Railroad Flagging

The safe operation of the Railroad shall take precedence over Department's work on, under and above the Railroad ROW. Contractor shall not, without Railroad's prior consent, come within 25 feet of Railroad's tracks. All work of the Contractor to be performed on, above, below or adjacent to the right-of-way shall be coordinated with Railroad so as to avoid, to the greatest extent possible, interference with railroad operations. Contractor shall be solely responsible with complying with any applicable laws, rules and regulations, including but not limited to OSHA regulations governing multi-employer work sites.

While on the Railroad's ROW, Contractor shall comply with Railroad's rules and regulations concerning protection of persons and property. Railroad shall make its applicable rules available to the Contractor for review and copying.

Except as authorized by Railroad the Contractor shall not work within the "Minimum Clearance Zone" of any track. The "Minimum Clearance Zone" is defined as an area measured 25 feet, horizontally, on either side of the centerline of track with unlimited vertical distance within the horizontal limits. Additionally, Contractor will locate all equipment, devices, and materials at a sufficient distance from any track to ensure that no apparatus or part of any equipment, device, or material, such as the boom of a crane or a dragline, could under any circumstances encroach on the "Minimum Clearance Zone" of any track.

Flagging services provided by a Railroad-qualified flagging contractor will be required whenever agents, employees or equipment of the Contractor or any of its contractors or subcontractors on this Project shall be within twenty-five feet (25') of the nearest rail, unless otherwise waived in writing by the Railroad.

Contractors shall notify the Railroad concerning any flagging services that will be required during the course of the Project, but arrangements for flagging protection must be made directly by the Contractor with a Railroad-qualified flagging contractor. Railroad's designation of a company or individual as a "qualified" flagman or flagman provider shall be construed solely as Railroad's willingness to allow said individual or entity to provide flagging services on Railroad's property without further proof of qualification, and shall not be construed as an endorsement or other verification of the abilities or qualifications of said flagman or flagman provider. All flagmen utilized on the Project shall be treated solely as independent contractors of the Contractor, with no relationship to Railroad, for all purposes hereunder..

The Contractor shall contract directly with one of the Railroad-qualified flagging contractors and pay them directly. Contractor must provide at least one month's notice prior to the first use of flagmen. Current Railroad-qualified flagging contractors are:

| | | |
|---|---|---|
| *Railroad Protective Services*<br>*2001 Ryan Road*<br>*Saint Augustine, FL 32092*<br>*Patsy Crisafi*<br>*904-273-8121 (Office)*<br>*904-813-9905 (Cell)*<br>*pjcrisafi@aol.com*<br><br>*Alternate Contact*<br>*David Schaffer*<br>*904-588-3433*<br>*drsshaffer@aol.com* | *Rail Pros, Inc.*<br>*25 Mauchly Drive, Suite 329*<br>*Irvine, CA 92618*<br>*Donna Beasley*<br>*318-938-2815, Ext. 3 (Office)*<br>*714-900-9270 (Cell)*<br>*866-762-7619 (Fax)*<br>*Donna.Beasley@railpros.com*<br><br>*General e-mail*<br>*flagging@railpros.com*<br><br>*Alternate Contact*<br>*Johnny Johnson*<br>*949-278-8637 (Cell)*<br>*johnny.johnson@railpros.com* | *JP Signal, Inc.*<br>*P. O. Box 247*<br>*Overton, TX 75684*<br>*John Posey*<br>*903-834-6578 (Office)*<br>*903-520-8672 (Cell)*<br>*jpsignal@earthlink.net* |

Contractor may also obtain a list of Railroad-qualified flagging contractors together with their address and telephone numbers for flagging purposes at the proposed site by written request, sent at least 30 (thirty) days in advance, by US mail or by e-mail addressed to:

Sri Honnur, P. E.
Engineering Department
Post Office Box 219335
Kansas City, MO 64121-9335
SHonnur@KCSouthern.com

Contractor will clear the tracks when directed to do so by the flagman. The presence of the flagman will not relieve Contractor of its duty to keep all of its agents, employees and contractors clear of the tracks when trains are in dangerous proximity to the area where construction is occurring.

All Contractor and sub contractor's employees and supervisors who will be coming inside the Railroad ROW shall be trained, at their own costs, in Railroad's On Track Safety Rules by paying any and all applicable fees. The training can be obtained by the Railroad certified training consultant. The consultant can be contacted at:

TrackSense Inc.
308 Durst Dr. Warren, OH 44483
Phone: (330) 847-8661; Cell: (330) 219-4721;
Attention: Larry Slater
Email: lslater@neo.rr.com

**5.1** The Contractor shall be advised that trains and/or equipment are expected on any track, at any time, in either direction. Contractor shall become familiar with the train schedules in this location and structure its bid assuming intermittent track windows in this period.

**5.1.1** All railroad tracks within and adjacent to the Project site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. Railroad traffic and operations will occur continuously throughout the day and night on the tracks. The Contractor shall coordinate and schedule the work so that construction activities do not interfere with railroad operations. Any and all costs associated with delays caused to the train traffic by the Contractor shall be reimbursed by the Contractor. The Department or the Contractor can audit these costs.

**5.1.2** Work windows for this Project shall be coordinated with the Department's and the Railroad's Designated Representative. There are costs to the Railroad associated with granting curfews which includes but not limited to train crew costs, train delay costs, etc. All these costs shall be reimbursed by the Contractor.. The Department or the Contractor can audit these costs.

Types of work windows include Conditional Work Windows and Absolute Work Windows. As defined below:

(A) Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities and or normally when construction activities may occur on and adjacent to the railroad tracks within 25 feet of the nearest track. Conditional Work Windows are available for this Project.

(B) Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window the railroad track(s) and/or signals must be completely operational for train operations and all Railroad, Public Utilities Department, (PUC) and Federal Railroad Administration (FRA) requirements, codes and regulations for operational tracks must be complied with. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing the track back into service. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

**5.2** The Contractor shall notify Railroad of the completion of work on Railroad ROW within 30 days after the completion of work on Railroad ROW. Railroad shall inspect Railroad's property within 30 days after the Contractor has given this notice, to verify the Contractor's compliance with these Railroad Requirements. Railroad shall notify the Engineer of any outstanding issues to be addressed on Railroad ROW. Engineer will notify the Contractor of work to be completed.

**6.0** The Contractor hired to work on this Project within Railroad's right-of-way to provide:

(A) Comprehensive General Liability Insurance Policy. This insurance must contain broad form contractual liability applicable to work within Railroad's right-of-way with limits of not less than three million dollars ($3,000,000) for bodily injury and property damage per occurrence and not less than six million dollars ($6,000,000) aggregate for all occurrences. If any part of the Project is sublet, similar insurance shall be provided by or on behalf of the subcontractors to cover their operations.

(B) Contractors' Protective Liability Insurance. IDOT's contractor shall furnish evidence to COMPANY that IDOT's contractor carries a contractors' Protective Liability Insurance Policy applicable to work within Railroad's right-of-way providing for a limit of not less than three million dollars ($3,000,000) for bodily injury and property damage per occurrence and not less than six million dollars ($6,000,000) aggregate for all occurrences.

(C) Railroad Protective Liability Insurance (which includes Bodily Injury, Property Damage, and Physical Damage Insurance). A single Railroad Protective Liability Insurance policy, naming the COMPANY as insured, with minimum limits of $5,000,000 combined single limit per occurrence for bodily injury liability and property damage liability, with an aggregate limit of $10,000,000 over the life of the policy as set forth in Federal-Aid Policy Guide, Chapter I, Subchapter G, Part 646, Subpart A (23 CFR 646A).

(D) Automobile Liability insurance with combined single limits of not less than $1,000,000 per occurrence covering all vehicles owned, used or hired.

(E) Workers' Compensation and Employer's Liability insurance coverage (Part B). Employer's liability must have limits of at least $500,000 each accident, $500,000 by disease each employee, and $500,000 by disease policy limit.

The insurance specified in paragraphs (A) through (E) of this section shall be carried until all work required to be performed under the terms of this Agreement is satisfactorily completed as evidenced by formal acceptance by IDOT.

Each policy must be issued by financially reputable insurers licensed to do business in all jurisdictions where work is performed during the term of the Agreement. Comprehensive General Liability and any Umbrella Liability policy will each name Kansas City Southern and Subsidiaries as an additional insured and to the fullest extent allowed under law contain a waiver of subrogation in favor of the Railroad. The Contractor will provide to Railroad a certificate of insurance reasonably satisfactory in form and content to Railroad, evidencing that all the required coverage is in force and has been endorsed to provide that no policy will be canceled or materially altered without first giving the Railroad 30 days' prior written notice. All policies will be primary to any insurance or self-insurance Railroad may maintain for acts or omissions of the Contractor or anyone for whom the Contractor is responsible. The Contractor will include copies of relevant endorsements or policy provisions with the required certificate of insurance.

(a) The insurer shall be rated A- or better by A.M. Best Company, Inc.

(b) The policy shall be written using one of the following combinations of Insurance Services Office ("ISO") Railroad Protective Liability Insurance Form Numbers:

(1) CG 00 35 01 96 and CG 28 31 10 93.

(2) CG 00 35 07 98 and CG 28 31 07 98.

(c) The named insured shall read:

The Kansas City Southern Railway Company
427 West 12th Street
Kansas City, MO 64105

Railroad shall be named as an additional insured on all such policies.

**6.1** Evidence of Insurance

The Declarations shall include the description of operations matching the project description in this special provision and shall include the appropriate Department project and contract identification numbers. The job number and project location shall appear on the Declarations and shall include the city, state and appropriate highway designation:

I-70, St. Clair County, IL
Contract Number 76D61

**6.1.1** The name and address of the prime Contractor shall appear on the Declarations. The name and address of the Department shall be identified on the Declarations as the "Involved Governmental Authority or Other Contracting Party".

**6.1.2** Other endorsements/forms that will be accepted are:

(a) Broad Form Nuclear Exclusion – Form IL 00 21.

(b) 30-day Advance Notice of Non-renewal or cancellation.

(c) Required State Cancellation Endorsement.

(d) Quick Reference or Index Form CL/IL 240.

**6.1.3** Endorsements/forms that will NOT be acceptable are:

(a) Any Pollution Exclusion Endorsement except CG 28 31.

(b) Any Punitive or Exemplary Damages Exclusion.

(c) Known injury or Damage Exclusion form CG 00 59.

(d) Any Common Policy Conditions form.

(e) Any other endorsement/form not specifically authorized in this special provision.

**6.1.4** If any part of the work is sublet, similar insurance and evidence thereof as specified above, shall be provided by or on behalf of the subcontractor to cover the subcontractor's operations on the Railroad's right of way.

**6.1.5** Prior to entry on the Railroad's right of way, the original Railroad Protective Liability Insurance Policy shall be submitted by the prime Contractor to the Department at the addresses below for review by the Department and approval by the Railroad. In addition, certificates of insurance evidencing the Contractor's and any subcontractor's Commercial General Liability Insurance shall be issued to the Railroad and the Department at the addresses below for review by the Department and approval by the Railroad. The certificates of insurance shall state that the insurance coverage shall not be suspended, voided, canceled or reduced in coverage or limits without 30 days advanced written notice to the Railroad and the Department. No work shall be permitted on the Railroad's right-of-way until the Railroad has reviewed and approved the evidence of insurance required herein.

Railroad
Srikanth Honnur, P. E.
Director, Track & Bridge Construction
The Kansas City Southern Railway Co.
P.O. Box 219335
Kansas City, MO 64121-9335

Department
Ms. Mary Lamie, P.E.
Deputy Director of Highways, Region 5 Engineer
Illinois Department of Transportation
1102 Eastport Plaza Drive
Collinsville, IL 62234
Ofc: 618-346-3110
Mary.Lamie@illinois.gov

**7.0** Failure to Comply

In the event the Contractor violates or fails to comply with any of the requirements of this special provision, the below orders may be applied. Any such orders applied shall remain in effect until the Contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

(a) The Railroad Engineer may require that the Contractor vacate the Railroad's property.

(b) The Engineer may withhold all monies due to the Contractor until the Contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

**8.0** Payment for Cost of Compliance.

No separate payment will be made for any extra cost incurred on account of compliance with this special provision. All such cost shall be included in contract unit price for other items included in the contract.

## UNION PACIFIC RAILWAY COMPANY MINIMUM CONSTRUCTION REQUIREMENTS

### 1.01 DESCRIPTION

This project includes construction work within the Right-of-Way and/or properties of the Union Pacific Railroad Company ("UPRR") and adjacent to tracks, wire lines and other facilities. This section describes the special minimum requirements for coordination with UPRR when work by the Contractor will be performed upon, over or under the UPRR Right-of-Way or may impact current or future UPRR operations. The Contractor will coordinate with UPRR while performing the work outlined in this Contract, and shall afford the same cooperation with UPRR as it does with the Agency. All submittals and work shall be completed in accordance with UPRR Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the UPRR Designated Representative.

For purposes of this project, the UPRR Designated Representative shall be the person or persons designated by the UPRR Manager of Industry and Public Projects to handle specific tasks related to the project.

### 1.02 DEFINITION OF AGENCY AND CONTRACTOR

As used in these UPRR requirements, the term "Agency" shall mean the State of Illinois, by and through its Department of Transportation.

As used in these UPRR requirements, the term "Contractor" shall mean the contractor or contractor's hired by the Agency to perform any project work on any portion of UPRR's property and shall also include the contractor's subcontractors and the contractor's and subcontractor's respective officer, agents and employees, and others acting under its or their authority.

### 1.03 UPRR CONTACTS

The primary UPRR point of contact for this project is:

Dave McKernan
Manager Industry and Public Projects
Union Pacific Railroad Company
100 North Broadway, Suite 1500
St. Louis, Missouri 63102
Phone: 314-331-0682
Fax: 402-501-2520

For UPRR flagging services and track work, contact:

Bill Brendel
Manager Track Maintenance
Union Pacific Railroad Company
3412 Carondelet Avenue
Dupo, Illinois 62239
Phone: 618-286-0048
Fax: 618-286-0481

## 1.04 REQUEST FOR INFORMATION / CLARIFICATION

All Requests for Information ("RFI") involving work within any UPRR Right-Of-Way shall be in accordance with the procedures listed elsewhere in these bid documents. All RFI's shall be submitted to the Engineer of Record. The Engineer of Record will submit the RFI to the UPRR Designated Representative for review and approval for corresponding to work within the UPRR Right-Of-Way. The Contractor shall allow four (4) weeks for the review and approval process by UPRR.

## 1.05 PLANS / SPECIFICATIONS

The plans and specifications for this project, affecting the UPRR, are subject to the written approval by the UPRR and changes in the plans may be required after award of the Contract. Such changes are subject to the approval of the Agency and the UPRR.

## 1.06 UTILITIES AND FIBER OPTICS

All installations shall be constructed in accordance with current AREMA recommendations and UPRR specifications and requirements. UPRR general guidelines and the required application forms for utility installations can be found on the UPRR website at www.uprr.com.

## 1.07 GENERAL

A. Contractor shall perform all work in compliance with all applicable UPRR and FRA rules and regulations. Contractor shall arrange and conduct all work in such manner and at such times as shall not endanger or interfere with the safe operation of the tracks and property of UPRR and the traffic moving on such tracks, or the wires, signals and other property of UPRR, its tenants or licensees, at or in the vicinity of the work. UPRR shall be reimbursed by Contractor or Agency for train delay costs and lost revenue claims due to any delays or interruption of train operations resulting from Contractor’s construction work or other activities.

B. Construction activities will be permitted within 12 feet of the centerline of operational tracks only if absolutely necessary and UPRR's Designated Representative grants approval. Construction activities within 12 feet of the operational track(s) must allow the tracks to stay operational.

C. Track protection is required for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail.

D. The Contractor is also advised that new railroad facilities within the project may be built by UPRR and that certain Contractor's activities cannot proceed until that work is completed. The Contractor shall be aware of the limits of responsibilities and allow sufficient time in the schedule for that work to be accomplished and shall coordinate its efforts with the UPRR.

## 1.08 RAILROAD OPERATIONS

A. The Contractor shall be advised that trains and/or equipment are expected on any track, at any time, in either direction. Contractor shall become familiar with the train schedules in this location and structure its bid assuming intermittent track windows in this period, as defined in Paragraph B below.

B. All railroad tracks within and adjacent to the Contract Site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. Railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. The Contractor shall coordinate and schedule the work so that construction activities do not interfere with railroad operations.

C. Work windows for this Contract shall be coordinated with the Agency's and the UPRR's Designated Representatives. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:

1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and adjacent to the railroad tracks within 25 feet of the nearest track, a UPRR flag person will be required. At the direction of the UPRR flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the UPRR Designated Representative, from the tracks). Conditional Work Windows are available for the Project.

2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window the railroad tracks and/or signals must be completely operational for train operations and all UPRR, Public Utilities Commission (PUC) and Federal Railroad Administration (FRA) requirements, codes and regulations for operational tracks must be complied with.

3. In the situation where the operating tracks and/or signals have been affected, the UPRR will perform inspections of the work prior to placing that track back into service. UPRR flag persons will be required for construction activities requiring an Absolute Work Window. **Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for UPRR review.**

## 1.09 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

A. Prior to beginning any work on or over the property of, or affecting the facilities of, the UPRR, the Contractor shall notify the primary railroad representative at least ten (10) working days in advance of such work and at least ten (10) working days in advance of proposed performance of any work by contractor in which any person or equipment will be within twenty-five (25) feet of any track or will be near enough to any track that any equipment extension (such as, but not limited to, a crane boom) will reach within twenty-five (25) feet of any track. If the contractor will be on UPRR property outside the limits of the State's easements, Contractor shall enter into an agreement with the UPRR in the form of the "Contractor's Right of Entry Agreement", attached as EXHIBIT 6 to the Grade Separation Construction and Maintenance Agreement, or latest version thereof provided by the UPRR. There is a fee for processing of the agreement. This cost shall be borne by the Contractor. Contractor shall submit a copy of the executed agreement and the insurance policies, binders, certificates and endorsements set forth therein to the Agency prior to commencing work on UPRR property. The right of entry agreement shall specify working time frames, flagging and inspection requirements, and any other items specified by the UPRR.

B. The Contractor shall give the advance notice to the UPRR as required above before commencing work in connection with construction upon or over UPRR's Right-of-Way and shall observe UPRR's rules and regulations with respect thereto.

C. All work upon UPRR's Right-of-Way shall be done at such times and in such manner so as not to interfere with or endanger the operations of UPRR. Whenever work may affect the operations or safety of trains, the method of doing such work shall first be submitted to UPRR's Designated Representative for approval, but such approval shall not relieve the Contractor from liability. Any work to be performed by the Contractor, which requires flagging and/or inspection service, shall be deferred until the flagging protection required by UPRR is available at the job site. See Section 1.24 for railroad flagging requirements.

D. The Contractor shall make requests in writing for both Absolute and Conditional Work Windows, at least two weeks in advance of any work. The written request must include:

1. Exactly what the work entails.
2. The days and hours that work will be performed.
3. The exact location of work, and proximity to the tracks.
4. The type of window requested and the amount of time requested.
5. The designated contact person.

The Contractor shall provide a written confirmation notice to the UPRR at least 48 hours before commencing work in connection with approved work windows when work will be performed within **25 feet of any track center line.** All work shall be performed in accordance with previously approved work plans.

E. Should a condition arising from, or in connection with the work, require that immediate and unusual provisions be made to protect operations and property of UPRR, the Contractor shall make such provisions. If in the judgment of UPRR's Designated Representative such provisions are insufficient, the UPRR's Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the UPRR. UPRR or the Agency shall have the right to order Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the UPRR's Designated Representative, the Contractor's operations could endanger UPRR's operations. In the event such an order is given, Contractor shall immediately notify the Agency of the order.

## 1.10 INSURANCE

Contractor shall not begin work upon or over UPRR's Right-of-Way until UPRR has been furnished the insurance policies, binders, certificates, and endorsements required by the UPRR Insurance Requirements, Exhibit 5 to the Grade Separation Construction and Maintenance Agreement, and UPRR's Designated Representative has advised the Agency that such insurance is in accordance with the Agreement. The required insurance shall be kept in full force and effect during the performance of work and thereafter until Contractor removes all tools, equipment, and material from UPRR's property and cleans the premises in a manner reasonably satisfactory to UPRR.

## 1.11 RAILROAD SAFETY ORIENTATION

**All personnel employed by the Contractor and all subcontractors must complete the UPRR course "Orientation for Contractor's Safety", and be registered prior to working on UPRR property. This orientation is available at www.contractororientation.com. This course is required to be completed annually.**

## 1.12 COOPERATION

UPRR will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of UPRR's right-of-way in performing the work.

## 1.13 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

The Contractor shall abide by the following minimum temporary clearances during the course of construction:

12' – 0" horizontal from centerline of track
21' – 6" vertically above top of rail.

For construction clearance less than listed above, local Operating Unit review and approval is required.

## 1.14 APPROVAL OF REDUCED CLEARANCES

A. The minimum track clearances to be maintained by the Contractor during construction are specified in Section 3.07 herein.

B. Any proposed infringement on the specified minimum clearances due to the Contractor's operations shall be submitted to UPRR's Designated Representative through the Agency at least 30 days in advance of the work and shall not be undertaken until approved in writing by the UPRR's Designated Representative.

C. No work shall commence until the Contractor receives in writing assurance from UPRR's Designated Representative that arrangements have been made for flagging service, as may be necessary and receives permission from UPRR's Designated Representative to proceed with the work.

## 1.15 CONSTRUCTION AND AS-BUILT SUBMITTALS

A. Submittals are required for construction materials and procedures as outlined below. The submittals shall include all review comments from the Agency and the Engineer of Record. All design submittals shall be stamped and signed by a Professional Engineer registered in the State of Illinois.

B. The tables below provide UPRR's minimum submittal requirements for the construction items noted. Submittal requirements are in addition to those specified elsewhere in these bid documents. The minimum review times indicated below represent UPRR's requirements only. The Contractor shall allow additional time for the Agency's review time as stated elsewhere in these bid documents.

C. Submittals shall be made by the Agency to the UPRR Manager of Industry and Public Projects unless otherwise directed by the Railroad. Items in Table 1 shall be submitted for both railroad overpass and underpass projects, as applicable. Items in Table 2 shall be submitted for railroad underpass projects only.

**TABLE 1**

| ITEM | DESCRIPTION | SETS REQD. | UPRR's Minimum Review Time |
|---|---|---|---|
| 1 | Shoring design and details | 4 | 4 weeks |
| 2 | **Falsework design and details** | 4 | 4 weeks |
| 3 | Drainage design provisions | 4 | 4 weeks |
| 4 | Erection diagrams and sequence | 4 | 4 weeks |
| 5 | Demolition diagram and sequence | 4 | 4 weeks |

**Prior to or during construction of railroad underpass structures, the UPRR requires the review of drawings, reports, test data and material data sheets to determine compliance with the specifications. Product information for items noted in Table 2 be submitted to UPRR's Designated Representative through the Agency for their own review and approval of the material.**

**The signed submittal and the Agency's review comments will be reviewed by UPRR or their consultant. If a consultant performs the reviews, the consultant may reply directly to the Agency or its Designated Representative after consultation with UPRR. Review of the submittals will not be conducted until after review by the Agency or its Designated Representative. Review of the submittal items will require a minimum of four (4) weeks after receipt from the Agency.**

**TABLE 2**

| ITEM | DESCRIPTION | SETS REQD. | NOTES |
|---|---|---|---|
| 1 | Shop drawings | 4 | Steel and Concrete members |
| 2 | **Bearings** | 4 | For entire structures |
| 3 | Concrete Mix Designs | 4 | For entire structures |
| 4 | Rebar & Strand certifications | 4 | For superstructure only |
| 5 | 28 day concrete strength | 4 | For superstructure only |
| 6 | Waterproofing material certifications and installation procedure | 4 | Waterproofing & protective boards |
| 7 | Structural steel certifications | 4 | All fracture critical members & other members requiring improved notch toughness |
| 8 | Fabrication and Test reports | 4 | All fracture critical members & other members requiring improved notch toughness |
| 9 | Welding Procedures and Welder Certification | 4 | AWS requirements |
| 10 | Foundation Construction Reports | 4 | Pile driving, drilled shaft construction, bearing pressure test reports for spread footings |
| 11 | Compaction testing reports for backfill at abutments | 4 | Must meet 95% maximum dry density, Modified Proctor ASTM D1557 |

D. As-Built Records shall be submitted to the UPRR within 60 days of completion of the structures. These records shall consist of the following items:

Overpass Projects

1. Electronic files of all structure design drawings with as-constructed modifications shown, in Microstation J or Acrobat .PDF format.
2. Hard copies of all structure design drawings with as-constructed modifications shown.

Underpass Projects

1. Electronic files of all structure design drawings with as-constructed modifications shown, in Microstation J or Acrobat .PDF format.
2. Hard copies of all structure design drawings with as-constructed modifications shown.
3. Final approved copies of shop drawings for concrete and steel members.
4. Foundation Construction Reports
5. Compaction testing reports for backfill at abutments

## 1.16 APPROVAL OF DETAILS

The details of the construction affecting the UPRR tracks and property not already included in the Contract Plans shall be submitted to UPRR's Designated Representative through the Agency for UPRR's review and written approval before such work is undertaken. Review and approval of these submittals will require a minimum of four (4) weeks in addition to the Agency's review time as stated elsewhere in these bid documents.

## 1.17 MAINTENANCE OF RAILROAD FACILITIES

A. The Contractor shall be required to maintain all ditches and drainage structures free of silt or other obstructions which may result from Contractor's operations; to promptly repair eroded areas within UPRR's right of way and to repair any other damage to the property of UPRR, or its tenants.

B. All such maintenance and repair of damages due to the Contractor's operations shall be done at the Contractor's expense.

C. The Contractor must submit a proposed method of erosion control and have the method reviewed by the UPRR prior to beginning any grading on the Project Site. Erosion control methods must comply with all applicable local, state, and federal regulations.

## 1.18 SITE INSPECTIONS BY UPRR's DESIGNATED REPRESENTATIVE

A. In addition to the office reviews of construction submittals, site inspections may be performed by UPRR's Designated Representative at significant points during construction, including but not limited to the following:

1. Preconstruction meetings.

2. Pile driving, drilling of caissons or drilled shafts.

3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.

4. Erection of precast concrete or steel bridge superstructure.

5. Placement of waterproofing (prior to placing ballast on bridge deck).

6. Completion of the bridge structure.

B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by UPRR.

C. A detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to be performed, shall be provided to the Agency for submittal to UPRR's Designated Representative for review prior to commencement of work. This schedule shall also include the anticipated dates when the above listed events will occur. This schedule shall be updated for the above listed events as necessary, but at least monthly so that site visits may be scheduled.

## 1.19 UPRR REPRESENTATIVES

A. UPRR representatives, conductors, flag person or watch person will be provided by UPRR at expense of the Agency or Contractor (as stated elsewhere in these bid documents) to protect UPRR facilities, property and movements of its trains or engines. In general, UPRR will furnish such personnel or other protective services as follows:

1. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from centerline of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

2. For any excavation below elevation of track subgrade if, in the opinion of UPRR's Designated Representative, track or other UPRR facilities may be subject to settlement or movement.

3. During any clearing, grubbing, excavation or grading in proximity to UPRR facilities, which, in the opinion of UPRR's Designated Representative, may endanger UPRR facilities or operations.

4. During any contractor's operations when, in the opinion of UPRR's Designated Representative, UPRR facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.

5. The Contractor shall arrange with the UPRR Designated Representative to provide the adequate number of flag persons to accomplish the work.

## 1.20 WALKWAYS REQUIRED

Along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than twelve feet (12') from centerline of track, shall be maintained. Any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours while UPRR's flagman service is provided shall be removed before the close of each work day.

Walkways with railings shall be constructed by Contractor over open excavation areas when in close proximity of track, and railings shall not be closer than 8' – 6" horizontally from center line of tangent track or 9' – 6" horizontally from centerline of curved track.

## 1.21 COMMUNICATIONS AND SIGNAL LINES

If required, UPRR will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by UPRR's forces in connection with its operation at expense of the Agency. This work by UPRR will be done by its own forces and it is not a part of the Work under this Contract.

## 1.22 TRAFFIC CONTROL

Contractor's operations that control traffic across or around UPRR facilities shall be coordinated with and approved by the UPRR's Designated Representative.

## 1.23 CONSTRUCTION EXCAVATIONS

A. The Contractor shall be required to take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls, or other facilities that require shoring shall comply with requirements of OSHA, AREMA and UPRR "Guidelines for Temporary Shoring".

B. The Contractor shall contact UPRR's "Call Before Your Dig" at least 48 hours prior to commencing work at 1-800-336-9193 during normal business hours (6:30 a.m. to 8:00 p.m. central time, Monday through Friday, except holidays - also a 24 hour, 7 day a week number for emergency calls) to determine location of fiber optics. If a telecommunications system is buried anywhere on or near UPRR property, the Contractor will co-ordinate with UPRR and the Telecommunication Company(ies) to arrange for relocation or other protection of the system prior to beginning any work on or near UPRR property.

## 1.24 RAILROAD FLAGGING

Performance of any work by the Contractor in which person(s) or equipment will be within twenty-five (25) feet of any track, or will be near enough to any track that any equipment extension (such as, but not limited to, a crane boom) will reach within twenty-five (25) feet of any track, may require railroad flagging services or other protective measures. Contractor shall give the advance notice to the UPRR as required in Section 1.09 above before commencing any such work, so that the UPRR may determine the need for flagging or other protective measures to ensure the safety of the railroad's operations. Contractor must provide Railroad a minimum of five (5) days notice prior to the cessation of the need for a flagman. If five (5) days notice of cessation is not given, Contractor will still be required to pay flagging charges for the five (5) day notice period required by union agreement to be given to the employee, even though flagging is not required for that period. An additional ten (10) days notice must then be given to Railroad if flagging services are needed again after such five day cessation notice has been given to Railroad. Contractor shall comply with all other requirements regarding flagging services as specified by the UPRR. Any costs associated with failure to abide by these requirements will be borne by the Contractor.

The UPRR shall invoice the Agency directly for flagging services.

## 1.25 CLEANING OF RIGHT-OF-WAY

Contractor shall, upon completion of the work to be performed by Contractor upon the premises, over or beneath the tracks of UPRR, promptly remove from the Right-of-Way of UPRR all of Contractor's tools, implements, and other materials whether brought upon the Right-of-Way by Contractor or any subcontractors, employee or agent of Contractor or of any subcontractor, and leave the Right-of-Way in a clean and presentable condition to satisfaction of UPRR.

**EXHIBIT 5**

**Union Pacific Railroad**
**Insurance Requirements**

Contractor shall, at its sole cost and expense, procure and maintain during the course of the project and until all project work on property has been completed and the Contractor has removed all equipment and materials from property and has cleaned and restored property to satisfaction, the following insurance coverage:

**A.** **Commercial General Liability** insurance. Commercial general liability (CGL) with a limit of not less than $5,000,000 each occurrence and an aggregate limit of not less than $10,000,000. CGL insurance must be written on ISO occurrence form CG 00 01 12 04 (or a substitute form providing equivalent coverage).

The policy must also contain the following endorsement, which must be stated on the certificate of insurance:

- Contractual Liability Railroads ISO Form CG 24 17 10 01 (or a substitute form providing equivalent coverage) showing "Union Pacific Railroad Company Property" as the Designated Job Site.
- Designated Construction Project(s) General Aggregate Limit ISO Form CG 25 03 03 97 (or a substitute form providing equivalent coverage) showing the project on the form schedule.

**B.** **Business Automobile Coverage** insurance. Business auto coverage written on ISO form CA 00 01 (or a substitute form providing equivalent liability coverage) with a limit of not less $5,000,000 for each accident, and coverage must include liability arising out of any auto (including owned, hired, and non-owned autos).

The policy must contain the following endorsements, which must be stated on the certificate of insurance:

- Coverage For Certain Operations In Connection With Railroads ISO form CA 20 70 10 01 (or a substitute form providing equivalent coverage) showing "Union Pacific Property" as the Designated Job Site.

- Motor Carrier Act Endorsement - Hazardous materials clean up (MCS-90) if required by law.

**C.** **Workers Compensation and Employers Liability** insurance. Coverage must include but not be limited to:

- Contractor's statutory liability under the workers' compensation laws of the State of Illinois.

- Employers' Liability (Part B) with limits of at least $500,000 each accident, $500,000 disease policy limit $500,000 each employee.

If Contractor is self-insured, evidence of state approval and excess workers compensation coverage must be provided. Coverage must include liability arising out of the U. S. Longshoremen's and Harbor Workers' Act, the Jones Act, and the Outer Continental Shelf Land Act, if applicable.

**D.** **Railroad Protective Liability** insurance. Contractor must maintain Railroad Protective Liability insurance written on ISO occurrence form CG 00 35 12 04 (or a substitute form providing equivalent coverage) on behalf of Railroad as named insured, with a limit of not less than $5,000,000 per occurrence and an aggregate of $10,000,000. A binder stating the policy is in place must be submitted to Railroad before the work may be commenced and until the original policy is forwarded to Railroad.

**E.** **Umbrella or Excess** insurance. If Contractor utilizes umbrella or excess policies, these policies must "follow form" and afford no less coverage than the primary policy.

**F.** **Pollution Liability** insurance**.** Pollution Liability coverage must be included when the scope of the work as defined in the Agreement includes installation, temporary storage, or disposal of any "hazardous" material that is injurious in or upon land, the atmosphere, or any watercourses; or may cause bodily injury at any time.

Pollution liability coverage must be written on ISO form Pollution Liability Coverage Form Designated Sites CG 00 39 12 04 (or a substitute form providing equivalent liability coverage), with limits of at least $5,000,000 per occurrence and an aggregate limit of $10,000,000.

If the scope of work as defined in this Agreement includes the disposal of any hazardous or non-hazardous materials from the job site, Contractor must furnish to Railroad evidence of pollution legal liability insurance maintained by the disposal site operator for losses arising from the insured facility accepting the materials, with coverage in minimum amounts of $1,000,000 per loss, and an annual aggregate of $2,000,000.

**Other Requirements**

**G.** All policy(ies) required above (except worker's compensation and employers liability) must include Railroad as "Additional Insured" using ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage). The coverage provided to Railroad as additional insured shall, to the extent provided under ISO Additional Insured Endorsement CG 20 26, and CA 20 48 provide coverage for Railroad's negligence whether sole or partial, active or passive, and shall not be limited by Contractor's liability under any indemnity provisions under which Contractor is to indemnity Railroad under this Project.

Contractor shall not assign or subcontract its contract with the State or any contract with Railroad for this Project, or any interest therein, without the written consent of the State or Railroad, as applicable. Contractor shall be responsible for the acts and omissions of all subcontractors. Before Contractor commences any work, the Contractor shall, except to the extent prohibited by law: (1) require each of its subcontractors to include the Contractor as "Additional Insured" in the subcontractors Commercial General Liability policy and Business Automobile policies with respect to all liabilities arising out of the subcontractor's performance of work on behalf of the Contractor by endorsing these policies with ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage;

(2) require each of its subcontractors to endorse their Commercial General Liability Policy with "Contractual Liability Railroads" ISO Form CG 24 17 10 01 (or a substitute form providing equivalent coverage) for the job site; and (3) require each of its subcontractors to endorse their Business Automobile Policy with "Coverage For Certain Operations In Connection With Railroads" ISO form CA 20 70 10 01 (or a substitute form providing equivalent coverage) for the job site.

**H.** Punitive damages exclusion, if any, must be deleted (and the deletion indicated on the certificate of insurance), unless (a) insurance coverage may not lawfully be obtained for any punitive damages that may arise under this agreement, or (b) all punitive damages are prohibited by all states in which this agreement will be performed.

**I.** Contractor waives all rights against Railroad and its agents, officers, directors and employees for recovery of damages to the extent these damages are covered by the workers compensation and employers' liability or commercial umbrella or excess liability insurance obtained by Contractor required by this agreement.

**J.** Prior to commencing the work, Contractor shall furnish Railroad with a certificate(s) of insurance, executed by a duly authorized representative of each insurer, showing compliance with the insurance requirements in this Agreement.

**K.** All insurance policies must be written by a reputable insurance company acceptable to Railroad or with a current Best's Insurance Guide Rating of A- and Class VII or better, and authorized to do business in the State of Illinois.

**L.** The fact that insurance is obtained by Contractor will not be deemed to release or diminish the liability of Contractor, including, without limitation, liability under the indemnity provisions of any agreement that Contractor has with the State or Railroad. Damages recoverable by State or Railroad from Contractor or any third party will not be limited by the amount of the required insurance coverage.

**EXHIBIT 6**

**CONTRACTOR'S**
**RIGHT OF ENTRY AGREEMENT**

**(ILLINOIS)**
**ONLY REQUIRED FOR WORK OFF OF STATE's EASEMENT**

**THIS AGREEMENT** is made and entered into as of the _____ day of _____, 20_____,
by and between **UNION PACIFIC RAILROAD COMPANY**, a Delaware corporation ("Railroad"); and _____
_____, a _____
corporation ("Contractor").

**RECITALS**:

Contractor has been hired by the State of Illinois, acting by and through its Department of Transportation to perform work relating to _____
_
_____
_____
(the "work"), with all or a portion of such work to be performed on property of Railroad in the vicinity of Railroad's Milepost _____ on Railroad's _____ [Subdivision] [Branch] [at or near DOT No. _____] located at or near _____, in _____ County, State of _____, as such location is in the general location shown on the print marked **Exhibit A**, attached hereto and hereby made a part hereof, which work is the subject of a contract dated _____ between Railroad and State.

Railroad is willing to permit Contractor to perform the work described above at the location described above subject to the terms and conditions contained in this Agreement

**AGREEMENT**:

**NOW, THEREFORE**, it is mutually agreed by and between Railroad and Contractor, as follows:

**ARTICLE 1 - DEFINITION OF CONTRACTOR.**

For purposes of this Agreement, all references in this agreement to Contractor shall include Contractor's contractors, subcontractors, officers, agents and employees, and others acting under its or their authority.

**ARTICLE 2 - RIGHT GRANTED; PURPOSE.**

Railroad hereby grants to Contractor the right, during the term hereinafter stated and upon and subject to each and all of the terms, provisions and conditions herein contained, to enter upon and have ingress to and egress from the property described in the Recitals for the purpose of performing the work described in the Recitals above. The right herein granted to Contractor is limited to those portions of Railroad's property specifically described herein, or as designated by the Railroad Representative named in Article 4.

**ARTICLE 3 - TERMS AND CONDITIONS CONTAINED IN EXHIBITS B, C AND D.**

The terms and conditions contained in **Exhibit B, Exhibit C** and **Exhibit D**, attached hereto, are hereby made a part of this Agreement.

**ARTICLE 4 - ALL EXPENSES TO BE BORNE BY CONTRACTOR; RAILROAD REPRESENTATIVE.**

A. Contractor shall bear any and all costs and expenses associated with any work performed by Contractor, or any costs or expenses incurred by Railroad relating to this Agreement.

B. Contractor shall coordinate all of its work with the following Railroad representative or his or her duly authorized representative (the "Railroad Representative"):

_____
_____
_____
_____

C. Contractor, at its own expense, shall adequately police and supervise all work to be performed by Contractor and shall ensure that such work is performed in a safe manner as set forth in Section 7 of **Exhibit B**. The responsibility of Contractor for safe conduct and adequate policing and supervision of Contractor's work shall not be lessened or otherwise affected by Railroad's approval of plans and specifications involving the work, or by Railroad's collaboration in performance of any work, or by the presence at the work site of a Railroad Representative, or by compliance by Contractor with any requests or recommendations made by Railroad Representative.

**ARTICLE 5 - TERM; TERMINATION.**

A. The grant of right herein made to Contractor shall commence on the date of this Agreement, and continue until _____, unless sooner terminated as herein provided, or at such time as Contractor has completed its work on Railroad's property, whichever is earlier. Contractor agrees to notify the Railroad Representative in writing when it has completed its work on Railroad's property.

B. This Agreement may be terminated by either party on ten (10) days written notice to the other party.

**ARTICLE 6 - CERTIFICATE OF INSURANCE.**

A. Before commencing any work, Contractor will provide Railroad with the (i) insurance binders, policies, certificates and endorsements set forth in **Exhibit C** of this Agreement, and (ii) the insurance endorsements obtained by each subcontractor as required under Section 12 of **Exhibit B** of this Agreement.

B. All insurance correspondence, binders, policies, certificates and endorsements shall be sent to:

Union Pacific Railroad Company
_____
[Insert mailing address]
_____
_____
Attn:_____
Folder No. _____

**ARTICLE 7 - DISMISSAL OF CONTRACTOR's EMPLOYEE.**

At the request of Railroad, Contractor shall remove from Railroad's property any employee of Contractor who fails to conform to the instructions of the Railroad Representative in connection with the work on Railroad's property, and any right of Contractor shall be suspended until such removal has occurred. Contractor shall indemnify Railroad against any claims arising from the removal of any such employee from Railroad's property.

**ARTICLE 8 - ADMINISTRATIVE FEE.**

Upon the execution and delivery of this Agreement, Contractor shall pay to Railroad _____ Dollars ($_____) as reimbursement for clerical, administrative and handling expenses in connection with the processing of this Agreement.

**ARTICLE 9 - CROSSINGS.**

No additional vehicular crossings (including temporary haul roads) or pedestrian crossings over Railroad's trackage shall be installed or used by Contractor without the prior written permission of Railroad.

**ARTICLE 10.- EXPLOSIVES.**

Explosives or other highly flammable substances shall not be stored on Railroad's property without the prior written approval of Railroad.

**IN WITNESS WHEREOF**, the parties hereto have duly executed this agreement in duplicate as of the date first herein written.

**UNION PACIFIC RAILROAD COMPANY**

By:_____
Title:_____

____

_____
(Name of Contractor)

By:_____
Title:_____

**EXHIBIT B**
**TO**
**CONTRACTOR'S RIGHT OF ENTRY AGREEMENT**

**Section 1. NOTICE OF COMMENCEMENT OF WORK - FLAGGING.**

A. Contractor agrees to notify the Railroad Representative at least ten (10) working days in advance of Contractor commencing its work and at least ten (10) working days in advance of proposed performance of any work by Contractor in which any person or equipment will be within twenty-five (25) feet of any track, or will be near enough to any track that any equipment extension (such as, but not limited to, a crane boom) will reach to within twenty-five (25) feet of any track. No work of any kind shall be performed, and no person, equipment, machinery, tool(s), material(s), vehicle(s), or thing(s) shall be located, operated, placed, or stored within twenty-five (25) feet of any of Railroad's track(s) at any time, for any reason, unless and until a Railroad flagman is provided to watch for trains. Upon receipt of such ten (10)-day notice, the Railroad Representative will determine and inform Contractor whether a flagman need be present and whether Contractor needs to implement any special protective or safety measures. If flagging or other special protective or safety measures are performed by Railroad, Railroad will bill Contractor for such expenses incurred by Railroad, unless Railroad and a federal, state or local governmental entity have agreed that Railroad is to bill such expenses to the federal, state or local governmental entity. If Railroad will be sending the bills to Contractor, Contractor shall pay such bills within thirty (30) days of Contractor's receipt of billing. If Railroad performs any flagging, or other special protective or safety measures are performed by Railroad, Contractor agrees that Contractor is not relieved of any of its responsibilities or liabilities set forth in this Agreement.

B. The rate of pay per hour for each flagman will be the prevailing hourly rate in effect for an eight-hour day for the class of flagmen used during regularly assigned hours and overtime in accordance with Labor Agreements and Schedules in effect at the time the work is performed. In addition to the cost of such labor, a composite charge for vacation, holiday, health and welfare, supplemental sickness, Railroad Retirement and unemployment compensation, supplemental pension, Employees Liability and Property Damage and Administration will be included, computed on actual payroll. The composite charge will be the prevailing composite charge in effect at the time the work is performed. One and one-half times the current hourly rate is paid for overtime, Saturdays and Sundays, and two and one-half times current hourly rate for holidays. Wage rates are subject to change, at any time, by law or by agreement between Railroad and its employees, and may be retroactive as a result of negotiations or a ruling of an authorized governmental agency. Additional charges on labor are also subject to change. If the wage rate or additional charges are changed, Contractor (or the governmental entity, as applicable) shall pay on the basis of the new rates and charges.

C. Reimbursement to Railroad will be required covering the full eight-hour day during which any flagman is furnished, unless the flagman can be assigned to other Railroad work during a portion of such day, in which event reimbursement will not be required for the portion of the day during which the flagman is engaged in other Railroad work. Reimbursement will also be required for any day not actually worked by the flagman following the flagman's assignment to work on the project for which Railroad is required to pay the flagman and which could not reasonably be avoided by Railroad by assignment of such flagman to other work , even though Contractor may not be working during such time.

When it becomes necessary for Railroad to bulletin and assign an employee to a flagging position in compliance with union collective bargaining agreements, Contractor must provide Railroad a minimum of five (5) days notice prior to the cessation of the need for a flagman. If five (5) days notice of cessation is not given, Contractor will still be required to pay flagging charges for the five (5) day notice period required by union agreement to be given to the employee, even though flagging is not required for that period. An additional ten (10) days notice must then be given to Railroad if flagging services are needed again after such five day cessation notice has been given to Railroad.

**Section 2. LIMITATION AND SUBORDINATION OF RIGHTS GRANTED**

A. The foregoing grant of right is subject and subordinate to the prior and continuing right and obligation of the Railroad to use and maintain its entire property including the right and power of Railroad to construct, maintain, repair, renew, use, operate, change, modify or relocate railroad tracks, roadways, signal, communication, fiber optics, or other wirelines, pipelines and other facilities upon, along or across any or all parts of its property, all or any of which may be freely done at any time or times by Railroad without liability to Contractor or to any other party for compensation or damages.

B. The foregoing grant is also subject to all outstanding superior rights (including those in favor of licensees and lessees of Railroad's property, and others) and the right of Railroad to renew and extend the same, and is made without covenant of title or for quiet enjoyment.

**Section 3. NO INTERFERENCE WITH OPERATIONS OF RAILROAD AND ITS TENANTS.**

A. Contractor shall conduct its operations so as not to interfere with the continuous and uninterrupted use and operation of the railroad tracks and property of Railroad, including without limitation, the operations of Railroad's lessees, licensees or others, unless specifically authorized in advance by the Railroad Representative. Nothing shall be done or permitted to be done by Contractor at any time that would in any manner impair the safety of such operations. When not in use, Contractor's machinery and materials shall be kept at least fifty (50) feet from the centerline of Railroad's nearest track, and there shall be no vehicular crossings of Railroads tracks except at existing open public crossings.

B. Operations of Railroad and work performed by Railroad personnel and delays in the work to be performed by Contractor caused by such railroad operations and work are expected by Contractor, and Contractor agrees that Railroad shall have no liability to Contractor, or any other person or entity for any such delays. The Contractor shall coordinate its activities with those of Railroad and third parties so as to avoid interference with railroad operations. The safe operation of Railroad train movements and other activities by Railroad takes precedence over any work to be performed by Contractor.

**Section 4. LIENS.**

Contractor shall pay in full all persons who perform labor or provide materials for the work to be performed by Contractor. Contractor shall not create, permit or suffer any mechanic's or materialmen's liens of any kind or nature to be created or enforced against any property of Railroad for any such work performed.

Contractor shall indemnify and hold harmless Railroad from and against any and all liens, claims, demands, costs or expenses of whatsoever nature in any way connected with or growing out of such work done, labor performed, or materials furnished. If Contractor fails to promptly cause any lien to be released of record, Railroad may, at its election, discharge the lien or claim of lien at Contractor's expense.

**Section 5. PROTECTION OF FIBER OPTIC CABLE SYSTEMS.**

A. Fiber optic cable systems may be buried on Railroad's property. Protection of the fiber optic cable systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits. Contractor shall telephone Railroad during normal business hours (7:00 a.m. to 9:00 p.m. Central Time, Monday through Friday, except holidays) at 1-800-336-9193 (also a 24-hour, 7-day number for emergency calls) to determine if fiber optic cable is buried anywhere on Railroad's property to be used by Contractor. If it is, Contractor will telephone the telecommunications company(ies) involved, make arrangements for a cable locator and, if applicable, for relocation or other protection of the fiber optic cable. Contractor shall not commence any work until all such protection or relocation (if applicable) has been accomplished.

b. In addition to other indemnity provisions in this Agreement, Contractor shall indemnify, defend and hold Railroad harmless from and against all costs, liability and expense whatsoever (including, without limitation, attorneys' fees, court costs and expenses) arising out of any act or omission of Contractor, its agents and/or employees, that causes or contributes to (1) any damage to or destruction of any telecommunications system on Railroad's property, and/or (2) any injury to or death of any person employed by or on behalf of any telecommunications company, and/or its contractor, agents and/or employees, on Railroad's property. Contractor shall not have or seek recourse against Railroad for any claim or cause of action for alleged loss of profits or revenue or loss of service or other consequential damage to a telecommunication company using Railroad's property or a customer or user of services of the fiber optic cable on Railroad's property.

**Section 6. PERMITS - COMPLIANCE WITH LAWS.**

In the prosecution of the work covered by this Agreement, Contractor shall secure any and all necessary permits and shall comply with all applicable federal, state and local laws, regulations and enactments affecting the work including, without limitation, all applicable Federal Railroad Administration regulations.

**Section 7. SAFETY.**

A. Safety of personnel, property, rail operations and the public is of paramount importance in the prosecution of the work performed by Contractor. Contractor shall be responsible for initiating, maintaining and supervising all safety, operations and programs in connection with the work. Contractor shall at a minimum comply with Railroad's safety standards listed in **Exhibit D**, hereto attached, to ensure uniformity with the safety standards followed by Railroad's own forces. As a part of Contractor's safety responsibilities, Contractor shall notify Railroad if Contractor determines that any of Railroad's safety standards are contrary to good safety practices. Contractor shall furnish copies of **Exhibit D** to each of its employees before they enter the job site.

B. Without limitation of the provisions of paragraph A above, Contractor shall keep the job site free from safety and health hazards and ensure that its employees are competent and adequately trained in all safety and health aspects of the job.

C. Contractor shall have proper first aid supplies available on the job site so that prompt first aid services may be provided to any person injured on the job site. Contractor shall promptly notify Railroad of any U.S. Occupational Safety and Health Administration reportable injuries. Contractor shall have a nondelegable duty to control its employees while they are on the job site or any other property of Railroad, and to be certain they do not use, be under the influence of, or have in their possession any alcoholic beverage, drug or other substance that may inhibit the safe performance of any work.

D. If and when requested by Railroad, Contractor shall deliver to Railroad a copy of Contractor's safety plan for conducting the work (the "Safety Plan"). Railroad shall have the right, but not the obligation, to require Contractor to correct any deficiencies in the Safety Plan. The terms of this Agreement shall control if there are any inconsistencies between this Agreement and the Safety Plan.

**Section 8. INDEMNITY.**

A. To the extent not prohibited by applicable statute, Contractor shall indemnify, defend and hold harmless Railroad, its affiliates, and its and their officers, agents and employees ("Indemnified Parties") from and against any and all loss, damage, injury, liability, claim, demand, cost or expense (including, without limitation, attorney's, consultant's and expert's fees, and court costs), fine or penalty (collectively, "loss") incurred by any person (including, without limitation, any indemnified party, contractor, or any employee of contractor or of any indemnified party) arising out of or in any manner connected with (i) any work performed by Contractor, or (ii) any act or omission of Contractor, its officers, agents or employees, or (iii) any breach of this Agreement by Contractor.

b. The right to indemnity under this Section 8 shall accrue upon occurrence of the event giving rise to the loss, and shall apply regardless of any negligence or strict liability of any indemnified party, except where the loss is caused by the sole active negligence of an indemnified party as established by the final judgment of a court of competent jurisdiction. The sole active negligence of any indemnified party shall not bar the recovery of any other indemnified party.

c. Contractor expressly and specifically assumes potential liability under this Section 8 for claims or actions brought by Contractor's own employees. Contractor waives any immunity it may have under worker's compensation or industrial insurance acts to indemnify Railroad under this Section 8. Contractor acknowledges that this waiver was mutually negotiated by the parties hereto.

d. No court or jury findings in any employee's suit pursuant to any worker's compensation act or the federal employers' liability act against a party to this Agreement may be relied upon or used by Contractor in any attempt to assert liability against Railroad.

e. The provisions of this Section 8 shall survive the completion of any work performed by Contractor or the termination or expiration of this Agreement.

In no event shall this Section 8 or any other provision of this Agreement be deemed to limit any liability Contractor may have to any indemnified party by statute or under common law.

**Section 9. RESTORATION OF PROPERTY.**

In the event Railroad authorizes Contractor to take down any fence of Railroad or in any manner move or disturb any of the other property of Railroad in connection with the work to be performed by Contractor, then in that event Contractor shall, as soon as possible and at Contractor's sole expense, restore such fence and other property to the same condition as the same were in before such fence was taken down or such other property was moved or disturbed. Contractor shall remove all of Contractor's tools, equipment, rubbish and other materials from Railroad's property promptly upon completion of the work, restoring Railroad's property to the same state and condition as when Contractor entered thereon.

**Section 10. WAIVER OF DEFAULT.**

Waiver by Railroad of any breach or default of any condition, covenant or agreement herein contained to be kept, observed and performed by Contractor shall in no way impair the right of Railroad to avail itself of any remedy for any subsequent breach or default.

**Section 11. MODIFICATION - ENTIRE AGREEMENT.**

No modification of this Agreement shall be effective unless made in writing and signed by Contractor and Railroad. This Agreement and the exhibits attached hereto and made a part hereof constitute the entire understanding between Contractor and Railroad and cancel and supersede any prior negotiations, understandings or agreements, whether written or oral, with respect to the work to be performed by Contractor.

**Section 12. ASSIGNMENT - SUBCONTRACTING.**

Contractor shall not assign or subcontract this Agreement, or any interest therein, without the written consent of the Railroad. Contractor shall be responsible for the acts and omissions of all subcontractors. Before Contractor commences any work, the Contractor shall, except to the extent prohibited by law; (1) require each of its subcontractors to include the Contractor as "Additional Insured" in the subcontractor's Commercial General Liability policy and Business Automobile policies with respect to all liabilities arising out of the subcontractor's performance of work on behalf of the Contractor by endorsing these policies with ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage; (2) require each of its subcontractors to endorse their Commercial General Liability Policy with "Contractual Liability Railroads" ISO Form CG 24 17 10 01 (or a substitute form providing equivalent coverage) for the job site; and (3) require each of its subcontractors to endorse their Business Automobile Policy with "Coverage For Certain Operations In Connection With Railroads" ISO Form CA 20 70 10 01 (or a substitute form providing equivalent coverage) for the job site.

**EXHIBIT C**
**TO**
**CONTRACTOR'S**
**RIGHT OF ENTRY AGREEMENT**

**Union Pacific Railroad Company**
**Insurance Provisions For**
**Contractor's Right of Entry Agreement**

Contractor shall, at its sole cost and expense, procure and maintain during the course of the Project and until all Project work on Railroad's property has been completed and the Contractor has removed all equipment and materials from Railroad's property and has cleaned and restored Railroad's property to Railroad's satisfaction, the following insurance coverage:

**A.** **Commercial General Liability** insurance. Commercial general liability (CGL) with a limit of not less than $5,000,000 each occurrence and an aggregate limit of not less than $10,000,000. CGL insurance must be written on ISO occurrence form CG 00 01 12 04 (or a substitute form providing equivalent coverage).

The policy must also contain the following endorsement, which must be stated on the certificate of insurance:

- Contractual Liability Railroads ISO form CG 24 17 10 01 (or a substitute form providing equivalent coverage) showing "Union Pacific Railroad Company Property" as the Designated Job Site.
- Designated Construction Project(s) General Aggregate Limit ISO Form CG 25 03 03 97 (or a substitute form providing equivalent coverage) showing the project on the form schedule.

**B.** **Business Automobile Coverage** insurance. Business auto coverage written on ISO form CA 00 01 10 01 (or a substitute form providing equivalent liability coverage) with a combined single limit of not less $5,000,000 for each accident and coverage must include liability arising out of any auto (including owned, hired and non-owned autos).

The policy must contain the following endorsements, which must be stated on the certificate of insurance:

- Coverage For Certain Operations In Connection With Railroads ISO form CA 20 70 10 01 (or a substitute form providing equivalent coverage) showing "Union Pacific Property" as the Designated Job Site.
- Motor Carrier Act Endorsement - Hazardous materials clean up (MCS-90) if required by law.

**C.** **Workers' Compensation and Employers' Liability** insurance. Coverage must include but not be limited to:

- Contractor's statutory liability under the workers' compensation laws of the state where the work is being performed.
- Employers' Liability (Part B) with limits of at least $500,000 each accident, $500,000 disease policy limit $500,000 each employee.

If Contractor is self-insured, evidence of state approval and excess workers compensation coverage must be provided. Coverage must include liability arising out of the U. S. Longshoremen's and Harbor Workers' Act, the Jones Act, and the Outer Continental Shelf Land Act, if applicable.

The policy must contain the following endorsement, which must be stated on the certificate of insurance:

- Alternate Employer endorsement ISO form WC 00 03 01 A (or a substitute form providing equivalent coverage) showing Railroad in the schedule as the alternate employer (or a substitute form providing equivalent coverage).

**D.** **Railroad Protective Liability** insurance. Contractor must maintain Railroad Protective Liability insurance written on ISO occurrence form CG 00 35 12 04 (or a substitute form providing equivalent coverage) on behalf of Railroad as named insured, with a limit of not less than $5,000,000 per occurrence and an aggregate of $10,000,000. A binder stating the policy is in place must be submitted to Railroad before the work may be commenced and until the original policy is forwarded to Railroad.

**E.** **Umbrella or Excess** insurance. If Contractor utilizes umbrella or excess policies, these policies must "follow form" and afford no less coverage than the primary policy.

**F.** **Pollution Liability** insurance**.** Pollution liability coverage must be written on ISO form Pollution Liability Coverage Form Designated Sites CG 00 39 12 04 (or a substitute form providing equivalent liability coverage), with limits of at least $5,000,000 per occurrence and an aggregate limit of $10,000,000.

If the scope of work as defined in this Agreement includes the disposal of any hazardous or non-hazardous materials from the job site, Contractor must furnish to Railroad evidence of pollution legal liability insurance maintained by the disposal site operator for losses arising from the insured facility accepting the materials, with coverage in minimum amounts of $1,000,000 per loss, and an annual aggregate of $2,000,000.

**Other Requirements**

**G.** All policy(ies) required above (except worker's compensation and employers liability) must include Railroad as "Additional Insured" using ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage). The coverage provided to Railroad as additional insured shall, to the extent provided under ISO Additional Insured Endorsement CG 20 26, and CA 20 48 provide coverage for Railroad's negligence whether sole or partial, active or passive, and shall not be limited by Contractor's liability under the indemnity provisions of this Agreement.

**H.** Punitive damages exclusion, if any, must be deleted (and the deletion indicated on the certificate of insurance), unless the law governing this Agreement prohibits all punitive damages that might arise under this Agreement.

**I.** Contractor waives all rights of recovery, and its insurers also waive all rights of subrogation of damages against Railroad and its agents, officers, directors and employees. This waiver must be stated on the certificate of insurance.

**J.** Prior to commencing the work, Contractor shall furnish Railroad with a certificate(s) of insurance, executed by a duly authorized representative of each insurer, showing compliance with the insurance requirements in this Agreement.

**K.** All insurance policies must be written by a reputable insurance company acceptable to Railroad or with a current Best's Insurance Guide Rating of A- and Class VII or better, and authorized to do business in the state where the work is being performed.

**L.** The fact that insurance is obtained by Contractor will not be deemed to release or diminish the liability of Contractor, including, without limitation, liability under the indemnity provisions of this Agreement. Damages recoverable by Railroad from Contractor or any third party will not be limited by the amount of the required insurance coverage.

**EXHIBIT D**
**TO**
**CONTRACTOR'S RIGHT OF ENTRY AGREEMENT**

**MINIMUM SAFETY REQUIREMENTS**

The term "employees" as used herein refer to all employees of Contractor as well as all employees of any subcontractor or agent of Contractor.

## I. Clothing

A. All employees of Contractor will be suitably dressed to perform their duties safely and in a manner that will not interfere with their vision, hearing, or free use of their hands or feet.

Specifically, Contractor's employees must wear:

(i) Waist-length shirts with sleeves.
(ii) Trousers that cover the entire leg. If flare-legged trousers are worn, the trouser bottoms must be tied to prevent catching.
(iii) Footwear that covers their ankles and has a defined heel. Employees working on bridges are required to wear safety-toed footwear that conforms to the American National Standards Institute (ANSI) and FRA footwear requirements.

B. Employees shall not wear boots (other than work boots), sandals, canvas-type shoes, or other shoes that have thin soles or heels that are higher than normal.

C. Employees must not wear loose or ragged clothing, neckties, finger rings, or other loose jewelry while operating or working on machinery.

## II. Personal Protective Equipment

Contractor shall require its employees to wear personal protective equipment as specified by Railroad rules, regulations, or recommended or requested by the Railroad Representative.

(i) Hard hat that meets the American National Standard (ANSI) Z89.1 – latest revision. Hard hats should be affixed with Contractor's company logo or name.
(ii) Eye protection that meets American National Standard (ANSI) for occupational and educational eye and face protection, Z87.1 – latest revision. Additional eye protection must be provided to meet specific job situations such as welding, grinding, etc.
(iii) Hearing protection, which affords enough attenuation to give protection from noise levels that will be occurring on the job site. Hearing protection, in the form of plugs or muffs, must be worn when employees are within:

- 100 feet of a locomotive or roadway/work equipment
- 15 feet of power operated tools
- 150 feet of jet blowers or pile drivers
- 150 feet of retarders in use (when within 10 feet, employees must wear dual ear protection – plugs and muffs)
-

(iv) Other types of personal protective equipment, such as respirators, fall protection equipment, and face shields, must be worn as recommended or requested by the Railroad Representative.

## III. On Track Safety

Contractor is responsible for compliance with the Federal Railroad Administration's Roadway Worker Protection regulations – 49CFR214, Subpart C and Railroad's On-Track Safety rules. Under 49CFR214, Subpart C, railroad contractors are responsible for the training of their employees on such regulations. In addition to the instructions contained in Roadway Worker Protection regulations, all employees must:

(i) Maintain a distance of twenty-five (25) feet to any track unless the Railroad Representative is present to authorize movements.
(ii) Wear an orange, reflectorized workwear approved by the Railroad Representative.
(iii) Participate in a job briefing that will specify the type of On-Track Safety for the type of work being performed. Contractor must take special note of limits of track authority, which tracks may or may not be fouled, and clearing the track. Contractor will also receive special instructions relating to the work zone around machines and minimum distances between machines while working or traveling.

## IV. Equipment

A. It is the responsibility of Contractor to ensure that all equipment is in a safe condition to operate. If, in the opinion of the Railroad Representative, any of Contractor's equipment is unsafe for use, Contractor shall remove such equipment from Railroad's property. In addition, Contractor must ensure that the operators of all equipment are properly trained and competent in the safe operation of the equipment. In addition, operators must be:

- Familiar and comply with Railroad's rules on lockout/tagout of equipment.
- Trained in and comply with the applicable operating rules if operating any hy-rail equipment on-track.
- Trained in and comply with the applicable air brake rules if operating any equipment that moves rail cars or any other railbound equipment.

B. All self-propelled equipment must be equipped with a first-aid kit, fire extinguisher, and audible back-up warning device.

C. Unless otherwise authorized by the Railroad Representative, all equipment must be parked a minimum of twenty-five (25) feet from any track. Before leaving any equipment unattended, the operator must stop the engine and properly secure the equipment against movement.

D. Cranes must be equipped with three orange cones that will be used to mark the working area of the crane and the minimum clearances to overhead powerlines.

## V. General Safety Requirements

A. Contractor shall ensure that all waste is properly disposed of in accordance with applicable federal and state regulations.

B. Contractor shall ensure that all employees participate in and comply with a job briefing conducted by the Railroad Representative, if applicable. During this briefing, the Railroad Representative will specify safe work procedures, (including On-Track Safety) and the potential hazards of the job. If any employee has any questions or concerns about the work, the employee must voice them during the job briefing. Additional job briefings will be conducted during the work as conditions, work procedures, or personnel change.

C. All track work performed by Contractor meets the minimum safety requirements established by the Federal Railroad Administration's Track Safety Standards 49CFR213.

D. All employees comply with the following safety procedures when working around any railroad track:

(i) Always be on the alert for moving equipment. Employees must always expect movement on any track, at any time, in either direction.
(ii) Do not step or walk on the top of the rail, frog, switches, guard rails, or other track components.
(iii) In passing around the ends of standing cars, engines, roadway machines or work equipment, leave at least 20 feet between yourself and the end of the equipment. Do not go between pieces of equipment of the opening is less than one car length (50 feet).
(iv) Avoid walking or standing on a track unless so authorized by the employee in charge.
(v) Before stepping over or crossing tracks, look in both directions first.
(vi) Do not sit on, lie under, or cross between cars except as required in the performance of your duties and only when track and equipment have been protected against movement.

E. All employees must comply with all federal and state regulations concerning workplace safety.

**MODOT TO IDOT PLAN AND PAY ITEM CONVERSION**

The following table depicts all pay items associated with the bridge portion of the contract and the corresponding IDOT pay item number.

| IDOT ITEM NO. | ITEM DESCRIPTION |
|---|---|
| MD000010 | CLASS 1 EXCAVATION |
| MD000240 | TEMPORARY SHORING |
| MD000020 | DRILLED SHAFTS (6 FT. 6 IN. DIA.) |
| MD000030 | ROCK SOCKETS (6 FT. 0 IN. DIA.) |
| MD000040 | SUPPL. TV CAMERA INSPECTION |
| MD000050 | FOUNDATION INSPECTION HOLES |
| MD000060 | CONCRETE CORING |
| MD000070 | SONIC LOGGING TESTING |
| MD000080 | CLASS B CONCRETE (Substructure) |
| MD000090 | SLAB ON STEEL |
| MD000100 | BARRIER CURB (TYPE D) |
| MD000110 | REINFORCING STEEL (BRIDGES) |
| MD000120 | MECHANICAL BAR SPLICE |
| MD000250 | STANDPIPE |
| MD000130 | REINFORCING STEEL (EPOXY COATED) |
| MD000140 | PROTECTIVE COATING - CONCRETE BENTS AND PIERS (EPOXY) |
| MD000150 | TEMPORARY COATING - CONCRETE BENTS AND PIERS (WEATHERING STEEL) |
| MD000160 | FABRICATED STRUCTURAL LOW ALLOY STEEL (MISC) |
| MD000170 | FABRICATED STRUCTURAL LOW ALLOY STEEL (PL GIRDER) A709 GRADE 50W |
| MD000180 | FABRICATED STRUCTURAL LOW ALLOY STEEL (PL GIRDER) A709 GRADE HPS70W |
| MD000200 | DRAINAGE SYSTEM (ON STRUCTURE) |
| MD000210 | POT BEARING |
| MD000220 | MODULAR EXPANSION JOINT |

**CLASS 1 EXCAVATION**

Description. This work shall consist of the necessary excavation for the crashwalls associated with Pier 20 (EB and WB) and Pier 21(EB and WB) as shown in the bridge plans. Work shall be performed in accordance with the applicable portions of Sec 206, the bridge plans, and as herein specified.

Method of Measurement. Measurement of class 1 excavation will be made to the nearest 1/2 cubic yard (0.5 $m^3$) for each structure of that volume of material actually removed from within the limits established in this section. The volume measured will be limited by vertical planes 18 inches (450 mm) outside of and parallel with the neat lines of the footings. The upper limits of the volume measured will be the existing ground. The lower limits of the volume measured will be the bottom of the footings, bottom of seal courses, or 18 inches (450 mm) below the bottom of tie beams and overhangs. Excavation for columns above drilled shafts will be class 1 excavation, with measurement made of the volume of material actually removed above the top of the drilled shaft. The volume measured will not exceed that of a cylinder having a diameter 36 inches (900 mm) greater than that of the column above the drilled shaft.

Excavation will not be measured above drilled shafts if the top of the drilled shaft is less than or equal to 3'0" below the ground surface at the centerline of the shaft. No measurement will be made of any material excavated for the drilled shaft below the top of casing elevation shown on the bridge plans.

Basis of Payment. All work described under this Special Provision will be paid for at the contract unit price per cubic yard for CLASS 1 EXCAVATION.

Payment for additional CLASS 1 EXCAVATION required to carry footings a maximum of 8 feet (2.5 m) below elevations shown on the bridge plans will be made at 125 percent of the contract unit price for that additional excavation within the limits of Class 1, and at 150 percent of the contract unit price for that additional excavation within the limits of Class 2 Excavation. Additional excavation required to carry footings a depth of more than 8 feet (2.5 m) below plan elevations will be considered changes in the work, and will be paid for in accordance with Article 104.02 of the Illinois Standard Specifications.

Payment will not be made for removal or replacement of foundation material that became unsuitable because of improper methods of construction by the Contractor. Payment for removal of inherently unsound material for foundation stabilization will be made at the contract unit price for excavation for structures. No payment will be made for any costs involved in replacing the volume below the foundations, except that the Contractor will be reimbursed for the delivered cost of the granular backfill when directed by the Engineer.

The accepted quantities of excavation for structures and porous backfill will be paid for at the contract unit price for each of the pay items included in the contract.

No direct payment will be made for removing existing structures within the limits of excavation for structures. Existing headwalls or culvert concrete to be removed will be paid for as removal of improvements for roadway culverts or partial removal of culvert concrete for bridge culverts.

Payment for seal courses other than those on the bridge plans will be made only with written authorization from the Engineer.

**TEMPORARY SHORING**

Description. This work shall consist of designing, furnishing, installing and subsequent removal of the temporary soil retention system according to the dimensions and details shown on the bridge plans and in the approved submittal.

General. The temporary soil retention system shall be designed by the Contractor as a minimum, to retain the exposed surface area specified in the bridge plans or as directed by the Engineer.

Submittals. The design calculations and details for the temporary soil retention system proposed by the Contractor shall be submitted to the Engineer for approval. Submittals shall be made in accordance with Article 105.04 of the IDOT Standard Specifications for Road and Bridge Construction, the bridge plans and as specified herein. The calculations shall be prepared, signed and sealed by an Illinois Licensed Structural Engineer. This approval will not relieve the Contractor of responsibility for the safety of the excavation.

Approval shall be contingent upon acceptance by all involved utilities and railroad companies.

Construction. The Contractor shall verify locations of all underground utilities before installing any of the soil retention system components or commencing any excavation. Any disturbance or damage to existing structures, utilities or other property, caused by the Contractor's operation, shall be repaired by the Contractor in a manner satisfactory to the Engineer at no additional cost to the Department. The soil retention system shall be installed according to the Contractor's approved design, or as directed by the Engineer, prior to commencing any related excavation. If unable to install the temporary soil retention system as specified in the Contractor's approved submittal, the Contractor shall have the adequacy of the design re-evaluated by an Illinois Licensed Structural Engineer. Any reevaluation shall be submitted to the Engineer for approval prior to commencing the excavation adjacent to the area in question. The Contractor shall not excavate below the maximum excavation line shown in the Contractor's approved submittal without the prior permission of the Engineer.

The temporary soil retention system shall remain in place until the Engineer determines it is no longer required. The temporary soil retention system shall be removed and disposed of by the Contractor when directed by the Engineer. The Contractor shall not leave any portion of the temporary soil retention system in place. Removed system components shall become the property of the Contractor.

When an obstruction is encountered, the Contractor shall notify the Engineer and upon concurrence of the Engineer, the Contractor shall begin working to break up, push aside, or remove the obstruction. An obstruction shall be defined as any object (such as but not limited to, boulders, logs, old foundations etc.) where its presence was not obvious or specifically noted on the bridge plans prior to bidding, that cannot be driven or installed through or around, with normal driving or installation procedures, but requires additional excavation or other procedures to remove or miss the obstruction.

Basis of Payment. All costs for furnishing material, labor, equipment, construction, drainage and other incidental work necessary to complete temporary shoring construction; and subsequent removal of any temporary shoring, berms, diversions, and any other items necessary to complete the work as shown on the drawings and as specified herein will be considered completely covered in the contract unit price per lump sum for TEMPORARY SHORING regardless of construction method.

Obstruction mitigation shall be paid for according to Article 109.04 of the IDOT Standard Specifications for Road and Bridge Construction.

Any temporary shoring installed beyond those dimensions shown on the bridge plans or the approved Contractor's design without the written permission of the Engineer and the railroad companies shall be performed at the Contractor's own risk at no additional expense to the contract.

**DRILLED SHAFTS (6 FT. 6 IN. DIA.)**

Description. This work shall be performed in accordance with the applicable portions of Sec 701, the bridge plans, and as herein specified.

Submittals. Submittals shall be made in accordance with Article 105.04 of the IDOT Standard Specifications for Road and Bridge Construction, the bridge plans and as specified herein.

Required submittals for qualifications and procedures shall be in accordance with Sec 701.2.

If self-consolidating concrete is used in lieu of Class B-2 concrete, the mix design shall be submitted to IDOT's Bureau of Materials at least 45 days prior to its use in accordance with Sec 701.3.1.1.

Shop drawings for permanent steel casings shall be prepared in accordance with Sec 1080 and shall be submitted to the IDOT Bureau of Bridges and Structures, Rm. 240, 2300 S. Dirksen Pkwy, Springfield, IL 62764 prior to the installation of the casings.

Materials. Use of spiral welded pipe for permanent casing shall not be permitted under any circumstances. There shall be no exceptions.

Concrete for the drilled shafts shall have a design strength, $f'_c$ = 5,500 psi at 28 days.

Construction. The Contractor shall verify locations of all underground utilities before installing any of the drilled shaft components or commencing any excavation. Any disturbance or damage to existing structures, utilities or other property, caused by the Contractor's operation, shall be repaired by the Contractor in a manner satisfactory to the Engineer at no additional cost to the Department.

When an obstruction is encountered, the Contractor shall notify the Engineer and upon concurrence of the Engineer, the Contractor shall begin working to break up, push aside, or remove the obstruction. An obstruction shall be defined as any object (such as but not limited to, boulders, logs, old foundations etc.) where its presence was not obvious or specifically noted on the plans prior to bidding, that cannot be driven or installed through or around, with normal driving or installation procedures, but requires additional excavation or other procedures to remove or miss the obstruction.

Method of Measurement. Accepted drilled shafts will be measured for payment to the nearest 0.10 linear foot (0.05 m) of length along the axis of each shaft complete-in-place. For shafts without a rock socket, measurement will be from the top of the casing elevation as shown in the bridge plans to the bottom of the shaft. For shafts with a rock socket, measurement will be from the top of the casing elevation as shown in the bridge plans to the top of the rock socket. "Top of the rock socket" will be defined as the upper elevation at which sound rock occurs across the entire width of the shaft, as determined by the Engineer.

Basis of Payment. This work will be paid for at the contract unit price per linear foot for DRILLED SHAFTS (6 FT. 6 IN. DIA.), irrespective of the character of the material actually encountered during excavation. Payment will be considered full compensation for all steel casing required, costs of drilling, excavation, slurry, cleaning, an acceptable method of inspection as required, furnishing and placing concrete, grouting and incidental work and material required by the contract documents. No additional compensation will be made for concrete required to fill an oversized casing or for oversized excavation. If the method of construction requires that drilled shaft casing be seated into the sound rock such that the bottom of the casing is below the determined top of sound rock elevation, payment for excavation below the top of the sound rock layer (top of the rock socket) will be included in the payment for the rock socket.

If sound rock is encountered within the excavation at which point a rock auger, core barrel or other rock-removing specialty tool must be used by the Contractor before the top of the sound rock elevation to be used as "top of the rock socket" is confirmed by the Engineer, that work will be paid for as ROCK SOCKETS (6 FT. 0 IN. DIA.)

The cost of any required excavation down to the top of the drilled shafts will be considered completely covered by the contract unit price for DRILLED SHAFTS (6 FT. 6 IN. DIA.), unless noted otherwise in the bridge plans.

Payment for excavation below the top of the sound rock layer (top of the rock socket) will be included in the payment for ROCK SOCKETS (6 FT. 0 IN. DIA.). If sound rock is encountered within the excavation at which point a rock auger, core barrel or other rock-removing specialty tool must be used by the Contractor before the top of the sound rock elevation to be used as "top of the rock socket" is confirmed by the Engineer, that work will be paid for as ROCK SOCKETS (6 FT. 0 IN. DIA.).

Reinforcement furnished and installed will be paid for at the contract unit price per pound for REINFORCING STEEL (BRIDGES).

Mechanical bar splices will be paid for at the contract unit price per each for MECHANICAL BAR SPLICE.

If evidence of poor welding is found, radiographing or other non-destructive testing of welds required by the Engineer will be noncompensable and any effect on time of performance nonexcusable.

Mitigation of obstructions shall be paid for according to Article 109.04 of the IDOT Standard Specifications for Road and Bridge Construction.

**ROCK SOCKETS (6 FT. 0 IN. DIA.)**

Description. This work shall be performed in accordance with the applicable portions of Sec 701 and as herein specified.

Method of Measurement. Accepted rock sockets will be measured for payment to the nearest 0.10 linear foot (0.05 m) of length along the axis of each rock socket in-place from the top of the rock socket to the bottom of the rock socket as built. "Top of the rock socket" will be defined as the upper elevation at which sound rock occurs across the entire width of the shaft, as determined by the Engineer. In the event that additional rock socket construction is directed by the Engineer, the additional length will be measured to the nearest 0.10 linear foot (0.05 m).

Basis of Payment. This work will be paid for at the contract unit price per linear foot for ROCK SOCKETS (6 FT. 0 IN. DIA.). Payment will be considered full compensation for drilling, excavation, slurry, cleaning, dewatering, an acceptable method of inspection as required, furnishing and placing concrete and incidental work and material according to the contract documents. For payment purposes the length of any rock socket installed and accepted shall be paid for at the contract unit price per linear foot (m) for the diameter of the rock socket specified, irrespective of the character of the material actually encountered during excavation.

In the event that the Engineer orders additional rock socket construction, payment for the additional length will be at the rate of 150 percent of the contract unit price per linear foot (m) of rock socket up to a maximum additional length of 8 feet (2 m). Any work necessary to extend the length of the rock socket more than the additional 8 feet (2 m) will be paid for as changes in the work in accordance with Article 104.02 of the IDOT Standard Specifications for Road and Bridge Construction. Payment at the adjusted rate will be considered full compensation for the additional excavation into rock, all additional concrete, except reinforcing steel, including any and all splices, and all incidentals necessary to complete the work down to the elevation designated by the Engineer.

Reinforcement furnished and installed will be paid for at the contract unit price per pound for REINFORCING STEEL (BRIDGES).

**SUPPLEMENTARY TELEVISION CAMERA INSPECTION**

Description. This work shall consist of providing additional television inspections of the drilled shafts, rock sockets or steel casings as required by the Engineer. Work will be in accordance with Sec 701.4.10 and as herein specified.

Method of Measurement. Any additional television inspections required by the Engineer due to extending the rock socket to a greater depth or when supplementary inspections are required by the Engineer and no defects are found, will be measured for payment as SUPPLEMENTARY TELEVISION CAMERA INSPECTION, per each.

Basis of Payment. Payment for one complete television camera inspection of each shaft, including the rock socket when applicable, shall be included in the payment for DRILLED SHAFTS (6 FT. 6 IN. DIA.). Any additional television inspections required by the Engineer due to extending the rock socket to a greater depth, or when supplementary inspections are required by the Engineer and no defects are found, will be paid for at the contract unit price for SUPPLEMENTARY TELEVISION CAMERA INSPECTION, per each. Payment will not be made for supplementary television camera inspections that reveal defects due to the Contractor's operation. Payment for television camera inspection will be considered full compensation for moving in equipment, flushing turbid water from the shaft, conducting the actual scanning as specified, furnishing video tape, removing equipment, and all tools, labor and any incidentals necessary to complete the work. The number of supplementary television camera inspections may vary from the estimated quantities, but the contract unit price shall prevail regardless of the variation.

**FOUNDATION INSPECTION HOLES**

Description. This work will be required for the drilled shafts with rock sockets and consist of the drilling or coring of holes, packaging the samples or cores, laboratory testing, and delivering the cores to IDOT. The work will be performed in accordance with Sec 701.4.11 and as herein specified.

Method of Measurement. Measurement for payment for foundation inspection holes will be to the nearest 0.10 linear foot (0.05 m) of length along the axis of each hole by the linear foot (m).

For shafts designed in side friction, measurement will be from the top of the rock socket to the bottom of the foundation inspection hole. For shafts designed in end bearing, measurement will be from the bottom of the rock socket to the bottom of the foundation inspection hole. If the Engineer directs foundation inspection borings more than 10 feet (3.0 m) below the anticipated bottom of the rock socket elevation as shown on the bridge plans, measurement for payment for that portion of the boring in excess of 10 feet (3.0 m) below anticipated bottom of the rock socket elevation as shown on the bridge plans will be to the nearest 0.10 linear foot (0.05 m) of excess.

Basis of Payment. This work will be paid for at the contract unit price per linear foot for FOUNDATION INSPECTION HOLES. Payment shall be considered full compensation for drilling or coring the holes, extracting and packaging the samples or cores, laboratory testing, delivering the samples or cores to the specified location and for all other expenses necessary to complete the work. If the Engineer directs foundation inspection borings more than 10 feet (3 m) below the anticipated bottom of rock socket elevation as shown on the bridge plans, payment for that portion of the boring in excess of 10 feet (3 m) below the anticipated bottom of the rock socket elevation as shown on the bridge plans will be at the rate of 150 percent of the contract price per linear foot (m) of excess. If, for shafts designed in end bearing, the foundation inspection hole is drilled prior to shaft construction or prior to rock socket excavation, coring of the rock above the bottom of the rock socket will be noncompensable.

**CONCRETE CORING**

Description. This work shall be in accordance with the applicable portions of Sec 701 and as herein specified.

Method of Measurement. Measurement for payment for concrete cores will be to the nearest 0.10 linear foot (0.05 m) of length along the axis of the shaft from the top of concrete to a point as determined by the Engineer, and may extend the entire length of the shaft plus one foot (300 mm) below the bottom of the rock socket.

Basis of Payment. This work shall be paid for at the contract unit price per linear foot for CONCRETE CORING. Payment will be considered full compensation for all material, labor, tools, equipment, grouting and incidentals necessary to complete the work. The number of feet (m) of cored holes may vary from the estimated quantities, but the contract unit price shall prevail regardless of the variation.

**SONIC LOGGING TESTING**

Description. Sonic logging testing shall be done on each completed drilled shaft and rock socket. Work shall be performed in accordance with the applicable portions of Sec 701 and as herein specified.

Method of Measurement. Sonic logging testing of drilled shafts, as required, will be measured for payment per each.

Basis of Payment. This work shall be paid for at the contract unit price per each for SONIC LOGGING TESTING. No payment will be made for supplementary sonic logging testing to evaluate defects. Payment for SONIC LOGGING TESTING will be considered full compensation for providing all equipment, access pipes, conducting the actual probing measurements as specified, furnishing reports, removing equipment, and all tools, labor and any incidentals necessary to complete the work. The number of sonic logging inspections may vary from the estimated quantities, but the contract unit price shall prevail regardless of the variation.

**CLASS B CONCRETE (SUBSTRUCTURE)**

Description. This work shall be done in accordance with Sec 703 and Sec 706 and as herein specified.

Submittals. Submittals shall be made in accordance with Article 105.04 of the IDOT Standard Specifications for Road and Bridges, the bridge plans, and as specified herein.

Detailed plans for falsework, prepared, signed and sealed by an Illinois Licensed Structural Engineer, shall be submitted to the Engineer in accordance with Sec 703.3.1.

Concrete mix design shall be submitted to the Engineer in accordance with Sec 501.3.

Method of Measurement. Final measurement will not be made unless changes from bridge plans are authorized by the Engineer during construction, or appreciable errors are found in the contract quantity. The revision or correction will be computed and added to or deducted from the contract quantity. Where required, quantities for concrete masonry will be computed from dimensions shown on the bridge plans, or as revised in writing by the Engineer because of changes to the bridge plans or due to appreciable errors, and will be computed to the nearest 1/10 cubic yard (0.1 $m^3$) for each structure. No deduction will be made for the space occupied by reinforcing steel, conduit or piles. Deductions will be made for the space occupied by the tubes in voided slabs.

Measurement of concrete quantities used to fill cavities or crevices will be made for the accepted quantity placed below the authorized elevation of the structure footing.

Basis of Payment. This work shall be paid for at the contract unit price per cubic yard for CLASS B CONCRETE (SUBSTRUCTURE). No direct payment will be made for incidental items necessary to complete the work unless specifically provided as a pay item in the contract documents. No direct payment will be made for concrete required to fill overbreak where footings or walls are cast against vertical faces of rock or shale excavation.

The accepted quantity of concrete used to fill cavities or crevices below final authorized bottom elevation of the footing structure will be paid for per Section 109 of the IDOT Standard Specifications for Road and Bridge Construction.

Reinforcement furnished and installed will be paid for at the contract unit price per pound for REINFORCING STEEL (BRIDGES).

Mechanical bar splices will be paid for at the contract unit price per each for MECHANICAL BAR SPLICE.

Protective coating as shown in the bridge plans will be paid for at the contract unit price per lump sum for PROTECTIVE COATING – CONCRETE BENTS AND PIERS (EPOXY).

Temporary protective coating for protection of staining due to weathering steel shall be paid for at the contract unit price per lump sum for TEMPORARY COATING – CONCRETE BENTS AND PIERS (WEATHERING STEEL).

**SLAB ON STEEL**

Description. This item shall include all work necessary to complete the bridge deck, including prestressed precast panels, bedding material, conventional forms, falsework, all concrete, and coated and uncoated reinforcing steel. Work shall be in accordance with applicable portions of Sec 703, Sec 705 and Sec 706 and as herein specified.

Submittals. Submittals shall be made in accordance with Article 105.04 of the IDOT Standard Specifications for Road and Bridge Construction, the bridge plans and as specified herein.

Shop drawing requirements for the prestressed deck panels shall be in accordance with Sec 1029.6.1. Shop drawings shall be submitted to the IDOT Bureau of Bridges and Structures, Rm. 240, 2300 S. Dirksen Pkwy, Springfield, IL 62764 for approval.

Concrete mix design for the deck pour shall be submitted to the Engineer in accordance with Sec 501.3. Deviation from the deck pour sequence shown in the bridge plans shall require that the Contractor submit a written request and shall be subject to the approval of the Engineer in accordance with Sec 703.3.3.4.

Construction. The planks shall be at least 60 days old at the time the deck is poured. The Contractor shall furnish a quantity of planking equal to a minimum of 105% of the theoretical area needed to form the deck in order to account for a time delay due to possible damage to the planking during shipping, handling and/or placement.

In addition to requirements set forth in Sec 1029, the following shall apply:

Cast-in-place deck concrete and reinforcement bars shall be placed according to the plans and these special provisions. Particular emphasis shall be placed on proper vibration of the concrete to avoid honeycombs and voids, especially at construction joints and at ends of planks.

Prior to placement of the concrete over the planks, the surface of the planks shall be clean and free of all foreign material and shall be saturated with water.

Method of Measurement. Final measurement will not be made unless changes from bridge plans are authorized by the Engineer during construction, or appreciable errors are found in the contract quantity. No additional measurement will be made for the quantity of planking in excess of the theoretical area needed to form the deck to account for possible damage to the planking during shipping and handling. The revision or correction will be computed and added to or deducted from the contract quantity.

Where required, slab on steel shall be measured for payment in place and the area computed in square yards. The dimensions used will not exceed those shown on the bridge plans or ordered in writing by the Engineer.

Basis of Payment. This work shall be paid for at the contract unit price per square yard for SLAB ON STEEL. Payment will be considered full compensation for all prestressed panels, bedding material, stay-in-place forms, conventional forms, falsework, furnishing and placing concrete, coated and uncoated reinforcing steel, surface sealing, incidental work, tools, equipment and labor required to construct the bridge deck in accordance with the contract documents. No additional payment will be made for the quantity of planking in excess of the theoretical area needed to form the deck to account for possible damage to the planking during shipping and handling.

**BARRIER CURB (TYPE D)**

Description. This work shall consist of constructing Type D barrier curb as shown in the bridge plans. Work shall be in accordance with applicable portions of Sec 617 and Sec 703 and as herein specified.

Submittals. Submittals shall be in accordance with Article 105.04 of the IDOT Standard Specifications for Road and Bridge Construction, the bridge plans, and as specified herein.

Concrete mix design shall be submitted to the Engineer in accordance with Sec 501.3.

Electric Raceway Rough-In At Light Blisters

This work shall include the installation of all electrical items necessary to provide a light blister rough-in for the general roadway lighting systems. This work shall include, but not be limited to; PVC coated rigid aluminum raceways and other work as shown on the bridge plans, or as required and as specified herein. All work shall be performed and fully comply with the specifications and details of IDOT and the National Electrical Code, and other regulatory agencies as applicable.

All light blister rough-in raceway shall be PVC coated rigid aluminum, sized as specified, and in accordance with the National Electrical Code. All materials shall be UL listed for the application used.

Provide threaded rough-in conduits with watertight threaded caps, the threaded surface shall be coated when fitting up so that there will not be unprotected surfaces exposed.

Assembly of PVC coated rigid aluminum rough-in shall be as required and recommended by the manufacturer. Special tools or equipment required for the assembly shall be obtained from the manufacturer. At the completion of this project, all special tools or equipment purchased shall be turned over to IDOT.

All surface damage, scratches, abrasions etc. to the PVC coated rigid aluminum rough-in conduit and fittings etc. shall be repaired as recommended by, and furnished by the manufacturer.

Rough-in conduit minimum size shall be 1-1/2".

Method of Measurement. Final measurement will not be made except for authorized changes during construction, or where appreciable errors are found in the contract quantity. The revision or correction will be computed and added to or deducted from the contract quantity. Where required, measurement for each type of permanent concrete traffic barrier, including barrier height transitions, will be made to the nearest 1/2 linear foot (0.1 m) for each continuous length and totaled to the nearest linear foot (0.5 m) for the sum of the lengths.

Electric raceway rough-in at light blisters, including anchor rods, hardware, additional forming, and additional concrete will not be measured.

Basis of Payment. Accepted concrete traffic barrier will be paid for at the contract unit price per linear foot for BARRIER CURB (TYPE D). No direct payment will be made for reinforcing steel, dowels, joint filler material, sawed joints, or stenciling of structure identification numbers.

No separate payment will be made for electric raceway rough-in at light blisters, including anchor rod, hardware, forming, and additional concrete. The cost of the electric raceway rough-in will be considered completely covered by the contract unit price for BARRIER CURB (TYPE D).

No direct payment will be made for traffic barrier delineators provided on new permanent concrete traffic barrier or temporary traffic barrier.

**REINFORCING STEEL (BRIDGES)**

Description. This work shall consist of furnishing and placing reinforcing steel of the designated size, shape and grade as shown on the bridge plans. Reinforcing steel in bridge deck and Type D barrier is not included in this item. Work shall be done in accordance with Sec 706 and as herein specified.

Method of Measurement. Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. Where required, measurement of reinforcing steel will be made to the nearest 10 pounds (5 kg) for each structure. The weight (mass) will be the plan weight (mass) of uncoated bars, and will not include mechanical bar splice systems, clips, wire, supports, spacers or other fastening devices for holding the reinforcement in place. Allowances will not be made for an overrun in scale weights (masses) of bars. The revision or correction will be computed and added to or deducted from the contract quantity.

Basis of Payment. The accepted quantity of reinforcing steel shall be paid for at the contract unit price per pound for REINFORCING STEEL (BRIDGES).

Approved mechanical bar splices as required will be paid for at the contract unit price per each for MECHANICAL BAR SPLICE.

**MECHANICAL BAR SPLICE**

Description. This work shall consist of furnishing and installing mechanical splices as shown in the bridge plans and as specified herein.

Materials and Procedures. The mechanical connection may be made by means of an approved mechanical splicer. Splicer bar type systems lapped with the primary reinforcement will not be allowed. The mechanical splicer shall develop in tension at least 125 percent of the specified yield strength of the bar.

Where mechanical bar splices are shown in the bridge plans, they shall be used. Substitution with lap splices is not acceptable.

When both reinforcement bars being spliced are epoxy coated the mechanical splicer shall also be epoxy coated according to AASHTO M284.

Contact the IDOT Bureau of Materials for a current list of approved mechanical reinforcing bar splicer/coupler systems.

Installation. The Contractor shall supply the manufacturer's written installation instructions to the Engineer prior to installing the mechanical splices.

Reinforcing bar lengths shown in the bill of reinforcing steel may require modification to accommodate the specific mechanical bar splice system that will be used. The Contractor shall determine the actual reinforcing bar lengths to accommodate the manufacturer's recommendations for installation of the mechanical bar splices.

Testing. A minimum of two tension tests will be made with the method of splicing selected on each size bar to be spliced. The Contractor shall furnish certified copies of the test reports from an independent testing laboratory.

Method of Measurement. Mechanical bar splice systems will be measured per each.

Basis of Payment. This work will be paid for at the contract unit price each for MECHANICAL BAR SPLICE.

**STANDPIPE**

Description. The work under this item consists of furnishing, fabricating and installing the dry standpipe and the items necessary to complete the standpipe as shown in the bridge plans and as specified herein.

Submittals. Submittals shall be in accordance with Article 105.04 of the IDOT Standard Specifications for Road and Bridge Construction, the bridge plans, and as specified herein.

Detailed shop drawings of the dry standpipe shall be prepared and submitted to the IDOT Bureau of Bridges and Structures, Rm. 240, 2300 S. Dirksen Pkwy, Springfield, IL 62764. Shop drawings shall be in accordance with Sec 1080. Catalog data may be furnished for components that are standard manufactured items in lieu of detailed drawings provided governing dimensions are given.

Materials. The Hydrant Top at Pier 18 WB shall have two (2) 2-1/2" National Standard Hose Threads and one (1) 4" National Standard Thread hose connections horizontally aligned along the front. Each connection shall have its own valve and stem assembly. Hydrant top shall meet or exceed the requirements of AWWA C503.

The Hose Connection at Pier 22WB shall be a Double Clapper Siamese Connection. Connection shall be double drop clapper with (2) pin lug swivel inlets that can provide 500 gpm minimum (250 gpm minimum per inlet). Connection shall be cast brass rated up to at least 175 psi and branded "STANDPIPE". Outlet shall be 6" and the 2 inlets shall be 2-1/2" NH (NST) Female connections.

All hose connection and fire department connection threads shall be tested to verify their compatibility with threads used by the local fire department. The test shall consist of threading hydrant top connections and double clapper Siamese connections onto local fire department equipment to verify compatibility prior to installation. The local fire departments shall include

The drain valve at Pier 18WB shall be an Automatic Drain (Ball Drip) Valve meeting UL1726, spring loaded, with a 1/2" NPT threaded end rated for at least 175 psi. Valve shall be designed to be and shall be installed in the vertical position.

The drain valve at Pier 22WB shall either be stainless steel or brass full port 1/4 turn ball valve and shall be rated for at least 175 psi. The valve shall be installed so that the handle is facing downward in the fully open position.

The pipe and fittings shall be joined by Flexible or Rigid Couplings except as noted on the bridge plans for the drain valves which shall be Outlet Couplings and shall be hot-dipped galvanized to ASTM A-153. Rigid Couplings shall only be used in straight run sections and where full pipe lengths cannot be supported.

Flexible Couplings shall be: Victaulic Style 75, Gruvlok 7000, or Grinnell 705
Rigid Couplings shall be: Victaulic Style 07, Gruvlok 7401, or Grinnell 772
Outlet Couplings shall be: Victaulic Style 72, Gruvlok 7042, or Grinnell 702

All pipes shall be schedule 40 hot-dipped galvanized meeting the requirements of ASTM-A53, NFPA 14 and shall be Factory Mutual approved. Pipe shall have grooved ends compatible with the couplings and prepared per the coupling manufacturers specifications.

All fittings shall be ductile iron conforming to ASTM A-536, Grade 64-45-12 and have grooved ends compatible with the couplings. Fittings shall be hot-dipped galvanized conforming to ASTM A-153.

Riser Clamp shall be stainless steel or galvanized steel that complies with Federal Specification A-A-1192A (Type 42), ANSI/MSS SP-69 and MSS SP-58 (Type 42). Clamp shall be a minimum thickness of 5/16".

The Contractor shall furnish a manufacturer's certification to the Engineer for each lot furnished, certifying that the materials supplied are in accordance with all requirements specified. The certification shall include results of all required tests. Acceptance of the material will be based on the manufacturer's certification and upon results of such tests as may be performed by the engineer. The certification shall show the quantity and lot number it represents.

Construction Requirements. The standpipe shall be sloped to drain to the hose connection at Pier 22WB and to the automatic drain valve at Pier 18WB. The standpipe shall be supported at each cross frame member and shall be loose fitting in the U Bolt hanger. No pipe length should be left unsupported between any two Flexible Couplings.

Testing. Following system installation, the standpipe system shall be tested hydrostatically with water at not less than 300 psi of pressure for 2 hours. The hydrostatic test pressure shall be measured at the low elevation point of the system, located at the hose connection at Pier 22 near the ground.

The automatic drain (ball drip) valve at the top of Pier 18 shall be removed and the outlet plugged for the hydrostatic test. Upon successful hydrostatic testing, the automatic drain valve at Pier 18 which was removed, shall be re-installed.

Inspection and tests shall be made by the Contractor's representative and witnessed by the Engineer. All defects shall be corrected and the system left in a serviceable condition before the Contractor's personnel finally leave the job. Documentation of the inspection shall be in accordance with "Contractor's Material and Test Certificate for Aboveground Piping," incorporated herein.

The standpipe system shall show no leakage at any time during the hydrostatic test. Any leaks found during the hydrostatic test shall be repaired at no additional cost to the contract. The hydrostatic pressure test shall be repeated until no leakage occurs at any time during the hydrostatic test.

Basis of Payment. Payment for the above described work, including all material, equipment, testing, labor and any other incidental work items will be considered completely covered under the contract lump sum price for STANDPIPE.

# Contractor's Material and Test Certificate for Aboveground Piping

**Standpipe System NFPA 14**

**PROCEDURE**

Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

| | | |
|---|---|---|
| PROPERTY NAME | | DATE |
| PROPERTY ADDRESS | | |
| PLANS | ACCEPTED BY APPROVING AUTHORITIES (NAMES) | |
| | ADDRESS | |
| | INSTALLATION CONFORMS TO ACCEPTED PLANS | ☐ YES ☐ NO |
| | EQUIPMENT USED IS APPROVED OR LISTED | ☐ YES ☐ NO |
| | IF NO, EXPLAIN DEVIATIONS | |
| TYPE OF SYSTEM | AUTOMATIC-DRY | ☐ YES |
| | AUTOMATIC-WET | ☐ YES |
| | SEMIAUTOMATIC-DRY | ☐ YES |
| | MANUAL-DRY | ☐ YES |
| | MANUAL-WET | ☐ YES |
| | COMBINATION STANDPIPE/SPRINKLER | ☐ YES |
| | OTHER, IF YES EXPLAIN | ☐ YES |
| WATER SUPPLY DATA USED FOR DESIGN AND AS SHOWN ON PLANS | FIRE PUMP DATA | |
| | MANUFACTURER _____ MODEL _____ | |
| | TYPE: ☐ ELECTRIC ☐ DIESEL ☐ OTHER, EXPLAIN _____ | |
| | RATED GPM _____ RATED PSI _____ SHUT-OFF PSI _____ | |
| WATER SUPPLY SOURCE CAPACITY, GALLONS | PUBLIC WATER-WORKS SYSTEM ☐ STORAGE TANK ☐ GRAVITY TANK ☐ OPEN RESERVOIR ☐ | |
| | OTHER ☐ EXPLAIN | |
| IF PUBLIC WATERWORKS SYSTEM: | STATIC PSI _____ RESIDUAL PSI _____ FLOW IN GPM _____ | |
| HAVE COPIES OF THE FOLLOWING BEEN LEFT ON THE PREMISES? | ☐ SYSTEM COMPONENTS INSTRUCTIONS ☐ CARE AND MAINTENANCE OF SYSTEM ☐ NFPA 25 | |
| | ☐ COPY OF ACCEPTED PLANS ☐ HYDRAULIC DATA/CALCULATIONS | |
| SUPPLIES BUILDING(S) | MAIN WATERFLOW SHUT-OFF LOCATION _____ | |
| | NUMBER OF STANDPIPE RISERS _____ | |
| | DO ALL STANDPIPE RISERS HAVE BASE OF RISER SHUT-OFF VALVES? | ☐ YES ☐ NO |
| VALVE SUPERVISION | LOCKED OPEN ☐ SEALED AND TAGGED ☐ TAMPERPROOF SWITCH ☐ OTHER ☐ IF OTHER, _____ | |
| PIPE AND FITTINGS | TYPE OF PIPE _____ | |
| | TYPE OF FITTINGS _____ | |
| BACKFLOW PREVENTOR | A) DOUBLE CHECK ASSEMBLY ☐ SIZE _____ MAKE AND MODEL _____ | |
| | B) REDUCED-PRESSURE DEVICE ☐ | |

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**CONTROL VALVE DEVICE**

| TYPE | SIZE | MAKE | MODEL |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

TIME TO TRIP THROUGH REMOTE HOSE VALVE _____ MIN ____ SEC WATER PRESSURE _____ AIR PRESSURE _____
TIME WATER REACHED REMOTE HOSE VALVE OUTLET _____ MIN _____ SEC TRIP POINT AIR PRESSURE _____ PSI
ALARM OPERATED PROPERLY ☐ YES ☐ NO IF NO, EXPLAIN _____

TIME WATER REACHED REMOTE HOSE VALVE OUTLET _____ MIN _____ SEC
HYDRAULIC ACTIVATION ☐ YES
ELECTRIC ACTIVATION ☐ YES
PNEUMATIC ACTIVATION ☐ YES
MAKE AND MODEL OF ACTIVATION DEVICE _____
EACH ACTIVATION DEVICE TESTED ☐ YES ☐ NO IF NO, EXPLAIN _____

EACH ACTIVATION DEVICE OPERATED PROPERLY ☐ YES ☐ NO IF NO, EXPLAIN _____

**PRESSURE-REGULATING DEVICE**

| LOCATION & FLOOR | MODEL | NONFLOWING (PSI) INLET | NONFLOWING (PSI) OUTLET | FLOWING (PSI) INLET | FLOWING (PSI) OUTLET | GPM |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

ALL HOSE VALVES ON SYSTEM OPERATED PROPERLY ☐ YES ☐ NO IF NO, EXPLAIN _____

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| | | | |
|---|---|---|---|
| TEST DESCRIPTION | HYDROSTATIC: HYDROSTATIC TESTS SHALL BE MADE AT NOT LESS THAN 200 PSI (13.6 BAR) FOR 2 HOURS OR 50 PSI (3.4 BAR) ABOVE STATIC PRESSURE IN EXCESS OF 150 PSI (10.2 BAR) FOR 2 HOURS. DIFFERENTIAL DRY PIPE VALVE CLAPPERS SHALL BE LEFT OPEN DURING TEST TO PREVENT DAMAGE. ALL ABOVEGROUND PIPING LEAKAGE SHALL BE STOPPED.<br>PNEUMATIC: ESTABLISH 40 PSI (2.7 BAR) AIR PRESSURE AND MEASURE DROP, WHICH SHALL NOT EXCEED 1½ PSI (0.1 BAR) IN 24 HOURS. TEST PRESSURE TANKS AT NORMAL WATER LEVEL AND AIR PRESSURE AND MEASURE AIR PRESSURE DROP, WHICH SHALL NOT EXCEED 1½ PSI (0.1 BAR) IN 24 HOURS. | | |
| TESTS | ALL PIPING HYDROSTATICALLY TESTED AT _____ PSI FOR _____ HRS<br>DRY PIPING PNEUMATICALLY TESTED ☐ YES ☐ NO<br>EQUIPMENT OPERATES PROPERLY ☐ YES ☐ NO | IF NO, STATE REASON | |
| | DO YOU CERTIFY AS THE STANDPIPE CONTRACTOR THAT ADDITIVES AND CORROSIVE CHEMICALS, SODIUM SILICATE, OR DERIVATIVES OF SODIUM SILICATE, BRINE, OR OTHER CORROSIVE CHEMICALS WERE NOT USED FOR TESTING SYSTEMS OR STOPPING LEAKS? ☐ YES ☐ NO | | |
| | DRAIN TEST | READING OF GAUGE LOCATED NEAR WATER SUPPLY TEST CONNECTION _____ PSI | RESIDUAL PRESSURE WITH VALVE IN TEST CONNECTION OPEN WIDE _____ PSI |
| | UNDERGROUND MAINS AND LEAD-IN CONNECTIONS TO SYSTEM RISERS FLUSHED BEFORE CONNECTION MADE TO STANDPIPE PIPING.<br>VERIFIED BY COPY OF THE U FORM NO. 85B ☐ YES ☐ NO OTHER EXPLAIN<br>FLUSHED BY INSTALLER OF UNDER-GROUND STANDPIPE PIPING ☐ YES ☐ NO | | |
| BLANK TESTING | NUMBER USED | LOCATIONS | NUMBER REMOVED |
| WELDING | WELDED PIPING ☐ YES ☐ NO | | |
| | IF YES . . . | | |
| | DO YOU CERTIFY AS THE STANDPIPE CONTRACTOR THAT WELDING PROCEDURES COMPLY WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3 ☐ YES ☐ NO<br>DO YOU CERTIFY THAT THE WELDING WAS PERFORMED BY WELDERS QUALIFIED IN COMPLIANCE WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3 ☐ YES ☐ NO<br>DO YOU CERTIFY THAT WELDING WAS CARRIED OUT IN COMPLIANCE WITH A DOCUMENTED QUALITY CONTROL PROCEDURE TO ENSURE THAT ALL DISCS ARE RETRIEVED, THAT OPENINGS IN PIPING ARE SMOOTH, THAT SLAG AND OTHER WELDING RESIDUE ARE REMOVED, AND THAT THE INTERNAL DIAMETERS OF PIPING ARE NOT PENETRATED ☐ YES ☐ NO | | |
| CUTOUTS (DISCS) | DO YOU CERTIFY THAT YOU HAVE A CONTROL FEATURE TO ENSURE THAT ALL CUTOUTS (DISCS) ARE RETRIEVED? ☐ YES ☐ NO | | |
| HYDRAULIC DATA NAMEPLATE | NAME PLATE PROVIDED ☐ YES ☐ NO IF NO, EXPLAIN | | |
| REMARKS | DATE LEFT IN SERVICE WITH ALL CONTROL VALVES OPEN: | | |
| NAME OF SPRINKLER/ STANDPIPE CONTRACTOR | NAME OF CONTRACTOR _____<br>ADDRESS _____<br>STATE LICENSE NUMBER (IF APPLICABLE) _____ | | |
| SYSTEM OPERATING TEST WITNESSED BY | PROPERTY OWNER _____ TITLE _____ DATE _____<br>SPRINKLER/STANDPIPE CONTRACTOR _____ TITLE _____ DATE _____<br>APPROVING AUTHORITIES _____ TITLE _____ DATE _____ | | |
| ADDITIONAL EXPLANATION AND NOTES | | | |

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**REINFORCING STEEL (EPOXY COATED)**

Description. This work shall consist of furnishing and placing epoxy-coated reinforcing steel of the size, shape and grade as shown on the bridge plans. Reinforcing steel in the bridge deck and barrier curb is not included in this item. Work shall be in accordance with applicable portions of Sec 706 and Sec 710 and as herein specified.

Method of Measurement. Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. Where required, measurement of reinforcing steel will be made to the nearest 10 pounds (5 kg) for each structure. The weight (mass) will be the plan weight (mass) of uncoated bars, and will not include mechanical bar splice systems, clips, wire, supports, spacers or other fastening devices for holding the reinforcement in place. Allowances will not be made for an overrun in scale weights (masses) of bars. The revision or correction will be computed and added to or deducted from the contract quantity.

Basis of Payment. The accepted quantity of epoxy-coated reinforcing steel complete in place will be paid for at the contract unit price per pound for REINFORCING STEEL (EPOXY COATED).

Approved mechanical bar splices as shown in the bridge plans will be paid for at the contract unit price per each for MECHANICAL BAR SPLICE.

Repair of damaged epoxy coating in accordance with Sec 710.3.3 shall be at the Contractor's expense.

**PROTECTIVE COATING - CONCRETE BENTS AND PIERS (EPOXY)**

Description. This work shall consist of the surface preparation and application of protective coatings for sealing and protecting concrete elements as shown in the bridge plans. Work shall be in accordance with Sec 711 and as herein specified.

Basis of Payment. This work shall be paid for at the contract unit price per lump sum for PROTECTIVE COATING – CONCRETE BENTS AND PIERS (EPOXY).

**TEMPORARY COATING – CONCRETE BENTS AND PIERS (WEATHERING STEEL)**

Description. This work shall consist of the surface preparation and application of a temporary clear coating for protection of staining from weathering steel. It shall be applied to all concrete surfaces above the ground line in accordance with Sec 711 and as herein specified.

Basis of Payment. This work shall be paid for at the contract unit price per lump sum for TEMPORARY COATING – CONCRETE BENTS AND PIERS (WEATHERING STEEL).

**FABRICATED STRUCTURAL LOW ALLOY STEEL (MISC); FABRICATED STRUCTURAL LOW ALLOY STEEL (PLATE GIRDER) A709, GRADE 50W; FABRICATED STRUCTURAL LOW ALLOY STEEL (PLATE GIRDER) A709, GRADE HPS70W**

Description. This work shall consist of furnishing the fabricated steel and the field construction of the bridge structures as shown on the bridge plans. Work shall be in accordance with Sec 712, the bridge plans and as herein specified.

Submittals. Submittals shall be made in accordance with Article 105.04 of the IDOT Standard Specifications for Road and Bridge Construction, the bridge plans and as specified herein.

Shop drawings for structural steel, miscellaneous structural steel, bearings and expansion joints shall be in accordance with Sec 1080 and shall be submitted to the design consultant, Crawford, Murphy and Tilly, Inc., 2750 West Washington St., Springfield, IL 62702.

An erection plan shall be completed, signed and sealed by an Illinois Licensed Structural Engineer in accordance with Sec 712.5 and submitted to the Engineer.

New welding procedures shall be prepared as a written procedure specification and submitted to the Engineer in accordance with Sec 1080.3.2.2.

Method of Measurement. Payment for structural steel and wrought iron weights (masses) will be based on contract plan quantities. The theoretical weight (mass) of the various sections will be used to compute the contract plan quantities of the material incorporated in the completed structure. No allowance will be made for overrun in scale weights (masses) or for erection bolts, excess field bolts or similar items, or the weight (mass) of any coating, galvanizing or weld material.

The weight (mass) of steel bolts for steel-to-steel connections will be included in the contract plan quantities for fabricated structural steel on the basis of following weights (masses) per 100 bolts:

| Bolt Weights[a] | |
|---|---|
| English | |
| Bolt Size (in.) | Weight (lb) |
| 5/8 | 40 |
| 3/4 | 65 |
| 7/8 | 95 |
| 1 | 135 |

| Metric | |
|---|---|
| Bolt Size (mm) | Mass (kg) |
| M16 | 15 |
| M20 | 30 |
| M22 | 43 |
| M24 | 55 |
| M27 | 75 |
| M30 | 00 |

[a]These specified weights (masses) will be considered to cover the head, nut, any required washers and only that part of the bolt extending outside the grip of steel.

The weight (mass) of bolts connecting steel to concrete or timber will be included for payment as fabricated structural steel, and the full weight of the bolts will be computed.

Castings will be computed on the basis of the theoretical weight (mass) of the material in the completed structure, and no allowance will be made for overrun in scale weights (masses) or for the weight (mass) of any coating material, galvanizing material or other protective coatings.

Weights (masses) of structural steel, wrought iron and castings will be computed to the nearest 10 pounds (5 kg) of the total weight (mass) of each class of material in the completed structure.

Measurement will not be made when the contract specifies units of measurement per lump sum.

A steel bar dam shall consist of the complete assembly on both sides of the expansion joint and will be considered a unit.

The weight (mass) of shear connectors will be based on the theoretical weight (mass) and will be included for payment in the weight (mass) of material to which the connectors are attached.

Basis of Payment. Cross frames, end diaphragms, and associated bolts shall be paid for at the contract unit price per pound for FABRICATED STRUCTURAL LOW ALLOW STEEL (MISC). Grade 50W plate girder steel, splice plates and bolts for field splices, intermediate and bearing stiffeners, and shear studs shall be paid for at the contract unit price per pound for FABRICATED STRUCTURAL LOW ALLOW STEEL (PLATE GIRDER) A709, GRADE 50W. Grade HPS 70W plate girder steel shall be paid for at the contract unit price per pound for FABRICATED STRUCTURAL LOW ALLOW STEEL (PLATE GIRDER) A709, GRADE HPS70W. Payment will be based on plan quantities. Any change in the contract plan quantities based on approved change orders will be paid for at the contract unit price. Payment for the shop prime coat, including inaccessible areas, will be included in the cost of fabricated structural steel, and no direct payment will be made. No direct payment will be made for coating bolted field connections, touch-up, galvanizing, applying protective coating to machined surfaces or for cleaning coatings and rust streaks from finished concrete.

Bolts for attaching timber members to any part of a structure will be classified as hardware and no direct payment will be made.

Payment for surface preparation and applying field coatings to the structural steel, if specified as a contract item, will be based on the contract plan quantities. Any change in the contract plan quantities, based on approved change orders, will be paid for at the contract unit price. If no contract item is specified for surface preparation or applying field coatings, no direct payment will be made. Payment for the shop applied coatings, including inaccessible areas, will be considered completely covered by the cost of the fabricated structural steel. No direct payment will be made for the surface preparation or applying field coatings to the bearings, diaphragms, stiffeners and all other miscellaneous steel within the limits of surface preparation or of the field coatings. No direct payment will be made for stencils, paint and painting specified in Sec 1081. No direct payment will be made for field touch-ups specified in Sec 1081.

**DRAINAGE SYSTEM (ON STRUCTURE)**

Description. The work under this item consists of furnishing, fabricating and installing the drainage items necessary to complete the entire drainage system as shown on the bridge plans and as specified herein.

Submittals. Submittals shall be made in accordance with Article 105.04 of the IDOT Standard Specifications for Road and Bridge Construction, the bridge plans and as specified herein.

Detailed shop drawings of the drainage system shall be prepared and submitted to the IDOT Bureau of Bridges and Structures, Rm. 240, 2300 S. Dirksen Pkwy, Springfield, IL 62764. Shop drawings shall be in accordance with Sec 1080. Catalog data may be furnished for components that are standard manufactured items in lieu of detailed drawings, providing governing dimensions are given.

Materials. Scupper outlets and grates shall be equivalent to IDOT DS-12 as detailed in the plans. All castings shall conform to AASHTO M 306. All cast iron parts shall be gray iron conforming to the requirements of AASHTO M 105. A fabricated outlet and grate of similar size and in accordance with the requirements for ASTM A 709 Grade 36 (250) steel may be submitted for approval. Castings shall be galvanized in accordance with ASTM A 385. Steel outlets and grates shall be galvanized in accordance with ASTM A 123.

Reinforced fiberglass pipe, collection basins and fittings shall be a Reinforced Thermosetting Resin Pipe (RTRP) system in accordance with the requirements of ASTM D 2996. The RTRP system shall have a minimum short time rupture strength hoop tensile stress of 30,000 psi (207 MPa). The RTRP system shall be pigmented resin throughout the wall. The color of the RTRP system shall be concrete gray or as specified on the bridge plans. The RTRP system shall not be coated with paint, gel-coat or any other exterior coating.

The Contractor shall furnish a manufacturer's certification to the Engineer for each lot furnished, certifying that the materials supplied is in accordance with all requirements specified. The certification shall include results of all required tests. Acceptance of the material will be based on the manufacturer's certification and upon results of such tests as may be performed by the Engineer. The certification shall show the quantity and lot number it represents.

Construction Requirements. All connections shown on the bridge plans to facilitate future removal for maintenance cleanout or flushing shall be made with a threaded gasket coupler system, bolted gasket flange system or a female to male threaded PVC plug. Adhesive bonded joints will be permitted for runs of pipe between such connections.

Runs of pipe shall be supported at a spacing of not greater than the lesser of those as recommended by the manufacturer of the pipe or as shown on the bridge plans. Supports that have point contact or narrow supporting areas shall be avoided. Standard sling, clamp, clevis hangers and shoe supports designed for use with steel pipe may be used. Minimum hanger thickness shall be 3/16 inch (5 mm) with the minimum strap width for the pipe sizes shown in the table below. Straps shall have 120 degree minimum contact with the pipe. Pipe supported on a surface with less than 120 degrees of contact shall have a split fiberglass pipe protective sleeve bonded in place with adhesive. All new steel, hangers and miscellaneous hardware for drainage system shall be ASTM A 709 Grade 36 (250) steel except as noted on the bridge plans.

All new steel, hangers and miscellaneous hardware for drainage system shall be galvanized in accordance with ASTM A 153 except as noted on the bridge plans.

| Pipe Sizes inches (mm) | Minimum Strap Width inches (mm) |
|---|---|
| 3 (76.2) | 1.25 (32) |
| 4 (101.6) | 1.25 (32) |
| 6 (152.4) | 1.50 (38) |
| 8 (203.2) | 1.75 (45) |
| 10 (254.0) | 1.75 (45) |
| 12 (304.8) | 2.00 (51) |
| 14 (355.6) | 2.00 (51) |

The RTRP system shall be handled and installed in accordance with guidelines and procedures as recommended by the manufacturer.

Basis of Payment. Payment for the above described work, including all material, equipment, labor and any other incidental work necessary, will be considered completely covered under the contract lump sum price for “DRAINAGE SYSTEM (ON STRUCTURE)”.

**POT BEARING**

Description. This item shall include furnishing and installing complete-in-place factory produced rotational guided expansion bearings and rotational fixed floating bearings in accordance with details shown on the bridge plans and this special provision. The term HLMR (High-Load Multi-Rotational) bearing shall be considered interchangeable with POT or Disc bearing.

Submittals. Submittals shall be made in accordance with Article 105.04 of the IDOT Standard Specifications for Road and Bridge Construction, the bridge plans and as specified herein.

Shop drawings shall be prepared in accordance with Sec 1080. Shop drawings shall be submitted to the design consultant, Crawford, Murphy and Tilly, Inc., 2750 West Washington St., Springfield, IL 62702.

Materials. Material requirements, tolerances, finishes and other details for these bearings are prescribed on the bridge plans and in this special provision.

General. Standard manufactured HLMR bearings meeting all contract requirements for materials, movement and loads shall be utilized. The bearing shall be capable of resisting a lateral load as shown on the bridge plans. Masonry plates shall be designed for a maximum load of 1,000 psi (6.9 MPa).

A center bar guide system may be used in lieu of an exterior guide bar system to meet plan requirements, provided the guide and keyway have mating surfaces of stainless steel and Teflon. For either system, provisions shall be made to accommodate the total transverse movements as shown on the bridge plans before the guides are engaged. The fixed bearing shall also provide for the total transverse movements as shown on the bridge plans.

For both expansion and fixed bearings, the transverse movement indicated on the bridge plans is due to thermal effects and no additional movement beyond what is specified on the bridge plans shall be allowed. Provisions shall be made for the transverse guidance mechanism to allow equal movements, one-half of total movement, due to thermal expansion and contraction at 60°F (16°C). The guidance mechanism shall be adjusted appropriately for temperatures different than 60°F (16°C).

Any modifications required to meet the height of bearings shown on bridge plans will be the responsibility of the Contractor. Cost of any modification required shall be borne by the Contractor.

Polytetrafluoroethylene (PTFE) Requirements. PTFE sliding surfaces for expansion bearings are designed to translate or rotate by sliding of a self-lubricating PTFE surface across a smooth hard mating surface of stainless steel. The unfilled or filled PTFE sliding surfaces shall have 3/64-inch (1.0 mm) minimum thickness and 3/32-inch (2.0 mm) maximum thickness.

| Maximum Coefficient of Friction (PTFE to stainless steel as furnished) | |
|---|---|
| At 75% of Capacity | 0.03 |
| At 25% of Capacity | 0.05 |

The PTFE sliding surface shall be bonded under factory controlled conditions to a rigid back-up material capable of resisting any bending stresses to which the sliding surfaces may be subjected. Alternatively, PTFE material of twice the thickness specified above may be recessed for half its thickness in the back-up material.

The mating stainless steel surface to the PTFE shall be an accurate flat surface as required by the design and shall have a minimum Brinell hardness of 125 and a surface finish of less than 20 micro inches (0.508 µm) rms. The mating surfaces shall completely cover PTFE surface in all operating positions of the bearing. Stainless steel used as a mating surface shall be seal welded around its entire perimeter.

PTFE Resin. The virgin PTFE resin, filled or unfilled PTFE sheets, back-up materials and all other parts of the fixed or expansion bearings shall have the friction, mechanical and physical properties prescribed in this specification, or as shown on the bridge plans. PTFE resin shall be virgin material in accordance with ASTM D 4895. Specific gravity shall be 2.13 to 2.19. Melting point shall be ±623°F (±327°C).

Filler Material. Filler material when used shall be milled glass fibers, carbon or other approved inert filler materials.

Adhesive Material. Adhesive material shall be an epoxy resin in accordance with Federal Specification MMA-A-134.

Unfilled PTFE Sheet. Finished unfilled PTFE sheet shall be made from virgin PTFE resin and in accordance with the following requirements.

| Properties | Value | Test Method |
|---|---|---|
| Tensile Strength, psi (MPa) min. | 2800 (19.3) | ASTM D 4895 |
| Elongation, percent, min. | 200 | ASTM D 4895 |

Filled PTFE Sheet. Filled PTFE sheet shall be made from virgin PTFE resin uniformly blended with inert filler material. Finished filled PTFE sheets containing glass fiber or carbon shall be in accordance with the following requirements.

| Mechanical Requirements | | | |
|---|---|---|---|
| Properties | 15% Glass Fibers | 25% Carbon | Test Method |
| Tensile Strength, psi (MPa) min. | 2000 (13.8) | 1300 (9.0) | ASTM D 4895 |
| Elongation, percent, min. | 150 | 75 | ASTM D 4895 |

| Physical Requirements | | | |
|---|---|---|---|
| Properties | 15% Glass Fibers | 25% Carbon | Test Method |
| Specific Gravity, min. | 2.20 | 2.10 | ASTM D 792 |
| Melting Point, °F (°C) | 81 ±18 (27 ±10) | 621 ±18 (327 ±10) | ASTM D 4895 |

Surface Treatment. Where PTFE sheets are to be epoxy bonded, one side of the PTFE sheet shall be factory treated by an approved manufacturer by the sodium ammonia or sodium naphthalene process.

Stainless Steel Mating Surface. Stainless steel mating surfaces, when used, shall be 16-gage minimum thickness and in accordance with ASTM A 240 Type 304 with a surface finish of less than 20 micro inches (0.500 µm) rms. Stainless steel mating surfaces shall be polished or rolled as necessary to meet the friction requirements of this specification.

Structural Carbon Steel. Base plates, sole plates, guide bars, and other bridge bearing components shall be constructed of structural steel in accordance with ASTM A 709 Grade 36 (250) and shop coated a prime coat of the coating system as specified on the bridge plans to provide a minimum dry film thickness of 5 mils (125 µm) in accordance with Sec 1081.

Elastomeric Components. The neoprene elastomer shall be 50 Durometer in accordance with Sec 1038 and dimensions as shown on the bridge plans.

Guiding Arrangements. Guiding arrangements shall have Teflon to stainless steel sliding surfaces.

Fabrication. Fabrication of all parts of the bearing shall be in strict accordance with the approved shop drawings. The clearance between guide bar and bearing of all guided bearings shall be maintained in strict compliance with the bridge plans.

During the welding procedure of the stainless steel plates to the top plate and guide bars the surface of the stainless steel plates shall be protected from weld splatter.

The bonding of the PTFE sheets shall be performed at the factory of the bearing manufacturer of the expansion bearing under controlled conditions and in accordance with the written instructions of the manufacturer of the approved adhesive system.

After completion of the bonding operation, the PTFE surface shall be smooth and free from bubbles. Filled PTFE surfaces shall then be polished.

Testing and Acceptance. Each manufactured lot of bearing assemblies shall be accompanied by a manufacturer's certificate stating that the steel, neoprene elastomer and PTFE material are in accordance with this specification and shall show the actual test results for the materials used in the manufacturing of the bearings. Acceptance of bearing assemblies will be based on satisfactory manufacturer's certification, acceptable test results and inspection at the time of installation.

The manufacturer shall furnish facilities for the test and inspection of the completed bearings, representative samples at the plant or at an independent test facility.

A random sample from the production lot of bearings shall be tested. As soon as all bearings have been manufactured for a given project, notification shall be given to the Engineer.

The test method and equipment shall be approved by the Engineer and include the following requirements.

(a) The test shall be arranged so that the coefficient of friction of the first movement of the manufactured bearing can be determined.

(b) The bearing surface shall be cleaned prior to testing, upon instructions of the bearing manufacturer.

(c) The test shall be conducted at maximum working stress for the PTFE working surface with the test load applied continuously for 12 hours prior to measuring friction.

(d) The first movement static and dynamic coefficient of friction of the test bearing shall be determined at a sliding speed or less than one inch (25 mm) per minute and shall not exceed the coefficient of friction for design.

(e) The bearing specimen shall then be subjected to 100 movements of at least one inch (25 mm) of relative movement and if the test facility permits, the full design movement at a speed of less than one foot (305 mm) per minute. Following this test, the static and kinetic coefficient of friction shall be determined again and shall not exceed the values measured in requirement (d). The bearing or specimen shall show no sign of bond failure or other defects.

(f) A proof load test shall be performed on a sample selected at random from the production lot, by applying load equal to 150 percent of the design capacity of the bearing for a period of one hour. The test bearing shall show no sign of failure or other defects while under load or subsequently upon disassembly and inspection.

Bearings represented by the test specimen passing the above requirements will be approved for use in the structure subject to on-site inspection for visible defects.

Packaging. The bearings shall be packaged and crated in such a manner that they will be protected from dust and moisture, and not become damaged while being handled, transported or stored.

The Contractor shall replace any bearing damaged during handling, transporting or storing at no expense to the Department.

Construction Requirements. The bridge bearings are not designed to accept bending stresses and shall be fully supported over the entire area of the bottom and upper surfaces at all times when under load.

The bearing base plate shall be set to line and grade. The Contractor shall locate the bearings at the proper elevation and orient them in the proper direction. The Engineer will approve the location and orientation of the bearing. The upper part of the bearing shall be located relative to the base of the bearing according to the Engineer's recommendations for the temperature at the time of erection.

If for any reason the bearings are disassembled, extreme care shall be used to insure that the rubber pads and piston rings are properly seated in the recess with the piston ring gaps 180 degrees apart.

It is necessary to exercise care in aligning both the base and upper part of the guided expansion bearing parallel to the axis of the structure, otherwise a wedging action will occur and unsought horizontal forces will result.

The Contractor shall align all bearings on any one pier exactly to the direction as shown on the bridge plans.

The Contractor shall avoid scratching, gouging or otherwise marking the PTFE or mating stainless steel surfaces of the bearings during handling or erection. The Contractor shall use whatever means are necessary to protect the bearings from dirt, grout or other foreign materials during the construction of other elements of the structure.

Method of Measurement. Measurement will be made per each. The POT bearing, complete in place, shall include the steel sole plate, masonry plate, POT bearing pad, anchor bolts, heavy hexagon nuts and washers, coating and any incidental material needed to complete the work.

Basis of Payment. Payment for the above described work, including all material, equipment, labor, and any other incidental work necessary to complete this item, will be considered completely covered by the contract unit price for POT BEARING.

**MODULAR EXPANSION JOINT**

Description. This work shall consist of furnishing materials, services, labor, tools, equipment, and incidentals necessary to design, fabricate, inspect, test and install the expansion joint system as shown in the bridge plans and as specified herein.

General. The modular expansion joint system shall consist of multiple strip seal joints that shall allow movements as shown on the bridge plans. The configuration of the expansion joint system shall consist of neoprene strip seals mechanically held in place by steel edge and separation beams. Each separation beam shall be supported by independent multiple support bars, which are welded to the separation beams. The multiple support bars shall be suspended over the joint opening by sliding elastomeric bearings.

Scissor type modular expansion joint systems will not be permitted. An equidistant control system shall be incorporated that develops its maximum compressive force when the joint is at its maximum opening. The expansion joint system shall not incorporate any bolted connections between the separation beams and support bars. The final completed expansion joint system shall be continuous across the full width of the roadway and continue into the traffic barriers as shown on the bridge plans.

Qualified Manufacturers. The qualified manufacturer shall have a minimum of 5 years experience in designing and fabricating modular expansion joint systems and be certified as a minimum under the AISC certification program for "Major Steel Bridges". The following manufacturers are known suppliers of modular expansion joint systems:

D.S. Brown
300 East Cherry Street
North Baltimore, OH 45872
Telephone (419) 257-3561
www.dsbrown.com

D.S. TechStar, Inc.
1219 West Main Cross Street
Findlay, OH 45840
Telephone: (419) 424 0888
www.techstar-inc.com

Watson-Bowman & Acme Corp
95 Pineview Drive
Amherst, NY 14120
Phone (716) 691-7566
www.wbacorp.com

Design Requirements

Truck and Impact Loading. The modular expansion joint system shall be designed in accordance with the latest edition of AASHTO LRFD Bridge Design Specifications except that the LRFD truck loading shall be HS-20 Modified (HS-25) and impact being 100 percent. The modular expansion joint system shall be designed for the maximum number of lanes between the barrier curbs and the lane width shall be considered as 10 feet (3.05 m). The modular expansion joint system shall be designed such that the joint system is designed to support a wheel load being 12 inches (300 mm) from the roadway face of the curb.

Field Splices. The design and fabrication of the modular expansion joint system shall be one continuous unit without field splices

Movement. The modular expansion joint system shall be designed to provide the minimum total movement as noted on the bridge plans and to accommodate all expected longitudinal movements (i.e. thermal, creep, shrinkage, elastic shortening, etc.) as well as vertical and horizontal rotations. This design shall incorporate strip seal glands with a maximum movement range of 3.15 inches (80 mm) per seal.

Fatigue. The modular expansion joint system shall be tested and designed following the guidelines provided in the National Cooperative Highway Research Program (NCHRP), Report 402 “Fatigue Design of Modular Bridge Expansion Joints” as well as the provisions included in Chapter 14, “Joints and Bearings”, of the latest edition of AASHTO LRFD Bridge Design Specifications.

Water Tightness. After the modular expansion joint system has been completely installed, the joint shall be flooded for a minimum of one hour to a minimum depth of 3 inches (75 mm). Testing shall be done in stages with traffic flow maintained in accordance with the traffic control plans. If the Engineer observes leakage, the expansion joint system shall be repaired at the Contractor's expense. The repair procedure shall be as recommended by the manufacturer and approved by the Engineer.

Corrosion Protection. All steel surfaces, except as noted, shall be hot dip galvanized in accordance with AASHTO M 111 (ASTM A 123).

Anchorage of Expansion System. The modular expansion joint system anchorage shall be designed by the manufacturer and included in the design computations and shown in the shop drawings.

Material. All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows.

Structural Steel. Structural Steel shall be in accordance with AASHTO M 270, Grade 50 (345) (ASTM A 709, Grade 50 (345)). All shop-welded connections that splice the horizontal separation beams and edge beams shall be full penetration welds. All separation beams to support bar welded connections shall be full penetration welds in accordance with NCHRP Report 402 requirements. Aluminum components will not be permitted. All fabrication of structural steel shall be in accordance with Sec 712 and 1080.

Stainless Steel. The stainless steel shall be in accordance with Sec 1038.4.2.

Sliding Bearings. The sliding bearings shall be fabricated as steel reinforced elastomeric pads with polytetraflourethylene (PTFE) in accordance with Sec 1038 and as required by the manufacturer. The bearings shall be designed so that they are removable and replaceable.

Strip Seals and Lubricant Adhesive. Strip seals and lubricant adhesive shall be in accordance with Sec 717 and Sec 1073. The strip seals shall not protrude above the top of the joint.

Submittals

Submittals shall be made in accordance with Article 105.04 of the IDOT Standard Specifications for Road and Bridge Construction, the bridge plans and as specified herein.

Design Computations and Shop Drawings. The Contractor shall submit for review the design computations and shop drawings; all shall be signed, sealed and stamped by a licensed Structural Engineer in Illinois. The design computations shall include fatigue design and a strength design for all structural elements and connections. Shop drawings shall be prepared for the modular expansion joint system in accordance with Sec 1080 and shall be submitted to the design consultant, Crawford, Murphy and Tilly, Inc., 2750 West Washington St., Springfield, IL 62702.

The shop drawings shall also include the following:

(a) Plans, elevation, and section of the joint system for each movement rating and roadway width showing dimensions and tolerances.

(b) All ASTM, AASHTO or other material designations.

(c) Method of installation, including but not limited to sequence, setting relative to temperature, anchorage during setting and installation at curbs.

(d) Corrosion protection system.

(e) Details of temporary support for shipping and handling.

Maintenance Manual. The manufacturer shall submit to the Engineer a written maintenance manual and part replacement plan at the time of the shop drawing submission. Included in the submission shall be list of parts to be inspected, acceptable wear tolerances and the method of part replacement. The manufacturer shall conduct a pre-installation meeting to train IDOT's construction inspectors and MoDOT's maintenance personnel on the installation and maintenance of the modular expansion joint system.

Certificates of Compliance. The manufacturer shall provide certification of the manufacturer's experience, including a list of projects, and certificate of compliance with the AISC certification program, in accordance with the section on Qualified Manufacturers of this job special provision, to be submitted to the Engineer.

Construction Requirements. The expansion joint system shall be stored at the job site in accordance with the manufacturer's written recommendations. Damage to the joint system during shipping or handling will be cause for rejection of the joint system. Any damage to the corrosion protection system shall be repaired to the satisfaction of the Engineer at the Contractor's expense. The support boxes shall rest on cast-in-place concrete or grout pads installed into a preformed block out. Concrete shall be forced under and around support boxes, anchorage systems and supporting hardware. Proper consolidation shall be achieved by localized internal vibration. Installation of the modular expansion joint system shall be as recommended by the manufacturer. The Contractor shall obtain the services of a qualified technical representative, approved by the manufacturer of the expansion joint system and acceptable to the Engineer, to assist during the installation. The installation shall not occur without the qualified technical representative being present. The qualified technical representative shall have 3 years of experience working on installation of modular expansion joint systems on bridges. This experience shall also include modular joints that had field splices for staged construction.

Method of Measurement. Final measurement will not be made except for authorized changes during construction, or where appreciable errors are found in the contract quantity. Where required, the MODULAR EXPANSION JOINT will be measured to the nearest linear foot, based on measurement from the roadway face of curb to roadway face of curb along the centerline of the joint. Portions of the joint that extend past the roadway face of curbs will not be measured for payment. The revision or correction will be computed and added to or deducted from the contract quantity.

Basis of Payment. Modular expansion joint system, including all material, coating, equipment, labor, fabrication, installation, technical assistance and any other incidental work necessary to complete this work, will be paid for at the contract unit price for MODULAR EXPANSION JOINT.

**SECTION 106 MODOT CONTROL OF MATERIAL**

This Special Provision, SECTION 106 MoDOT CONTROL OF MATERIALS, shall take precedence over Article 106 of the Illinois "Standard Specifications for Road and Bridge Construction" for the following Special Provisions:

CLASS 1 EXCAVATION
TEMPORARY SHORING
DRILLED SHAFTS (6 FT. 6 IN. DIA.)
ROCK SOCKETS (6 FT. 0 IN. DIA.)
SUPPLEMENTARY TELEVISION CAMERA INSPECTION
FOUNDATION INSPECTION HOLES
CONCRETE CORING
SONIC LOGGING TESTING
CLASS B CONCRETE (SUBSTRUCTURE)
SLAB ON STEEL
BARRIER CURB (TYPE D)
REINFORCING STEEL (BRIDGES)
MECHANICAL BAR SPLICE
STANDPIPE
REINFORCING STEEL (EPOXY COATED)
PROTECTIVE COATING - CONCRETE BENTS AND PIERS (EPOXY)
TEMPORARY COATING – CONCRETE BENTS AND PIERS (WEATHERING STEEL)
FABRICATED STRUCTURAL LOW ALLOY STEEL (MISC)
FABRICATED STRUCTURAL LOW ALLOY STEEL (PLATE GIRDER) A709, GRADE 50W
FABRICATED STRUCTURAL LOW ALLOY STEEL (PLATE GIRDER) A709, GRADE HPS70W
DRAINAGE SYSTEM (ON STRUCTURE)
POT BEARING
MODULAR EXPANSION JOINT
SECTION 206 EXCAVATION FOR STRUCTURES
SECTION 501 CONCRETE
SECTION 502 PORTLAND CEMENT CONCRETE BASE AND PAVEMENT
SECTION 617 CONCRETE TRAFFIC BARRIER
SECTION 621 FLOWABLE BACKFILL
SECTION 623 CONCRETE BONDING COMPOUND, EPOXY MORTAR
SECTION 701 DRILLED SHAFTS
SECTION 703 CONCRETE MASONRY CONSTRUCTION
SECTION 705 PRESTRESSED CONCRETE MEMBERS FOR BRIDGES
SECTION 706 REINFORCING STEEL FOR CONCRETE STRUCTURES
SECTION 707 CONDUIT SYSTEM ON STRUCTURE
SECTION 710 EPOXY COATED REINFORCING STEEL
SECTION 711 PROTECTIVE COATINGS FOR EXPOSED CONCRETE SURFACES
SECTION 712 STRUCTURAL STEEL CONSTRUCTION
SECTION 717 NEOPRENE AND SILICONE JOINT SYSTEMS

SECTION 1005 AGGREGATE FOR CONCRETE
SECTION 1017 GROUND GRANULATED BLAST FURNACE SLAG
SECTION 1018 FLY ASH FOR CONCRETE
SECTION 1019 CEMENT
SECTION 1029 FABRICATING PRESTRESSED CONCRETE MEMBERS FOR BRIDGES
SECTION 1036 REINFORCING STEEL FOR CONCRETE
SECTION 1037 SHEAR CONNECTORS
SECTION 1038 BEARING PADS FOR STRUCTURES
SECTION 1039 EPOXY RESIN MATERIAL
SECTION 1045 PAINT FOR STRUCTURAL STEEL
SECTION 1053 CONCRETE SEALER
SECTION 1054 CONCRETE ADMIXTURES
SECTION 1055 CONCRETE CURING MATERIAL
SECTION 1057 MATERIAL FOR JOINTS
SECTION 1058 POLYETHYLENE SHEETING
SECTION 1059 PROTECTIVE COATING MATERIAL
SECTION 1060 ELECTRICAL CONDUIT
SECTION 1065 DELINEATORS
SECTION 1066 MORTARS AND GROUT
SECTION 1070 WATER
SECTION 1073 JOINT MATERIAL FOR STRUCTURES
SECTION 1080 STRUCTURAL STEEL FABRICATION
SECTION 1081 COATING OF STRUCTURAL STEEL
TM14 SOUNDNESS TEST OF COARSE AGGREGATE – WATER – ALCOHOL FREEZE METHOD
TM 38 DETERMINATION OF DEW POINT FOR STRUCTURAL STEEL PAINTING
TM 71 DELETERIOUS CONTENT OF AGGREGATE
TM 73 VOLUME OF VOIDS IN COMPACTED FILLER OR FINES
TM 74 PULLOUT TESTS ON EPOXY BONDING AGENTS FOR RESIN ANCHOR SYSTEMS

**106.1 Source of Supply and Quality Requirements.**

**106.1.1** All material needed in the work shall be furnished by the Contractor, unless otherwise stated in the contract. The Contractor shall assume full responsibility for ordering material of the required quality and quantity. The Contractor shall be responsible for the delivered costs of all material ordered.

**106.1.2** The material used in the work shall meet all quality requirements of the contract, and shall be obtained from supply sources that meet the approval of the Engineer. If a uniform product is not being furnished from a supply source or if for any reason, the product from any source at any time proves to be unsatisfactory, the Contractor may be required to furnish approved material from other sources. The Engineer may reject the entire output of any source where it is impractical to secure a continuous flow of uniformly satisfactory material.

**106.1.3** Any work incorporating material having no prior approval from the Engineer shall be performed at the Contractor's risk and may be considered unacceptable and unauthorized and, if so considered, will not be paid for. If a change in source will affect the control or appearance of the work, the use of any one kind or class of material for a specific project from more than one source will be prohibited, except as approved by the Engineer. If approved, the Engineer will set forth the conditions under which the change may be made.

**106.1.4** Material will be subject to inspection or test at any time during production or manufacture or at any subsequent time prior to or after incorporation into the work. The points of inspection will be determined by the Engineer. Material for sampling will be selected by the Engineer. Material provided by the source solely as a sample of that material for testing verification will not be permitted. Initial inspection, testing and approval or rejection will be made as early as practical. The Engineer may waive any of the requirements regarding determination of quality and accept material on certification or visual inspection if, in the judgment of the Engineer, the quantity involved is too small or the material use is not sufficiently important to warrant tests.

**106.1.5** To expedite the inspection and testing of material, the Contractor shall submit a list of proposed sources of material to the Engineer at the pre-construction conference or two weeks prior to beginning work, whichever is earlier. The list shall be in a format acceptable to the Engineer. At the option of the Engineer, material may be approved at the source of supply before delivery is started.

**106.2 Local Material Sources.**

**106.2.1 Designated Sources.** The Department may acquire the right and make available to the Contractor the right to take material from sources designated on the plans or described in the contract including the right to use designated property if so specified, for plant site, stockpiles and haul roads. In general, the quality of material contained in such sources will be considered acceptable, but the Contractor shall determine the method of operation, equipment and work required to produce a material meeting the specifications from the source. Designation of a source for material will not be a representation of the quantity of acceptable material obtainable or the method, equipment or work required to obtain material from the source. It is not feasible to ascertain from samples the limits for an entire deposit, and variations will be considered as usual and are to be expected. The Engineer may order procurement of material from any portion of a deposit and may reject portions of the deposit as unacceptable.

**106.2.2 Contractor Furnished Sources.** If sources of material are not designated on the plans or described in the contract, or if the Contractor desires to use material from sources other than those designated, the Contractor shall acquire the necessary rights to take material from the sources and shall pay all costs related thereto, including any that may result from an increase in length of haul. All costs of exploring, meeting environmental requirements and developing such other sources shall be at the Contractor's expense. Environmental compliance documentation shall be in accordance with IDOT Standard Specifications for Road and Bridge Construction for Contractor furnished borrow and shall be submitted to the Engineer for review and approval. The use of material from other than designated sources will not be permitted until representative samples taken by the Contractor in the presence of the Engineer have been approved and written authority is issued for the use thereof. If sources of material or material deposits are provided by the Contractor, the Engineer will test the samples and determine the suitability of the material.

**106.2.3 Operation of Sources.** Whether sources of material are acquired and made available by the Department or are furnished by the Contractor, activities shall be in compliance with all federal and state laws and the areas shall be excavated or worked in such a manner to comply with the current MoDOT Pollution Prevention Plan (for sources in Missouri) and IDOT Storm Water Pollution and Prevention Plan (for sources in Illinois) and minimize siltation of streams, lakes, ponds and reservoirs.

**106.2.4 Final Condition of Sources.** Unless otherwise permitted, pits and quarries shall be excavated such that water will not collect and stand therein. Sites from which material has been removed shall be left in such a condition to avoid or minimize siltation of streams, lakes, ponds and reservoirs, and shall be left in a neat and presentable condition upon completion of the work.

**106.3 Samples, Tests and Cited Specifications.** Samples for tests will be taken and shipped to the laboratory in accordance with MoDOT's Engineering Policy Guide unless otherwise directed by the Engineer. There shall be no direct charge to the Department for material taken as samples, either for field tests or for laboratory tests. If a specification of a recognized national standard agency (AASHTO, ASTM, AWS, AWWA, etc.) is designated, the material shall meet either the designated specification if a date is indicated or the latest revision thereof in effect at the time of bid opening. Tests of samples of material will be conducted by the Engineer in accordance with the methods specified in the contract or in accordance with the latest methods in effect at the time of bid opening, as prescribed by the national standard agency. Such national standard specifications and methods of tests will include those designated as tentative, interim or amended and officially approved and published by the sponsoring agency. If appropriate methods have not been so prescribed, tests shall be performed in a manner determined by the Engineer.

**106.4 Plant Inspection.** The Engineer may inspect material at the source. If plant inspection is undertaken the following conditions shall be met.

**106.4.1** The Engineer shall have the cooperation and assistance of the Contractor and the producer of the material.

**106.4.2** The Engineer shall be permitted unlimited access to all parts of the plant as required for adequate inspection of the plant equipment and for selection of samples. Facilities shall be furnished for the procurement of samples, performance of the tests and for the protection of testing equipment and supplies when tests are conducted at the source of production.

**106.4.3** If bituminous shipments are considered by the Engineer to justify testing at the source, laboratory facilities and testing equipment meeting requirements of the prescribed methods shall be provided by the supplier. The space and equipment shall be adequate for the orderly and proper testing of material without interference to or by the refinery personnel.

**106.4.4** Not Used.

**106.4.5** The Department will refuse to provide plant inspection at sources where adequate safety measures are not provided and maintained.

**106.4.6** The Department reserves the right to inspect plant equipment and to retest all material prior to or after incorporation into the work and to reject all material which, when retested, do not meet the requirements of the specifications.

**106.5 Storage of Material.** The Contractor shall be responsible for proper storage and handling of all material to ensure preservation of required quality and shall be arranged such as to facilitate inspection.

**106.6 Handling Material.** All material shall be handled in such a manner as to preserve the material's quality and fitness for the work. Aggregate shall be transported from the storage site to the work in tight vehicles constructed to prevent loss or segregation of material after loading and measuring.

**106.7 Unacceptable Material.** All material not in accordance with the specifications, when initially inspected and tested, will be considered defective, and all such material, whether in place or not, will be rejected and unless remedied, shall be removed from the site of the work. Any approved material that, in the judgment of the Engineer, is no longer specification compliant will be rejected. Defective material, including any material furnished by the Department that has been damaged by the Contractor after delivery, shall be replaced or reconditioned by the Contractor at the Contractor's expense. Rejected material that has been reconditioned or corrected such that the material satisfactorily meets the specifications shall not be used without the Engineer's written approval.

**106.8 Material Furnished by the Department.** If any material is to be furnished by the Department, special provisions designating such material will be included in the contract documents. The cost of handling and placing such material after delivery to the Contractor will be considered as part of the contract price for that material or work. The Contractor shall be responsible for all material upon receipt, and deductions will be made from any monies due to the Contractor to make good any shortages and deficiencies, from any cause whatsoever, for any damage that may occur after such delivery and for any demurrage charges.

**106.9 Buy America Requirement.** All iron and steel products, which are to be incorporated into the work shall be domestically manufactured or produced and fabricated. The Contractor shall obtain from the iron or steel producer and/or fabricator, in addition to the mill analysis, a certification that all iron or steel materials meet these domestic source requirements.

**106.9.1** The application of all coatings, epoxy, galvanizing, painting, etc., to metal products shall be domestically applied. Metal materials other than iron and steel, which are not domestically produced, may be accepted provided:

(a) The Contractor notifies the Department in advance of his/her intention to use other than domestically manufactured or produced material.

(b) Written evidence is provided in English of compliance with all requirements of the Specifications.

(c) Physical tests conducted by the Department verify the acceptability of the material.

**106.9.2** Not used.

**106.9.3** Not used.

**106.9.4** Not used.

**106.9.5** Not used.

**106.10** This section does not apply.

**106.11 Metric Implementation.**

**106.11.1 Equipment.** Equipment such as scales, concrete and asphalt plants, and placement equipment shall be scaled in or measured in English units, except equipment for metric projects may be in metric units. Equipment requiring calibration will be calibrated using the equipment's "as manufactured" units.

**106.11.2 Material.** All material shall be furnished quantified in the specified units of measure for dimensions and other physical aspects except as follows. English material may be provided in lieu of metric specified material and metric reinforcing steel may be provided in lieu of English specified reinforcing steel if the material is equivalent or better and used consistently, if other components or aspects are unaffected, and if the material is approved by the Engineer. Any cost of re-design due to use of material with units of measure other than as specified by the contract shall be at the Contractor's expense.

**106.11.3 Project Documentation.** All project tickets, paperwork for measurement, certifications or reporting of material shall be in the unit measure specified in the contract, except if metric is specified, documentation may be furnished in English units, provided documentation is done consistently for the project and supplier.

**106.12 Pre-Acceptance List of Material and Sources.**

**106.12.1 Pre-Acceptance List Description.** A MoDOT PAL will indicate material products or sources that have complied with all pre-approval requirements for a specific material and indicates a source has committed to continued compliance with applicable contract requirements. The link to the MoDOT PAL lists on MoDOT's website is **http://www.modot.org/business/materials/pdf/PAL/PALcont.pdf**

**106.12.1.1 Pre-Acceptance List Material.** For material acceptance based on MODOT PAL approval, Sec 106.12 will govern over all other applicable specifications. All material shall be in full compliance with Sec 106 and all other applicable contract documents, and shall be certified as such by the source of the material. Random sampling of the material will be conducted by the Engineer to verify that the material is in compliance with the applicable specifications. Material on a MODOT PAL may be used on a project by the Contractor prior to the Engineer receiving random sample test results.

**106.12.1.2 Unavailable MODOT PAL Material.** If there are no MODOT PAL materials or suppliers for a specific MODOT PAL listing, or during the transition of a material to the MODOT PAL, the material may be accepted following sampling, testing and documentation review of each shipment in accordance with the specifications for that material.

**106.12.2 Definition of Terms.** The following definitions will apply only to Sec 106.12 and subsections:

(a) **Source**. The manufacturer, supplier, fabricator, source or any other entity that is listed on a MODOT PAL as the provider of that specific material or product.

(b) **Intermediate Agent**. A supplier of a MODOT PAL material, but who is not listed as the source of that specific material or product on the MODOT PAL.

**106.12.3 Application for Placement on the MODOT PAL.** A source may propose a material for MODOT PAL inclusion by submitting the information required in these specifications and other applicable contract documents, along with any required samples to the Illinois Department of Transportation, Bureau of Materials and Physical Research, 126 E. Ash Street, Springfield, Illinois 62704. Consideration of a material for MODOT PAL inclusion will be based on compliance with this specification or other applicable contract documents, the material's history and any other applicable criteria. Submittal of a request for MODOT PAL inclusion will not guarantee approval. The application shall include the following in a written document with attachments as needed:

(a) A completed, original Product Listing/New Product Evaluation Request Form (M-PAL Form).

(b) A completed, original MODOT PAL Program Inclusion Certification and Guarantee Statement Form (M-STMNT Form).

(c) A complete description of the material and how the material may be identified.

(d) A list of all Special Provisions applicable to the material.

(e) All documentation required by applicable Special Provisions or any other contract document.

**106.12.4 Material Term on a MODOT PAL.** Upon approval, the material will remain on a MODOT PAL for three years, provided the material's name, formulation and properties have not changed, the specification requirements have not changed, or the material or source has not been removed from the MODOT PAL for non-compliance reasons.

**106.12.4.1 Material Reapplication on a MODOT PAL.** During the last 12 months of a material's term on a MODOT PAL, the source shall reapply for placement on the MODOT PAL in accordance with Sec 106.12.3. No term expiration notification will be sent to the source, and the source shall be responsible for initiating reapplication.

**106.12.4.2 Material Updates.** Any name, source, or physical or chemical property changes to the material shall be submitted in writing and approved by Construction and Materials prior to use of the revised material. All physical or chemical changes to a material required to meet new or updated specifications shall be accompanied by identifiable name or identification changes, including revisions of any pertinent product information and certifications affected by the change. This information shall be provided in addition to the documentation required under Sec 106.12.3. When an update is properly submitted and approved, the update will be considered the same as a MODOT PAL reapplication, and the expiration date will be extended for three years from the date the changes were approved.

**106.12.5 Material Removal from a MODOT PAL.** Any material proposed for use after removal from a MODOT PAL, including use on existing contracts, will not be accepted by MODOT PAL methods. Unless stated otherwise, material removed from a MODOT PAL for reasons other than failure to re-apply will not be considered for reinstatement until one year after the date of removal. A material may be removed from a MODOT PAL for any of the following reasons.

**106.12.5.1** Material and sources may be removed immediately from a MODOT PAL based on the discretion of Construction and Materials, for reasons including, but not limited to, failure of material to meet specifications, falsification of documentation, not providing required documentation or notification, lack of response to Engineers' inquiries by the material's approved source, unsatisfactory performance in the field or other reasons indicating lack of consistent material quality or suitability.

**106.12.5.2** Material that fails more than one random sample test in any 12-month period, for whatever reason, including improper manufacture, improper sampling, or improper supplier or Contractor handling, will be subject to removal immediately from the MODOT PAL without recourse.

**106.12.5.3** If a reapplication in accordance with Sec 106.12.4.1, as determined by postmark, is not received prior to the material's termination date, the material will automatically be removed from the MODOT PAL at the end of the material's term. For reinstatement of these materials to a MODOT PAL, the source shall submit an application in accordance with Sec 106.12.3.

**106.12.5.4** Material that has not been documented as being used on MoDOT projects in any three consecutive years will be removed from a MODOT PAL. Once removed, a material will not be reinstated until substantial evidence of recent satisfactory use is provided and specific intended use on MoDOT work is established. No other time suspension will apply for considering reinstatement of these requests.

**106.12.5.5** Any material or source removed from a MODOT PAL twice for any reason in any two-year period will be subject to permanent removal, with a minimum suspension of three years.

**106.12.5.6** If a source has more than two materials removed from a MODOT PAL in any three-year period, all material from that source may be subject to removal from all MODOT PALs.

**106.12.6 Reinstatement of a Material on a MODOT PAL.** Consideration for reinstatement of a material once removed from a MODOT PAL will be no sooner than specified under Sec 106.12.5, will require a written document from the source stating the reasons for removal of the material from a MODOT PAL, the action taken to correct those deficiencies, written concurrence from Construction and Materials that the cause has been suitably addressed, followed by an application in accordance with Sec 106.12.3 for MODOT PAL approval.

**106.12.7 Source Certification and Guarantee.** Material to be accepted by the Engineer under MODOT PAL approval shall include a source's certification, which may include certified test results, and a guarantee in accordance with the applicable material specification in the contract documents. The written documentation shall also certify that the material provided is similar in all aspects to the material originally approved and placed on the MODOT PAL, and shall indicate the specific date of approval. An intermediate agent shall furnish a manufacturer and supplier's certification identifying the material, and stating that the material meets all contract document requirements for the specified intended use. Required documentation shall be retained by the manufacturer and each intermediate agent for a period of two years from the date of shipment of the material. The documentation shall be traceable to the destination or destination project and shall be immediately available to the Engineer when requested.

**106.12.8 Notification of MODOT PAL Material Delivery.** Prior to delivery to the job site, the source, intermediate agent, shipper or Contractor's representative shall notify Construction and Materials by mail, fax or electronically of the impending shipment of MODOT PAL material. The source shall ensure that any intermediate agent of the source's approved MODOT PAL material carries out the required notification. This notification shall include, at minimum, the following:

(a) The specific contract number.
(b) Line number for which the material will be used.
(c) Type and quantity of material.
(d) Date of expected delivery to the job site.
(e) Brand and manufacturer name of the material.

**106.12.8.1** All of the above information shall have been received by Construction and Materials five working days prior to delivery of the material to the job site. Additional material may be considered part of the original shipment when the ordered quantity was underestimated or material was lost or damaged. Construction and Materials shall be notified prior to the shipment of additional material. No material shall be used on a project until Construction and Materials approves such use.

**106.12.8.2** Upon approval, the entity providing the notification of material delivery will be informed that the material was approved and an identification number for that specific material will be provided. This identification number shall be written on an orange tag or approved alternate label and shall be attached to the material prior to presentation for use at the job site. Requests for alternate MODOT PAL labeling shall be submitted to the Illinois Department of Transportation, Bureau of Materials and Physical Research, 126 E. Ash Street, Springfield, Illinois 62704, for approval. Material without the identification number attached will not be permitted for use on a project.

**106.12.9 Sampling of Material.** The source for a material shall ensure all users are adequately informed and monitored to ensure proper material sampling and usage. The source shall provide instructions for proper sampling of the material, and sampling shall be performed under the observation of the Engineer. The source shall be solely responsible for proper sampling, unless stated otherwise by IDOT Bureau of Materials and Physical Research.

**106.12.9.1** Additional material may be requested by the Engineer at the time of shipment to allow random sampling of the material at the project site without creating a material shortage.

**106.12.9.2** Sample size and sampling frequency will be at the discretion of the Engineer.

**106.12.10 Intermediate Agent Responsibilities.**

**106.12.10.1** Any intermediate agent supplying MODOT PAL material to a supplier or Contractor shall be responsible for proper handling, storage, sampling (if required to be performed by the agent) and delivery in accordance with applicable specifications and the source's recommendations, including notification of MODOT PAL material in accordance with Sec 106.12.8. If the intermediate agent is negligent in performing any of these specified tasks, the intermediate agent may be immediately denied as an intermediate agent for the MODOT PAL material without recourse and may be held responsible for material failure in accordance with Sec 106.12.13.

If an intermediate agent is disapproved by IDOT Bureau of Materials and Physical Research, that agent will not be reconsidered as an intermediate agent of any MODOT PAL material until one year after the date of removal as an intermediate agent of MODOT PAL material. Reinstatement will require a written document from the intermediate agent stating the reasons for removal as an intermediate agent for MODOT PAL material, the action taken to correct those deficiencies, and written concurrence from IDOT Bureau of Materials and Physical Research that the problem has been suitably addressed and that the agent is approved as an intermediate agent of MODOT PAL material.

**106.12.10.2** An intermediate agent will be allowed to request MODOT PAL inclusion for a product manufactured by a separate company that does not have substantial business interest in applying for MODOT PAL or for a product that is only used in small quantities. If MODOT PAL inclusion is granted, the intermediate agent shall be responsible for any material provided that does not meet the applicable specifications. The intermediate agent shall assume all penalties for non-compliant material, including removal from a MODOT PAL in accordance with Sec 106.12.5.

**106.12.11** Contractor MODOT PAL Use. The source for MODOT PAL material shall be listed on the MODOT PAL at the time the material is incorporated into the project. The Contractor bears the risk that material on the MODOT PAL at the time of bidding is no longer on the MODOT PAL at the time of incorporation. The Contractor may obtain a list of MODOT PAL material by contacting IDOT Bureau of Materials and Physical Research. Use of MODOT PAL material shall not relieve the Contractor or supplier of any responsibility to provide an inspected and approved material meeting all requirements of the contract documents.

**106.12.12 Testing of Material.** Test results from any sample will be considered representative of the material, and a final determination of specification compliance will be made on the basis of that sample.

**106.12.13 Responsibility for Material Failure.** When material has been incorporated into the project and fails any specified tests, Sec 106.7 will apply. The use of this material on all other projects shall be suspended until notified otherwise by IDOT Bureau of Materials and Physical Research.

**106.13 Quality Control/Quality Assurance.** For material or work governed by QC/QA specifications, quality control performed by the Contractor will determine acceptance of the material when test results are confirmed by the Engineer's sampling, testing and assessment. When the Engineer’s sampling, testing or assessment do not support the Contractor's results, work shall be suspended and any material in place will be subject to rejection following a review by the Engineer. Final acceptance of the material, work or process will be based on the Engineer's sampling, testing and assessment.

**106.14 Proprietary Items.** In the event a proprietary item included in a contract becomes unavailable during the term of the contract, the Contractor shall promptly provide documentation to the Engineer substantiating that the proprietary item is unavailable. Price or credit terms demanded of the Contractor by the supplier will not constitute sufficient reason to substitute for the specified proprietary item. As part of the documentation, the Contractor shall propose an alternative source or item that meets the performance requirements of the original proprietary item included in the contract.

Any adjustment in the contract unit price shall be made in accordance with Article 109.04 of the IDOT Standard Specifications for Road and Bridge Construction. If an acceptable alternative item cannot be located, the proprietary item and any associated work may be underrun from the contract.

## SECTION 206 EXCAVATION FOR STRUCTURES

**206.1 Description.** This work shall consist of the necessary excavation for the foundations of all structures, removal and disposal of all excavated material, backfilling around the completed structures, and all related work.

**206.1.1** All removal work that might endanger the new structure shall be completed before any work on the new structure is started. Partial removals of any structure or adjustments to any utility shall be made with care to preserve the value of the retained portions. Work around any live utility shall be done in such a manner that uninterrupted service is maintained.

**206.1.2** Excavated material that is unsuitable for backfill and embankments, and excess material not required for either, shall be disposed of. Excavated material shall not be dumped into the channel of a stream.

**206.2 Depth of Excavation.** The elevation of the bottoms of footings as shown on the bridge plans shall be considered an approximate elevation, and the Engineer by written order may make changes in plan elevations and dimensions of footings as necessary to secure a satisfactory foundation.

**206.3 Foundation Stabilization and Tests.**

**206.3.1** The Contractor shall furnish and place sand, rock, gravel or other suitable granular backfill material to replace unsuitable material encountered below box culvert slabs or below the foundation elevation of the structures.

**206.3.2** The Contractor shall stabilize suitable foundation material or form the bottom of pile footings, if necessary to obtain a stable foundation. The Contractor shall assist in driving sounding rods or shall drill test holes to permit an adequate inspection of the foundation subgrade. The depth of the excavation, the character of the material and the condition of the foundation shall be approved by the Engineer before any concrete is placed in the footing.

**206.4 Construction Requirements.**

**206.4.1 Foundation Excavation Protection.** Methods shall be used in excavating for foundations of structures that will ensure maintaining the stability of the material adjacent to the excavation. Sheeting, cribbing, timbering or bracing shall be placed by the Contractor where indicated on the bridge plans and wherever considered necessary. The Contractor shall ensure the adequacy of all sheeting, cribbing, timbering or bracing used.

**206.4.2 Foundation Key.** Foundations for structures and retaining walls shall be free of loose material, and the footing shall be placed on undisturbed material. Footings shall be keyed no less than 6 inches (150 mm) into hard, solid rock, and no less than 18 inches (450 mm) into soft rock or shale or other suitable material specified for spread footings.

Excavation in rock or shale for the key shall be made as near as practical to the size of the footing, or of the key, as shown on the bridge plans. When placing the footing, the key portion shall be cast against the vertical, undisturbed face of the rock or shale. If side forms are necessary for footings, the forms shall be removed approximately 24 hours after placing the concrete, and the excavation immediately backfilled to the top of the footing. All cavities or crevices shall be cleaned out and filled with concrete in accordance with Sec 703.3.3.9, or spanned with a reinforced concrete beam, as directed by the Engineer.

**206.4.3 Foundation Subgrade**. Care shall be taken to avoid disturbing the material below the bottom of the footings where the structure is founded on material other than rock, and final removal to grade shall not be made until just prior to placing concrete. Where foundation piles are required, the excavation of each pit shall be completed before the piles are driven, and after the driving is completed, all loose and displaced material shall be removed.

**206.4.4** Not used.

**206.4.5 Footing Construction.** Concrete footings for structures shall be placed on foundation material that is reasonably dry in the judgment of the Engineer. The Contractor shall perform all draining, bailing or pumping operations, drive any sheeting, and construct any cofferdams or cribs necessary to obtain this condition. Pumping from the interior of any foundation enclosure shall be done in a manner to preclude the possibility of the movement of water, or other fluids or semi-fluids, through any fresh concrete. If necessary, the footing form shall be made watertight and shall be sealed around the bottom, and all pumping done between the footing form and the wall of the enclosure.

**206.4.6 Footing Drainage.** All holes, pits or sumps resulting from excavating operations shall be kept drained or pumped out until the completion of the work. No ponding of water around footings on other than rock will be permitted.

**206.4.7** Not used.

**206.4.8 Temporary Shoring.** When temporary shoring is required by the contract documents, the Contractor shall provide temporary shoring as needed, consisting of sheet piling or alternate methods for the construction of roadway fills, mechanically stabilized earth walls or structures. The Contractor shall submit the proposed method of temporary shoring construction to the Engineer prior to beginning work.

**206.4.9** Not used.

**206.4.10 Backfill.** Backfill material shall be free from large or frozen lumps, wood or other extraneous material. All spaces excavated and not occupied by the new structure or by porous backfill shall be refilled with earth to the original ground surface or to the finished ground lines shown on the bridge plans. The backfill at end bents, walls or other units that fall within the limits of the roadbed shall be placed in successive 6-inch (150 mm) layers and compacted to the same density required for the adjacent roadbed. Dry footings at interior bents shall be backfilled and compacted to no less than the density of the adjacent undisturbed material. Precautions shall be taken to prevent any wedging action against the masonry. The slope bounding the excavation, if steeper than 6:1 (1:6), shall be stepped or serrated. Backfill placed around culverts and piers shall be kept at approximately the same elevation on opposing sides.

Drains consisting of 5 cubic feet (0.15 $m^3$) of coarse aggregate shall be placed at weep holes, except where porous backfill is required. Backfill material shall not be placed against end bents of bridges, on sides of box culverts or behind retaining walls until the concrete has attained the strength specified in Sec 703.3.2.13. Backfill material shall not be placed higher behind than in front of end bents until the superstructure, including the bridge deck, is in place. Until the grade is in place, drainage shall be maintained away from the end bent backwall by constructing a 6:1 (1:6) or steeper slope away from the backwall for a minimum distance of 3 feet (1 m) and by providing a lateral path for all water to flow off the roadbed section.

**206.4.11** Not used.

**206.4.12 Flowable Backfill.** Flowable backfill will be required when indicated on the bridge plans. The Contractor may, with approval from the Engineer, use flowable backfill as an alternate to compacted backfill for structures, pipes or utility cuts. Flowable backfill intended for any other use by the Contractor shall also be approved by the Engineer. Flowable backfill shall not be used to surround drainage systems such as vertical drains or edge drains. Flowable backfill shall be in accordance with Sec 621.

## SECTION 501 CONCRETE

**501.1 Description.** Concrete shall consist of a mixture of cement, fine aggregate, coarse aggregate and water, combined in the proportions specified for the various classes. Admixtures may be added as specifically required or permitted.

**501.2 Material**. All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Coarse Aggregate[a] | 1005.2 |
| Fine Aggregate[a] | 1005.3 |
| Ground Granulated Blast Furnace Slag | 1017 |
| Fly Ash | 1018 |
| Cement | 1019 |
| Concrete Admixture | 1054 |
| ~~Concrete Tinting Material~~ | ~~1056~~ |
| Water | 1070 |

[a]Regardless of the gradation of the coarse and fine aggregate used in concrete for pavement or base, the aggregate shall meet the quality requirements of coarse and fine aggregate for concrete pavement.

**501.2.1 Aggregate Acceptance.** Aggregate for Portland cement concrete masonry will be sampled and tested by the Engineer in accordance with the following table at the last possible point of incorporation into the project.

| Item | Property | Minimum Number of Tests |
|---|---|---|
| Portland Cement Concrete Masonry | Gradation of Coarse Aggregate - AASHTO T 27 and T 11 | One per 500 cubic yards per fraction per project. None if less than 100 cubic yards. |
| | Gradation of Fine Aggregate - AASHTO T 27 and T 11 | |
| | Deleterious Content - MoDOT Test Method TM 71 | |
| | Absorption of Coarse Aggregate - AASHTO T 85 | |
| | Thin or Elongated Pieces - ASTM D 4791 (1 3/4 in., 5:1) | One per project. |

**501.2.2 Retained Samples.** The Engineer shall retain the portion of the sample not tested after reducing the original sample to testing size. Approximately twenty percent of the retained samples will be sent to the IDOT Bureau of Materials & Physical Research, 126 East Ash Street, Springfield, IL 62704-4766 for comparison purposes.

**501.3 Mix Design.** The proportions of cement, fine aggregate and coarse aggregate for concrete shall be approved by the Engineer within the applicable limits of the specifications for the class of concrete specified in the contract. The Contractor shall submit a mixture designed by absolute volume methods or an optimized mix design method such as Shilstone method or other recognized optimization method. Optimized will refer to aggregate gradations that produce lower water demands, as well as improved workability and finishing characteristics. The target and allowable gradation range of each fraction shall be included. The Contractor may be required to submit representative samples of each ingredient to the Engineer for submittal to the IDOT Bureau of Materials & Physical Research, 126 East Ash Street, Springfield, IL 62704-4766 for laboratory testing.

**501.3.1 Required Information.** The concrete mix design shall contain the following information:

(a) Source, type and specific gravity of Portland cement
(b) Source, type (class, grade, etc.) and specific gravity of supplementary materials, if used
(c) Source, name, type and amount of admixtures
(d) Source, type (formation, etc.), ledge number if applicable, and gradation of the aggregate
(e) Specific gravity and absorption of each fraction in accordance with AASHTO T 85 for coarse aggregate and AASHTO T 84 for fine aggregate, including raw data
(f) Unit Weight of each fraction in accordance with AASHTO T 19
(g) The percent of each aggregate component used for optimized concrete mixes
(h) The design air content and slump
(i) Batch weights of Portland Cement and supplemental cementious materials
(j) Batch weights of coarse, intermediate and fine aggregates
(k) Batch weight of water

**501.3.2 Paving Concrete.** For PCCP mixes, the gradation requirements of Sec 1005 will not apply. For all fractions, 100 percent of each fraction shall pass the 2-inch (50 mm) sieve. When Grade F is required, 100 percent of each fraction shall pass the 3/4-inch (19.0 mm) sieve.

**501.3.3 Optimized Masonry Concrete.** For optimized PCCM mixes, the gradation requirements of Sec 1005.2 and Sec 1005.3 will not apply. For coarse aggregate, 100 percent of each fraction shall pass the one-inch (25 mm) sieve and no more that 2.5 percent shall pass the No. 200 (75 µm) sieve. For fine aggregate, no more than 2.0 percent shall pass the No. 200 (75 µm) sieve for natural sand, and no more than 4.0 percent shall pass the No. 200 (75 µm) sieve for manufactured sand.

**501.3.4 Non-Optimized Masonry Concrete.** When optimized aggregate gradations are not selected by the Contractor, all provisions, including gradations requirements of Sec 1005 shall apply.

**501.3.5 Fine Aggregate Classes.** Fine aggregates are grouped into four classes and a minimum cement factor has been established for each class.

**501.3.6. Cement Factors.** The minimum cement requirements in pounds per cubic yard (kg/m$^3$) of concrete for the various classes of sand shall be as follows:

| Cement Requirements[a,b] | | | | | | | |
|---|---|---|---|---|---|---|---|
| Class of Sand | Class A-1 Concrete | Class B Concrete | Class B-1 Concrete | Class B-2 Concrete | Class MB-2 Concrete[g,h] | Pavement Concrete | Seal Concrete |
| A[c] | 600(360) | 525(310) | 610(360) | 705(420) | 600(360) | 560(330) | 660(390) |
| B[d] | 640(380) | 565(330) | 640(380) | 735(430) | 620(370) | 560(330) | 695(410) |
| C[e] | -- | 585(350) | 660(390) | 750(450) | 640(380) | 560(330) | 715(420) |
| D[f] | -- | 620(370) | 695(410) | 790(470) | 660(390) | 560(330) | 735(430) |

[a]When used, Type IP, I(PM), IS or I(SM) cement shall be substituted on a pound for pound (kg for kg) basis for Type I or Type II cement and adjustments in design mix proportions will be required to correct the volume yield of the mixture.
[b]The contractor may submit an optimized mix design which has a maximum 50 pounds per cubic yard (30 kg/m$^3$) reduction in cement from that shown in the tables. If the contractor chooses this option, the mixture will be subject to review, laboratory testing and approval by the engineer. All other requirements for the cement factor will apply.
[c]Class A sand will include all sand, except manufactured sand, weighing 109 pounds per cubic foot (having a mass of 1740 kg/m$^3$) or more.
[d]Class B sand will include all chert, river and Crowley Ridge sand weighing from 106 to 108 pounds, inclusive, per cubic foot (having a mass of 1610 - 1730 kg/m$^3$ inclusive) or glacial sand weighing 108 pounds or less per cubic foot (having a mass of 1730 kg/m$^3$ or less).
[e]Class C sand will include all chert, river and Crowley Ridge sand weighing from 101 to 105 pounds, inclusive, per cubic foot (having a mass of 1610 - 1680 kg/m$^3$, inclusive).
[f]Class D sand will include all sand weighing 100 pounds or less per cubic foot (having a mass of 1600 kg/m$^3$ or less) and any manufactured sand that is produced by the process of grinding and pulverizing large particles of aggregate or which contains more than 50 percent of material produced by the reduction of coarser particles. Manufactured sand produced from limestone or dolomite shall not be used in Portland cement concrete for driving surfaces such as bridge decks, pavements and shoulders.
[g]Modified B-2 (MB-2) concrete may be used in-place of Class B-2 Concrete.
[h]Modified B-2 (MB-2) concrete shall use at least one supplementary cementitious material in accordance with this specification. In no case shall MB-2 concrete use less than 15 percent fly ash or GGBFS when used as the individual supplementary cementitious material.

**501.3.7 Unit Weight.** The weight per cubic foot (mass/m$^3$) shall be the dry rodded weight per cubic foot (mass/m$^3$) of the aggregate, determined in accordance with AASHTO T 19.

**501.3.8 Compressive Strength Requirements.** Concrete classes shall meet the following compressive strength requirements in pounds per square inch (MPa):

| Minimum Design Compressive Strength[1] | | | | | | |
|---|---|---|---|---|---|---|
| Class A-1 Concrete | Class B Concrete | Class B-1 Concrete | Class B-2 Concrete | Class MB-2 Concrete | Pavement Concrete | Seal Concrete |
| 6,000 (42) | 3,000 (21) | 4,000 (28) | 4,000 (28) | 4,000 (28) | 4,000 (28) | 3,000 (21) |

[1]Minimum compressive strength required unless otherwise specified in the contract documents or approved by the engineer.

**501.4 Sampling.** Sampling of fresh concrete shall be in accordance with AASHTO T 141, except that for central or truck mixed concrete, the entire sample for slump and air tests and for molding compressive strength specimens may be taken at one time after approximately one cubic yard ($m^3$) of concrete has been discharged, instead of at three or more regular intervals during the discharge of the entire batch. Acceptability of the concrete for slump and air content and, if applicable, for strength requirements, will be determined by tests on these samples.

**501.5 Consistency.** The slump of the concrete shall be within the limits for the respective classes of concrete. The concrete shall be uniform in consistency and shall contain the minimum quantity of water required to produce the designated slump. The slump of concrete mixes will be determined in accordance with AASHTO T 119. The quantity of mixing water in the concrete shall be considered the net quantity after proper allowance has been made for absorption by the aggregate. The slump and mixing water content of the concrete, when placed in the work, shall not exceed the following limits:

| Slump and Maximum Water/Cementitious Materials Ratio | | | |
|---|---|---|---|
| Class of Concrete | Max. Slump, In. (mm) | Max. Pounds of Mixing Water Per Pound of Cementitious Materials (Max. Kilograms of Mixing Water Per Kilogram of Cement) | |
| | | Air-Entrained | Non-Air-Entrained |
| A-1 | 3 1/2 (90) | 0.46 | 0.51 |
| B | 4 (100) | 0.51 | 0.55 |
| B-1 | 4 (100) | 0.44 | 0.53 |
| B-2 | 3 (75) | 0.40 | ---- |
| MB-2 | 6 (150) | 0.42 | ---- |
| Pavement | ---- | 0.50 | 0.53 |
| Seal | 8 (200) | ---- | 0.53 |

**501.6 Measurement of Material.** The cement and aggregate for concrete shall be measured by weight (mass). The weights (masses) of coarse and fine aggregates to be used will be calculated from the proportions approved by the Engineer. Batches that do not contain the proper quantities of material shall be wasted at the Contractor's expense.

**501.6.1 Weighing Tolerances.** The weighing (mass determination) and batching equipment shall be designed and maintained in such a condition that the material for each batch can be quickly and accurately weighed (determined) and shall be operated within a tolerance of plus or minus 0.5 percent for cement and plus or minus 1.0 percent for aggregate. The equipment used for delivery of material to the weigh hoppers shall not permit intermingling of material.

Weighing hoppers shall discharge completely and there shall be no accumulation of tare material. Scales shall be accurate to within 0.4 percent of the net load applied. The change in load required to change the position of rest of the indicating element or elements of indicating scales an observable amount shall not be greater than 0.1 percent of the nominal scale capacity. If beam-type scales are used, a separate beam shall be provided for each type of material to be used and means shall be provided for adjustment of tare on a scale separate from those used for other material.

**501.6.2 Water Meter Tolerances.** Mixing water shall be measured by volume or by weight (mass). If measured by weight (mass), scales shall be in accordance with Sec 501.6.1. The device for the measurement shall be readily adjustable and under all operating conditions shall measure the required quantity within a tolerance of one quart (one liter) or one percent, whichever is greater.

**501.6.3 Calibration Frequency.** Mixing plants in Illinois shall comply with Article 1104.01 of the IDOT Standard Specifications for Road and Bridge Construction. For mixing plants in Missouri, the following shall apply. Plant scales and water metering devices shall be calibrated and certified by an approved commercial scale service. A copy of the certification and calibration shall be provided to the Engineer and approved before production begins. Plants shall be calibrated and certified annually, and whenever plants are moved or found to be out of tolerance during verification. Scales and water metering devices shall be verified by the Contractor in the presence of the Engineer every 30 working days.

**501.7 Mixing.** The mixer shall produce concrete uniform in color, appearance and distribution of the material throughout the mixture. The cement, aggregate and no less than 60 percent of the water shall be mixed a minimum of one minute. The remaining water shall be added within 15 seconds after all other material for the batch is in the mixer. If mixers having multiple compartment drums are used, the time required to transfer material between compartments will be considered mixing time. The speed at which the drum rotates shall be as designated by the manufacturer. If such mixing does not result in uniform and smooth texture concrete, a sufficient number of additional revolutions at the same speed shall be performed until a thorough mixing of each batch of concrete is secured. The mixing time shall be measured from the time all cement, aggregate and 60 percent of the water are in the drum. The volume of concrete mixed in each batch shall not exceed the manufacturer's rated capacity. The mixer shall be equipped to automatically time the mixing of each batch of concrete. If the automatic timing device becomes inoperable, a manual timing device shall be provided to complete the day's operation.

**501.8 Central and Truck Mixed Concrete.** The following additional requirements will apply to central and truck mixed concrete.

**501.8.1 Mixer Inspection.** All central mixers, truck mixers and agitators shall be in accordance with of these specifications prior to use, and inspection of the equipment shall be made periodically during the work. Only equipment found acceptable in every respect and capable of producing uniform results will be permitted.

**501.8.2 Uniformity Testing.** Central mixed concrete shall be mixed in a stationary mixer. Except as otherwise permitted in accordance with Sec 501.8.9, the concrete shall be transported to the point of delivery in a truck mixer operating at agitating speed or in an agitator truck.

The mixing time shall be in accordance with Sec 501.7, and as necessary to produce concrete that meets the uniformity criteria when tested in accordance with Section 10.3 of ASTM C 94, with the following additions and exceptions:

(a) The two samples shall be obtained within an elapsed time of no more than 15 minutes.

(b) The air content, slump and mix proportions of the concrete tested shall be in accordance with these specifications for that class of concrete or the uniformity tests shall be invalid.

(c) The use of a one-quarter cubic foot (0.007 $m^3$) measure will be permitted in determination of weight per cubic foot (mass/$m^3$).

(d) Cylinders may be cured in damp sand after the first 48 hours.

(e) The Contractor may designate the mixing time for which uniformity tests are to be performed. The mixing time shall be a minimum of 60 seconds. The maximum mixing time shall not exceed the mixing time established by uniformity tests by more than 60 seconds for air-entrained concrete. The mixed concrete shall meet the uniformity requirements specified above before any concrete may be used for pavement or structures. The Engineer may allow the use of the test concrete for appropriate incidental construction. Tests shall be performed by the Contractor, in the presence of the Engineer. No direct payment will be made for labor, equipment, material or testing. After operational procedures of batching and mixing are thus established, no changes in procedure will be permitted without re-establishing procedures by uniformity tests.

**501.8.2.1 Measuring Mixing Time.** Measurement of mixing time shall start at the time all the solid material is in the drum and shall end at the beginning of the next sequential operation.

**501.8.2.2 Verification of Mixer.** Mixer performance tests shall be repeated whenever the appearance of the concrete or the coarse aggregate content of samples selected in accordance with ASTM C 94, as modified above, indicates that adequate mixing is not being accomplished.

**501.8.3 Truck Mixed Concrete.** Truck mixed concrete shall be mixed at the proportioning plant and the mixer shall operate at agitating speed while in transit. Truck mixed concrete may be mixed at the point of delivery, provided the cement or cement and mixing water, are added at that point. Mixing of truck mixed concrete shall begin immediately after the introduction of the mixing water and cement to the aggregate or the introduction of the cement to the aggregate.

**501.8.4 Truck Mixer Requirements.** A truck mixer shall consist of a watertight revolving drum suitably mounted, fitted with adequate blades, and equipped with a device for determining the number of mixing revolutions. Truck mixers shall produce a thoroughly mixed and uniform mass of concrete and shall discharge the concrete without segregation. A truck agitator shall consist of a watertight revolving drum or a watertight container suitably mounted and fitted with adequate revolving blades. Truck agitators shall transport and discharge the concrete without segregation. Mixers and agitators shall be cleaned of accumulation of hardened concrete or mortar.

**501.8.5 Rating Plate.** Except as hereinafter permitted, each truck mixer shall have permanently attached to the truck a metal rating plate issued by and in accordance with the capacity requirements of the Truck Mixer Manufacturers Bureau (TMMB), as approved by NRMCA, on which is stated the maximum capacity in terms of volume of mixed concrete for the various uses to which the equipment is applicable. The truck shall also have attached a manufacturer's data plate that shall state the actual capacity as an agitator, and the maximum and minimum mixing and agitating speeds. If truck mixers are used for mixing or agitating, the volume of concrete in each batch shall not exceed the maximum capacity shown on the metal rating plate issued by the TMMB, as approved by NRMCA, except that if a lower capacity for agitating is shown on the manufacturer's data plate, that lower capacity shall govern. The minimum batch size for truck mixers shall be one cubic yard ($m^3$). The Engineer may reduce the batch size or reject use of any truck mixer that does not produce concrete uniform in color, appearance and distribution of material throughout the mass. A quantity of concrete that results in axle and gross loads in excess of statutory limits will not be permitted.

**501.8.6 Truck Mixing Requirements.** Truck mixers and agitators shall be operated at the speed of rotation designated by the manufacturer of the equipment. Truck mixed concrete shall initially be mixed no less than 70 or more than 100 revolutions of the drum at mixing speed after all ingredients, including water, are in the mixer, except that when the batch volume does not exceed 57.5 percent of the gross volume of the drum or 91 percent of the rated maximum capacity, the number of revolutions required for mixing shall be no less than 50 or more than 100. When a truck mixer or truck agitator is used for transporting concrete that has been completely mixed, agitation of the concrete shall continue during transportation at the speed designated by the manufacturer of the equipment as agitating speed. Water may be added to the mixture no more than two times after initial mixing is completed. Each time water is added, the drum shall be turned an additional 30 revolutions, or more if necessary, at mixing speed, until uniform mixing is accomplished. All water added will be included in determining the effective water in the mixture.

**501.8.7 Water Adjustments at Job Site.** Each increment of water added at the job site shall be measured within a tolerance of one percent of the total effective water required for the batch. Water used to wash the drum of the mixer shall not be used as mixing water.

**501.8.8 Handling and Discharge Requirements.** Central or truck mixed concrete shall be delivered to the site of the work and shall meet the following conditions:

(a) The handling and discharge of concrete shall not cause segregation or damage to the concrete and will allow placement with a minimum of handling. All handling and discharge shall occur prior to initial set of the concrete.

(b) Truck mixed concrete shall not exceed 300 revolutions after the beginning of mixing.

**501.8.9 Non-Agitating Equipment.** The discharge of concrete transported in non-agitating equipment shall not cause segregation or damage to the concrete and will allow placement with a minimum of handling. All handling and discharge shall occur prior to initial set of the concrete. Bodies of non-agitating hauling equipment shall be smooth, mortar-tight metal containers capable of discharging the concrete at a satisfactory, controlled rate without segregation.

**501.8.10 Testing Facilities.** Proper facilities shall be provided for the Engineer to inspect ingredients and processes used in the manufacture and delivery of the concrete. A Type 1 field laboratory in accordance with the following shall be provided at the proportioning plant.

**Laboratory Requirements.** A laboratory shall be furnished for each item of work that is specified in the contract as requiring such a unit. Separate laboratories will not be required for successive items of work when any preceding item has been completed, provided that the laboratory complies with the requirements for specific work. Additional laboratories may be required for the proper control of the work when simultaneous operations on the same item of work are being carried on at more than one location separated by a distance of one mile (1.6 km) or more and separate testing operations are necessary. The Engineer will specify the number of laboratories required based on the operations of the Contractor.

The laboratory shall be located and maintained at the site of current operations by the Contractor. Work that requires the use of a field laboratory will not be permitted until a laboratory is provided. The laboratory shall remain the property of the Contractor, and shall be disposed of by the Contractor upon completion of the work requiring the laboratory.

Regardless of the number of field laboratories specified on the bridge plans, the number may be increased, decreased or completely underrun at the discretion of the Engineer.

**Type 1 Field Laboratory**. The Type 1 field laboratory shall be substantially constructed and weatherproof with wood or concrete floors, windows on at least two sides and at least one outside door. Windows and doors shall be equipped with screens and locks, and the necessary keys shall be furnished to the Engineer. The laboratory shall have a minimum of 120 square feet (11 m2) of floor space. The ceiling shall be no less than 7 feet (2.1 m) high. The laboratory shall have at least one worktable 30 inches (760 mm) high, with a smooth one piece top, no less than 8 feet (2.4 m) long and 30 inches (760 mm) wide. The laboratory shall be equipped with a storage shelf, a fire extinguisher, a desk and a chair. An operational electric hot plate or gas burner, having no less than two burners with adjustable temperature controls and capability of accommodating two 14 x 20-inch (355 x 510 mm) sample pans shall be provided. A faucet-equipped sink capable of accommodating a 14 x 20-inch (355 x 510 mm) sample pan and connected to an operating water source of at least a 50-gallon (190 L) capacity shall be provided. The Contractor shall keep an adequate supply of potable water available at all times. Lighting facilities shall be located to adequately illuminate all work in the interior of the laboratory. When required by the Engineer, grounded electrical outlets with 110 to 120 volts, 60-Hertz continuous current and a climate control capable of maintaining an ambient temperature range of 72 to 80 F (22 to 27 C) shall be provided. Laboratories shall be relocated on the project as directed by the Engineer.

**Basis of Payment.** Unless otherwise specified, no direct payment will be made for Type 1 Field Laboratories.

Facilities for obtaining representative samples of each fraction of aggregate, cement and each admixture just prior to incorporation into the mix shall be provided by the producer. Aggregate samples may be taken either by sampling the flowing aggregate stream or by belt sampling.

The producer shall furnish the necessary equipment and personnel to assist the Engineer in obtaining a representative sample.

**501.8.11 Delivery Tickets.** The manufacturer of truck mixed concrete and of central mixed concrete for use in structures shall furnish to the Engineer with each truck load of concrete before unloading at the site, a delivery ticket on which is shown information concerning the concrete as follows:

(a) Name of concrete plant.
(b) Serial number of the ticket.
(c) Date and truck number.
(d) Name of Contractor.
(e) Specific project, route and county designation.
(f) Specific class of concrete.
(g) Quantity of concrete in cubic yards ($m^3$).
(h) Time when batch was loaded or of first mixing of cement and aggregate.

**501.9 Volumetric Batched and Continuous Mixed Concrete.** Upon written request by the Contractor, the Engineer may approve the use of concrete proportioned by volume. If concrete is proportioned by volume, the other requirements of these specifications with the following modifications will apply.

**501.9.1 Proportional Devices.** Volume proportioning devices, such as counters, calibrated gate openings or flow meters, shall be available for controlling and determining the quantities of the ingredients discharged. In operation, the entire measuring and dispensing mechanism shall produce the specified proportions of each ingredient.

**501.9.2 Controls.** All indicating devices that affect the accuracy of proportioning and mixing of concrete shall be in full view of and near enough to be read by the operator while concrete is being produced. The operator shall have convenient access to all controls.

**501.9.3 Calibration.** The proportioning devices shall be calibrated by the Contractor in the presence of and subject to approval from the Engineer. Calibration of the cement and aggregate proportioning devices shall be accomplished by weighing (determining the mass of) each component. Calibration of the admixture and water proportioning devices shall be accomplished by weight (mass) or volume. Tolerances in proportioning the individual components will be as follows:

| Item | Tolerance |
|---|---|
| Cement, Weight (Mass) percent | 0 to +4 |
| Fine Aggregate, Weight (Mass) percent | ± 2 |
| Coarse Aggregate, Weight (Mass) percent | ± 2 |
| Admixtures, Weight (Mass) or Volume percent | ± 3 |
| Water, Weight (Mass) or Volume Percent | ± 1 |

**501.9.4 Verification of Yield.** Verification of the proportioning devices may be required at any time by the Engineer. Verification shall be accomplished as follows. With the cement meter set on zero and all other controls set for the designated mix, the activated mixer shall discharge mixed material into a 1/4 cubic yard (0.25 $m^3$) container measuring 36 x 36 x 9 inches (1000 x 1000 x 250 mm). When the container is level-struck full, making provisions for settling the material into all corners, the cement meter shall show a discharge equal to the design proportion of cement for 1/4 cubic yard (0.25 $m^3$). A tolerance of ± 1/8 inch (± 3 mm) from the top of the container will be permitted. If the correct yield is not obtained, the proportioning devices shall be adjusted to obtain the design mix or the proportioning devices shall be recalibrated as directed by the Engineer.

**501.9.5 Water Control.** The rate of water supplied shall be measured by a calibrated flow meter coordinated with the cement and aggregate feeding mechanism and with the mixer. The rate shall be adjustable in order to control slump at the desired level.

**501.9.6 Liquid Admixture**. Liquid admixtures shall be dispensed through a controlled flow meter. A positive means to observe the continuous flow of material shall be provided. If an admixture requires diluting, the admixture shall be diluted and thoroughly mixed prior to introducing the admixture into the dispenser. When admixtures are diluted, the ratio of dilution and the mixing shall be approved by and performed in the presence of the Engineer.

**501.9.7 Concrete Mixer.** The concrete mixer shall be approved by the Engineer and shall be an auger-type continuous mixer used in conjunction with volumetric proportioning. The mixer shall produce concrete, uniform in color and appearance, with homogeneous distribution of the material throughout the mixture. Mixing time necessary to produce uniform concrete shall be established by the Contractor and shall comply with other requirements of these specifications. Only equipment found acceptable in every respect and capable of producing uniform results will be permitted.

**501.9.7.1 Material Storage Capacity.** The continuous mixer shall be capable of carrying sufficient unmixed dry bulk cement, fine aggregate, coarse aggregate, admixtures and water, in separate compartments to produce no less than 6 cubic yards (4.5 $m^3$) of concrete at the job site. Each batching or mixing unit or both, shall carry in a prominent place a metal plate or plates on which are plainly marked the gross volume of the unit in terms of mixed concrete, discharge speed and the weight-calibrated constant of the machine in terms of a revolution counter or other output indicator.

**501.9.7.2 Measurement of Cement**. The continuous mixer shall be capable of positive measurement of cement being introduced into the mix. A recording meter visible to the operator and equipped with a ticket printout shall indicate the quantity.

**501.9.7.3 Measurement of Water.** The continuous mixer shall provide positive control of the flow of water and admixtures into the mixing chamber. Water flow shall be indicated by a flow meter and be readily adjustable to provide for minor variations in aggregate moisture. The mixer shall be capable of continuously circulating or mechanically agitating the admixtures.

**501.9.7.4 Scalping Screen**. The continuous mixer shall have a one-inch (25 mm) maximum size scalping screen over the fine aggregate bin to screen out mud balls, conglomerate lumps or any other contaminant material that could interrupt the flow of fine aggregate during proportioning.

**501.9.7.5 Batching Operations.** The continuous mixer shall be capable of being calibrated to automatically proportion and blend all components on a continuous or intermittent basis as required, and shall discharge mixed material through a conventional chute.

**501.9.8 Handling Materials.** Storage facilities for all material shall be designed to permit the Engineer to make necessary inspections prior to the batching operations. The facilities shall also permit identification of approved material at all times, and shall be designed to avoid mixing with or contaminating by, unapproved material. Coarse and fine aggregate shall be furnished and handled so variations in the moisture content affecting the uniform consistency of the concrete will be avoided.

**501.10 Air-Entrained Concrete.** Air content for all classifications of concrete shall be determined in accordance with AASHTO T 152. Air-entrained concrete shall be used for the construction of the following items:

(a) All retaining walls and bridge units, except culvert-type structures and seal courses.
(b) Concrete median barriers.
(c) All piles (not required for cast-in-place concrete piles).
(d) Concrete pavements.
(e) Approach slabs and paved approaches.
(f) Concrete medians and median strips.
(g) Sidewalks, curb ramps and steps.
(h) Curbs, gutters, curb and gutter and surface drain basins and drains.
(i) Concrete pedestals for signs, signals and lighting.

**501.10.1 Other Concrete.** All other concrete, except seal concrete, may be air-entrained but only in accordance with the requirements of these specifications.

**501.10.2 Required Air Content.** If air-entrained concrete is used, the designated quantity of air by volume shall be a minimum of 5.0 percent. For concrete pavement, the specified air content will apply to the measurements taken behind the paver or to measurements taken in front of the paver minus the established air loss through the paver.

**501.10.3 Incorporation Procedures.** Air-entraining admixtures shall be added to the concrete during the mixing process. The admixture shall be of such volume and strength that the admixture can be accurately measured and dispensed in accordance with the manufacturer's recommendations. The dispenser shall consistently deliver the required quantity of admixture within a tolerance of ± 3 percent.

**501.10.4 Redosing.** When the measured air content is below the minimum specified value, the Contractor will be allowed to re-dose the concrete in the field one time. The Contractor shall submit a Re-dosing Plan to the Engineer for approval. The Re-dosing Plan shall address the following:

(a) Field measurement of the air entrainment admixture
(b) Brand of air entrainment admixture being used
(c) Incorporation and mixing of the air entrainment admixture
(d) The use of additional water

**501.10.4.1 Allowed.** The Re-dosing Plan shall be approved prior to use.

**501.10.4.2 Other Requirements.** All other requirements of this specification shall still apply.

**501.10.4.3 Unacceptable Results.** Concrete with measured air content below 4.0 percent is unacceptable.

**501.11 Concrete Admixtures for Retarding Set.** If specified in the contract, an approved retarding admixture shall be provided and incorporated into the concrete. If not specified in the contract, the use of an approved retarding admixture will be permitted upon written notification from the Contractor. Any retarding admixture shall be added in accordance with Sec 501.10.3 by means of a dispenser conforming to the requirements of that section. No direct payment will be made for furnishing the retarding admixture or for incorporating the admixture into the mixture.

**501.12 Water-Reducing Admixtures.** Type A water-reducing admixtures may be used in any concrete. When Type A water-reducing admixture is added to pavement concrete for paving purposes, a reduction of cement up to 25 lbs per cubic yard (15 kg/$m^3$) will be permitted. The dosage rate of Type A water-reducing admixture shall be within the ranges recommended by the manufacturer and approved by the Engineer. Any cementitious material substitution permitted by specification shall be based on the reduced cement content. Water-reducing admixtures shall be added in accordance with Sec 501.10.3 by means of a dispenser conforming to the requirements of that section. High range water-reducing admixtures may be used when specified or as approved by the Engineer.

**501.12.1 Modified B-2 Utilized.** Modified B-2 concrete shall use a Type A or Type D water-reducer admixture.

**501.12.2 Silica Fume Utilized.** Concrete utilizing silica fume shall use a water-reducer admixture that may be added by hand methods. The amount of water contained by the water-reducer admixture shall be included in the overall water content of the concrete.

**501.12.3 Consistency Requirement.** When a water-reducer admixture is used the maximum allowed slump may be increased to 6 inches for all concrete classes. The concrete shall be homogeneous with no aggregate segregation.

**501.13 Calcium Chloride.** The use of calcium chloride or other approved accelerating admixtures in concrete mixtures will not be permitted.

**501.14 Supplementary Cementitious Materials in Concrete.** The Contractor may use fly ash, GGBFS or silica fume in the production of concrete in accordance with these specifications. Ternary mixes will be allowed for all concrete classes. Ternary mixes are mixes that contain a combination of Portland cement and two supplementary cementitious materials. Supplementary cementitious materials may be used to replace a maximum of 40 percent of the Portland cement.

The amount of each supplementary cementitious materials used in a ternary mix shall not exceed the limits specified herein.

**501.14.1 Fly Ash.** Approved Class C or Class F fly ash may be used to replace a maximum of 25 percent of the Portland cement on a pound for pound (kg for kg) basis in all concrete.

**501.14.2 Ground Granulated Blast Furnace Slag**. Approved GGBFS may be used to replace a maximum of 30 percent of the Portland cement on a pound for pound (kg for kg) basis in all concrete.

**501.14.3 Silica Fume.** Approved silica fume may be used to replace a percent of the Portland cement on a pound for pound (kg for kg) basis. The following limits shall apply when silica fume is used:

| Silica Fume Replacement Limits, % | | |
|---|---|---|
| **Class of Concrete** | **Minimum** | **Maximum** |
| MB-2 | 6 | 8 |
| A-1, B, B-1, B-2, PCCP, Seal | ---- | 8 |

**501.14.3.1 Silica Fume Requirements**. Silica fume shall be approved prior to use and be in accordance with ASTM C 1240, except as noted herein. If dry compacted form, the admixture shall be 100 percent silica fume with no admixtures. Silica fume slurries may contain other approved admixtures, such as water reducers or retarders, if the admixtures are included by the manufacturer of the silica fume admixture.

**501.14.3.2 Manufacturer Certification**. The Contractor shall furnish to the Engineer a manufacturer's certification along with the brand name, batch identification, quantity represented, percent solids and the type, name and quantity of any admixtures that are provided in the silica fume admixture.

**501.14.3.3 Silica Fume Test Results.** The manufacturer's certification shall contain results of recent tests conducted on samples of the silica fume material taken during production or transfer and indicating conformance with Tables 1 and 3 of ASTM C 1240 and this specification. The supplier shall further certify that the material being furnished is in accordance with this specification.

**501.14.3.4 Silica Fume Approval.** For approval prior to use, the supplier shall furnish the same information to the Engineer for submittal to the IDOT Bureau of Materials & Physical Research, 126 East Ash Street, Springfield, IL 62704-4766, along with any requested samples for testing.

**501.14.3.5 Silica Fume Slurry.** Liquid silica fume admixture shall be protected from freezing at all times.

**501.14.3.6 Admixture Compatibility**. All admixtures used shall be compatible with the silica fume admixture and shall be recommended or approved in writing by the manufacturer of the silica fume admixture.

**501.14.4 Source Changes.** Changes in class or source of fly ash, grade and source of GGBFS, or brand and source of silica fume used in concrete structures will be permitted only with written approval from the Engineer. Only fly ash, GGBFS or silica fume resulting in concrete of the same color shall be used in any individual unit of the structure.

**501.14.5 Mix Proportions.** When fly ash or GGBFS is used, an adjustment in design mix proportions will be required to correct the volume yield of mixture. Approval shall be obtained from the Engineer prior to any change in mix design or proportions.

**501.14.6 Mixing Water.** Maximum mixing water shall be based on total cementitious material. The quantity of mixing water in the concrete shall be considered the net quantity after proper allowance has been made for absorption by the aggregate.

**501.14.7 Measuring Fly Ash and Ground Granulated Blast Furnace Slag**. Fly ash or GGBFS shall be measured in the same manner and with the same accuracy as cement. (The mass determination of) Fly ash or GGBFS may be weighed (determined) separately on the same scale as cement, provided the scale increments are such that the specified weighing (mass determination) accuracy can be maintained. If the (mass of) fly ash or GGBFS is weighed (determined) together with the cement, the (mass of) cement shall be weighed (determined) first and the accuracy shall apply to the combined weight (mass).

**501.14.8 Measuring Silica Fume.** Silica fume shall be measured by weight (mass) or volume within a tolerance of plus or minus 2 percent.

**501.14.9 Silica Fume Batching Sequence.** Silica fume shall be added at the plant at the same point in the batch sequence as recommended by the manufacturer of the silica fume. The silica fume may be added by hand methods.

**501.14.10 Calculating Silica Fume Solids.** For silica fume solutions, the quantity of liquid silica fume admixture needed to furnish the required silica fume solids shall be calculated based on the weight per gallon (mass per liter) and percent solids of the silica fume admixture being used.

**501.14.11 Measuring Cementitious Materials.** Fly ash, GGBFS or silica fume will be considered as cement when measuring mixing time.

**501.15 Commercial Mixture.** If specified in the contract that an approved commercial mixture of concrete may be used, the Contractor shall notify the Engineer in writing, setting out for approval the source and proportions of the mixture proposed to be furnished. The statement shall include the following:

(a) The types and sources of aggregate.
(b) Type and source of cement and other cementitious material.
(c) Scale weights (masses) of each aggregate proposed as pounds per cubic yard (kg/$m^3$) of concrete.
(d) Quantity of water proposed, as pounds or gallons per cubic yard (kg or L per $m^3$) of concrete.
(e) Quantity of cement proposed as pounds per cubic yard ($m^3$) of concrete.

**501.15.1 Minimum Cement Content.** The concrete shall contain no less than 517 pounds (305 kg) of cement per cubic yard ($m^3$). The use of fly ash, GGBFS or silica fume shall be in accordance with Sec 501.14. The plant shall comply with other requirements of these specifications or be as approved by the Engineer. The concrete will be subject to acceptance or rejection by visual inspection at the job site.

**501.15.2 Certification.** The supplier shall furnish certification with the first truck load of each day's production of concrete that the material and mix proportions used are in accordance with the approved mixture. Upon completion of the work, plant certification shall be furnished by the supplier for the total quantity delivered.

## SECTION 502 PORTLAND CEMENT CONCRETE BASE AND PAVEMENT

**502.1 Description.** This work shall consist of constructing a Portland cement concrete base or pavement, with or without reinforcement as specified, shown on the bridge plans or directed by the Engineer.

**502.2 Material.** All material, proportioning, air-entrainment, mixing, slump and transporting for Portland cement concrete shall be in accordance with Sec 501. All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Emulsified Asphalt (SS-1, SS-1H, CSS-1 or CSS-1H) | 1015 |
| Steel Wire Fabric for Concrete | 1036 |
| Concrete Curing Material | 1055 |
| Material for Joints | 1057 |

**502.3 Equipment.** Equipment and tools necessary for handling material and performing all parts of the work shall be satisfactory to the Engineer as to design, capacity and mechanical condition. The equipment shall be at the job site sufficiently ahead of the start of construction operations to be examined thoroughly by the Engineer and shall be in accordance with the following:

**502.3.1 Batching Plant, Mixer and Hauling Equipment.** The batching plant, mixer, water measuring equipment, weighing (mass determination) and hauling equipment shall be in accordance with Sec 501.

**502.3.2 Slip-Form Construction.** Concrete base or pavement may be constructed by the use of sliding form methods. Slip-form construction shall be in accordance with these specifications.

**502.3.2.1 Consolidating and Finishing Equipment.** The concrete shall be consolidated and finished by a slip-form paver designed to spread, consolidate and shape the concrete in one complete pass of the machine in such a manner to provide a smooth, dense and homogeneous pavement in conformance with the bridge plans and specifications. No apparent slumping of the concrete shall occur within 6 inches (150 mm) of the pavement edge. If necessary to stop the forward movement of the paver, the vibratory and tamping elements shall be stopped immediately.

**502.3.2.2 Forms and Keyways.** Forms shall be used where necessary to produce a concrete base or pavement of plan section and the forms shall incorporate a keyway where required. Longitudinal tongue and groove joints of the specified type and size shall be constructed at locations shown on the bridge plans or approved by the Engineer. The groove side of the joint shall be slip-formed or formed with approved metal forms that will produce a keyway in accordance to plan location and dimensions. The form shall remain in place for sufficient time to prevent slump. Metal forms may be left in place if approved by the Engineer. The tongue side of the joint may be constructed without forms provided the plan section of the concrete and joint is maintained.

**502.3.3 Vibrators.** Vibrators used for full width vibration of the concrete shall be of the internal type. Vibrating equipment shall be operated in accordance with the manufacturer's recommendation at a frequency to provide satisfactory results, but shall be no less than 4500 impulses per minute. Hand vibrators shall have a frequency of no less than 4500 impulses per minute. The Contractor shall have a tachometer available at all times for checking the vibration frequency.

**502.3.4 Concrete Saw.** If sawed joints are required, equipment shall be capable of providing a groove of the specified dimensions in the concrete. Equipment shall be a wet-cut saw, referred to as a "conventional concrete saw" or a lighter weight dry-cut saw, referred to as an "early-entry concrete saw," used to establish joints sooner than the conventional saw.

**502.3.5 Equipment for Sealing Joints.** An approved double boiler-type heating kettle equipped with a mechanical agitator and a satisfactory temperature indicating device shall be required. The equipment shall be capable of heating the joint sealing material uniformly without damage.

**502.3.6 Auxiliary Equipment.** Auxiliary equipment shall be available at all times as follows:

(a) A minimum of one footbridge designed to be readily transportable and having no contact with the concrete base or pavement.

(b) Metal dyes with beveled face numerals 3 inches (75 mm) to 5 inches (125 mm) high and thick enough to make an indentation of 1/4 inch (6 mm). A satisfactory dye shall be used for marking the location of the station number.

**502.3.7 Field Laboratory.** The Contractor shall provide a Type 1 field laboratory in accordance with Sec 601.

**502.4 Construction Requirements.**

**502.4.1 Weather Limitations.** Concrete shall not be placed upon frozen subgrade. All concrete shall be effectively protected from freezing until a minimum compressive strength of 3500 psi (24 MPa) has been attained. The Contractor shall provide a method, meeting the approval from the Engineer, of monitoring the concrete that demonstrates that the concrete has been protected from freezing. Regardless of precautions taken, the Contractor shall assume all risks, and all frozen concrete shall be replaced at the Contractor's expense.

**502.4.2 Protection Against Rain.** To protect against rain, the Contractor shall have on location at all times material for the protection of the edges and surface of the unhardened concrete. The Contractor shall protect the concrete from damage due to rain. Failure to properly protect unhardened concrete may constitute cause for the removal and replacement of defective concrete at the Contractor's expense.

**502.4.3 Setting Forms.** Forms shall be sufficiently supported to avoid displacement during paving operations. Both straight and curved forms shall be supported in such position that the face of the form shall be vertical on tangents and perpendicular to the superelevated section on curves. The top of the form shall not vary more than 1/8 inch (3 mm) from the true grade line during placing, compacting and finishing operations. The form alignment shall not vary more than 1/4 inch (6 mm) from the true alignment.

**502.4.4 Conditioning of Subgrade.** When forms have been securely set to grade, the subgrade shall be brought to proper cross-section in accordance with Sec 209. Low areas of treated bases shall be filled only with concrete integral with the pavement. No direct payment will be made for the concrete used to fill these low areas.

**502.4.5 Proportioning and Mixing Concrete.** Concrete shall be proportioned and mixed by truck or central mixers in accordance with Sec 501. This shall consist of batching all aggregate, cement and water by means of automatic weighing (mass determination) or metering, with all additives dispensed automatically and interlocked with the automatic weighing (mass determination) or metering controls. For central mixed concrete, the mixing cycle shall be timed and interlocked with the weight (mass) batch cycle. The weight (mass determination) setting controls shall be equipped such that the controls may be locked when directed by the Engineer. The automatic batching equipment shall be capable of conversion to manual operation if necessary. Manual operation shall not be permitted beyond 24 hours after breakdown in the automatic equipment, except by written approval of the Engineer. When a project includes paving that cannot be performed in a normal sequence, the Contractor will be permitted to place a maximum of 7000 square yards (5800 m2) using manual batching methods. For all contracts having a total of no more than 20,000 square yards (16,700 m2) of concrete base course and concrete pavement combined, manual batching methods will be permitted.

**502.4.6 Placing Concrete.** The concrete shall be deposited over the entire width of the subgrade in such a manner as to prevent segregation and to minimize handling. Mixers, including truck mixers and trucks used for transporting concrete, will be permitted to discharge concrete by chute or by dumping directly on the subgrade or prepared base provided the underlying material is not damaged or distorted. Honeycomb in the concrete base or pavement edge may be cause for rejection of the concrete.

**502.4.7 Tie Bar Placement.** Tie bars shall be supported in the proper position by chairs driven into the subgrade, or may be placed by approved mechanical methods prior to the consolidation of the concrete after the concrete has been struck off. Tie bars shall be free from dirt, oil, paint and grease. Tie bars required at longitudinal construction joints shall be positioned before concrete base or pavement consolidation.

**502.4.8 Final Strike-off, Consolidation and Finishing.** Machine finishing by extrusion methods or by vibrating and screeding processes shall be required for all concrete except as permitted in accordance with Sec 502.4.8.6.

After the final course of the concrete has been placed, the concrete shall be struck-off and thoroughly vibrated until concrete of a uniform and satisfactory density is attained. The surface of the pavement shall be of uniform texture and to the proper grade and typical section.

**502.4.8.1 Consolidation.** Vibrating tubes shall extend into the concrete the distance necessary to provide adequate consolidation. Vibrators shall be operated only when the machine to which the vibrators are attached is moving. Care shall be taken that the vibrator does not penetrate the subgrade or dislodge or move the joints. Vibrators shall not come in contact with the reinforcement, load transfer devices, subgrade or side forms.

**502.4.8.2 Added Finishing Water.** Moisture in any form shall not be applied to the surface of the concrete except for emergency conditions. When emergency conditions exist and it becomes necessary to apply additional moisture to the surface of the concrete in order to complete the final finishing operation, water may only be applied in the form of a fine pressure spray. Under such conditions, placement of additional concrete on the subgrade shall be discontinued until the emergency conditions cease.

**502.4.8.3 Surface Texture.** After surface irregularities have been removed, the concrete surface shall be given a uniformly roughened finish. The surface texture shall be tested in accordance with ASTM E 965, except as modified herein, to ensure the texture is adequate for desired friction characteristics. The test locations will be the same locations as identified for strength and thickness determination.

**502.4.8.3.1 Sample Container.** Plastic sample containers for ASTM E 965 testing shall be of a rigid material that will crack or break if the container is deformed. Damaged or deformed containers shall not be used.

**502.4.8.3.2 Required Texture Depth.** The results of ASTM E 965 shall show a texture depth of any sublot, as defined in Sec 502.10.1, to have a minimum value of 0.70 mm. Any sublot showing a texture depth of less than 0.70 mm shall require diamond grinding of the pavement represented by this sublot to attain the necessary texture. All testing of the surface texture shall be completed no later than the day following pavement placement.

**502.4.8.3.3 Minimum Diamond Grinding Length.** Diamond grinding, except for bump correction, shall be across the entire width of the traveled way and shall be continuous for a minimum of 0.1 mile (0.2 km).

**502.4.8.3.4 Wave Texture Testing.** ASTM E 965 will be waived if the Contractor elects to diamond grind or tine the concrete with a wire comb. The concrete may be tined either longitudinally or transversely.

**502.4.8.3.4.1 Wire Comb.** A wire comb shall be no less than 10 feet (3 m) long with a single line of wires exposed to a length of approximately 4 inches (100 mm). The wire shall be blue-tempered and polished spring steel with nominal dimensions of 0.028 inch (0.71 mm) thick and 0.100 to 0.125 inch (2.54 to 3.175 mm) wide. The wires shall be spaced to provide 1/2-inch (13 mm) clear space between wires and securely mounted in a rigid head. Except for concrete finished by hand methods, the wire comb shall be mechanically operated and capable of covering the full width of slab in a single pass, at a uniform speed and at a uniform depth. Final approval of the wire comb will be based on satisfactory performance during actual use

**502.4.8.3.4.2 Texturing with Wire Comb.** Successive passes of the comb shall be overlapped the minimum necessary to attain a continuously textured surface. The surface texture produced shall have an average texture depth of approximately 0.125 inch (3 mm). Small or irregular areas, or areas not suitable for machine texturing when adjacent surrounding concrete is ready for texturing, may be textured with a hand operated device producing a textured surface equivalent to that required for machine combing.

**502.4.8.4 Edging at Forms and Joints.** After the final finish, but before the concrete initial set, the edges of the concrete along each form line, and on each side of transverse expansion joints and construction joints shall be worked with an edging tool having a radius of approximately 3/8 inch (10 mm). A well-defined and continuous radius having a smooth, dense finish shall be produced. The surface of the concrete shall not be unduly disturbed by tilting of the tool during use. Tool marks on the pavement shall be eliminated by brooming or dragging the surface. In doing this, the rounding of the corner of the pavement shall not be disturbed. All concrete on top of the joint filler shall be completely removed. All joints shall be tested with a straightedge before the concrete has set, and corrections made if one side of the joint is higher than the other.

**502.4.8.5 Station Numbers.** The Contractor shall indent station numbers into all pavement immediately following the final finishing operations and before the concrete's final set. The numbers shall be placed at alternating full stations as ascertained by measurements determined by the Engineer. Equations in stationing shall also be marked in the pavement. On undivided pavement, the station numbers shall be on the left side of the pavement with respect to the ascending stationing and shall be on the pavement edge unless an integral curb is involved, in which case the numbers shall be placed on the face of the curb. On divided pavement, station numbers shall be placed on the median side of each pavement. The numbers shall be placed facing the centerline of the pavement, or the centerline of each pavement in the case of divided pavements. The numbers shall be placed on a troweled area of the finished surface. No direct payment will be made for marking station numbers.

**502.4.8.6 Hand Finishing.** Compacting, vibrating and finishing concrete by hand methods will be permitted:

(a) For all curves having a form line radius of less than 200 feet (60 m) or where wood forms are used.

(b) For all irregularly shaped areas.

(c) For pavement lanes less than 200 feet (60 m) long.

(d) For pavement lanes less than 10 feet (3 m) wide.

(e) For bridge approaches and pavement to first expansion joint.

(f) When a breakdown of the mechanical compacting and finishing equipment occurs or in the event of some other emergency. After a breakdown, only material which has already been proportioned and which may be rendered unsatisfactory for use may be finished by hand.

(g) For all Portland cement concrete base.

**502.5 Joints.** Joints shall be of the specified type and dimensions, and constructed at the locations shown on the bridge plans or as approved by the Engineer. Where joints are preformed, the form or joint shall be set and securely fastened to ensure the joint being in the required position when the concrete is finished. The final position of dowels and tie bars shall be parallel to the subgrade and perpendicular to the line of the joint. Dowel supporting assemblies shall conform to one of the types shown on the bridge plans. The concrete shall be placed to avoid displacement or disarrangement of the joint installations.

**502.5.1 Expansion Joints.** Expansion joints shall extend for the full cross-section of the concrete pavement. Filler placed prior to the placement of the concrete shall be installed with a removable cap or edging bar as a guide for edging the joint and protection of the filler during the concrete's placing and finishing. Joints constructed after the placement of concrete shall be sawed full depth, and the exposed edges shall be ground to a chamfer of 3/8 inch (10 mm). The filler shall rest snugly on the subgrade from form to form. The joints shall be sealed in accordance with Sec 502.5.4. Upon removal of the forms, any struts or fins of concrete extending across the joint shall be removed to the full width of the joint and the full thickness of the concrete base or pavement.

**502.5.2 Construction Joints.** Construction joints shall be made at the close of each day's work or when the work is stopped or interrupted for more than 30 minutes. Transverse construction joint shall be located 15 feet from the last contraction joint. Construction joints shall be constructed perpendicular to the top surface and the centerline of the concrete base or pavement. Construction joints may be formed with a timber header or may be sawed full depth. The final joint shall conform to the cross-section of the pavement. Before paving operations are resumed, all surplus concrete and other refuse shall be removed from the subgrade.

**502.5.3 Sawing Joints.** Unless otherwise provided, all transverse contraction joints and all Type L longitudinal joints shall be sawed in a single cutting operation with the joint groove cut to the dimensions shown on the bridge plans except as herein specified. If the groove for poured type transverse joints is cut prior to removal of the forms, the groove shall be cut as close as is practical to the concrete base or pavement edge, and the resulting crescent shaped plug in the groove, immediately adjacent to the form, will be acceptable. For intersections and irregular pavement, joints shall be sawed at locations as approved by the Engineer. Sawing of the joints shall begin as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling. All joint grooves shall be established before uncontrolled shrinkage cracking takes place. The sawing of any joint shall be omitted if a crack occurs at or near the joint location prior to the time of sawing. Sawing shall be discontinued when a crack develops ahead of the saw. The Engineer reserves the right to have the Contractor install preformed type joints on multiple width construction when the use of sawed joints fails to prevent random cracking. Any joint that opens more than ¼ inch (6 mm) shall be sealed. Any pavement with random cracking not controlled by dowels or tie bars shall be either removed and replaced using dowels or tie bars as appropriate to the nearest controlled joint or repaired with some other method approved by the Engineer at the Contractor's expense.

**502.5.3.1 Forming Longitudinal Joint.** A joint forming device may be used to establish the longitudinal joint between the two driving lanes or between the driving lane and shoulder 6 foot wide or greater. The pavement shall have a plan thickness of 8 inches or greater.

**502.5.3.1.1 Notification.** The Contractor shall indicate in the Quality Control Plan if the longitudinal joint forming devices is going to be utilized on the project.

**502.5.3.1.2 Joint Forming Device.** The joint forming device shall consist of a pair of straight blades mounted under the paver. The first blade shall be placed under the front of the primary pan extending forward between the vibrators, if mechanically possible. The second blade shall be placed on the finishing pan in identical alignment to the first blade. Blade depth shall be equal to one-third of the slab thickness.

**502.5.3.1.3 Depth Verification.** The Engineer shall have access behind the paver to randomly check joint formation by inserting a thin metal strip equal to one-third of the slab thickness into the formed joint.

**502.5.3.1.4 Weak Plane Verification.** The Contractor shall take four 4-inch diameter cores in the longitudinal joint. Cores shall be taken and tested the following day after the first day of paving. Samples shall be taken from random locations determined by the Engineer. The cores shall be centered within ± ½ inch around the joint forming trail. The first one-third of the slab thickness and the second one-third of the slab thickness of each core shall be sawed off from the top and tested in the vertical position for split tensile strength. The average strength ratio of the first and second cores shall be 1/3 or less.

**502.5.3.1.5 Testing Frequency.** For each successive day after the first day of paving, two 4-inch diameter cores shall be taken in the longitudinal joint. Samples shall be taken from random locations determined by the Engineer. Cores shall be taken and tested the following day after placement. Cores shall be tested to determine the indirect tensile strength ratios. If satisfactory results are consistently achieved, the Engineer may reduce the number of cores taken.

**502.5.3.1.6 Joint Continuity.** The Contractor shall ensure longitudinal joint continuity between consecutive day's paving.

**502.5.3.1.7 Unacceptable Results.** If the test results or the quality of the joint forming process are not satisfactory to the Engineer, the Contractor shall saw the longitudinal joint for the length affected.

**502.5.4 Sealing Joints.** All sawed contraction joints shall be unsealed, unless otherwise specified. Sawed or formed expansion joints shall be sealed with joint sealing material before the pavement is opened to any traffic, including construction traffic. Immediately prior to sealing, the joints shall be thoroughly cleaned and dried. The sealing material shall be heated to the pouring temperature recommended by the manufacturer. Any material which has been heated above the maximum safe heating temperature will be rejected. Any excess material shall be removed from the pavement surface.

**502.5.5 Joint Filler at Railroad Crossings.** Bituminous filler for use between railroad crossing approach slabs and the crossing shall be an approved commercial bituminous mixture in accordance with Sec 401. The mixture shall be tamped into a firm and compacted state.

**502.6 Curing.** Immediately after the finishing operations have been completed and as soon as marring of the concrete will not occur, the entire surface and exposed edges of the newly placed concrete shall be covered and cured in accordance with one of the following methods.

The concrete shall not be left exposed for more than 30 minutes between stages of curing or during the curing period.

**502.6.1 White Pigmented Membrane.** After the free water has left the pavement surface, the entire surface shall be sealed by spraying with a uniform application of white pigmented membrane curing material. The Contractor shall provide satisfactory equipment to ensure uniform mixture and coverage of curing material, without loss, on the pavement at the rate of not less than one gallon for each 200 square feet (0.20 L/m2). If rain falls on the newly coated pavement before the film has dried sufficiently to resist damage, or if the film is damaged in any other way, the Contractor shall apply additional curing material to the affected portions. All areas cut by finishing tools subsequent to the application of the curing material shall immediately be given new applications at the rate specified above. If hairline cracking develops before the membrane can be applied, the concrete shall be initially cured with wet burlap in accordance with Sec 502.6.2 before the membrane is placed. Membrane curing shall not be used on Portland cement concrete base. Emulsified asphalt may be used to cure the concrete base if the surface course is to be a bituminous type.

**502.6.2 Burlap.** The top surface of the concrete shall be temporarily covered with thoroughly damp burlap after the concrete has set sufficiently to prevent marring of the surface. Burlap shall be handled in such a manner that contact with earth or other deleterious substances is avoided. All burlap, except burlap previously used for curing concrete, shall be thoroughly washed. The burlap shall be kept thoroughly wet until removed for application of the final curing material. Neither the top nor the edge of the concrete shall be left unprotected for more than 30 minutes. When the burlap is removed, white pigmented membrane curing material shall be continued by one of the approved methods.

**502.7 Removing Forms.** Forms shall be removed carefully to avoid damage to the concrete base or pavement. Honeycombed areas not rejected shall be immediately repaired. If the forms are removed less than 72 hours after placing concrete, the sides of the concrete shall be cured by one of the methods specified above. Any trench excavated for the forms shall be entirely backfilled so water will not stand next to the concrete base or pavement.

**502.8 Surface Test.** The concrete base or pavement surface shall be thoroughly tested for smoothness by profilographing or straightedging as indicated.

**502.8.1 Straightedging.** .As soon as practical, the Engineer will straightedge all segments of the paved surface not profilographed, including shoulders. Any variations exceeding 1/8 inch in 10 feet (3 mm in 3 m) will be marked. Areas more than 1/8 inch (3 mm) high shall be removed in accordance with Sec 502.8.6.2. For areas more than 1/8 inch (3 mm) low, appropriate correction will be required for suitable smoothness. The straightedge path for shoulders will be located near the shoulder's centerline. Shoulders that are paved integrally with an adjacent driving lane will not require straightedging. Correction areas on shoulders will not be considered a marred surface. Concrete base shall be finished so that the surface will not vary more than 1/4 inch (6 mm) from a 10-foot (3 m) straightedge.

**502.8.2 Profilographing.** Profilographing will be applicable to the surface of all mainline paving, auxiliary lanes, turning lanes and ramps for projects or combination of projects, consisting of more than 0.5 mile (1 km) of total profilographable pavement.

Profilographing may be waived by the Engineer if staging of the overall project, such as multiple entrance lane gaps, lane staging, etc., affects the normal paving operation, or if multiple profilograph exceptions continuously exist eliminating smoothness requirements on a large portion of the same roadway. Upon waiver, all smoothness requirements shall be in accordance with Sec 502.8.1.

**502.8.2.1 Starting Point.** All wheels of the profilograph shall be placed on the new pavement, with stationing based on the center wheel.

**502.8.2.2 Exceptions.** Profilographing will not be required for the following:

(a) Bridge decks, bridge approach slabs and concrete approach pavements.

(b) Pavement on horizontal curves with centerline radius of curve less than 1000 feet (300 m) and pavement within the superelevation transition of such curves.

(c) Pavement on vertical curves having a "K" value less than 90 and a length less than 500 feet (150 m).

(d) Pavement width transitions.

(e) Fifty feet (15 m) in direction of travel on each side of utility appurtenances such as manholes and valve boxes.

(f) Fifty feet (15 m) in direction of travel on each side of intersecting routes with special grade transition.

(g) Shoulder areas.

(h) Any lane which abuts an existing lane not constructed under the same contract.

(i) Interruptions designated by the Engineer which provide independently placed sections shorter than 50 feet (15 m). Interruptions designated by the Contractor's operations shall be in accordance with Sec 502.8.5.12.

(j) The last 15 feet (5 m) of any section where the prime Contractor is not responsible for the adjoining surface.

(k) The first or last 12.5 feet (4 m) of a pavement section adjoining any above exception area.

**502.8.3 Equipment.** The profilograph shall be a California-type as approved by the Engineer. The equipment furnished shall be in accordance with MoDOT Test Method TM 59. The profilogram line drawn by the profilograph will be referred to as the profile trace in these specifications.

**502.8.4 Calibration.** All profilographs used shall be calibrated at least annually on a test section directed by MoDOT. The Contractor's calibration profile index shall not vary more than 2.0 inches per mile (30 mm/km) from a standard profile index produced by a MoDOT profilograph.

**502.8.4.1 Longitudinal.** Longitudinal calibration shall consist of pushing the profilograph over a pre-measured test distance and determining the scale factor by dividing the premeasured test distance by the length of the paper in inches (mm). This factor shall be 25 (300), one inch equals 25 feet (25 mm equals 7.622 m). If not, the machine shall be adjusted until the scale factor is 25 (300) plus or minus 0.2 percent.

**502.8.4.2 Vertical.** Vertical calibration shall consist of sliding a pre-measured calibration block, measured to the nearest 0.01 inch (0.25 mm), under the sensing wheel while the profilograph is stationary. The measurement of the vertical trace line from the base line to the peak and return shall be the same as the calibration block. The trace line shall return to the base line. No tolerance will be allowed.

**502.8.4.3 Comparison.** A profilograph equipped with automatic profile trace reduction capabilities shall be checked by comparing the machine's results with the results obtained by the Engineer. This shall be done for the profile trace obtained on MoDOT's test section. The results including all reduction settings and the profilogram shall be submitted to the Engineer. The results of the comparison may not differ by more than 2.0 inches per mile (30 mm/km).

**502.8.4.4 Certification.** The Contractor shall furnish certification that the 25-foot (7.622 m) profilograph test and evaluation was conducted by an operator trained in the use of profilograph equipment and with sufficient experience to demonstrate the operator's competence.

**502.8.4.5 Settings.** Reduction settings used during the annual calibration shall be used during production without exception. Changes to the reduction settings void the calibration.

**502.8.5 Test Procedures and Reporting.**

**502.8.5.1 Section Definition.** A profilogram shall be made for each continuous pavement section of 50 feet (15 m) or greater completed during each day's placement. A section will be defined where paving begins and terminates at a day's work joint. Interruptions designated by the Engineer which cause placement to cease and begin at a new location will be considered as a separate section for that day's operation if the separate section is greater than 250 feet (75 m).

**502.8.5.2 Profilograph Reporting.** The Contractor shall furnish the profilogram and the profilogram evaluation to the Engineer. The testing shall be done by a certified operator in the presence of the Engineer. The testing procedure and the evaluation of the profilogram shall be done in accordance with this specification and MoDOT Test Method TM 59. The profilogram and evaluation shall be furnished to the Engineer no later than the end of the next working day following placement of the pavement. If corrective grinding is required, another profilogram and evaluation shall be furnished to the Engineer no later than two days after completing corrective grinding. The evaluation shall be reported on an approved form for each day's placement. Separate sections in a day's placement shall be appropriately identified on the day's report for MoDOT use. Standard forms for reporting results may be obtained from MoDOT.

**502.8.5.3 Profilogram Quality Acceptance.** The Engineer may test the surface or re-evaluate the profilogram for comparison and quality assurance purposes. If these tests or re-evaluations indicate the Contractor-furnished profilograms are not accurate within 3.0 inches per mile (45 mm/km), the Engineer may test the entire project length.

If the entire project length is tested, the Contractor will be charged for this work at the rate of $500.00 per lane mile ($310.00 per lane kilometer). Furnishing inaccurate test results may result in decertification of the operator.

**502.8.5.4 Objects on Pavements.** All objects and foreign material on the pavement surface, including protective covers, if used, shall be removed by the Contractor prior to testing and, if appropriate, protective covers shall be properly replaced by the Contractor after testing.

**502.8.5.5 Wheel Initialization.** The sensing wheel shall be lifted, rotated to take slack out of the linkage, and lowered to the pavement surface at the starting point prior to testing.

**502.8.5.6 Speed.** The profilograph shall be propelled at walking speed in the paths in accordance with Sec 502.8.5.10 for each section of pavement. Propulsion may be provided by manually pushing or by another suitable propulsion unit. Speed of the profilograph shall be decreased if excessive spikes are encountered on the trace.

**502.8.5.7 Location Indicator.** A location indicator for lateral placement shall be used. The back end of the profilograph shall be kept in the required path on horizontal curves except where profilographing is not required in accordance with Sec 502.8.2.2 (b).

**502.8.5.8 Stationing.** The actual stations shall be shown on the profilogram at least every 200 feet (50 m) for necessary bump referencing. The stations may be marked on the trace by manual placement of a vertical mark when the sensing wheel reaches the station. The corresponding station shall be written at the mark. This vertical mark shall reference the upward direction of the trace.

**502.8.5.9 Required Information.** Both ends of the profilogram shall be labeled with the stationing, lane designation, position or track on the pavement, the direction the pavement was placed and the date placed.

**502.8.5.10 Profilograph Path.** Pavement profiles shall be taken near the center of each traffic lane and parallel to the edge of pavement as directed by the Engineer. Each profile line will be incorporated into the section report as separate tracks.

**502.8.5.11 Segment Definition.** Sections shall be divided into segments of 0.1 mile (0.2 km) with the exception of the last segment. If the last segment is greater than 250 feet (75 m) and less than 0.1 mile (0.2 km), then the segment shall be considered as a 0.1 mile (0.2 km) segment. If the last segment is 250 feet (75 m) or less long, the profilogram for that segment shall be included in the evaluation for the adjacent segment in that section.

**502.8.5.12 Short Sections.** If an independently placed section required by the bridge plans or the Engineer is between 50 feet and 250 feet (15 m and 75 m), or an independently placed section caused by the Contractor's operation is less than 50 feet (15 m), a profilogram shall be made for that section and included in the evaluation of the most recently placed adjoining segment of another day’s placement.

**502.8.5.13 End of Section.** The last 12.5 feet (4 m) of a pavement section and the construction header shall be included in the profilogram of the next day’s placement.

**502.8.5.14 Profile Index.** A profile index shall be calculated from the profilogram for each segment of all profile trace lines and for the overall section. A report for each day's placement shall be completed. A day's report may consist of more than one section index if a bridge or a designated interruption is encountered in a day's placement. The profile index shall be calculated by summing the vertical deviations of the profile trace above or below the reference line. The units of this measure shall be inches per mile (mm/km).

**502.8.6 Surface Corrections.** Bump correction or smoothness correction or both may be required after the initial smoothness report is performed to produce a final report. If the initial report has no corrections in accordance with Secs 502.8.6.3 and 502.8.6.5, the initial report will serve as the final report.

**502.8.6.1 Acceptable Index.** If an average profile index of 45.0 inches per mile (711 mm/km) for pavements having a final posted speed greater than 45 mph (70 km/h), or 65.0 inches per mile (1026 mm/km) for pavements having a final posted speed of 45 mph (70 km/h) or less, is exceeded in any daily paving operation, the paving operation will be suspended and will not be permitted to resume until corrective action approved by the Engineer is taken by the Contractor.

**502.8.6.2 Correction.** Corrective action to improve the average profile index shall be accomplished by diamond grinding or by use of an approved device designed for that purpose. The use of a bush hammer or other impact device will not be permitted. The final surface texture of corrected concrete pavement shall be comparable to adjacent sections that do not require correcting. Satisfactory longitudinal grinding is acceptable as the final surface of the corrected pavements. All corrective work shall be completed prior to determination of pavement thickness.

**502.8.6.3 Bumps.** High points on the profile trace which correspond to high points or bumps on the pavement surface shall be separately identified. All bumps greater than 0.40 inch (10 mm) high over a 25-foot (7.622 m) span, as indicated on the profile trace, shall be corrected. The corrected bumps will be considered satisfactory when measurements by the profilograph show that the bumps are 0.40 inch (10 mm) or less high over a 25-foot (7.622 m) span. Station referencing or additional profiles may be used to accurately locate deviations greater than 0.40 inch (10 mm).

**502.8.6.4 Intermediate Report.** After removing all individual deviations greater than 0.40 inch (10 mm) high, an intermediate profilogram report for the appropriate section shall be provided. The report shall provide segment indexes for the entire day's section after initial bump correction. The intermediate report will serve as the final report if all average profile segment indexes are below the limits in accordance with Sec 502.8.6.5.

**502.8.6.5 Required Correction.** After removing individual deviations of 0.40 inch (10 mm), additional correction may be necessary to reduce any average profile segment index to 25.0 inches (395 mm) or less per mile (km) for pavements having a final posted speed greater than 45 mph (70 km/h), or 45.0 inches (711 mm) or less per mile (km) for pavements having a final posted speed of 45 mph (70 km/h) or less. On pavement segments where corrections are necessary, additional profiles shall be made to verify corrections have produced an average profile segment index within the limits noted above. Upon correction, a final report will be performed.

**502.9 Opening to Traffic.** The concrete base and pavement shall not be opened for low volume, light construction traffic until the concrete has attained a minimum compressive strength of 3000 psi (21 MPa). The concrete base and pavement shall not be opened to all types of traffic until the concrete has attained a minimum compressive strength of 3500 psi (24 MPa) and all sawed joints that have opened more than ¼ inch are sealed. Compressive strength will be determined by tests conducted in accordance with MoDOT test methods. Pavement shall be cleaned prior to opening to traffic.

**502.10 Material Acceptance.** Acceptance will be based on the following criteria being met:

(a) Test results indicating the concrete base or pavement meets the specification requirements

(b) Contractor following the approved Quality Control Plan (QCP)

(c) Favorable comparison between the Contractor's quality control tests and the Engineer's quality assurance tests. Favorable comparison will be obtained when the Engineer's QA tests results are within two standard deviations from the mean of the QC test results for each individual lot of material. For properties not evaluated on a lot by lot basis, favorable comparison will be obtained when both the QC and QA tests results meet the specification requirements. Compressive strength and slab thickness will be evaluated on a lot by lot basis.

**502.10.1 Lot Definition.** A lot shall be the surface area placed in a single day. Each lot shall be divided into no less than four or more than six sublots of equal surface area. For high daily production rates exceeding 7500 square yards (6275 m2) per day, the Contractor may choose to divide the day's production into two equal lots consisting of no less than four or more than six sublots each. The Contractor shall notify the Engineer of the size of the sublot or of the decision to divide a day's production into two equal lots prior to taking any core samples. When a day's production involves less than 600 square yards (500 m2), combine the following day's or days' production to reach 600 square yards (500 m2) and treat as a single lot, except while completing a particular mix design or project, in which case combine with the previous day's production and treat as a single lot. If a project has less than 7500 square yards (6275 m2) of a particular mix type, the lot will be defined as the plan quantity shown in the contract documents.

**502.10.2 Sampling.** One QC sample shall be taken for each sublot and a minimum of one QA sample shall be taken per lot. A sample shall be taken from the finished concrete consisting of a 4-inch (100 mm) diameter core for concrete bases or pavements less than 12 inches (300 mm) thick and a 6-inch (150 mm) diameter core for concrete bases or pavements 12 inches (300 mm) or greater. Sampling locations will be determined by the Engineer using random sampling procedures in accordance with ASTM D 3665.

**502.10.3 Coring.** Cores shall be taken in accordance with AASHTO T 24. Cores shall not be taken until a minimum compressive strength of 3000 psi (21 Mpa) has been attained. Cores shall be neatly cut with a core drill. The Contractor shall furnish all tools, labor and material for cutting samples and filling the cored hole. The Contractor shall fill the core holes with an approved non-shrink grout within one day after sampling.

**502.10.3.1 Testing Cores.** The core thickness shall be determined by the average caliper measurement in accordance with AASHTO T 148. After the thickness is determined, the cores shall be sawed to an L/D ratio of 2.0 and tested in accordance with AASHTO T 22. Cores shall not be taken until a minimum compressive strength of 3000 psi (21 MPa) has been attained. The Contractor shall determine the compressive strength by approved methods. Cores shall be tested for compressive strength 28 days after placement.

**502.10.3.2 Pavement Thickness after Diamond Grinding.** If the Contractor elects to diamond grind to improve smoothness or surface texture, in accordance with Sec 502.4.8.3, re-coring of the concrete for thickness acceptance will be required for all lots that were previously determined to be at plan thickness or less. The Engineer may require re-coring, regardless of the initial slab thickness, if two or more diamond grinding passes are conducted within a given lot. Cores shall be 4 inch (100 mm) in diameter. Location of coring will be determined by the Engineer using random sampling procedures in accordance with ASTM D 3665.

**502.10.4 Quality Level Analysis.** Compressive strength and thickness shall be evaluated for acceptance on a lot-by-lot basis using a Quality Level Analysis (QLA). The QLA will consider the variability (standard deviation) of the material and the testing procedures, as well as the average (mean) value of the test results to calculate the percentage of material that is above the lower specification tolerance limit (LSL) for compressive strength and thickness.

**502.10.4.1 Determine Quality Index.** The Percent Within Limits (PWL) will be based on the mean, standard deviation and quality index of each lot's test results as follows:

Mean

$$x_a = \sum \frac{x_i}{n}$$

where:

$x_a$ = Mean of the individual values being considered
$\sum x_i$ = The summation of all the individual values being considered
n = The number of individual values under consideration

Standard Deviation

$$s = \sqrt{\frac{\sum (x_i - x_a)^2}{n-1}}$$

Where:

s = Standard Deviation

Upper Quality Index

$$Q_U = \frac{USL - x_a}{s}$$

Lower Quality Index

$$Q_L = \frac{x_a - LSL}{s}$$

Where:

$Q_U$ = Upper Quality Index
$Q_L$ = Lower Quality Index
USL = Pay Factor Item Upper Spec Limit
LSL = Pay Factor Item Lower Spec Limit

**502.10.4.2 Determine Percent Within limits.** The upper (PWLU) and lower (PWLL) will be determined from Table I. Total percent within limits is: PWLt = (PWLU + PWLL) - 100. For thickness and compressive strength in this specification, PWLU shall be 100.

**502.10.4.3 Utilizing Quality Control Test Results.** The Engineer will make the Quality Level Analysis (QLA) within 24 hours after receipt of the Contractor's test results, by determining the PWLt for each designated pay factor item. The Contractor's test results will be used when applicable to determine the PWL, provided the Contractor's QC tests and the Engineer's QA tests compare favorably, and provided the Engineer's inspection and monitoring activities indicate the Contractor is following the approved QC Plan.

**502.10.4.4 Material Rendered Unfit.** The Engineer may at any time reject and require the Contractor to dispose of any batch of concrete mixture which is rendered unfit for use due to contamination, segregation, improper slump or improper entrained air content. Such rejection may be based on only visual inspection. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the Engineer, and if demonstrated in the laboratory in the presence of the Engineer that such material was erroneously rejected, payment will be made for the material at the contract unit price.

**502.10.4.5 Lower Specification Limits.** .The lower specification limit (LSL) for compressive strength and thickness shall be:

(a) Compressive Strength – 4000 psi (28 MPa).

(b) Thickness – Plan thickness minus 1/2 inch (13 mm).

**502.10.5 Outliers.** Individual compressive strength tests within a lot may be checked for an outlier in accordance with the determination of statistic T in ASTM E 178, at a significance level of 5 percent. Replacement cores shall be obtained at the location designated and in the presence of the Engineer. The PWL shall be determined using the replacement values.

**502.11 Contractor Quality Control.**

**502.11.1 Quality Control Plan.** Prior to approval of concrete mix designs by the Engineer, the Contractor shall submit a QCP to Construction and Materials. The QCP shall be approved prior to placing any concrete. The QCP shall include:

(a) Name and contact information should be provided for the Contractor's representative in charge of QC and the project level representative if different from the Contractor's representative.

(b) Identify the number of sublots each lot will utilize and describe how lots and sublots will be designated.

(c) State the method for determining when concrete cores can be extracted.

(d) State the method for demonstrating the concrete has been protected from freezing.

(e) State the location where control charts will be posted.

(f) For optimized concrete mix, state the target gradation and allowable gradation ranges for each fraction being used.

(g) A proposed independent third party company name, contact person, address, and phone number for dispute resolution.

**502.11.1.1 Third Party.** The third party shall be independent of the Contractor, MoDOT consultants, and all project subContractors or suppliers on each specific project. All testing of material for dispute resolution shall be performed by an approved laboratory that is AASHTO Accreditation Program certified in the areas of the material being tested.

**502.11.2 Quality Control Testing.** The Contractor shall perform all quality control tests necessary to control the production and construction processes applicable to this specification and as set forth in the QCP. Quality control testing shall be performed by technicians qualified through MoDOT's technician certification program. Testing shall include, but not necessarily be limited to, deleterious content, coarse aggregate absorption, thin or elongated pieces, entrained air content, slump, pavement thickness and compressive strength. The Contractor shall record all test results and furnish a copy to the Engineer no later than the beginning of the day following the test.

**502.11.2.1 Fine and Coarse Aggregate.**

**502.11.2.1.1 Aggregate Gradation.** A sieve analysis shall be performed once a week. Testing shall be performed in accordance with AASHTO T 27 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt. Sieve analysis shall be performed on the following sieves:

| Mix Design Method | Sieves Tested |
|---|---|
| Absolute Volume | Maximum sieve size[a] |
| Optimized | Sieves sizes specified by the mix design |

[a]Coarse aggregate only

**502.11.2.1.2 Deleterious Materials.** Deleterious content shall be determined each day at a frequency of one test per 7500 square yards (6275 m2) of material placed or fraction thereof. Test shall be performed in accordance with MoDOT Test Method TM 71 from randomly sampled material taken from the discharge gate of the storage bin or from the conveyor belt. Test shall be performed on coarse aggregate fractions.

**502.11.2.1.3 Absorption.** Samples for coarse aggregate absorption shall be taken from the discharge gate of the storage bins or from the conveyor belt at least once every 2000 cubic yards (1500 m3) with a minimum of once per project. Coarse aggregate absorption shall be in accordance with AASHTO T 85.

**502.11.2.1.4 Thin or Elongated Pieces.** Thin or elongated pieces shall be determined on samples of coarse aggregate taken from the discharge gate of the storage bins or from the conveyor belt. The aggregate particles retained on the 3/4 in. (19.00 mm) sieve shall not exceed 5 percent when tested in accordance with ASTM D 4791, based on a 5:1 ratio. Test shall be preformed at least once every 10,000 cubic yards with a minimum of once per project.

**502.11.2.1.5 Retained Samples.** All aggregate samples taken by the Contractor for determining the gradation, deleterious content, absorption, and thin or elongated pieces shall be retained for the Engineer for a minimum of seven days unless otherwise instructed. The retained sample shall be the remaining half of the final reduction in sample size obtained for QC testing. These samples shall be maintained in clean covered containers, without contamination, readily accessible to the Engineer. The retained sample's identification shall consist of, but is not limited to:

(a) Time and date sampled.
(b) Product specification number.
(c) Type of sample, i.e. belt, bin, stockpile.
(d) Lot and sublot designation.
(e) Sampler/Tester.
(f) Project Job Number.

**502.11.2.2 Slump.** Slump tests shall be performed on a random basis for each 500 cubic yards (375 m3) of material produced. The Engineer will designate the random location at the time of sampling. If a day's material production does not exceed 500 cubic yards (375 m3), one slump test shall be performed. Slump tests shall be in accordance with AASHTO T 119 from randomly sampled material discharged from trucks at the paving site. Material samples shall be in accordance with AASHTO T 141.

**502.11.2.3 Entrained Air Content.** Tests for entrained air content shall be performed on a random basis for each 500 cubic yards (375 m3) of material produced. The Engineer will designate the random location at the time of sampling. The minimum air content in front of the paver shall be 5.0 percent plus the air loss through the paver. The air loss through the paver is determined a minimum of once per half-day production by sampling the concrete ahead of the paver and behind the paver and subtracting the value obtained ahead of the paver from the value obtained behind the paver. The Engineer shall be given notification prior to determining the air loss in order to witness the air loss determination. On the first day of paving, the target air content shall be determined immediately after placing 200 cubic yards (150 m3) of concrete. The entrained air content of the first 200 cubic yards (150 m3) of concrete placed on the first day of paving, sampled in front of the paver, shall be greater than 6.0 percent. Tests shall be in accordance with AASHTO T 152.

**502.11.3 Control Charts.** The Contractor shall maintain linear control charts for fine and coarse aggregate gradation, slump, entrained air content, time taken and loss through the paver, compressive strength, either by cylinders or maturity, and slab thickness.

Control charts shall be posted in a location satisfactory to the Engineer and shall be kept up to date at all times. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the action and suspension limits, or specification limits, applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a potential problem and the Contractor is not taking satisfactory corrective action, the Engineer may halt production or acceptance of the material.

**502.11.3.1 Fine and Coarse Aggregate Gradation.** The Contractor shall record the gradation tests for each control sieve on linear control charts. Specification limits from Sec 1005, Sec 501.3, or the limits established in the QC plan for optimized mixtures, shall be superimposed on the control chart for job control.

**502.11.3.2 Slump, Air Content and Absorption.** The Contractor shall maintain linear control charts for both individual measurements of slump, air content, and absorption in accordance with the following action limits. The individual measurement control charts shall use the mix design target values as indicators of central tendency.

| Individual Measurements | |
|---|---|
| **Control Parameter** | **Action Limit** |
| Slump | +1 in. (25 mm) |
| Air Content | 4.5 to 5.0% |
| Absorption | Mix Design |
| | plus 0.3% to Mix Design plus 0.6% |

**502.11.4 Corrective Action.** As a minimum, a process shall be deemed out of control and corrective action taken if any one of the conditions below exists. In addition, each truckload of material en route prior to the process of being deemed out of control shall be tested for specification compliance.

**502.11.4.1 Aggregate Gradation.** When one test is outside the allowable range, immediate steps shall be taken to correct the gradation.

**502.11.4.2 Deleterious Content.** When one test is outside the specification limits, immediate steps shall be taken to correct the deleterious content.

**502.11.4.3 Slump, Air Content, and Absorption.** The Contractor shall halt production and make appropriate adjustments whenever either of the following occurs:

(a) One point falls outside the action limit line for individual measurements or range.

(b) Two points in a row fall outside the specification limit but within the action limit line for individual measurements.

**502.11.5 Pavement.** For pavements with a plan thickness below 8 inches, the following shall apply:

(a) QC shall determine compressive strength at a frequency of no less than one per 7500 square yards. Compressive strength shall be determined from at least two 6- by 12-inch (150- by 300-mm) cylinders or from at least three 4- by 8-inch (100- by 200-mm) cylinders made in accordance with AASHTO T-23 or by the Maturity Method in accordance with the contract documents. QA will determine the compressive strength at least once per 30000 square yards. Cylinders shall be tested in accordance with AASHTO T-22. A compressive strength of 3500 (24 MPa) shall be attained by 28-days. Sampling locations will be determined by the Engineer using random sampling procedures in accordance with ASTM D 3665

(b) QC shall determine pavement thickness of the fresh concrete at a frequency of no less than one per 7500 square yards. QA will determine the pavement thickness of the fresh concrete at least once per 30000 square yards. Sampling locations will be determined by the Engineer using random sampling procedures in accordance with ASTM D 3665

(c) QC shall determine the slump, air content, gradation, deleterious, thin and elongated and absorption in accordance with Sec 502.11. QA will determine the slump, air content, gradation, deleterious, thin and elongated and absorption in accordance with Sec 502.12.

**502.11.6 Shoulders.** Shoulders with a plan thickness 8 inches or greater shall be inspected in accordance with requirements applied to concrete placed in the travel way. Shoulders with a plan thickness below 8 inches shall be handled in accordance with Sec 502.11.5.

**502.11.7 Dispute Resolution.** When there are significant discrepancies between the Engineer's and the Contractor's test results, dispute resolution procedures will be used.

**502.11.7.1 Cease Work.** The Contractor's operations may be required to cease until the dispute is resolved, if the test results indicate the mixture is unacceptable.

**502.11.72 Third Party Resolution.** The first step in dispute resolution will be to identify differences in procedures and to correct inappropriate procedures before moving to third party resolution. If that does not resolve the dispute, either the Contractor or the Engineer may request the approved QCP third party involvement. The recommendations of the approved third party will be binding on both the Engineer and Contractor.

**502.11.7.3 Third Party Payment.** The Contractor shall be responsible for the costs associated with third party testing and resolution if the final result indicates the Engineer's test results were correct. Likewise the Commission will be responsible for the cost associated with the third party testing and resolution if the final result indicates the Contractor's results were correct.

**502.11.7.4 Other Adjustments.** The Contractor will not be entitled to any additional payment for costs incurred due to use of the dispute resolution procedures such as, but not limited to, those for delay, cessation of operations, costs to subContractors, etc. The Engineer may give consideration to adjustment of working days, if warranted.

**502.11.8 Concrete Mix Design Adjustment**

**502.11.8.1 Field Adjustment.** When test results indicate the concrete produced does not meet the specification requirements or is not performing satisfactory, the Contractor may adjust the mix design in the field as noted herein. Field adjustments may consist of changing the constituents listed on the approved mix design by no more than 5.0 percent or changing the water cement ratio by no more than 0.02 from the approved mix design. The Engineer shall be notified immediately when any change is made to the mix design. Additional fractions of material or new material will not be permitted as a field adjustment. The field adjusted mix shall meet the requirements specified in Sec 501.

**502.11.8.2 Field Redesign.** When the constituents listed on the approved mix design are adjusted by more than 5.0 percent or the water cement ratio is changed by more than 0.02, the Contractor shall submit a new mix design meeting the requirements specified in Sec 501. The mix design shall be submitted immediately to the District for approval. The Contractor will be allowed to continue production while the mix design is reviewed.

**502.12 Quality Assurance.** Corrective action shall be required in accordance with Sec 502.11.4 for any QA tests outside the action limit. The Engineer will at a minimum, independently test at the following frequency:

| Test | Frequency |
|---|---|
| Compressive Strength | 1 per lot |
| Thickness | 1 per lot |
| Surface Texture | 1 per lot |
| Slump | 1 per day |
| Entrained Air Content | 1 per day |
| Aggregate Gradation | 1 per project |
| Coarse Aggregate Deleterious | 1 per week |
| Aggregate Absorption | 1 per 10,000 cubic yards |
| Thin or Elongated Pieces | 1 per project |

**502.12.1 Retained Samples.** The QA inspector will test at least ten percent of the retained portion of the QC samples for aggregate gradation and deleterious content. The QA inspector will test at least twenty percent of the QC retained samples for absorption and thin or elongated pieces. Retained samples will be chosen at random. A comparison will be considered favorable when the QA results of a QC retained sample are within the applicable limits specified in Sec 403.18.2

**502.12.2 Quality Control Equipment.** All QC mixture testing shall be performed using equipment maintained in accordance with Sec 403.17.3, except as follows:

| Equipment – Test Method (AASHTO) | Requirement | Interval (Month) |
|---|---|---|
| Sieves | Check Physical Condition | 6 |
| Mechanical Shakers - T27 | Check Sieving Thoroughness | 12 |
| Ovens | Verify Temp. Settings | 4 |
| Balances | Verify | 12[a] |
| Air Meters - T152 | Calibrate | 12 |
| Compression Testing Machine - T22 | Verify Load Indications | 12 |
| Capping Material | Check Strength | 3 |
| Slump Cones - T119 | Check Critical Dimensions | 12 |

[a]Verify after each move.

**502.13 Unacceptable Material.** Any material meeting the following criteria shall be considered unacceptable:

(a) If any core measurement of thickness is greater than 10 percent deficient from the plan thickness
(b) If any core measurement of compressive strength is less than 3500 psi (24Mpa)
(c) All material with an entrained air content less than 4.0 percent.

## SECTION 617 CONCRETE TRAFFIC BARRIER

### 617.10 Permanent Concrete Traffic Barrier

**617.10.1 Description.** This work shall consist of constructing permanent concrete traffic barrier as shown on the bridge plans or as directed by the Engineer. For purposes of this specification, permanent concrete traffic barrier will be defined as Type A, B, C, D or any modification of these types.

**617.10.2 Material.** All reinforcing steel shall be Grade 60 deformed bar, and all reinforcing steel and dowels shall be epoxy coated. All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section/Specification |
|---|---|
| Reinforcing Steel for Concrete | 1036 |
| Concrete Curing Material | 1055 |
| Dowel Bars | 1057 |
| Preformed Fiber Expansion Joint Material | 1057 |
| Joint Sealer | 1057 |
| Joint Filler | 1057 |
| Prestressing Strands | AASHTO M 203 |

**617.10.3 Construction Requirements.**

**617.10.3.1** Permanent concrete traffic barrier shall be constructed of Class B or B-1 concrete. Concrete shall be air-entrained with 28-day compressive strength of 4000 psi (28 MPa). Material, proportioning, air-entraining, mixing, slump and transporting shall be in accordance with Sec 501.

Concrete shall be placed and finished in accordance with Sec 703. Permanent concrete traffic barrier shall be cured in accordance with the following.

**Curing.** Immediately after the finishing operations have been completed and as soon as marring of the concrete will not occur, the entire surface and exposed edges of the newly placed concrete shall be covered and cured in accordance with one of the following methods. The concrete shall not be left exposed for more than 30 minutes between stages of curing or during the curing period.

**White Pigmented Membrane.** After the free water has left the pavement surface, the entire surface shall be sealed by spraying with a uniform application of white pigmented membrane curing material. The Contractor shall provide satisfactory equipment to ensure uniform mixture and coverage of curing material, without loss, on the pavement at the rate of not less than one gallon for each 200 square feet (0.20 L/m2). If rain falls on the newly coated pavement before the film has dried sufficiently to resist damage, or if the film is damaged in any other way, the Contractor shall apply additional curing material to the affected portions. All areas cut by finishing tools subsequent to the application of the curing material shall immediately be given new applications at the rate specified above. If hairline cracking develops before the membrane can be applied, the concrete shall be initially cured with wet burlap in accordance with the following before the membrane is placed. Membrane curing shall not be used on Portland cement concrete base. Emulsified asphalt may be used to cure the concrete base if the surface course is to be a bituminous type.

**Burlap.** The top surface of the concrete shall be temporarily covered with thoroughly damp burlap after the concrete has set sufficiently to prevent marring of the surface. Burlap shall be handled in such a manner that contact with earth or other deleterious substances is avoided. All burlap, except burlap previously used for curing concrete, shall be thoroughly washed. The burlap shall be kept thoroughly wet until removed for application of the final curing material. Neither the top nor the edge of the concrete shall be left unprotected for more than 30 minutes. When the burlap is removed, white pigmented membrane curing material shall be continued by one of the approved methods.

**617.10.3.2** Permanent concrete traffic barrier shall be constructed using forms specifically designed for constructing cast-in-place reinforced concrete traffic barrier. Precast units will not be permitted. Barriers that do not exhibit a consistent surface shall be corrected to the satisfaction of the Engineer.

**617.10.3.3** Not used.

**617.10.3.4** For retrofit installation, dowels shall be installed in accordance with Sec 1039.30.

**617.20 Not Used.**

**Section 617.30 Traffic Barrier Delineators**

**617.30.1 Description.** This work shall include furnishing, installing and maintaining retroreflectorized traffic barrier delineators as shown on the bridge plans or as designated by the Engineer.

**617.30.2 Material.** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Specification |
|---|---|
| Delineators | 1065 |

**617.30.3 Construction Requirements.**

**617.30.3.1** Delineators shall be placed on all traffic barrier spaced at 50-foot (15 m) intervals.

**617.30.3.2** Delineator reflector colors shall correspond with pavement marking. Delineators shall be sheeted on one side, facing oncoming traffic, unless otherwise specified. Where permanent concrete traffic barrier divides opposing lanes of travel, the delineators shall have retroreflective sheeting on both sides corresponding to adjacent pavement marking.

**617.30.3.2.1** Delineators mounted on permanent concrete traffic barrier shall be anchored with galvanized mechanical fasteners that prevent movement in accordance with the manufacturer's recommendations.

**617.30.3.2.2** Delineators mounted on temporary concrete traffic barriers shall be mounted to the traffic barrier in accordance with the manufacturer's recommendations.

**617.30.3.3** Any damaged or missing delineators shall be replaced by the Contractor at the Contractor's expense.

## SECTION 621 FLOWABLE BACKFILL

**621.1 Description**. This work shall consist of furnishing flowable backfill as specified on the bridge plans or otherwise permitted for compacted backfill and other cavity filling uses.

**621.2 Material.**

**621.2.1** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Fly Ash | 1018 |
| Cement | 1019 |
| Admixtures | 1054 |
| Water | 1070 |

**621.2.2** Fine aggregate shall be in accordance with Sec 1005.3, except for the percent passing the No. 200 (75 µm) sieve. Aggregate shall be fine enough to stay in suspension in the mortar to the extent required for proper flow, and shall be in accordance with the following gradation:

| Sieve Size | Percent Passing |
|---|---|
| 3/4 inch (19.0 mm) | 100 |
| No. 200 (75 µm) | 0-10 |

**621.3 Composition of Mixture.** The Contractor shall submit to the Engineer a mix design with the proportions and source of material, admixtures, dry cubic yard ($m^3$) batch weights (masses) and actual 28-day compressive test results. The 28-day compressive strength of the mixture shall exceed 50 psi (345 kPa).

**621.3.1 Consistency.** Flowable backfill will be tested by filling an open-ended 3-inch (75 mm) diameter, 6-inch (150 mm) high cylinder to the top with the mixture and immediately pulling the cylinder straight up. The correct consistency of the mixture shall produce an approximate 8-inch (200 mm) diameter circular-type spread with no segregation. Adjustments to the proportions of fine aggregate or water may be made to achieve proper solid suspension and optimum flowability with approval from the Engineer, except the theoretical yield shall be maintained at one cubic yard ($m^3$) for the given batch weights (masses).

**621.3.2 Commercial Mixtures.** Approved commercial brand mixtures intended specifically for use as flowable backfill may be used, provided the specified strengths are obtained.

**621.3.2.1** If approved for use, the material shall be placed in accordance with the manufacturer's recommendations, and a copy of the manufacturer's recommendations shall be furnished to the Engineer.

**621.3.2.2** The manufacturer shall submit a request for approval along with appropriate documents to IDOT Bureau of Materials for testing and evaluation.

**621.4 Construction Requirements.**

**621.4.1** The open ends of the area to be backfilled shall be plugged, and the void area filled without the use of a vibrator.

**621.4.2** Care shall be taken to prevent the movement of any structure from the designated location or intrusion of flowable backfill into undesirable locations. If such movement or intrusion occurs, the Engineer may require the affected structure to be excavated and replaced to the proper grade at the Contractor's expense.

**621.4.3** If flowable backfill is placed in more than one layer, the base layer shall be thoroughly roughened and all loose and foreign material removed before placing the next layer.

**621.4.4** No flowable backfill shall be covered or accepted until a minimum compressive strength of 30 psi (205 kPa) has been attained, as demonstrated by failure to deform or crush underfoot when a pressure of approximately 30 psi (205 kPa) is applied. If the backfill does not harden to support the required load, the backfill shall be removed and replaced with an acceptable material at the Contractor's expense.

**621.5 Method of Measurement.** If flowable backfill is used as an alternate to compacted backfill specified in the contract or as shown on the bridge plans, measurement will be made as required for the item specified.

**621.6 Basis of Payment.** No additional payment will be made if flowable backfill is used as an alternate to compacted backfill.

## SECTION 623 CONCRETE BONDING COMPOUND, EPOXY MORTAR

### 623.10 Concrete Bonding Compound

**623.10.1 Description.** This work shall consist of preparing the surface, furnishing and applying the concrete bonding compound to be used to bond plastic concrete mortar to hardened concrete as shown on the bridge plans or as directed by the Engineer.

**623.10.2 Material.** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Type II Epoxy | 1039 |

### 623.10.3 Construction Requirements

**623.10.3.1 Surface Preparation.** The surface of the hardened concrete to which the plastic concrete mortar is to be bonded shall be surface dry and thoroughly cleaned such that all loose and unsound concrete is removed prior to application of the bonding agent.

**623.10.3.2 Application.** The bonding agent shall be applied when both the air and surface temperature is within the manufacturer's written recommendations.

**623.10.3.2.1** Components shall be mixed in accordance with manufacturer's written recommendations. The components may be warmed with indirect heat to a maximum temperature of 100 F (38 C) to reduce the viscosity. No solvents shall be added to the compound.

**623.10.3.2.2** The mixed bonding agent shall be applied in such a manner as to thoroughly work the bonding compound into the hardened concrete surface. The thickness of the application shall be 20 to 25 mils (0.5 to 0.6 mm). If the concrete absorbs the bonding agent, additional coats shall be applied until the correct thickness is attained.

**623.10.3.2.3** The plastic concrete mortar shall be placed while the bonding agent is still tacky. If there is a delay in placing the plastic concrete mortar and the bonding agent becomes tack free, another coat of bonding agent shall be applied.

**623.10.4 Basis of Payment.** No direct payment will be made for furnishing material, surface preparation or application.

**623.20 Epoxy Mortar**

**623.20.1 Description.** This work shall consist of preparing the surface, furnishing and applying epoxy mortar as shown on the bridge plans.

**623.20.2 Material.** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Type III Epoxy | 1039 |
| Sand for Mortar | 1039 |

**623.20.3 Construction Requirements**

**623.20.3.1 Surface Preparation.** The surfaces to which the epoxy mortar is to be applied shall be free of dust, water or any other material that may affect the adhesion.

**623.20.3.2 Application.** The epoxy mortar shall be prepared and placed when the weather is dry and the air temperature is in accordance with the manufacturer's written recommendations.

**623.20.3.2.1** The Contractor shall mix only the number of containers of material that can be placed in 20 to 40 minutes.

**623.20.3.2.2** Epoxy shall be thoroughly mixed in accordance with the manufacturer's written recommendations. Mixing shall continue as permitted to ensure uniformity.

**623.20.3.2.3** When the epoxy material has been thoroughly mixed, sand shall be added at the manufacturer's recommended rate while mixing continues. After the proper quantity of sand has been added, mixing shall continue until the mixture is uniform.

**623.20.3.2.4** Areas to be patched or leveled shall be thoroughly primed with an application of neat epoxy. After the area is primed, the mortar shall be placed and struck off to grade. The surface shall have a rough finish equal to that of a Portland cement concrete deck.

**623.20.3.2.5** The patched or leveled area shall be protected during the curing period to prevent damage. Material shall be cured in accordance with the manufacturer's written recommendations. Curing acceleration by direct flame application will not be permitted.

**623.20.4 Basis of Payment.** No direct payment will be made for furnishing material, surface preparation or application.

**SECTION 701 DRILLED SHAFTS**

**701.1 Description.** This work shall consist of constructing cast-in-place reinforced concrete drilled shafts and rock sockets, as required, to serve as a structural foundation. This work shall provide reinforced concrete shafts cast in cylindrically excavated holes extending sufficiently into soil or sound rock to adequately support the structure and all externally applied loads for which the shaft was designed.

The drilled shaft foundation, including the rock socket, where required, shall be constructed in accordance with these specifications, as shown on the bridge plans and in accordance with other specifications included in the contract documents. When directed by the Engineer, corrections made by the Contractor will be noncompensable and any effect on time of performance nonexcusable.

**701.2 Preconstruction Submittals.** The following shall be submitted.

(a) Qualifications. At the time of the preconstruction conference, the Contractor shall provide the following documentation.

(1) References. A list containing at least three projects completed within the three years prior to this project's bid date which the Contractor performing this work has installed drilled shafts of similar diameter, length, and site conditions to those shown in the bridge plans. The list of projects shall contain names and phone numbers of owner's representatives who can verify the Contractor's participation on those projects.

(2) Experience. Name and experience record of the drilled shaft supervisor, responsible for all facets of the shaft installation, and the drill operator(s) who will be assigned to this project. The supervisor and operator(s) shall each have a minimum of three years experience in the construction of drilled shafts.

(b) Installation Procedure. A detailed installation procedure shall be submitted to the Engineer for acceptance at least 45 days prior to drilled shaft construction and shall address each of the following items unless otherwise directed by the Engineer in writing.

(1) Equipment List. List of proposed equipment to be used including cranes, drill rigs, augers, belling tools, casing, core barrels, bailing buckets, final cleaning equipment, slurry equipment, tremies, or concrete pumps, etc. Standby equipment shall be available to assure there is no delay in placing concrete once drilling and pouring operations have started.

(2) General Sequence. Details of the overall construction operation sequence, equipment access, and the sequence of individual shaft construction within each substructure bent or footing group. The submittal shall address the Contractor's proposed time delay and/or the minimum concrete strength necessary before initiating a shaft excavation adjacent to a recently installed drilled shaft.

(3) Shaft Excavation. A site specific step by step description of how the Contractor anticipates the shaft excavation to be advanced based on their evaluation of the subsurface data and conditions expected to be encountered. This sequence shall note the method of casing advancement, anticipated casing lengths, tip elevations and diameters, the excavation tools used and drilled diameters created. The Contractor shall indicate whether wet or dry drilling conditions are expected or if the water table will be sealed from the excavation.

(4) Slurry Quality Control. When the use of slurry is proposed, details covering the measurement and control of the hardness of the mixing water, agitation, circulation, de-sanding, sampling, testing, and chemical properties of the slurry shall be submitted.

(5) Shaft Cleaning and Inspection. Method(s) and sequence proposed for the shaft cleaning operation as well as recommendations on how the shaft excavation will be inspected under the installation conditions anticipated.

(6) Reinforcement Placement. Details of reinforcement placement, including cage centralization devices to be used and method to maintain proper elevation and plan location of cage within the shaft excavation during concrete placement. The method(s) of adjusting the cage length if rock is encountered at an elevation other than as shown on the bridge plans.

(7) Concrete Placement. Details of concrete placement including proposed operational procedures for free fall, tremie or pumping methods. The sequence and method of casing removal shall also be stated along with the top of pour elevation, and method of forming through water above streambed.

(8) Mix Design. The proposed concrete mix design(s).

The Engineer will evaluate the drilled shaft installation procedure and notify the Contractor of acceptance, need for additional information, or concerns with the installation's effect on the existing or proposed structure(s). Excavation for drilled shafts shall not proceed until written authorization is received from the Engineer.

**701.3 Material.** All material shall be in accordance with this specification, the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Reinforcing Steel for Concrete | 1036 |
| Concrete Admixtures | 1054 |
| Concrete Curing Material | 1055 |
| Mortars and Grout | 1066 |
| Water | 1070 |

**701.3.1 Concrete.** Drilled shafts shall be constructed of Class B-2 concrete, and all material, proportioning, mixing and transporting of concrete shall be in accordance with Sec 501, except as specified herein. An air entrainment admixture shall be used. A high range water-reducing admixture may be used to increase the slump to a maximum of 8 inches (200 mm). If used, the water-reducing admixture shall be added only after the concrete has reached the job site to reduce the potential for flash setting. The concrete mix for drilled shafts shall be dense, homogeneous, fluid and resistant to segregation, and shall consolidate under self-weight. The concrete mix shall have a set time that ensures that fluidity is maintained throughout the shaft concrete placement and removal of temporary casing, if used. A concrete retarder in accordance with AASHTO M 194, Type B, may be incorporated into the mix to retard set approximately two hours. Concrete for drilled shafts shall have a 28-day minimum compressive strength of 5500 psi.

Portland cement shall be Type I or Type II. The maximum water per cement ratio of a concrete mix to be placed under water shall be 0.45.

**701.3.1.1 Self-consolidating Concrete.** In lieu of using Class B-2 concrete, the Contractor may use Self-consolidating Concrete (SCC) to construct the drilled shafts. Self-consolidating Concrete is a specially designed concrete that enables the concrete to flow under the influence of its own weight and does not require mechanical vibration for consolidation. All material, proportioning, mixing and transporting of concrete shall be in accordance with Sec 501, except as specified herein.

**701.3.1.1.1 Aggregate.** Fine and coarse aggregate shall be in accordance with Sec 1005, except that the requirements for gradation will not apply.

**701.3.1.1.1.1 Gradation.** The Contractor shall submit the target gradation and allowable gradation range of each fraction of each aggregate source used in the mix design. During production, the Contractor shall be within the allowable gradation range for each aggregate that was submitted.

**701.3.1.1.1.2 Maximum Size.** For SCC mixes, 100 percent of each fraction shall pass the ¾-inch sieve.

**701.3.1.1.2 Admixture.** All chemical admixtures shall be in accordance with Sec 1054, except as noted herein:

**701.3.1.1.2.1 High Range Water Reducer.** The polycarboxylate based high range water reducer shall be in accordance with AASHTO M 194, Type F or G. The high range water reducing admixture shall be added only after the concrete has reached the job site to reduce the potential for flash setting.

**701.3.1.1.2.2 Viscosity Modifier.** The viscosity-modifying admixture shall be evaluated according to the test methods and mix design proportions referenced in AASHTO M 194.

**701.3.1.1.2.3 Combination.** The self-consolidating admixture system shall consist of either a polycarboxylate based high range water-reducing admixture or a polycarboxylate based high range water reducer combined with a separate viscosity-modifying admixture.

**701.3.1.1.3 Concrete Mix Design.** At least 45 days prior to using SCC, the Contractor shall submit a mix design for approval to IDOT's Bureau of Materials. The SCC mix shall be designed by absolute volume methods or an optimized mix design method such as Shilstone or other recognized optimization method.

**701.3.1.1.3.1 Required Information.** The mix design shall contain the following information:

(a) Source, type and specific gravity of Portland cement

(b) Source, type (class, grade, etc.) and specific gravity of supplementary materials, if used

(c) Source, name, type and amount of admixture

(d) Source, type (formation, etc.), ledge number if applicable, and gradation of the aggregate

(e) Specific gravity and absorption of each fraction in accordance with AASHTO T 85 for coarse aggregate and AASHTO T 84 for fine aggregate, including raw data

(f) Unit weight of each fraction in accordance with AASHTO T 19

(h) The design air content and target slump flow

(i) Batch weights of Portland cement and supplemental cementitious materials

(j) Batch weights of coarse, intermediate and fine aggregates

(k) Batch weight of water

**701.3.1.1.3.2 Water Amount.** The water per cementitious materials ratio shall meet the following requirements:

| Water/Cementitious Materials Ratio | |
|---|---|
| Minimum | Maximum |
| 0.32 | 0.45 |

**701.3.1.1.3.3 Percent Fine Aggregate.** The percent fine aggregate by absolute volume should range from 35 to 50 percent.

**701.3.1.1.3.4 Minimum Cementitious Amount.** The total amount of cementitious materials shall not be below 650 pounds per cubic yard.

**701.3.1.1.3.5 Slump Flow.** The slump flow test shall be performed in accordance with ASTM C 1611. The slump flow shall meet the following requirements:

| Slump Flow (inches) | |
|---|---|
| Minimum | Maximum |
| 22 | 30 |

The visual stability index rating shall be a maximum of 1.

**701.3.1.1.3.6 Passing Ability.** Passing ability of SCC shall be determined in accordance with ASTM C 1621 and shall not exceed 2 inches. The visual stability index rating shall be a maximum of 1.

**701.3.1.1.3.7 Air Content.** The minimum air content, when placed in the work, shall 5.0 percent. Test shall be performed in accordance with AASHTO T 152.

**701.3.1.1.3.8 Compressive Strength.** Concrete shall have a 28-day minimum compressive strength as shown on the bridge plans. Test shall be performed in accordance with AASHTO T 22.

**701.3.1.1.4 Additional Information.** The Contractor shall submit a Batching Sequence Plan outlining how the SCC mix will be batched and mixed. The Batching Sequence Plan shall be submitted to the Engineer for approval.

**701.3.1.1.5 Trial Batch.** A trial batch shall be done prior to SCC being used to ensure the mix is in accordance with this special provision. The SCC mix design shall not be used until all of the specified criteria have been met. The trial batch shall be at least 3 cubic yards. The Engineer shall be present during the trial batch.. The SCC mix shall be tested for air content, slump flow, visual stability index, passing ability and compressive strength.

**701.3.1.1.6 Production.** SCC mix shall not be used until the concrete mix, the Batching Sequence Plan and the trial batch have been approved. The SCC mix shall not vary from the mix design submitted for approval. Any changes in material sources, aggregate gradations, or material content shall require a new SCC mix be resubmitted for approval. Changes to the water content and chemical admixture dosages will be allowed to handle changes in environmental conditions.

**701.3.1.1.6.1 Forms.** SCC mixes generate higher fluid pressures than conventional concrete mixes. Forms shall be mortar-tight and capable of supporting the additional pressure.

**701.3.1.1.6.2 Reinforcement.** Reinforcement and other critical components shall be tightly secured in the form to prevent these items from shifting during concrete placement.

**701.3.1.1.7 Quality Control.** The quality of freshly mixed SCC may fluctuate at the beginning of daily production, the Contractor shall conduct air test, slump flow, visual stability index, and passing ability for every truck until consistent and compliant results are obtained. Subsequently, all testing shall be conducted in accordance with MoDOT specifications.

**701.3.1.1.7.1 Slump Flow Requirement.** The slump flow shall be within +/- 2 inches of the target slump flow designated by the Contractor and shall not exceed 30 inches.

**701.3.2 Casing.** Welded or seamless steel permanent casings shall be in accordance with ASTM A 252, Grade 2, unless otherwise specified. The Contractor shall furnish two copies of certification from the fabricator detailing the designated specification with which the furnished casings comply.

**701.3.2.1 Shop Drawings.** Shop drawings for permanent steel casings shall be prepared in accordance with Sec 1080 and shall be submitted to the IDOT Bureau of Bridges and Structures, Rm. 240, 2300 S. Dirksen Pkwy, Springfield, IL 62764 prior to installation of the casings.

**701.3.2.2 Condition of Casings.** Casings shall be smooth, clean and watertight. For out-of-round tolerance of steel casings before and after installation, the departure of any point on the periphery of the casing from a true circle shall not exceed one inch (25 mm), measured radially.

**701.3.2.3 Extent of Casing Length.** Permanent casings, if required, shall be continuous wherever possible or practical. The permanent casing shall terminate at the specified elevation, and the concrete shall be trimmed to within tolerances specified in Sec 701.4.16 prior to acceptance of the completed drilled shaft.

Permanent casings shall be extended into rock, as needed, to provide a positive seal and to stabilize the shaft excavation against collapse, excessive deformation, or flow of water. Casings meeting all specified requirements shall be installed from the work platform to the elevations shown on the bridge plans. Where drilled shafts are located in open water areas, casings shall be extended from at least 18 inches (450 mm) above the water elevation and unless otherwise specified in the contract documents, to the specified bottom of casing elevation to protect the shaft concrete from water action during placement and curing of concrete.

**701.3.2.4 Use of Teeth or Cutting Edge.** The casing may be fabricated with teeth or a cutting edge to facilitate insertion into the rock.

**701.3.2.5 Splices.** Splicing of permanent casings is not desirable and will only be permitted when approved by the Engineer. If splices are required, the welding process shall be in accordance with the requirements specified herein. The Contractor shall be fully responsible for the adequacy of welds during driving.

**701.3.2.6 Welding.** Shop welding of casings shall be performed by a fully-automated welding process to develop the full capacity of the shell. All welding shall be in accordance with Sec 1080, except that shop welding of casings will not require radiographic inspection. Inspection will be of a visual nature. If evidence indicating poor welding is found, the Engineer may require radiographing. Field-welded splices of sections of the steel casings shall be made by shielded metal-arc welding procedures performed by a qualified field welder using properly dried low-hydrogen E7018 electrodes that have been protected from the elements to maintain the dry condition. The welds shall be full penetration, watertight and of x-ray quality in accordance with Sec 1080. Spiral welding of permanent casing shall not be permitted.

**701.3.3 Slurry.** Drilling slurry will be defined as mineral slurry, polymer slurry, natural slurry formed during the drilling process, water or other fluids used to maintain stability of the drilled shaft excavation to aid in the drilling process or to maintain the quality of the rock socket. In addition, the terms mineral slurry and polymer slurry, as used herein, will be defined as the final mixed composite of all additives, including manufactured mineral or polymer slurry additives required to produce the acceptable drilling slurry.

**701.3.3.1 Slurry Usage.** Drilling slurry shall be used if detailed in the approved installation plan, if in accordance with the contract documents or if approved in writing by the Engineer. Drilling slurry may be used at the Contractor's option if the slurry is not in accordance with the contract documents; however, any slurry shall be approved by the Engineer prior to use. Drilling slurry, when used, will be noncompensable and effect on time of performance due to the use of the slurry will be nonexcusable.

**701.3.3.2 General Properties.** The material used to make the slurry shall not be detrimental to the concrete or surrounding ground strata. Mineral slurries shall have both a mineral grain size that remains in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. Polymer slurries shall have sufficient viscosity and gel characteristics to transport excavated material to suitable screening systems or settling tanks. The percentage and specific gravity of the material used to make the slurry shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement. If approved by the Engineer, the Contractor may use water and on-site soils as a drilling slurry. In that case, the range of acceptable values for density, viscosity and pH, as shown in the following table for bentonite slurry, shall be met, except that maximum density (unit weight) shall not exceed 70 pounds/cubic foot (1120 kg/$m^3$).

When water is used as the drilling fluid to construct rock sockets in limestone, dolomite, sandstone or other formations that are not erodible, the requirements for slurry testing will not apply.

**701.3.3.3 Preparation**. Prior to introduction into the shaft excavation, the manufactured mineral or polymer slurry admixture shall be pre-mixed thoroughly with clean, fresh water and for adequate time in accordance with the slurry admixture manufacturer's recommendations allotted for hydration. Water used for mixing shall be in accordance with Sec 1070. Slurry tanks of adequate capacity will be required for slurry mixing, circulation, storage and treatment. No excavated slurry pits will be allowed in lieu of slurry tanks without written approval from the Engineer. Adequate desanding equipment will be required as necessary to control slurry properties during the drilled shaft excavation in accordance with the values provided in the table below. Desanding will not be required for signposts or lighting mast foundations unless specified in the contract documents.

**701.3.3.4 Control Tests.** Control tests using a suitable apparatus shall be performed by the Contractor on the slurry to determine density, viscosity, sand content and pH of freshly mixed slurry, recycled slurry and slurry in the excavation. Tests of slurry samples from within one foot (0.3 m) of the bottom and at mid-height of the shaft shall be conducted in each shaft excavation during the excavation process to establish a consistent working pattern. A minimum of four sets of tests shall be conducted during the first eight hours of slurry use on the project. When the results show consistent behavior, the testing frequency may be decreased to one set every four hours of slurry use, or as otherwise approved by the Engineer. Reports of all tests, signed by an authorized representative of the Contractor, shall be furnished to the Engineer on completion of each drilled shaft. An acceptance range of values for the physical properties will be as shown in the table below.

**701.3.3.5 Sampling.** When slurry samples are found to be unacceptable, the Contractor shall bring the slurry in the shaft excavation to within specification requirements. Concrete shall not be poured until resampling and testing results produce acceptable values. Prior to placing shaft concrete, the Contractor shall take slurry samples from within one foot (0.3 m) of the bottom and at mid-height of the shaft. Any heavily contaminated slurry that has accumulated at the bottom of the shaft shall be removed. Disposal of all slurry shall be done in areas approved by the Engineer. The Contractor shall perform final shaft bottom cleaning after suspended solids have settled from the slurry mix.

| Range of Acceptable Values for Mineral and Polymer Slurries in Fresh Water Without Additives | | | | | |
|---|---|---|---|---|---|
| Property | **Bentonite** | **Emulsified Polymer** | **Dry Polymer** | **Units** | **Test Method** |
| **Density (Unit Weight)** | | | | | |
| At Introduction | 63.5 - 66.8 (1017-1070) | < 63 (1009) | < 63 (1009) | lb/ft$^3$ (kg/m$^3$) | Density Balance |
| Prior to Concreting | 63.5 - 70.5 (1017-1129) | < 63 (1009) | < 63 (1009) | | |
| **Marsh Funnel Viscosity** | | | | | |
| At Introduction | 32 – 60 (34 – 63) | 33 – 43[b] (35 – 45)[b] | 50 – 80[b] (53 – 85)[b] | sec/qt (sec/liter) | Marsh Funnel |
| Prior to Concreting | 32 – 60 (34 – 63) | 33 – 43[b] (35 – 45)[b] | 50 – 80[b] (53 – 85)[b] | | |
| **pH** | | | | | |
| At Introduction | 8 – 10 | 8 – 11 | 7 – 11 | -- | pH Paper or pH Meter |
| Prior to Concreting | 8 – 10 | 8 – 11 | 7 – 11 | -- | |
| **Sand Content** | | | | | |
| At Introduction | < 4 | < 1 | < 1 | Percent by Volume | API Sand Content Kit |
| Prior to Concreting | < 10 | < 1 | < 1 | | |
| **Maximum Contact Time**[a] | 4 | 72 | 72 | Hours | |

[a]Without agitation and sidewall cleaning.
[b]Higher viscosities may be required to maintain excavation stability in loose or gravelly sand deposits.

## 701.4 Construction

**701.4.1 Protection of Existing Structures.** All precautions shall be taken to prevent damage to existing structures and utilities. These measures shall include, but are not limited to, monitoring and controlling the vibrations from the driving of casing or drilling of the shaft, and selecting construction methods and procedures that shall prevent excessive caving of the shaft excavation.

**701.4.2 Technique Shafts.** When required by the Engineer, the Contractor shall demonstrate the adequacy of methods and equipment used during construction of the first drilled shaft, which shall be an out of position technique shaft, constructed with reinforcement as identified for production shafts on the bridge plans. This technique shaft shall be drilled in the position as directed by the Engineer and drilled to the maximum depth for any production shaft shown on the bridge plans. If at any time the Contractor is unable to demonstrate, to the satisfaction of the Engineer, the adequacy of methods or equipment and alterations required, an additional technique shaft(s) may be required. Technique shafts shall be cut off 3 feet (0.9 m) below groundline, buried or otherwise disposed of as specified in the contract documents or as directed by the Engineer. Once approval has been given to construct production shafts, no changes will be permitted in the methods of equipment used to construct the shaft without approval from the Engineer. When a technique shaft is not required, construction of the first production shaft will be used to determine if the methods and equipment used by the Contractor are acceptable. Failure at any time to demonstrate to the Engineer the adequacy of methods or equipment will be cause for the Engineer to require appropriate alterations in equipment or method by the Contractor to eliminate unsatisfactory results.

**701.4.3 Construction Sequence.** Excavation to footing elevation shall be completed before shaft construction begins, unless otherwise authorized by the Engineer. Any disturbance to the footing area caused by shaft installation shall be repaired by the Contractor prior to pouring the footing. When drilled shafts are to be installed in conjunction with embankment placement, the Contractor shall construct drilled shafts after placement of fills. Drilled shafts constructed prior to the completion of fills shall not be capped until the fills have been placed as near to final grade as possible, leaving only the necessary work room for construction of the caps.

**701.4.4 General Equipment and Methods.** The Contractor shall perform excavations through whatever material is encountered to the dimensions and elevations shown on the bridge plans. The Contractor's methods and equipment shall be suitable for the intended purpose and for whatever material is encountered.

**701.4.4.1 General Equipment.** The Contractor shall provide equipment capable of constructing shafts to a depth equal to the deepest shaft tip elevation shown on the bridge plans plus 15 feet (4.6 m), or as otherwise specified in the contract documents. When a rock socket is identified on the bridge plans at a shaft location, the definition of "shaft tip elevation", for the purposes of this subsection, shall be taken to refer to the bottom of the rock socket.

**701.4.4.2 General Methods.** Excavations required for shafts and rock sockets shall be completed in a continuous operation. The Contractor shall be responsible for ensuring the stability of the shaft excavation and the surrounding soil. When obstructions, either expected or unexpected, are encountered, the Contractor shall notify the Engineer promptly. Either the dry method, wet method, temporary casing method, permanent casing method if specified, or combinations, as necessary, shall be used to produce sound, durable concrete drilled shafts free of defects. The permanent casing method shall be used only when required by the contract documents. Blasting excavation methods will not be permitted. When a rock socket is required, the Engineer will be the sole judge as to what constitutes the top of sound rock. The Engineer may order in writing additional depths of rock socket below the top of sound rock as considered necessary to improve the foundation. If the top surface of the sound rock is found to be inclined across the width of the shaft, the Contractor shall immediately notify the Engineer. The Contractor shall use an airlift, or other method approved by the Engineer, to clean the bottom of the shaft excavation.

**701.4.4.2.1 Dry Construction Method.** The dry construction method shall be used only at sites where the groundwater table and site conditions, generally stiff to hard clays or rock above the water table, are suitable to permit construction of the shaft in a relatively dry excavation and where the sides and bottom of the shaft remain stable without any caving, sloughing or swelling and allow visual inspection prior to concrete placement. The dry method shall consist of drilling the shaft excavation, removing accumulated seepage water and loose material from the excavation and placing the shaft concrete in a relatively dry excavation. The dry construction method shall be used only when shaft excavations, as demonstrated in a technique shaft or first production shaft, have 12 inches (300 mm) per hour or less of seepage.

**701.4.4.2.2 Wet Construction Method.** The wet construction method shall be used at sites where a dry excavation cannot be maintained for placement of the shaft concrete. This method shall consist of drilling the shaft excavation below the water table, keeping the shaft filled with water, natural slurry formed during the drilling process, mineral slurry or polymer slurry to contain seepage and groundwater movement, and to maintain stability of the hole perimeter until excavation to the final depth and placement of the reinforcing cage and concrete has been completed. This procedure will require placing the shaft concrete with either a tremie or concrete pump beginning at the shaft bottom, and displacing the water or slurry as concrete is placed. Temporary partial depth casings near the ground surface shall be provided to aid shaft alignment and position and to prevent sloughing of the top of the shaft excavation. Where drilled shafts are located in open water areas, shafts shall be constructed by the wet method using casings extending from above the water elevation to the plan casing tip elevation to protect the shaft concrete from water action during placement and curing. The casing shall be installed in a manner that produces a positive seal at the bottom of the casing.

**701.4.4.2.3 Temporary Casing Construction Method.** The temporary casing construction method shall be used at all sites where the stability of the excavated hole or the effects of groundwater cannot be controlled by other means. In this method, the hole shall be advanced through caving material by the wet method in accordance with Sec 701.4.4.2.2. When a formation is reached that is nearly impervious, a casing shall be placed in the hole and sealed. Drilling may proceed by the dry method to the projected depth. The placement of concrete shall proceed by the dry or wet method, except that the casing shall be withdrawn after the concrete is placed. In the event seepage conditions prevent use of the dry method, excavation shall be completed by the wet method. Before and during casing withdrawal, a 5-foot (1.5 m) minimum head of fresh concrete above the bottom of the casing shall be maintained at such a level that fluid trapped behind the casing is displaced upward out of the shaft excavation without mixing with or displacing the shaft concrete. Casing extraction shall be at a slow, uniform rate with the pull in line with the axis of the shaft. Temporary casings shall be removed while the concrete is still workable and the slump of the concrete is between 4 and 8 inches (100 and 200 mm). Vibratory hammers shall not be used for casing installation or removal within 50 feet (15.2 m) of other shafts that have been completed less than 24 hours earlier. The reinforcing cage shall not be damaged or displaced when withdrawing the temporary casing.

**701.4.4.2.4 Permanent Casing Construction Method.** The permanent casing construction method shall be used only when required by the contract documents or authorized by the Engineer. The casing shall be continuous between top and bottom elevations shown on the bridge plans. Vibratory hammers shall not be used for casing installation within 50 feet (15.2 m) of shafts that have been completed less than 24 hours earlier.

**701.4.5 Slurry**

**701.4.5.1 Time Limitations**. When bentonite slurry is used, the Contractor shall adjust construction operations such that the maximum time that slurry is in contact with the bottom 5 feet (1.5 m) of the shaft, the time from the end of drilling to the beginning of concrete placement, does not exceed four hours without agitation. If the four-hour limit is exceeded, the bottom 5 feet (1.5 m) of the shaft shall be overreamed prior to performing other operations in the shaft. For rock sockets constructed in shale using polymer slurry, concrete placement shall begin within 72 hours of starting the rock socket excavation to avoid degradation of the shaft sidewall. Before concrete placement begins, foundation inspection, when required, cleaning operations and reinforcing steel placement shall be completed and approved by the Engineer. These operations will be included in the 72-hour time limit. If concrete placement is not begun within the time limit, the Contractor shall take corrective measures to the satisfaction of the Engineer.

**701.4.5.2 Level of Slurry.** During construction, the level of slurry shall be maintained at a height sufficient to prevent caving of the excavation. If the Engineer determines that the slurry construction method is failing to produce the desired final results, the Contractor shall discontinue operations and propose an alternate method for approval from the Engineer. Correction for a failed slurry construction method will be noncompensable and any effect on time of performance nonexcusable.

**701.4.5.3 Slurry Manufacturer's Representative.** When manufactured mineral or polymer slurry additives are to be incorporated into the drilling slurry mix, the Contractor shall provide the technical assistance of a representative of the mineral or polymer slurry additive manufacturer at the site prior to introduction of the slurry into the first shaft where slurry use will be required, and during drilling and completion of a minimum of one shaft to adjust the slurry mix to the specific site conditions.

**701.4.5.4 Drilling Fluids for Rock Socket Excavation.** For rock sockets excavated in limestone, dolomite, sandstone or other formations that are not erodible and cannot be constructed in the dry, only water shall be used as the drilling fluid, except that when other slurry types are used in drilling through overburden, that slurry shall be removed and replaced with fresh clean water prior to rock socket excavation. For rock sockets excavated in geomaterial that may be eroded by drilling water, such as shales, a polymer slurry will be required prior to beginning rock socket drilling through completion of concreting the rock socket.

**701.4.6 Cleaning of Shaft or Casing Sidewalls.** Cleaning of the shaft or casing sidewalls shall occur by a method approved by the Engineer as necessary to remove the depth of softening or to remove excessive slurry cake buildup.

**701.4.7 General Excavation Considerations.** The bridge plans will indicate the top of shaft elevations and the estimated bottom of shaft elevations between which the drilled shaft shall be constructed. Drilled shafts may be extended deeper when the Engineer determines that the foundation material encountered while drilling the shaft excavation is unsuitable or is not the same as anticipated in the design of the drilled shaft. Drilled shafts may be shortened when the Engineer determines the material encountered is better than that anticipated, or based on the results of load tests.

**701.4.7.1 Time Restrictions.** The integrity of the drilled shaft excavation shall be maintained by the placing of reinforcement and concrete in a timely manner following completion of the excavation. No two adjacent shafts shall be excavated at the same time, and shafts shall not be constructed within 24 hours of the completion of an adjacent shaft if the center-to-center spacing is less than 3 shaft diameters.

**701.4.7.2 Disposal of Excavated Material.** Excavated material removed from the shaft and any drilling fluids used shall be disposed of in accordance with the contract documents, as directed by the Engineer, and in compliance with federal and state laws.

**701.4.7.3 Worker Entry Into Shaft Excavation.** The Contractor shall not allow workers to enter the shaft excavation for any reason, unless both a suitable casing has been installed and adequate safety equipment and procedures have been provided to workers entering the excavation.

**701.4.8 Unexpected Obstructions.** Subsurface obstructions at drilled shaft locations shall be removed by the Contractor. The Contractor shall employ special procedures or tools when the hole cannot be advanced using conventional equipment. Blasting will not be permitted. Except as provided in this section, all cost and time effects, direct, indirect and cumulative of subsurface obstruction of whatever nature, will be conclusively deemed fully compensated under the pay items in accordance with the contract. Encountering unexpected obstructions will be considered inherent risks in the nature of this work, both as to type and extent as is variability in material encountered in the work as to effort required to drill through or excavate the material. In the event the Contractor encounters at the site of a drilled shaft location a subsurface or latent physical condition that differs materially from that indicated in the contract documents, the Contractor shall strictly follow the procedure provided for a differing site condition set forth in Article 104.03 of the Illinois “Standard Specifications for Road and Bridge Construction.” Any adjustment to the contract amount or time will only be those expressly permitted by the contract documents and only to the extent expressly provided in the contract documents. No contract adjustment will be determined, as to entitlement or amount on any basis other than under the contract as a differing site condition. Specifically, but not by way of limitation, the Contractor agrees that the Contractor will not be entitled to any contract adjustment arising from encountering an unexpected obstruction on the basis that, with respect to the obstruction, the Department made: (1) a positive representation; (2) of a material fact; (3) which was false or incorrect; (4) as to which positive representation of material fact the Contractor lacked knowledge that the representation was false or incorrect; (5) upon which positive representation of material fact the Contractor asserts that the Contractor relied; and (6) was damaged as a direct result of the positive representation of material fact.

**701.4.9 Lost Tools.** Drilling tools lost in the excavation will not be considered obstructions and shall be promptly removed by the Contractor. All work required to remove lost tools or to perform associated corrective work, including but not limited to repair of hole degradation due to removal operations, will be noncompensable and any effect on time of performance nonexcusable.

**701.4.10 Excavation Inspection**

**701.4.10.1 Inspection Equipment.** The Contractor shall maintain at the job at all times, all equipment suitable for use in the shaft inspection.

**701.4.10.2 Removal of Excess Sediment and Water.** Final shaft depth shall be measured with approved methods after final cleaning by airlift, or other method approved by the Engineer. Unless otherwise stated in the contract documents, a minimum of 50 percent of the base of each shaft shall have less than 1/2 inch (13 mm) of sediment at the time of concrete placement. The maximum depth of sediment or any debris at any place on the base of the shaft shall not exceed 1 1/2 inches (38 mm). For dry excavations, the maximum depth of water shall not exceed 3 inches (75 mm) prior to concrete pour. Shaft cleanliness will be verified by the Engineer for wet or dry shafts.

**701.4.10.3 Television Camera Inspection.** The primary means of inspecting a shaft excavation, steel casing and the rock socket shall be by television camera lowered into the shaft. The Contractor shall furnish all equipment necessary to conduct the camera inspection. The Contractor shall operate the camera and supporting equipment under the direction of the Engineer in such a manner as to obtain optimum results from the equipment. The television camera and lighting equipment shall be capable of operating in dry or submerged conditions encountered during the inspection. The excavated shaft shall have the Engineer's approval prior to proceeding with construction.

**701.4.10.3.1 Equipment.** Methods and equipment for controlling the camera will be subject to approval from the Engineer and achievement of a satisfactory video record.

**701.4.10.3.2 Drawings.** The Contractor shall submit layout drawings to the Engineer showing the relative position of all components of the television inspection system, including type and size of barge or other work area. The information submitted shall include a written description of the operating procedure in a step-by-step sequence and shall state the source of power.

**701.4.10.3.3 Shaft Inspection.** Inspection of a shaft by television camera shall be performed as directed by the Engineer. The excavated shaft, including the rock socket when applicable, shall be thoroughly cleaned of all loose fragments, sediment and turbidity prior to inspection. The camera shall be operated such that optimum clarity of detail can be obtained and all surface areas of the shaft, including the rock socket and the rock socket's base, can be observed. All scanning of the rock surfaces shall be recorded on videotape. After completion of the inspection of a rock socket, the Engineer will direct whether or not drilling of the shaft shall be continued to a greater depth. All tapes shall be stored in proper containers with dust-tight closures and shall be properly labeled as to shaft number along with project and Contractor identification. Tapes shall be furnished to and shall become the property of the Engineer upon completion of the work.

**701.4.11 Foundation Inspection.** NX size cores will be required for drilled shafts with rock sockets, where NX refers to the nominal diameter of rock core, and the NX core barrel has a 2 1/8-inch (54 mm) inside diameter. The Contractor may be directed to extend the rock socket to a lower elevation, resulting from the Engineer's evaluation of the foundation inspection cores.

**701.4.11.1 Inspection for End Bearing Design.** For drilled shafts that develop load-carrying capacity in end bearing at the base of the rock socket, the Contractor shall drill one NX size core for each rock socket to a depth of 10 feet (3 m) below the bottom of the rock socket upon completion of the rock socket to the elevation shown on the bridge plans, or as directed by the Engineer. This requirement will also apply for rock socket designs that utilize a combination of end bearing and side friction.

These rock cores will be used to determine the quality of founding material directly below the rock socket. When a casing method is used, foundation inspection holes may be drilled prior to rock socket excavation, if approved by the Engineer. Foundation inspection holes may be drilled prior to shaft excavation if the Contractor can establish, to the satisfaction of the Engineer, that the method used shall place the NX size core directly below the tip of the rock socket.

**701.4.11.2 Inspection for Side Friction Design**. For drilled shafts that develop load-carrying capacity through side friction only within the rock socket, the Contractor shall drill one NX size core for each rock socket at a location directed by the Engineer, to a depth of 10 feet (3 m) below the bottom of the rock socket as shown on the bridge plans or as directed by the Engineer. These rock cores will be used to determine the quality of material of the rock socket sidewalls. Foundation inspection holes for rock sockets designed to provide side friction shall be drilled prior to rock socket excavation.

**701.4.11.3 Log of Excavated Material.** The Contractor shall maintain a log of excavated material for each foundation inspection hole, and such logs shall be delivered to the Engineer within 24 hours of completion of the boring. The log shall include the following:

(a) The amount of NX cored per run and the amount recovered. All core loss shall be noted and explained. Clay layers shall be noted and located on the log by depth.

(b) The Rock Quality Designation (RQD) for the NX core. The bedding thickness and degree of weathering shall also be noted.

(c) For drilled shaft rock sockets that develop load-carrying capacity through side friction, one unconfined compression test per 5 feet (1.5 m) of NX core, unless otherwise specified by the contract documents or directed by the Engineer, shall be run on samples of NX core from the rock socket. The results of these tests shall be delivered to the Engineer. Any effect on time of performance resulting from delays in delivery of the above test results to the Engineer will be nonexcusable.

**701.4.11.4 Storage and Labeling of Rock Cores.** Rock cores shall be stored in structurally sound core boxes and shall be protected from the elements. The core boxes shall be properly labeled to indicate location, depth, beginning elevation, Contractor and date, and shall be delivered to the Engineer.

**701.4.12 Reinforcing Steel Cage Fabrication and Placement**. The reinforcing steel cage, consisting of the longitudinal bars, ties, spirals, cage stiffener bars, spacers, centering devices, and other necessary appurtenances, shall be completely assembled as a unit, and shall be placed immediately after the shaft excavation is inspected and accepted, and just prior to shaft concrete placement. Temporary internal cage stiffeners shall be removed as the cage is placed in the shaft such that interference with the placement of concrete does not occur.

**701.4.12.1 Reinforcing Ties, Splices and Clearances.** All reinforcing steel in the shaft shall be double-wire tied and supported such that the steel remains within the allowable tolerances specified herein during placement of concrete or casing removal. With approval from the Engineer, mechanical bar splices meeting the requirements specified in the contract documents may be used.

Mechanical bar splices shall be staggered such that no more than 50 percent of the splices are within a 2-lap splice distance. Welding of reinforcing steel will not be permitted. The reinforcing steel cage shall have sufficient rigidity to prevent racking or permanent deformations during delivery or installation.

| Concrete Cover | | | |
|---|---|---|---|
| **Shaft Diameter** | **Uncased** | **Casing Remains** | **Casing Withdrawn** |
| 2'-0" or less (600 mm or less) | 3" (75 mm) | 3" (75 mm) | 4" (100 mm) |
| 3'-0" (900 mm) | 3" (75 mm) | 3" (75 mm) | 4" (100 mm) |
| 4'-0" (1200 mm) | 4" (100 mm) | 4" (100 mm) | 4" (100 mm) |
| 5'-0" or larger (1500 mm or larger) | 6" (150 mm) | 6" (150 mm) | 6" (150 mm) |

**701.4.12.2 Spacers.** Rolling spacers for reinforcing steel shall be used to minimize disturbance of the shaft sidewalls and to facilitate removal of the casing during concrete placement. Concrete spacers or other approved non-corrosive spacing devices shall be used at sufficient intervals, near the bottom and along the shaft at intervals not exceeding 5 feet (1.5 m), to ensure concentric location of the cage within the shaft excavation. When the vertical steel is greater than one inch (25 mm) in diameter, the maximum spacing may be increased to 10 feet (3.0 m). As a minimum, a set of spacers shall be provided within 2 feet (0.6 m) of both the top and bottom of the shaft. In addition, one set of spacers shall be provided at both 2 feet (0.6 m) above and below each change in shaft diameter. Non-corrosive spacers shall be provided at a minimum of one spacer per 30 inches (750 mm) of circumference of cage with a minimum of three at each level to maintain the required reinforcement clearances. The spacers shall be of adequate dimension to maintain the specified clearance between the outside of the reinforcing cage and the side of the excavated hole or casing.

**701.4.12.3 Bottom Supports.** Approved non-corrosive bottom supports shall be provided for the reinforcing cage to ensure that the reinforcing is the correct distance above the bottom of shaft. The bottom supports shall not be used to support the weight of the cage. In the event that the shaft has been excavated below the anticipated tip elevation, the reinforcing cage shall be extended at the lower tip end by lap lengths for No. 11 bars or smaller or by use of mechanical connectors. Splices of adjacent bars will not need to be staggered in this situation and all of the reinforcing bars may be spliced at a given location. Reinforcement will not be required for the bottom 12 inches (300 mm).

**701.4.12.4 Durability of Spacers.** Concrete spacers and bottom supports shall be constructed of concrete equal in quality and durability to the concrete specified for the shaft. Spacers fabricated from reinforcing steel shall be epoxy coated.

**701.4.12.5 Protection of Reinforcing Cage.** The reinforcing cage bottom supports shall be positioned such that the reinforcing steel is not allowed to come into contact with the soil or rock and to ensure that the bottom of the cage is maintained at the proper distance above the base as identified in the contract documents or directed by the Engineer.

**701.4.12.6 Check of Tolerances for Placement of Reinforcing Cage.** The elevation of the top of the reinforcing cage shall be checked before and after the concrete is placed. The reinforcing cage shall be maintained within the specified tolerances, and the Contractor shall make corrections to those tolerances, as required, to the satisfaction of the Engineer. No additional shafts shall be constructed until the Contractor has modified the reinforcing cage support to obtain the required tolerances.

**701.4.13 Concrete Placement**

**701.4.13.1 General Considerations.** Accumulations of water in casings and excess sediment at the base shall be removed as described herein before the concrete is placed. No concrete shall be placed until all casings, if used, within a 15-foot (4.6 m) radius have been installed. Within the 15-foot (4.6 m) radius, all driving or vibratory installation methods shall be discontinued until the concrete in the last shaft has set at least five days. Concrete placement shall begin as soon as possible after completion of the excavation, inspection and setting of the reinforcing cage, and shall proceed in a continuous operation from the bottom of the shaft to the plan construction joint or above as specified herein. An unplanned stoppage of work may require an emergency construction joint during the shaft construction.

**701.4.13.1.1 Placement of Concrete in the Shaft.** Concrete shall be placed for each shaft with the flow of concrete directed down the center of the shaft. Concrete shall be placed by free fall or through a tremie or concrete pump. The free fall placement method will only be permitted in dry holes when approved by the Engineer. The maximum height of free fall placement shall be 80 feet (24.4 m). Concrete placed by free fall shall fall directly to the base without contacting either the reinforcing cage or hole sidewall. Drop chutes may be used to direct concrete to the base during free fall placement.

**701.4.13.1.2 Extent of Concrete Placement.** Concrete placement shall continue after the shaft is filled until good quality concrete, as determined by the Engineer, is evident at the plan construction joint at the top of the shaft and until a minimum of 18 inches (450 mm) of concrete, measured vertically, has been expelled. Immediately after concrete placement has been completed, all contaminated concrete and deleterious material accumulated above the top of shaft shall be removed to within one foot (0.3 m) of plan top of shaft. Any concrete remaining above the top of shaft shall be carefully removed to the plan construction joint after curing and excess casing removal.

**701.4.13.1.3 Time Limitations.** The elapsed time from the beginning of concrete placement in the shaft to the completion of the placement shall not exceed two hours. All admixtures shall be adjusted for the conditions encountered on the job so the concrete remains in a workable plastic state throughout the two-hour placement limit. Prior to concrete placement, the Contractor shall provide test results of both a trial mix and a slump loss test conducted by an approved testing laboratory using approved methods to demonstrate that the concrete meets the two-hour requirement. The Contractor may request a longer placement time if a concrete mix is provided that will maintain a slump of 4 inches (100 mm) or greater over the longer placement time in the entire shaft as demonstrated by trial mix and slump loss tests. The trial mix and slump loss tests shall be conducted using concrete and ambient temperatures approved for site conditions.

**701.4.13.1.4 Adequacy of Concrete Placement Method.** Failure to demonstrate the adequacy of concrete placement methods or equipment during construction of any technique or production shafts will be cause for the Engineer to require appropriate alterations in equipment or methods by the Contractor to eliminate unsatisfactory results. Drilled shafts that are completed, but do not meet the concrete placement requirements, will be unacceptable. The Contractor shall correct all unacceptable completed shafts to the satisfaction of the Engineer at the Contractor's expense.

**701.4.13.2 Concrete Placement by Tremie.** Tremies used to place concrete shall consist of a tube of sufficient length to discharge concrete at the shaft base elevation. The tremie shall have sufficient weight to rest on the shaft bottom before the start of concrete placement and to prevent curling of the tremie line during placement of the concrete. The tremie shall not contain aluminum parts that may come in contact with the concrete. A tremie shall consist of a watertight tube having an inside diameter of no less than 10 inches (250 mm) and fitted with a hopper at the top. The inside and outside surfaces of the tremie shall be clean and smooth to permit both flow of concrete and unimpeded withdrawal during concrete placement. The tremie wall thickness shall be adequate to prevent crimping or sharp bends that restrict concrete placement. Tremies used for depositing concrete in a dry drilled shaft excavation shall be supported such that the free fall of the concrete is less than 80 feet (24.4 m) at all times.

**701.4.13.2.1 Adjustment of Concrete Free Fall or Rate of Concrete Flow.** If the free fall concrete causes the shaft excavation to cave or slough, the Contractor shall control the movement of concrete by reducing the free fall of the concrete or the rate of flow of concrete into the excavation. The Contractor shall be responsible for proposing, developing, and after approval from the Engineer, implementing corrective work.

**701.4.13.2.2 Tremie Operation.** Underwater placement of concrete shall not begin until the tremie is at the shaft base elevation. The discharge end of the tremie shall be constructed to permit the free radial flow of concrete during placement operations. The tremie discharge end shall remain immersed as deep as practical in the concrete, but shall be no less than 5 feet (1.5 m) at all times. The tremie shall be supported such as to permit free movement of the discharge end over the entire top surface of the work and to permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end shall be sealed closed at the start of work to prevent water from entering the tube before the tube is filled with concrete. After placement has started, the level of the concrete in the tremie shall be maintained above the level of slurry or water in the borehole at all times to prevent water or slurry intrusion into the shaft concrete. If water enters the tube after placement is started, the tremie shall be withdrawn, the discharge end resealed, and the placement restarted. The flow of concrete shall be continuous until the work is completed.

**701.4.13.2.3 Removal of Tremie Orifice From Concrete.** If at any time during the concrete pour, when using the wet construction method, the tremie line orifice is removed from the fluid concrete column and discharges concrete above the rising concrete surface, the entire drilled shaft will be considered defective. In such a case, the Contractor shall remove the reinforcing cage and concrete, complete any necessary sidewall cleaning or overreaming as directed by the Engineer, and repour the shaft. Corrections made by the Contractor will be noncompensable and any effect on time of performance nonexcusable.

**701.4.13.3 Concrete Placement by Pump.** Concrete pumps and lines may be used for concrete placement by either the wet or dry construction method. All pump lines shall have a minimum diameter of 5 inches (125 mm) and shall be constructed with watertight joints. Concrete placement shall not begin until the pump line discharge orifice is at the shaft base elevation. For the wet construction method, a plug or similar device shall be used to separate the concrete from the fluid in the hole until pumping begins. The plug shall either be removed from the excavation or shall be of a material that does not cause a defect in the shaft if the plug is not removed. The discharge orifice shall remain at least 5 feet (1.5 m) below the surface of the fluid concrete. If at any time during the concrete pour the pump line orifice is removed from the fluid concrete column and discharges concrete above the rising concrete level, the shaft will be considered defective. In such a case, the Contractor shall remove the reinforcing cage and concrete, complete any necessary sidewall cleaning or overreaming as directed by the Engineer, and repour the shaft. Corrections made by the Contractor will be noncompensable and any effect on time of performance nonexcusable.

**701.4.13.4 Drop Chutes.** Drop chutes may be used to direct placement of free fall concrete down the center of the shaft excavations where the maximum depth of water does not exceed one inch (25 mm). The free fall method of placement shall not be used in wet excavations. Drop chutes shall be a smooth tube constructed either as a continuous one-piece unit or as removable sections. Aluminum drop chutes will not be permitted. Concrete may be placed through either a hopper at the top of the tube or side openings as the drop chute is retrieved during concrete placement. The drop chute shall be supported such that the free fall of the concrete measured from the bottom of the chute is less than 80 feet (24.4 m) at all times.

**701.4.14 Construction Joints.** Unless otherwise approved by the Engineer, construction joints shall be made only where shown on the bridge plans. All planned reinforcing steel shall extend uninterrupted through joints. Unless otherwise shown on the bridge plans, horizontal joints may be constructed without keys. Surfaces of fresh concrete at horizontal construction joints shall be rough floated sufficiently to thoroughly consolidate the surface and to intentionally leave the surface in a roughened condition. Shear keys, if required, shall consist of formed depressions in the surface covering approximately one-third of the contact surface.

**701.4.15 Concrete Protection and Curing.** For at least 48 hours after shaft concrete has been placed, no construction operations that will cause soil movement adjacent to the shaft shall be conducted, except for movement of light construction equipment. Portions of drilled shafts exposed to a body of water shall be protected from the action of water by leaving the forms in place for at least seven days after concrete placement or until the shaft concrete reaches a minimum strength of 2500 psi (18 MPa). After placement, the temporarily exposed surfaces of the shaft concrete shall be cured to prevent loss of water by use of one or more of the approved methods. Curing shall be in accordance with the following.

**Curing.** Immediately after the finishing operations have been completed and as soon as marring of the concrete will not occur, the entire surface and exposed edges of the newly placed concrete shall be covered and cured in accordance with one of the following methods. The concrete shall not be left exposed for more than 30 minutes between stages of curing or during the curing period.

**White Pigmented Membrane.** After the free water has left the pavement surface, the entire surface shall be sealed by spraying with a uniform application of white pigmented membrane curing material.

The Contractor shall provide satisfactory equipment to ensure uniform mixture and coverage of curing material, without loss, on the pavement at the rate of not less than one gallon for each 200 square feet (0.20 L/m2). If rain falls on the newly coated pavement before the film has dried sufficiently to resist damage, or if the film is damaged in any other way, the Contractor shall apply additional curing material to the affected portions. All areas cut by finishing tools subsequent to the application of the curing material shall immediately be given new applications at the rate specified above. If hairline cracking develops before the membrane can be applied, the concrete shall be initially cured with wet burlap in accordance with the following before the membrane is placed. Membrane curing shall not be used on Portland cement concrete base. Emulsified asphalt may be used to cure the concrete base if the surface course is to be a bituminous type.

**Burlap.** The top surface of the concrete shall be temporarily covered with thoroughly damp burlap after the concrete has set sufficiently to prevent marring of the surface. Burlap shall be handled in such a manner that contact with earth or other deleterious substances is avoided. All burlap, except burlap previously used for curing concrete, shall be thoroughly washed. The burlap shall be kept thoroughly wet until removed for application of the final curing material. Neither the top nor the edge of the concrete shall be left unprotected for more than 30 minutes. When the burlap is removed, white pigmented membrane curing material shall be continued by one of the approved methods.

**701.4.16 Construction Tolerances.** During excavation of the shaft, the Contractor shall make frequent checks on the plumbness, alignment and dimensions of the shaft. Any deviation exceeding the allowable construction tolerances specified herein shall be corrected with a procedure approved by the Engineer. Drilled shaft excavations constructed in such a manner that the concrete shaft cannot be completed within the required tolerances will not be accepted. Correction methods shall be submitted by the Contractor for the Engineer's approval. Drilled shaft construction shall not begin until approval has been obtained. When a shaft excavation is completed with unacceptable tolerances, the Contractor shall propose, develop and, after approval from the Engineer, implement corrective work. Redesign drawings and computations submitted by the Contractor shall be signed by a licensed Structural Engineer in Illinois. The following construction tolerances will apply to drilled shafts unless stated otherwise in the contract documents:

(a) Temporary casing diameters shall provide a final shaft diameter as shown on the bridge plans. When approved by the Engineer, the Contractor may provide a larger casing at the Contractor's expense.

(b) Shafts shall be constructed such that the center of the top of the shaft is within 3 inches (75 mm) of plan position in the horizontal plane at the plan elevation for the top of the shaft.

(c) The vertical alignment of a vertical shaft excavation shall not vary from the plan alignment by more than 1/4 inch per foot (20 mm/m) of depth. The alignment of a battered shaft excavation shall not vary by more than 1/2 inch per foot (40 mm/m) of the distance along the axis of the shaft from the prescribed batter.

(d) After all the shaft concrete is placed; the top of the reinforcing steel cage shall be no more than 6 inches (150 mm) above and no more than 3 inches (75 mm) below plan position.

(e) The top elevation of the shaft shall be no more than one inch (25 mm) above or 3 inches (75 mm) below the plan top of shaft elevation.

(f) The bottom of the shaft excavation shall be normal to the axis of the shaft within a tolerance of 3/8 inch per foot (30 mm/m) of shaft diameter.

**701.4.17 Integrity Testing.** The completed shaft shall be subjected to the specified testing methods, such as concrete coring or sonic logging testing, to determine the extent of any defects that may be present. Work and material required for testing shall be furnished by the Contractor and will be paid for in accordance with the contract documents. If testing reveals voids or discontinuities in the concrete that, as determined by the Engineer, indicate that the shaft is not structurally adequate, the shaft will be rejected. The Contractor shall then repair, replace or supplement the defective shaft in a method approved by the Engineer. The construction of additional drilled shafts shall be discontinued until the Contractor demonstrates the adequacy of the shaft construction method to the satisfaction of the Engineer. Any additional work required by the Contractor as a result of shaft defects will be noncompensable and any effect on time of performance nonexcusable.

**701.4.17.1 Concrete Coring.** At locations where concrete coring is to be provided, as indicated in the contract documents or as directed by the Engineer, the following will apply. Upon completion of placing concrete and after waiting a minimum of 48 hours, the top surface of concrete shall be cleaned of laitance and any unsound concrete, and then one core hole shall be drilled completely through the shaft concrete and the rock socket to approximately one foot (0.3 m) below the bottom of the rock socket of each shaft. Provisions for the inspection of the concrete surface shall be in accordance with the applicable requirements described herein. Core holes shall be drilled at locations specified by the Engineer. The holes shall be drilled to recover NX size cores. The core samples recovered shall be labeled as to the location from which the samples were taken. The samples shall be delivered to the Engineer for examination. If the cores indicate defective concrete in the shaft, which in the judgment of the Engineer impairs the strength of the completed shaft, the Contractor shall drill additional cores as directed by the Engineer. If the concrete is found to be defective, the Contractor shall submit to the Engineer in writing a proposal for correction, and those corrective procedures shall be approved by the Engineer before such corrective work is undertaken. The cored holes in non-defective concrete shall be filled with grout such that all voids are filled. All grout used for core holes shall be in accordance with Sec 1066. No direct payment will be made for grout and grouting.

**701.4.17.2 Sonic Logging Testing.** The Contractor shall perform non-destructive integrity testing on completed drilled shafts and rock sockets using the crosshole sonic logging (CSL) method for concrete drilled shafts. The tests shall be conducted as indicated on the bridge plans or other contract documents, or as directed by the Engineer. Sonic logging measurements and data interpretation shall be performed by a CSL consultant with at least two years of experience in CSL drilled shaft testing. The Contractor shall submit the testing organization experience record to the Engineer, along with a written description of the testing procedures, operation manuals for the testing equipment, and samples of previous test results indicating both sound and defective concrete. The Contractor shall inform the Engineer of scheduled test dates at least seven days prior to CSL testing. The Contractor shall provide reasonable access to the shaft top for performance of the sonic logging testing.

**701.4.17.2.1 Installation of Pipes.** The Contractor shall furnish and install 2-inch (50 mm) nominal inside diameter steel pipes, ASTM A 53, Standard Weight, for use in sonic testing of each drilled shaft. Pipes shall be installed in each drilled shaft at the locations shown on the bridge plans, as required by the testing agency or as directed by the Engineer. The pipes shall be sufficiently regular and free from defects to permit the free and unobstructed passage of the probes. The pipe shall be installed such that all internal joints are flush. Stiffening devices such as mandrels, tape or similar material to seal the joints shall not be used. Pipe shall be watertight with clean internal and external faces, the latter to ensure a good bond between the concrete and the pipes. The pipes shall be fitted with a screw-on watertight shoe and cap and shall be securely fixed to the interior of the reinforcement cage with a minimum cover of 3 inches (75 mm) from the shaft periphery. The pipes shall be as near to parallel as possible, equally spaced and vertical. Where several sections of pipe are required to reach the full length, joints shall be made watertight. The pipes shall be filled with water and plugged or capped before shaft concrete is poured. The upper end of the pipe shall not be left open after the pour. The pipes shall extend at least 3 feet (0.9 m) above the top of the concrete in the shaft to compensate for water displaced by insertion and removal of the transmitter, receiver, and cable. For shafts with a rock socket, the lower end of the pipes shall extend to the bottom of the rock socket. Care shall be taken during the drilled shaft concrete pour to not damage the pipes. If a tremie is used, the tremie shall not be permitted to rest on top of the pipes during the pour. After completion of the sonic logging and final acceptance of the drilled shaft, the Contractor shall fill the access pipes with grout.

**701.4.17.2.2 Sonic Logging Equipment.** The sonic logging equipment furnished by the CSL Consultant shall consist of all necessary supplies, support equipment and power to perform the sonic logging testing requirements as described herein.

**701.4.17.2.3 Sonic Logging Test Procedure.** The drilled shaft shall be tested between 2 and 40 days after concrete placement. The following procedures shall apply:

(a) Pipes shall be checked to ensure the pipes are free from blockages and are filled with water.

(b) Levels shall be taken on top of each pipe, each pipe shall be plumbed and the length shall be recorded.

(c) Testing shall be performed between each pair of adjacent pipes around the shaft perimeter and also in pairing combinations between each pipe with all other pipes in the shaft.

(d) All tests shall be carried out with the probes in the same horizontal plane unless the Engineer directs that defects be further evaluated with the probes on different horizontal planes.

(e) The probes shall be raised simultaneously from the bottom of the pipes ensuring that all slack is taken out of the cables before the analyzer is switched on, and that the distance between transducers remains constant during the course of the test. The speed of ascent shall be less than 12 inches per second (300 mm/second). Measurements shall be taken at 3-inch (75 mm) intervals or less. Anomalies indicated by longer pulse first-arrival times (FAT) and significantly lower amplitude per energy signals shall be reported.

If anomalies are detected, additional tests with two or more sources per receiver vertical offsets of greater than or equal to 20 inches (500 mm) shall be conducted between the same tubes unless the anomaly is within 20 inches (500 mm) of the bottom of the shaft.

(f) The Contractor shall provide accurate measurements of probe depths on the logs.

**701.4.17.2.4 Record of Testing.** Preliminary results of the testing shall be provided on site prior to the CSL consultant leaving the site. A detailed CSL report and test data shall be submitted to the Engineer within seven days. The CSL report shall be signed and sealed by a Professional Engineer. The CSL report shall include, but is not limited to, the following: project identification and dates of testing, a table and schematic showing shafts tested with accurate identification of tube coordinates and collar elevation, name of personnel that performed the tests and interpretation and those personnel's affiliation, equipment used, data logs, interpretation, analysis, and results. The data logs shall include XY plots of FAT, amplitude and velocity versus depth. CSL data shall be processed to provide easy to understand 2D cross-sections between tubes for all tube pair combinations. These plots shall be annotated by the CSL consultant as appropriate to delineate anomalous results. If offset surveys are performed as part of 3D tomography, data plots shall include 3D volumetric images for the entire shaft, color-coded, to indicate velocity variations along the shaft. Locations and geometry of anomalies or unconsolidated zones shall be identified in 3D color images with detailed discussion. The results for CSL and 3D surveys shall be based on the percentage decrease in velocity as correlated to the following Concrete Condition Rating Criteria (CCRC). The velocity datum of good concrete shall be established by averaging the velocities in the good concrete along the drilled shaft. Deviations from the velocity datum shall be used for determining the Concrete Condition Rating.

| Concrete Condition Rating Criteria | | | |
|---|---|---|---|
| **Concrete Condition Rating** | **Rating Symbol** | **Velocity Reduction** | **Indicative Results** |
| Good | G | 0 to 10% | Acceptable concrete |
| Questionable | Q | 10% to 25% | Minor concrete contamination or intrusion. Questionable quality concrete. |
| Poor | P/D | > 25% | Defects exist, possible water slurry contamination, soil intrusion, and or poor quality concrete. |
| Water | W | V= 4760 to 5005 ft/sec (1,450 to 1525 m/s) | Water intrusion, or water filled gravel intrusion with few or no fines present. |
| No Signal | NS | No signal received | Soil intrusion or other severe defect absorbed the signal, tube debonding if near top. |

**701.4.17.2.5 Correction of Unacceptable Results.** The Contractor shall immediately inform the Engineer of any suspected anomalies, honeycombing or poor concrete quality detected by testing. The Contractor and CSL consultant shall duly perform further tests as directed by the Engineer to evaluate the extent of any detected anomalies. Core drilling, or other investigative methods as approved by the Engineer, shall be performed to further investigate the anomaly.

If a defect is confirmed, the Contractor shall bear all costs involved with the shaft coring, grouting and remediation. Within 14 days of the completion of testing, the Contractor shall provide a report signed and sealed by a licensed Structural Engineer in Illinois providing the results of the additional investigations and recommendations to accept or repair the shaft. The report shall also contain recommendations for modification of construction procedures to prevent defects for subsequent shaft installations. The dates of the completion of drilling, cleaning, steel placement and concrete pour shall also be provided. Construction above the top of shaft shall not be performed until the shaft has been accepted by the Engineer.

**701.5 Drilled Shaft Load Tests.** All load tests, when required by the contract documents, shall be completed and submitted to the Engineer for review and approval before construction of any production drilled shafts. The locations of load test shafts, the maximum loads to be applied, the test equipment to be furnished by the Contractor, and the actual sequence of the load testing shall be as shown on the bridge plans or as specified in the contract documents. After completion of testing, test shafts not used as production shafts shall be cut off at an elevation 3 feet (0.9 m) below the finished ground line. The portion of shafts cut off shall be disposed of by the Contractor, at the Contractor's expense, in a manner approved by the Engineer.

## SECTION 703 CONCRETE MASONRY CONSTRUCTION

**703.1 Description.** This work shall consist of constructing culverts, bridges and other concrete structures as shown on the bridge plans or as directed by the Engineer.

### 703.2 Material

**703.2.1** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Bearing Pads | 1038 |
| Joints for Concrete Structures | 1057 |
| Joint Sealing Material | 1057 |
| Concrete Sealer | 1053 |

**703.2.2** All material, proportioning, air-entraining, mixing, slump and transporting of Portland cement concrete shall be in accordance with Sec 501.

**703.2.3** Changes in sources of cement and aggregate will be permitted only with written approval from the Engineer. Aggregate of essentially the same characteristics, except as noted in Sec 1005, and cements resulting in concrete of the same color, shall be used in any individual unit of the structure. The superstructure will be considered an individual unit of the structure unless otherwise shown on the bridge plans.

### 703.3 Construction Requirements

**703.3.1 Falsework.** The Contractor shall submit detailed plans for falsework, prepared and sealed by an Illinois Licensed Structural Engineer, for examination by the Engineer. If such plans are not satisfactory to the Engineer, the Contractor shall make such changes in them as may be required.

For continuous concrete slab and girder bridges, falsework shall be provided for the full length of each continuous unit and the full width of the structure.

For calculating the strength of falsework, a weight (mass) of 150 lb/cu ft (2400 kg/cu m) shall be assumed for the concrete. The design of the falsework shall take into account the weight of the concrete and also other loads incidental to the construction operations. All falsework shall be designed and constructed to provide the necessary rigidity and to support the imposed loads without appreciable settlement or deformation. The Contractor shall make allowance for the deflection, shrinkage, and settlement of falsework, in addition to the allowance for the amount of dead load deflection and camber shown on the bridge plans. A method satisfactory to the Engineer shall be used to detect any settlement that may occur during the placing of the concrete.

Falsework bents shall be founded upon piling driven to a capacity sufficient to support the load without appreciable settlement. If the soil is firm and well compacted, the Contractor may, as an alternate, place falsework bents upon concrete footing or mud sills of sufficient size that the pressure on the soil will not exceed 1 1/2 tons/sq ft (145 kPa) or the Contractor may support falsework from the piers or abutments, provided sleeves for any tie bolts can be cast into the concrete. Sleeves or other appurtenances cast into the concrete shall be constructed so as to permit their removal to a depth of at least 1 1/2 in. (40 mm) from the face without injury to the concrete. Drilling into existing piers or abutments that are to remain as a part of the final structure will not be permitted for the support of falsework. The Engineer may require the Contractor to use screw jacks or hardwood wedges to take up any settlement in the form work, either before or during the placing of the concrete.

Falsework supporting forms for cast-in-place concrete shall remain in place until tests show that the concrete has attained the required flexural strength and the curing period is completed. In the absence of tests to determine the flexural strength, the falsework shall remain in place until at least 14 days have elapsed after the placing of the concrete, exclusive of days in which the temperature falls below 45 ºF (7 ºC). When either fly ash or ground granulated blast-furnace slag has been used in the concrete mixture, falsework shall remain in place a minimum of 28 days from the time of concrete placement in the absence of strength tests.

No superimposed load, either dead or live, will be allowed upon the bridge during the period the falsework is required to remain in place. If longitudinal construction joints are provided in the roadway of any superstructure, the falsework shall not be released under one portion adjacent to such a joint until the concrete in that portion has attained the required strength and the concrete has been placed in the portion on the opposite side of such joint. The falsework shall not be removed from either side of such joint until all the concrete has attained the required flexural strength and the curing period is completed.

A compressive strength established through field testing to be equivalent to the required flexural strength may be used if approved by the Engineer.

Falsework shall be removed in such a manner as to permit the concrete to take uniformly and gradually the stress due to its weight (mass).

**703.3.2 Forms.** Forms for concrete shall be built true to the lines and grades specified, and shall be mortar-tight and of sound material adequate to prevent distortion during the placing and curing of concrete.

All concrete shall be formed unless otherwise specified. A concrete pad of approved thickness may be used as a form for the unexposed bottom of end bent beams on piles. If required by the Engineer, formwork plans shall be submitted by the Contractor before formwork is started. If during or after placing the concrete the forms sag or bulge, the affected concrete shall be removed, the forms realigned and new concrete placed. Construction camber to accommodate shrinkage or settlement impairing the strength of the structure by the reduction of depth will not be permitted. The forms shall be designed for following minimum criteria: a fluid pressure of 150 pounds per cubic foot (a fluid density of 2400 kg/m$^3$), and for a live load of 50 pounds per square foot (2.4 kPa) on horizontal surfaces and 30 pounds per square foot (1.5 kPa) on vertical surfaces for impact and vibration.

**703.3.2.1** Face lumber of forms for exposed surfaces of concrete shall have a smooth dressed surface free of loose knots, knotholes and other defects. The spacing of supports and the thickness of face lumber shall be adequate to prevent distortion due to the pressure of the concrete. Form material shall be placed with horizontal joints. Triangular molding, smooth on three sides and having a 3/4-inch (19 mm) width on each of the two form sides, shall be used to bevel all exposed edges of the structure, except where special bevels are shown on the bridge plans.

**703.3.2.2** Forms reused shall be in good condition.

**703.3.2.3** Design and construction of forms shall permit the removal of the forms without damage to the concrete. Cofferdam braces or struts that will extend through any exposed concrete section will not be permitted. Forms under copings and around offsets may be given a draft of no more than one inch per foot (83 mm/m) to permit removal without damage to the concrete. For narrow walls where access to the bottoms of the forms is not otherwise obtainable, an opening shall be provided to allow chips, dirt, sawdust or other foreign material to be removed immediately prior to placing concrete.

**703.3.2.4** Form lining will be permitted, and will be required for exposed curved surfaces. Liners other than plywood may be used with approval from the Engineer.

**703.3.2.5** Fiber tubes for column forms above the ground line shall have a finish free of gaps or overlaps in the inside ply and shall be coated inside with a waterproofing material that will not stick or bond to, or discolor the concrete surface of the column. Fiber tubes for column forms from 6 inches (150 mm) below the finished ground line down may show seams, shall be waterproofed and need not be removed.

**703.3.2.6** If wood forms are to be used in combination with metal forms, form details shall be submitted for approval if requested by the Engineer. Steel panels, or panels with metal frames and wood that leaves permanent impressions or ridges shall not be used, except for concrete box culvert-type structures and other non-exposed areas.

**703.3.2.7** The inside of all forms shall be oiled, except for forms having composition linings. The oil used shall be a light, clear paraffin-based oil or other approved material that will not discolor or damage the exposed concrete surface. The coating shall be applied before placing reinforcing steel.

**703.3.2.8** Ties, spreaders and all metal appliances used inside of forms to hold the forms in correct alignment and location shall be constructed such that after removal of the forms, the metal may be removed to a depth of at least one inch (25 mm) below the surface of the concrete. Metal tie rods used inside the forms where concrete will have an exposed surface shall be of a type that will not produce a cavity at the surface of the concrete greater than 1 1/2 inches (38 mm) in diameter. Bolts and rods used as ties shall not be removed by pulling the bolts and rods through the concrete. Wire ties and pipe spreaders will not be permitted, and metal or wood spreaders, which are separate from form ties, shall be removed as concrete is being placed. A bolt-through method of supporting forms for massive substructure units may be used with approval from the Engineer. No form ties shall be embedded in concrete above the roadway surface on bridges, except that coil ties and threaded rods may be permitted through the vertical face of the base and vertically through the top of barrier curbs. Coil ties, and all metal to be embedded in barrier curbs shall be epoxy-coated or galvanized.

**703.3.2.9** Cavities produced by the removal of metal tie rods shall be filled with mortar composed of approximately one part Portland cement to two parts sand or a non-shrinking, non-staining type of mortar. After the cavities are filled, the finished surface shall be left smooth, even and uniform in color and texture with minimal evidence of shrinkage. White cement may be added to the mortar if necessary to obtain the required color. Tie rod cavities in surfaces against which backfill is to be placed shall be filled with mortar or an approved plastic compound in accordance with Sec 1057. Patching of tie rod cavities in the interior surfaces of box girders will not be required.

**703.3.2.10** Fiber tubes for voids shall be properly designed for the use indicated. The outside surface shall be waterproof. Distortion of the tubes shall be prevented. The ends shall be covered with suitably designed mortar-tight caps. If material used for capping tubes expands when moist, preformed joint filler 5/16 inch (8 mm) thick shall be used around the perimeter of the caps to prevent distortion, or another method approved by the Engineer.

**703.3.2.11** Steel tubes for voids shall be properly designed for the use indicated. Excessive distortion shall be prevented in handling, storage and placing. The diameter of the tube shall be as shown on the bridge plans with a tolerance of plus zero and minus 3/4 inch (19 mm). The ends of tubes shall be covered with suitably designed mortar-tight metal end caps.

**703.3.2.12** Tubes for producing voids in concrete slab superstructures shall be accurately located in positions shown on the bridge plans and shall be positively anchored to the joists carrying the floor forms. Anchors and ties shall be designed to leave a minimum of supporting material exposed in the bottom of the finished slab of the completed structure. Details of proposed anchorage and ties for the tubes shall be submitted for approval before work is started on the bridge superstructure. One 3/4-inch (19 mm) diameter weephole shall be provided near each end of each tube. Weepholes shall be placed in straight lines parallel to bents, and shall extend through the forms and be kept open at all times. Tubes shall be protected from moisture and heat until concrete is placed. Distortion of tubes after placing of concrete shall not increase the tubes' vertical axis by more than 1/2 inch (13 mm).

**703.3.2.13** Falsework and form removal from under any structural concrete unit shall not be started until the concrete has attained at least the required compressive strength shown. The falsework support of all concrete spans of a continuous or monolithic series shall be first released from the center of all spans, and shall proceed simultaneously from all span centers each way toward adjacent bents.

Release shall be in such a manner as to permit the concrete to gradually and uniformly take stresses due to the self weight (mass) of the concrete. Compressive strength will be determined by tests conducted in accordance with AASHTO T 22.

| Class of Concrete | Compressive Strength, psi (MPa), min |
|---|---|
| B | 2750 (19) |
| B-1 | 3000 (21) |
| B-2 | 3000 (21) |

**703.3.2.14** Except in accordance with Sec 703.3.6, forms for vertical surfaces of bridge superstructures shall be removed as soon as the concrete is self-supporting to permit prompt patching of tie holes.

**703.3.3 Placing Concrete.** Placing concrete in any unit of a structure shall not begin until preparations for placing and finishing are satisfactory to the Engineer. Concrete shall be placed in the form in layers as near final position as practical with minimum handling. Each placement shall be completed in a continuous operation with no interruption in excess of 45 minutes between the placing of contiguous portions of concrete. Where a finishing machine is to be used, the machine shall be moved over the area to be finished immediately prior to placing concrete in any bridge deck pour to facilitate checking reinforcement cover and slab thickness. This checking shall be done in the presence of the Engineer and with the screeds in the finishing position. Placing of concrete for bridge decks shall proceed uniformly for the full width of the placement. Once begun, placing of concrete in the superstructure of a continuous or monolithic series of spans shall proceed as rapidly as good construction practice will permit until all concrete in that series is placed. Vibrators having a minimum frequency of 4500 impulses per minute shall be used to thoroughly consolidate the concrete in the forms and around the reinforcing steel. Sufficient vibrators shall be on hand to ensure continuous placement of the concrete without delay. The vibrators shall not be used for moving concrete nor shall vibrators penetrate or disturb previously placed layers of concrete after initial set. Vibration shall not cause segregation of the material. Reinforcing steel protruding through transverse or longitudinal headers shall not be disturbed until the concrete is at least 24 hours old. Applicable portions of Sec 502 shall also apply.

**703.3.3.1** Where placing operations involve dropping the concrete more than 5 feet (1.5 m), the concrete shall be deposited as approved by the Engineer to avoid segregation and contamination. Where concrete is placed in the interior of pneumatic caissons, the concrete may be deposited through air locks or other approved devices, and the requirement of dropping the mixture no more than 5 feet (1.5 m) may be waived.

**703.3.3.2** Concrete shall be worked under and around the reinforcing steel without displacing the steel. Forms and reinforcing steel above concrete being placed, and placing equipment shall be kept clean and free from coatings of hardened concrete. Water used for flushing the equipment shall be discharged clear of the concrete and forms.

**703.3.3.3** Concrete shall be placed around the tubes forming voids in slab spans using methods to prevent the displacement of the tubes. For tubes having an inside diameter greater than 14 inches (350 mm), the concrete shall be placed in three layers. The first layer shall extend from the floor forms up to a plane 1/4- tube diameter above the bottom of the tubes and the second layer to 3/4-tube diameter.

For tubes 14 inches (350 mm) or smaller, the concrete shall be placed in two layers, with the lower layer extending to the middle of the tube. Each layer shall be vibrated and allowed to settle after placing, before the next succeeding layer is placed. The succeeding layer shall be deposited while the concrete in the layer below is still plastic enough to permit intermixing the two layers by use of a vibrator.

**703.3.3.4** The sequence of placement of concrete for roadway slabs on a continuous series of spans will be shown on the bridge plans, along with the minimum rates of placement required for the basic sequence and for combinations thereof. The basic sequence of placement shall be observed unless it can be demonstrated that the Contractor can place and satisfactorily finish combined placements at the required rate. If the Contractor wishes to alter the placing sequence or to combine units, the Contractor shall submit a written request subject to approval from the Engineer.

**703.3.3.5** Concrete for substructure units shall be placed in the dry unless otherwise approved by the Engineer. If the supporting material at plan elevation of the bottom of a pile footing is not sufficiently stable to support the concrete, the material shall be stabilized, or the bottom of the footing shall be formed to adequately support the concrete. The stabilizing of material or forming under pile footings will be at the Contractor's expense.

**703.3.3.6** Depositing concrete under water will be permitted if provided for in the contract documents or upon written approval from the Engineer. The concrete shall be placed by tremie bottom dump bucket or mechanically applied pressure. The concrete shall be placed in the final position in still water and shall not be vibrated or disturbed after being deposited. Concrete placed under water for seal courses shall be Seal Concrete in accordance with Sec 501.

**703.3.3.7** Conveying, placing and pumping equipment shall have adequate capacity, be suitable for the intended work and shall be operated to produce a continuous stream of uniform concrete. Equipment shall be arranged to prevent transmission of vibration to freshly placed concrete. The system through which the concrete is pumped shall be manufactured such that no aluminum parts will come into contact with the concrete.

**703.3.3.8** At the completion of concrete placement, the last concrete in the pipeline shall not be used.

**703.3.3.9** Concrete used for filling cavities or crevices as directed by the Engineer and as required in Sec 206 shall be Class B concrete. This concrete shall be unformed mass concrete placed separately from and prior to the placing of footing concrete.

**703.3.3.10** When a closure pour is specified on the bridge plans, or is necessary for other requirements, the closure pour between slabs poured independently shall be expansive Class B-2 concrete. Unpolished aluminum powder shall be added to the Class B-2 concrete as recommended by the powder manufacturer or as approved by the Engineer for controlled expansion. A shrinkage compensating cement may be substituted for the unpolished aluminum powder and cement. If a shrinkage compensating cement is substituted, the type and amount shall be approved by the Engineer.

**703.3.3.10.1** Prior to placing the closure pour, the Contractor shall release the falsework to allow the initial deflection in the slab extension. The Contractor shall obtain approval from the Engineer prior to placing the closure pour.

**703.3.3.10.2** The slab area to be in contact with the closure pour shall be sandblasted to remove all foreign matter and shall be cleaned to remove all dirt and loose material. After the slab area has been cleaned and any damaged epoxy coating on the reinforcing bars repaired, an epoxy-bonding compound shall be applied to the slab area to be in contact with the closure pour. The concrete bonding compound and application shall be in accordance with Sec 623.

**703.3.3.10.3** Immediately following application and before the concrete bonding compound has set, the closure pour shall be placed.

**703.3.4 Joints in Concrete Masonry.** Construction and expansion joints in concrete masonry shall be located where shown on the bridge plans, except that in case of an unforeseen contingency, an emergency construction joint may be permitted.

**703.3.4.1** Surfaces of construction joints shall be roughened or scored unless shear keys are shown on the bridge plans. The face edges of all joints shall be carefully finished, and feathered edges shall be avoided. When the placing of concrete is temporarily discontinued, the concrete shall be cleaned of laitance and other objectionable material after becoming firm enough to retain form, and shall be thoroughly wetted before placing new concrete. Contraction joints in floor slabs of truss bridges may be sawed. Waterstops and flashings as shown on the bridge plans shall be continuous if practical. Splices shall be watertight.

**703.3.4.2** Preformed sponge rubber expansion joint material shall be of the dimensions shown on the bridge plans. Splices shall be held to a practical minimum and shall be made by lacing with copper wire or soft-drawn galvanized steel wire. All joint material shall be securely stitched to one face of the concrete with No. 10 gage (2.588 mm) copper wire or No. 12 gage (2.692 mm) soft-drawn galvanized steel wire. Unless joint sealing is specified, the sponge rubber material shall be left exposed for the material's full length with clean and true edges.

**703.3.5 Concrete Finishes.** Riding surfaces shall be finished true to the alignment, grade, cross section and camber shown on the bridge plans. These surfaces shall be finished by use of an approved mechanical finishing machine. On skewed structures the finishing machine shall be adjusted to finish the surface approximately parallel to the skew if the angle of skew exceeds 45 degrees, or if the angle of the skew exceeds 30 degrees and the placement width divided by the span length equals or exceeds 0.8. Vibratory screeds shall not be used, including those that are a part of the proposed finishing machine.

**703.3.5.1** Machine finishing shall be with an approved self-propelled mechanical finishing machine. The Engineer may waive the use of a finishing machine on isolated irregular shaped areas of the bridge surface. The finishing machine shall travel on adjustable rails or guides set to proper grade, and supported outside the limits of the finished riding surface. Where a longitudinal joint is shown on the bridge plans, the finishing machine rails or guides shall be placed as close as practical to the longitudinal joint. The rails shall be supported to limit the full operating load deflection between supports to 1/8 inch (3 mm) or less. The rails shall be placed parallel with the centerline of roadway or the longitudinal axis of the area to be finished. Where supports are located such that fresh concrete must be placed around the supports, the rails or guides shall be furnished in sections of 10 feet (3 m) or less and placed above the concrete surface. The sections and supports shall be removed and the holes filled with concrete immediately after the final straightedging. The finishing machine shall make sufficient passes to obtain the specified cross section and surface finish.

The final pass of the machine shall be of the maximum practical length, and shall be coordinated with the rate of placement. Finishing machine loads will not be permitted on concrete that has not reached a compressive strength of 3200 psi (22 MPa).

**703.3.5.2** Where hand finishing of riding surfaces is permitted, the surface shall be finished to the specified cross section and surface texture.

**703.3.5.3** Sufficient work bridges shall be provided to complete the work in an orderly and continuous manner. Work bridges shall be supported outside the limits of concrete placement.

**703.3.5.4** The riding surface shall be checked with a 10-foot (3 m) straightedge immediately after the final finishing operation. The straightedge shall be pulled lightly across the surface from one edge of the finished area to the other without interruption. Reaching from outer edges to the center of the finished area will not be permitted. Each transverse pass shall overlap the previously straightedged portion by approximately one-half the length of the straightedge. The straightedge shall not be used to cut or move concrete from its finished position. Any irregularities, bumps or improperly finished areas shall be refinished and the surface again checked by repeating the straightedging operation.

**703.3.5.5** The roadway surface, except within 12 inches (300 mm) of the inside face of the curb, shall be textured as soon as the condition of the concrete will permit. The roadway finishing shall otherwise be in accordance with applicable portions of Sec 502.4. Hand-operated devices producing a satisfactory texture will be permitted. At the Contractor's option, a finned float with a single row of fins may be used. The grooves produced by the finned float shall be approximately 1/8 inch (3 mm) wide at 5/8 to 3/4-inch (16 - 19 mm) centers and shall be approximately 1/8 inch (3 mm) deep. This operation shall be performed at such a time and in such a manner that the desired texture will be achieved while minimizing displacement of the layer aggregate particles.

**703.3.5.6** As soon as curing has been completed, the riding surface will be thoroughly straightedged by the Engineer, and all variations exceeding 1/8 inch in 10 feet (3 mm in 3 m) will be plainly marked. Areas more than 1/8 inch (3 mm) high shall be removed by an approved device consisting of multiple cutting edges leaving a grooved surface finish comparable to that produced by the broom. The use of a bush hammer or other impact device will not be permitted.

**703.3.5.7** Unless an armored joint is shown on the bridge plans, construction and expansion joints in the roadway surface shall be carefully edged and left free of all mortar and concrete. If shown on the bridge plans, these joints shall be sealed with joint sealing material. Joints shall be dry and cleaned immediately before the joints are sealed. Required joint sealing shall be done prior to surface sealing the bridge deck.

**703.3.5.8** Surface finish for concrete masonry units, other than those specified in Sec 703.3.5, shall begin immediately following removal of the forms. Fins and irregular projections shall be removed. Form tie cavities, holes, honeycomb spots in other than exposed surfaces, and other defects shall be thoroughly cleaned, saturated with water and carefully pointed with a mortar in accordance with Sec 703.3.2.9. Repaired surfaces shall be satisfactorily cured.

**703.3.5.9** Bridge seats shall be finished to a smooth even surface. Where lead plates or fabric pads are used to seat steel bearing plates, the area under the lead plates or fabric pads shall be finished to within 1/8 inch (3 mm) above plan elevation and shall be dressed to a uniform, level bearing with a Carborundum brick or power grinder after the concrete has set sufficiently to fix the larger particles of sand. The deviation of the bearing seat from a true level surface shall not exceed 1/16 inch (1.5 mm). Where elastomeric bearing pads are used, the finishing of 1/8 inch (3 mm) above plan elevation and grinding of the bridge seat area will not be required. Wells for anchor bolts shall be completely filled with an expansive-type mortar in accordance with Sec 1066 after the steel has been erected and adjusted. In lieu of wells, anchor bolt holes may be drilled in accordance with Sec 712. Keyways, anchor bolt wells, holes and other depressions that might collect water and freeze shall be sealed.

**703.3.6 Curing Concrete.** Curing of exposed concrete masonry surfaces, except for bridge decks and other surfaces to be sealed, shall be initiated after finishing operations are completed and as soon as marring of the concrete will not occur by application of the curing process. The surface of exposed concrete shall be covered and cured in accordance with one of the following methods. Concrete adjacent to construction joints shall be wet cured, and other locations shall be either wet cured or cured by application of Type 1-D liquid membrane-forming compound in accordance with Sec 1055. Curing mats for curing exposed surfaces shall be kept wet for 72 hours. The mats shall remain in place until the mats are dry, or if not dry, at least 24 hours after the wet curing period. Concrete shall not be left exposed for more than 30 minutes between stages of curing and during the curing period.

**703.3.6.1** Surfaces to be damp proofed and railroad bridge decks to be waterproofed shall not be cured with membrane.

**703.3.6.2** Footings may be cured by submersion with approval from the Engineer.

**703.3.6.3** Curing compound for bridge decks and other surfaces to be sealed shall be liquid membrane-forming curing compound Type 1-D in accordance with Sec 1055 for bridge deck curing compounds, except that if diamond grinding is specified, either Type 1-D or Type 2 liquid membrane-forming curing compound in accordance with Sec 1055 may be used for the surfaces to be textured by diamond grinding.

**703.3.6.3.1** The material shall be approved by the Engineer prior to use and shall be applied at the manufacturer's recommended rate, but no less than 150 square feet per gallon (0.025 $m^2$/L).

**703.3.6.3.2** When conventional texturing is specified, fresh concrete shall be sprayed immediately with a curing compound following texturing as specified in Sec 703.3.5.5. The application of the interim curing compound shall progress such that no more that 10 linear feet (3 m) of the textured concrete surface is exposed without curing compound at any time.

**703.3.6.3.3** When diamond grinding is specified in lieu of conventional deck texturing, fresh concrete shall be sprayed immediately after surface floating to smooth surface with a curing compound as specified in Sec 703.3.6.3.

**703.3.6.3.4** The concrete shall be covered with clean mats as soon as the interim curing compound has dried sufficiently to prevent adhesion, and the concrete surface will support the curing mat without marring or distorting the finish, but no more than 90 minutes after the concrete is floated or textured.

The mats shall be sufficiently wet at the time of placement to prevent moisture absorption from the finished surface. The Contractor shall control the run-off so as not to cause a traffic hazard or soil erosion. The continuous wet cure shall be maintained a minimum of seven days and until the concrete has attained a minimum compressive strength of 3,000 psi (21MPa).

**703.3.6.3.5** Steam curing or curing by complete submersion in water will be permitted for precast members. If steam curing is applied, the jets shall not impinge directly on the concrete or on the forms, free circulation around the units shall be maintained, the steam shall be thoroughly saturated at all times, and the temperature around the concrete shall be raised no more than 40 F (20 C) per hour and shall not exceed 160 F (71 C) at any time. After the steam curing period, the temperature inside the chamber shall be reduced at a rate of no more than 40 F (20 C) per hour until the temperature has reached about 20 F (10 C) above the temperature of the air to which the concrete will be exposed.

**703.3.6.3.6** Light material and equipment weighing less than 1000 pounds (450 kg) may be carried onto the bridge deck after the deck concrete has been in place at least 24 hours, provided curing is not interfered with and the surface texture is not damaged. Vehicles, material and equipment needed for construction activities and weighing less than 4000 pounds (1800 kg) shall not be moved onto any span until after the last placed deck concrete has attained a compressive strength of at least 3200 psi (22 MPa). Loads in excess of the above shall not be moved onto the bridge deck until the deck concrete has reached the compressive strength specified on the bridge plans.

**703.3.6.3.7** Structures shall not be opened to any public vehicular traffic until at least 14 days after the last placement of deck concrete and until such concrete has attained the compressive strength specified on the bridge plans.

**703.3.7 Bridge Deck Surface Texturing.** For conventional texturing, the roadway surface shall be textured in accordance with Sec 703.3.5.5 prior to the application of the curing compound.

**703.3.8 Surface Sealing for Concrete.** Bridge decks, except those that are to be surfaced later, shall be sealed with one application of an approved concrete sealer in accordance with Sec 1053. The concrete sealer shall be applied to the top surface of roadways, and the top and roadway faces of concrete sidewalks, curbs, parapets and medians. The concrete sealer shall be applied on a clean, dry surface of concrete that has been allowed to dry a minimum of 48 hours after curing mats have been removed and before the bridge is opened to other than essential construction traffic. Foreign material on the surface shall be removed and the ambient temperature shall not be below 35 F (2 C) at the time of application. The application of the mixture shall be at the rate of no less than 0.05 gallon per square yard (0.25 $L/m^2$). The mixture shall be applied evenly and shall be thoroughly broomed, brushed or mopped on all specified surfaces. For conventional texturing operations, the Contractor shall remove all curing compound in accordance with the manufacturer's recommendations before the concrete sealer is applied.

**703.3.8.1** When latex modified concrete wearing surface is used, only the new safety barrier curbs shall be sealed. The latex modified concrete wearing surface shall be protected from spillage of concrete sealer.

**703.3.8.2** When a low slump concrete wearing surface is used, the deck surface and the new safety barrier curbs shall be surface sealed.

**703.3.9 Hot Weather Concreting.** The Contractor shall schedule placing and finishing of bridge deck concrete during hours in which the ambient temperature will be lower than 85 F (30 C). The mixed concrete when placed in the forms shall have a temperature no higher than 85 F (30 C).

**703.3.10 Cold Weather Concreting.** Concrete work shall proceed on all structures, except bridge superstructures, whether or not heating will be required, unless it can be definitely established that the overall progress of the project will not be affected. Placing of concrete in the superstructure of a continuous or monolithic series of spans once begun shall be continued within the provisions of cold weather concreting procedures until all the concrete in that series is placed. Concrete placed in cold weather shall be protected from freezing during the curing period. Concrete shall not be placed on frozen ground, or against steel or concrete surfaces with temperatures lower than 35 F (2 C). Concrete shall not be placed where the ambient temperature is below 35 F (2 C) without prior approval from the Engineer. Concrete in bridge superstructures shall not be placed where the ambient temperature is below 45 F (7 C) without prior approval from the Engineer.

**703.3.10.1** The aggregate, the water, or both, shall be heated during the season when the atmospheric temperature may drop below 40 F (5 C). Aggregate shall not be heated higher than 150 F (65 C). The temperature of the aggregate and water combined shall not be higher than 100 F (38 C) when the cement is added. Any method of heating during the mixing of concrete may be used, provided the heating apparatus will heat the mass uniformly and avoid hot spots that will burn the material. The temperature of the concrete at the time of placing in the forms shall be no lower than 45 F (7 C) for concrete in footings, massive piers and abutments, or less than 60 F (16 C) for all other concrete.

**703.3.10.2** When the ambient temperature is below 40 F (5 C), with the approval from the Engineer, curing of superstructure concrete, substructure units above ground surface, retaining walls and box culverts of more than 15 square feet (1.5 $m^2$) opening shall be accomplished by methods that will prevent concrete from freezing. The minimum compressive strength required for form removal and ending protection from freezing shall be in accordance with Sec 703.3.2.13 The Contractor shall furnish temperature monitoring equipment and accessories that demonstrate to the Engineer that concrete has been protected from freezing, with payment for such equipment and accessories included in the contract unit price for concrete. Exposed surfaces of the concrete shall be kept moist during the curing process. Substructure concrete below ground surface may be protected by submersion provided the temperature of the water is maintained between 40 and 80 F (5 and 27 C) for seven days.

## SECTION 705 PRESTRESSED CONCRETE MEMBERS FOR BRIDGES

**705.1 Description.** This work shall consist of furnishing and placing prestressed concrete members, complete in place, in the superstructure of bridges. This work shall cover both prestressed and post-tensioned members.

**705.2 Material**

**705.2.1** All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

| Item | Section |
|---|---|
| Prestressed Concrete Members for Bridges | 1029 |
| Reinforcing Steel for Concrete Structures | 1036 |

**705.3 Equipment.** Prestressing equipment shall be in accordance with Sec 1029.

**705.4 Construction Requirements**

**705.4.1 Post-Tensioned Members.** Post-tensioned members shall be in accordance with Sec 1029.

**705.4.2 Erection.** Erection of the structure shall be in accordance with the working drawings. Camber of beams, measured as the differential between adjacent beams in the final location, shall be no more than 1/8 inch (1 mm) per 10 feet (1 m) of span, and in no case greater than 1 inch (25 mm). The butt joints between precast panels shall be caulked to prevent excessive grout leakage between panels.

## SECTION 706 REINFORCING STEEL FOR CONCRETE STRUCTURES

**706.1 Description.** This work shall consist of furnishing and placing reinforcing steel of the designated shape, size and grade as shown on the bridge plans.

**706.2 Material**

**706.2.1** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Reinforcing Steel for Concrete | 1036 |

**706.2.2** Reinforcing steel shall be accurately cut and bent to the dimensions and shapes shown on the bridge plans. Cutting and bending tolerances for reinforcing steel shall be in accordance with the Concrete Reinforcing Steel Institute's Manual of Standard Practice. Flame-cutting of uncoated reinforcing steel will be permitted.

**706.3 Construction Requirements**

**706.3.1** Reinforcing steel shall be protected from damage at all times. When placed in the work and before concrete is placed, reinforcing steel shall be free from dirt, oil, paint, grease, loose mill scale, thick rust, any dried mortar and other foreign substances. A thin layer of powdery rust may remain. All reinforcing steel required for superstructure concrete, such as slabs, girders and beams and top slabs of culverts with more than a 4-foot (1.2 m) span, shall be held securely in correct position with approved metal or plastic bar supports and ties. Reinforcing bars shall be positively secured against displacement.

For bridge decks and top slabs of culverts, bars in the top mat shall be firmly tied with wire at each cross or lap. At other locations, the bars shall be firmly tied at alternate crossings or closer. The steel shall be tied in the correct position with proper clearance maintained between the forms and the reinforcement. The Contractor shall construct the unit as shown on the bridge plans. Measurements to reinforcing steel will be made to the centerline of bar, except where the clear distance from face of concrete is shown on the bridge plans.

**706.3.2** Bars shall not be spliced, except as shown on the bridge plans or as directed by the Engineer.

## SECTION 707 CONDUIT SYSTEM ON STRUCTURE

**707.1 Description.** This work shall consist of furnishing and placing all material and equipment and performing all work necessary to create a complete conduit system as shown on the bridge plans.

**707.2 Material.** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Electrical Conduit | 1060 |
| Pull and Junction Boxes | 1062 |

### 707.3 Construction Requirements

**707.3.1** Conduit systems shall be free from corrosion, restrictions, sharp edges and debris. The ends of conduit runs shall be protected by bushings and shall be temporarily capped if conductor cable is not installed immediately. Conduit shall be rigidly held in place to prevent misalignment during placement of concrete. Reinforcing bars shall not be cut, bent, displaced or otherwise altered unless authorized by the Engineer. All joints shall be rigid and waterproof. A 1/2-inch (13 mm) diameter drain hole in all low points of conduits and junction boxes where exposed and a 1/2-inch (13 mm) rigid steel conduit drop from the low point if the conduit and junction boxes are encased in concrete, shall be provided for drainage of water. Exposed ends of such drains shall be covered with either a commercial bronze or a stainless steel insect screen having an open area between 60 percent and 70 percent, held in place with a conduit bushing.

**707.3.2** After placing concrete, the conduit around which the concrete is placed shall be tested by the Contractor, in the presence of the Engineer, for continuity and freedom from obstruction by pulling a steel ball through the entire length. The steel ball shall have a diameter 1/2 inch (13 mm) smaller than the inside diameter of the conduit being tested. Galvanized pullwires shall be installed in conduit for pulling wiring by others.

**707.3.3** Not used.

## SECTION 710 EPOXY COATED REINFORCING STEEL

**710.1 Description.** This work shall consist of furnishing and placing epoxy-coated reinforcing steel of the shape, size and grade shown on the bridge plans, and in accordance with Sec 706, except as modified herein.

### 710.2 Material

**710.2.1** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Epoxy Coated Reinforcing Steel | 1036 |

**710.2.2** Epoxy coated reinforcing steel shall not be flame-cut.

### 710.3 Construction Requirements

**710.3.1 Handling.** All systems for handling epoxy-coated bars shall have padded contact areas. If, in the judgment of the Engineer, the coating is damaged to the extent that the coating can no longer provide the intended protection and cannot be satisfactorily patched, the material shall be returned to the coating applicator for repair or shall be replaced.

### 710.3.2 Placement

**710.3.2.1** Epoxy-coated bars shall be held securely in the correct position with approved metal bar supports coated with plastic or epoxy or on plastic bar supports, and shall be held in place by use of plastic-coated tie wires or molded, plastic clips. When placing epoxy-coated bars, the bars shall be prevented from coming into contact with other steel items such as drains and shear connectors.

**710.3.2.2** The Contractor shall prevent damage to the epoxy coating when placing and vibrating concrete. In order to prevent damaging the coated bars, the vibrator head shall be covered with a sheet of rubber, and shall be equipped with a rubber tip with a maximum diameter of 2 1/2 inches (65 mm). Another resilient material may be substituted for rubber as approved by the Engineer.

**710.3.2.3** After the reinforcing bars are secured to approved bar supports, a final visual inspection will be made, and all uncoated or damaged areas shall be coated or repaired in accordance with Sec 710.3.3 as directed by the Engineer.

**710.3.3 Repairing Bars.** All damaged areas of epoxy coating shall be patched with the material specified in Sec 1036, and in accordance with the manufacturer's recommendations. All sheared or cut ends of bars, end areas left bare during the coating process, and any areas where the entire coating is removed shall be patched. All repairs shall be completed as soon as practical, and in the case of bare end areas and sheared ends, before visible oxidation of the surface occurs.

**710.3.4 Mechanical Bar Splices.** Requirements for mechanical bar splice systems shown on the bridge plans shall be in accordance with MECHANICAL BAR SPLICE. Epoxy coated mechanical bar splices shall be used with epoxy-coated reinforcing steel, and if the epoxy coating is damaged, shall be repaired in accordance with Sec 710.3.3 as directed by the Engineer.

## SECTION 711 PROTECTIVE COATINGS FOR EXPOSED CONCRETE SURFACES

**711.1 Description.** This work shall consist of the surface preparation and application of protective coatings for sealing and protecting exposed concrete elements. The locations and elevations of the protective coatings shall be as shown on the bridge plans. The work involving temporary coating on weathering steel bridges shall also include the removal of the temporary coating.

**711.2 Material.** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Protective Coating Material | 1059 |

### 711.3 Construction Requirements

**711.3.1 Protective Coating - Concrete Bents and Piers (Urethane).** This protective coating shall consist of a modified urethane or polyurethane elastomer. New concrete shall cure a minimum of 28 days prior to application of the protective coating. The coating shall be applied to dry surfaces. The surface preparation and application shall be in accordance with the manufacturer's recommendations. The coating shall be applied to obtain a minimum dry film thickness of 40 mils (1 mm). Any unevenly applied film that causes ponding of water shall be given additional coats as directed by the Engineer.

**711.3.2 Protective Coating - Concrete Bents and Piers (Epoxy).** This protective coating shall consist of a two-component, modified polyamide converted epoxy, clear or gray in color. New concrete shall cure a minimum of 28 days prior to application of the protective coating. The coating shall be applied to dry surfaces. The surface preparation and application shall be in accordance with the manufacturer's recommendations. The coating shall be applied to obtain a minimum dry film thickness of 6 mils (150 µm).

**711.3.3 Concrete and Masonry Protection System.** This protective coating shall consist of a clear penetrating siloxane or silane based sealer. The surface preparation and application shall be in accordance with the manufacturer's recommendations. Field approval of the proposed material will be in accordance with Sec 1059.

**711.3.4 Sacrificial Graffiti Protection System.** This system shall consist of a clear coating that can be removed with a hot water wash. The surface preparation and application shall be in accordance with the manufacturer's recommendations. Field approval of the proposed material will be in accordance with Sec 1059.

**711.3.5 Temporary Coating - Concrete Bents and Piers (Weathering Steel)**. This protective coating shall consist of a clear temporary coating applied to the concrete substructure for protection against staining from weathering steel girders during initial weathering. The surface preparation and application shall be in accordance with the manufacturer's recommendations. The concrete substructure shall be cured a minimum of 14 days prior to application, unless otherwise specified by the manufacturer. The coating shall be applied to the concrete substructure before the erection of structural steel. The temporary coating shall be removed by the Contractor after construction of the deck and curbs are complete, or as directed by the Engineer.

## SECTION 712 STRUCTURAL STEEL CONSTRUCTION

**712.1 Description.** This work shall consist of the field construction of bridges and structures made of structural steel and miscellaneous metals.

**712.2 Material.** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Shear Connectors | 1037 |
| Paint for Structural Steel | 1045 |
| Structural Steel Fabrication | 1080 |
| Coating of Structural Steel | 1081 |

**712.3 Handling, Transporting, Storing and Erecting.** Fabricated material shall be properly braced and supported at all times to prevent damage from torsional, vertical and lateral deflections. Members or shipped material showing possible damage during handling, transporting, storing or erecting will be subjected to nondestructive tests as directed by the Engineer. The costs of these tests will be at the Contractor's expense. Fabricated structural steel shall be stored on suitable supports. Trough sections shall be stored in a manner to provide drainage. Any material that has become bent shall be straightened before being assembled or shall be replaced, if necessary. Material intended for use in the finished structure shall not be used by the Contractor for erection or temporary purposes unless such use is provided for in the contract, or with written approval from the Engineer.

**712.4 Falsework.** Staging and falsework necessary for the erection of the structure shall be furnished and placed and, upon completion of the erection, removed by the Contractor. If required, plans for falsework shall be submitted to the Engineer before starting the work, but the Engineer's acceptance of the plans will not relieve the Contractor of the responsibility for obtaining satisfactory results.

**712.5 Erection.** The Contractor or sub-contractor performing the erection of the structural steel is herein referred to as the Erection Contractor.

Erection Plan: The Erection Contractor shall retain the services of an Illinois Licensed Structural Engineer, experienced in the analysis and preparation of curved steel girder erection plans, for the completion of a project-specific erection plan.

The structural Engineer, herein referred to as the Erection Engineer, shall sign and seal the erection plan, drawings, and calculations for the proposed erection of the structural steel.

The erection plan shall be complete in detail for all phases, stages, and conditions anticipated during erection. The erection plan shall include structural calculations and supporting documentation necessary to completely describe and document the means, methods, temporary support positions, and loads necessary to safely erect the structural steel in conformance with the contract documents and as outlined herein. The erection plans shall address and account for all items pertinent to the steel erection including such items as sequencing, falsework, temporary shoring and/or bracing, girder stability, crane positioning and movement, means of access, pick points, girder shape, permissible deformations and roll, interim/final plumbness, cross frame/diaphragm placement and connections, bolting and anchor bolt installation sequences and procedures, and blocking and anchoring of bearings. The Erection Contractor shall be responsible for the stability of the partially erected steel structure during all phases of the steel erection.

The erection plans and procedures shall be submitted to the Engineer for review and acceptance prior to starting the work. Review, acceptance and/or comments by the Department shall not be construed to guarantee the safety or final acceptability of the work or compliance with all applicable specifications, codes, or contract requirements, and shall neither relieve the Contractor of the responsibility and liability to comply with these requirements, nor create liability for the Department. Significant changes to the erection plan in the field must be approved by the Erection Engineer and accepted by the Engineer for the Department.

**712.5.1 Fit-up and Drifting.** Truss spans, plate girders and continuous I-beams shall be supported to maintain required camber during erection. High-strength bolted field splices and primary connections, except for trusses and structures carrying live load erection stresses, shall have no less than one-half of the holes fitted with bolts and cylindrical drift pins using one-third fitting up bolts and two-thirds pins. Splices and primary connections carrying erection traffic during erection or truss connections shall have no less than three-fourths of the holes filled with drift pins and bolts using one-third fitting up bolts and two-thirds pins. The specified ratio of pins to bolts shall apply to each element of the splice, for example, top flange, web and bottom flange of girders. Fitting up bolts shall be the same diameter as the high-strength bolts. Drift pins shall be at least 1/32 inch (0.8 mm) larger than the high-strength bolts to provide a driving fit. Fitting up bolts shall be placed uniformly to draw the entire splice tight. All fitting up bolts and drift pins shall be properly installed before beginning high strength bolt installation. Bolts used for fitting up shall not be used in the final assembly. Holes that do not match shall be reamed only with approval from the Engineer. Drifting that would distort the metal will not be permitted.

**712.5.2 Bearings.** The lead plates or preformed rubber and fabric pads shall be approximately 1/8 inch (3 mm) thick and 1/2 inch (13 mm) greater in length and width than the bottom bearing plates under which the plates are to be placed. Lead plates shall weigh (have a mass of) approximately 8 psf (39 kg/$m^2$). Preformed rubber and fabric pads shall be in accordance with Sec 1038. Shop drawings will not be required for lead plates or preformed rubber and fabric pads. Lead plates or preformed rubber and fabric pads will be considered incidental to bearings, and payment will be considered as covered under the contract unit price for bearings.

**712.5.3 Anchor Bolts.** Anchor bolts for steel superstructures shall be set in the substructure units in accordance with the details shown on the plans. When anchor bolts are set during the placing of concrete, the bolts shall be accurately located and held firmly in place by a method that permits proper finishing of the surface of the concrete, and shall remain in place until the concrete has set. Where permitted or required, the anchor bolt wells may be omitted, and in lieu thereof, holes drilled into the substructure. The anchor bolt holes shall be drilled in the exact location shown, to the required depth and perpendicular to the plane of the bridge seat. The drilled holes shall be no smaller than the diameter of the holes in the steel bearing plates or castings. When the anchor bolts are set in holes or wells, the hole or well shall be clean and dry prior to grouting with an expansive mortar in accordance with Sec 1066. Excess mortar forced out of the holes shall be removed. The location of anchor bolts in relation to the center of slotted holes provided in movable plates and shoes shall be varied to compensate for the movement of spans due temperatures above or below 60 F (16 C). Nuts on anchor bolts through moving parts of expansion bearings shall be adjusted to provide ample clearance for free movement of the span.

**712.5.4 Grouting.** Grouting under bearing plates and castings to build the bearing plates and castings to the proper grade will not be permitted. Steel shims the full size of the plate of the bearing device may be used for this purpose. Shims shall be placed between the bottom of the stringers and the top of bearing plates, if practical, and shall be straightened to a plane surface.

**712.6 Field Welding.** All field welding shall be performed in accordance with Sec 1080.

**712.6.1 Certification.** All field welders shall be certified to weld on all steel products incorporated in MoDOT or IDOT projects.

**712.6.2 Testing.** Field welders shall be qualified by a test facility with an established accredited AWS Certified Welder Program as defined in AWS Standard QC 4-89 or by an independent testing laboratory furnished by the Contractor. If specimens are to be tested at an independent testing laboratory, the tests shall be witnessed and properly documented by the Engineer. All tested specimens and radiographs, including the laboratory's test report certifying the test results, shall be delivered to the Engineer for final acceptance or rejection. If the field welder was tested and certified by a facility with an established accredited AWS Certified Welder Program, as defined in AWS Standard QC 4-89, the tested specimens and radiographs will not be subject to the Engineer's review. A copy of the welder's certification from the AWS test facility shall be delivered to the Engineer.

**712.6.3 Issuance of Cards.** Qualification cards will be issued by the Engineer for field welders working on MoDOT projects. No individual may weld on a MoDOT project unless the Engineer can confirm the individual has continued to weld on MoDOT projects with the processes and in the positions for which the individual was initially certified, without an interruption exceeding 12 months. The Engineer may require recertification if there is specific reason to question the welder's ability.

**712.6.4 Welding Procedures.** Welding procedures shall be submitted for review prior to welding. Submittals shall be made in accordance with Article 105.04 of the IDOT Standard Specifications for Road and Bridge Construction, the bridge plans and as specified herein. Submit welding procedures to the Illinois Department of Transportation Bureau of Bridges and Structures, 2300 S. Dirksen Parkway, Springfield, Illinois 62764.

## 712.7 High-Strength Bolt Installation

**712.7.1 Bolted Parts.** The slope of surfaces of bolted parts in contact with the bolt head and nut shall not exceed one in 20 with respect to a plane normal to the bolt axis. All bolted parts, including underhead bearing areas and joint surfaces within the grip of the bolt, shall fit solidly together when assembled in the snug tight condition, and shall not be separated by gaskets or any other interposed compressible material. When assembled, all joint surfaces, including those adjacent to the bolt heads, nuts or washers, shall be free of scale, dirt, burrs, other foreign material and other defects that would prevent solid seating of the parts. Contact surfaces within friction-type joints shall be free of oil and paint, except in accordance with Sec 1081.3.9, lacquer, rust inhibitor and galvanizing. All bolts, nuts and washers shall be free of rust, burrs, dirt, other foreign material and other defects that would prevent proper tensioning. All nuts for coated high-strength bolts shall be properly lubricated with a visible water-soluble lubricant. All nuts for uncoated high-strength bolts shall be properly lubricated with a water-soluble lubricant that is oily to the touch.

**712.7.2 Snug Tightness of Connections.** Regardless of the method of final tightening used to install the fasteners, the joint and all fasteners shall first be brought to the snug tight condition. Snug tight will be defined as the tightness where all faying surfaces of the joint are in firm contact as attained by a few impacts of an impact wrench or the full effort of a person using an ordinary spud wrench. Snug tightening shall progress systematically from the most rigid part of the connection to the free edges. Bolts shall be retightened in a similar manner as necessary until all bolts are simultaneously snug tight, and the section is fully compacted with the bolted parts of the joint in full contact.

**712.7.3 Bolt Tension.** Each fastener shall be tightened to provide, when all fasteners in the joint are tight, at least the minimum bolt tension shown below for the size and grade of fastener used. Threaded bolts shall be tightened by methods described in Secs 712.7.5, 712.7.6 or 712.7.7. If required because of bolt entering and wrench operation clearances, tightening may be done by turning the bolt while the nut is prevented from rotating. On non-parallel abutting surfaces where bevel washers will not be required, the nut shall be torqued against the non-sloping surface. Nuts shall be placed on the inside face of exterior girders, the top of girder flanges or in other situations the least exposed position, except if inaccessible for turning, on a sloping surface or otherwise approved by the Engineer. Impact wrenches, if used, shall be of adequate capacity and sufficiently supplied with air to perform the required tightening of each bolt in approximately 10 seconds. Bolts or nuts, once tensioned and subsequently loosened (turned), shall not be used as permanent bolts or nuts. Bolt tension calibration devices shall be calibrated and certified as to accuracy by a private testing lab within one year before usage, or at any time the tensioning process indicates that the calibration is in error.

| Bolt Tension | | |
|---|---|---|
| English | | |
| Bolt Size (in.) | Minimum Bolt Tension (lb x 1000) | |
| | A 325 | A 490 |
| 1/2 | 12 | 15 |
| 5/8 | 19 | 24 |
| 3/4 | 28 | 35 |
| 7/8 | 39 | 49 |
| 1 | 51 | 64 |
| 1 1/8 | 56 | 80 |
| 1 1/4 | 71 | 102 |
| 1 3/8 | 85 | 121 |
| 1 1/2 | 103 | 148 |
| Metric | | |
| Bolt Size (mm) | Minimum Bolt Tension (kN) | |
| | A 325M | A 490M |
| M16 x 2 | 91 | 114 |
| M20 x 2.5 | 142 | 179 |
| M22 x 2.5 | 176 | 221 |
| M24 x 3 | 205 | 257 |
| M27 x 3 | 267 | 334 |
| M30 x 3 | 326 | 408 |
| M36 x 4 | 475 | 595 |

**712.7.4 Washers.** All fasteners shall have a hardened washer under the nut or bolt head, whichever is turned in tightening. All fasteners over all oversized or slotted holes shall also have a hardened washer under the non-turned element. Where an outer face of the bolted parts has a slope of more than one in 20 with respect to a plane normal to the bolt axis, a smooth beveled washer shall be used to compensate for the lack of parallelism.

**712.7.5 Calibrated Wrench Method.** When calibrated wrenches are used to provide the bolt tension specified in Sec 712.7.3, the wrench setting shall be such as to induce a bolt tension 5 to 10 percent in excess of the specified value. Wrenches shall be calibrated at least once each working day by tightening in a device capable of indicating actual bolt tension no less than three typical bolts of each diameter from the bolts to be installed. Power wrenches shall be adjusted to stall or cut out at the selected tension. If manual torque wrenches are used, the torque indication corresponding to the selected tension shall be noted and used in the installation of all bolts of the tested lot. Nuts shall be in tightening motion when torque is measured. After the joint has been brought to a snug tight condition, all bolts in the joint shall be tightened by progressing systematically from the most rigid part of the joint to the free edges. When using calibrated wrenches to install several bolts in a single joint, the wrench shall be returned to "touch up" bolts previously tightened, which may have been loosened by the tightening of subsequent bolts, until all are tightened to the selected tension. During tightening, there shall be no rotation of the part not turned by the wrench.

**712.7.6 Turn-of-Nut Method.** When the turn-of-nut method is used to provide the bolt tension, there shall first be enough bolts brought to a snug tight condition as defined in Sec 712.7.2 to ensure that the parts of the joint are brought into full contact with each other. Following this initial operation, bolts shall be placed in any remaining holes in the connection and brought to snug tightness. All bolts in the joint shall then be tightened additionally by the applicable nut rotation specified below, with tightening progressing systematically from the most rigid part of the joint to the free edges. During this operation, there shall be no rotation of the part not turned by the wrench.

| Nut[a] Rotation from Snug Tight Condition | | | |
|---|---|---|---|
| Disposition of Outer Faces of Bolted Parts | | | |
| **Bolt length measured from underside of head to extreme end of point** | **Bolt faces normal to bolt axis** | **One face normal to bolt axis and other face sloped not more than 1:20 (bevel washer not used)** | **Both faces sloped not more than 1:20 from normal to bolt axis (bevel washers not used)** |
| Up to and including 4 diameters | 1/3 turn | 1/2 turn | 2/3 turn |
| Over 4 diameters but not exceeding 8 diameters | 1/2 turn | 2/3 turn | 5/6 turn |
| Over 8 diameters but not exceeding 12 diameters | 2/3 turn | 5/6 turn | 1 turn |

[a]Nut rotation shall be relative to bolts, regardless of the element (nut or bolt) being turned. For bolts installed by one-half of a turn and less, the tolerance will be ± 30 degrees. For bolts installed by two-thirds of a turn and more, the tolerance will be ± 45 degrees.

**712.7.7 Load Indicating Bolt Method.** Tightening by this method will be permitted, provided it can be demonstrated by the following procedure that the bolt has been tightened, at a minimum, to the bolt tension indicated in Sec 712.7.3. Three bolts of a representative length and of the same grade, diameter and condition as those under inspection shall be placed individually in a calibration device capable of indicating bolt tension. There shall be a washer under the part turned in tightening each bolt. Each bolt specified shall be tightened in the calibration device until the spline drive has sheared off. When this method is used to provide the bolt tension, all bolts in the joint shall be tightened in stages to prevent or minimize slackening of the installed bolts. The first stage shall be to tighten all bolts to a snug tight condition at which point all of the faying surfaces of the joint shall be firmly in contact. The final stage of tightening to full tension shall be accomplished by progressing systematically from the most rigid part of the joint to the free edges.

**712.7.8 Bolt Length.** When snug tight, the beginning of the bolt threads shall be even with or project slightly beyond the nut. When properly tensioned, the bolt projections beyond the nut shall be as such to prevent the nut from engaging the thread runout.

**712.7.9 Bolt Tension Calibration Device.** A Skidmore-Wilhelm Calibrator or an acceptable equivalent tension measuring device will be required at each job site during erection. Periodic testing, at least once each working day when the calibrated wrench method is used, shall be performed to assure compliance with the installation test procedures required for the tightening method used, and to perform pre-installation job site rotational-capacity testing. Bolts too short for the Skidmore-Wilhelm Calibrator may be tested using direct tension indicators (DTI).

The DTI shall be calibrated in the Skidmore-Wilhelm Calibrator using longer bolts. Bolt tension calibration devices shall be calibrated and certified as to accuracy by a private testing laboratory within one year before usage or at any time the accuracy is questionable.

**712.7.10 Rotational-Capacity Testing.** The rotational-capacity test shall be performed on each rotational-capacity lot prior to the start of bolt installation. Hardened steel washers shall be part of the test, regardless if washers will not be required as part of the installation procedure. Bolt, nut, and washer when required, combinations as installed shall be only from the established and tested rotational-capacity lot.

**712.7.11 Weathered Bolts.** Weathered or rusted bolts or nuts not in accordance with Secs 712.7.1, 712.7.3 and 712.7.10 shall be cleaned and relubricated prior to installation. Recleaned or relubricated bolt, nut and washer assemblies shall be retested in accordance with Sec 712.7.10 prior to installation.

**712.7.12 Inspection.** The Engineer will observe the installation and tightening of bolt assemblies to determine that the selected tightening procedure is properly used, and will determine that all bolt assemblies are tightened. The following verification inspection will be used:

(a) Either the Engineer, or the Contractor in the presence of the Engineer, will use an inspecting torque wrench and bolt tension calibration device furnished by the Contractor.

(b) Five bolt assemblies of a representative length, and of the same grade, diameter and condition as those under inspection will be placed individually in a calibration device capable of indicating bolt tension. There will be a washer under the part turned in tightening each bolt. Each bolt specified will be tightened in the device by any convenient means to the minimum tension specified in Sec 712.7.3. The inspecting torque wrench then will be applied to the tightened bolt, and the torque necessary to turn the nut or head 5 degrees, approximately one inch (25 mm) at 12-inch (300 mm) radius, in the tightening direction will be determined. Of the five values obtained, the highest and the lowest values will be disregarded, with the average of the remaining three being taken as the job inspecting torque to be used in the manner specified in Sec 712.7.12. The inspecting torque will be re-established at intervals of no more than 30 calendar days or at any time appreciable changes are encountered.

(c) Bolts represented by the sample prescribed in Sec 712.7.12 that have been tightened in the structure will be inspected by applying, in the tightening direction, the inspecting wrench and the wrench's job inspecting torque to 10 percent of the bolts, but no less than two bolts, selected at random in each connection. If no nut or bolt head is turned by this application of the job inspecting torque, the connection will be accepted as properly tightened. If any nut or bolt head is turned by the application of the job inspecting torque, this torque shall be applied to all bolts in the connection. All bolts whose nut or head was turned by the job inspecting torque shall be tightened and re-inspected.

(d) Calibrated wrench tightening will be verified during actual installation in the assembled steel work. The wrench adjustment selected by the calibration shall not produce a bolt or nut rotation from snug tight greater than permitted in Sec 712.7.6.

**712.8 Field Coating.** Field coating of structural steel shall be in accordance with Sec 1081.

**712.9 Steel Bar Dams.** Steel bar dams placed at expansion devices on existing bridges to serve as headers for surfacing material shall be installed in a manner that will not interfere with the movement of the expansion devices.

## SECTION 717 NEOPRENE AND SILICONE JOINT SYSTEMS

### 717.10 Preformed Compression Seal

**717.10.1 Description.** This work shall consist of furnishing and installing a preformed compression seal for joints as shown on the bridge plans or as directed by the Engineer. Structural steel for the joints shall be furnished and installed as shown on the bridge plans.

**717.10.2 Material.** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Preformed Compression Seals | 1073 |

### 717.10.3 Construction Requirements

**717.10.3.1 Shop Drawings.** Shop drawings for structural steel for expansion devices shall be prepared in accordance with Sec 1080. The dimensions of the seal shall be shown on the shop drawings for the armored joint. Shop drawings will not be required when the seal is placed against concrete or existing armor steel.

**717.10.3.2 Installation.** The preformed compression seal shall be installed in joints in one continuous piece without field splices. Factory splicing will be permitted for joints in excess of 53 feet (16 m). The area of steel armor to come in contact with preformed compression seal lubricant adhesive shall be sand blasted prior to installing the seal. Sand blasting will be considered acceptable when the steel surfaces have been cleaned to an SSPC-SP10 degree of cleanliness. The lubricant adhesive shall be applied in a continuous film to the sides of the seal and to the joint surfaces just prior to placing the seal in the joint. The seal shall be installed with an installation tool recommended by the manufacturer, in a manner that prevents the seal from being damaged and from being in tension. Twisting, curling and nicking the seal will be prohibited. Lubricant adhesive on top of the installed seal shall be removed before drying. Unless the installation tool is capable of installing the seal without elongation prior to placement, the seal shall be pre-cut to the exact length for the joint plus ends as shown in the contract documents. The pre-cut seal shall be installed and measured for stretch. The seal shall be removed and reinstalled if the seal stretch length exceeds five percent of the pre-cut length.

### 717.20 Strip Seal

**717.20.1 Description.** This work shall consist of furnishing and installing a watertight strip seal for joints as shown on the bridge plans or as directed by the Engineer. The structural steel for the joints shall be furnished and installed as shown on the bridge plans.

**717.20.2 Material.** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Strip Seal | 1073 |

**717.20.3 Construction Requirements**

**717.20.3.1 Shop Drawings**. Shop drawings shall be prepared for the armored joint in accordance with Sec 1080. The drawings shall show in detail the type, size, location of anchors, and sequence of installation. The extrusion in the steel armor shall be of a dimensional tolerance that prevents the gland of the strip seal from slipping loose. The upper lip of the extrusion shall extend over the bottom lip to avoid pinching the gland when the expansion device is in a closed position. Shop drawings will not be required when the seal is placed in existing steel extrusions.

**717.20.3.2 Installation.** The area of steel armor to come in contact with strip seal lubricant adhesive shall be sand blasted prior to installing the seal. Sand blasting will be considered acceptable when the steel surfaces have been cleaned to an SSPC-SP10 degree of cleanliness. The strip seal shall be made watertight with a lubricant adhesive for bonding the neoprene gland to the steel extrusion as recommended by the manufacturer. The Contractor shall obtain the services of a qualified technical representative, approved by the manufacturer of the expansion system and acceptable to the Engineer, to assist during the installation. The installation shall not occur without the technical representative being present.

**717.30 Silicone Expansion Joint Sealant**

**717.30.1 Description**. This work shall consist of furnishing and installing the backer rod and silicone expansion joint sealant for joints as shown on the bridge plans or as directed by the Engineer. Structural steel for the joints shall be furnished and installed as shown on the bridge plans.

**717.30.2 Material.** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Silicone Expansion Joint Sealant | 1057 |

**717.30.3 Construction Requirements.** The Contractor shall furnish to the Engineer the manufacturer's written product information, installation procedures and instructional information at least two weeks prior to installation. The Contractor shall obtain the services of a qualified technical representative approved by the manufacturer of the expansion system and acceptable to the Engineer, to assist during the installation. The Contractor, the technical representative and the Engineer shall meet to review and clarify installation procedures and requirements prior to starting the work. The start of surface preparations and sealant installation shall not occur without the technical representative being present. The technical representative shall be present for at least one day at the start of surface preparations and sealant installation.

**717.30.3.1 Shop Drawings.** Shop drawings for structural steel for expansion devices shall be prepared in accordance with Sec 1080. The dimensions of the seal shall be shown on the drawings for the armored joint. Shop drawings will not be required when the sealant is placed against concrete or existing armor steel.

**717.30.3.2 Surface Preparation.** The concrete or steel surface shall be prepared for priming and sealant placement. New Portland cement concrete shall be fully cured and allowed to dry a minimum of seven days. The joint shall be cleaned of all gravel, loose material and other contaminates before sand blasting. Areas that will be in contact with the sealant shall be sand blasted with a clean, hard aggregate that will leave little to no dust residue. Sand blasted concrete surfaces will be considered acceptable when areas that will be in contact with the sealant have a roughened surface with clean, exposed aggregate. The surface shall be free of foreign matter or plastic residue. Sand blasted steel surfaces will be considered acceptable when the steel surfaces have been cleaned to an SSPC-SP10 degree of cleanliness. After sand blasting is completed, the joint shall be cleaned of debris using oil-free and water-free compressed air or a vacuum, either being at least 90 psi (620 kPa).

**717.30.3.3 Priming.** Priming shall immediately follow sand blasting and cleaning and will only be permitted to proceed when the air and substrate temperatures are at least 40 F (5 C) and rising. Sand blasting, priming and sealing shall be performed on the same day. The entire sand blasted surface shall be primed. Application and drying times for primers shall be in accordance with the manufacturer's recommendations. All leftover primer shall be properly disposed.

**717.30.3.4 Joint Installation.** The backer rod shall be installed as specified on the bridge plans and in accordance with the manufacturer's recommendations. All voids in the installed backer rod shall be filled to prevent sealant leakage.

**717.30.3.5 Sealant Placement.** The sealant thickness and recess depth shall be as shown in the contract documents and shall be measured during installation at approximately 2 foot (600 mm) intervals. Adjustments to correct sealant thickness to within ± 1/8-inch (3 mm) tolerance shall be made before the sealant begins to set. Sealant placement will only be permitted when the air and substrate temperatures are above 40 F (5 C), below 90 F (32 C) and 5 F (3 C) above the dew point. The joint surfaces shall be kept clean and dry during sealing. The joint shall remain clean and dry during the sealing operation. Sealing shall be performed using a pneumatic gun in accordance with the manufacturer's recommendations. End of seal treatment at vertical faces of curbs, sidewalks or parapets shall be as recommended by the manufacturer and as shown in the contract documents. Sealant placed incorrectly shall be removed and replaced at the Contractor's expense.

**717.40 Silicone Joint Sealant For Saw Cut And Formed Joints**

**717.40.1 Description.** This work shall consist of sealing the saw cut and formed joints as shown in the contract documents.

**717.40.2 Material.** All material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section |
|---|---|
| Silicone Joint Sealant for Saw Cut and Formed Joints | 1057 |

**717.40.3 Construction Requirements**

**717.40.3.1 Saw Cut Joints.** Joints shall be sawed as shown on the bridge plans as soon as the concrete has hardened sufficiently to permit sawing of a neat straight joint with minimal raveling, and before uncontrolled shrinkage cracking occurs. All joints shall be sawed to the required dimension and cleaned by sand blasting, wire brushing or other methods approved by the Engineer in accordance with the manufacturer's recommendations. Joint interfaces shall be fully cured and dry, or free of moisture at the time of installation. All loose particles shall be removed by oil-free and water-free compressed air or a vacuum of at least 90 psi (620 kPa) before the application of the backer rod and sealant.

**717.40.3.2 Formed Joints.** Any joints 0.25 inch (6 mm) or greater shall be cleaned and packed with backer rod and silicone joint sealant. Any joints less than 0.25 inch (6 mm) shall be cleaned and caulked with silicone joint sealant as shown on the bridge plans. All joint interfaces shall be cleaned by grinding, saw cutting, sand blasting, wire brushing or other methods approved by the Engineer in accordance with the manufacturer's recommendations. New Portland cement concrete shall be fully cured and allowed to dry a minimum of seven days. The joint interfaces shall be free of moisture at the time of installation. All loose particles shall be removed by oil-free and water-free compressed air or vacuum of at least 90 psi (620 kPa) before the application of the backer rod and sealant.

**717.40.3.3 Joint Backer Rod.** The backer rod shall be used in the joint slot to ensure the sealant adheres to the sidewalls or interface of the joint. All joint areas requiring a backer rod shall be packed with a closed-cell, expanded polyethylene foam to obtain the appropriate depth of the sealant. The backer rod shall be slightly oversized for the joint width, and shall be resilient, compressible in nature, nonabsorbent, non-shrinking and compatible with the sealant.

**717.40.3.4 Sealant Placement.** Sealant shall be placed in the proper configuration as shown on the bridge plans. Joint sealer shall be protected from dust and other foreign matter until cured to a tack-free condition. The sealant shall fill the joint from the bottom to slightly below the surface currently being applied. Immediately after placement and before a skin forms, the sealant shall be tooled to force the sealant against the joint face and to recess the bead approximately 1/8 inch (3 mm).

**SECTION 1005 AGGREGATE FOR CONCRETE**

**1005.1 Scope.** This specification covers aggregate to be used for concrete construction.

**1005.2 Coarse Aggregate**

**1005.2.1** All coarse aggregate for concrete shall consist of sound, durable rock, free from objectionable coatings and frozen and cemented lumps.

The percentage of deleterious substances shall not exceed the following values, and the sum of percentages of all deleterious substances, exclusive of Items 5 and 6, shall not exceed 6.0 percent. For crushed stone, the percentage of wear shall not exceed 50 when tested in accordance with AASHTO T 96.

| Deleterious Material | Percent by Weight (Mass) |
|---|---|
| Deleterious Rock | 6.0 |
| Shale | 1.0 |
| Chert in Limestone | 4.0 |
| Other Foreign Material | 0.5 |
| Material Passing No. 200 (75 µm) Sieve Gradations D & E | 2.5 |
| Thin or Elongaged | 5.0 |

**1005.2.1.1** The above requirements will apply to each size or fraction of aggregate produced.

**1005.2.1.2** Crushed stone shall be obtained from rock of uniform quality. Rock tested for initial approval shall be in accordance with the criteria below. Source approval and production samples shall also meet the following criteria:

| Property | Value |
|---|---|
| Los Angeles Abrasion, AASHTO T 96, percent loss, max | 50 |
| Absorption, AASHTO T 85, percent, max.: | |
| (a) Portland Cement Concrete Pavement | -- |
| (b) Portland Cement Concrete Masonry | 3.5 |
| Soundness, MoDOT Test Method TM 14, percent loss, max.: | |
| (a) Portland Cement Concrete Pavement | -- |
| (b) Portland Cement Concrete Masonry | 18.0 |
| Durability Factor, AASHTO T 161 Procedure B, percent, min: | |
| (a) Portland Cement Concrete Pavement | 75[a] |
| (b) Portland Cement Concrete Masonry | -- |

[a] Approval will be based on maximum aggregate size produced that meets durability requirements.

**1005.2.1.3** Gravel shall be washed and shall be in accordance with the criteria below for initial approval. Source approval and production samples shall also meet the following criteria:

| Property | Value |
|---|---|
| Los Angeles Abrasion, AASHTO T 96, percent loss, max. | 45 |
| Absorption, AASHTO T 85, percent, max. | 4.5 |
| Soundness, MoDOT Test Method TM 14, percent loss, max. | 18.0 |

**1005.2.1.4** The Engineer reserves the right to use additional test methods, such as ASTM C 586, AASHTO T 161 or other appropriate tests, to measure the soundness and durability of aggregate for use in concrete when deemed necessary.

**1005.2.2** Coarse aggregate for concrete pavement or base course shall be crushed stone or porphyry.

**1005.2.3 Grade F Aggregate.** Coarse aggregate for Portland cement concrete pavement, base and approach slabs for bridges that is not produced from the Burlington, Keokuk, Cedar Valley (formerly Callaway) or Warsaw limestone formations, which is obtained from sources in the following areas shall have a maximum top size of ¾ inch:

(a) State of Kansas, Iowa and Nebraska.

(b) Counties of Missouri – Adair, Andrew, Atchison, Bates, Benton, Buchanan, Caldwell, Carroll, Cass, Cedar, Chariton, Clay, Clinton, Daviess, DeKalb, Gentry, Grundy, Harrison, Henry, Holt, Jackson, Johnson, Lafayette, Linn, Livingston, Mercer, Macon, Nodaway, Pettis, Platte, Putnam, Randolph, Ray, St. Clair, Saline, Schuyler, Sullivan, Vernon and Worth.

**1005.2.4** Coarse aggregate for concrete for structures, except as specified in Sec 1005.2.5, may be gravel or crushed stone. Coarse aggregate for Class B, B-1, B-2, MB-2 or Seal concrete shall be in accordance with either Gradation D or E. Coarse aggregate for Class A-1 concrete shall be in accordance with Gradation E.

| Gradation D | Percent by Weight (Mass) |
|---|---|
| Passing 1-inch (25.0 mm) sieve | 100 |
| Passing 3/4-inch (19.0 mm) sieve | 85-100 |
| Passing 3/8-inch (9.5 mm) sieve | 15-55 |
| Passing No. 4 (4.75 mm) sieve | 0-10 |

| Gradation E | Percent by Weight (Mass) |
|---|---|
| Passing 3/4-inch (19.0 mm) sieve | 100 |
| Passing 1/2-inch (12.5 mm) sieve | 70-100 |
| Passing 3/8-inch (9.5 mm) sieve | 40-70 |
| Passing No. 4 (4.75 mm) sieve | 0-10 |
| Passing No. 8 (2.36 mm) sieve | 0-6 |

**1005.2.5** Coarse aggregate for ornamental concrete shall be crushed stone in accordance with Sec 1005.2.4, Gradation E. However, the use of coarse aggregate containing more than 2 percent chert will not be permitted.

**1005.3 Fine Aggregate**

**1005.3.1** Fine aggregate for concrete shall be a fine granular material naturally produced by the disintegration of rock of a siliceous nature, or shall be manufactured from an approved limestone or dolomite source as defined in Sec 1005.2. By specific approval from the Engineer, chat sand produced from flint chat in the Joplin area or fines manufactured from igneous rock or chert gravel may be used. Fine aggregate shall be free from cemented or conglomerated lumps and shall not have any coating of injurious material. The percentage of deleterious substances shall not exceed the following values:

| Deleterious Material | Percent by Weight (Mass) |
|---|---|
| Clay Lumps and Shale | 0.25 |
| Coal and Lignite | 0.50 |
| Total Lightweight (low mass density) Particles, Including Coal and Lignite | 0.50 |
| Material Passing No. 200 (75 µm) Sieve<br>(a) Natural Sand<br>(b) Manufactured Sand | <br>2.0<br>4.0 |
| Other Deleterious Substances | 0.10 |

**1005.3.2** The total lightweight (low mass density) particle requirement will not apply to angular chert sand or manufactured sand.

**1005.3.3** Fine aggregate shall produce a mortar having a seven-day compressive strength of at least 90 percent of a control mortar developed at the same proportions, using standard Ottawa sand. Tests shall be performed in accordance with AASHTO T 106. Cement used in the tests shall be Type I, in accordance with Sec 1019. AASHTO T 106 may be waived provided the fine aggregate produces a glass color standard lighter than Organic Platte No. 3, in accordance with AASHTO T 21.

**1005.3.4** Fine aggregate for ornamental concrete shall be free from coal and lignite material when tested in accordance with AASHTO T 113.

**1005.3.5** All fine aggregate for PCCM shall meet the following gradation requirements:

| Sieve | Percent by Weight (Mass) |
|---|---|
| Passing 3/8-inch (9.5 mm) sieve | 100 |
| Passing No. 4 (4.75 mm) sieve | 95-100 |
| Passing No. 8 ( 2.36 mm) sieve | 70-100 |
| Passing No. 16 (1.18 mm) sieve | 45-90 |
| Passing No. 30 (600 µm) sieve | 15-65 |
| Passing No. 50 (300 µm) sieve | 5-30 |
| Passing No. 100 (150 µm) sieve | 0-10 |

## SECTION 1017 GROUND GRANULATED BLAST FURNACE SLAG

**1017.1 Scope.** This specification covers ground Granulated Blast Furnace Slag (GGBFS) for use in Portland cement concrete.

**1017.2 General.** All GGBFS shall be in accordance with AASHTO M 302, Grade 100 or 120, except as herein specified. Only GGBFS from sources qualified in accordance with these specifications will be permitted.

**1017.2.1** GGBFS may only be used with AASHTO M 85, Type I or Type II Portland cement, unless otherwise directed by the Engineer.

**1017.2.2** The mixing of different grades and sources of GGBFS will not be permitted.

**1017.2.3** The term "manufacturer", as used in this specification, will be the company grinding the granulated blast furnace slag to produce GGBFS. The term "marketing entity", as used in this specification, will be the supplier or broker of the GGBFS. The marketing entity will be responsible for complying with these specifications.

**1017.2.4** All tests shall be performed in a MoDOT pre-approved laboratory or an IDOT approved laboratory. Documentation of a pre-approved MoDOT laboratory shall be submitted to the Engineer.

**1017.3 Sampling, Testing and Acceptance Procedures**. All marketing entities and terminals furnishing GGBFS to this project shall be qualified as herein described. All GGBFS will be subject to inspection and sampling by IDOT at the source of manufacture, an intermediate shipping terminal or destination. IDOT shall be allowed unlimited access to all facilities and records as required to conduct inspection and sampling.

**1017.3.1 Marketing Entity Qualification.** In order to become qualified, a written request shall be sent by the marketing entity to the IDOT Bureau of Materials & Physical Research, 126 East Ash Street, Springfield, IL 62704-4766, along with a copy of the marketing entity's QC plan. The production source and terminals may be inspected to verify the information and to establish personal contact with the QC personnel.

**1017.3.1.1** The following information shall be included in the request for qualification:

(a) An outline of the QC program from the source of manufacture to the point where the product is relinquished to the purchaser. The QC program shall cover all tests in accordance with the specification and include the testing frequency for each test. The name of the testing laboratory shall be included. Each sample shall not represent less than 500 tons (500 Mg).

(b) A copy of the testing laboratory's most recent Cement and Concrete Reference Laboratory (CCRL) inspection report and the latest CCRL proficiency sample report. The CCRL inspection shall cover all tests in accordance with the specification. Documentation showing satisfactory resolution of all inspection deficiencies shall be included.

(c) Complete name and address of the GGBFS source and owner. If located in an area without precise address identification, a complete map description shall be furnished. If more than one source is used, all sources shall be listed.

(d) Grade of GGBFS produced.

(e) Description of storage facilities, including capacities, set-aside capabilities and sampling method(s).

(f) A copy of a typical bill of lading with the required certification statement.

(g) A split sample of the GGBFS proposed for use, obtained over a minimum of one production day. The marketing entity's test results for the split sample shall also be submitted. The marketing entity shall provide reference cement if the cement used is unavailable to the area.

**1017.3.1.2** In order to maintain qualification, the following will be required:

(a) QC test results covering the production of all GGBFS proposed for use in this IDOT and other MoDOT projects, including the high, low and average results shall be kept on file by the marketing entity. Sampling and testing shall be in accordance with these specifications.

(b) A sample shall be tested for each 2000 tons (2000 Mg) intended for use. The sample shall be tested by the marketing entity for fineness, No. 325 (45 µm) sieve analysis and Blaine, air content, 7-day and 28-day Slag Activity Index, percent sulfide sulfur (S) and percent sulfate ion (SO3), taken from a composite sample representing each 2000 tons (2000 Mg) of GGBFS transported to the storage silo. The composite shall be comprised of a minimum of four samples, each representing not more than 500 tons (500 Mg). Automatic samplers may be used in lieu of the individual 500-ton (500 Mg) grab samples.

(c) A copy of the most recent CCRL inspection and proficiency sample reports and any deficiency resolutions shall be forwarded promptly to IDOT.

(d) Semi-annual split samples for the class of approved GGBFS will be obtained by IDOT for joint testing by the marketing entity. Marketing entity test results on the split samples shall be furnished to the IDOT Bureau of Materials & Physical Research when completed.

(e) All QC test results shall be available for a minimum of three years, for IDOT review upon request.

(f) Only GGBFS in compliance with these specifications shall be allowed into a silo destined for IDOT projects.

**1017.3.2 Terminal Qualification.** In order to become a qualified terminal, a written request shall be sent from terminal personnel to the IDOT Bureau of Materials & Physical Research . A letter shall accompany the request from each affected and qualified marketing entity, advising of the intent to ship through the respective terminal. Any changes in GGBFS sources shall be updated in the same manner. Terminals will be inspected to ensure adequacy to accept, retain and ship GGBFS from qualified marketing entities.

**1017.3.3 Failure to Comply.** Failure to fulfill any of these requirements may result in disqualification of the GGBFS manufacturer, marketing entity or terminal. In cases of dispute, test results obtained by IDOT will control.

**1017.3.4 Disqualified Facilities.** If a facility has been disqualified, the marketing entity will be required to designate the silo, bin or storage facility from which the marketing entity proposes to furnish GGBFS for MoDOT and IDOT projects. Each silo, bin or storage facility designated must be sampled, tested, sealed and approved by IDOT prior to shipment. The marketing entity shall also sample, test and report the test results for each designated silo, bin or storage facility. This procedure will continue until adequate QC has been established.

**1017.3.5 Shipping.** GGBFS continually sampled and tested via autosamplers at a location, frequency and duration acceptable to IDOT, may be continuously shipped direct from a marketing entity. All GGBFS manually sampled and tested shall be held in the silo or bin until such time as the test results are completed prior to shipping.

**1017.3.6 Storage.** All GGBFS intended for use shall be sampled, tested and placed in a designated silo or bin.

**1017.4 Acceptance.** The marketing entity shall certify that the material complies with the specification requirements. When a qualified marketing entity or terminal is shipping GGBFS for, or purchasing GGBFS from, another qualified marketing entity, the bill of lading or delivery receipt shall be from the shipping company. The certification statement showing the actual manufacturer shall be prominently placed on the bill of lading or delivery receipt. A copy of the bill of lading or delivery receipt shall accompany each shipment and shall be furnished to IDOT at the shipping and destination points.

**1017.4.1** The bill of lading or delivery receipt for each shipment to IDOT projects shall carry the following certification statement:

"This is to certify this Grade _____ GGBFS originated from an IDOT qualified manufacturer, has been maintained to meet IDOT specifications and was loaded from silo number _____."

_____
Name and Location of Manufacturer

_____
Name and Location of Shipping Facility

By_____
Signature and Name of Marketing Entity

## SECTION 1018 FLY ASH FOR CONCRETE

**1018.1 Scope.** This specification covers fly ash for use in Portland cement concrete.

**1018.2 General.** Only fly ash from sources qualified in accordance with these specifications will be permitted. The mixing of different classes and sources of fly ash will not be permitted. All fly ash shall be in accordance with AASHTO M 295, Class C or F, except as herein specified.

1018.2.1 Class C fly ash shall meet one or both of the following requirements:

(a) The 7-day Strength Activity Index with Portland cement shall be at a minimum be 85 percent of the control.

(b) The Calcium oxide content shall be 23 percent, minimum.

**1018.2.2** The percent each of silicon dioxide ($SiO_2$), aluminum oxide ($Al_2O_3$) and iron oxide ($Fe_2O_3$) shall be reported in addition to the total of the three.

| Class | Range |
|---|---|
| Class C | 50-66% |
| Class F | 74% Minimum |

**1018.2.3** Loss on Ignition shall not exceed 1.5 percent.

**1018.2.4** The term “manufacturer”, as used in this specification, will be the actual manufacturer of the fly ash. The term, “marketing entity”, as used in this specification, will be the supplier or broker of the fly ash. The marketing entity shall be responsible to be in accordance with these specifications.

**1018.2.5** Cement used for testing fly ash shall be in accordance with AASHTO M85.

**1018.2.6** All marketing entities, terminals, and independent testing laboratories shall be qualified prior to acceptance of any material.

**1018.3 Laboratory Qualification**

**1018.3.1** Laboratories approved prior to 10/01/06 shall maintain qualification based on continued compliance with all of the of all requirements specified herein.

**1018.3.2** In order to become qualified, a written request shall be sent by the marketing entity to the IDOT Bureau of Materials & Physical Research, 126 East Ash Street, Springfield, IL 62704-4766, along with a copy of the independent laboratory’s most recent Cement and Concrete Reference Laboratory (CCRL) certification and the latest CCRL Pozzolan proficiency sample report. The CCRL inspection shall cover all tests required by the specification. Documentation showing satisfactory resolution of all inspection deficiencies shall be included.

**1018.3.3 Failure to Comply.** Failure to comply with any of these requirements and/or specified herein may result in the issuance of a strike. If a laboratory accumulates three strikes, the laboratory shall be disqualified. For every year a laboratory does not receive a strike, a strike will be removed from the laboratory’s accumulated total. In cases of dispute, test results obtained by IDOT will control.

**1018.3.4 Disqualified Facilities.** If a laboratory has been disqualified, the marketing entity must utilize an existing IDOT approved laboratory or qualify a laboratory fulfilling IDOT requirements. A disqualified laboratory will be unable to maintain qualification based on requirements governed in this specification. Laboratories found to not be operating independent of qualified marketing entities shall be disqualified.

**1018.4 Marketing Entity Qualification.** In order to become qualified, a written request shall be sent by the marketing entity to the IDOT Bureau of Materials & Physical Research, along with a copy of the marketing entity’s QC plan and the following information. The power plant and terminals may be inspected to verify the information and to establish personal contact with the QC personnel.

**1018.4.1.** The following information shall be included in the request for qualification:

(a) An outline of the QC program from the coal yard to the point where the product is relinquished to the purchaser. The QC program shall cover all tests required by the specification, and shall include the testing frequency for each test. The name of the testing laboratory shall also be included.

(b) A copy of the testing laboratory's most recent Cement and Concrete Reference Laboratory (CCRL) inspection report and the latest CCRL proficiency sample report. The CCRL inspection shall cover all tests required by the specification. Documentation showing satisfactory resolution of all inspection deficiencies shall be included.

(c) Complete name and address of the fly ash source and owner. If located in an area without precise address identification, a complete map description shall be furnished.

(d) Complete name and address or map location of the coal mine. If more than one source of coal is used, all sources shall be listed.

(e) Type of coal used.

(f) Class of fly ash produced.

(g) A description of production procedures including, but not limited to, any additives mixed with the coal during production, any additive or dust suppressant used to collect the fly ash, ash collection methods, production capacity in tons (Mg) per day, and the proportions and proportioning procedures of any blended coals.

(h) Description of storage facilities, including capacities and set-aside capabilities.

(i) A copy of a typical bill of lading in accordance with the certification statement.

(j) A split sample of the class of fly ash proposed for use, obtained from the autosampler over a minimum of one production day. The marketing entity's test results for the split sample shall also be submitted.

**1018.4.2** In order to maintain qualification, the following will be required:

(a) Quality control test results covering the production of all fly ash proposed for use in this IDOT and other MoDOT projects, including the high, low and average results for each class shall be kept on file by the marketing entity. Sampling and testing frequency shall be in accordance with ASTM C 311. Results shall include the percent each of silicon dioxide ($SiO_2$), aluminum oxide ($Al_2O_3$) and iron oxide ($Fe_2\ O_3$) in addition to a total of all three.

(b) A copy of the most recent CCRL inspection and proficiency sample reports and any deficiency resolutions shall be forwarded promptly to IDOT.

(c) Semi-annual split samples for the class of approved fly ash shall be obtained by MoDOT for joint testing by the marketing entity.

Marketing entity test results on the split samples shall be furnished to the IDOT Bureau of Materials & Physical Research when completed.

(d) All QC test results shall be available for a minimum of three years, for IDOT review upon request.

(e) All monthly or each 3200-ton samples shall be available for a minimum of one year, for IDOT testing upon request.

(f) Only fly ash in compliance with these specifications shall be allowed into a silo destined for IDOT projects.

**1018.4.3 Failure to Comply.** Failure to comply with any of these requirements and/or specified herein may result in the issuance of a strike. If a marketing entity accumulates three strikes, the marketing entity shall be disqualified. For every year a marketing entity does not receive a strike, a strike will be removed from the marketing entity's accumulated total. In cases of dispute, test results obtained by IDOT will control.

**1018.5 Terminal Qualification.** In order to become a qualified terminal, a written request shall be sent from terminal personnel to the IDOT Bureau of Materials & Physical Research. A letter shall accompany the request from each affected and qualified marketing entity, advising of the intent to ship through the respective terminal. Any changes in fly ash source shall be updated in the same manner. Terminals shall be inspected to ensure adequacy to accept, retain and ship fly ash from qualified marketing entities.

**1018.6 Sampling, Testing and Acceptance Procedures.** All fly ash will be subject to inspection and sampling by IDOT at the power plant, an intermediate shipping terminal or destination. IDOT shall be allowed unlimited access to all facilities and records in order to conduct inspection and sampling.

**1018.6.1 Failure to Comply.** Failure to fulfill any of these requirements may result in disqualification of the fly ash manufacturer, marketing entity or a terminal. In cases of dispute, test results obtained by IDOT will control.

**1018.6.2 Disqualified Facilities.** If a facility has been disqualified, the marketing entity may elect to designate the silo, bin or storage facility from which the marketing entity proposes to furnish fly ash for IDOT projects. If this option is used, each silo, bin or storage facility designated must be sampled, tested, sealed and approved by IDOT prior to shipment. The marketing entity shall also sample, test and report the test results for each designated silo, bin or storage facility.

**1018.6.3 Shipping.** Fly ash shall be continually sampled and tested via autosamplers at a location, frequency and duration acceptable to IDOT, and may be continuously shipped direct from a marketing entity or generating station silo.

**1018. 6.4 Storage.** All fly ash intended for use shall be sampled, tested, and placed in designated silos or bins.

**1018.6.5 Coal Sources and Process.** Fly ash from each coal source at each plant shall be qualified separately. Coals from different sources may be blended prior to burning, but the qualification shall be based on the blend. When the production procedure or fuel source is changed, or when any change is made by the manufacturer that alters the properties or characteristics of the qualified fly ash, requalification may be required.

**1018.6.6 Acceptance.** The marketing entity shall certify that the material complies with the specification requirements. When a qualified marketing entity or terminal is shipping fly ash for, or purchasing fly ash from, another qualified marketing entity, the bill of lading or delivery receipt shall be from the shipping company. The certification statement showing the actual manufacturer shall be prominently placed on the bill of lading or delivery receipt. A copy of the bill of lading or delivery receipt shall accompany each shipment and shall be furnished to IDOT at the shipping and destination points.

**1018.6.7** The bill of lading or delivery receipt for each shipment to IDOT projects shall carry the following certification statement:

"This is to certify this Class ___ fly ash originated from an IDOT qualified manufacturer, has been maintained to meet IDOT specifications and was loaded from silo number _____."

_____
Name and Location of Manufacturer

_____
Name and Location of Shipping Facility

By_____
Signature and Name of Marketing Entity

## SECTION 1019 CEMENT

**1019.1 Scope.** This specification covers Portland cement, hydraulic cement and blended hydraulic cement.

**1019.2 General.** All Portland cement shall be in accordance with the following requirements. The basis of acceptance will be as described in Sec 1019.3.

**1019.2.1 Portland Cement.** All Portland cement shall be in accordance with AASHTO M 85 with the following modifications:

(a) Specific surface, fineness, for all Type I Portland cements shall not exceed 420 $m^2$/kg using Air permeability test. When sample fails to meet the requirements of the air permeability test, the turbidimeter test shall be used and requirement of 230 $m^2$/kg maximum for the turbidimeter method shall govern.

(b) For limestone cements, include the $CO_2$ content of Portland cement on all mill test reports. Determine the $CO_2$ content in accordance with ASTM C114. When the $CO_2$ content exceeds 1.0% or when any quantity of limestone is added, report the $C_3S$ as calculated in ASTM C150, Annex A1, using the actual $CO_2$ value.

**1019.2.2 Hydraulic Cement.** All hydraulic cement shall be in accordance with ASTM C 1157, Type GU.

**1019.2.3 Blended Hydraulic Cement.** All blended hydraulic cement shall be in accordance with Type IP, I(PM), IS or I(SM) of AASHTO M 240 with the modification that chemical composition shall be provided and tolerances checked in accordance with Section 7.2 of AASHTO M240.

**1019.2.4 Other Cements.** White Portland cement shall meet the requirements for Type I. Air-entraining Portland cement shall be used only when specified in the contract. Different types of cement shall not be mixed nor shall different types be used in the same unit of construction.

**1019.2.5 Sack or Bag.** A sack or bag of cement will be considered to be 94 pounds (42.6 kg) net.

**1019.3 Sampling, Testing and Acceptance Procedures.** All manufacturers and terminals furnishing cement to this IDOT or other MoDOT projects shall be qualified as herein described. All cement will be subject to inspection and sampling by IDOT at the source of manufacture, an intermediate shipping terminal or destination. IDOT shall be allowed unlimited access to all facilities and records as required to conduct inspection and sampling.

**1019.3.1 Manufacturer Qualification.** In order to become qualified, a written request shall be sent by the manufacturer to the IDOT Bureau of Materials & Physical Research, 126 East Ash Street, Springfield, IL 62704-4766, along with a copy of the QC plan. In order to maintain qualification, the manufacturer shall submit additional information, as listed, to IDOT. The plant may be inspected to verify the information and to establish personal contact with the QC personnel.

**1019.3.1.1** The following information shall be included in the request for qualification:

(a) An outline of the QC program from the quarry to the point where the product is relinquished to the purchaser. The QC program shall cover all tests required by the specification and shall include the testing frequency for each test.

(b) A copy of the most recent Cement and Concrete Reference Laboratory (CCRL) inspection report and the latest CCRL proficiency sample report. The CCRL inspection shall cover all tests required by the specification. Documentation showing satisfactory resolution of all inspection deficiencies shall be included.

(c) The physical layout of the plant, including the number and capacity of finish mills and silos and the type of cement stored in each silo.

(d) A copy of a typical bill of lading with the required certification statement.

(e) A split sample of each type of cement proposed for use. Manufacturer test results for the split sample shall also be submitted.

**1019.3.1.2** In order to maintain qualification, the following will be required:

(a) Monthly QC test results covering the production of cement types proposed for use in this IDOT or other MoDOT projects, including the high, low and average results for each type shall be forwarded to IDOT upon manufacturer completion.

(b) A copy of the most recent CCRL inspection and proficiency sample reports and any deficiency resolutions shall be forwarded promptly to IDOT.

(c) Semi-annual split samples for each type of approved cement will be obtained by IDOT for joint testing by the manufacturer. Manufacturer test results on the split samples shall be furnished to IDOT when completed.

(d) All QC test results shall be available for a minimum of three years, for IDOT review upon request.

(e) Only cement in compliance with these specifications shall be allowed into a silo destined for IDOT projects.

**1019.3.2 Terminal Qualification**. In order to become a qualified terminal, a written request shall be sent from terminal personnel to the IDOT Bureau of Materials & Physical Research. The request shall be accompanied by a letter from each affected and qualified manufacturer, advising of the intent to ship through the respective terminal. Any changes in cement source shall be updated in the same manner. Terminals will be inspected to ensure adequacy to accept, retain and ship cement from qualified manufacturers.

**1019.3.3 Failure to Comply.** Failure to fulfill any of these requirements may result in disqualification of the cement manufacturer or a terminal. In cases of dispute, test results obtained by IDOT will control.

**1019.3.4 Disqualified Manufacturers.** If a manufacturer has been disqualified, the manufacturer will be required to designate the silo, bin or storage facility from which they propose to furnish cement for IDOT projects. Each silo, bin or storage facility designated shall be sampled, tested, sealed and approved by IDOT prior to shipment. The manufacturer shall also sample, test and report the test results for each designated silo, bin or storage facility. This procedure shall continue until adequate QC has been established.

**1019.3.5 Foreign Cement.** All tests on foreign cement shall be performed by a qualified domestic manufacturer.

**1019.4 Acceptance.** The supplier shall certify that the material complies with the specification requirements. When a qualified manufacturer or terminal is shipping cement for, or purchasing cement from, another qualified manufacturer, the bill of lading or delivery receipt shall be from the shipping company. The certification statement showing the actual manufacturer shall be prominently placed on the bill of lading or delivery receipt. A copy of the bill of lading or delivery receipt shall accompany each shipment and shall be furnished to IDOT at the shipping and destination points.

**1019.4.1 Certification.** The bill of lading or delivery receipt for each shipment to IDOT projects shall carry the following certification statement:

"This is to certify this Type ___ cement originated from an IDOT qualified manufacturer, has been maintained to meet IDOT specifications and was loaded from silo number _____."

_____
Name and Location of Manufacturer

_____
Name and Location of Shipping Facility

By_____
Signature and Name of Marketing Entity

## SECTION 1029 FABRICATING PRESTRESSED CONCRETE MEMBERS FOR BRIDGES

**1029.1 Scope.** This specification covers the fabrication of prestressed concrete members for bridges. This specification covers both pretensioned and post-tensioned members.

**1029.2 Acceptance.** Unless otherwise specified in the contract, acceptance of prestressed units will be based on tests of the material and inspection of the completed product. Acceptability of all types of sections covered by these specifications will be determined by the material tests required in the referenced sections of Sec 1029.3, by crushing tests on concrete cores or cured concrete cylinders, and by inspection of the finished sections, including quantity and placement of reinforcement, and freedom from defect.

**1029.3 Material**

**1029.3.1 Cement.** Cement shall be in accordance with Sec 1019.

**1029.3.2 Aggregate.** Fine and coarse aggregate shall be in accordance with Sec 1005, except that requirements for gradation and percent passing the No. 200 (75 µm) sieve will not apply.

**1029.3.3 Steel Reinforcement.** Reinforcement shall be in accordance with Sec 1036.

**1029.3.4 Steel Strand.** Steel strand shall be in accordance with AASHTO M 203.

**1029.3.5 Structural Steel.** Structural steel shall be in accordance with ASTM A 36. Structural steel for anchorage plates shall be in accordance with AASHTO M 270, Grade 50.

**1029.3.6 Wire and Parallel Lay Wire Cables.** Wire and parallel lay wire cables shall be in accordance with AASHTO M 203.

**1029.3.7 High-Strength Steel Bars.** High-Strength Steel Bars shall be in accordance with AASHTO M 275.

**1029.3.8 Enclosures.** Enclosures for post-tensioning tendons shall be mortar tight, semi-rigid metal tubes with an internal diameter at least 1/4 inch (6 mm) larger than the bar, cable, strand or wire group to be enclosed, and shall be provided with suitable entrance and discharge ports for grouting.

**1029.3.9 Mortar.** Mortar for grouting tendons in post-tensioned members shall consist of a mixture of cement and fine sand in the approximate proportions of four parts cement to three parts sand, by volume, with sufficient water to form a grout having the consistency of heavy paint.

**1029.3.10 Concrete Mixture.** Concrete material, proportioning, air-entraining, mixing, slump and transporting of concrete shall be in accordance with Sec 501, except as noted herein. Concrete for prestressed members shall conform to all requirements of Class A-1 concrete, except as noted herein. The Contractor may use Type I, IP, I(PM), IS, I(SM), Type II or Type III cement. Alternate mix designs may be submitted to Construction and Materials for approval. Trial batches may be required. Independent laboratory testing may be required. Submissions shall include all mix design, testing and production detail requested by the Engineer.

**1029.4 Documentation.** All wire, strand, bars and anchorage assemblies shall be assigned a lot number and tagged for identification. The Contractor shall furnish one copy of the certified mill test report giving the chemical analysis and results of physical tests on the material furnished, except chemical analysis will not be required for steel strand in accordance with AASHTO M 203. The Contractor shall also furnish one certified copy of the stress-strain curve representative of the lot to be used.

**1029.5 Equipment**

**1029.5.1 Prestressing.** The Contractor shall provide all equipment necessary for the construction and the prestressing of concrete members. Prestressing shall be done with approved jacking equipment. If hydraulic jacks are used, the jacks shall be equipped with accurate pressure gauges. All gauges, load cells, dynamometers and other devices for measuring the stressing load shall have an accuracy within two percent. The combination of jack and gauge shall be calibrated by a testing laboratory meeting the approval of the Engineer. A certified graph or table showing the calibration shall be furnished to the Engineer. The total load as determined from the strand elongation shall check that indicated by the gauge within five percent of the total load required to achieve the designated elongation. If other types of jacks are used, proving rings or other devices calibrated by a testing laboratory meeting the approval of the Engineer shall be furnished such that the jacking forces may be accurately determined. Calibration shall be repeated at intervals not exceeding one year and after each overhaul. While work is in progress, if any jack or gauge appears, in the judgment of the Engineer, to be giving erratic results, or if gauge pressure and elongation indicate materially different stresses, recalibration may be required. The Contractor shall furnish means of accurately measuring the elongation of the tendons to within 1/16 inch (1.5 mm). Elongation upon completion of stressing operations shall be within five percent of that specified. No tensioning of strands shall be done when strand temperatures are below 30 F (-1 C).

**1029.5.2 End Anchorages.** End anchorages and stressing blocks for pretensioned members shall be adequately designed to withstand the forces incidental to prestressing and to maintain the tension in all prestressed tendons of any member until the concrete has been placed and attained its specified transfer strength.

**1029.5.3 Concrete Testing Equipment.** Equipment for field determination of compressive strength of concrete shall be furnished by the Contractor at the location of manufacture of prestressed concrete members. The testing machine may be of any mechanical or hydraulic type, shall be power operated in accordance with AASHTO T 22, Section 1.2.1, shall be capable of testing cylinders to failure, and shall comply with the accuracy tolerances and corrections specified in AASHTO T 67, Sections 16.1 and 17. Approximately the last one-half of the load shall be applied at a rate between 1200 and 3000 psi (8 and 21 MPa) per minute. The Contractor shall furnish a sufficient number of 6 x 12-inch (152.4 x 304.8 mm) or 4 x 8-inch (101.6 x 203.2 mm) compression test cylinder molds of a type meeting the approval of the Engineer. The Contractor shall furnish sufficient personnel for cleaning and preparing reusable molds. The Contractor shall, at the option of the Engineer, furnish technicians to assist the Engineer with concrete testing and the making of test cylinders during the placing of concrete.

**1029.5.4 Field Laboratory.** When requested, a Type 1 field laboratory in accordance with Sec 601 shall be furnished.

**1029.6 Construction Requirements**

**1029.6.1 Shop Drawings.** Submittals shall be made in accordance with Article 105.04 of the IDOT Standard Specifications for Road and Bridge Construction, the bridge plans and as specified herein. Shop drawings shall show in detail the type, size, number of units, location of tendons, enclosures, method and sequence of releasing the strands, anchorage details and details of proposed lifting loops and lifting procedure. The Contractor may select the method of prestressing, provided an approved specific method is used and the total prestressing force and the center of gravity of the prestressing tendons as shown on the bridge plans are maintained. The shop drawings shall show a tabulation of the design computations and the total prestress force, size and spacing of all reinforcing steel and concrete compressive strengths for strand release and design. No inspection will be conducted until the plant inspector has received a copy of the approved shop drawings. Prior to making shop drawings, the Contractor shall submit in writing for approval of the Engineer any proposed tack welding in lieu of tying of the reinforcing bars of prestressed members. If approved by the Engineer, the location of tack welding of reinforcing bars shall be shown on the shop drawings submitted for approval. No heat or welding will be permitted in the proximity of prestressing tendons in the members. Shop drawings for the prestressed concrete solid, voided slab and box girder beams shall be required to include the alignment of the holes for the tie rods. The holes shall be aligned in such a way as to prevent damage to the precast units during the placement of the precast units on the beam caps and the installation and tensioning of the tie rods through the precast units.

**1029.6.2 Forms and Formwork.** Forms and formwork, placing and tying of reinforcing bars and placing and vibrating of concrete shall be in accordance with Sec 703 and Sec 706, with the following additions:

(a) Clamps, bolts or other devices connecting the bulk-head to the side forms, inserts and blockouts shall be capable of being removed or loosened before steam curing is applied.

(b) The casting bed shall have a concrete deck on which the form grillage and soffit plates may be adequately centered, aligned and leveled to the same plane.

(c) Exterior forms for prestressed members shall be metal other than aluminum, mortar-tight and of adequate design to produce members within the tolerances specified. Supplemental forms, such as those used to form steps or to establish slopes, may be made of a material other than metal, so long as dimensional tolerances and mortar-tightness are maintained.

(d) The temperature of the mixed concrete when placed shall be no higher than 90 F (32 C). The forms and reinforcing steel shall be cooled by acceptable methods to an ambient temperature of 90 F (32 C) or lower.

(e) Fabricating plants with demonstrated facilities for protection of the concrete during cold weather may, with the approval of the Engineer, cast prestressed units when the ambient temperature is below 40 F (5 C). When the ambient temperature is below 40 F (5 C), the forms or enclosures and reinforcing steel shall be heated to attain and maintain a temperature of at least 40 F (5 C). No concrete shall be placed when the concrete temperature is below 60 F (15 C).

(f) Concrete for girders shall be placed in a minimum of two continuous lifts. No more than 30 minutes shall elapse between the placing of contiguous lifts of concrete. The thickness of the first layer for I-girder beam sections shall be such that the top of the concrete is slightly above the top of the bottom fillet. The casting procedure shall be modified if the length of girders and placement conditions are such that an initial set of concrete may result if each lift is continued full length before another lift is placed.

**1029.6.3 Prestressing Tendons.** Prestressing tendons for pretensioned members, and metal enclosures for post-tensioned members, shall be accurately placed and securely held during placing and curing of the concrete. Strand chucks for pretensioning shall anchor the strand positively without slippage after seating. Strand chuck components shall be cleaned and inspected between each use and lubricated as necessary. All strands shall be free of contaminants such as dirt, oil, paint, wax, corrosion or other foreign material that may prevent a bond between the strands and the concrete. The use of prestressing strands having kinks, bends, nicks or other defects shall not be permitted. A light coating of rust will not be cause for rejection, provided that the loose rust is removed and the surface of the strands is not visibly damaged. Tensioned strands shall be protected against excessive temperatures such as those produced by torches, welding equipment or sparks. Strands from more than one source shall not be used in any one tensioning operation.

**1029.6.4 Strand Splices.** One approved splice per strand will be permitted provided the splices are located outside of the prestressed member. For single strand tensioning, the number of strands per bed that may be spliced is not restricted. If multi-strand jacking is used, either all strands shall be spliced or no more than 10 percent of the strands shall be spliced. Spliced strands shall be similar in physical properties, from the same source, and have the same twist or lay. Previously tensioned strands may be reused one time provided the strands meet all requirements of these specifications.

**1029.6.5 Wire Failures and Strand Slippage.** Wire failures in deck panels / planks will be cause for rejection of that deck panel / plank. Strand slippage (withdrawal) in excess of 1/16 inch at each end of a deck panel / plank will be cause for rejection of that panel / plank. A measurement method for strand slippage shall be developed by the fabricator for review and use by the plant inspector and the Engineer.

**1029.6.6 Stressing Requirements.** The Contractor shall provide a technician skilled in the use of the system of prestressing to supervise the prestressing operations.

**1029.6.7 Elongation.** The Contractor shall compute the required elongation. Two copies of the computations shall be submitted to the Engineer. The length of the strand to be used in calculating elongations shall be the actual length of the strand along the strand's trajectory between the fixed anchorage and the reference point at jacking end of the strand. Stress losses due to slippage of strand anchorages, splice chucks and movement of anchorage abutments shall be included in the elongation computations.

**1029.6.8 Pretensioned Members.** Prestressing tendons shall be uncoated seven-wire low relaxation strands in accordance with AASHTO M 203, Grade 270. Several pretensioned members may be cast in one continuous line. The time intervening between the casting of the first and last member on a bed shall not exceed four days unless otherwise permitted by the Engineer. When the temperature at the time of tensioning is such that correction must be made to compensate for change in strand stresses, all members on the bed shall be cast in a continuous pour. The tension in the strand as determined from the elongation at the time of placing concrete shall be within five percent of that specified. The stress to be given each strand shall be as shown on the bridge plans. Pretensioning shall be by either the single strand or multi-strand jacking method. Each strand shall be brought to a uniform initial tension. The initial tension of each strand shall be accurately measured by a dynamometer or other approved means. The initial tension shall be within 50 pounds (200 N) or two percent of that required, whichever is the larger. The same jack used for single strand tensioning may be used for initial tensioning provided the jack is equipped with a proper gauging system for measuring the initial tension. Measurement of elongation shall not begin until initial tensioning has been completed. Strands tensioned as a group shall have the same initial tension, be from the same source, and have essentially the same modulus of elasticity. Coil ties shall be held in place in the forms by setting studs projecting through the forms. Studs shall be left in place until girders are erected and then replaced by coil tie rods. Alternate methods may be used, provided acceptable results are achieved. Coil ties shall have a concrete pull-out strength of at least 9000 pounds in 3000 psi (40 kN in 21 MPa) concrete.

**1029.6.9 Post-Tensioned Members.** Post-tensioned members shall be stressed in such a manner that the tension being applied and the elongation of the tendon may be measured at all times. The Contractor shall furnish a certified record of gauge pressures and elongations to the Engineer. Friction losses in the enclosures, elastic shortening and anchorage set shall be included in the computations for the required elongation of the tendon. In cases of discrepancies between gauge readings and the stress indicated by the elongation of the tendon, the elongation method of stress determination shall govern. Loads shall not be applied to the concrete until the concrete has attained the design compressive strength shown on the bridge plans. Tendons shall be stressed in a sequence to produce the least eccentricity of the load. Post-tensioning elements shall be placed in metal enclosures and after stressing shall be bonded by pressure grouting the space between the enclosure and the tendon. Enclosures shall be thoroughly cleaned of all foreign material prior to grouting. The discharge ports shall be closed after all air has been forced out of the enclosure, as evidenced by the steady discharge of grout at the grout's proper consistency, and a pump pressure of at least 50 psi (345 kPa) maintained on the grout for a sufficient length of time to ensure completely filling all voids in the enclosure. Post-tensioned members shall not be removed from their supports for at least 24 hours after grouting.

**1029.6.10 Strand Release.** Strands shall not be released until the concrete has attained the required compressive strength shown on the approved shop drawings. The compressive strength shall be determined by tests of standard cylinders made of concrete from the same batches and cured in the same manner as the members. The strands or prestressing elements shall be cut or released in a sequence that produces the least eccentricity of the load. If steam curing is used, strand release shall be performed while the members are still warm. Forms, hold down devices, or other appurtenances that may restrict movement of the members shall be removed or loosened prior to strand release. The sequence of release for hold down devices and strands shall be indicated on the shop drawings. Release shall be in accordance with the approved shop drawings.

**1029.6.11 Curing.** Concrete members shall be kept continuously wet until the conclusion of the curing period. Curing shall be accomplished by covering with burlap or jute mats kept continuously wet by moist air, live steam or any combination of these methods. Other moist curing methods that will keep the member moist may be used provided the details of the proposed method are submitted to the Engineer and approved. As soon as the concrete has set sufficiently that no marring of the surface or distortion will result, wet burlap or jute mats shall be applied, covering the exposed surface. Curing shall be continued until the concrete has attained the design compressive strength shown on the bridge plans. The concrete shall not be exposed to temperatures below freezing until the curing has been completed.

**1029.6.11.1 Steam Curing.** A preset period of no less than four hours shall be allowed before steam cure is applied. When the ambient temperature is below 50 F (10 C), steam shall be applied also during the preset period, but only at a rate sufficient to keep the air surrounding the member at a temperature between 50 and 70 F (10 and 20 C). After the preset period, steam shall be applied at a rate that will not increase the temperature of the air surrounding the members more than 40 F (20 C) per hour. The maximum curing temperature shall not exceed 160 F (70 C), and the difference in temperature adjacent to the concrete at different locations within the enclosure shall not exceed 30 F (15 C) at any time. Fluctuations of the temperature adjacent to the concrete during the curing period at any one location shall vary no more than 30 F (15 C). The Contractor shall furnish and place, at the direction of the Engineer, a minimum of two portable recording thermometers and no less than one for each 150 feet (45 m) of enclosure, for use in determining the magnitude and degree of uniformity of temperatures within the enclosure. The temperature recording system shall be capable of automatically producing a temperature record during the entire curing period. The temperature record shall show the temperature at each location at intervals of no more than 15 minutes and have a range of approximately zero to 200 F (-20 to 95 C). The temperature recording system shall be accurate within plus or minus 5 F (3 C). Steam shall be applied from pipes with perforations at suitable intervals laid along each side of the member, or by other approved arrangements. Jets of steam will not be permitted to impinge directly against the member, forms or test specimens. Provisions shall be made for effective circulation of the steam around all portions of the members. The concrete shall be kept continuously moist during the steam curing period. Steam curing shall continue until the required strength for transfer of load has developed. Steam or other curing methods shall continue until the concrete has attained the design compressive strength shown on the bridge plans. After the expiration of the steam curing period, the temperature inside the chamber shall be reduced at a rate of no more than 40 F (20 C) per hour until a temperature has been reached approximately 40 F (20 C) above the temperature of the air to which the concrete will be exposed.

**1029.6.12 Form Removal.** Forms shall not be stripped from prestressed concrete members sooner than 12 hours after casting. If strand release strength has then been attained, forms may be removed and members moved without unnecessary delay to a curing area. If forms are removed before the concrete has attained the strength which will permit the units to be moved or stressed, only the minimum area of the curing enclosure that is necessary to remove each individual form section shall be removed at any one time. The open area in the enclosure shall immediately be closed as each form section is removed. When the surrounding air temperature is below 30 F (-1 C), no portion of the enclosure shall be removed before the unit has attained the required transfer strength. Forms of test specimens shall be stripped at the same time the forms are removed from the members.

**1029.6.13 Handling.** Handling and storage of prestressed members shall be performed with the members in an upright position and with points of support in approximately the same position as designated for the final position of the members in the structure. Members shall not be transported nor erected until the concrete has attained the design compressive strength shown on the bridge plans. In storage, the members shall be fully supported across their width on battens that are no less than 4 inches (100 mm) wide. During transportation, the ends of I-beams shall not extend a distance of more than the depth of the beam beyond the bolsters or other supports on the transporting vehicle. Other beams shall not extend more than 1 1/2 times their depth beyond the supports on the transporting vehicle. During storage, the supports shall maintain the members in essentially a level position without twisting. Stacking of members in storage shall be done only with the approval of the Engineer. If such permission is granted, the supports of all members shall be in the same vertical planes and shall be of adequate thickness to prevent damage to the lifting devices.

**1029.6.13.1 Aging.** The planks shall be at least 60 days old at the time the deck is poured.

**1029.6.13.2 Quantity of Planking For Possible Damage.** The Contractor shall furnish a quantity of planking equal to a minimum of 105% of the theoretical area needed to form the deck in order to account for a time delay due to possible damage to the planking during shipping, handling and/or placement.

**1029.6.14 Surface Finish, I-Girders.** Surface finish shall be in accordance with Sec 703.3.5.8, except that no cracks of any kind in post-tensioned members shall be filled before the stressing is completed. The Engineer will determine the kind, type and extent of cracks and surface defects, such as honeycomb and chipped edges or corners, that will be tolerated. Repairs may be permitted with mortar in accordance with Sec 703.3.2.9. Commercially available patching material may be used if approved by the Engineer. The top surface of members shall be scored transversely to a depth of approximately 1/4 inch (6 mm) with a wire brush, stiff broom or other approved method. A 3-inch (75 mm) wide strip across the top flange of the member shall be smooth finished to accurate top flange depth at each point designated on the bridge plans. No laitance shall remain on surfaces to be embedded in concrete. After removal of hold-down devices, holes shall be plugged. If the method for plugging these holes is not shown on the shop drawings, written approval of the proposed method shall be obtained from the Engineer. Exposed reinforcing steel shall be thoroughly cleaned of all concrete before delivery of members. The portions of girders to be embedded in the diaphragms at supports shall be roughened by sandblasting or other approved methods to provide suitable bond between girder and diaphragm. Mechanical benders, without the use of heat, shall be used to bend the strands on girders.

**1029.6.15 Surface Finish, Tee Girders.** Surface finish shall be in accordance with Sec 703.3.5.8, except that no cracks of any kind in post-tensioned members shall be filled before the stressing is completed. The Engineer will determine the kind, type and extent of cracks and surface defects, such as honeycomb and chipped edges or corners, that will be tolerated. Repairs may be permitted with mortar in accordance with Sec 703.3.2.9. Commercially available patching material may be used if approved by the Engineer. The top surface of members shall be scored transversely to a depth of approximately 1/8 inch (3 mm). A 6-inch (150 mm) square area at each end and at each point designated on the bridge plans, centered on each stem, shall be smooth finished to accurate top flange depth. Laitance on surfaces to be embedded in concrete shall be removed by sandblasting, waterblasting or other approved methods. After removal of hold down devices, holes shall be plugged. If the method for plugging these holes is not shown on the shop drawings, written approval of the proposed method shall be obtained from the Engineer. Exposed reinforcing steel shall be thoroughly cleaned of all concrete before delivery of members. The portion of girders to be embedded in the diaphragms at supports shall be roughened by sandblasting or other approved methods to provide suitable bond between girder and diaphragm. Mechanical benders, without the use of heat, shall be used to bend the strands on girders.

**1029.6.16 Surface Finish, Deck Panels.** The top surface of the panel shall be scored to facilitate bond with the cast-in-place deck. The scoring shall be perpendicular to the prestressing strands in the panel and shall be a minimum of 1/8 inch (3 mm) in depth but shall not exceed a depth of ¼ inch. Spacing of scoring shall be 0.50 inch to 0.75 inch, but in no case shall spacing exceed 1.0 inch or as directed by the Engineer.

**1029.7 Dimensional Tolerances.** The dimensional tolerances shall be as shown in Table I, II or III.

**1029.8 Marking.** Each precast unit shall be identified with the date, manufacturer and identification number. Markings may be indented on the unit or painted thereon with waterproof paint, and shall be located as shown on the bridge plans or as directed by the Engineer.

| Table I<br>Dimensional Tolerances – I–Girders, Solid Slab Beams, Voided Slab Beams, Box Girder Beams and Miscellaneous Prestress Units | |
|---|---|
| **ENGLISH** | |
| Length of Beam | ±1/8 inch per 10 feet of beam length, but no greater than 3/4 inch |
| Width (Flanges, Web and Fillets) | +3/8 inch, -1/4 inch |
| Depth (Flanges, Web and Fillets) | ±1/4 inch |
| Depth (Overall) | +1/2 inch, -1/4 inch |
| Horizontal Alignment - I-Girders and Miscellaneous Prestressed Units (Deviation from a straight line parallel to centerline of member) | 1/2 inch max., to 40-foot lengths<br>3/4 inch max., 40 to 60-foot lengths<br>1 inch max., 60-foot or greater lengths |
| Horizontal Alignment - Solid Slab, Voided Slab and Box Girder Beams (Deviation from a straight line parallel to centerline of member) | 1/4 inch max., to 40-foot lengths<br>3/8 inch max., 40 to 60-foot lengths<br>1/2 inch max., 60-foot or greater lengths |
| Camber (Deviation from design camber within 7 days of strand release) | ±1/2 inch, to 80-foot lengths<br>±1 inch, greater than 80-foot lengths |
| Stirrup Bars (Projection above top of beam) | ± 3/4 inch |
| Stirrup Bars (Longitudinal spacing) | ± 2 inches |
| Tendon Position- I-Girders and Miscellaneous Prestressed Units | ± 1/4 inch center of gravity of strand group and individual tendons |
| Tendon Position - Solid Slab, Voided Slab and Box Girder Beams | ± 1/8 inch center of gravity of strand group and individual tendons |
| Position of Deflection Points for Deflected Strands | ± 6 inches, longitudinal |
| Position of Lifting Devices | ± 6 inches, longitudinal |
| Side Inserts (Centerline to centerline and centerline to end) | ± 1/2 inch |
| Coil Inserts (Centerline to centerline and centerline to end) | ± 2 inches horizontal, except must be 3 inches or more from end of beam and within reinforcement cage of bent, ±1 inch vertical |
| Slab Drain Inserts | ± 1/2 inch from designated location, engineer may approve location ± 6 inches from design, multiple inserts for single drain must be within ± 1/2 inch of vertical line |
| Exposed Beam Ends (Deviation from square or designated skew) | ± 1/4 inch horizontal, ± 1/8 inch vertical per foot of beam height |
| Bearing Area (Deviation from plane) | ±1/8 inch |
| Bearing Plates (Centerline to centerline) | ±1/8 inch per 10 feet of beam length, but no greater than 3/4 inch |
| Bearing Plates (Centerline to end of beam) | ±1/2 inch |
| Diaphragm Hole Location | ±1 1/2 inches for centerline of group<br>±1/2 inch within group |
| Scupper holes, blockouts and voids | Placed as close as possible to design location after reinforcement steel and strands are properly located |

| Table II<br>Dimensional Tolerances – Tee Girders | |
|---|---|
| **ENGLISH** | |
| Length of Beam | ± 1/8 inch per 10 feet of beam length, but not greater than 1/2 inch |
| Width (Overall) | ± 1/4 inch |
| Depth (Overall) | ± 1/4 inch |
| Flange Thickness and Stem Thickness | ± 1/8 inch |
| Horizontal Alignment (Deviation from a straight line parallel to centerline of member) | 1/4 inch max., to 40-foot lengths<br>3/8 inch max., 40 to 60-foot lengths<br>1/2 inch max., 60-foot or greater lengths |
| Camber (Deviation from design camber within 7 days of strand release) | ± 1/2 inch, to 80-foot lengths<br>± 1 inch, greater than 80-foot lengths |
| Stirrup Bars (Projection above top of beam) | ± 3/4 inch |
| Stirrup Bars (Longitudinal spacing) | ± 2 inches |
| Tendon Position | ± 1/8 inch center of gravity of strand group and individual tendons |
| Strand Projection | ± 1 inch |
| Diagonal Tolerance | ± 1/4 inch |
| Position of Deflection Points for Deflected Strands | ± 6 inches, longitudinal |
| Position of Lifting Devices | ± 6 inches, longitudinal |
| Side Inserts (Centerline to centerline and centerline to end) | ± 1/2 inch |
| Coil Inserts (Centerline to centerline and centerline to end) | ± 2 inches horizontal, except must be 3 inches or more from end of beam and within reinforcement cage of bent, ± 1 inch vertical |
| Exposed Beam Ends (Deviation from square or designated skew) | ± 1/4 inch horizontal, ± 1/8 inch vertical per foot of beam height |
| Bearing Area (Deviation from plane) | ± 1/8 inch |
| Bearing Plates (Centerline to centerline) | ± 1/8 inch per 10 feet of beam length, but not greater than 3/4 inch |
| Bearing Plates (Centerline to end of beam) | ± 1/2 inch |
| Center of Stem to Outside Edge of Top Flange | ± 1/8 inch |
| Center to Center Distance Between Stems | ± 1/8 inch |
| Stem End to End of Top Flange | ± 1/4 inch |
| Diaphragm Hole Location | ± 1 1/2 inches for centerline of group<br>± 1/2 inch within group |
| Scupper holes, blockouts and voids | Placed as close as possible to design location after reinforcement steel and strands are properly located |

| Table III<br>Dimensional Tolerances – Deck Panels | |
|---|---|
| **ENGLISH** | |
| Length | + 1/8 inch, -1/2 inch |
| Width | ± 1/4 inch |
| Depth | ± 1/8 inch |
| Stirrup Bars (Projection above top of panel) | ± 1/4 inch |
| Stirrup Bars (Longitudinal spacing) | ± 1 inch |
| Tendon Position | ± 1/8 inch center of gravity of strand group and individual tendons |
| Strand Projection | ± 1 inch |
| Diagonal Tolerance | ± 1/4 inch |
| Scupper holes, blockouts and voids | Placed as close as possible to design location after reinforcement steel and strands are properly located |
| Metric | |
| Length | + 3 mm, -12 mm |
| Width | ± 6 mm |
| Depth | ± 3 mm |
| Stirrup Bars (Projection above top of panel) | ± 6 mm |
| Stirrup Bars (Longitudinal spacing) | ± 25 mm |
| Tendon Position | ± 3 mm center of gravity of strand group and individual tendons |
| Strand Projection | ± 25 mm |
| Diagonal Tolerance | ± 6 mm |
| Warpage of corner (one corner out of plane of other three) | Be 1/16 in./ft (5 mm/m) times the distance from the nearest adjacent corner |
| Bowing or camber, concave or convex, of any part of a flat surface | Shall not exceed length of bow in inches (mm) divided by 360, with maximum of 3/4 inch (19 mm); and differential bowing or camber between the adjacent members of the same design shall not exceed 1/4 inch (6 mm) |
| Scupper holes, blockouts and voids | Placed as close as possible to design location after reinforcement steel and strands are properly located |

## SECTION 1036 REINFORCING STEEL FOR CONCRETE

**1036.1 Scope.** This specification covers reinforcing steel to be used in concrete.

### 1036.2 Acceptance

**1036.2.1** All material shall be obtained from a source identified on the MoDOT PAL designated for this specification, see Sec 106.12 of these Special Provisions. The source shall be listed on the PAL at the time the material is incorporated into the project.

**1036.2.2** All material will be inspected and accepted in accordance with Sec 106.

**1036.2.3** AASHTO specifications, when referenced, will control only the physical properties, chemical properties and handling and storage of the material, except as otherwise specified herein or shown on the bridge plans.

### 1036.3 Reinforcing Steel for Concrete Structures

**1036.3.1** Unless otherwise specified, reinforcement bars shall conform to the requirements of ASTM A706 Gr 60.

**1036.3.2** Spiral reinforcement shall be in accordance with Sec 1036.3.1, except that the reinforcement may be plain or deformed or shall be cold drawn steel wire in accordance with AASHTO M 32 or deformed steel wire in accordance with AASHTO M 225.

**1036.3.3** Welded steel wire fabric shall be in accordance with AASHTO M 55 or AASHTO M 221.

### 1036.4 Epoxy Coated Reinforcing Steel

**1036.4.1** Epoxy coated reinforcing steel shall be in accordance with AASHTO M 284/M284M-2 except as otherwise specified herein or shown on the bridge plans.

**1036.4.1.1** Only steel in accordance with Sec 1036.3.1 shall be used.

**1036.4.1.2** Coated bars shall not be spliced except as shown on the bridge plans.

**1036.4.1.3** Organic coatings, other than epoxy, shall not be used.

**1036.4.1.4** Patching or repair material shall be compatible with the coating, inert in concrete and in accordance with the epoxy resin manufacturer's recommendations. The material shall be epoxy and be suitable for application at the plant or in the field to uncoated areas and damaged areas of the coating.

### 1036.5 Documentation

**1036.5.1** Documentation of uncoated steel shall include the steel manufacturer's certified mill test report showing complete chemical and physical test results for each heat.

**1036.5.2** Documentation of coated steel shall include the coating applicator's certification that all material used, the preparation of the bars, coating and curing are in accordance with these specifications, and that no bar contains more than one holiday per linear foot (300 mm). The certification shall include or have attached specific results of tests of coating thickness and flexibility of coating.

## SECTION 1037 SHEAR CONNECTORS

**1037.1 Scope.** This specification covers the requirements for stud-type shear connectors and weldability qualification.

**1037.2 Material.** Studs shall be in accordance with AASHTO M 169 for cold drawn carbon steel bars Grades 1015, 1018 or 1020, either semi- or fully-killed. If flux retaining caps are used, the steel for the caps shall be of a low carbon grade suitable for welding and shall be in accordance with ASTM A 109. The flux for welding shall be self-contained either in the base of the stud or in the ferrule and automatically applied in the welding operation. A ferrule of heat resistant ceramic or other suitable material shall be used with each stud, and the ferrule shall be composed of material, which is not detrimental to the welds, does not cause excessive slag and has sufficient strength to withstand thermal or structural shock.

**1037.3 Qualification Procedure.** The procedure for weldability tests to qualify shear connector studs for welding under shop or field conditions shall be as follows. Such tests may be performed by a university, independent laboratory or by other approved testing agencies. The tests shall be made on each type and size of stud. The agency performing the tests shall submit to the manufacturer of the stud a certified report giving procedures and results for all tests, including the information listed under Sec 1037.9.

**1037.4 Duration of Qualification.** Qualifications will be considered valid until the manufacturer makes a change in the base of the stud, the flux or the arc shield, which affects the welding characteristics.

**1037.5 Preparation of Specimens**

**1037.5.1** Test specimens shall be prepared by welding representative studs to the center of square specimen plates, 1/2 to 3/4 inch (13 to 19 mm) thick, in accordance with ASTM A 36. At the option of the manufacturer, several studs may be welded to a large plate and the specimen plates cut of a size suitable for test equipment used. Studs shall be welded with power source, welding gun and control equipment as recommended by the manufacturer. Welding voltage, current and time shall be measured by suitable instrumentation and recorded for each specimen. Lift and plunge shall be at the optimum setting as recommended by the manufacturer.

**1037.5.2** Studs shall be of uniform quality and condition, free from laps, fins, seams, cracks, twists, bends or other injurious defects. The finish shall be as produced by cold drawing, cold rolling or machining. The overall height after welding will be shown on the bridge plans. The size of studs with allowable tolerance shall be as follows.

| Stud Size - Inches (mm) | | | | |
|---|---|---|---|---|
| **Shank Diameter** | **Shank Diameter Tolerances** | **Overall Height (Tolerance After Welding)** | **Head Diameter** | **Head Thickness, Min.** |
| 3/4 (19) | + 0.000 (0.0) - 0.010 (- 0.25) | + 0.062 (+ 1.6) - 0.125 (- 3.2) | 1 1/4 ± 1/64 (32 ± 0.40) | 3/8 (9.5) |
| 7/8 (22) | + 0.000 (0.0) - 0.010 (- 0.25) | + 0.062 (+ 1.6) - 0.125 (- 3.2) | 1 3/8 ± 1/64 (35 ± 0.40) | 3/8 (9.5) |

**1037.5.3** Thirty test specimens shall be welded consecutively with optimum current and time. Optimum current and time shall be the midpoint of the range normally recommended by the manufacturer for production welding.

**1037.5.4** Thirty test specimens shall be welded consecutively with time held constant at optimum, but with current 10 percent below optimum.

**1037.5.5** Thirty test specimens shall be welded consecutively with time held constant at optimum, but with current 10 percent above optimum.

**1037.6 Qualification Tests**

**1037.6.1 Tensile Tests.** Ten of the specimens welded in accordance with Sec 1037.5.3, ten in accordance with Sec 1037.5.4 and ten in accordance with Sec 1037.5.5, shall be subjected to a tensile test. Tensile properties shall be determined in accordance with the applicable sections of AASHTO T 244. If a fracture occurs outside the middle half of the gage length, the test shall be repeated. A stud will be considered as qualified if all test specimens meet the following requirements:

| Property | Requirement |
|---|---|
| Tensile Strength, min | 60,000 psi (414 MPa) |
| Yield Strength, as determined by a 0.2% offset method, min | 50,000 psi (345 MPa) |
| Elongation, min | 20% in 2 inches (50 mm) |
| Reduction of Area, min | 50% |

**1037.6.2 Bend Tests.** Twenty of the specimens welded in accordance with Sec 1037.5.3, 20 in accordance with Sec 1037.5.4 and 20 in accordance with Sec 1037.5.5, shall be bent alternately 30 degrees in opposite directions until failure occurs. A stud will be considered as qualified if, on all test specimens, fracture occurs in the shank of the stud and not in the weld.

**1037.7 Retests.** If a weld failure occurs in any of the tensile or bend test groups, another test group may be prepared and tested. If weld failure repeats, the stud shall fail to qualify.

**1037.8 Qualification**. For a manufacturer's studs and arc shields to be qualified, each group of thirty studs shall, by test or retest, meet the requirements specified in Sec 1037.6.

**1037.9 Report of Tests.** The report of the testing laboratory to the manufacturer shall include the following:

(a) Drawings which show shapes and dimensions with tolerances of studs, arc shields and flux.

(b) A complete description of material used in the studs and arc shields, including the quantity and analysis of the flux.

(c) A certification that the studs and arc shields described in the report are qualified in accordance with Sec 1037.8.

**1037.10 Certification.** Prior to inspection, the Contractor shall submit to the Engineer the following information:

(a) The name of the manufacturer.

(b) A detailed description of the studs to be furnished.

(c) A certification from the manufacturer that the studs delivered are qualified in accordance with Sec 1037.8.

(d) A copy of the qualification test results as certified by the testing laboratory unless the source and manufacturing process for these studs has been previously approved.

(e) Certified copies of in-plant quality control test results.

## SECTION 1038 BEARING PADS FOR STRUCTURES

**1038.1 Scope.** These specifications cover elastomeric bearing pads of neoprene, of rubber and fabric and of rubber and fiber. Elastomeric bearing pads shall include plain bearings, consisting of elastomer only, and laminated bearings, consisting of layers of elastomer restrained at their interfaces by bonded laminates.

**1038.2 Acceptance.** All material will be accepted on the basis of the required certification and testing required by the Engineer.

### 1038.3 Elastomeric Bearing Pads

**1038.3.1 Material.** The elastomer shall be 100 percent virgin chloroprene (neoprene) compound meeting the requirements shown below. The pads shall be of the Durometer Grade specified on the bridge plans. If test specimens are cut from the finished product, a 10 percent variation in "Physical Properties" will be allowed.

| ASTM Standard | Property | Durometer Grade | | |
|---|---|---|---|---|
| | | 50 | 60 | 70 |
| D 2240 | Hardness | 50 ± 5 | 60 ± 5 | 70 ± 5 |
| D 412 | Tensile Strength, psi (MPa), minimum | 2500 (17.2) | 2500 (17.2) | 2500 (17.2) |
| D 412 | Ultimate Elongation, percent, min | 400 | 350 | 300 |
| D 573 70 hrs @ 212 F (100 C) | Heat Resistance<br>Change in Durometer Hardness, points, max<br>Change in Tensile Strength, percent, max<br>Change in Ultimate Elongation, percent, max | <br><br>+15<br><br>-15<br><br>-40 | <br><br>+15<br><br>-15<br><br>-40 | <br><br>+15<br><br>-15<br><br>-40 |
| D 395, Method B | Compressive Set<br>22 hrs at 212 F (100 C), %, max | 35 | 35 | 35 |
| D 1149 | Ozone<br>100 pphm ozone in air by volume, 20 % strain 100 ± 2 F (37.7 ± 1 C), 100 hrs, mounting procedure ASTM D 518 Procedure A | No Cracks | No Cracks | No Cracks |
| D 429, Method B | Adhesion<br>Bond made during vulcanization, lbs/inch (N/m) | 40 (7.010) | 40 (7.010) | 40 (7.010) |
| D 746, Procedure B | Low Temperature Test<br>Brittleness at -40 F (-40 C) | No Failure | No Failure | No Failure |

**1038.3.2 Laminates.** Laminates shall be cold rolled sheets in accordance with ASTM A 1008 or hot rolled steel sheets in accordance with ASTM A 1011 with a minimum grade of 36 (250).

**1038.3.3 Manufacturing Requirements.** Shop drawings for laminated neoprene bearings pad assemblies shall be prepared in accordance with Sec 1080.3.2. Shop drawings will not be required for plain neoprene bearing pads or laminated neoprene bearing pads without a steel sole plate. Cut edges shall be at least as smooth as ANSI 250 (6 µm) finish. Unless otherwise shown on the bridge plans, all components of a laminated bearing shall be molded together into an integral unit, and all edges of the laminations shall be covered by a minimum of 1/8 inch (3 mm) of elastomer except at laminate restraining devices and around holes that will be entirely closed on the finished structure. The laminated neoprene bearings pad assembly steel sole plate shall be bonded by vulcanization to the laminated neoprene pad to provide a homogenous bond free of air and moisture pockets. The following values shall be met under laboratory testing conditions of full size bearings:

(a) Compressive strain of any layer of an elastomeric bearing shall not exceed seven percent at 800 psi (5.5 MPa) average unit pressure or at the design dead load plus live load pressure, if so indicated on the bridge plans.

(b) Shear resistance of the bearing shall not exceed 50 psi (345 kPa) for 50 durometer, 75 psi (520 kPa) for 60 durometer or 110 psi (760 kPa) for 70 durometer compounds at 25 percent strain of the total effective elastomer thickness after an extended 4-day ambient temperature of -20 F (-29C).

**1038.3.4** The manufacturer shall proof load each laminated neoprene bearing with a compressive load of 1,500 psi (10.34 MPa) on the bearing area. The bulging pattern shall not indicate improper laminate placement or poor laminate bond. No more than two separate surface cracks with a width of 0.08 inches [2 mm] and a depth of 0.08 inches (2 mm) will be permitted.

### 1038.4 Type "N" Polytetrafluoroethylene (PTFE) Bearings

**1038.4.1** Type "N" PTFE bearings shall be either fixed units or expansion units having sliding surfaces of mirror stainless steel against PTFE material. Shop drawings for type "N" PTFE bearings shall be prepared and submitted to the MoDOT Bridge Division for approval in accordance with Sec 1080.3.2. The PTFE sliding bearings shall consist of a steel sole plate with a welded upper element of stainless steel bearing on a lower element consisting of a layer of PTFE material bonded to a stainless steel plate that shall be bonded to the neoprene elastomeric pad. The surface of the stainless steel plate shall be protected from weld splatter during the welding procedure.

**1038.4.2** The stainless steel sheet for the top and bottom elements of sliding bearings shall be Type 304 in accordance with ASTM A 240. The finished stainless surface of the top element shall be a plane within a tolerance of 1/32 inch (0.8 mm), polished sufficiently to meet the friction requirement in Sec 1038.4.6.1, and shall be comparable to a No. 8 mirror finish as established by the American Iron and Steel Institute Committee of Stainless Steel Producers "Finishes for Stainless Steel" at the completion of fabrication.

**1038.4.3** Neoprene elastomeric pads shall be in accordance with Sec 1038.3.

**1038.4.4** The PTFE material shall be 100 percent virgin PTFE fluorocarbon resin, unfilled or filled with fiberglass reinforcement to minimize the cold flow tendencies while maintaining the friction properties of the PTFE fluorocarbon resin. The amount of filler by weight of filled PTFE sheet shall be no more than 15 percent. The finished material shall exhibit the following physical properties:

| Requirement | Test Method | Filled Value | Unfilled Value |
|---|---|---|---|
| Tensile Strength, psi (MPa) | ASTM D 638 | 2000 (13.8), min | - |
| | ASTM D 2256 | - | 2800 (19.3), min |
| Elongation, Percent | ASTM D 638 | 150, min | - |
| | ASTM D 2256 | - | 200, min |
| Melting Point | ASTM D 4895 | 621 ± 18 F (327 ± 10 C) | 623 ± 2 F (328 ± 1 C) |
| Specific Gravity | ASTM D 4895 | 2.20 ± 0.03 | 2.16 ± 0.03 |

**1038.4.5** The PTFE sheet shall be bonded to the stainless steel with epoxy bonding material designated by the manufacture as compatible with the PTFE sheet and stainless steel and be able to withstand the temperatures of vulcanization. The stainless steel shall then be bonded by vulcanization to the neoprene elastomer to provide a homogenous bond free of air and moisture pockets.

**1038.4.6** One load specimen from the sliding bearing, consisting of a bottom element and a compatible top element no less than the smaller of the bearing area or 7 x 7 inches (178 mm x 178 mm) shall be tested by the manufacturer.

**1038.4.6.1** The specimen shall be loaded to 800 psi (5.51 MPa) compression at 68 F ± 2 F (20 C ± 1 C) and subjected to 100 cycles of one inch (25 mm) of horizontal movement each way from center at a rate of 2.5 inches (63 mm) per minute. The breakaway friction coefficient shall be computed for each direction of each cycle, and the breakaway friction coefficient mean and standard deviation shall be computed for the sixth through twelfth cycles. The initial static breakaway coefficient of friction for the first cycle shall not exceed twice the design coefficient of friction. The maximum coefficient of friction for all subsequent cycles shall not exceed the design coefficient of friction. Failure of a single sample shall result in rejection of the entire lot. Following the test, the breakaway coefficient of friction shall be determined again and shall not exceed the initial value. The bearing shall show no signs of bond failure or other defect.

**1038.4.6.2** A minimum of one test for sliding bearings shall be performed for each lot of bearings.

### 1038.5 Rubber and Fabric Pads

**1038.5.1** Rubber and fabric bearings pads shall be manufactured of new material and be composed of multiple layers of prestressed cotton duck material weighing no less than 8.1 ounces per square yard (0.2746 kg/$m^2$). The duck warp count shall be 50 threads plus or minus one thread per inch (25 mm) and filing count 40 threads plus or minus two threads per inch (25 mm), each with two yarns per thread. The finished pads shall have 64 plies per inch (25 mm) of thickness. The duck material shall be impregnated and bound with a high quality rubber compound containing rot and mildew inhibitors and anti-oxidants, compounded into resilient pads of uniform thickness.

**1038.5.2** The pads shall withstand compressive loads perpendicular to the plane of laminations of no less than 10,000 psi (69 MPa) without separation of bond or detrimental deformation. Load deflection properties, determined in accordance with procedures of Military Specifications MIL-C-882B, shall not exceed 10 percent of total pad thickness at 1000 psi (6.9 MPa) and 15 percent of total pad thickness at 2000 psi (14 MPa). When loaded to 1500 psi (10 MPa), permanent set as load shall be removed in accordance with procedures of MIL-C-882B and shall be no more than 2.5 percent of the original "zero point" thickness. Type A Durometer hardness shall be 87 to 95. The ratio of lateral expansion to vertical deflection shall not exceed 0.25 when loaded to 1500 psi (10 MPa). The material shall not lose effectiveness throughout a temperature range of -65 F to 150 F (-54 to 66 C). The thickness shall vary no more than five percent from that shown on the bridge plans. There shall be no visible evidence of damage or deterioration resulting from environmental effects of sunshine, humidity, salt spray, fungus or dust in accordance with MIL-E-5272.

### 1038.6 Rubber and Fiber Pads

**1038.6.1** Rubber and fiber bearing pads shall consist of a rubber body and fabric fibers for insulation under aluminum rail posts. The bearing pads shall be made from new unvulcanized rubber and unused fabric fibers. Fibers and rubber shall be in proper proportion to maintain specified strength and stability.

**1038.6.2** Type A durometer surface hardness of the pads shall be 70 to 90. Pads of the specified thickness shall be capable of withstanding compressive loads of no less than 7000 psi (48 MPa) without excessive extrusion or detrimental reduction in thickness.

**1038.7 Tolerances.** For both plain and laminated bearings, the permissible variation from the dimensions and configuration shown on the bridge plans shall be as follows:

| | **Inch (mm)** |
|---|---|
| Overall Vertical Dimensions | |
| Average total thickness 1 1/4 inches (32 mm) or less | -0, +1/8 (-0, +3) |
| Average total thickness over 1 1/4 inches (32 mm) | -0, +1/4 (-0, +6) |
| Overall Horizontal Dimensions | |
| 36 inches (914 mm) and less | -0, +1/4 (-0, +6) |
| Over 36 inches (914 mm) | -0, +1/2 (-0, +12) |
| Thickness of Individual Layers of Elastomer (Laminated bearings only) | ± 1/8 (± 3) |
| Variation from a Plane Parallel to the Theoretical Surface (as determined by measurements at the edges of bearings) | |
| Top | 1/8 (3) |
| Sides | 1/4 (6) |
| Individual non-elastic laminates | 1/8 (3) |
| Position of Exposed Connection Members | 1/8 (3) |
| Edge Cover of Embedded Laminates or Connection Members | -0, +1/8 (-0, +3) |
| Size of Holes, Slots or Inserts | -0, +1/8 (-0, +3) |
| Position of Holes, Slots or Inserts | ± 1/8 (± 3) |

**1038.8 Certification.** The manufacturer shall furnish certification of all material. The certification shall indicate that the components are in accordance with this specification and shall include typical test results representative of the material, except for bearings meeting 1038.3 and 1038.4 which will require test results for the material actually used in the bearing. The certification shall indicate the results of the proof loading, when required.

## SECTION 1039 EPOXY RESIN MATERIAL

### 1039.10 Type II Epoxy

**1039.10.1 Scope.** This specification covers epoxy resin to be used to bond plastic concrete or mortar to hardened concrete or mortar.

**1039.10.2 General Requirements.** The epoxy shall be furnished as a system in accordance with the requirements of ASTM C 881, Type II, Grade 2, Class B or C.

**1039.10.3 Manufacturer and Brand Name Approval.** Prior to approval and use of this material, the manufacturer shall submit to the IDOT Bureau of Materials a certified test report showing specific test results from an independent laboratory in accordance with all requirements of these specifications. The certified test report shall contain the manufacturer's name, brand name of material, lot tested, date of manufacture and ratio of components. In addition, the manufacturer shall submit a one-quart (liter) sample of each component, A and B, for laboratory testing accompanied by a technical data sheet and an MSDS. With approval from the Engineer of the certified test report and satisfactory results of tests performed on the sample submitted, the brand name and manufacturer will be placed on a qualified list of concrete bonding compounds. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed and may be required when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

**1039.10.4 Acceptance.** To obtain final acceptance of this material, the manufacturer shall furnish certification to the Engineer at the destination that the material supplied is in accordance with all requirements specified and stating that the material is the same system and is identically formulated to the material tested for manufacturer and brand name approval.

**1039.20 Type III Epoxy**

**1039.20.1 Scope.** This specification covers epoxy to be used in the grouting of dry cracks, in epoxy mortar for patching concrete and in epoxy mortar surface leveling.

**1039.20.2 General Requirements.** The epoxy shall be furnished as a system in accordance with the requirements of ASTM C 881, Type III, Grade 1, Class B or C.

**1039.20.3 Manufacturer and Brand Name Approval.** Prior to approval and use of this material, the manufacturer shall submit to the IDOT Bureau of Materials a certified test report showing specific test results from an independent laboratory in accordance with all requirements of these specifications. The certified test report shall contain the manufacturer's name, brand name of material, lot tested, date of manufacture and ratio of components. In addition, the manufacturer shall submit a one-quart (liter) sample of each component, A and B, for laboratory testing accompanied by a technical data sheet and an MSDS. With approval from the Engineer of the certified test report and satisfactory results of tests performed on the sample submitted, the brand name and manufacturer will be placed on a qualified list of concrete bonding compounds. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed and may be required when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

**1039.20.4 Acceptance.** To obtain final acceptance of this material, the manufacturer shall furnish a certification to the Engineer at destination certifying that the material supplied is in accordance with all requirements specified and stating that the material is the same system and is identically formulated to the material tested for manufacturer and brand name approval.

## 1039.30 Epoxy Or Polyester Bonding Agents For Dowels

**1039.30.1 Scope.** This specification covers a multi-component epoxy or polyester bonding agent to be used in anchoring epoxy coated dowel bars in concrete for pavement repair.

**1039.30.2 General Requirements.** Epoxy or polyester bonding agents for anchoring epoxy coated dowel bars shall be furnished as a multi-component system. The system shall include automatic mixing, whether in cartridge or bulk form. The component ratios shall be shown on the label of each cartridge or bulk container.

**1039.30.3 Properties.** The epoxy or polyester bonding agent shall exhibit good bonding properties between the epoxy coated dowel bar and the existing concrete and shall cure in two hours or less. Bonding agents, when initially mixed, shall have a viscosity, which prevents flow from a horizontal hole. When tested in accordance with MoDOT Test Method TM 49, the minimum pull-out load shall be 8100 pounds (36 kN).

**1039.30.4 Manufacturer and Brand Name Approval.** Prior to approval and use of this material, the manufacturer shall submit to the IDOT Bureau of Materials a certified test report from an independent laboratory showing specific test results in accordance with all requirements of this specification. The certified test report shall contain the manufacturer's name, brand name of material, lot tested, date of manufacture, ratio of components by volume and system tested. In addition, the manufacturer shall submit to the IDOT Bureau of Materials a sample representing the system for laboratory testing accompanied by a technical data sheet, an MSDS and any special installation instructions relative to the system being submitted, including recommended curing time. With approval from the Engineer of the certified test report and satisfactory results of tests performed on the sample submitted, the brand name and manufacturer will be placed on a qualified list of bonding agents for dowels. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed and may be required when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

**1039.30.5 Acceptance.** To obtain final acceptance of this material, the manufacturer shall furnish certification to the Engineer at the destination that the material supplied is in accordance with all requirements specified and stating that the material supplied is the same system and is identically formulated to the material tested for manufacturer and brand name approval.

## 1039.40 Epoxy Bonding Agents For Resin Anchor Systems

**1039.40.1 Scope.** This specification covers a multi-component epoxy bonding agents to be used in anchoring steel components in concrete for structures.

**1039.40.2 General Requirements.** The epoxy shall be furnished as a system in accordance with the requirements of ASTM C 881, Type IV, and Grade 3 and as described herein.

**1039.40.3 Pull Test.** The epoxy bonding agent shall exhibit good bonding properties between the anchored product and the existing concrete and shall cure in 24 hours or less. When tested in accordance with MoDOT Test Method TM 74, the ultimate minimum pull-out load shall be in accordance with the following table:

| Pull-Out Specification Requirements | |
|---|---|
| **Diameter of Threaded Rod or Reinforcing Bar** | **Minimum Ultimate Pullout Strength** |
| 1/2" (13 mm) | 9800 lbs (43.59 kN) |
| 5/8" (16 mm) | 15,500 lbs (68.95 kN) |
| 3/4" (19 mm) | 20,400 lbs (90.75 kN) |
| 7/8" (22 mm) | 27,500 lbs (122.33 kN) |
| 1" (25 mm) | 33,600 lbs (149.46 kN) |

**1039.40.4 Manufacturer and Brand Name Approval**. Prior to approval and use of this material, the manufacturer shall submit to the IDOT Bureau of Materials a certified test report from an independent laboratory showing specific test results in accordance with all requirements of this specification. The certified test report shall contain the manufacturer's name, brand name of material, lot tested, date of manufacture, bar or rod size tested, embedment depth and ratio of components. In addition, the manufacturer shall submit a one- quart (liter) sample of each component, A and B, for laboratory testing accompanied by a technical data sheet and a material safety data sheet. With approval from the Engineer of the certified test report and satisfactory results of tests performed on the sample submitted, the brand name and manufacturer will be placed on a qualified list of Epoxy Bonding Agents for Resin Anchor Systems. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed and may be required when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

**1039.40.5 Acceptance.** To obtain final acceptance of this material, the manufacturer shall furnish certification to the Engineer at the destination that the material supplied is in accordance with all requirements specified and stating that the material is the same system and is identically formulated to the material tested for manufacturer and brand name approval.

**1039.50 Sand For Epoxy Mortar**

**1039.50.1 Scope.** This specification covers sand for use in epoxy mortar for the repairing of concrete surfaces. The epoxy material used in epoxy mortar shall be Type III epoxy in accordance with Sec 1039.20.

**1039.50.2 Properties.** Sand for mortar shall be a quartzite sand, Ottawa sand or equal. The sand shall be clean and dust free. The maximum moisture content shall be 2 percent. The gradation shall be in accordance with the following requirements:

| Gradation Requirements | |
|---|---|
| **Sieve Size** | **Percent Passing by Weight (Mass)** |
| No. 16 (1.18 mm) | 100 |
| No. 30 (600 µm) | 97-100 |
| No. 50 (300 µm) | 5-35 |
| No. 100 (150 µm) | 0-2 |
| No. 200 (75 µm) | 0-0.4 |

**1039.50.3 Acceptance.** The manufacturer shall furnish certification to the Engineer at the destination that the material supplied is in accordance with all requirements of this specification. Acceptance will be based on certification and testing.

## 1039.60 Epoxy Polymer Concrete Overlay

**1039.60.1 Scope.** This specification covers an epoxy concrete overlay system consisting of an epoxy resin material and aggregate for use on bridge deck surfaces.

**1039.60.2 Epoxy Resin Material.** The infrared spectrum for each component of the epoxy-resin material shall essentially match that of the standard infrared spectrum for the particular component as specified in AASHTO T 237, Sections 4 and 5. The epoxide equivalent for Component A shall not exceed 270. The mixed epoxy shall meet the following requirements:

| Epoxy Resin Requirements | |
|---|---|
| **Property** | **Specific Value** |
| Pot life, 75 F (24 C), minutes | 10 - 55 |
| Tensile strength, 75 F (24 C), 7 Days, psi (MPa), min. | 1500 (10.3) |
| Tensile elongation, 75 F (24 C), percent, min. | 20 |
| Water absorption, percent, max. | 0.8 |
| Compressive strength, 4 hr., psi (MPa), min. | 1000 (6.8) |
| Compressive strength, 48 hr. wet, psi (MPa), min. | 4000 (27.5) |
| Ash content, percent, max | 0.5 |
| Rotational Viscosity, 75 F (24 C), Spindle 3, 60 rpm, Poise | 7 - 25 |
| Volatile Content, percent, max. | 3.0 |
| Thermal Shear | No shearing, shrinkage, expansion or scaling. |

**1039.60.2.1 Classes.** Epoxy resin shall be formulated for use at specific temperatures as specified in ASTM C 881. The controlling temperature shall be that of the hardened concrete surface to which the overlay is applied. Where unusual curing rates are desired and upon the approval from the Engineer, a class of epoxy may be used at a temperature other than that for which the epoxy is normally intended.

**1039.60.2.2 Packaging.** Containers shall be identified as "Component A--Contains Epoxy Resin" and "Component B--Contains Hardener" and shall show the type, class and mixing directions. Each container shall be marked with the name of the manufacturer, class, batch, or lot number, date of packaging, date of shelf life expiration, pigmentation, if any, manufacturer, and the quantity contained in pounds (kilograms) and gallons (liters).

**1039.60.3 Aggregate for Epoxy Polymer Concrete Overlay.** Aggregate shall be bauxite, crushed porphyry, aluminum oxide, flint chat or other similarly hard, durable, dry aggregates with less than 0.2 percent moisture. Aggregate shall be in accordance with the following gradation:

| Aggregate Requirements | |
|---|---|
| **Sieve Size** | **% Passing By Weight** |
| # 4 (4.75 mm) | 100 |
| # 20 (850 µm) | 0-5 |
| # 200 (75 µm) | 0-1.0 |

**1039.60.3.1 Lead Content.** Aggregate produced as a by-product from lead or zinc mining operations shall not have a total lead content greater than 4,500 ppm, as determined by EPA Method 3050A, "Acid Digestion of Sediments, Sludges and Soils (particle size reduced to 1 mm or less)". Suppliers of this aggregate shall provide certification to the Engineer for each shipment that the total lead content of the aggregate does not exceed this value, and attach a typical test report from the same source no older than 12 months prior to the shipment.

**1039.60.3.2 Aggregate Recommendation.** For each contract, the epoxy supplier shall supply a letter to the Engineer specifically recommending the use of a designated aggregate and source, which has been previously approved by MoDOT Construction and Materials.

**1039.60.4 Overlay System.** The overlay system shall not exhibit shearing, shrinkage, expansion or scaling.

**1039.60.5 Test Methods.** Tests will be performed in accordance with the following methods:

| Test Methods | |
|---|---|
| Rotational Viscosity | ASTM D 2393 Model LVT Brookfield viscometer |
| Epoxy equivalent | MoDOT Test Method TM 73 |
| Volatile content[a] | ASTM D 1259, Method B, for mixed system |
| Filler content | MoDOT Test Method TM 73 |
| Ash content | ASTM D 482 |
| Pot life | AASHTO T 237 |
| Tensile strength | ASTM D 638 |
| Compressive strength | ASTM C 881 |
| Water absorption | ASTM D 570 |
| Thermal Shear | MoDOT Test Method TM 72 |

[a]Sample cured 4 days at room temperature and weighed on a previously weighed metal foil.

**1039.60.6 Manufacturer and Brand Name Approval.** Prior to approval and use of this material, the manufacturer shall submit to the IDOT Bureau of Materials a certified test report showing specific test results in accordance with all requirements of this specification. The certified test report shall include the manufacturer's name, brand name of material, lot tested, date of manufacture, ratio of components by volume and system tested. In addition, the manufacturer shall submit to the IDOT Bureau of Materials a sample representing the system for laboratory testing accompanied by a technical data sheet, an MSDS and any special installation instructions relative to the system being submitted. Upon approval of the certified test report and satisfactory results of tests performed on the sample submitted, the brand name and manufacturer will be placed on a qualified list of epoxy resin material for polymer concrete overlay.

New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed and may be required when random sampling and testing of material offered for use indicates non-conformity with any of the requirements herein specified.

**1039.60.7 Product History.** The overlay system shall have a proven record of a minimum of two years on similar bridge decks within the United States. A list including the location, the name of the agency involved with the project, and a name and phone number of a contact person with that agency, shall be provided for each location used as evidence of satisfactory use.

**1039.60.8 Acceptance.** The manufacturer shall furnish certification to the Engineer at the destination that the material supplied is in accordance with all requirements specified and stating that the material supplied is the same system and is identically formulated to the material tested for manufacturer and brand name approval. Acceptance will be based on certification and testing.

**1039.70 Polymer Concrete**

**1039.70.1 Scope.** This specification covers polymer concrete consisting of a fast setting epoxy based solid that may contain aggregate for use at bridge expansion joints.

**1039.70.2 General Requirements.** The polymer concrete shall be resilient, self-adhering, water tight and shall withstand and remain bonded to the surrounding material under repeated impact and thermal cycling. The polymer concrete shall not flow or become tacky at temperatures up to 130 F (54 C), shall be resistant to ultraviolet radiation, petroleum products and abrasion, and shall be capable of curing at all temperatures above 50 F (10 C). Mixing and placement shall be in accordance with the manufacturer's recommendations.

**1039.70.2.1** The combined liquid components with no aggregate added shall be in accordance with the following requirements:

| Epoxy Requirements | |
|---|---|
| **Property** | **Specific Value** |
| Mixing Ratio, by Volume | 1:1 |
| Viscosity (ASTM D 2393), Poises, Spindle 2, 30 rpm, 25 C ± 2 C | 9-20 |
| Color | Black |
| Gel Time (AASHTO M-200-73), minutes | 25-50 |
| Elongation (ASTM D 638[a]), percent | 45-55 |
| Tensile Strength (ASTM D 638[a]), psi (6.20 MPa), min. | 900 |
| Shore D Hardness (ASTM D 2240), 77 F (25 C) | 45-75 |

[a]Test Method Type 1, Molded Specimens, 0.25 inches (6.4 mm) thickness

**1039.70.2.2** The cured polymer concrete including aggregate, which shall be supplied by the manufacturer, shall be in accordance with the following requirements:

| Polymer Concrete Requirements | |
|---|---|
| **Property** | **Specific Value** |
| Compression strength (ASTM C 579), psi (MPa), min. at 24 hours | 2500 (17.23) |
| Bond Shear Strength (ASTM C 882), psi (MPa) | 700 (4.82) |
| Abrasion Resistance (ASTM C 501), Wear Index (Taber H-22), max. | 1.0 |
| Compressive Stress (OK/OHD L-6), psi (MPa) | 350 (2.41) |
| Resilience (OK/OHD L-6), percent | 70 |

**1039.70.3 Manufacturer and Brand Name Approval.** Prior to approval and use of this material, the manufacturer shall submit to the IDOT Bureau of Materials a certified test report from an independent laboratory showing specific test results in accordance with all requirements of this specification. The certified test report shall contain the manufacturer's name, brand name of material, lot tested, date of manufacture and ratio of components. In addition, the manufacturer shall submit a one-quart (liter) sample of each component, A and B, for laboratory testing accompanied by a technical data sheet and a material safety data sheet. With approval from the Engineer of the certified test report and satisfactory results of tests performed on the sample submitted, the brand name and manufacturer will be placed on a qualified list of polymer concretes. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed and may be required when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

**1039.70.4 Acceptance**. To obtain final acceptance of this material, the manufacturer shall furnish certification to the Engineer at destination certifying that the material supplied is in accordance with all requirements specified and stating that the material is identically formulated to the material tested for manufacturer and brand name approval.

## SECTION 1045 PAINT FOR STRUCTURAL STEEL

**1045.1 Scope.** This specification covers paint, paint material and coating systems for use on structural steel.

### 1045.2 Paint and Paint Material

**1045.2.1 General.** All single component paints shall be ready-mixed at the factory to comply with the specification formula for the type of paint ordered; shall be well ground to a uniform consistency and smooth texture; shall be free from dirt, water and other foreign matter; shall be of such consistency to have good application, covering and leveling properties; and shall dry within the specified period to a good film without running, streaking or sagging.

**1045.2.1.1** Any paint that has livered or hardened or thickened to any extent in the container, or in which the pigment has settled such that the paint cannot be readily broken up with a paddle to a smooth uniform paint of good application consistency, will be rejected.

**1045.2.1.2** All percentages and proportions shall be on a weight (mass) basis unless otherwise stated.

**1045.2.1.3** All VOC content requirements specified shall be a maximum when thinned for application.

**1045.2.2 Sampling.** Each batch or lot of paint shall be sampled and approved prior to use. Each batch or lot of each component of multiple-component paints shall be sampled and approved prior to use.

**1045.2.3 Packaging and Labeling.** The lining of the containers shall not react with the paint. All components shall bear a label on which shall be clearly shown the name of the manufacturer, the kind of paint, lot number, shelf life, date of manufacture and net weight (mass) of contents. The lot number and date of manufacture shall be stamped, stenciled or painted directly onto the container using a weatherproof, durable material.

**1045.2.4 Determination of Quantities**. Quantities of paint shall be determined by volume. One gallon (4 L) shall equal 231 cubic inches (0.004 $m^3$) at 77 F (25 C).

**1045.3 High Solids Inorganic Zinc Silicate Coating**

**1045.3.1 Description.** High solids inorganic zinc coating shall be a solvent base multiple-component material which, when mixed and applied in accordance with Sec 1081, cures without the use of a separate curing solution. High solids inorganic zinc coating shall be in accordance with AASHTO M 300, Type IA. The VOC content shall not exceed 3.50 pounds per gallon (420 g/L). If thinning is necessary for application, the maximum VOC content after thinning shall not exceed 3.50 pounds per gallon (420 g/L).

**1045.3.2 Manufacturer and Brand Name Approval.** Prior to approval and use of high solids inorganic zinc, the manufacturer shall submit to the IDOT Bureau of Materials a certified test report from an approved testing laboratory showing specific test results conforming to all quantitative and resistance test requirements of these specifications. The certified test report shall also contain the exact ratio, by weight (mass), of each component of the coating used for the tests, the lot tested, the manufacturer's name, brand name of coating and date of manufacture. Upon approval from the Engineer of this certified test report, further resistance tests will not be required, except as hereinafter noted, of that manufacturer for that brand name of coating. New certified test results shall be submitted any time the manufacturing process or the coating formulation is changed, and may be required by the Engineer when sampling and testing of material offered for use indicates nonconformance to any of the requirements herein specified. All resistance testing shall be performed on duplicate sets of test panels, and upon completion of the prescribed exposure testing, the manufacturer shall submit one set of the exposed panels to the IDOT Bureau of Materials.

**1045.3.3 Alternate Approval.** If approved by the IDOT Bureau of Materials, compliance with all specified requirements for the system under NTPEP or Northeast Protective Coating Committee (NEPCOAT), in addition to the physical property requirements of this specification, may be substituted for the manufacturer and brand name approval requirements of Sec 1045.3.2. The manufacturer shall provide documentation identifying specific products evaluated, along with the manufacturer’s code numbers and/or report code numbers.

## 1045.4 High Solids Epoxy System G Intermediate Coating

**1045.4.1 Description.** The coating shall be a multiple-component, modified epoxy primer with an amine/amide-type curing system compatible as an intermediate coat over high solids inorganic zinc primer and suitable for topcoating with polyurethane.

**1045.4.2 Mixed Coating.** The color shall be gray (Federal Standard 595b No. 26373) or brown (Federal Standard 595b No. 30045) unless otherwise specified. The color of the intermediate coat shall match the color of the finish coat, unless otherwise approved by the Engineer. The physical properties of the mixed paint shall be as follows:

| High Solids Epoxy System G Intermediate Coating | |
|---|---|
| **Item** | **Requirement** |
| Viscosity, Krebs-Stormer, 77 F (25 C) KU | 80-130 |
| VOC Content, max., lb/gal (g/L) | 3.50 (420) |
| Fineness of Grind, Hegeman Gage, min. | 4 |
| Sag Resistance, Leneta Anti-Sag Meter, mils (µm) wet, min. | 8 (203) |
| Dry to Touch, hours, max. | 3 |
| Dry to Handle, hours, max. | 6 |

**1045.4.3 Packaging and Labeling.** Packaging and labeling shall be in accordance with Sec 1045.2.3.

**1045.4.4 Manufacturer and Brand Name Approval.** Prior to approval and use of the specified coating system, the manufacturer shall submit to the IDOT Bureau of Materials a one-gallon (4 L) unit of each coat of the coating system proposed. The manufacturer shall also submit a certified test report from an approved independent testing laboratory showing specific test results obtained on the specified coating system for Relative Humidity Resistance ASTM D 1735 or D 2247, 3000 hours, Salt Fog Resistance ASTM B 117, 3000 hours and Accelerated Weathering ASTM G 153 Cycle 1 (Carbon Arc), 4000 hours. ASTM G 155, Cycle 2, Xenon Arc or G 154, Cycle 2 QUV (Fluorescent UV-Condensation Type using Type A lamps) may be used as an alternate to Carbon Arc.

**1045.4.4.1** All coats of the system to be tested shall be applied to steel test panels that have been prepared according to AASHTO M 300. Each coat of the system shall be from the same manufacturer. Test panels for salt fog exposure shall be scribed as specified in ASTM D 1654 and, when rated according to ASTM D 1654, each panel shall receive a rating of 7 or greater. Test panels shall not exhibit more than slight rusting, undercutting, discoloration, fading, blistering, chalking, loss of gloss or change in color. Accelerated weathering resistance testing shall be performed on test panels that have received finish coats in the specified colors for which approval is being requested. After 4000 hours of testing for accelerated weathering resistance, each color of the finish coat shall show a difference in color of no greater than 3 $\Delta$E, when compared to the control panel. Color change measurements shall be made in accordance with Section 6.2 CIE 1976 L*a*b* of ASTM D 2244. All resistance testing shall be performed on duplicate sets of test panels, and upon completion of the prescribed exposure testing, the manufacturer shall submit one set of the exposed panels to the IDOT Bureau of Materials.

**1045.4.4.2** The manufacturer shall provide documentation that the specified coating system has performed satisfactorily for three years. The document shall include the name, address and telephone number of the proprietary agency and location of the structures. Upon approval of the coating by the Engineer, further submittals for preliminary approval will not be required of that manufacturer for that brand name of coating, except as hereinafter noted. A new sample, new testing data and new test panels shall be submitted any time the manufacturing process or the batching proportions are changed. The Engineer may withdraw manufacturer and brand name approval when sampling and testing of material offered for use indicates nonconformance to any of the requirements herein specified. All data submitted for preliminary approval will be considered confidential to MoDOT.

**1045.4.5 Alternate Approval.** If approved by the IDOT Bureau of Materials, compliance with all specified requirements for the system under NTPEP or NEPCOAT, in addition to the physical property requirements of this specification, may be substituted for the manufacturer and brand name approval requirements of Sec 1045.4.4. If approval is requested under NTPEP or NEPCOAT, the accelerated weathering requirements stated in Sec 1045.4.4 will apply. The manufacturer shall provide documentation identifying specific products evaluated, along with the manufacturer's code numbers and/or report code numbers.

### 1045.5 Polyurethane System G Finish Coating

**1045.5.1 Description.** The coating shall be a multiple-component, aliphatic acrylic polyurethane suitable for use over High Solids Epoxy Intermediate Coating. The coating shall cure to a semi-gloss to high gloss, abrasion resistant surface and shall provide an easily cleanable finish.

**1045.5.2 Mixed Coating.** The mixed coating properties shall be as follows:

| Polyurethane System G Finish Coating | | |
|---|---|---|
| **Physical Property** | **Requirement** | |
| Color, Federal Standard 595b | Gray 26373 | Brown 30045 |
| Viscosity, Krebs-Stormer, 77 F (25 C), KU | 65-96 | |
| VOC Content, lb/gal (g/L), max. | 3.50 (420) | |
| Fineness of Grind, Hegeman Gage, min. | 6 | |
| Sag Resistance, Leneta Anti-Sag Meter, mils (µm) wet, min. | 8 (203) | |
| Dry to Touch, hours, max. | 4 | |
| Dry to Handle, hours, max. | 8 | |

**1045.5.3 Packaging and Labeling.** Packaging and labeling shall be in accordance with Sec 1045.2.3.

**1045.5.4 Manufacturer and Brand Name Approval.** Manufacturer and brand name approval shall be in accordance with Sec 1045.4.4 or Sec 1045.4.5. If approval is requested under Sec 1045.4.5, the accelerated weathering requirements stated in Sec 1045.4.4 will apply. The manufacturer shall provide documentation identifying specific products evaluated, along with the manufacturer's code numbers and/or report code numbers.

### 1045.6 Waterborne Acrylic System H Intermediate and Finish Coating

**1045.6.1 Description.** The intermediate coating shall be a single component waterborne acrylic compatible as a coating over high solids inorganic zinc primers. The finish coating shall be a single component waterborne acrylic suitable for use over a waterborne acrylic intermediate coating. The finish coating shall cure to a tough, abrasion resistant surface that performs well in weathering exposures. The gray finish coat shall cure to a semi-gloss finish and the brown finish coat shall cure to a low-gloss finish.

**1045.6.2 Mixed Coating.** The color of the intermediate coat shall be gray (Federal Standard 595b No. 26373) or brown (Federal Standard 595b No. 30045) unless otherwise specified. The color of the intermediate coat will normally be required to match the color of the finish coat. The mixed coating properties shall be as follows:

| Waterborne Acrylic System H Intermediate and Finish Coating | | |
|---|---|---|
| **Physical Property** | **Requirement** | |
| Color, Finish Coat, Federal Standard 595b | Gray 26373 | Brown 30045 |
| Viscosity, Krebs-Stormer, 77 F (25 C), KU | 80-100 | |
| VOC Content, lb/gal (g/L), max. | 3.50 (420) | |
| Fineness of Grind, Hegeman Gage, min. | 7 | |
| Sag Resistance, Leneta Anti-Sag Meter, mils (µm) wet, min. | 8 (203) | |
| Dry to Handle, hours, max. | 2 | |

**1045.6.3 Packaging and Labeling.** Packaging and labeling shall be in accordance with Sec 1045.2.3.

**1045.6.4 Manufacturer and Brand Name Approval.** Prior to approval and use of waterborne acrylic intermediate and finish coats, the manufacturer shall obtain manufacturer and brand name approval in accordance with Sec 1045.4.4 or Sec 1045.4.5, except that, after the 4000 hour testing for accelerated weathering resistance, the Federal Standard 595b 30045 (brown) color of the finish coat shall show a difference in color of no greater than 4 $\Delta E$ when compared to the control panel. If approval is requested under Sec 1045.4.5, the accelerated weathering requirements stated in Sec 1045.4.4 will apply. The manufacturer shall provide documentation identifying specific products evaluated, along with the manufacturer's code numbers and/or report code numbers.

### 1045.7 Aluminum Epoxy-Mastic Primer

**1045.7.1 Description.** The coating shall be a one-coat system aluminum epoxy-mastic primer designed for adhesion to rusty steel, aged galvanized steel and other uses. Aluminum epoxy-mastic primer will not be permitted for use on any surface that is to be in contact with fresh concrete. The epoxy-mastic shall be a two-component, modified epoxy-primer containing metallic-aluminum flake.

**1045.7.2 Pigment.** The primary pigment shall be metallic-aluminum.

**1045.7.3 Vehicle.** The vehicle shall be an epoxy-type. The curing agent shall have suitable insensitivity to moisture to allow trouble-free application.

**1045.7.4 Mixed Coating**

**1045.7.4.1** The coating shall be well-ground, not caked, skinned or badly settled in the container. The mixed coating, when applied in one coat, shall be capable of achieving 5 mils (127 µm) dry film thickness without runs or sags.

**1045.7.4.2** The mixed coating properties shall be as follows:

| Aluminum Epoxy-Mastic Primer | |
|---|---|
| **Physical Property** | **Requirement** |
| Dry to touch, hours, max. | 24 |
| Dry hard, days, max. | 5[a] |
| VOC Content, lb/gal (g/L), max. | 3.50 (420) |

[a]When air-cured at a temperature of 75 F (24 C) or above to a hard, tough film by evaporation of solvent and chemical reaction.

**1045.7.5 Resistance Tests.** Test panels of steel in accordance with ASTM D 609, and having dimensions of 2 x 5 x 1/8 inch (50 x 125 x 3 mm) shall be prepared by sandblasting all surfaces to a white metal condition in accordance with Structural Steel Painting Council SP5 (SSPC-SP5-82). The cleaned panels shall then be exposed to outdoor weather for 30 days or until uniform rusting occurs. The panel shall then be hand cleaned with a wire brush in accordance with SSPC-SP2-82. A 6-mil (152 µm) dry coating of the epoxy-mastic shall then be applied in one coat in accordance with the manufacturer's current recommendations. The coating shall be cured as recommended by the manufacturer. Fresh Water, Salt Water, and Weathering and Salt Fog resistance tests, as detailed herein, shall be performed on one or more test panels. The material will not be approved if any individual test panel fails any of the resistance tests specified herein.

**1045.7.5.1 Fresh Water Resistance.** Panels shall be scribed down to base metal with an "X" of at least 2-inch (50 mm) legs, and shall be immersed in fresh tap water at 75 ± 5 F (24 ± 2 C). The panels shall show no rusting, blistering or softening beyond 1/16 inch (2 mm) from the scribe mark, when examined after 30 days. Discoloration of the coating will be permitted.

**1045.7.5.2 Salt Water Resistance.** Panels shall be scribed down to base metal with an "X" of at least 2-inch (50 mm) legs and immersed in five percent sodium chloride at 75 ± 5 F (24 ± 2 C). The panels shall show no rusting, blistering or softening beyond 1/16 inch (2 mm) from the scribe mark upon examination after 7, 14 and 30 days. Discoloration of the coating will be permitted. The sodium chloride solution shall be replaced with fresh solution after each examination.

**1045.7.5.3 Weathering and Salt Fog Resistance**. Panels shall be tested in the weatherometer in accordance with ASTM G 154 QUV (Fluorescent UV-Condensation Tape using Type A Lamps) for 300 hours using a test cycle consisting of four hours light followed by four hours condensation. After this period, the panels shall be removed and scribed with an "X" of at least 2-inch (50 mm) legs down to base metal. The test panels shall then be tested in accordance with ASTM B 117.

After 1000 hours of continuous exposure, the coating shall show no loss of bond, nor shall the coating show rusting or blistering beyond 1/16 inch (2 mm) from the center of the scribe mark.

**1045.7.6 Packaging and Labeling.** Packaging and labeling shall be labeled in accordance with Sec 1045.2.3.

**1045.7.7 Approval and Prequalification**

**1045.7.7.1 Manufacturer and Brand Name Approval**. Prior to approval and use of the epoxy-mastic primer, the manufacturer shall submit to the IDOT Bureau of Materials a one-gallon (4 L) sample of the coating and a certified test report from an approved independent testing laboratory showing specific test results conforming to all quantitative and resistance test requirements of these specifications. The certified test report shall contain the exact ratio, by weight (mass), of the pigment component to the vehicle component of the epoxy-mastic used for the tests, the lot tested, the manufacturer's name, brand name of the epoxy-mastic, and date of manufacture. In addition, the manufacturer shall submit a complete set of tested panels that have undergone each required resistance test. The set of panels submitted shall include one untested control panel that has been prepared in accordance with Sec 1045.7.5. Upon approval by the IDOT Bureau of Materials of this certified test report, further resistance tests will not be required of that manufacturer for that brand name of epoxy-mastic primer, except as noted. New certified test results shall be submitted any time the manufacturing process or the epoxy-mastic formulation is changed, and may be required by the Engineer when sampling and testing of material offered for use indicates nonconformance to any of the requirements specified herein.

**1045.7.7.2 Final Acceptance.** Final acceptance of the epoxy-mastic primer will be based on a manufacturer's certification submitted by the Contractor to the Engineer and on results of tests conducted on samples of the material. Each lot of each component will be sampled and tested prior to approval or use of the material.

**1045.8 Gray Epoxy-Mastic Primer**

**1045.8.1 Description.** This specification covers a one-coat gray epoxy-mastic primer system designed for adhesion to rusty steel, aged galvanized steel and other uses, including uses in contact with freshly poured Portland cement concrete. The epoxy-mastic shall be a multiple-component modified epoxy containing gray pigmentation, and shall be in accordance with the requirements specified herein.

**1045.8.2 Pigment.** The pigmentation shall be any pigment or combination of pigments formulated to offer the intended protective properties to the cured coating, and shall be totally non-reactive to the constituents contained in both cured and uncured Portland cement concrete.

**1045.8.3 Vehicle.** The vehicle shall be an epoxy type. The curing agent shall have suitable insensitivity to moisture to allow trouble-free application.

**1045.8.4 Mixed Coating**

**1045.8.4.1** The provisions of Sec 1045.7.4.1 will apply.

**1045.8.4.2** The mixed coating properties shall be as follows:

| Gray Epoxy-Mastic Primer | |
|---|---|
| **Physical Property** | **Requirement** |
| Color, Federal Standard 595b | Gray 26373 |
| Viscosity, (Krebs-Stormer, 25 C) KU | 90 - 120 |
| Volatile Organic Content, lb/gal (g/L), max. | 3.50(420) |
| Dry to touch, hours, max. | 24 |
| Dry hard, days, max. | 7[a] |

[a]When air-cured at a temperature of 75 F (24 C) or above to a hard, tough film by evaporation of solvent and chemical reaction.

**1045.8.5 Resistance Tests.** Test requirements and approval criteria shall be in accordance with Sec 1045.7.5.

**1045.8.6 Packaging and Labeling.** Packaging and labeling shall be in accordance with Sec 1045.2.3.

**1045.8.7 Approval and Prequalification**

**1045.8.7.1 Manufacturer and Brand Name Approval.** Manufacturer and brand name approval shall be in accordance with Sec 1045.7.7.1.

**1045.8.7.2 Final Acceptance.** Final acceptance will be in accordance with Sec 1045.7.7.2.

**1045.9 Calcium Sulfonate System**

**1045.9.1 Description.** This specification covers calcium sulfonate sealer, calcium sulfonate primer and various colors of calcium sulfonate topcoat paints for steel. The color of topcoat will be specified in the contract and shall be in accordance with all requirements specified herein.

**1045.9.1.1** The primary resin used to manufacture each coat of the calcium sulfonate system shall be a modified overbased crystalline calcium sulfonate that creates a highly polar complex capable of protecting the underlying steel from corrosion. In addition to the calcium sulfonate complex, the paint shall contain film forming oleoresinous compounds that act to reduce tack in the dry film.

**1045.9.1.2** The coating material shall be uniform, stable in storage, and free from grit and coarse particles.

**1045.9.2 Calcium Sulfonate Rust Penetrating Sealer**

**1045.9.2.1 General.** The sealer, after allowing a minimum drying time, may be recoated with an approved primer or topcoat. The sealer will be suitable for any steel structure that has developed pack rusting in overlapping steel plates, joints or at bolted areas. This coating shall be used on in-place structures as part of a long-term maintenance program, and as such shall be applied in accordance with SSPC-PA1, Shop, Field and Maintenance Painting.

**1045.9.2.2 Properties.** The mixed coating properties shall be as follows:

| Calcium Sulfonate Rust Penetrating Sealer | |
|---|---|
| **Physical Property** | **Requirement** |
| **Color** | **Red iron oxide** |
| Modified Crystalline Overbased Calcium Sulfonate, percent by weight, min. | 15 |
| Coarse Particles and Skins as retained on No. 325 (45µm) mesh sieve, percent, max. | 1.0 |
| Viscosity, #4 Ford Cup, Seconds | 50 - 70 |
| VOC Content, lbs/gal.(g/L), max. | 3.5 (420) |
| Drying Time, hours to recoat | 2 - 6 |
| Flash Point, F (C), max | 104 (40) |
| Salt Fog Resistance, 500 hours (Coating applied at 1-2 mils (25-50 µm) dry film over SSPC-SP5 cold rolled steel) | No more than 1% rust undercutting, blistering or peeling. |

### 1045.9.3 Calcium Sulfonate/Alkyd Primer

**1045.9.3.1 General.** This primer shall be used in non-abrasion exposures to provide a firm, corrosion resistant, highly adherent film. This primer may be used for in-place structures but shall not be used as a shop-applied primer.

**1045.9.3.2 Properties.** The mixed coating properties shall be as follows:

| Calcium Sulfonate/Alkyd Primer | |
|---|---|
| **Physical Property** | **Requirement** |
| **Color** | **Red iron oxide** |
| Modified Crystalline Overbased Calcium Sulfonate, percent by weight, min. | 15 |
| Coarse Particles and Skins as retained on No. 325 (45µm) mesh sieve, percent, max. | 1.0 |
| Viscosity, 77 F (25 C), KU | 90 – 120 |
| VOC Content, lbs/gal (g/L), max. | 3.50 (420) |
| Fineness of Grind, Hegman Units, min. | 5 |
| Drying Time, Hours (3 to 4 Mil (75 µm to100 µm) Dry Film): | |
| Dust Dry | 1 – 4 |
| Tack Free | 5 – 12 |
| Dry Firm | 24 – 48 |
| Sag Resistance, Mils (µm) | 12+ (300+) |
| Salt Spray Resistance, 1500 hours (4 mil (100 µm) dry film over SSP-SP-5 blasted cold rolled steel – 1 to 2 mil (25 µm to 50 µm) profile) | No more than 1 % under-cutting, blistering or peeling. |

### 1045.9.4 Calcium Sulfonate/Alkyd Topcoat

**1045.9.4.1 General.** Calcium sulfonate/alkyd topcoat shall be a medium to light gray, brown, green or tan low-gloss coating as specified in the contract for use over calcium sulfonate/alkyd penetrating sealer or calcium sulfonate/alkyd primer. This paint shall be used as a topcoat for a calcium sulfonate/alkyd corrosion inhibitive primer, and shall be applied in accordance with SSPC-PA 1, Shop, Field, and Maintenance Painting. The topcoat may be used for in-place structures and shall not be used as a shop-applied finish.

**1045.9.4.2 Properties.** The mixed coating properties shall be as follows:

| Calcium Sulfonate/Alkyd Topcoat | | | | |
|---|---|---|---|---|
| **Physical Property** | **Requirement** | | | |
| | **Brown** | **Gray** | **Tan** | **Green** |
| Color, Federal Standard 595b | 30045 | 26373 | 23522 | 24260 |
| Modified Crystalline Overbased Calcium Sulfonate, per cent by weight, min. | 15 | | | |
| Coarse Particles and Skins as retained on No. 325 (45 µm) mesh sieve, percent, max. | 1.0 | | | |
| Viscosity, 77 F (25 C), KU | 90-130 | | | |
| Fineness of Grind, Hegman Units, min. | 5 | | | |
| Drying Time, 2-3 mils (50-75 µm), hours | | | | |
| Dust Dry | 1 - 4 | | | |
| Tack Free | 5 - 12 | | | |
| Dry Firm | 24 – 48 | | | |
| VOC Content, lbs/gal (g/L), max. | 3.5 (420) | | | |
| Sag Resistance, Mils (µm) | 12+ (300+) | | | |
| QUV Weathering Resistance, 1000 hrs. (4 mil (100µm) dry film over SSP-SP-5 blasted cold rolled steel - 1-2 mil (25-50 µm) profile) | No excessive chalking, blistering, or change in color. | | | |
| Salt Spray Resistance, 1000 hrs (4 mil (100 µm) dry film over SSP-SP-5 blasted cold rolled steel – 1-2 mil (25-50 µm) profile) | No more than 1 % rust under-cutting, blistering or peeling. | | | |

**1045.9.5 Test Methods.** The test methods used to verify compliance with the properties specified in Secs 1045.9.2, 1045.9.3 and 1045.9.4 shall be as follows:

| American Standards for Testing and Materials (ASTM) | |
|---|---|
| G154 | Practice for Operating Light- and Water-Exposure Apparatus |
| B117 | Salt Spray (Fog) Testing |
| D562 | Consistency of Paints Using the Stormer Viscometer |
| D1200 | Viscosity of Paints, Varnishes and Lacquers by Ford Viscosity Cup |
| D1210 | Fineness of Dispersion of Pigment-Vehicle Systems |
| D1475 | Density of Paint, Varnish, Lacquer and Related Products |
| D3278 | Flash Point of Liquids by Seta Flash Closed Tester |
| D3960 | VOC Content of Paints |
| Federal Test Method Standard No. 141 | |
| Method 4061 | Drying Time |
| Method 4494 | Sag Test (multi-notch blade) |

**1045.9.6 Pigment Settlement.** The paint shall have perfect suspension (10 rating) when tested as specified in ASTM D 869, when stored for six months.

**1045.9.7 Working Properties.** The paint shall be uniform and easily spray-applied when tested in accordance with Federal Standard No.141, Method 4331. The primer and topcoat shall show no streaking, running or sagging after drying.

**1045.9.8 Storage.** The paint shall show no thickening, curdling, gelling or hard caking when tested as specified in Federal Standard No.141, Method 3011 after storage for six months from date of delivery in tightly covered containers at a temperature of at least 50 F (10 C) and no more than 110 F (43 C).

**1045.9.9 Packaging and Labeling.** Packaging and labeling shall be in accordance with Sec 1045.2.3.

**1045.9.10 Approval and Prequalification**

**1045.9.10.1 Manufacturer and Brand Name Approval.** Prior to approval and use of the calcium sulfonate coating system, the manufacturer shall submit to the IDOT Bureau of Materials a one-gallon (4 L) sample of each coat of the proposed coating system. The manufacturer shall also submit a certified test report from an approved independent laboratory showing specific test results as follows:

(a) Calcium Sulfonate Penetrating Sealer. Salt spray resistance of steel panels prepared and tested in accordance with Sec 1045.9.2.2.

(b) Calcium Sulfonate Primer. Salt spray resistance of steel panels prepared and tested in accordance with Sec 1045.9.3.2.

(c) Calcium Sulfonate Topcoat. Salt spray resistance and QUV weathering resistance in accordance with Sec 1045.9.4.2.

**1045.9.10.2 Final Acceptance.** Final acceptance of calcium sulfonate penetrating sealer, calcium sulfonate primer and calcium sulfonate topcoat will be based on the manufacturer's certification submitted by the Contractor to the Engineer, and on results of tests conducted on samples of the material. Each lot will be sampled and tested prior to approval and use.

## SECTION 1053 CONCRETE SEALER

**1053.1 Scope.** This specification covers concrete sealers for the protection of concrete against damage from de-icing chemicals.

**1053.2 Acceptance.** All material shall be obtained from a source identified on the MoDOT PAL designated for this specification, except as otherwise listed below. For information on the PAL see Sec 106.12 of these Special Provisions. All material under this specification will be inspected and accepted in accordance with Sec 106.12, except as otherwise listed below. ASTM specifications, when referenced, control only the physical and chemical properties of the material.

### 1053.3 Branded, Pre-Blended Boiled Linseed Oil and Petroleum Spirits

**1053.3.1** Branded mixtures shall be in accordance with AASHTO M 233. The label shall include the mixture ratio.

**1053.3.2** Prior to initial approval, the manufacturer shall submit certification to the IDOT Bureau of Materials setting forth the brand name and designation, the composition of the material, and the manner in which the material will be identified on the containers.

### 1053.4 Mixture of Boiled Linseed Oil and Petroleum Spirits

**1053.4.1** Boiled linseed oil in accordance with ASTM D 260, Type I or II, and petroleum spirits in accordance with ASTM D 235 shall be mixed in equal parts.

**1053.4.2** A manufacturer not listed on the PAL may provide this material.

**1053.5 Documentation.** The supplier of the mixture shall retain evidence of the source of the individual components and the material compliance to this specification in accordance with Sec 106.

## SECTION 1054 CONCRETE ADMIXTURES

**1054.1 Scope.** This specification covers air-entraining admixtures, water-reducing admixtures, retarding admixtures, accelerating admixtures and latex emulsion admixtures for concrete.

**1054.2 Acceptance.** All material under this specification shall be obtained from a source identified on the MoDOT PAL designated for this specification. For information on the PAL see Sec 106.12 of these Special Provisions. All material under this specification will be inspected and accepted in accordance with Sec 106.12.

**1054.3 Air-Entraining Admixtures.** Air-entraining admixtures shall be in accordance with AASHTO M 154, except as modified herein.

**1054.3.1 Certification.** The manufacturer shall submit a certification to the IDOT Bureau of Materials prior to approval. The certification shall provide the following:

(a) The brand name and designation.
(b) The composition or description of the admixture.
(c) The manufacturing ranges for percent total solids and pH by AASHTO T 200.
(d) The infrared spectrum.
(e) The manner in which the material will be identified on containers.
(f) The material is in accordance with these specifications.

**1054.3.1.1** Certifications shall include or have attached specific test results as required in Sec 1054.3.1.2 or Sec 1054.3.1.3.

**1054.3.1.2** For an air-entraining admixture other than that specified in Sec 1054.3.1.3, the certification shall include results of tests conforming to the requirements of AASHTO M 154. Tests for bleeding, bond strength and volume change will not be required.

**1054.3.1.3** For an air-entraining admixture that is an aqueous solution of vinsol resin manufactured by neutralizing the resin with sodium hydroxide, the certification shall include results of tests showing the ratio of sodium hydroxide to vinsol resin. The certification or test report shall also state that no other additive or chemical agent is present in the solution.

**1054.3.2 Packaging and Marking.** The containers in which air-entraining admixtures are delivered shall be plainly marked with the manufacturer's name, the brand name and designation of the material, lot number and net quantity. A delivery ticket showing this information shall accompany bulk shipments. If the manufacturer supplies air-entraining admixtures in more than one concentration, the concentration shall be designated on the container, or for bulk shipments, in a prominent manner on the delivery ticket.

**1054.4 Water-Reducing Admixtures.** Water-reducing admixtures shall be in accordance with AASHTO M 194, Type A, except as modified herein. High range water-reducing admixtures, when permitted for use, shall be in accordance with AASHTO M 194, Type F or Type G.

**1054.4.1 Certification**. The manufacturer shall submit certification to the IDOT Bureau of Materials prior to approval.

**1054.4.1.1** The certification shall provide the following:

(a) The brand name and designation.
(b) The composition or description of the admixture.
(c) The manufacturing ranges for specific gravity at 77 F (25 C) and percent total solids.
(d) The infrared spectrum.
(e) The manner in which the material will be identified on containers.
(f) The material is in accordance with these specifications.

**1054.4.1.2** The certification shall include or have attached specific test results in accordance with AASHTO M 194, Type A, F or G, as applicable, and the recommendation for use, including amounts to be added.

**1054.4.2 Packaging and Marking.** The containers in which water-reducing admixtures are delivered shall be plainly marked with the manufacturer's name, the brand name and designation of the material, lot number and net quantity. A delivery ticket showing this information shall accompany bulk shipments.

**1054.5 Retarding Admixtures.** Retarding admixtures shall be in accordance with AASHTO M 194, Type B or D, except as modified herein.

**1054.5.1 Certification.** The manufacturer shall submit certification to the IDOT Bureau of Materials prior to approval.

**1054.5.1.1** The certification shall provide the following:

(a) The brand name and designation.
(b) The composition or description of the admixture.
(c) The manufacturing ranges for specific gravity at 77 F (25 C) and percent total solids.
(d) The infrared spectrum.
(e) The manner in which the material will be identified on containers.
(f) The material is in accordance with these specifications.

**1054.5.1.2** The certification shall include or have attached specific test results in accordance with AASHTO M 194, Type B or D, and the recommendation for use, including amounts to be added.

**1054.5.2 Packaging and Marking.** The containers in which retarding admixtures are delivered shall be plainly marked with the manufacturer's name, the brand name and designation of the material, lot number and net quantity. A delivery ticket showing this information shall accompany bulk shipments.

**1054.6 Accelerating Admixtures.** Accelerating admixtures shall be in accordance with AASHTO M 194, Type C or E, except as modified herein.

**1054.6.1 Certification.** The manufacturer shall submit certification to the IDOT Bureau of Materials prior to approval.

**1054.6.1.1** The certification shall provide the following:

(a) The brand name and designation.
(b) The composition or description of the admixture.
(c) The manufacturing ranges for specific gravity at 77 F (25 C) and percent total solids.
(d) The infrared spectrum.
(e) The manner in which the material will be identified on containers.
(f) The material is in accordance with these specifications.

**1054.6.1.2** The certification shall include or have attached specific test results in accordance with AASHTO M 194, Type C or E, and the recommendation for use, including amounts to be added.

**1054.6.2 Packaging and Marking.** The containers in which accelerating admixtures are delivered shall be plainly marked with the manufacturer's name, the brand name and designation of the material, lot number and net quantity. A delivery ticket showing this information shall accompany bulk shipments.

**1054.7 Latex Emulsion Admixtures.** Latex emulsion admixtures shall be non-toxic, film-forming, polymeric emulsion in water to which all stabilizers have been added at the point of manufacture. The admixture shall be a styrene-butadiene latex emulsion in which at least 90 percent of the non-volatiles are styrene-butadiene polymers.

**1054.7.1. Properties** The admixture shall be homogeneous, uniform in composition and shall be in accordance with the following requirements when tested with the procedures shown in Report No. FHWA RD 78 35, April 1978, Styrene-Butadiene Latex Modifiers for Bridge Deck Overlay Concrete:

## SECTION 1055 CONCRETE CURING MATERIAL

**1055.1 Scope.** This specification covers material to be used for the purpose of curing concrete.

### 1055.2 Liquid Membrane-Forming Curing Compounds

**1055.2.1 Acceptance.** All material under this specification shall be obtained from a source identified on the MoDOT PAL designated for this specification. For information on the PAL see Sec 106.12 of these Special Provisions. If the manufacturer is different from the source supplying the material, the manufacturer shall also be listed. All material under this specification will be inspected and accepted in accordance with Sec 106.12.

### 1055.2.2 Material

**1055.2.2.1 General.** Water retention properties for all curing compounds shall be determined by ASTM Test Method C 156. The vehicle class of all curing compounds shall be Class A.

**1055.2.2.2 Type 1-D Curing Compounds.** Type 1-D liquid membrane-forming curing compounds shall be in accordance with AASHTO M 148 for Type 1-D, clear or translucent with fugitive dye.

**1055.2.2.3 Type 2 Curing Compounds.** Type 2, liquid membrane-forming curing compounds shall be in accordance with AASHTO M 148 for Type 2, white pigmented.

**1055.2.2.4 Bridge Curing Compounds.** Bridge curing compounds shall be liquid membrane-curing compounds in accordance with AASHTO M 148 for Type 1-D or Type 2 and shall be designated to be dissipating. All bridge curing compounds shall be manufactured such that the curing compounds may be removed prior to dissipation.

**1055.2.3 Documentation**

**1055.2.3.1 Certification For Qualification.** Prior to use and in addition to the required PAL documentation, the manufacturer shall submit certification to the IDOT Bureau of Materials, setting forth the brand name and designation, the composition or description of the curing material, the manner in which the material will be identified on the containers, and shall list typical values of current tests for consistency, drying time, reflectance and moisture retention.

**1055.2.3.2 Additional Certification.** Certification for bridge curing compounds shall include a statement that the product is manufactured to dissipate. The certification shall specify the method by which removal of the compound prior to dissipation or removal of residual material from the surface can be accomplished.

**1055.2.3.3 Shipment Documentation.** For each shipment of material, the source shall maintain the manufacturer's certification and test results showing that the product is in accordance with this specification. The manufacturer's certification and test results shall be made available upon request.

**1055.3 Other Concrete Curing Material**

**1055.3.1 Acceptance.** All material under this specification shall be obtained from a source identified on the MoDOT PAL designated for this specification. For information on the PAL see Sec 106.12 of these Special Provisions. All material under this specification will be inspected and accepted in accordance with Sec 106.12.

**1055.3.2 Material**

**1055.3.2.1 Waterproof Paper.** Waterproof paper shall be in accordance with AASHTO M 171.

**1055.3.2.2 Polyethylene Sheeting.** Polyethylene sheeting shall be in accordance with Sec 1058 for curing Portland cement concrete.

**1055.3.2.3 White Burlap-Polyethylene Sheeting.** White burlap-polyethylene sheeting shall be in accordance with AASHTO M 171.

**1055.3.2.4 Burlap and Mats of Jute or Cotton.** Burlap shall be fabric made from jute or other suitable fibers. Jute mats shall consist of two plies of burlap stitched together to maintain the shape and stability of the unit. Cotton mats shall consist of filler or cotton batts covered with unsized cloth or burlap, and tufted or stitched to maintain the shape and stability of the unit. Burlap and mats shall, in the judgment of the Engineer, be of such construction and in such a condition as required to adequately maintain free moisture on the surface of the concrete with the type of system being used to provide the water. Material shall be free from deleterious matter harmful to concrete.

**1055.3.3 Documentation.** The distributor shall maintain certification that the material supplied is in accordance with these specifications. The certification shall be made available upon request.

## SECTION 1057 MATERIAL FOR JOINTS

**1057.1 Scope.** This specification covers joint material to be used as specified or as shown on the bridge plans.

**1057.2 Acceptance.** All material under this specification shall be obtained from a source identified on the MoDOT PAL designated for this specification. For information on the PAL see Sec 106.12 of these Special Provisions.

**1057.3 Dowel Bars.** Dowels for transverse joints shall be in accordance with the requirements for plain rounds of AASHTO M 31, AASHTO M 42 or AASHTO M 53. The dowels shall be epoxy coated in accordance with Sec 1036, except the coating thickness shall be a 5-mil (127 µm) minimum, the flexibility of coating requirement will not apply and the cut ends will not be required to be coated. The dowels shall be free of cutting burrs and other projections. Dowel supporting units shall be in accordance with one of the types shown on the bridge plans.

**1057.3.1** The free end of the dowel bar shall be coated with an approved graphite grease for a length of 11 inches (280 mm). Graphite grease shall contain a minimum of 25 percent graphite, and the graphite content shall be certified by the manufacturer or shown on the container label. Graphite grease shall be applied with a thin, uniform coating that will result in a thorough covering of the free end of the bar.

**1057.3.2** In lieu of the graphite grease application, the dowel bar basket supplier may supply completed basket units pre-dipped in an approved bondbreaker solution. The bondbreaker solution shall not be applied in a spray or field application. The resulting dry dowel bar coating shall be visually evident. The coating shall be uniformly applied without excessive drips or thickness. Dirty or excessively scraped dowel bar units will be rejected. Rejected units may be used if the units are fully cleaned of all dirt and bondbreaker coating and graphite grease is applied according to these specifications. The dowel basket supplier shall provide a certification for the coating with each shipment, certifying the bondbreaker product name, manufacturer and date of coating application.

**1057.4 Tie Bars.** Tie bars for longitudinal joints and construction joints shall be round, deformed and in accordance with AASHTO M 31, AASHTO M 42 or AASHTO M 53, except that tie bars that are to be bent and straightened shall be in accordance with AASHTO M 31, Grade 40. Tie bars shall not be bent and straightened more than one time. Tie bars shall be epoxy coated in accordance with Sec 1036, except the coating thickness shall be a 5-mil (127 µm) minimum, the flexibility of coating requirement will not apply and the cut ends will not be required to be coated.

**1057.5 Concrete and Asphalt Joint Sealer, Hot-Poured Elastic Type.** ”The sealer material shall be in accordance with ASTM D 6690, Type II. The joint sealer material shall be packed and shipped in suitable commercial containers clearly marked with the name of the material, the name of the manufacturer, brand name, weight (mass), batch number, pouring temperature recommended by the manufacturer and maximum safe heating temperature.

**1057.6 Preformed Fiber Expansion Joint Filler.** Preformed fiber expansion joint filler material shall be in accordance with AASHTO M 213.

## 1057.7 Joints for Concrete Structures

**1057.7.1 Plastic Waterstop**. The plastic waterstop shall consist of a basic resin of polyvinyl chloride (PVC) with additional resins, plasticizers and stabilizers as necessary to produce a durable material with a high fatigue point, resistant to acid and alkali solutions, showing little deterioration under accelerated aging tests and shall meet the approval of the Engineer. The plastic waterstop shall have a tensile strength of no less than 1800 psi (12 MPa) and an ultimate elongation of no less than 200 percent. The waterstop shall be a continuous strip, ribbed on both sides, and with a hollow bulb center, a "U" shaped reinforced center-pleat section, or other approved type of center section.

**1057.7.2 Rubber Waterstop.** The rubber water stop shall consist of a durable, elastic, cured rubber compound capable of effectively sealing joints in concrete against the infiltration of moisture.

1057.7.2.1 The rubber waterstop shall be in accordance with the following requirements:

(a) Hardness - The Shore A durometer hardness shall be 60 - 70.

(b) Elongation - The elongation shall be no less than 450 percent.

(c) Tensile Strength - The tensile strength shall be no less than 3000 psi (20 MPa).

(d) Water Absorption - The water absorption shall be a maximum of five percent by weight (mass) after immersion in water for two days at 158 F (70 C).

(e) Tensile Strength After Aging - The tensile strength of the test specimen, after accelerated aging test of seven days at 158 F (70 C), shall be no less than 80 percent of the tensile strength prior to the aging test. The tensile strength of the test specimen, after accelerated aging test of 48 hours in oxygen at 158 F (70 C) and 300 psi (2 MPa), shall be no less than 80 percent of the tensile strength prior to the test.

(f) Compression Set - The compression set after 22 hours at 158 F (70 C) shall be no more than 30 percent.

**1057.7.2.2** The waterstop shall be manufactured in such a manner that the finished product will have an integral cross section that will be dense, homogeneous, and free from porosity and other imperfections. Minor surface defects, such as surface peel covering less than one square inch (645 $mm^2$), and surface cavities or bumps less than 1/4 inch (6 mm) in the longest lateral dimension and less than 1/16 inch (1.5 mm) deep, will be permitted.

**1057.7.3 Copper Sheeting for Flashing.** Copper sheeting shall be of soft grade containing no less than 99.7 percent copper and shall be capable of being bent cold through an angle of 180 degrees flat upon itself without evidence of cracking. Test specimens shall have an elongation in 2 inches (50 mm) of at least 20 percent. The weight per square foot (mass/$m^2$) of the sheeting to be used will be shown on the bridge plans. Tolerances in thickness shall be in accordance with ASTM B 248.

**1057.7.4 Preformed Sponge Rubber Expansion and Partition Joint Filler.** This material shall be in accordance with AASHTO M 153, Type I, Sponge Rubber.

**1057.8 Plastic Joint Compound for Vitrified Clay and Concrete Pipe.** Plastic joint compound shall be a homogeneous blend of bituminous or butyl rubber material, inert filler and suitable solvents or plasticizing compounds thoroughly mixed at the factory to a uniform requirements of the compound shall be in accordance with ASTM C 990. Trowel grade material shall conform to the following requirement:.

| | |
|---|---|
| Bitumen, soluble in CS2 or Butyl Rubber (Hydrocarbon Blend), ASTM D482 with 1200F (649 C) max test temperature, percent by weight (mass), min | 45 |
| Ash, percent by weight (mass) | 15-50 |
| Penetration, standard cone, 150 g, 5 sec, 25 C – use 12 ounce (340 g) can | 110-250 |

Primer, as recommended by the manufacturer, shall be used with extruded rope or flat tape types, if required to maintain the material in position while pipe sections are being joined.

**1057.9 Tubular Joint Seal.** Tubular joint seal shall be manufactured from extruded closed-cellular rubber, the base polymer being a blend of nitrile and vinyl meeting the physical requirements of ASTM D 1056, Type 2, Class C, Grade 1, and the chemical resistance requirements of AASHTO M 198. The seal shall be a single continuous part conforming to the joint shape. The outer surface shall be completely covered with a natural skin. The cross-sectional diameter and installation shall be in accordance with the manufacturer's recommendations for the size of pipe being placed.

**1057.10 Silicone Expansion Joint Sealant.** The sealant for expansion joints shall be in accordance with Sec 717.30. The silicone joint sealant shall be a rapid cure, self-leveling, cold applied, two-component silicone sealant. The sealant shall demonstrate resilience, flexibility and resistance to moisture and puncture upon curing. The sealant shall demonstrate excellent adhesion to Portland cement concrete, polymer concrete and steel over a range of temperatures from –30 to 130 F (-34 to 54 C), while maintaining a watertight seal. The sealant shall not contain any solvents or diluents that cause shrinkage or expansion during curing. Acid-cure sealants shall not be used. The date of manufacture or “use by” date shall be provided with each lot of sealant or primer. Material 12 months old or older from the date of manufacture or past the “use by” date shall not be used. The Engineer reserves the right to test representative samples from material proposed for use. The manufacturer shall certify that the sealant meets or exceeds the following test requirements before installation begins:

| Physical Properties: | Requirement |
|---|---|
| Each component as supplied:<br>Specific Gravity (ASTM D 1475)<br>Extrusion Rate (ASTM C 1183)<br>Durometer Hardness, Shore (ASTM D 2240) "00" (0 C and 25 C ± 1 C [77 ± 3 F])<br>Ozone and U.V. Resistance (ASTM C 793) | <br>1.2 - 1.4<br>200 - 550 g/minute<br>30 - 60<br><br>No chalking, cracking or bond loss after 5000 hrs. |
| After Mixing:<br>Flow<br>Tack-Free Time (ASTM C 679) | <br>Self-Leveling<br>60 minutes maximum |
| Upon Complete Cure: (ASTM D 5329[a])<br>Joint Elongation (Adhesion to concrete/ steel/polymer concrete)<br>Joint Modulus (at 100% elongation) | <br>600% minimum<br><br>3-12 psi (21 - 83 kPa) |

[a]Modified; Sample cured two days at 77 ± 2 F (25 ± 1 C) and 50 ± 5 percent relative humidity.

**1057.11 Silicone Joint Sealant for Saw Cut and Formed Joints.** The sealant for sawed and formed joint shall be in accordance with Sec 717.40. The silicone joint sealant shall be a cold applied, single component, chemically curing gray sealant with 100 percent elongation and 50 percent compressive joint movement capability. The sealant shall be type NS (Non-Sag) and the physical properties shall be in accordance with ASTM D 5893 and the following:

| Physical Properties | Requirement |
|---|---|
| Color | Gray |
| Tack free time | 35 – 75 minutes |
| Cure time | 7 days @ 75 F – 90 F (24 C – 32 C) and 45 – 55 % relative humidity |

**1057.12 Backer Rod.** The backer rod shall be closed-cell as recommend by the sealant manufacture or shall be in accordance with ASTM D 5249, Type 3.

**1057.13 Certification.** The Contractor shall furnish a manufacturer's certification for all material specified in this section. The certification shall show representative test results of the material and certify that the material supplied is in accordance with these specifications.

## SECTION 1058 POLYETHYLENE SHEETING

**1058.1 Scope.** This specification covers polyethylene sheeting for use in highway construction.

**1058.2 Polyethylene Sheeting for Curing.** Polyethylene sheeting for curing Portland cement concrete shall be white and shall be in accordance with AASHTO M 171.

**1058.3 Polyethylene Sheeting as a Bond Breaker.** Polyethylene sheeting for use as a bond breaker under bridge approach slabs shall have a minimum nominal thickness of 4.0 mils (0.10 mm) and a plain surface finish. The sheeting may be natural, clear, white or color tinted with a light color. Black or other dark colors shall not be used.

The polyethylene sheeting for bond breaking shall be in accordance with either AASHTO M 171 or ASTM D 4397, except the following properties will not apply:

(a) Reflectance requirements, AASHTO M 171 and ASTM D 4397.
(b) Moisture loss requirements, AASHTO M 171.
(c) Water vapor transmission requirements, ASTM D 4397.
(d) Luminous transmittance requirements, ASTM D 4397.
(e) Minimum net weight (mass) requirements, ASTM D 4397.

**1058.4 Certification and Acceptance**. The Contractor shall furnish a manufacturer's certification that the material supplied is in accordance with these requirements.

## SECTION 1059 PROTECTIVE COATING MATERIAL

### Section 1059.10 Protective Coating–Concrete Bents And Piers (Urethane)

**1059.10.1 Scope.** This specification covers modified urethane or polyurethane elastomeric coating to be used as shown on the bridge plans. This material will typically be applied under expansion devices for protection from deleterious agents in areas where aesthetics is not a high priority.

**1059.10.2 General Requirements**. The material shall be suitable for outdoor exposure and shall be resistant to deterioration by ultraviolet light. Additives for ultraviolet stabilization shall not be added after the original manufacturing process. The material shall be suitable for application to concrete surfaces. Surface preparation shall be in accordance with the manufacturer's recommendations. The material shall be suitable for application to obtain a thickness of 40 mils (1000 µm), dry film without runs or sags when applied to a vertical concrete surface. The material shall have a minimum shelf life, in unopened containers, of at least six months from the date of delivery.

**1059.10.3 Cured Material.** The cured material shall be in accordance with the following:

| Protective Coating – Concrete Bents and Piers (Urethane) | |
|---|---|
| **Property** | **Requirement** |
| Shore A Hardness, ASTM D 2240 (Material shall be cured in 40 mil (1 mm) thick film for 7 days at 75 ± 2 F (24 ± 1 C) at 50% relative humidity. Test specimen shall be composed of plied pieces, to a minimum 1/4-inch (6 mm) thickness). | 15, minimum |
| Tensile Strength, ASTM D 412 (Method and time of cure may be modified as recommended by the manufacturer). | 45 psi (310 kPa) , minimum |
| Elongation, ASTM D 412 (Method and time of cure may be modified as recommended by the manufacturer). | 400 percent, minimum |
| Water Vapor Permeability, ASTM D 1653 or ASTM E 96, Method BW 40 mil (1 mm) film thickness. | 0.8 perms, maximum |

**1059.10.4 Packaging.** All two-component materials shall be prepackaged to exact mixing quantities.

**1059.10.5 Manufacturer and Brand Name Qualification.** Prior to approval and use, the manufacturer shall submit a representative one-gallon (3.8 L) sample to the IDOT Bureau of Materials. Upon approval of the material, the brand name and manufacturer will be placed on a list of qualified Urethane Protective Coating Agents for Concrete Bents and Piers. The sample shall be identified by brand name, manufacturer's name and address, and shall be accompanied by the following:

(a) Manufacturer's complete material data showing typical test results for the properties specified, generic name of the major components of the material, mixing instructions, surface preparation and application instructions and intended use.

(b) Test results after 1000 hours of exposure in an accelerated weathering device, in accordance with ASTM D 822, Procedure B. The film thickness of test specimens shall be 40 mils (1000 µm) and shall show no cracking, flaking or blistering after exposure. Slight discoloration will be permitted.

(c) In lieu of the accelerated weathering test results required in Sec 1059.10.5(b), the manufacturer may submit a use history showing satisfactory performance for three years in at least two exposed applications. Name, address and telephone number of the users shall be included in the use history.

**1059.10.6 Acceptance.** The Contractor shall furnish a manufacturer's certification stating that the material supplied is in accordance with all requirements specified and that the material furnished is of the same composition as originally qualified. The Engineer reserves the right to sample the material at destination if deemed necessary.

**Section 1059.20 Protective Coating – Concrete Bents And Piers (Epoxy)**

**1059.20.1 Scope.** This specification covers two-component modified polyamide converted epoxy to be used as shown on the bridge plans. This material will typically be applied under expansion devices where aesthetics is a high priority.

**1059.20.2 Material.** The material shall be suitable for application to obtain a minimum coating thickness of 6 mils (150 µm), dry film without runs or sags when applied to a vertical concrete surface. Pot life and method and time of cure shall be in accordance with the manufacturer's recommendation. The material shall be suitable for outdoor exposure and shall be resistant to deterioration by ultraviolet light. Additives for ultraviolet stabilization shall not be added after the original manufacturing process. The material shall have a minimum shelf life, in unopened containers, of at least six months from the date of delivery.

**1059.20.2.1 Color.** The color shall be clear or concrete gray.

**1059.20.2.2 Finish.** The finish shall be high gloss.

**1059.20.3 Packaging.** Two-component material shall be prepackaged to exact mixing quantities.

**1059.20.4 Manufacturer and Brand Name Qualification.** Prior to approval and use, the manufacturer shall submit a representative one-gallon (3.8 L) sample to the IDOT Bureau of Materials.

Upon approval of the material, the brand name and manufacturer will be placed on a list of qualified Epoxy Protective Coating Agents for Concrete Bents and Piers. The sample shall be identified by brand name, manufacturer's name and address, and accompanied by the following information:

(a) Manufacturer's complete material data showing typical test results for the properties specified, generic name of the major components of the material, mixing instructions, surface preparation and application instructions and intended use.

(b) Test results after 1000 hours of exposure in an accelerated weathering device shall be provided. The tests shall be conducted in accordance with ASTM D 822 or ASTM G 154 using test cycle No. 2 defined in ASTM D 822, except that during the six hour period of darkness, the relative humidity of the air shall be 95 ± 4%. If ASTM G 154 QUV exposure testing is used, Type A lamps shall be used.

**1059.20.4.1** For either test, specific operating conditions shall be summarized and provided with the test results. The film thickness on test specimens shall be 6 mils (150 µm) and shall show no cracking, flaking or blistering after exposure. Only slight discoloration will be permitted.

**1059.20.4.2** In lieu of the accelerated weathering test results required in Sec 1059.20.4 (b), the manufacturer may submit a use history showing satisfactory performance for three years in at least two exposed applications. Name, address and telephone number of the users shall be included in the use history.

**1059.20.5 Acceptance.** The Contractor shall furnish a manufacturer's certification stating that the material supplied is in accordance with all requirements specified and that the material furnished is of the same composition as originally qualified. The Engineer reserves the right to sample the material at destination if deemed necessary.

**Section 1059.30 Concrete And Masonry Protection System**

**1059.30.1 Scope.** This specification covers clear penetrating siloxane or silane based sealer for use as shown on the bridge plans. 1059.30.2 Physical Properties. The sealer shall be breathable and non-yellowing and shall be in accordance with the following requirements:

| Concrete and Masonry Protection System | | |
|---|---|---|
| Specification Item[a] | Sealer Type | |
| | Vertical Application | Horizontal Application |
| Solids Content, percent by weight, min. | 6.7 | 20 |
| Reduction in Water Absorption, percent, min. | 80 | 85 |
| Reduction in Chloride Intrusion, percent, min. | 82 | 85 |
| Water Vapor Transmission, percent, min. | 110 | |

[a]Tested in accordance with NCHRP 244 Series tests.

**1059.30.3 Manufacturer and Brand Name Qualification.** Prior to approval and use, the manufacturer shall submit a representative one-quart (1 L) sample to the IDOT Bureau of Materials.

The sample shall be identified as to brand name, designation as to horizontal or vertical application, manufacturer's name and address, and shall be accompanied by the manufacturer's data and application sheets, and test results in accordance with Sec 1059.30.2. The manufacturer shall submit certification that the material complies with all requirements of this specification. Upon approval of the material, the brand name and manufacturer will be placed on a list of qualified Concrete and Masonry Protection Systems.

**1059.30.4 Field Approval.** Prior to application of the sealer, including bulk purchase and delivery of products, the Contractor shall prepare a minimum 12 x 12 inch (300 x 300 mm) application sample on each of the specified concrete or masonry products for the purpose of demonstrating the final effect, visual and physical/chemical, of the planned installation. The Contractor shall proceed with work only after the Engineer's acceptance of the test application for color and compatibility with the substrate.

**1059.30.5 Acceptance.** The Contractor shall furnish a manufacturer's certification stating that the material supplied is in accordance with all requirements specified and that the material furnished is of the same composition as originally approved. The Engineer reserves the right to sample the material at destination if deemed necessary.

**Section 1059.40 Sacrificial Graffiti Protection System**

**1059.40.1 Scope.** This specification covers a sacrificial graffiti protection system for application to all surfaces as shown on the bridge plans.

**1059.40.2 Physical Properties.** The sacrificial graffiti protection system shall be in accordance with the following physical properties and shall be chemically compatible with any other coatings to be used. The material shall be suitable for application to obtain a wet-film thickness of 4 to 6 mils (100-150 µm) without runs or sags when applied to a vertical surface.

| Sacrificial Graffiti Protection System | |
|---|---|
| **Item** | **Requirement** |
| Melting Point, F (C), ASTM F 766 | 165 ±5 (74 ±2.8) |
| Solids Content, min., percent by weight, ASTM D 2834 | 26 |
| Volatile Organic Content (VOC), lb/gal (g/L), max, ASTM D 3960 | 0.58 (70) |

**1059.40.3 Manufacturer and Brand Name Qualification**. Prior to approval and use, the manufacturer shall submit a representative one-gallon (3.8 L) sample to the IDOT Bureau of Materials. The manufacturer shall submit documentation to the IDOT Bureau of Materials stating brand name, manufacturer's name and address and accompanied by the manufacturer's data and application sheets. The manufacturer shall submit certification, including specific test results, that the material complies with all requirements of this specification. Upon approval of the material, the brand name and manufacturer will be placed on a list of qualified Sacrificial Graffiti Protection Systems.

**1059.40.4 Field Approval.** Prior to application of the sacrificial graffiti protection system, including bulk purchase and delivery of products, the Contractor shall prepare a minimum 12 x 12 inch (300 X 300 mm) application sample on each of the specified concrete or masonry products for the purpose of demonstrating the compatibility of the planned installation. If the sacrificial graffiti protection system is to be applied over previous coatings, the test specimen shall have already received these previous coatings. The Contractor shall proceed with work only after the Engineer's acceptance of the test application for appearance and compatibility.

**1059.40.5 Acceptance.** The Contractor shall furnish a manufacturer's certification stating that the material supplied is in accordance with all requirements specified and that the material furnished is of the same composition as originally approved. The Engineer reserves the right to sample the material at destination if deemed necessary.

**Section 1059.50 Temporary Coating – Concrete Bents And Piers (Weathering Steel)**

**1059.50.1 Scope.** This specification covers a system for protection against absorptive staining from unpainted, corrosion-resistant steel during initial weathering as shown on bridge plans.

**1059.50.2 Physical Properties.** The temporary coating shall be in accordance with the following physical properties and shall be compatible with any other coatings to be used. The material shall be suitable for application to obtain a wet-film thickness of 4 to 6 mils (100-150 µm) without runs or sags when applied to a vertical surface.

| Temporary Coating – Concrete Bents and Piers (Weathering Steel) | |
|---|---|
| **Item** | **Requirement** |
| Melting Point, F (C) , ASTM F 766 | 165 ±5 (74 ±2.8) |
| Solids Content, min., percent by weight, ASTM D 2834 | 26 |
| Volatile Organic Content (VOC), lb/gal (g/L), max, ASTM D 3960 | 0.58 (70) |

**1059.50.3 Manufacturer and Brand Name Qualification.** Prior to approval and use, the manufacturer shall submit a representative one-gallon (3.8 L) sample to the Engineer for submittal to the IDOT Bureau of Materials and Physical Research. The manufacturer shall submit documentation to the Engineer stating brand name, manufacturer's name and address, and accompanied by the manufacturer's data and application sheets. The manufacturer shall submit certification, including specific test results, that the material complies with all requirements of this specification. Upon approval of the material, the brand name and manufacturer will be placed on a list of qualified Rust Staining Protection Systems.

**1059.50.4 Acceptance.** The Contractor shall furnish a manufacturer's certification stating that the material supplied is in accordance with all requirements specified and that the material furnished is of the same composition as originally approved. The Engineer reserves the right to sample the material at destination if deemed necessary.

**SECTION 1060 ELECTRICAL CONDUIT**

**1060.1 Scope.** This specification covers electrical conduit to be used as specified or as shown on the bridge plans.

**1060.2 Acceptance.** All material in this section will be accepted based on certification indicating the material is in accordance with this specification and any testing as required by the Engineer.

**1060.3 Material**

**1060.3.1 Rigid Metallic Conduit and Tubing.** Except for rigid aluminum conduit, rigid metallic conduit shall be galvanized on both the inside and the outside surfaces. The weight (mass) of zinc coating shall be no less than 0.5 ounce per square foot (0.15 kg/$m^2$) of coated surface, as determined in accordance with AASHTO T 65. The interior or exterior surface, or both, may be given a coating of suitable material to facilitate installation of wires and cables and to permit the conduit to be readily distinguished from pipe used for purposes other than electrical.

**1060.3.1.1 Rigid Steel Conduit, Zinc Coated.** Rigid steel conduit, zinc coated, (GRC) shall be in accordance with ANSI C80.1, except as noted herein.

**1060.3.1.2 Intermediate Metal Conduit.** Intermediate metal conduit (IMC) shall be in accordance with ANSI C80.6, except as noted herein.

**1060.3.1.3 Rigid Aluminum Conduit.** Rigid aluminum conduit (RAC) shall be in accordance with ANSI C80.5.

**1060.3.1.4 Electrical Metallic Tubing, Zinc Coated.** Electrical metallic tubing (EMT), zinc coated, shall be in accordance with ANSI C80.3 except as noted herein.

**1060.3.1.5 Fittings for Rigid Metal Conduit and Electrical Metallic Tubing.** Fittings shall be in accordance with ANSI C80.4.

**1060.3.1.6 Fittings for Intermediate Metal Conduit.** Fittings shall be in accordance with UL 1242, except the coating shall meet the same requirements as the conduit with which the fittings are used.

**1060.3.1.7 Inspection.** Conduit, tubing and fittings will be inspected for compliance with specifications. Test specimens for determination of weight (mass) of coating will be at least 2 inches (50 mm) long, cut no less than 6 inches (150 mm) from the end of the length of conduit or tubing selected for testing. If the prescribed two additional samples for retests are taken, and either sample does not comply, the lot represented will be rejected.

**1060.3.2 Rigid Non-Metallic Conduit**. Rigid non-metallic conduit shall be either polyvinyl chloride (PVC) or high-density polyethylene (HDPE).

**1060.3.2.1 Polyvinyl Chloride Conduit.** PVC conduit, bends, couplings and fittings shall be in accordance with UL 651.

**1060.3.2.2 High Density Polyethylene Conduit.** HDPE conduit shall be in accordance with ASTM D 3035 SDR11.

**1060.3.2.3 Fittings for Polyvinyl Conduit.** Fittings for PVC conduit shall be in accordance with UL 514. Cement used for the fittings shall be in accordance with the conduit manufacturer's recommendations.

**1060.3.2.4 Fittings for High Density Polyethylene Conduit.** Fittings for HDPE conduit shall be in accordance with ASTM D 2683. Epoxy used for the fittings shall be in accordance with the conduit manufacturer's recommendations.

**1060.3.2.5 Inspection and Testing.** Material will be inspected for compliance with the specifications, and samples for testing will be taken at either the project location or warehouse, as determined by the Engineer.

**1060.4 Certification.** The Contractor shall furnish a manufacturer's certification that the material supplied is in accordance with all requirements. If requested by the Engineer, the Contractor shall also furnish typical test results representative of the material.

## SECTION 1065 DELINEATORS

**1065.1 Scope.** This specification covers delineators for use in highway construction.

**1065.2 Guardrail, Median Barrier Delineator Body.** The delineator body shall be manufactured from high-impact, weather-resistant plastic and final body thickness shall be a minimum of 0.08 inch (2.03 mm). Dimensions shall be as shown on the bridge plans.

**1065.3** Not Used.

**1065.4 Retroreflective Sheeting.** The retroreflective sheeting shall be an approved MoDOT Type 7 sheeting in accordance with the following. Retroreflective sheeting shall be permanently affixed to the body of the delineator. Manufacturer's certification shall be provided for delineator sheeting.

Daytime luminance values (Y%) for all MoDOT types of reflective sheeting shall be in accordance with ASTM D 4956. Retroreflective sheeting shall be in accordance with ASTM D 4956, except as noted herein. Retroreflective sheeting shall have sufficient strength and flexibility such that the sheeting can be handled, processed and applied according to the manufacturer's recommendations without appreciable stretching, tearing, cracking or other damage. The sheeting surface shall be readily screen processed and compatible with recommended transparent and opaque screen process colors. The retroreflective sheeting manufacturer shall furnish information as to the type of solvent or solvents that may be used to clean the surface of the sheeting without detrimental loss of brightness and durability. The sheeting shall be properly orientated on the sign face to meet retroreflection requirements as specified herein.

Type 7 retroreflective sheeting shall be in accordance with ASTM D 4956, Type IV, Class 1 or 2, except as noted herein.

Type 7 retroreflective sheeting shall meet or exceed the minimum coefficient of retroreflection requirements shown below, expressed as candelas per footcandle per square foot (candelas/lux/m2).

| Type 7 Retroreflective Sheeting<br>Minimum Coefficient of Retroreflection | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Observ. Angle, Degrees | Entrance Angle, Degrees | White | Yellow | Red | Green | Blue | Orange | Brown |
| 0.2 | -4 | 430 | 350 | 110 | 45 | 20 | 250 | 24 |
| 0.2 | +30 | 235 | 190 | 48 | 24 | 11 | 110 | 10 |
| 0.5 | -4 | 200 | 160 | 45 | 20 | 9.8 | 100 | 8 |
| 0.5 | +30 | 135 | 85 | 26 | 10 | 5 | 50 | 3 |

Outdoor Exposure. Retroreflective sheeting, except for work zone signs, shall be submitted by the manufacturer to NTPEP for two years of 45-degree south-facing outdoor exposure. Retroreflective sheeting for work zone signs shall be submitted by the manufacturer to NTPEP for an exposure time of one year. Results shall be published by NTPEP and available for MoDOT review. For all NTPEP test decks, retroreflective sheeting shall have a coefficient of retroreflection at least 50 percent of the original reading for Type 1 or 80 percent of the original reading for Type 3 and Type 7.

## SECTION 1066 MORTARS AND GROUT

**1066.1 Scope.** This specification covers mortars and grout for use in pipe joints, rubble and brick masonry.

**1066.2 Mortars and Grout.** Mortars and grout shall be mixed in small quantities as needed and shall not be retempered or used after setting has begun. Type I Portland cement shall be accordance with Sec 1019. Sand shall be clean and shall be in accordance with Sec 1005, except the minus No. 200 (75 µm) sieve requirement will not apply. Water shall be in accordance with Sec 1070.

**1066.2.1 Mortar For Pipe Joints.** Mortar shall consist of one part Type I Portland cement and two parts sand, by volume, mixed with sufficient water to form a plastic mortar.

**1066.2.2 Mortar for Grout.** Mortar used for grout shall consist of one part Type I Portland cement and three parts sand, by volume, mixed with sufficient water to form a grout of proper consistency.

**1066.2.3 Mortar For Rubble and Brick Masonry.** The mortar shall be composed of one part Portland cement plus 10 percent, by volume, of hydrated lime and of two parts sand by volume. Hydrated lime shall be in accordance with ASTM C 207, Type N. After the dry material has been thoroughly mixed, water shall be added, and the mixture shall be turned and chopped by hand or mechanical methods until a stiff mortar results. Mortar shall be mixed no more than 30 minutes prior to use. Mortar for pointing shall be mixed in the proportions of one part Portland cement to one part sand by volume.

### 1066.2.4 Expansive Mortar

**1066.2.4.1 Aluminum Powder Expansive Mortar.** The mortar shall consist of one part Type I Portland cement and three parts sand, by volume, mixed with sufficient water to form a stiff plastic mortar. Unpolished aluminum powder at the rate of 4 grams per sack (1 g/10 kg) of cement shall be thoroughly dry mixed with the cement before incorporation with other ingredients.

**1066.2.4.2 Other Expansive Mortars.** Upon approval from the Engineer, other expansive mortars may be used. The expansive mortars shall contain no more than 0.02 percent chlorides by weight (mass) and, when subjected to a pull-out test, shall equal or exceed the results of tests conducted using the material specified in Sec 1066.2.4.1.

## SECTION 1070 WATER

**1070.1 Scope.** This specification covers water for use in mixing and curing concrete, and for use in mortar and grout.

**1070.2 Requirements.** Water for use in mixing and curing concrete, and in mortar and grout, shall be reasonably clean and shall be free from injurious quantities of deleterious substances such as oil, acid, alkali, salt or organic matter. Potable water may be accepted without being tested. Requirements for testing water for mixing or curing purposes may be waived if in the judgment of the Engineer, the water is considered satisfactory for the purpose.

**1070.3 Testing.** As required by the Engineer, and if laboratory testing shows that the pH of the water is less than 4.5 or more than 9.5, or that the water contains deleterious substances, the following requirements shall also be met. Autoclaved bars, made with the water and a cement that shows satisfactory soundness when mixed with distilled water, shall show an expansion not to exceed 0.5 percent. The compressive strength at seven days of a mortar consisting of one part cement and 2.75 parts of natural silica sand and the water being tested shall show a reduction of no more than 10 percent of the compressive strength developed by 1:2.75 mortar containing the same cement and sand and mixed with distilled water.

## SECTION 1073 JOINT MATERIAL FOR STRUCTURES

**1073.1 Scope.** This specification covers material for performed compression seals and strip seals with lubricant-adhesive for sealing joints, and expanded or extruded polystyrene material for use as bedding material under prestressed panels and in the corrugation areas of stay-in-place forms used on bridge decks.

**1073.2 Acceptance.** All material under this specification shall be obtained from a source identified on the MoDOT PAL designated for this specification. For information on the PAL see Sec 106.12 of these Special Provisions. All material will be inspected and accepted in accordance with Sec 106.12.

**1073.3 Preformed Compression Seal.** Preformed compression seals shall be in accordance with ASTM D 3542 and with the following additional requirements.

**1073.3.1** The movement range of the seal as defined in ASTM D 3542 shall be as shown in the contract documents, and the height of seal shall be no less than the nominal width. The seal shall be delivered in containers marked with the manufacturer's name, size of the seal, lot number and date of manufacture.

**1073.3.2** The lubricant adhesive applied for installation shall be in accordance with the seal manufacturer and in accordance with Sec 717. The lubricant adhesive shall be delivered in containers marked with the manufacturer's name, lot number, date of manufacture and instructions for storage and use.

**1073.4 Strip Seal.** Strip seals shall be in accordance with ASTM D 2628 and the following additional requirements.

**1073.4.1** The gland lugs of the seal that fasten into the steel extrusion shall be of a type that exerts pressure to the contact surfaces. Glands with snap or arrowhead-type lugs will not be permitted. The seal shall be delivered in containers marked with the manufacturer's name, size of the seal, lot number and date of manufacture.

**1073.4.2** The lubricant adhesive applied for bonding the gland to the steel extrusion shall be as recommended by the seal manufacturer and in accordance with Sec 717. The lubricant-adhesive shall be delivered in containers marked with the manufacturer's name, lot number, date of manufacture and instructions for storage and use.

**1073.5 Expanded or Extruded Polystyrene Material**

**1073.5.1 Bedding Material for Prestressed Panels**. The expanded or extruded polystyrene material shall be in accordance with the following:

| Property | Test | Requirement |
|---|---|---|
| Compression Strength | ASTM D 1621 | 60 psi (420 kPa), min. |
| Water Absorption | ASTM D 2842 | 2% by volume, max. |
| Oxygen Index | ASTM D 2863 | 24 minimum |

**1073.5.2 Material for Corrugation Areas of Stay-In-Place Forms.** Expanded polystyrene material shall be in accordance with the following:

| Property | Test | Requirement |
|---|---|---|
| Compression Strength | ASTM D 1621 | 10 psi (69 kPa), min. |
| Water Absorption | ASTM D 2842 | 2% by volume, max. |

**1073.5.3 Adhesive for Expanded or Extruded Polystyrene Materials.** Adhesive for use with expanded or extruded polystyrene material shall be in accordance with the polystyrene manufacturer's recommendations.

**1073.6 Documentation.** Prior to approval and use of this material, the manufacturer shall submit to the IDOT Bureau of Materials a certified test report showing specific test results in accordance with all requirements of these specifications. The certified test report shall contain the manufacturer's name, brand name of material, lot tested and date of manufacture. In addition, the manufacturer shall submit a sample of the seal or polystyrene material and a one-pint (0.5 L) sample of the adhesive for laboratory testing, accompanied by a technical data sheet and an MSDS.

With approval by the Engineer of the certified test report and satisfactory results of tests performed on the sample submitted, the brand name and manufacturer will be placed on the appropriate pre-acceptance list. Pre-acceptance lists are available through MoDOT Construction and Materials or MoDOT's web site. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed, and may be required when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

## SECTION 1080 STRUCTURAL STEEL FABRICATION

**1080.1 Scope.** This specification covers the fabrication and inspection of bridges and structures made of structural steel and miscellaneous metals.

**1080.2 Material.** Except as amended by Sec 1080.2.4, all material shall be in accordance with the 1000 series Special Provisions-Material Details included herein, and specifically as follows:

| Item | Section / Specification |
|---|---|
| Shear Connectors | 1037 |
| Paint for Structural Steel | 1045 |
| Coating of Structural Steel | 1081 |
| Structural Carbon Steel | AASHTO M 270, Grade 36 (250)<br>ASTM A 709, Grade 36 (250) |
| Structural Low Alloy Steel | AASHTO M 270, Grade 50 (345)<br>ASTM A 709, Grade 50 (345)<br>AASHTO M 270, Grade 50W (345W)<br>ASTM A 709, Grade 50W (345 W) |
| Quenched and Tempered Alloy Steel | AASHTO M 270, Grade HPS 50W (HPS 345W)<br>ASTM A 709, Grade HPS 50W (HPS 345W)<br>AASHTO M 270, Grade HPS 70W (HPS 485W)<br>ASTM A 709, Grade HPS 70W (HPS 485W)<br>ASTM A 709, Grade 100/100W (690/690W) |
| Low Carbon Steel Bolts and Nuts | ASTM A 307 |
| High Strength Bolts, Nuts and Washers | AASHTO M 164 (ASTM A 325)<br>AASHTO M 253 (ASTM A 490) |
| Cold Finished Carbon Steel Shafting | AASHTO M 169 (ASTM A 108) |
| Carbon Steel Forgings | AASHTO M 102 (ASTM A 668)<br>Class F |
| Alloy Steel Forgings | AASHTO M 102 (ASTM A 668)<br>Class G |
| Gray Iron Castings | AASHTO M 105 (ASTM A 48)<br>Class 50 |
| Malleable Iron Castings | ASTM A 47 |
| Carbon Steel Castings | AASHTO M 103 (ASTM A 27)<br>Grade 485-275 |
| Galvanized Coatings | AASHTO M 111 (ASTM A 123) |
| Lead for Bearing Pads | ASTM B 29 |

**1080.2.1 Galvanized Bolts.** Bolts, nuts and washers specified to be galvanized shall be galvanized in accordance with the requirements of AASHTO M 232 (ASTM A 153), Class C or shall be mechanically galvanized in accordance with AASHTO M 298 (ASTM B 695), Class 55. Except for anchor bolts, galvanizing thickness shall not exceed 6 mils (150 µm). Fasteners installed prior to the completion of shop blast cleaning will not require galvanizing. The thickness of the zinc coating for galvanized bolts shall be measured on the wrench flats and top of the bolt head. For mechanically galvanized bolts, the significant surfaces as referenced in AASHTO M 298 (ASTM B 695) shall be the entire bolt surface, excluding the underside of the surface of the head and the shank surface between the threaded portion and the underside of the head. The thickness of the zinc coating on the galvanized nuts shall be measured on the wrench flats. For mechanically galvanized nuts, the significant surfaces shall be all surfaces of the nut excluding the threads. The thickness of the zinc coating on galvanized washers shall be measured on both sides. The significant surfaces on mechanically galvanized washers shall be all surfaces of the washer.

**1080.2.2 Fit Up Bolts.** Fit up and shipping bolts shall be coated to prevent corrosion where a finish coat will not be applied. Shipping bolts for uncoated weathering steel will not require coating.

**1080.2.3 Falsework**. Falsework material will be subject to the Engineer's approval. All falsework material shall be in good condition such that the material performs as designed. Falsework piling shall be capable of withstanding driving to a depth sufficient to develop adequate bearing.

**1080.2.4 Certified Mill Test Reports.** For structural steel, the Contractor shall submit a copy of the certified mill test report giving the chemical analysis and results of physical tests on the material furnished. The mill test report shall state the location of the mill where the molten metal was produced. Two copies of the mill test report will be required for material used in railroad structures. If steel is produced outside the United States, the Contractor shall submit a certified test report from an IDOT approved U. S. laboratory showing specific results of chemical analysis and physical tests for each heat furnished and stating that the material meets the specification requirements. Mill tests and laboratory reports shall be submitted for approval before any request is made for shop or field inspection. In addition, the Engineer may take samples for chemical analysis and physical tests from the fabricated steel delivered to the project site. Any time or cost effects caused by obtaining and analyzing samples from delivered steel shall be anticipated by the Contractor as part of the quality assurance process and no compensation or additional time will be allowed for costs or delays associated with this activity. Unless otherwise specified, the supplementary requirements of AASHTO M 270 (ASTM A 709) for Charpy V-notch impact tests in temperature zone 2 shall be mandatory where the contract documents indicate notch toughness is required for fracture critical or non-fracture critical components. Mill test reports shall include the results of Charpy V-notch testing and impact serial numbers for fracture critical components.

**1080.2.5 High Strength Fastener Assemblies.** In addition to the requirements of Sec 712.2, high strength bolts, nuts and washers shall meet the following requirements. The Contractor shall furnish a manufacturer's certification showing results of tests performed. Identification in accordance with the appropriate AASHTO/ASTM specifications shall be maintained by container markings which shall match identifying numbers on the certifications and be traceable to the certified mill test reports.

High strength fastener assemblies shall be galvanized unless used with unpainted weathering steel or specifically indicated otherwise by the contract documents. When high strength bolts are used with weathering steel, the fasteners shall be Type 3. AASHTO M 253 (ASTM A 490) bolts shall be installed black, tensioned and then cleaned and coated with the coating system as specified on the bridge plans. The cleaning and the zinc coating shall not be applied by any process, which can cause hydrogen embrittlement. All certification testing requirements and mill test reports referenced in the following sections shall be in accordance with Sec 106.

**1080.2.5.1 Bolts.** All bolts shall be in accordance with AASHTO M 164 (ASTM A 325) except when ASSHTO M 253 (ASTM A 490) bolts are specified on the bridge plans. If the Contractor elects to use load indicator bolts, only a hex head will be permitted. The type of head used shall be consistent throughout the entire structure, unless otherwise approved by the Engineer.

**1080.2.5.1.1 Proof Load Tests.** Proof load tests in accordance with ASTM F 606 Method 1 shall be performed. Minimum test frequency shall be in accordance with AASHTO M 164 (ASTM A 325).

**1080.2.5.1.2 Wedge Tests.** Wedge tests on full size bolts, in accordance with ASTM F 606, paragraph 3.5 shall be performed. If bolts are to be galvanized, tests shall be performed after galvanizing. Minimum test frequency shall be in accordance with AASHTO M 164 (ASTM A 325).

**1080.2.5.2 Nuts.** All nuts shall be in accordance with AASHTO M 292 (ASTM A 194) as applicable or AASHTO M 291 (ASTM A 563), except as follows.

**1080.2.5.2.1 Nut Grades.** Ungalvanized nuts shall be grades 2, C, D or C3 with a minimum Rockwell hardness of 89 HRB or Brinell hardness 180 HB or heat treated grades 2H, DH or DH3. Nuts that are to be galvanized shall be heat treated grade 2H, DH or DH3.

**1080.2.5.2.2 Overtapping.** Nuts to be galvanized shall be tapped oversize the minimum amount required for proper assembly. The amount of overtap in the nut shall be such that the nut will assemble freely on the bolt in the coated condition and shall be in accordance with the mechanical requirements AASHTO M 291 (ASTM A 563) and the rotational-capacity test. The overtapping requirements of ASTM A 563 will apply, except these limits shall be considered maximum values instead of the minimum, as currently shown.

**1080.2.5.2.3 Nut Lubrication.** All galvanized nuts, including ASTM A 194 nuts, shall meet the supplementary requirements of ASTM A 563. Galvanized nuts shall be lubricated with a lubricant containing a dye of any color that contrasts with the color of the galvanizing.

**1080.2.5.2.4 Proof Load Tests.** Proof load tests in accordance with ASTM F 606 shall be performed. Minimum test frequency shall be in accordance with AASHTO M 291 (ASTM A 563) or AASHTO M 292 (ASTM A 194). If nuts are to be galvanized, tests shall be performed after lubricating.

**1080.2.5.2.5 Weathering Steel.** When Type 3 fasteners are specified for use with weathering steel, nuts shall be in accordance with AASHTO M 291 (ASTM A 563) and shall be grades C3 or DH3. 1080.2.5.3 Washers. All washers shall be in accordance with AASHTO M 293 (ASTM F 436). Hardness testing shall be performed on galvanized washers. The coating shall be removed prior to taking hardness measurements.

**1080.2.5.4 Rotational-Capacity Tests**. Rotational-capacity tests shall be performed on all bolt, nut and washer assemblies by the manufacturer or distributor prior to shipping. Washers shall be part of the test, regardless if they are required as part of the installation procedure or not. Tests shall be conducted after galvanizing when galvanizing is required.

**1080.2.5.4.1 Test Methods.** Except as modified herein, the rotational-capacity test shall be performed in accordance with AASHTO M 164 (ASTM A 325).

**1080.2.5.4.2 Test Lots.** Each combination of bolt production lot, nut lot and washer lot shall be tested as an assembly. Where washers are not required as part of the installation procedures, washers need not be included in the lot identification. A rotational-capacity lot number shall be assigned to each combination of lots tested. The minimum frequency of testing shall be two assemblies per rotational-capacity lot.

**1080.2.5.4.3 Testing Device.** The bolt, nut and washer assembly shall be assembled in a Skidmore-Wilhelm Calibrator or an acceptable equivalent device.

**1080.2.5.4.4 Minimum Rotation.** The minimum rotation, from a snug tight condition, 10 percent of the specified proof load, shall be as follows:

| Minimum Bolt Rotation | |
|---|---|
| **Bolt Length** | **Rotation** |
| ≤ 4 Diameters | 240° (2/3 turn) |
| > 4 Diameters and ≤ 8 Diameters | 360° (1 turn) |
| > 8 Diameters | 480° (1 1/3 turn) |

**1080.2.5.4.5 Required Tension.** The tension reached at the above rotation shall be equal to or greater than 1.15 times the required installation tension. The installation tension and the tension for the turn test for AASHTO M 164 (ASTM A 325) and ASSHTO M 253 (ASTM A 490) bolts shall be as follows:

| Required Bolt Tensions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Diameter, in.** | **1/2** | **5/8** | **3/4** | **7/8** | **1.00** | **1-1/8** | **1-1/4** | **1-3/8** | **1-1/2** |
| **(mm)** | **(12.7)** | **(15.9)** | **(19.0)** | **(22.2)** | **(25.4)** | **(28.6)** | **(31.8)** | **(34.9)** | **(38.1)** |
| AASHTO M 164 (ASTM A 325) | | | | | | | | | |
| Req. Installation Tension, kips (kN) | 12 (53) | 19 (85) | 28 (125) | 39 (173) | 51 (227) | 56 (249) | 71 (316) | 85 (378) | 103 (458) |
| Turn Test Tension, kips (kN) | 14 (62) | 22 (98) | 32 (142) | 45 (200) | 59 (262) | 64 (285) | 82 (365) | 98 (436) | 118 (525) |
| AASHTO M 253 (ASTM A 490) | | | | | | | | | |
| Req. Installation Tension, kips (kN) | 15 (627) | 24 (107) | 35 (156) | 49 (218) | 64 (285) | 80 (356) | 102 (454) | 121 (538) | 148 (658) |
| Turn Test Tension, kips (kN) | 17 (76) | 28 (125) | 40 (178) | 56 (249) | 74 (329) | 92 (409) | 117 (520) | 139 (618) | 170 (756) |

**1080.2.5.4.6 Torque.** After the required installation tension has been exceeded, one reading of tension and torque shall be taken and recorded. The torque value shall be as follows:

Torque ≤ 0.25 PD

Where:
Torque = measured torque, foot-pounds (N-m)
P = measured bolt tension, pounds (N)
D = bolt diameter, feet (m)

**1080.2.5.4.7 Short Bolts.** Bolts that are too short to test in a Skidmore-Wilhelm Calibrator may be tested in a steel joint. The maximum torque requirement shall be computed using a value of P equal to the turn test tension shown in Sec 1080.2.5.4.5.

**1080.2.5.5 Reporting.** The results of all tests, including zinc coating thickness, required herein and in the applicable AASHTO/ASTM specifications and the location and date of the tests performance, shall be recorded on the appropriate document. The tests need not be witnessed by an inspection agency. The manufacturer or distributor performing the tests shall certify the results are accurate.

**1080.2.5.6 Documentation for High Strength Fastener Assemblies**

**1080.2.5.6.1 Mill Test Reports.** A Mill Test Report (MTR) shall be furnished for all mill steel used in the manufacture of the bolts, nuts or washers. The MTR shall indicate the location where the material was melted and manufactured.

**1080.2.5.6.2 Manufacturer Certified Test Reports.** The manufacturer of the bolts, nuts and washers shall furnish a Manufacturer Certified Test Report (MCTR) for each item furnished including the following information:

(a) The lot number of each of the items tested.

(b) The rotational-capacity lot number as required in Sec 1080.2.5.4.2.

(c) The results of the tests required in Sec 1080.2.5.5.

(d) The pertinent information required in Sec 1080.2.5.4.2.

(e) A statement that MCTR for the items are in conformance to this specification and the applicable AASHTO/ASTM specifications.

(f) The location where the bolt assembly components were manufactured.

(g) Rotational capacity testing if completed by the manufacturer.

**1080.2.5.6.3 Distributor Certified Test Reports.** The Distributor Certified Test Report (DCTR) shall include MCTR for the various bolt assembly components. The rotational-capacity test may be performed by a distributor in lieu of a manufacturer and shall be reported on the DCTR. The DCTR shall indicate the following if not included in the MCTR:

(a) The results of the tests required in Sec 1080.2.5.5.

(b) The pertinent information required in Sec 1080.2.5.4.2.

(c) The rotational-capacity lot number as required in Sec 1080.2.5.4.3.

(d) A statement that the MCTR are in accordance with this specification and the applicable AASHTO/ASTM specifications.

(e) Certification of galvanizing from the galvanizing supplier shall be in accordance with Sec 1080.2.1.

**1080.2.5.7 Shipping of High Strength Fastener Assemblies.** Bolts, nuts and washers, where required, from each rotational-capacity lot shall be shipped in the same container in proportionate quantities for use. If there is only one production lot number for each size of nut and washer, the nuts and washers may be shipped in separate containers. Each shipping container shall be permanently marked by the manufacturer or distributor with the rotational-capacity lot number such that identification will be possible at any stage prior to installation. The appropriate MTR, MCTR or DCTR shall be supplied in accordance with the contract documents.

**1080.2.6 Machine Bolts.** Machine bolted field connections shall be made with machine bolts having American Standard Regular Heads and Nuts of hexagonal shape and shall be in accordance with ANSI B 18.2.1 and B 18.2.2. Threads shall extend slightly beyond the nut to permit burring. One plain washer in accordance with ANSI B 18.22.1 shall be used at all slotted holes.

**1080.2.7 Cast Steel.** For cast steel, the foundry shall furnish a certified copy of foundry reports giving the chemical analysis and results of physical tests on the material from each heat. These reports shall be submitted for approval of material being furnished before any required machine work is done on the castings.

**1080.2.8 Cast Iron.** For gray iron castings, the foundry shall furnish one finished tension test specimen in accordance with AASHTO M 105 (ASTM A 48) from each heat. The required machine work shall not proceed until material being furnished has been approved. If cast steel is furnished in lieu of gray iron, the minimum tensile strength shall be 50,000 psi (345 MPa).

**1080.2.9 Identification of Metals**. The steel shall be stamped or stenciled and color striped with paint at the mill. Heat numbers shall be steel stamped or stenciled with paint at the mill. Separate markings and color codes shall be in accordance with AASHTO M 160 (ASTM A 6). The characteristic color stripes shall be placed on each part cut from the mill piece. For steels not covered by AASHTO M 160 (ASTM A 6), the fabricator shall furnish the Engineer the color coding in writing before fabrication begins. Heat numbers shall be painted on all principal pieces and these pieces shall be so noted on the shop drawings. Principal pieces for this requirement shall include all beams, flanges, webs, splice plates, cover plates, bearings, bearing stiffener plates, load bearing members of end diaphragms, pin plates, hanger plates and others as may be directed by the Engineer. Principal pieces shall include individual plates of all truss members, truss gusset plates, splice plates and floorbeam connection angles. The color code and heat number markings shall be placed on the material such that the markings are visible throughout the work of fabrication. Loss of identification on pieces or items will be cause for rejection of the pieces or items.

**1080.2.9.1 Fracture Critical Members.** Principal pieces requiring identification shall also include components of fracture critical members. Traceability of both heat numbers and impact serial numbers shall be maintained for fracture critical members and attachments.

**1080.2.9.2 Direction of Rolling.** Unless otherwise indicated in the contract documents, steel plates for main members and splice plates for flanges and main tension members shall be cut and fabricated such that the primary direction of rolling is parallel to the direction of the principal tensile or compressive stresses. The direction of rolling shall be maintained for all principal pieces during fabrication.

**1080.2.10 Steel Stamping.** Any metal die stamping of match marks and erection marks in structural steel members shall be limited to a position in the end 1 1/2 inches (38 mm) of flange plates and flange splice plates, the middle third of web plates and the outside edge of the middle third of web splice plates. Metal die stamping at other locations or for other purposes may be approved by the Engineer provided low stress dies are used. Low stress dies will be defined as those manufactured to produce impressions that are rounded at the bottom rather than sharp edged. Metal die stamping on pin plates and hanger plates will not be permitted.

**1080.3 Fabrication and Inspection**

**1080.3.1 Quality Assurance Inspection.** The Engineer will be responsible for QA inspection to assure the quality of the fabricated material. QA inspection by the Engineer will not relieve the Contractor of the responsibility to provide fabricated structural steel items in accordance with the contract documents. Sufficient QC, as necessary to assure work being performed conforms to the contract documents, shall be the responsibility of the Contractor and fabricator. Following adequate notification that QC inspections and testing by the fabricator have been performed, QA inspection will be at the option of the Engineer. Regardless of the location and degree of QA inspection, material and workmanship not meeting specified performance criteria or conforming to the contract documents or recognized good practice may be rejected at any time prior to final acceptance of the work.

**1080.3.1.1 Locations of Inspection.** QA inspection of fabricated material will be made in the shop for fabricating shops within the 48 contiguous States. Use of fabricating shops outside that 48 contiguous States is not permitted. High strength bolts, nuts and washers shall be presented for sampling at the fabrication shop performing the primary fabrication or at a location agreed to by the IDOT Bureau of Materials. In some cases, QA inspection in the fabrication shop may be waived by the IDOT Bureau of Materials and inspection made when the fabricated material is delivered to the project site.

**1080.3.1.2 Notification of Inspection**. The Engineer shall be notified at least four working days prior to the beginning of the shop fabrication so a QA inspector may be present if so desired and to allow the QA inspector to make travel arrangements. If the fabricator notifies and requests inspection and the QA inspector arrives at the location of inspection to find the material is not ready for inspection as indicated in the request, any travel costs incurred by IDOT for additional inspection shall be paid by the Contractor.

**1080.3.1.3 Access for Inspection.** The Engineer shall have full access to all parts of the shop or project site where material is being fabricated or assembled and shall be provided with every reasonable facility for determining the character of material and workmanship.

**1080.3.1.4 Field Inspection.** No increased time or compensation will be allowed for additional work, delays or additional costs as a result of QA inspection at the project site, including required repairs, including where samples were removed, refabrication, securing samples for chemical analysis and physical tests.

**1080.3.1.5 Office Space.** A suitable office area shall be provided for exclusive use by the Engineer. The office may be enclosed or semi-enclosed as available at the location of QA inspection, but shall be suitable for use as determined by the Engineer. The floor space shall be at least 120 square feet (11 $m^2$ ) unless otherwise approved by the Engineer, weatherproof, secure, insulated and lighted. The office space shall be adequately ventilated, heated and air conditioned. Electric outlets with 110-120 volt, 60 Hz current and a telephone with outside line, inter-plant and dial-up computer capabilities shall be provided. Office furniture consisting of a desk, a minimum of 30 x 60 inches (750 x 1500 mm) with drawers, a swivel desk chair with arms and a storage/filing cabinet with lock hardware and key shall be provided. All office furniture will be subject to approval by the Engineer. Should any furniture become unsatisfactory, the furniture shall be promptly repaired or replaced to the satisfaction of the Engineer. Accessible parking shall be provided near the office any time the shop is in operation on MoDOT projects. No direct payment will be made for furnishing and maintaining an acceptable office area for QA inspection.

**1080.3.1.6 Certifications.** All structural steel fabricators performing work for the following listed components of steel structures shall be certified prior to the start of fabrication under the appropriate category of the AISC Quality Certification Program as follows:

(a) Fabricators of main load-carrying components of welded plate girders, box girders, trusses and arches shall be certified under the AISC Major Steel Bridges category (Cbr). Fabricators of fracture critical members shall be certified under this category, with the additional endorsement for fracture critical capability.

(b) Fabricators of main load-carrying components for simple span or continuous rolled beam bridges and POT bearings shall, as a minimum, be certified under the AISC Simple Steel Bridge Structures category (Sbr).

(c) Fabricators of overhead sign trusses, temporary bridges and steel bearings shall, as a minimum, be certified under the AISC Conventional Steel Buildings category (Sbd).

(d) AISC certification will not be required for manufacturers of simple laminated or elastomeric bearing assemblies.

**1080.3.2 Shop Drawings.** Shop drawings for structural steel and miscellaneous metals shall be required and shall be prepared in strict accordance with the design details shown on the plans. If details are lacking, the details shall be supplied and shall conform to the design plans and specifications. All drawings shall be clear and complete and shall be thoroughly checked before submittal. Shop drawings shall be completely titled in accordance with the contract plans and shall pertain to only a single structure. Two sets of the shop drawings shall be submitted to the Engineer for approval. The prints submitted shall be legible and shall have distinct details of sufficient contrast to be suitable for microfilming. Prints that do not have the desired clarity and contrast will be returned for corrective action. One set of prints will be returned marked reviewed or approved subject to noted corrections. The Contractor shall promptly make necessary corrections and resubmit for final approval.

When shop drawings are approved, the Contractor shall furnish as many additional prints as requested. The approval of shop drawings will cover only the general design features and in no case shall this approval be considered to cover errors or omissions in shop details. The Contractor shall be responsible for the accuracy of the shop drawings, the fabrication of material and the fit of all connections. All changes in the fabrication and erection work caused by errors in shop drawings and any changes in fabrication necessary for satisfactory results shall be at the Contractor's expense. After shop drawings have been approved, no changes in dimensions or substitutions of sections shall be made without written approval from the Engineer. Shop drawings shall be revised to show any authorized changes and the required number of prints shall be furnished to the Engineer.

**1080.3.2.1 Non-Domestic Shop Drawings.** Shop drawings from fabricators located outside the 48 contiguous States shall not be accepted.

**1080.3.2.2 Weld Procedures.** All welding procedures to be used shall be prepared by the manufacturer, Contractor or fabricator as a written procedure specification. For new welding procedures, two copies shall be submitted to the Engineer for approval prior to submitting shop drawings. Approved weld procedures will be kept on file by the IDOT Bureau of Bridges and Structures and may be considered for use on multiple projects. Any changes to the parameters of an approved welding procedure shall require submittal for approval. The shop drawings submitted for approval shall indicate the welding procedure to be used for each joint.

**1080.3.2.3 Verification of Work.** By submission of shop drawings, the Contractor represents to the Department that all material, field measurements, construction requirements, performance criteria and similar data have been verified. The Contractor further represents that the shop drawings have been coordinated and verified with the details of the work to be performed by other fabricators and entities on the project. No allowance for additional costs or delays will be made to the Contractor for incorrect fabrication as a result of failure to coordinate or perform these verifications.

**1080.3.3 Fabrication.** Fabrication of all parts of the structure shall be carefully done in strict accordance with the approved shop drawings.

**1080.3.3.1 Straightening**. Straightening of any deformed structural material shall be performed by non-injurious methods prior to being worked in the shop. Sharp kinks and bends will be cause for rejection.

**1080.3.3.2 Holes.** Holes for connections of main members shall be subpunched or subdrilled and reamed while assembled in the shop or may be drilled from the solid with main members and each splice plate fully assembled in their final erected positions. Holes for floor beams and framed stringer connections shall be drilled or reamed to a steel template of sufficient thickness to center the drill accurately and all members to be secured through the same group of holes shall be drilled or reamed from the same template. Holes may be punched full size in secondary members such as lateral, longitudinal and sway bracing, lacing bars, stay plates and diaphragms. Stacking of web splice plates during drilling or reaming operations on straight girders will be permitted.

**1080.3.3.3 Reaming and Finishing of Holes.** Reaming or drilling full size from the solid shall be done while the truss, girder, continuous I-beam or other component as noted, is assembled, either in an upright position or on its side, properly adjusted for camber and sweep and after the connecting parts have been firmly fastened together. A minimum of one full span, from bearing to bearing, shall be fully assembled before reaming or drilling full size begins. Connecting parts assembled in the shop for the purpose of reaming or drilling holes for field or shop connections shall not be interchanged or reversed and shall be matchmarked. A diagram showing such marks shall be detailed on the shop drawings. Burrs resulting from reaming, drilling or punching shall be removed. All connections shall be disassembled after drilling or reaming to make these holes accessible for deburring. Required cleaning and painting shall be done after disassembly. Reamed, drilled or punched holes shall be round and perpendicular to the member. Any hole out of round more than 1/16 inch (1.5 mm) will be cause for rejection of the plate. Eighty-five percent of the holes in any group shall not show an offset greater than 1/32 inch (1 mm) between adjacent thicknesses of metal after reaming or drilling. All holes shall be drilled or reamed and aligned such that a bolt of the specified diameter will enter the hole and the head and nut will seat on the metal before tensioning.

**1080.3.3.4 Applicable Codes.** All welding, oxygen cutting, shearing and clipping and dimensional tolerances shall be in accordance with the ANSI/AASHTO/AWS D1.5: 2002, Bridge Welding Code. Tubular steel structures shall be governed by the current edition of the AWS D1.1, Structural Welding Code - Steel, in effect at the time of the contract, unless specified otherwise. Aluminum structures shall be governed by the current edition of the AWS D1.2, Structural Welding Code - Aluminum, except as amended by Sec 903, unless otherwise indicated.

**1080.3.3.5 Modifications to the Bridge Welding Code.** The following modifications to the ANSI/AASHTO/AWS D1.5 2002, Bridge Welding Code (AWS), shall apply:

**1080.3.3.5.1 AWS Sec 1.3 Paragraph 1.3.4** - Paragraph 1.3.4 shall be replaced with the following:

The gas metal arc welding process shall not be used on any structural components of bridges. Approved gas metal arc processes may be used for incidental, non-structural components as may be specifically approved by the Engineer. Tack welding with an approved gas metal arc process will be permitted for joints that will subsequently be welded using an approved submerged arc automatic welding process.

**1080.3.3.5.2 AWS Sec 1.3 Paragraph 1.3.7** - A new Paragraph 1.3.7 shall be added as follows:

All primary shop welds shall be made by approved submerged arc automatic welding processes. The automatic welding process shall be one in which the wire or electrode feed, speed of travel and guidance are all mechanically controlled. Noncompliance with this requirement will be cause for rejection of the welded material unless prior approval is granted by the Engineer for welding the specified joints by the use of other processes. The automatic welding process requirement for primary shop welds shall be shown on the shop drawings for each joint. Primary shop welds will be defined as flange and web butt welded splices in I-beams, box members and plate girders, plate girder or box flange to web fillet welds and cover plate to flange fillet welds.

**1080.3.3.5.3 AWS Sec 2.8 Paragraph 2.8.1.1** - Paragraph 2.8.1.1 shall be replaced with the following:

The minimum fillet weld size, except for fillet welds used to reinforce groove welds, shall be as shown in the following table or as calculated using procedures established to prevent cracking in accordance with Paragraph 4.2.2. In both cases, the minimum size will apply if the size is sufficient to satisfy design requirements.

| Material Thickness of Thicker Part Joined, in. (mm) | Minimum Size of Fillet Weld[a], in. (mm) |
|---|---|
| To 3/4 (20) | 1/4 (6)[b] |
| Over 3/4 (20) to 2 1/2 (64) | 5/16 (8)[b] |
| Over 2 1/2 (64) | 1/2 (14) |

[a]Except that the weld size need not exceed the thickness of the thinner part joined.
[b]Single pass welds must be used.

**1080.3.3.5.4. AWS Sec 3.2 Paragraph 3.2.2.2 (4)** - A new Paragraph 3.2.2.2 (4) shall be added as follows:

Quenched and tempered steel plate may be thermally cut provided sufficient preheating is applied according to the steel producer's written recommendations. Procedures for thermal cutting of quenched and tempered steel plate, along with the steel producer's written report, shall be submitted to the Engineer for approval prior to the start of such work.

**1080.3.3.5.5 AWS Sec 3.2 Paragraph 3.2.3.**4 - Paragraph 3.2.3.4 shall be replaced with the following:

The corrective procedures described in Table 3.1 shall not apply to discontinuities in rolled base-metal surfaces. Such discontinuities may be corrected by the fabricator in accordance with ASTM A 6 (AASHTO M 160), except that repair by welding will be permitted only when approved by the Engineer. Approval will be limited to areas where there will be less than the maximum design stress in the finished structure. When surface imperfections in alloy, low alloy and carbon steel plates are repaired by grinding, the surfaces shall have edges faired to the plate surface with a maximum slope of 1 in 10.

**1080.3.3.5.6 AWS Sec 3.2 Paragraph 3.2.11** - A new paragraph 3.2.11 shall be added as follows:

Sheared edges of plates not to be welded that are more than 5/8 inch (16 mm) thick and carrying calculated stress shall be planed to a depth of 1/4 inch (6 mm).

**1080.3.3.5.7 AWS Sec 3.3.8** - Sec 3.3.8 shall be replaced with the following:

Temporary welds shall be subject to the same WPS requirements as final welds. Temporary welds shall be removed unless otherwise permitted by the Engineer and the surface shall be made flush with the original surface. Unless previously approved in writing by the Engineer, there shall be no temporary welds for fabrication, transportation, erection or other purposes on main members except at locations more than 1/6 the depth of the web from the flanges of beams and girders. There shall be no temporary welds in tension zones of members of quenched and tempered steels. Temporary welds at other locations shall be shown on shop drawings and shall be made with approved consumables.

Removal of temporary welds shall conform to Paragraphs 3.3.7.3 and 3.3.7.4.

**1080.3.3.5.8 AWS Sec 3.4 Paragraph 3.4.6** - Paragraph 3.4.6 shall be replaced with the following:

All shop splices in each component part of a cover-plated beam or built-up member shall be made and all required nondestructive testing completed and approved by the Engineer before the component part is welded to other component parts of the member. Long members or member sections may be made by shop-splicing subsections, each made in accordance with this subsection (See 2.17.6). All shop splices shall be made using full penetration welds that fully develop the capacity of the original member. Additional shop splices required due to length limits of available material may be used if detailed on the shop drawings and placed at locations approved by the Engineer. No additional payment will be made for any additional shop splices placed in the members at the option of the Contractor, including shop splices that may be required as a result of material limitations.

**1080.3.3.5.9 AWS Sec 3.5 Paragraph 3.5.1.8.1** - A new Paragraph 3.5.1.8.1 shall be added as follows:

The maximum permissible variation from specified width for rolled or burned flange plates shall be -1/8 inch to +3/8 inch (-3 mm to +9.5 mm).

**1080.3.3.5.10 AWS Sec 3.5 Paragraph 3.5.1.9** - Paragraph 3.5.1.9 shall be replaced with the following:

The bearing ends of bearing stiffeners shall be flush and square with the web and shall have at least 75 percent of this area in contact with the inner surface of the flanges. The remaining 25 percent of the area of the bearing stiffener shall be within 0.010 inch (0.25 mm) of the inner surface of the flanges. When bearing against a steel base or seat, all steel components shall fit within 0.010 inch (0.25 mm) for 75 percent of the projected area of web and stiffeners and not more than 1/32 inch (0.8 mm) for the remaining 25 percent of the projected area. Girders without stiffeners shall bear on the projected area of the web on the outer flange surface within 0.010 inch (0.25 mm). The included angle between web and flange shall not exceed 90 degrees in the bearing length. The top surface of a flange or shelf plate supporting a steel bearing rocker shall be considered a flat surface with a tolerance of 0.003 inch per inch (0.003 mm/mm) in any direction over the projected area of the rocker. The top surface of a flange or shelf plate in direct contact with elastomeric bearings shall not deviate from a true plane surface by more than 1/16 inch (1.5 mm).

**1080.3.3.5.11 AWS Sec 3.5 Paragraph 3.5.1.16** - A new Paragraph 3.5.1.16 shall be added as follows:

Permissible variation in length of assembled beams or girders between the centerline of bearing devices shall not exceed plus or minus 1/4 inch (6 mm) for any one span or plus or minus 1/2 inch (12.7 mm) for any two or more spans within the assembled unit. The actual centerline of any bearing device shall lie within the thickness of the bearing stiffener.

**1080.3.3.5.12 AWS Sec 3.7 Paragraph 3.7.2.5** - A new Paragraph 3.7.2.5 shall be added as follows:

If, after three repairs to the same area of a weld requiring radiographic quality, there is any part of the original defect remaining or there is a new rejectable indication, the total joint shall be cut apart, all deposited weld metal removed, joint preparation made and the total joint rewelded.

**1080.3.3.5.13 AWS Sec 3.7 Paragraph 3.7.2.6** - A new Paragraph 3.7.2.6 shall be added as follows:

The gas metal arc welding process shall not be used for the repair of welds except when repairing welds made with the GMAW process.

**1080.3.3.5.14 AWS Sec 5.21 Paragraph 5.21.6.2** - A new Paragraph 5.21.6.2 shall be added as follows:

Any cost involved in qualifying welders, welding operators and tackers, including all material costs, finishing of test specimens, the physical testing of finished specimens and any radiography required shall be borne by the Contractor. Required radiography and physical testing of finished specimens shall be performed at test facilities approved by the Engineer.

**1080.3.3.5.15 AWS Sec 6.6 Paragraph 6.6.5** - Paragraph 6.6.5 shall be replaced with the following:

If the Engineer subsequently requests nondestructive testing, not specified in the original contract agreement, the Contractor shall perform any requested testing or shall permit any requested testing to be performed. Handling, surface preparation, repair welds and any nondestructive testing requested by the Engineer, as a result of weld repair, shall be at the Contractor's expense. Payment for any non-destructive testing that does not indicate the need for repair to the tested weld will be in accordance with Article 109.04 of the IDOT Standard Specifications for Road and Bridge Construction.

**1080.3.3.5.16 AWS Sec 6.7 Paragraphs 6.7.1, 6.7.1.1 and 6.7.1.2** - Paragraphs 6.7.1, 6.7.1.1 and 6.7.1.2 shall be replaced with the following:

Radiographic inspection shall be required for areas of both shop and field butt welds as specified herein. One hundred percent inspection shall be required for flanges of rolled beams and girders and 100 percent of transverse butt welds in webs for a distance of no less than one-sixth of the web depth from each flange and 25 percent of the remainder of the web depth. At least one-third of the length of all longitudinal web splices shall be radiographed at even intervals throughout the length of the splice. When a rejectable defect is found by radiography in any partially tested joint, either initially or in a later additional radiograph, tests shall be conducted on either side of and adjacent to the rejectable test area. If a rejectable defect is found in any additional areas, then 100 percent of vertical web splices and an additional 10 percent of total weld length in longitudinal web splices shall be tested. The location of these additional test areas shall be as directed by the Engineer. All complete joint penetration groove welds in T- and corner joints shall be tested by ultrasonic testing.

**1080.3.3.5.17 AWS Sec 6.10 Paragraph 6.10.3.4** - A new Paragraph 6.10.3.4 shall be added as follows:

Edge blocks shall be used when radiographing butt welds greater than 1/2 inch (13 mm) in thickness.

The edge blocks shall have a length sufficient to extend beyond each side of the weld centerline for a minimum distance of 2 inches (50 mm) and shall have a thickness equal to the thickness of the weld, plus or minus 1/16 inch (1.5 mm). The minimum width of the edge blocks shall be no less than 1 inch (25 mm). The edge blocks shall be centered on the weld with a snug fit against the plate being radiographed, allowing no more than 1/16 inch (1.5 mm) gap. Edge blocks shall be made of radiographically clean steel and the surface shall have a finish of ANSI 125µin. (3µm) or smoother (refer to ANSI/AWS D1.1-98 Structural Welding Code - Steel, Sec 6.17, Paragraph 6.17.13 and Figure 6.15).

**1080.3.3.5.18 AWS Sec 6.10 Paragraph 6.10.11.2** - Paragraph 6.10.11.2 shall be replaced with the following:

If the greatest and least thickness of a weld connecting parts of different thickness cannot be rendered with adequate contrast on a single film with a single exposure, a dual film or dual exposure technique shall be used to obtain suitable density for both the greatest and the least thickness of the weld.

**1080.3.3.5.19 AWS Sec 6.12 Paragraph 6.12.4** - A new Paragraph 6.12.4 shall be added as follows:

After completion of all radiographic inspection, the Contractor shall submit to the Engineer one set of drawing details showing the location and identification numbers of all radiographs taken.

**1080.3.3.5.20 AWS Sec 6.26 Paragraph 6.26.2.1** - Paragraph 6.26.2.1 shall be replaced with the following:

For any welds, the greatest dimension of any porosity or fusion type discontinuity that is 1/16 inch (1.5 mm) or larger in greatest dimension shall not exceed the size, B, indicated in Figure 6.8 for the effective throat or weld size involved. The distance from any porosity or fusion type discontinuity described above to another such discontinuity, to an edge or to the toe or root of any intersecting flange-to-web weld shall not be less than the minimum clearance allowed, C, indicated in Figure 6.8 for the size of discontinuity under examination.

**1080.3.3.5.21 AWS Sec 6.26 Paragraph 6.26.2.2 and Figure 6.9** - Delete paragraph 6.26.2.2 and Figure 6.9.

**1080.3.3.5.22 AWS Sec 6.26 Paragraph 6.26.3.1** - Paragraph 6.26.3.1 shall be replaced with the following:

Welds subjected to ultrasonic testing in addition to visual inspection shall conform to the requirements of Table 6.3.

**1080.3.3.6 Calibrated Tapes.** When the contract involves fabrication of a bridge with a bearing-to-bearing span of 100 feet (30 m) or more, certifications and identifying numbers of calibrated measuring tapes or numbered tapes matched to a calibrated master shall be kept on file for review by the Engineer. Certification of the measuring tape to be used or certification of the master from which the tape was matched shall be traceable to the U. S. National Bureau of Standards. Certification of tapes for shop use shall be renewed at least every two years.

**1080.3.3.7 Connection Angles.** Connection angles for floor beams and stringers shall be flush and shall be correct as to position and length of member. If milling is required, no more than 1/16 inch (1.5 mm) shall be removed from the thickness of the angles.

**1080.3.3.8 Longitudinal Stiffeners.** Longitudinal girder web stiffeners shall be a single length if possible. If more than a single length is necessary, such lengths shall be joined by a full penetration butt weld. The location of these butt welds shall be shown on the shop drawings for each joint and shall be subject to approval by the Engineer. Runoff plates in accordance with AWS Section 3.12 shall be used. The welds shall be radiographically tested and accepted in accordance with AWS Sec 6.10 prior to being attached to the web.

**1080.3.3.9 Pins.** Pins shall be furnished true to size and shall be straight, smooth and free from flaws. Pins shall be provided with hexagonal chamfered nuts. The screw ends shall be sufficiently long to permit burring the threads when members are connected. Pilot and driving nuts shall be furnished for each size of pins where required. Threads for all pins and bolts shall conform with the ANSI B1.1 Free Fit - Class 2 Series except that when recessed nuts are specified, pin ends requiring a threaded diameter of 1 3/8 inches (35 mm) or more shall have six threads per inch (25 mm). If standard nuts are specified for this size pin, a minimum of four threads to the inch (25 mm) shall be used.

**1080.3.3.10 Pin Holes.** Pin holes shall be bored true to size, smooth and straight, at right angles to the axis of the member and parallel with each other. The boring shall be done after the member is assembled and welded. The center-to-center distance of pin holes shall be correct within 1/32 inch (0.8 mm) for an individual component or member. The diameter of pin holes shall not exceed that of the pin by more than 1/50 inch (0.5 mm) for pins 4 inches (100 mm) or less in diameter or no more than 1/32 inch (0.8 mm) for pins larger than 4 inches (100 mm) in diameter.

**1080.3.3.11 Casting.** Castings shall be free from inclusions of foreign material, casting faults, injurious blow holes or other defects which render the castings unsuitable for the service intended. Castings shall be properly filleted at re-entrant angles. No tolerance will be allowed below the dimensions shown on the bridge plans for thicknesses over an appreciable area of the casting. A reasonable oversize will not be cause for rejection.

Bent plates shall be cold bent and taken from the stock plates such that the bend line will be at right angles to the direction of rolling. The radius of bends, measured to the concave face of the metal, shall be in accordance with the requirements as shown in the table below, in which "T" is the thickness of the plate. If a shorter radius is required, the plates shall be hot bent. Hot bent plates shall be bent at right angles to the direction of rolling. Before hot or cold bending, the corners of the plate shall be rounded to a radius of 1/16 inch (1.5 mm) throughout that portion of the plate at which the bending is to occur.

| Angle Through Which Plate is Bent | Minimum Radius |
|---|---|
| 61 degrees to 90 degrees | 1.0 T |
| Over 90 degrees to 120 degrees | 1.5 T |
| Over 120 degrees to 150 degrees | 2.0 T |

**1080.3.3.13 Surface Finish.** Bearing plates of rolled steel not requiring a surface finish shall be straightened to a plane surface. The surfaces of plates of rolled steel or cast material which are to be in contact shall be finished as shown on the bridge plans and the final finish shall be prepared in a manner to give at least 50 percent contact as indicated by standard machinist's blue test. Rockers and pedestals made from rolled steel shall be finished after welding. If a flat surface is shown on the bridge plans, the tolerance shall be 0.003 inch per inch (0.003 mm/mm) in any direction. Flat surfaces in full contact shall be finished at right angles to each other. Bearing plates shall be assembled in sets. The surface finish of bearing and base plates and other bearing surfaces that are to come in contact with each other or with concrete shall meet the following surface roughness requirements as defined in ANSI B 46.1, Surface Roughness, Waviness and Lay, Part I:

| Surface Roughness Requirements | Micro-inches (μm), Max. |
|---|---|
| Steel Slabs | 2000 (51) |
| Heavy Plates in Contact in Shoes to be Welded | 1000 (25) |
| Milled Ends of Compression Members, Stiffeners and Fillers | 500 (12) |
| Bridge Rollers and Rockers | 250 (6) |
| Pins and Pin Holes | 125 (3) |
| Sliding Bearings | 125 (3) |

**1080.3.3.14 Horizontally Curved Rolled Beams and Plate Girders.** If the bridge plans show rolled beams or welded plate girders to be finished to a horizontal curvature, fabrication shall be as follows:

(a) Rolled beams shall be curved by the heat curving procedure.
(b) Welded plate girders may be fabricated by cutting the flanges to the specified curvature before the girders are attached to the webs or, if not prohibited by the contract, may be curved by the heat curving procedure.
(c) If the heat curving procedure is used, the procedure shall comply with the following requirements:

(1) Material. Heat curving of rolled beams and welded plate girders shall be limited to AASHTO M 270 Grade 36 (ASTM A 709 Grade 36), AASHTO M 270 Grade 50 (ASTM A 709 Grade 50), AASHTO M 270 Grade 50W (ASTM A 709 Grade 50W) and AASHTO M 270 Grade HPS 70W (ASTM A709 Grade HPS 70W).

(2) Type of Heating. Beams and girders may be curved by either continuous or V-type heating.

(3) Temperature. The heat curving operation shall be conducted such that the temperature of the steel never exceeds 1100 F (593 C) as measured by temperature-indicating crayons or other suitable means applied before heating.

The heating of the steel to a temperature greater than 1200 F (650 C) will be considered destructive heating and will be conclusive cause for rejection of the steel. Quenching with water or water and air, will not be permitted. Cooling with dry compressed air will be permitted after the steel has cooled to 600 F (315 C).

(4) Position for Heating. The girder may be heat curved with the web in either a vertical or a horizontal position, unless noted on the bridge plans. When curved in the vertical position, the girder shall be braced or supported in such a manner that the tendency of the girder to deflect laterally during the heat curving process will not cause the girder to overturn. When curved in the horizontal position, the girder shall be supported near the ends and at intermediate points, if required, to obtain a uniform curvature. When the girder is positioned horizontally for heating, intermediate safety catch blocks shall be maintained at the mid-length of the girder within 2 inches (50 mm) of the flanges at all times during the heating process.

(5) Sequence of Operations. Heat curving shall be completed before the girder is painted. The Contractor shall submit a curving procedure addressing the attachment of stiffeners, connection plates and cover plates for review prior to commencement of the heat curving process.

**1080.3.3.15 Shop Assembly**

**1080.3.3.15.1** If required by the contract, the structural steel for bridges shall be completely shop assembled for inspection, supported only at points of bearing. Long bridges required to be entirely shop assembled may be divided into units for assembly with each unit extending from expansion device to expansion device.

**1080.3.3.15.2** Beams and girders of all other bridges shall be assembled for inspection in line assemblies with a minimum length assembled of one complete span, from bearing to bearing.

**1080.3.3.15.3** During shop assembly, connecting parts shall be firmly fastened together and held in alignment with a minimum of four drift pins and four make-up bolts per flange splice plate, web splice plate or similar connecting part, until assembly inspection is complete.

**1080.3.3.15.4** All trusses, plate girders and continuous I-beams shall be assembled to permit inspection of all parts. QA inspection of the assembly will be at the option of the Engineer.

**1080.3.3.16 Shop Measurement of Curvature and Camber.** Horizontal curvature and vertical camber will not be measured for QA inspection in the shop until all welding, drilling and heat curving operations have been completed and the flanges have cooled to a uniform temperature. For bridges not requiring complete shop assembly, the vertical camber will be checked with the girder in a horizontal position and the horizontal curvature will be checked with the girder in either a horizontal or vertical position. The shop drawings shall show the required offsets for both curvature and camber at approximately 10-foot (3 m) intervals, measured along the girder. The permissible variation in specified sweep for horizontally curved beams and girders, measured in inches (mm), but not to exceed 1/2 inch (13 mm), shall be as follows:

ENGLISH
1/8 inch x 0.1 x (number of feet from end bearing)

METRIC
3 mm x 0.1 x (number of meters from end bearing x 0.3)

**1080.3.4 Shear Connector Studs.** Shear connector studs shall be attached to the beams or girders in the field. The Contractor shall notify the Engineer no less than one week before the Contractor begins welding shear connectors to the beams or girders so the Engineer may inspect for approval the proposed welding procedure and equipment. Only welding procedures, equipment and operators meeting the requirements of Secs 1080.3.3.4, 1080.3.3.5 and 712 shall be used. Areas to which shear connectors are to be attached shall be cleaned of all foreign material, such as oil, grease or paint by a suitable method. Where a shop coat of inorganic zinc primer has been applied, removal shall be limited to the minimum area necessary to apply the studs. After completion of the welding operations, the primed area shall be touched up with a suitable inorganic zinc primer or epoxy mastic paint (non-aluminum).

**1080.3.5 Shipping.** Fabricated material shall not be shipped before a "Fabrication Inspection Shipment Release" is issued by the Engineer. All parts shall be loaded and protected to prevent damage in transit. Pins, nuts, bolts and other small parts shall be boxed or crated. The "Fabrication Inspection Shipment Release" shall be delivered by the Contractor to the Engineer at destination prior to erection of steel.

### 1080.4 Weathering Steel

**1080.4.1 Description.** This section contains provisions that shall modify, supplement and expand the requirements of the bridge plans and other provisions of Sec 1080 when the use of weathering steel is specified for structures. Weathering steel will be defined as structural steel specified under AASHTO M 270 (ASTM A 709) Grades 50W, HPS 50W and HPS 70W (Grades 345W, HPS 345W and HPS 485W) that is intended to be primarily used in a bare, uncoated application for the structure.

### 1080.4.2 High Performance Steels

**1080.4.2.1 Material Requirements.** All high performance steel shall be in accordance with the latest edition of AASHTO M 270 (ASTM A 709) and supplements. As an option, HPS 50W (HPS 345W) and HPS 70W (HPS 485W) thermomechanical-controlled-processing (TMCP) steel plates available from the manufacturer in limited thicknesses may be directly substituted for the quenched and tempered product.

**1080.4.2.2 Fabrication Requirements.** All fabrication shall be in accordance with the latest edition of the AASHTO Guide Specifications for Highway Bridge Fabrication with HPS70W Steel, an addendum to be used in conjunction with ANSI / AASHTO / AWS D1.5: 2002, except as modified by this section. Only fabricators meeting the requirements of the AISC Quality Certification Program Major Steel Bridges (Cbr) or approved equal may be used to fabricate HPS 50W (HPS 345W) and HPS 70W (HPS 485W) steel. Whenever magnetic particle testing is conducted, only the yoke technique will be permitted as described in Sec 6.7.6.2 of AWS D1.5: 2002, modified to test using alternating current only.

**1080.4.2.3 Welding Requirements for HPS.** All welding for high performance steel shall be in accordance with AASHTO / ANSI / AWS D1.5: 2002 Bridge Welding Code except as modified herein and by the latest edition of the AASHTO Guide Specifications for Highway Bridge Fabrication with HPS70W Steel. Only submerged arc and shielded metal arc welding processes shall be permitted when welding Grade HPS 70W (HPS 485W) steel. The matching submerged arc consumables using the ESAB electrode and Lincoln flux combinations, recommended in Appendix A of the guide specification shall not be allowed.

Filler metals used for single pass fillet welds or for complete joint penetration groove welds connecting Grade HPS 70W (HPS 485W) plate to ASTM A 709 Grade HPS 50W (HPS 345W) or Grade 50W (345W) may conform to the matching or undermatching requirements from AWS D1.5: 2002 as indicated in the guide specification. Moisture resistant coating shall be required for all shielded metal arc welding. The Contractor may request approval of alternate consumables in lieu of the filler metals listed in the guide specification for submerged arc welding in accordance with AWS D1.5 Table 4.1. The request for approval shall include documentation of successful welding and shall include diffusible hydrogen tests indicating the levels of diffusible hydrogen to meet the requirements of the guide specifications. Grade HPS 50W (HPS 345W) may be welded under the same requirements as ASTM A 709 Grade 50W (345W).

**1080.4.3 Cleaning.** Except for the areas of the structure to be partially coated as described in Sec 1080.4.4, all surfaces of the structural steel shall be blast cleaned in the fabrication shop to meet the requirements of the Steel Structures Painting Council (SSPC) SSPC-SP6 and may be left uncoated. Faying surfaces of connections to be shop bolted shall be blast cleaned prior to permanent assembly of the connections. After blast cleaning, the steel shall be kept clean of all foreign material. If the steel becomes contaminated, the steel shall be cleaned with a method approved by the Engineer. Girders contaminated with concrete or grout splatters shall be washed off before the material is allowed to dry.

**1080.4.4 Partial Coating.** The surfaces of all structural steel located under expansion joints, but not in contact with concrete, shall be coated with complete System H within a distance of 1 1/2 times the girder depth, but no less than 10 feet (3 m), from the centerline of all deck joints. Within this limit, items to be coated shall include all surfaces of beams, girders, diaphragms, stiffeners, bearings and miscellaneous structural steel items. The prime coat for the specified paint system shall be applied to the structural steel within the above limits in the fabrication shop. The intermediate and finish coats shall be applied in the field in accordance with Sec 1081.3.10. The color of the finish coat shall be brown. Portions of the structural steel embedded in or in contact with concrete, including but not limited to the top flanges of girders, shall be coated with no less than 2.0 mils (50 µm) of the prime coat for System H. Shear connectors may not be coated or protected from overspray.

**1080.4.4.1 Surface Preparation.** All surface preparation and application of the partial coating described herein shall be as specified in Sec 1081. Required work shall include blast cleaning for all areas to receive the specified prime coat to SSPC-SP-10 (Near White Blast Cleaning) in accordance with Sec 1081.3.2, except that areas to be primed that will be embedded in concrete may be prepared to no less than SSPC-SP-6. The limits of the areas to be shop and field coated shall be masked to provide crisp, straight lines to prevent overspray on adjacent areas.

**1080.4.4.2 Drain Bracket Coating.** The galvanized surfaces of drain support brackets shall be prepared according to the coating manufacturer's recommendation and field coated with a gray epoxy mastic primer (non-aluminum) within a distance of 6 inches (150 mm) from the point of connection to the weathering steel structure.

**1080.4.5 Bolting and Fasteners.** All fasteners, such as bolts, nuts and washers, that bolt directly to the weathering grade structural steel, including fasteners located in areas of the structure to be partially coated and fasteners for expansion device supports and similar items shall be high strength weathering fasteners with atmospheric corrosion resistance and weathering characteristics comparable with the A 709 (A 709M) weathering steel.

Bolts shall be in accordance with AASHTO M 164 (ASTM A 325) (ASTM A 325M), Type 3. Nuts shall be in accordance with the requirements of AASHTO M 291 (ASTM A 563) (ASTM A 563M) and shall be Grades C3 or DH3. Washers shall meet the requirements of AASHTO M 293 (ASTM F 436), Type 3. All other requirements of Secs 712 and 1080 relating to high strength fastener assemblies and fastener assembly installation shall remain in effect. Fasteners for slab drain brackets may be plain uncoated assemblies in accordance with Sec 1080.2.5 and coated in accordance with Sec 1080.4.5.1.

**1080.4.5.1 Coated Connections.** Weathering grade fasteners in contact with coated structural steel items or located in areas of the structure to be partially coated shall be initially prepared and coated in the field with a gray epoxy mastic (non-aluminum) after the erection of the structure in accordance with the same procedure specified in Sec 1081. The epoxy-primed fasteners shall be subsequently coated with the System H field coats specified for the structure in areas to be partially coated.

**1080.4.5.2 Cleaning.** Prior to field bolting connections of high strength fasteners, the faying surfaces shall be cleaned of loose rust by abrasive blast, power hand tools or other approved methods. Tightly adhering rust will not be required to be removed.

**1080.4.6 Welding.** All welds shall utilize welding processes and electrodes as required that will provide corrosion resistance and weathering characteristics for the welds comparable to the base metal, in accordance with the Section 4 of AWS D1.5: 2002 or as modified in Sec 1080.4.2.3.

**1080.4.7 Bearings and Anchor Bolts.** Steel bearings, plate steel for elastomeric and PTFE bearings, structural steel for POT bearings, anchor bolts, sole plates, masonry plates and associated items shall be in accordance with ASTM A 709 Grade 50W (ASTM A 709M Grade 345W). Anchor bolt nuts shall be heavy hexagon nuts in accordance with AASHTO M 291 (ASTM A 563) (ASTM A 563M), Grades C3 or DH3. The exposed surfaces of all bearings for weathering steel structures under expansion joints shall be shop primed and field coated with the complete System H in accordance with Sec 1080.4.4 and 1081.

**1080.4.8 Protection of Concrete Masonry.** All substructure concrete shall be protected from the effects of rust staining during construction in accordance with Sec 711.

**1080.4.9 Storage of Weathering Steel.** Weathering steel shall be stored under conditions that will prevent unsightly, uneven weathering and excessive corrosion. If uneven weathering occurs, the Contractor shall reclean the steel to the satisfaction of the Engineer. If cleaning does not produce satisfactory uniformity in appearance or if in the judgment of the Engineer, excessive corrosion or chemical contamination has occurred, the Contractor shall replace the material at the Contractor's expense. As a minimum, the following conditions shall be avoided and the Contractor shall take additional precautions as deemed necessary:

(a) Storage in transit, open cars or trucks for an extended period of time.
(b) Standing water on material in storage or entrapment of moisture.
(c) Contact with chemically treated lumber used for blocking or other types of foreign matter.
(d) Exposure to chlorides or other chemical contamination.

**1080.5 High Strength Bolt Installation.** Shop installed high strength bolts shall be in accordance with Sec 712.

**1080.6 Coating of Structural Steel.** Shop coating of structural steel shall meet the requirements of Sec 1081.

## SECTION 1081 COATING OF STRUCTURAL STEEL

**1081.1 Scope.** This specification covers coating new and existing bridges and structures made of structural steel and miscellanous metals.

**1081.2 Systems of Coatings.** The required system and color or choice of systems and color will be specified on the bridge plans. Each coat of the specified system shall be applied as specified on the bridge plans. The system and color of coating to be shop-applied shall be shown on the shop drawings. All coatings shall comply with local VOC (Volatile Organic Compound) regulations where the paint is applied. The system and color shall not vary for any portion of the entire structure, including material for field repairs and shall be compatible products of a single manufacturer. The Contractor shall coordinate the various items of work to ensure compliance with the requirements of this section. Approved material specifications and dry film thickness for the coating systems shall be as indicated in the following table:

| **Paint Systems for Structural Steel** | | |
|---|---|---|
| **System G (High Solids, Inorganic Zinc Silicate-Epoxy-Polyurethane)** | | |
| **Coating** | **Section** | **Dry Film Thickness, mils (µm)** |
| Prime Coat | 1045.3 | 3.0 (75) min.-6 (150) max. |
| Epoxy Intermediate Coat | 1045.4 | 3.0 (75) min.-5 (125) max. |
| Polyurethane Finish Coat, Gray or Brown | 1045.5 | 2.0 (50) min.-4 (100) max. |
| **System H (High Solids, Inorganic Zinc Silicate-Waterborne Acrylic Intermediate-Waterborne Acrylic Finish)** | | |
| **Coating** | **Section** | **Dry Film Thickness, mils (µm)** |
| Prime Coat | 1045.3 | 3.0 (75) min.-6 (150) max. |
| Waterborne Acrylic, Intermediate Coat | 1045.6 | 2.0 (50) min.-4 (100) max. |
| Waterborne Acrylic, Finish Coat, Gray or Brown | 1045.6 | 2.0 (50) min.-4 (100) max. |
| **Calcium Sulfonate System** | | |
| **Coating** | **Section** | **Dry Film Thickness, mils (µm)** |
| Calcium Sulfonate Rust Penetrating Sealer | 1045.9.2 | 1.0 (25) min. |
| Calcium Sulfonate Primer | 1045.9.3 | 4.0 (100) min. |
| Calcium Sulfonate Topcoat | 1045.9.4 | 5.0 (125) min. |
| **Aluminum & Gray Epoxy-Mastic Primer** | | |
| **Coating** | **Section** | **Dry Film Thickness mils (µm)** |
| Aluminum Epoxy-Mastic Primer | 1045.7 | 5.0 (125) min. |
| Gray Epoxy-Mastic Primer | 1045.8 | 5.0 (125) min |

## 1081.3 Protective Coating of Structural Steel

**1081.3.1 Scope.** This specification covers the preparation of previously uncoated structural steel surfaces, furnishing and applying specified coatings, protection and drying of coatings, furnishing protection from coating spatter and disfigurement, and final cleanup.

### 1081.3.2 Surface Preparation

**1081.3.2.1 Cleaning.** Oil, grease and other contaminants shall be removed in accordance with procedures from Steel Structures Painting Council specification SSPC-SP1 prior to blast cleaning. Where high strength bolts are installed prior to blast cleaning or finish coat, the lubricant on high strength bolt assemblies shall also be removed in accordance with SSPC-SP1. Surfaces to be prime coated shall be blast cleaned with abrasives in accordance with SSPC-SP10, producing a height of profile 1.5 mils (38 µm) minimum and 3.0 mils (76 µm) maximum for all systems. The appearance of the final blast cleaned surface shall be in accordance with SSPC-Vis1, Photograph A SP-10, B SP-10, C SP-10, or D SP-10. Conformance with the corresponding SP-5 photographs will also be acceptable. The blast profile shall be assessed with replica tape per ASTM D 4417, Method C. The Contractor shall make available to the Engineer access to all SSPC specifications referenced for cleaning and coating operations.

**1081.3.2.2 Preparation for Coating.** After blast cleaning, all surfaces shall be cleaned to remove any trace of blast products, dust or dirt from the surface and from all pockets and corners. The blast-cleaned surfaces shall be given the specified prime coat as soon as practical, but within 24 hours after blast cleaning. If blast cleaned surfaces rust before coating is accomplished, the surface shall be reblasted by the Contractor at the Contractor's expense. All rusted, damaged or uncoated areas, including ungalvanized nuts, bolts and washers to be prime coated in the field, shall be blast cleaned to the same degree as specified above for the applicable coating system. Care shall be exercised to ensure the blasted steel remains free of grease and oil during handling.

**1081.3.2.3 Recleaning.** When there is contamination of any blast-cleaned surface to be coated, the material shall be recleaned to the requirements of SSPC-SP10.

**1081.3.3 Limits of Coating Application.** Unless otherwise indicated on the bridge plans, the application of the intermediate and finish coats, hereinafter referred to as field coats, for Systems G and H shall be applied to the structure within the following limits.

**1081.3.3.1 Bridges over Roadways-Nonweathering Steel.** This section will not apply to bridges over railroads.

**1081.3.3.1.1** The field intermediate coat for beam and girder spans shall be applied to the surfaces of all structural steel, except that areas of steel to be in contact with concrete shall not receive the intermediate coat. The intermediate coat shall also be applied to the bearings, except where bearings will be encased in concrete. The finish coating for beam and girder spans shall include the facia girder or beams. The limits of the facia girders or beams shall include the bottom of the top exterior flanges, top of the bottom exterior flanges, the exterior web area, the exterior face of the top and bottom flange and the bottom of the bottom flange. Areas of steel to be in contact with concrete shall not receive the finish coat.

The finish coat shall also be applied to the exterior bearings, except where bearings will be encased in concrete.

**1081.3.3.1.2** The surfaces of all structural steel located under expansion joints of beam and girder spans shall be field coated for a distance of 1 1/2 times the girder depth, but no less than 10 feet (3 m) from the centerline of the joint. Within this limit, the items to be field coated shall include all surfaces of beams, girders, bearings, diaphragms, stiffeners and miscellaneous structural steel items. Areas of steel to be in contact with concrete shall not receive the field coats. The limits of the field coatings shall be masked to provide crisp, straight lines and to prevent overspray on adjacent areas.

**1081.3.3.1.3** For all truss or steel box girder spans, the above limits will not apply and all structural steel for these span types shall be field coated, except the areas of steel to be in contact with concrete.

**1081.3.3.2 Bridges Over Streams or Railroads- Nonweathering Steel**

**1081.3.3.2.1** The field coating for beam and girder spans shall include the facia girders or beams. The limits of the facia girders or beams shall include the bottom of the top exterior flanges, top of bottom exterior flanges, the exterior web area, the exterior face of the top and bottom flange and the bottom of the bottom flange. Areas of steel to be in contact with concrete shall not receive the field coats. The field coatings shall also be applied to the exterior bearings, except where bearings will be encased in concrete. The interior beams or girders shall only have the prime coat applied with no other field coating required.

**1081.3.3.2.2** The surfaces of all structural steel located under expansion joints of beam and girder spans shall be field coated for a distance of 1 1/2 times the girder depth, but no less than 10 feet (3 m) from the centerline of the joint. Within this limit, the items to be field coated shall include all surfaces of beams, girders, bearings, diaphragms, stiffeners and miscellaneous structural steel items. Areas of steel to be in contact with concrete shall not receive the field coats. The limits of the field coatings shall be masked to provide crisp, straight lines and to prevent overspray on adjacent areas.

**1081.3.3.2.3** For all truss or steel box girder spans, the above limits will not apply and all structural steel for these span types shall be field coated, except the areas of steel to be in contact with concrete.

**1081.3.4 Coating Thickness Measurement.** The dry film thickness of the coatings will be measured by magnetic-type gauges in accordance with Steel Structures Painting Council, specification SSPC-PA2. At the option of the Engineer, the adhesion of the prime coat will be measured in accordance with ASTM D 3359, Test Method A. When the adhesion is tested, each test result shall equal or exceed scale 3A. Locations for adhesion tests shall be randomly selected. Test locations shall be in areas of least visibility in the completed structure and shall be touched up in an approved manner after completion of the test. When satisfactory test results are not obtained, additional adhesion tests shall be taken to determine the area of insufficient adhesion. For these areas, the surface shall be prepared in accordance with Sec 1081.3.2.1 and the area recoated in accordance with these specifications. If additional prime coat is required to provide the specified minimum thickness, the prime coat shall be applied as soon as possible, but within 24 hours of the initial application.

**1081.3.5 Coating Material Storage.** All coating material shall be stored in accordance with the coating manufacturer's recommendations. Exposure to storage temperatures outside the range recommended in the manufacturer's specifications will be considered cause for rejection of the coating material.

**1081.3.6 Weather Conditions**

**1081.3.6.1 Temperature Limitations.** The prime coat shall be applied in accordance with the manufacturer's recommendations, except that the minimum air and steel temperature shall be no less than 34 F (1 C). Finish and intermediate coats applied over the prime coat shall be applied in accordance with the manufacturer's recommendations, which shall be furnished to the Engineer. The minimums and maximums or additional requirements established by the coating manufacturer's written specifications for recommended air or metal temperature or relative humidity will apply if those requirements are more restrictive than those specified in the contract documents.

**1081.3.6.2 Moisture Limitations.** Coatings shall not be applied in rain, snow, fog or mist, or when the steel surface temperature is less than 5 F (3 C) above the dew point. The dew point shall be determined in accordance with MoDOT Test Method TM 38. Coatings shall not be applied to wet, damp, frosted or ice-coated surfaces.

**1081.3.6.3 Application in Protected Areas.** When coatings are applied in a protected area to eliminate the weather conditions, the coated steel shall remain in the protected area until the coatings are cured.

**1081.3.6.4 Damaged Coatings.** Any uncured coatings exposed to freezing, excess humidity, rain, snow, condensation or curing temperatures outside the range recommended by the manufacturer will be considered damaged. Damaged coatings shall be permitted to dry, then shall be removed and the surface blast cleaned and recoated at the Contractor's expense.

**1081.3.7 Thinning.** Thinners will be permitted as recommended by the manufacturer's recommendations, provided VOC limits are not exceeded.

**1081.3.8 Application.** Coatings shall be applied in accordance with the Steel Structures Painting Council specification SSPC-PA1, unless otherwise specified by the product manufacturer. The manufacturer's written specifications for application, upon request, shall be submitted to the Engineer for review prior to application.

**1081.3.8.1 Application Repairs.** If deficiencies in the quality of work or material result in rejection, the Contractor shall submit a repair proposal for approval by the Engineer.

**1081.3.8.2 Curing of Coatings**. Curing time for recoating shall be within the limits of the manufacturer's recommendations. Application of the finish coat over the intermediate coat shall be accomplished within the recoat time for proper adhesion established by the manufacturer's recommendations.

**1081.3.9 Shop Coating.** All surfaces of fabricated structural steel, including areas that will be inaccessible after assembly, contact surfaces of high strength bolted connections and all surfaces to be in contact with concrete in the completed structure shall be coated in the shop with the prime coat.

The primer shall be of the type and thickness specified, except as modified by Secs 1081.3.9.1 and 1081.3.9.2. Structural steel sway bracing for the substructure may be prepared and coated in the field.

**1081.3.9.1 Contact Surfaces.** Contact surfaces of high strength bolted field splice and diaphragm connections shall be prime coated to produce a dry film thickness no less than 1.5 mils (40 µm) or more than 2.5 mils (65 µm). The limits of the coating thickness for these surfaces shall be shown on the shop drawings. The maximum limit of 2.5 mils (65 µm) may be increased provided acceptable test results in accordance with the Testing Method to Determine the Slip Coefficient for Coatings Used in Bolted Joints (AISC Specification for Structural Joints Using ASTM A 325 or A 490 Bolts, Appendix A) are submitted and approved by the Engineer. Revised shop drawings will not be required upon acceptance of the test results. The tests shall meet the requirements for the slip coefficient and creep resistance for Class B coatings and shall be performed by a nationally recognized independent testing laboratory. Any change in the formulation of the coating will require retesting, except when thinned within the limits of manufacturer's recommendations. At the Contractor's option, the contact surfaces of connections for all non-slab bearing diaphragms on non-curved girders may be prime coated with a dry film thickness of no less than 3.0 mils (75 µm) or more than 6.0 mils (150 µm), unless noted otherwise on the bridge plans.

**1081.3.9.2 Inaccessible Surfaces.** Surfaces that will not be in contact, but that will be inaccessible after assembly, shall be prime coated to produce a dry film thickness of no less than 3.0 mils (75 µm) and no more than 6.0 mils (150 µm). Dry film thickness on surfaces that will be in contact with concrete may be reduced to 2.0 mils (50 µm) provided thorough and complete coverage is obtained. Although shear connectors need not be coated, protection of the connectors from overspray when coating other parts of the beam or girder will not be necessary. Coating thickness measurements will not be made on shear connections.

**1081.3.9.3 Touch-up of Galvanized Bolts.** The galvanized coating of nuts, bolts and washers damaged during shop installation shall be shop repaired in accordance with Secs 1081.3.10.1 and 1081.3.10.1.1.

**1081.3.9.4 Inspection Prior to Coating.** No coatings shall be applied before shop inspection of fabrication has been completed. Surfaces of steel within 2 inches (50 mm) of edges to be field welded shall not be coated in the shop.

**1081.3.9.5 Erection Match Marks.** Erection match marks shall not be visible in the completed structure.

**1081.3.10 Field Coating.** Intermediate and finish coats for the specified coating system shall be applied in the field. The Contractor shall be responsible for final cleanup and field touch-up of any shop applied coating, including surface preparation and coating of field connections, welds or bolts, areas masked in the shop and all damaged or defective coating and rusted areas. Surface preparation for field touch-ups shall be performed in accordance with Sec 1081.3.2, unless otherwise approved by the Engineer. The touch-up field coat shall consist of the same coating used for the shop-applied coat. Contact surfaces of high strength bolted connections shall be protected from the intermediate and finish coats. Damage to the coating of galvanized bolts, nuts and washers where bare steel is exposed shall be repaired in accordance with these specifications or, the connection may be prepared as specified in Sec 1081.3.2, followed by a touch-up field coat application of the required coating system.

**1081.3.10.1 Field Touch-up of Galvanized Bolts.** The galvanized coating of nuts, bolts and washers damaged during installation shall be repaired. Lubricants shall be removed in accordance with SSPC-SP1. Rust shall be removed in accordance with SSPC-SP-2 or SSPC-SP-3. Touch-ups shall consist of the application of an approved gray epoxy mastic. The touch-up material shall be compatible with and from the same manufacturer as the coating system to be used for the structure. Prior to field coating operations, the Contractor shall submit information on the specific products to be used, including compatibility data and applicable recoating times, to the Engineer for review. Subsequent coatings shall be applied within the recoat time recommended by the manufacturer.

**1081.3.10.1.1 Touch-up Color.** For areas of the structure that will not receive a field coat, the color of the touch-up material for bolts specified in Sec 1081.3.10.1 shall be similar to galvanized metal.

**1081.3.10.1.2 Previously Repaired Material.** If repairs to the galvanized coating of shop-installed nuts, bolts and washers have previously been performed in accordance with Sec 1081.3.9.3 or if epoxy mastics are otherwise shop-applied to structural steel, the Contractor shall be responsible for any special field preparation required for proper adhesion of subsequent field coats to the epoxy coating. Prior to field coating operations, the Contractor shall submit the manufacturer's recommendations to the Engineer.

**1081.3.10.1.3 Masking.** Previously coated or adjacent areas shall be masked or otherwise protected from material used to touch-up the galvanized coating of fasteners.

**1081.3.10.2 Sequence of Work**. Field coatings, except for touch-up and coating of inaccessible surfaces, shall not be applied until the concrete deck has been placed, the forms removed and all concrete spatter, foreign material and contaminants are removed from existing coatings, unless otherwise approved by the Engineer. Prior to submittal of alternative application methods, the Contractor shall present methods to be used to prevent damage to the intermediate and final field coatings. The sequence of work shall be arranged to provide ample time for each coat to cure before the next coat is applied. The intermediate field coats shall be free of all oil, grease, dust or dirt prior to application of the next coat. Intermediate or prime coats that have been exposed to chlorides used in snow removal operations shall be cleaned by power washing as defined in Sec 1081.5.3.2.2 prior to application of the subsequent intermediate or final coats. In no case shall a coat be applied until the previous coat has been approved by the Engineer. Excessive rust streaks or coatings on concrete masonry shall be removed by sandblasting or by other approved methods without damage to the masonry.

**1081.3.10.3 Work Under Stage Construction Contracts.** If complete field coating is not included in the contract for erection of structural steel, the touch-up coating of newly erected work and the coating of surfaces that will be inaccessible after erection shall be included as part of the work to be performed under the contract for erection. Field coating under any contract that does not include the erection shall include cleaning, preparation of any previously applied coatings, repairs and spot application of coatings required at the time the work is performed. Prior to field coating structural steel that was erected under a previous contract, the Contractor shall submit the manufacturer's recommendations to the Engineer, outlining requirements for cleaning and preparation of all existing coatings. The manufacturer’s recommendations shall include requirements for preparation of epoxy mastics previously applied for touch-up or other purposes.

**1081.3.10.4 Partial Applications.** If partial application of the field finish coats to a structure as provided in Sec 1081.3.3 is required or permitted, the Contractor shall perform field touch-up coating to areas of the structural steel outside the limits to receive the intermediate and finish coats. Touch-up shall be in accordance with in Sec 1081.3.10 and at the Contractor's expense.

**1081.3.11 Identification.** The Contractor shall, at the completion of the coating application, stencil in black paint on the structure the number of the bridge, the word "COATED", the system used and the month and year the coating was completed. The letters shall be capitals approximately 3 inches (75 mm) high. The legend shall be stenciled on the outside face of an outside stringer or girder near each end of the bridge as directed by the Engineer.

**1081.3.12 Property and Traffic Protection.** The Contractor shall protect pedestrian, vehicular, railroad and other traffic, persons and property, upon, beneath and in the vicinity of the structure and all portions of the bridge against damage or disfigurement by blast media, blast residue, coatings, coating material, equipment or by any other operations.

**1081.4 Not Used**

**1081.5 Not Used**

**1081.6 Galvanized Metal.** Galvanizing shall be applied after fabrication. Galvanized material on which the galvanizing has been damaged will be rejected or may, with approval from the Engineer, be repaired in the field by the zinc alloy stick method. Required field welds and adjacent areas on which galvanizing has been damaged shall be galvanized by this same method. The area to be regalvanized shall be thoroughly cleaned, including the removal of slag on welds. Touch-up of galvanizing of sheet material less than 3/16 inch (5 mm) may be completed by the use of an approved aluminum epoxy mastic coating if the material will not be in direct contact with concrete or with an approved non-aluminum epoxy mastic coating if the material will be in direct contact with concrete.

**1081.7 Aluminum & Gray Epoxy-Mastic Primer**

**1081.7.1 Scope.** This specification covers the application of other approved primer coatings for touch-up and other repair applications.

**1081.7.2 Surface Preparation.** The epoxy-mastic shall be applied over an SSPC-SP2, SSPC-SP3 or SSPC-SP6 surface preparation, including removal of all rust scale, loose rust, loose mill scale and loose or non-adherent paint. Oil and grease shall be removed in accordance with SSPC-SP1 Solvent Cleaning. Areas adjacent to required areas will not be required to be masked to prevent overspray.

**1081.7.2.1 Environmental Regulations.** The surface preparation operation shall be in accordance with all local, state and federal regulations, including those defined in Sec 1081.4.3.2.

**1081.7.2.2 Collection of Residue.** The collection of residue shall be in accordance with Sec 1081.4.3.3 and 1081.5.3.1.3.

**1081.7.3 Application.** Material application methods, air and surface temperatures and relative humidity shall be in accordance with the manufacturer's written instructions and Sec 1081.3.

The most restrictive application and environmental requirements for the epoxy-mastic shall be used when applying the primer to the steel.

## TM 14 SOUNDNESS TEST OF COARSE AGGREGATE- WATER-ALCOHOL FREEZE METHOD

This method covers the procedure for determining the soundness of coarse aggregate using the water - alcohol freeze method.

### 14.1 Apparatus

(a) Freeze Chamber - Top-opening chamber capable of maintaining test temperature of 0.0 ± 5.0 F (-17.8 ± 2.8 C) when fully loaded.

(b) Thawing Tank - Metal, approximately 15 in. wide x 13 in. high x 60 in. (inside dimensions), fitted with stirring device, water level indicator and removable lids. Maximum capacity 12 samples per tank.

(c) Specimen Pans - Seamless aluminum cake pans, approximately 8 in. square x 2 5/8 in. deep, with slight taper on sides. (One pan easily accommodates the 2500 gram test specimen of aggregate).

### 14.2 Sample Preparation

(a) Samples consist of crushed stone, gravel, or ocher coarse aggregate. (If received as ledge stone, sample is crushed in laboratory, using a large jaw-type crusher.)

(b) Sample is oven dried overnight at 230 ± 9 F (110 ± 5 C).

(c) Allow sample to cool, and prepare freeze test specimen consisting of the following factions:

3/4 in. - ½ in., 1200 grams
1/2 in. - 3/8 in., 700 grams
3/8 in. - # 4, 600 grams
Total - 2500 grams

(d) Place prepared sample in specimen pan and proceed as explained in 14.4, Test Method.

### 14.3 Water-Alcohol Solution

Add 0.5% by volume, (one-half of one percent), Methyl Alcohol to ordinary tap water. Solution should be maintained from 65° F to 75° F during test period. Solution can usually be kept within these temperature limits by having sufficient volume of solution for number of specimens under test to prevent the solution from becoming too cold during the thaw cycle. The actual ratio required is based on experience. The laboratory has immersion heaters, which can be used if necessary. One charge of water - alcohol solution is used for 16 cycles or one complete freeze-thaw test.

### 14.4 Test Method

(a) Soak sample 24 hours in water.

(b) Drain water from sample, submerge in water-alcohol solution for a period of one hour.

(c) Remove sample from solution, drain off most of the solution, leaving approximately ½ in. solution in bottom of pan.

(d) Place samples in freezer so each shelf has a single layer of pans.

(e) Freezing Cycle:
15 1/4 hours, during night
6 1/4 hours, during day

(f) Thawing Cycle: Remove sample from freezer, submerge in solution for one hour. After one hour immersion, pour off excess solution, (leaving 1/2" in bottom of pan). Let solution drain from outer surfaces of pan for 15 minutes, then return sample to freezer.

(g) Number of cycles - 16 cycles constitutes a complete test.

(h) Determining Amount of Loss

Following final thawing period in water - alcohol solution, wash sample over No. 8 sieve, and dry in oven overnight at 230 ± 9 F (110 ± 5 C). Sieve washed and dried sample over No. 8 sieve, and weigh material retained on No. 8 sieve. Subtract this weight from original weight of sample to obtain amount of loss in grams.

Percent Loss = Loss (g) / Original Weight of Sample (g)

**Note:** "Sample", as it appears in(a) through (f), means aggregates and specimen pan, as one unit.

## TM 38 DETERMINATION OF DEW POINT FOR STRUCTURAL STEEL PAINTING

This method determines the dew point for painting structural steel.

### 38.1 Apparatus

(a) Sling Psychrometer (20°-125° F)
(b) Hygrometer (commercially called Humidicator)
(c) Dry bulb thermometer (20°-125° F)
(d) Surface thermometer (0°-150° F or a 0°-300° F magnetic thermometer)

### 38.2 Procedure

Dew point will be determined by one of the two procedures included in this test method. Procedure No. 1 is by use of a Sling Psychrometer and is to be considered referee in case of dispute.

Procedure No. 2 is by use of any calibrated hygrometer that indicates directly or indirectly the relative humidity of the air. The Engineer will determine the procedure to be used for determining dew point.

**38.2.1 Procedure No. 1 – Determination of Dew Point by Sling Psychrometer**

Determine the dry bulb and wet bulb temperature using a Sling Psychrometer.

The thermometers, wet-bulb coverings, water, location and preparing of the instrument shall be as follows:

(a) Thermometers – Two ASTM Precision Thermometers, either No. 62, 63, or 64, as specified in ASTM Specification E1, for ASTM Thermometers, or thermometers of equivalent or better accuracy. The thermometers shall be matched to one scale division, or better, within the range used and shall be mounted in such a manner as to prevent the air that passes the wet bulb from contacting the dry bulb.

(b) Wet-Bulb Covering – The bulb of the wet-bulb thermometer shall be completely covered with a close-fitting fabric wick of clean muslin, bleached cotton, linen, or other soft unsized material, of a soft-mesh tubular weave. The wick shall extend beyond the bulb and onto the stem of the thermometer, for at least one inch.

(c) Water – Clean water shall be used to wet the wick. If distilled water is available, its use will allow the wick to have a longer effective life. Temperature of the water should be the same as or slightly below the ambient temperature.

(d) Preparing Instrument – Moisten the covering of the wet bulb thoroughly with clean water. A small bottle or porous porcelain cup will serve as a convenient water container. (If a porous porcelain cup is used for storing water, the water will be self-cooled to approximately the correct temperature.) If the wick fabric is new or dry through disuse, several minutes may be required for complete saturation. Avoid touching the fabric with the fingers, which may deposit oil or dirt. Replace the wick when soiled. The dry bulb shall be maintained absolutely dry at all times.

(e) Location – When preparing for and performing the test, avoid locations where proximity to machinery, direct heat from the sun, or other sources of radiation would have undue influence. Stand preferably facing the air current so that the instrument receives the air before the air has passed near you. Greatest accuracy can be achieved when your clothing and skin surface have had time to come into approximate equilibrium with the atmospheric air.

Immediately after whirling the sling for 15-20 seconds, read both thermometers quickly but carefully. Read the wet bulb first. Under ordinary conditions, an approximate 0.27° F (0.15° C) error in wetbulb depression results in a one percent error in relative humidity. While the thermometers are read, keep surfaces at temperatures other than the environment, such as the hands, face, and either warmer or colder objects, as far as possible from the sensitive mercury bulbs.

Repeat the test as many times as necessary until three successive readings agree. It will be necessary to rewet the covering of the wet bulb when the fabric starts to dry, as indicated by change in appearance of the fabric.

After obtaining the dry and wet-bulb temperatures, enter Table 38.3 with these two known points and read dew point directly from the table in degrees F. If necessary, use straight- line interpolation of dew point to the nearest 0.5 °F.

Determine the temperature of the surface of the steel by using a surface thermometer. The surface temperature of the steel must be above the dew point before beginning the painting of structural steel.

**38.2.2 Procedure No. 2 – Determination of Dew Point by Dry Bulb Thermometer and Hygrometer**

Determine the ambient temperature using the dry bulb thermometer. Obtain the relative humidity from a hygrometer.

The hygrometer shall be calibrated before it is used to determine dew point. The hygrometer shall be considered satisfactory when the percent relative humidity correlates within ± 5 percent as calibrated by using Procedure No. 1 and Table 38.5. After initial calibration, the frequency of calibration will be determined by the Engineer but shall be at least once a year.

After obtaining the dry bulb temperature and relative humidity, enter Table 38.4 with these two known points and read dew point directly from the table in degrees F. If necessary, use straight-line interpolation of dew point to the nearest 0.5 F.

Determine the temperature of the surface of the steel using a surface thermometer. The surface temperature of the steel must be above the dew point before beginning the painting of structural steel.

Table 38.3

# DEW POINT CHART
## Dry Bulb vs. Wet Bulb Temperature (degrees F)
## Dew Point, degrees F

**DRY BULB**

| | | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 30 | <20 | | | | | | | | | | | | |
| W | 35 | 27 | <20 | <20 | | | | | | | | | | |
| E | 40 | 40 | 34 | 26 | <20 | <20 | | | | | | | | |
| T | 45 | | 45 | 40 | 33.5 | 25 | <20 | <20 | | | | | | |
| | 50 | | | 50 | 45.5 | 41 | 35 | 27 | <20 | <20 | <20 | | | |
| B | 55 | | | | 55 | 51.5 | 47.5 | 43 | 37 | 30 | 21 | <20 | <20 | |
| U | 60 | | | | | 60 | 57 | 54 | 50 | 46 | 41 | 35 | 27.5 | <20 |
| L | 65 | | | | | | 65 | 62.5 | 59.5 | 56.5 | 53 | 49 | 45 | 40 |
| B | 70 | | | | | | | 70 | 68 | 65.5 | 63 | 60 | 57 | 54 |
| | 75 | | | | | | | | 75 | 73 | 71 | 69 | 66.5 | 64.5 |
| | 80 | | | | | | | | | 80 | 78.5 | 76.5 | 75 | 73 |
| | 85 | | | | | | | | | | 85 | 83.5 | 82 | 80.5 |
| | 90 | | | | | | | | | | | 90 | 88.5 | 87.5 |
| | 95 | | | | | | | | | | | | 95 | 94 |
| | 100 | | | | | | | | | | | | | 100 |

1. Determine dry bulb and wet bulb temperatures.
2. Determine Dew Point directly from table. Use straight line Interpolation, to nearest 0.5F, if necessary.

The temperature of the surface of the steel must be above the Dew Point before painting can begin.

Table 38.4

## DEW POINT CHART
### Dry Bulb Temperature (degrees F) vs. Relative Humidity (percent)

**DRY BULB**

| | | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R | 10 | | | | | | | | <20 | 20 | 23 | 25 | 29 | 33 |
| E | 15 | | | | | | <20 | 21 | 25 | 9 | 32.5 | 3 6 | 40 | 44 |
| L | 20 | | | | | <20 | 23 | 27.5 | 31 | 35 | 40 | 44 | 47.5 | 51.5 |
| A | 25 | | | | <20 | 24 | 28.5 | 32.5 | 37 | 41 | 45.5 | 49.5 | 53.5 | 58 |
| T | 30 | | <20 | 20 | 24 | 28 | 33 | 37.5 | 41 | 46 | 50 | 54.5 | 58.5 | 63 |
| I | 35 | | <20 | 24 | 28 | 32.5 | 37 | 41 | 45 | 49.5 | 54.5 | 59 | 63 | 67.5 |
| V | 40 | 20 | 21 | 26.5 | 31 | 36 | 40.5 | 45 | 49 | 53 | 58 | 62.5 | 67 | 71.5 |
| E | 45 | 21 | 24.5 | 29 | 34 | 38.5 | 43 | 47.5 | 52 | 56.5 | 61.5 | 66 | 70.5 | 75 |
| | 50 | 22.5 | 26.5 | 31.5 | 37 | 41 | 46 | 50.5 | 55 | 59.5 | 64.5 | 69 | 73.5 | 78 |
| H | 55 | 25 | 29.5 | 34.5 | 39 | 43.5 | 48 | 53 | 58 | 62 | 67 | 71.5 | 76 | 81 |
| U | 60 | 27 | 32.5 | 37 | 41.5 | 46 | 50.5 | 55.5 | 60 | 65 | 69.5 | 74.5 | 79 | 83.5 |
| M | 65 | 29 | 34 | 39 | 43.5 | 48 | 52.5 | 57.5 | 62.5 | 67 | 72 | 76.5 | 81 | 86 |
| I | 70 | 30 | 36 | 40.5 | 45.5 | 50 | 55 | 59.5 | 64.5 | 69 | 74 | 79 | 83.5 | 88 |
| D | 75 | 32 | 37.5 | 42.5 | 47 | 52 | 56.5 | 61.5 | 66.5 | 71.5 | 76 | 81 | 85.5 | 90.5 |
| I | 80 | 34 | 39 | 44 | 48.5 | 54 | 58.5 | 63.5 | 68.5 | 73.5 | 78 | 83 | 88 | 92.5 |
| T | 85 | 35 | 40.5 | 45.5 | 50.5 | 55 | 60.5 | 65.5 | 70 | 75 | 80 | 85 | 89.5 | >93 |
| Y | 90 | 37 | 42.5 | 47 | 52 | 57 | 62 | 67 | 72 | 77 | 82 | 86.5 | 91.5 | >93 |
| | 95 | 38.5 | 43.5 | 48.5 | 53.5 | 58.5 | 63.5 | 68.5 | 73.5 | 78.5 | 83.5 | 88.5 | >93 | >93 |
| | 100 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |

1. Determine dry bulb temperature (Ambient temperature).
2. Determine relative humidity. May be determined using a Humidicator.
3. Enter the table with dry bulb temperature and relative humidity, read Dew Point. Use straight line interpolation to nearest 0.5 F, if necessary.

The temperature of the surface of the steel must be above the Dew Point before painting can begin.

Table 38.5

**RELATIVE HUMIDITY CHART**
**Dry Bulb vs. Wet Bulb Temperature (degrees F)**

**DRY BULB**

| | | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 30 | 22 | <2 | <2 | | | | | | | | | | |
| | 35 | 60 | 30 | 10 | <2 | <2 | | | | | | | | |
| W | 40 | 100 | 65 | 37 | 20 | 5 | <2 | <2 | | | | | | |
| E | 45 | | 100 | 67 | 43 | 26 | 12 | 3 | <2 | <2 | | | | |
| T | 50 | | | 100 | 70 | 48 | 31 | 19 | 9 | 3 | <2 | <2 | | |
| | 55 | | | | 100 | 73 | 52 | 36 | 24 | 15 | 8 | 3 | <2 | <2 |
| B | 60 | | | | | 100 | 75 | 55 | 40 | 29 | 20 | 13 | 8 | 4 |
| U | 65 | | | | | | 100 | 77 | 58 | 44 | 33 | 24 | 17 | 12 |
| L | 70 | | | | | | | 100 | 78 | 61 | 47 | 36 | 28 | 21 |
| B | 75 | | | | | | | | 100 | 79 | 63 | 50 | 39 | 31 |
| | 80 | | | | | | | | | 100 | 80 | 65 | 52 | 42 |
| | 85 | | | | | | | | | | 100 | 81 | 66 | 54 |
| | 90 | | | | | | | | | | | 100 | 82 | 68 |
| | 95 | | | | | | | | | | | | 100 | 83 |
| | 100 | | | | | | | | | | | | | 100 |

Relative Humidity
1. Determine dry bulb and wet bulb temperatures.
2. Determine relative humidity directly from table. Use straight line interpolation if necessary.

## TM 71 DELETERIOUS CONTENT OF AGGREGATE

This test method determines the deleterious content of fine and coarse aggregates.

### 71.1 Apparatus

1) Containers of such a size and shape to contain the sample.
2) Sieves - No. 4 (4.75 mm) and No. 16 (1.18 mm).
3) Water to wet particles for observation.
4) Balance sensitive to within 0.5 percent of the weight (mass) of sample to be weighed.

### 71.2 Procedure for Coarse Aggregate Deleterious

#### 71.2.1 Preparation

The sample shall be tested in an "as obtained" condition. The obtained sample shall be sieved over a No. 4 (4.75 mm) sieve, discarding the material passing the sieve. The material retained shall be the test sample used to determine the deleterious content.

#### 71.2.2 Sample Size

Recommended minimum test sample sizes of plus No. 4 (4.75 mm) material are as follows:

| Maximum Size[1], in. (mm) | Sample Size, g |
|---|---|
| 2 (50) | 10,000 |
| 1 ½ (37.5) | 9,000 |
| 1 (25.0) | 5,000 |
| 3/4 (19.0) | 3,000 |
| 1/2 (12.5) | 2,000 |
| 3/8 (9.5) | 1,000 |
| [1] Maximum size is defined as the smallest sieve through which 100 percent of the material will pass. | |

**71.2.3 Test**

Each individual particle comprising the sample shall be examined piece-by-piece and separated into the various constituents as required by the specifications and in accordance with the descriptions shown in 71.6, Deleterious Definitions. The sample may be rinsed at the time of examination but shall not be soaked in water. Material not considered deleterious may be discarded except as needed for review. Each deleterious constituent shall be weighed, and the weight recorded. In some instances when required by the specification, the constituents are to be combined prior to weighing.

**71.3 Procedure for Fine Aggregate Deleterious**

**71.3.1 Lightweight (Low Mass Density) Particle Content including Coal and Lignite**

The test shall be in accordance with AASHTO T 113, however lightweight (low mass density) sand particles are not considered deleterious lightweight (low mass density) particles.

**71.3.2 Percent Other Deleterious Substances, Clay Lumps and Shale in Fine Aggregate**

**71.3.2.1 Preparation**

Recommended test sample size is approximately 200 grams, before sample is sieved over the No. 16 sieve.

**71.3.2.2 Sample Size**

The sample shall be tested in a dry condition (dried to a constant weight). Sample shall be sieved over a No. 16 sieve, discarding material passing the sieve. The material retained shall be the test sample used to determine the clay lumps and shale.

**71.3.2.3 Procedure**

The test sample shall be visually examined for shale, clay lumps and other deleterious substances. Particles may be lightly rinsed at the time of examination, but shall not be soaked in water. The deleterious substances shall be separated out into the constituents required by specification.

Shale is determined by using a non-glazed ceramic bowl (Plastic Index bowl). If particles leave a black mark on the bowl when pressure is applied to the material while moving it across the bottom of the bowl, this material is considered shale.

### 71.4 Calculations for Deleterious Content

The percentage of a deleterious substance shall be calculated as follows:

P = 100 x C / W

Where:

P = Percentage of each deleterious substance component.
C = Actual weight (mass) of deleterious substance for that component.
W = Weight (mass) of test sample for the portion retained on the No. 4 sieve

### 71.5 Reports

Report the percent deleterious obtained for each constituent required by specification, to the nearest tenth (0.1).

### 71.6 Definitions of Deleterious Materials

The definition of deleterious material varies with the intended use and the anticipated affect on the final product.

#### 71.6.1 Coarse Aggregate for Portland Cement Concrete

For coarse aggregate for portland cement concrete (Sec 1005), the following definitions apply:

##### 71.6.1.1 Deleterious Rock

Deleterious rock includes the following material:

(1) Shaly rock. A rock that is generally contaminated with shale to a high degree. Color may vary but the rock usually has a dull gray appearance and is reasonably uniform in appearance. Also may occur in the form of numerous shale lines or seams closely spaced throughout the particle, thus giving a laminated or streaked appearance.

(2) Cap plus 20 percent. A rock particle with a line of demarcation of a layer or “cap” of shale or shaly rock which usually occurs on one face, but may be found on two faces; in either case, the summation of the percent of “caps” exceeds 20 percent of the volume of the rock particle.

(3) Extremely soft and/or porous rock. A rock which can be readily broken with the fingers. In some cases, due to the size or shape of the rock it cannot be broken, however, small areas can be spalled or chipped off with the fingers. Porosity or high absorption may be detected by rapid disappearance of surface water or by breaking rock in half and observing the depth of penetration of moisture.

**71.6.1.2 Shale**

A fine-grained rock formed by the consolidation of clay, mud, or silt; generally having a finely stratified or laminated structure.

**71.6.1.3 Chert in Limestone**

A fine-grained rock consisting of silica minerals, sharp-edged and may be highly absorptive. May occur in the form of nodules, lenses, or layers in limestone formations; and may vary in color from white to black. Quartz-type material is excluded. Any particle that contains more than 50% chert will be entirely classified as chert.

**71.6.1.4 Other Foreign Material**

Clay lumps, mud balls, lignite, coal, roots, sticks and other foreign material not related to the inherent material being inspected.

**71.6.1.5 Material Passing No. 200 [75 µm] Sieve**

The portion of material passing a No. 200 (75 µm) sieve as determined by a washed analysis.

**71.6.1.6 Thin or Elongated Pieces**

Rock particles that have a length greater than five times the maximum thickness. In case two sizes of coarse material are required to be combined into coarse aggregate, the limitation on “thin or elongated pieces” shall apply only to the coarser size so combined and shall only apply to particles retained on the 3/4 in. (19.0 mm) sieve. In the case of coarse aggregate produced without combining two sizes, the limitation on “thin or elongated pieces” shall apply only to particles retained on a 3/4 in. (19.0 mm) sieve.

**71.6.2 Coarse Aggregate for Asphaltic Concrete, Plant Mix Bituminous Pavement, Plant Mix Bituminous and Seal Coats**

For coarse aggregate for asphaltic concrete, plant mix bituminous pavement, plant mix bituminous leveling and seal coats, the following definitions apply.

**71.6.2.1 Deleterious Rock**

Deleterious rock includes the following materials:

(1) Shaly rock. A rock that is generally contaminated with shale to a high degree. Color may vary but the rock usually has a dull gray appearance and is reasonably uniform in appearance. Also may occur in the form of numerous shale lines or seams closely spaced throughout the particle, thus giving a laminated or streaked appearance.

(2) Cap plus 20 percent. A rock particle with a line of demarcation of a layer or "cap" of shale or shaly rock which usually occurs on one face, but may be found on two faces; in either case the summation of percent of "caps" exceeds 20 percent of the volume of the rock particle.

(3) Extremely soft rock. A rock that can be readily broken with the fingers. In some cases, due to size or shape of the rock it cannot be broken, however, small areas can be spalled or chipped off with the fingers.

(4) Chert. Chert which is soft and highly absorptive is considered deleterious.

**71.6.2.2 Shale**

A fine-grained rock formed by the consolidation of clay, mud, or silt; generally having a finely stratified or laminated structure.

**71.6.2.3 Other Foreign Material**

Clay lumps, mud balls, lignite, coal, roots, sticks, and other foreign material not related to the inherent material being inspected.

**71.6.3 Coarse Aggregate for Bituminous Surface and Plant Mix Bituminous Base**

For coarse aggregate for bituminous surface and plant mix bituminous base, the following definitions apply:

**71.6.3.1 Deleterious Rock**

Deleterious rock includes the following materials:

(1) Shaly rock. A rock that is generally contaminated with shale to a high degree. Color may vary, but the rock usually has a dull gray appearance and is reasonably uniform in appearance. Pieces of rock having shaly seams, skin shale, and pieces of rock, which are not predominantly shaly, are not to be considered as deleterious.

(2) Extremely soft rock. A rock that can be readily broken with fingers, or from which small areas can be spalled or chipped off readily with the fingers.

**71.6.3.2 Shale**

A fine-grained rock formed by the consolidation of clay, mud or silt; generally having a finely stratified or laminated structure.

**71.6.3.3 Mud balls**

Balls of mud.

**71.6.3.4 Clay**

A clay material that is more or less uniformly dispersed throughout the produced product.

**71.6.3.5 Other Foreign Material**

Any material not related to the inherent material being inspected.

### 71.6.4 Coarse Aggregate for Surfacing

For coarse aggregate for surfacing, the following definitions apply:

#### 71.6.4.1 Deleterious Rock

Deleterious rock includes extremely soft rock; a rock that can be readily broken or spalled with the fingers.

#### 71.6.4.2 Shale

A fine-grained rock formed by the consolidation of clay, mud, or silt; generally having a finely stratified or laminated structure.

#### 71.6.4.3 Mud Balls

Balls of mud.

#### 71.6.4.4 Other Foreign Material

Any material not related to the inherent material being inspected.

### 71.6.5 Coarse Aggregate for Base

For coarse aggregate for base, the following definitions apply:

#### 71.6.5.1 Deleterious Rock

Deleterious rock includes extremely soft rock; a rock that can be readily broken or spalled with the fingers.

#### 71.6.5.2 Shale

A fine-grained rock formed by the consolidated of clay, mud or silt; generally having a finely stratified or laminated structure.

#### 71.6.5.3 Mud Balls

Balls of mud.

## TM 73 VOLUME OF VOIDS IN COMPACTED FILLER OR FINES

This method is from National Asphalt Pavement Association Information Series 127, Appendix A and determines the void volume in a dry-compacted mineral filler or fines (Rigden voids). The test method is based upon the assumption that the densest packing (maximum bulk density) of fines can be obtained by compacting the dry fines in a mold.

### 73.1 Applicable Documents

C 188 Specific Gravity of Hydraulic Cement
D 422 Particle Size Analysis of Soils
D 854 Specific Gravity of Soils
E 11 Specification for Wire-Cloth Sieves for Testing Purposes

### 73.2 Summary of Method

In this test method, the volume of the voids in a dry-compacted bed of mineral dust (Rigden voids) is determined by compacting the dust in a small mold.

### 73.3 Definitions

**Maximum packing** occurs when the particles are packed together in their minimum volume with a minimum void volume. Maximum packing results in a maximum bulk density.

**Bulk density** of the compacted fines is defined as the dry weight of the fines divided by the bulk volume of the compacted fines. The bulk volume includes the sum of the solid volume of the fines particles and the volume of the voids between the particles.

**Density** of the fines is defined as the dry weight of the fines divided by the solid volume of the fines particles. This density can be obtained from ASTM Test Method C 188 or D 854 or another appropriate test method.

### 73.4 Significance

The void volume in dry compacted fines (Rigden voids) is sensitive to changes in gradation and other properties of the fines, and, therefore, the dry compaction test has been proposed as a test for monitoring the uniformity of the fines collected in HMA facilities. Rigden voids can also be used to estimate the stiffening effect of the fines when mixed with asphalt cement.

### 73.5 Apparatus

#### 73.5.1 Compaction Hammer

A compaction hammer, as shown in Fig. 106.7.73.5.1.1, is required to compact the fines into the test mold. The fines are compacted in one layer, using 25 blows of the hammer.

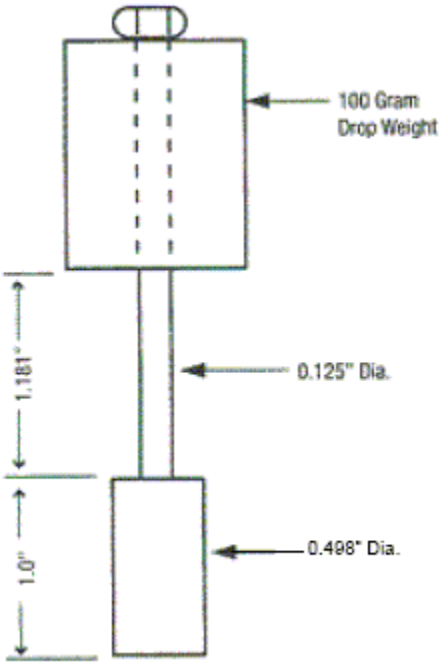


**Fig. 73.5.1.1 Compaction Hammer**

### 73.5.2 Test Mold

A test mold or sample holder, as shown in Fig. 73.5.1.2, is required for measuring the volume of the compacted bed of fines.

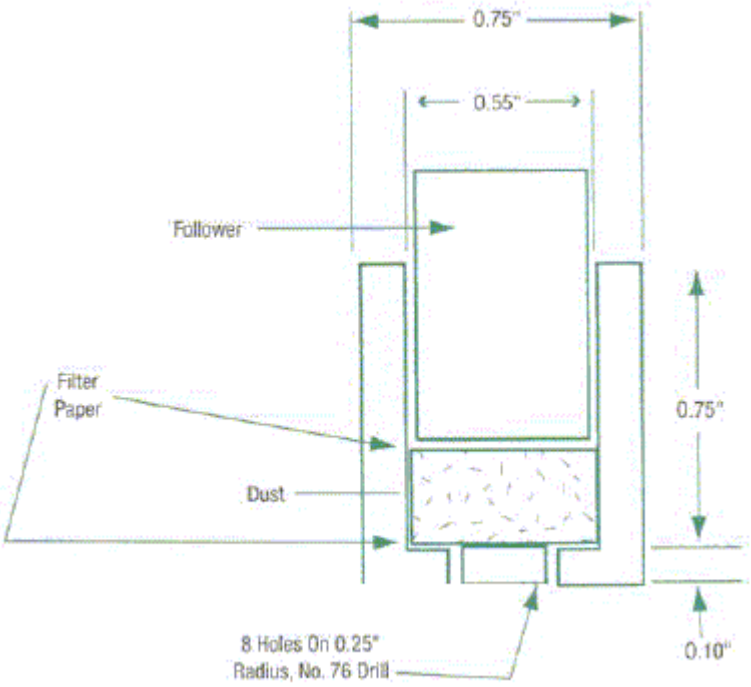


**Fig. 73.5.1.2 Sample Holder**

### 73.5.3 Compaction Pedestal

A steel block, 1 in. thick x 4 in. x 4 in. is used as a base for placing the test mold.

### 73.5.4 Thickness Measuring System

A dial gauge with 0.001 in. gradations is required for measuring the thickness of the compacted bed of fines.

### 73.5.5 Filter Membrane

Small, 1/2 in. diameter disks must be cut from Millipore No. SCWP0190R filter membrane. A round cutting tool can be used for this purpose.

### 73.5.6 Tweezers

Tweezers are needed for handling the filter disks.

### 73.5.7 No. 200 Sieve (75 µm)

A No. 200 (75 µm) sieve meeting the requirements of ASTM E 11 is needed to remove the particles larger than No. 200 (75 µm).

### 73.5.8 Balance or Scale

A balance or scale rated to 200 grams and sensitive to 0.01 gram is required.

## 73.6 Sample Preparation

The fines may be obtained from a primary or secondary dust collector, the coarse or fine aggregate, or the aggregate extracted from a mixture. Particles larger than No. 200 (75 µm) should be removed by sieving. Dry sieving is usually adequate if several sieves coarser than the No. 200 (75 µm) sieve are placed above the No. 200 (75 µm) sieve during the sieving operation to avoid overloading the No. 200 sieve (75 µm). Wet sieving should be avoided because the fine particles tend to stick together after they are dried.

## 73.7 Procedure

Use the cutting tool to cut a number of ½ in. diameter filter disks. Place two of these disks in the bottom of the sample cup, place the follower over the top of the disks, and seat the follower on the filter disks using firm finger pressure. Insert the entire assembly under the dial gauge. Record the dial gauge reading as $t_1$.

Weigh the empty mold, two filter disks, and the follower, and record the weight as $W_1$. Remove the follower and the two filter disks.

Place a filter disk in the bottom of the sample cup, making certain that it is centered and firmly in place at the bottom of the mold. Select a representative sample of minus No. 200 (75 µm) fines that weighs approximately 1.0-1.3 grams. Carefully place the fines in the sample cup over the top of the filter disk.

Place a second filter disk over the top of the fines and use the follower and firm hand pressure to seat the disk on top of the fines. This procedure will result in some initial compaction of the fines and is to be expected.

Remove the follower, place the sample cup on the steel base plate and apply 25 blows with the compaction hammer. Use caution during the compaction process to be certain that the mold is seated firmly on the compaction pedestal, the drop weight falls its full height and the drop weight falls freely.

Remove the compaction hammer and insert the follower on top of the compacted fines and filter disk. Insert the entire assembly under the dial gauge and record the dial gauge reading. $t_2$. Weigh the entire mold assembly and record as the weight $W_2$.

The specific gravity of the fines solids is required to complete the calculations. If the specific gravity of the fines solids is not known, it will be necessary to measure it using ASTM procedure C 188 or D 854. Caution: The specific gravity of the fines solids may not be the same as for the other aggregate fractions. Although kerosene has been used as a liquid for determining specific gravity, water can also be used without adversely affecting the accuracy of the results.

### 73.8 Calculations

#### 73.8.1 Notation

d = Diameter of test mold (in.)
$G_{fs}$ = Specific gravity of the fines solids
t = Thickness of compacted sample (in.)
$t_1$ = Initial dial gauge reading (in.)
$t_2$ = Final dial gauge reading (in.)
$V_{fB}$ = Bulk volume of compacted fines sample ($cm^3$)
$V_{fs}$ = Volume of fines solids ($cm^3$)
RV = Volume of voids in compacted fines or Rigden voids ($cm^3$)
%RV = Volume of voids in compacted fines expressed as percentage of bulk volume
$W_{fs}$ = Weight of dry fines solids (g)
$\gamma_w$ = Density (unit weight) of water (1.00 $g/cm^3$)

#### 73.8.2 Compacted Dust

Calculate the bulk volume of the compacted fines $V_{fB}$, in $cm^3$, as follows:

$V_{fB} = (15.7 \times \pi \times d^2 \times t) / 4$
where:
d = diameter of mold (in.)
$t = t_2 - t_1$, sample thickness (in.)

Calculate the volume of the fines solids, $V_{fs}$, in $cm^3$, as follows:

$V_{fs} = W_{fs} / (\gamma \times G_{fs})$
where:

Wfs = W2 –W1, weight of compacted fines (grams)
γ = unit weight of water, 1.000g/cm3
Gfs = specific gravity of fines solids as determined from the ASTM C 188 or D 854, or another suitable test method

Calculate the volume of the voids in compacted fines, RV (Rigden voids), as follows:

$RV = V_{fB} - V_{fS}$

Calculate the percentage of voids in the compacted fines (Rigden voids) as follows:

$\%RV_{fs} = 100 \times (V_{fB} - V_{fs}) / V_{fB}$

## TM 74 PULLOUT TESTS ON EPOXY BONDING AGENTS FOR RESIN ANCHOR SYSTEMS

This test method determines the total load in pounds (kN) required to cause failure of epoxy bonding agents for resin anchor systems for use in anchoring products such as threaded rod, and plain and epoxy coated reinforcing bars in concrete.

### 74.1 Concrete Cylinders and Anchored Products Requirements

#### 74.1.1 Concrete Cylinders

Two concrete cylinders, 6 in. x 12 in. (150 mm x 300 mm) for each bonding agent and style of anchoring product shall be prepared using a limestone coarse aggregate and moist cured for at least 28 days. Representative cylinders shall be tested and must obtain a minimum compressive strength of 6,000 psi (28 MPa).

#### 74.1.2 Reinforcing Bars

Reinforcing bars shall be Grade 60 (Grade 420) in accordance with Sec 706 and Sec 710. A #5 bar, 24 in. long shall be used for testing.

#### 74.1.3 Threaded Rods

A ½ in., Grade 8 threaded rod 24 in. long shall be used for testing.

### 74.2 Procedure

#### 74.2.1 Drilled Holes

The holes drilled in the concrete cylinders shall be 1/8 in. larger than the diameter of the bar or rod and drilled 5 in. deep. The holes shall be clean and blown dry prior to placing the bonding agent.

### 74.2.2 Bonding Agent

The placing of the bonding agent shall begin with positioning the cylinder with the hole in a horizontal position. If bulk material is furnished without a mixing tube, the bonding agent may be placed in the hole with the cylinder in a vertical position. The cylinder shall then immediately be placed in a horizontal position and the anchored product inserted. Enough bonding agent shall be placed in the hole to completely fill the cavity when the anchored product is inserted. The anchored product shall be inserted with a twisting motion sufficient for one full revolution. The cylinder shall remain in the horizontal position until curing is complete. All mixing and placing of the bonding agent shall be in accordance with the manufacturer's recommendations.

### 74.2.3 Performing Concrete Cylinder Test

The test shall be performed when the bonding agent has cured for 24 hours. The anchored product shall then be pulled from the concrete cylinder at the rate of 0.5 in. (13 mm) per minute. The pull out load shall be a minimum of 9000 pounds.

### 74.2.4. Additional Tests

The bonding agent shall be tested for pullout load in accordance to ASTM E488 by the manufacturer. The pullout tension loads shall meet the minimum values specified in Sec 1039.40. The minimum embedment depth for each anchor size shall be determined for each bonding agent.

### 74.3 Report

The report shall indicate for each test specimen, the type and size of the anchored product, the diameter of the hole, the ultimate load in pounds (kN) required to cause failure of the system, the average of the two test specimen loads, a description of the failure for each specimen and the cure time when tested. When tested in accordance to ASTM E488, the recommended embedment depth shall be noted for each anchor size to achieve the minimum specified load.

## ON-THE-JOB TRAINING SPECIAL PROVISIONS (NMRB)

Effective: April 1, 2010

This On-the-Job Training Special Provision (OJT special provision) supplements Recurring Special Provisions, Check Sheet #3: SPECIAL PROVISION FOR EEO and in the implementation of CFR 230, Subpart A.

It is the policy of the IDOT to require full utilization of all available training and skill-improvement opportunities to assure the increased participation of minority groups, disadvantaged persons and women in all phases of the highway construction industry. The intent of the OJT special provision is to recruit entry-level individuals, when feasible, and provide them with meaningful training intended to lead to journey-level employment. IDOT and its sub-recipients, in carrying out the responsibilities of a federally assisted contract, shall determine which federal-aid construction contract shall include "Training Special Provisions." Under the Training Special Provisions, the Contractor shall make every reasonable effort to enroll minority, disadvantaged persons and women trainees to the extent such persons are available within a reasonable recruitment area. This training provision is not intended, and shall not be used to discriminate against any applicant for training.

As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide training opportunities aimed at developing full journeyman in the type of trade or job classification involved. The number of trainees to be trained under this contract is **7**. In the event the Contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The Contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

Prior to commencing construction, the Contractor shall submit to the Illinois Department of Transportation for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make every effort to enroll minority trainees and women (e.g. by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The Contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by the Illinois Department of Transportation and the Federal Highway Administration. The Illinois Department of Transportation and the Federal Highway Administration shall approve a program, if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved by not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts.

Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. Accordingly, form SBE 1146 shall be submitted and approved prior to commencing work. It is the intention of these provisions that training is to be provided in the construction crafts rather then clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the Illinois Department of Transportation and the Federal Highway Administration. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the Contractor will be reimbursed $3.50 per hour of training given an employee on this contract in accordance with an approved training program. As approved by the Engineer, reimbursement will be made for training of persons in excess of the number specified herein. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the Contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirement of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program.

It is not required that all trainees be on board for the entire length of the contract. A Contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The Contractor shall furnish the trainee a copy of the program he will follow in providing the training. The Contractor shall provide each trainee with a certification showing the type and length of training satisfactorily complete.

The Contractor shall provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

Reports

The Contractor shall provide for the maintenance of records and furnish weekly reports documenting the Contractor's performance under this provision on form SBE 1014. All trainee notifications must be submitted prior to the start of the project. If a trainee has been previously approved by IDOT, the Contractor must still notify IDOT of the name of the individual(s) and proposed craft the trainees will be trained in, as well as, indicate which project the trainees will be working on. The trainee notifications or listing of the proposed trainees must be submitted via fax, mail or electronically to the District EEO Office. If the Contractor fails to submit the trainee notification or list of proposed trainees prior to the onset of the project, the Contractor will be subject to the sanctions as outlined in this OJT special provision. Weekly reports shall include at least the following information:

Contractor's name and address

Period, which the report covers

Job Number, Description, and Federal Aid number

Information for each employee being trained on the project, including:

- Trainee Name and Individual Identification Number
- Ethic Group
- Work Classification
- Status
- Hours and Days Worked
- Hours this Week
- Hours to Date

IDOT monitors contracts with training special provisions through onsite visits, investigations, weekly training and construction reports. These reports are generated by the Contractor and are to be disseminated to the Resident Engineer Office. If there are problems, the District EEO Office will contact the Contractor to address the deficiencies.

If there are deficiencies, the Contractor must provide a corrective action plan addressing the deficiencies.

No payment will be made under the bid item “Training” if the Contractor fails to provide the required training.

Payment will not be made if the Contractor fails to submit trainee reports in a timely manner.

Method of Measurement
The unit of measurement is in hours.

Basis of Payment
This work will be paid for at the contract unit price of $3.50 per hour for TRAINEES. The estimated total number of hours, unit price, and total price have been included in the schedule of prices.

Liquidated Damages

Progress payments shall be withheld for failing to comply with all OJT special provision requirements unless IDOT accepts evidence of the Contractor's good faith efforts.

If the training hours have not been obtained and evidence of good faith efforts have not been displayed upon project completion, the Contractor will be assessed liquidated damages in the amount of $7.00 per hour for those hours not realized. If the Department approves the Contractor's good faith efforts, these liquidated damages will not be assessed.

In the event the Contract will exceed the trainee goal on the project, the Contractor must submit a request to District EEO Office to obtain an extension of hours. The maximum amount of hours beyond those enumerated in the contract cannot exceed 500 hours per 1,000. For instance, if the goal was 1,000, the Contractor can be granted an extra 500 hours subject to the advance approval of the District EEO Office, and concurrence from the FHWA.

Trainee reports must be submitted in accordance with the Instruction to Contractors for Completing Form SBE 1014. Failure to submit timely reports will result in trainee hours not credited. In the cases of voluntary or involuntary trainee termination or when the trainee completes the hours specified in the program, the contractor must complete the final trainee report within five working days. The Contractor's failure to submit the proper reports in a timely manner may result in the loss of reimbursement for the training hours for that month

Failure to satisfactorily comply with the OJT special provision requirements will be reflected in the contractor's performance evaluation.

**APPROVAL OF PROPOSED BORROW AREAS, USE AREAS, AND/OR WASTE AREAS INSIDE ILLINOIS STATE BORDERS (BDE)**
Effective: November 1, 2008

Revise the title of Article 107.22 of the Standard Specifications to read:

"**107.22 Approval of Proposed Borrow Areas, Use Areas, and/or Waste Areas Inside Illinois State Borders.**"

Add the following sentence to the end of the first paragraph of Article 107.22 of the Standard Specifications:

"Proposed borrow areas, use areas, and/or waste areas outside of Illinois shall comply with Article 107.01."

**CONSTRUCTION AIR QUALITY - DIESEL VEHICLE EMISSIONS CONTROL (BDE)**
Effective: April 1, 2009 Revised: July 1, 2009

Diesel Vehicle Emissions Control. The reduction of construction air emissions shall be accomplished by using cleaner burning diesel fuel. The term "equipment" refers to any and all diesel fuel powered devices rated at 50 hp and above, to be used on the project site in excess of seven calendar days over the course of the construction period on the project site (including any "rental" equipment).

All equipment on the jobsite, with engine ratings of 50 hp and above, shall be required to: use Ultra Low Sulfur Diesel fuel (ULSD) exclusively (15 ppm sulfur content or less).

Diesel powered equipment in non-compliance will not be allowed to be used on the project site, and is also subject to a notice of non-compliance as outlined below.

The Contractor shall submit copies of monthly summary reports and include certified copies of the ULSD diesel fuel delivery slips for diesel fuel delivered to the jobsite for the reporting time period, noting the quantity of diesel fuel used.

If any diesel powered equipment is found to be in non-compliance with any portion of this specification, the Engineer will issue the Contractor a notice of non-compliance and identify an appropriate period of time, as outlined below under environmental deficiency deduction, in which to bring the equipment into compliance or remove it from the project site.

Any costs associated with bringing any diesel powered equipment into compliance with these diesel vehicle emissions controls shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed. The Contractor's compliance with this notice and any associated regulations shall also not be grounds for a claim.

Environmental Deficiency Deduction. When the Engineer is notified, or determines that an environmental control deficiency exists, he/she will notify the Contractor in writing, and direct the Contractor to correct the deficiency within a specified time period. The specified time-period, which begins upon Contractor notification, will be from 1/2 hour to 24 hours long, based on the urgency of the situation and the nature of the deficiency. The Engineer shall be the sole judge regarding the time period.

The deficiency will be based on lack of repair, maintenance and diesel vehicle emissions control.

If the Contractor fails to correct the deficiency within the specified time frame, a daily monetary deduction will be imposed for each calendar day or fraction thereof the deficiency continues to exist. The calendar day(s) will begin when the time period for correction is exceeded and end with the Engineer's written acceptance of the correction. The daily monetary deduction will be $1,000.00 for each deficiency identified.

If a Contractor or subcontractor accumulates three environmental deficiency deductions in a contract period, the Contractor will be shutdown until the deficiency is corrected. Such a shutdown will not be grounds for any extension of contract time, waiver of penalties, or be grounds for any claim.

**CONSTRUCTION AIR QUALITY - IDLING RESTRICTIONS (BDE)**
Effective: April 1, 2009

Idling Restrictions. The Contractor shall establish truck-staging areas for all diesel powered vehicles that are waiting to load or unload material at the jobsite. Staging areas shall be located where the diesel emissions from the equipment will have a minimum impact on adjacent sensitive receptors. The Department will review the selection of staging areas, whether within or outside the existing highway right-of-way, to avoid locations near sensitive areas or populations to the extent possible. Sensitive receptors include, but are not limited to, hospitals, schools, residences, motels, hotels, daycare facilities, elderly housing and convalescent facilities. Diesel powered engines shall also be located as far away as possible from fresh air intakes, air conditioners, and windows. The Engineer will approve staging areas before implementation.

Diesel powered vehicle operators may not cause or allow the motor vehicle, when it is not in motion, to idle for more than a total of 10 minutes within any 60 minute period, except under any of the following circumstances:

1) The motor vehicle has a gross vehicle weight rating of less than 8000 lb (3630 kg).
2) The motor vehicle idles while forced to remain motionless because of on-highway traffic, an official traffic control device or signal, or at the direction of a law enforcement official.
3) The motor vehicle idles when operating defrosters, heaters, air conditioners, or other equipment solely to prevent a safety or health emergency.
4) A police, fire, ambulance, public safety, other emergency or law enforcement motor vehicle, or any motor vehicle used in an emergency capacity, idles while in an emergency or training mode and not for the convenience of the vehicle operator.
5) The primary propulsion engine idles for maintenance, servicing, repairing, or diagnostic purposes if idling is necessary for such activity.
6) A motor vehicle idles as part of a government inspection to verify that all equipment is in good working order, provided idling is required as part of the inspection.
7) When idling of the motor vehicle is required to operate auxiliary equipment to accomplish the intended use of the vehicle (such as loading, unloading, mixing, or processing cargo; controlling cargo temperature; construction operations, lumbering operations; oil or gas well servicing; or farming operations), provided that this exemption does not apply when the vehicle is idling solely for cabin comfort or to operate non-essential equipment such as air conditioning, heating, microwave ovens, or televisions.
8) When the motor vehicle idles due to mechanical difficulties over which the operator has no control.
9) The outdoor temperature is less than 32 °F (0 °C) or greater than 80 °F (26 °C).

When the outdoor temperature is greater than or equal to 32 °F (0 °C) or less than or equal to 80 °F (26 °C), a person who operates a motor vehicle operating on diesel fuel shall not cause or allow the motor vehicle to idle for a period greater than 30 minutes in any 60 minute period while waiting to weigh, load, or unload cargo or freight, unless the vehicle is in a line of vehicles that regularly and periodically moves forward.

The above requirements do not prohibit the operation of an auxiliary power unit or generator set as an alternative to idling the main engine of a motor vehicle operating on diesel fuel.

Environmental Deficiency Deduction. When the Engineer is notified, or determines that an environmental control deficiency exists based on non-compliance with the idling restrictions, he/she will notify the Contractor, and direct the Contractor to correct the deficiency.

If the Contractor fails to correct the deficiency a monetary deduction will be imposed. The monetary deduction will be $1,000.00 for each deficiency identified.

**DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)**

Effective: September 1, 2000 Revised: January 1, 2010

FEDERAL OBLIGATION. The Department of Transportation, as a recipient of federal financial assistance, is required to take all necessary and reasonable steps to ensure nondiscrimination in the award and administration of contracts. Consequently, the federal regulatory provisions of 49 CFR part 26 apply to this contract concerning the utilization of disadvantaged business enterprises. For the purposes of this Special Provision, a disadvantaged business enterprise (DBE) means a business certified by the Department in accordance with the requirements of 49 CFR part 26 and listed in the Illinois Unified Certification Program (IL UCP) DBE Directory.

STATE OBLIGATION. This Special Provision will also be used by the Department to satisfy the requirements of the Business Enterprise for Minorities, Females, and Persons with Disabilities Act, 30 ILCS 575. When this Special Provision is used to satisfy state law requirements on 100 percent state-funded contracts, the federal government has no involvement in such contracts (not a federal-aid contract) and no responsibility to oversee the implementation of this Special Provision by the Department on those contracts. DBE participation on 100 percent state-funded contracts will not be credited toward fulfilling the Department's annual overall DBE goal required by the US Department of Transportation to comply with the federal DBE program requirements.

CONTRACTOR ASSURANCE. The Contractor makes the following assurance and agrees to include the assurance in each subcontract that the Contractor signs with a subcontractor:

The Contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of contracts funded in whole or in part with federal or state funds. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

OVERALL GOAL SET FOR THE DEPARTMENT. As a requirement of compliance with 49 CFR part 26, the Department has set an overall goal for DBE participation in its federally assisted contracts. That goal applies to all federal-aid funds the Department will expend in its federally assisted contracts for the subject reporting fiscal year. The Department is required to make a good faith effort to achieve the overall goal. The dollar amount paid to all approved DBE companies performing work called for in this contract is eligible to be credited toward fulfillment of the Department's overall goal.

CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined that the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. This determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates that, in the absence of unlawful discrimination, and in an arena of fair and open competition, DBE companies can be expected to perform **20.0%** of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will only award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set forth in this Special Provision:

(a) The bidder documents that enough DBE participation has been obtained to meet the goal; or
(b) The bidder documents that a good faith effort has been made to meet the goal, even though the effort did not succeed in obtaining enough DBE participation to meet the goal.

DBE LOCATOR REFERENCES. Bidders may consult the IL UCP DBE Directory as a reference source for DBE-certified companies. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217)785-4611, or by visiting the Department's web site at www.dot.il.gov.

BIDDING PROCEDURES. Compliance with this Special Provision is a material bidding requirement. The failure of the bidder to comply will render the bid not responsive.

(a) The bidder shall submit a Disadvantaged Business Utilization Plan on Department forms SBE 2025 and 2026 with the bid.

(b) The Utilization Plan shall indicate that the bidder either has obtained sufficient DBE participation commitments to meet the contract goal or has not obtained enough DBE participation commitments in spite of a good faith effort to meet the goal. The Utilization Plan shall further provide the name, telephone number, and telefax number of a responsible official of the bidder designated for purposes of notification of plan approval or disapproval under the procedures of this Special Provision.

(c) The Utilization Plan shall include a DBE Participation Commitment Statement, Department form SBE 2025, for each DBE proposed for the performance of work to achieve the contract goal. For bidding purposes, submission of the completed SBE 2025 forms, signed by the DBEs and faxed to the bidder will be acceptable as long as the original is available and provided upon request. All elements of information indicated on the said form shall be provided, including but not limited to the following:

(1) The names and addresses of DBE firms that will participate in the contract;

(2) A description, including pay item numbers, of the work each DBE will perform;

(3) The dollar amount of the participation of each DBE firm participating. The dollar amount of participation for identified work shall specifically state the quantity, unit price, and total subcontract price for the work to be completed by the DBE. If partial pay items are to be performed by the DBE, indicate the portion of each item, a unit price where appropriate and the subcontract price amount;

(4) DBE Participation Commitment Statements, form SBE 2025, signed by the bidder and each participating DBE firm documenting the commitment to use the DBE subcontractors whose participation is submitted to meet the contract goal;

(5) If the bidder is a joint venture comprised of DBE companies and non-DBE companies, the plan must also include a clear identification of the portion of the work to be performed by the DBE partner(s); and,

(6) If the contract goal is not met, evidence of good faith efforts.

GOOD FAITH EFFORT PROCEDURES. The contract will not be awarded until the Utilization Plan submitted by the apparent successful bidder is approved. All information submitted by the bidder must be complete, accurate and adequately document the good faith efforts of the bidder before the Department will commit to the performance of the contract by the bidder. The Utilization Plan will be approved by the Department if the Utilization Plan commits sufficient commercially useful DBE work performance to meet the contract goal or the bidder submits sufficient documentation of a good faith effort to meet the contract goal pursuant to 49 CFR part 26, Appendix A. The Utilization Plan will not be approved by the Department if the Utilization Plan does not commit sufficient DBE participation to meet the contract goal unless the apparent successful bidder documented in the Utilization Plan that it made a good faith effort to meet the goal. This means that the bidder must show that all necessary and reasonable steps were taken to achieve the contract goal. Necessary and reasonable steps are those which, by their scope, intensity and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not successful. The Department will consider the quality, quantity, and intensity of the kinds of efforts that the bidder has made.

Mere *pro forma* efforts, in other words, efforts done as a matter of form, are not good faith efforts; rather, the bidder is expected to have taken genuine efforts that would be reasonably expected of a bidder actively and aggressively trying to obtain DBE participation sufficient to meet the contract goal.

(a) The following is a list of types of action that the Department will consider as part of the evaluation of the bidder's good faith efforts to obtain participation. These listed factors are not intended to be a mandatory checklist and are not intended to be exhaustive. Other factors or efforts brought to the attention of the Department may be relevant in appropriate cases, and will be considered by the Department.

(1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBE companies that have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBE companies to respond to the solicitation. The bidder must determine with certainty if the DBE companies are interested by taking appropriate steps to follow up initial solicitations.

(2) Selecting portions of the work to be performed by DBE companies in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime Contractor might otherwise prefer to perform these work items with its own forces.

(3) Providing interested DBE companies with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(4) a. Negotiating in good faith with interested DBE companies. It is the bidder’s responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBE companies that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBE companies to perform the work.

b. A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm’s price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBE companies is not in itself sufficient reason for a bidder’s failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders are not, however, required to accept higher quotes from DBE companies if the price difference is excessive or unreasonable.

(5) Not rejecting DBE companies as being unqualified without sound reasons based on a thorough investigation of their capabilities.

The bidder's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.

(6) Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.

(7) Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.

(8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE companies.

(b) If the Department determines that the apparent successful bidder has made a good faith effort to secure the work commitment of DBE companies to meet the contract goal, the Department will award the contract provided that it is otherwise eligible for award. If the Department determines that the bidder has failed to meet the requirements of this Special Provision and that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan that the bid is not responsive. The notification shall include a statement of reasons why good faith efforts have not been found.

(c) The bidder may request administrative reconsideration of a determination adverse to the bidder within the five working days after receipt of the notification date of the determination by delivering the request to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764 (Telefax: (217)785-1524). Deposit of the request in the United States mail on or before the fifth business day shall not be deemed delivery. The determination shall become final if a request is not made and delivered. A request may provide additional written documentation and/or argument concerning the issue of whether an adequate good faith effort was made to meet the contract goal. The request will be forwarded to the Department's Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person in order to consider all issues of whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten working days after receipt of the request for reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. A final decision by the Reconsideration Officer that a good faith effort was made shall approve the Utilization Plan submitted by the bidder and shall clear the contract for award. A final decision that a good faith effort was not made shall render the bid not responsive.

CALCULATING DBE PARTICIPATION. The Utilization Plan values represent work anticipated to be performed and paid for upon satisfactory completion. The Department is only able to count toward the achievement of the overall goal and the contract goal the value of payments made for the work actually performed by DBE companies. In addition, a DBE must perform a commercially useful function on the contract to be counted. A commercially useful function is generally performed when the DBE is responsible for the work and is carrying out its responsibilities by actually performing, managing, and supervising the work involved.

The Department and Contractor are governed by the provisions of 49 CFR part 26.55(c) on questions of commercially useful functions as it affects the work. Specific counting guidelines are provided in 49 CFR part 26.55, the provisions of which govern over the summary contained herein.

(a) DBE as the Contractor: 100 percent goal credit for that portion of the work performed by the DBE's own forces, including the cost of materials and supplies. Work that a DBE subcontracts to a non-DBE does not count toward the DBE goals.

(b) DBE as a joint venture Contractor: 100 percent goal credit for that portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work performed by the DBE's own forces.

(c) DBE as a subcontractor: 100 percent goal credit for the work of the subcontract performed by the DBE's own forces, including the cost of materials and supplies, excluding the purchase of materials and supplies or the lease of equipment by the DBE subcontractor from the prime Contractor or its affiliates. Work that a DBE subcontractor in turn subcontracts to a non-DBE does not count toward the DBE goal.

(d) DBE as a trucker: 100 percent goal credit for trucking participation provided the DBE is responsible for the management and supervision of the entire trucking operation for which it is responsible. At least one truck owned, operated, licensed, and insured by the DBE must be used on the contact. Credit will be given for the following:

(1) The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.
(2) The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement.

(e) DBE as a material supplier:

(1) 60 percent goal credit for the cost of the materials or supplies purchased from a DBE regular dealer.
(2) 100 percent goal credit for the cost of materials or supplies obtained from a DBE manufacturer.
(3) 100 percent credit for the value of reasonable fees and commissions for the procurement of materials and supplies if not a regular dealer or manufacturer.

CONTRACT COMPLIANCE. Compliance with this Special Provision is an essential part of the contract. The Department is prohibited by federal regulations from crediting the participation of a DBE included in the Utilization Plan toward either the contract goal or the Department's overall goal until the amount to be applied toward the goals has been paid to the DBE. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan. After approval of the Utilization Plan and award of the contract, the Utilization Plan and individual DBE Participation Statements become part of the contract.

If the Contractor did not succeed in obtaining enough DBE participation to achieve the advertised contract goal, and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of DBE work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the amended contract goal.

(a) No amendment to the Utilization Plan may be made without prior written approval from the Department's Bureau of Small Business Enterprises. All requests for amendment to the Utilization Plan shall be submitted to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764. Telephone number (217) 785-4611. Telefax number (217) 785-1524.

(b) The Contractor must notify and obtain written approval from the Department's Bureau of Small Business Enterprises prior to replacing a DBE or making any change in the participation of a DBE. Approval for replacement will be granted only if it is demonstrated that the DBE is unable or unwilling to perform. The Contractor must make every good faith effort to find another certified DBE subcontractor to substitute for the original DBE. The good faith efforts shall be directed at finding another DBE to perform at least the same amount of work under the contract as the original DBE, to the extent needed to meet the contract goal.

(c) Any deviation from the DBE condition-of-award or contract specifications must be approved, in writing, by the Department. The Contractor shall notify affected DBEs in writing of any changes in the scope of work which result in a reduction in the dollar amount condition-of-award to the contract.

(d) In addition to the above requirements for reductions in the condition of award, additional requirements apply to the two cases of Contractor-initiated work substitution proposals. Where the contract allows alternate work methods which serve to delete or create underruns in condition of award DBE work, and the Contractor selects that alternate method or, where the Contractor proposes a substitute work method or material that serves to diminish or delete work committed to a DBE and replace it with other work, then the Contractor must demonstrate one of the following:

(1) That the replacement work will be performed by the same DBE (as long as the DBE is certified in the respective item of work) in a modification of the condition of award; or
(2) That the DBE is aware that its work will be deleted or will experience underruns and has agreed in writing to the change. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so; or
(3) That the DBE is not capable of performing the replacement work or has declined to perform the work at a reasonably competitive price. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so.

(e) Where the revision includes work committed to a new DBE subcontractor, not previously involved in the project, then a Request for Approval of Subcontractor, Department form BC 260A, must be signed and submitted.

(f) If the commitment of work is in the form of additional tasks assigned to an existing subcontract, than a new Request for Approval of Subcontractor shall not be required. However, the Contractor must document efforts to assure that the existing DBE subcontractor is capable of performing the additional work and has agreed in writing to the change.

(g) All work indicated for performance by an approved DBE shall be performed, managed, and supervised by the DBE executing the Participation Statement. The Contractor shall not terminate for convenience a DBE listed in the Utilization Plan and then perform the work of the terminated DBE with its own forces, those of an affiliate or those of another subcontractor, whether DBE or not, without first obtaining the written consent of the Bureau of Small Business Enterprises to amend the Utilization Plan. The Contractor shall notify the Bureau of Small Business Enterprises of any termination for reasons other than convenience, and shall obtain approval for inclusion of the substitute DBE in the Utilization Plan. If good faith efforts following a termination of a DBE for cause are not successful, the Contractor shall contact the Bureau of Small Business Enterprises and provide a full accounting of the efforts undertaken to obtain substitute DBE participation. The Bureau of Small Business Enterprises will evaluate the good faith efforts in light of all circumstances surrounding the performance status of the contract, and determine whether the contract goal should be amended.

(h) The Contractor shall maintain a record of payments for work performed to the DBE participants. The records shall be made available to the Department for inspection upon request. After the performance of the final item of work or delivery of material by a DBE and final payment therefore to the DBE by the Contractor, but not later than thirty calendar days after payment has been made by the Department to the Contractor for such work or material, the Contractor shall submit a DBE Payment Agreement on Department form SBE 2115 to the Regional Engineer. If full and final payment has not been made to the DBE, the DBE Payment Agreement shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes that the work has not been satisfactorily completed. If the Contractor does not have the full amount of work indicated in the Utilization Plan performed by the DBE companies indicated in the Utilization Plan and after good faith efforts are reviewed, the Department may deduct from contract payments to the Contractor the amount of the goal not achieved as liquidated and ascertained damages. The Contractor may request an administrative reconsideration of any amount deducted as damages pursuant to subsection (j) of this part.

(i) The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.

(j) Notwithstanding any other provision of the contract, including but not limited to Article 109.09 of the Standard Specifications, the Contractor may request administrative reconsideration of a decision to deduct the amount of the goal not achieved as liquidated damages. A request to reconsider shall be delivered to the Contract Compliance Section and shall be handled and considered in the same manner as set forth in paragraph (c) of “Good Faith Effort Procedures” of this Special Provision, except a final decision that a good faith effort was not made during contract performance to achieve the goal agreed to in the Utilization Plan shall be the final administrative decision of the Department.

**ENGINEER'S FIELD OFFICE TYPE A (BDE)**
Effective: April 1, 2007 Revised: August 1, 2008

Revise Article 670.02 of the Standard Specifications to read:

"**670.02 Engineer's Field Office Type A.** Type A field offices shall have a minimum ceiling height of 7 ft (2 m) and a minimum floor space 450 sq ft (42 sq m). The office shall be provided with sufficient heat, natural and artificial light, and air conditioning.

The office shall have an electronic security system that will respond to any breach of exterior doors and windows. Doors and windows shall be equipped with locks. Doors shall also be equipped with dead bolt locks or other secondary locking device.

Windows shall be equipped with exterior screens to allow adequate ventilation. All windows shall be equipped with interior shades, curtains, or blinds. Adequate all-weather parking space shall be available to accommodate a minimum of ten vehicles.

Suitable on-site sanitary facilities meeting Federal, State, and local health department requirements shall be provided, maintained clean and in good working condition, and shall be stocked with lavatory and sanitary supplies at all times.

Sanitary facilities shall include hot and cold potable running water, lavatory and toilet as an integral part of the office where available. Solid waste disposal consisting of two waste baskets and an outside trash container of sufficient size to accommodate a weekly provided pick-up service.

In addition, the following furniture and equipment shall be furnished.

(a) Four desks with minimum working surface 42 x 30 in. (1.1 m x 750 mm) each and five non-folding chairs with upholstered seats and backs.

(b) One desk with minimum working surface 48 x 72 in. (1.2 x 1.8 m) with height adjustment of 23 to 30 in. (585 to 750 mm).

(c) One four-post drafting table with minimum top size of 37 1/2 x 48 in. (950 mm x 1.2 m). The top shall be basswood or equivalent and capable of being tilted through an angle of 50 degrees. An adjustable height drafting stool with upholstered seat and back shall also be provided.

(d) Two free standing four drawer legal size file cabinet with lock and an underwriters' laboratories insulated file device 350 degrees one hour rating.

(e) One 6 ft (1.8 m) folding table with six folding chairs.

(f) One equipment cabinet of minimum inside dimension of 44 in. (1100 mm) high x 24 in. (600 mm) wide x 30 in. (750 mm) deep with lock. The walls shall be of steel with a 3/32 in. (2 mm) minimum thickness with concealed hinges and enclosed lock constructed in such a manner as to prevent entry by force. The cabinet assembly shall be permanently attached to a structural element of the field office in a manner to prevent theft of the entire cabinet.

(g) One refrigerator with a minimum size of 16 cu ft (0.45 cu m) with a freezer unit.

(h) One electric desk type tape printing calculator.

(i) A minimum of two communication paths. The configuration shall include:

(1) Internet Connection. An internet service connection using telephone DSL, cable broadband, or CDMA wireless technology. Additionally, an 802.11g/N wireless router shall be provided, which will allow connection by the Engineer and up to four Department staff.
(2) Telephone Lines. Three separate telephone lines.

(j) One plain paper copy machine capable of reproducing prints up to 11 x 17 in. (280 x 432 mm) with an automatic feed tray capable of storing 30 sheets of paper. Letter size and 11 x 17 in. (280 x 432 mm) paper shall be provided.

(k) One plain paper fax machine with paper.

(l) Two telephones, with touch tone, where available, and a digital telephone answering machine, for exclusive use by the Engineer.

(m) One electric water cooler dispenser.

(n) One first-aid cabinet fully equipped.

(o) One microwave oven, 1 cu ft (0.03 cu m) minimum capacity.

(p) One fire-proof safe, 0.5 cu ft (0.01 cu m) minimum capacity.

(q) One electric paper shredder.

(r) One post mounted rain gauge, located on the project site for each 5 miles (8 km) of project length."

Revise the first sentence of the first paragraph of Article 670.07 of the Standard Specifications to read:

"The building or buildings fully equipped as specified will be paid for on a monthly basis until the building or buildings are released by the Engineer."

Revise the last sentence of the first paragraph of Article 670.07 of the Standard Specifications to read:

"This price shall include all utility costs and shall reflect the salvage value of the building or buildings, equipment, and furniture which become the property of the Contractor after release by the Engineer, except that the Department will pay that portion of the monthly long distance telephone bills that, when combined, exceed $150."

**EQUIPMENT RENTAL RATES (BDE)**
Effective: August 2, 2007 Revised: January 2, 2008

Replace the second and third paragraphs of Article 105.07(b)(4)a. of the Standard Specifications with the following:

"Equipment idled which cannot be used on other work, and which is authorized to standby on the project site by the Engineer, will be paid for according to Article 109.04(b)(4)."

Replace Article 109.04(b)(4) of the Standard Specifications with the following:

"(4) Equipment. Equipment used for extra work shall be authorized by the Engineer. The equipment shall be specifically described, be of suitable size and capacity for the work to be performed, and be in good operating condition. For such equipment, the Contractor will be paid as follows.

a. Contractor Owned Equipment. Contractor owned equipment will be paid for by the hour using the applicable FHWA hourly rate from the "Equipment Watch Rental Rate Blue Book" (Blue Book) in effect when the force account work begins. The FHWA hourly rate is calculated as follows.

FHWA hourly rate = (monthly rate/176) x (model year adj.) x (Illinois adj.) + EOC

Where: EOC = Estimated Operating Costs per hour (from the Blue Book)

The time allowed will be the actual time the equipment is operating on the extra work. For the time required to move the equipment to and from the site of the extra work and any authorized idle (standby) time, payment will be made at the following hourly rate: 0.5 x (FHWA hourly rate - EOC).

All time allowed shall fall within the working hours authorized for the extra work.

The rates above include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs, overhaul and maintenance of any kind, depreciation, storage, overhead, profits, insurance, and all incidentals. The rates do not include labor.

The Contractor shall submit to the Engineer sufficient information for each piece of equipment and its attachments to enable the Engineer to determine the proper equipment category. If a rate is not established in the Blue Book for a particular piece of equipment, the Engineer will establish a rate for that piece of equipment that is consistent with its cost and use in the industry.

b. Rented Equipment. Whenever it is necessary for the Contractor to rent equipment to perform extra work, the rental and transportation costs of the equipment plus five percent for overhead will be paid. In no case shall the rental rates exceed those of established distributors or equipment rental agencies.

All prices shall be agreed to in writing before the equipment is used."

**FLAGGER AT SIDE ROADS AND ENTRANCES (BDE)**
Effective: April 1, 2009

Revise the second paragraph of Article 701.13(a) of the Standard Specifications to read:

"The Engineer will determine when a side road or entrance shall be closed to traffic. A flagger will be required at each side road or entrance remaining open to traffic within the operation where two-way traffic is maintained on one lane of pavement. The flagger shall be positioned as shown on the plans or as directed by the Engineer."

Revise the first and second paragraph of Article 701.20(i) of the Standard Specifications to read:

"Signs, barricades, or other traffic control devices required by the Engineer over and above those specified will be paid for according to Article 109.04. All flaggers required at side roads and entrances remaining open to traffic including those that are shown on the Highway Standards and/or additional barricades required by the Engineer to close side roads and entrances will be paid for according to Article 109.04."

**LIQUIDATED DAMAGES (BDE)**
Effective: April 1, 2009

Revise the table in Article 108.09 of the Standard Specifications to read:

| "Schedule of Deductions for Each Day of Overrun in Contract Time | | | |
|---|---|---|---|
| Original Contract Amount | | Daily Charges | |
| From More Than | To and Including | Calendar Day | Work Day |
| $ 0 | $ 100,000 | $ 375 | $ 500 |
| 100,000 | 500,000 | 625 | 875 |
| 500,000 | 1,000,000 | 1,025 | 1,425 |
| 1,000,000 | 3,000,000 | 1,125 | 1,550 |
| 3,000,000 | 5,000,000 | 1,425 | 1,950 |
| 5,000,000 | 10,000,000 | 1,700 | 2,350 |
| 10,000,000 | And over | 3,325 | 4,650" |

**MENTOR-PROTÉGÉ PROGRAM (BDE)**
Effective: June 1, 2007

Eligibility. This contract is eligible for the Department's Mentor-Protégé Program for those bidders with an approved Mentor-Protégé Development Plan.

In order for a Mentor-Protégé relationship to be recognized as part of this contract, the Protégé shall be used as a subcontractor and a Mentor-Protégé Agreement for Contract Assistance and Training shall be fully executed and approved.

The Mentor-Protégé Agreement for Contract Assistance and Training shall be completed on the form provided by the Department and submitted with the DBE Utilization Plan for approval by the Department. If approved, the Mentor-Protégé Agreement for Contract Assistance and Training shall become part of the contract. In the event the Mentor-Protégé Agreement for Contract Assistance and Training is not approved, the contract shall be performed in accordance with the DBE Utilization Plan exclusive of the Agreement.

DBE Goal Reduction. The DBE participation goal set for this contract may, at the discretion of the Department, be reduced according to the Mentor-Protégé Program Guidelines when the Protégé is used as a subcontractor. When submitting the DBE Utilization Plan, the bidder shall indicate whether the Protégé will be used as a subcontractor and to what extent.

Reimbursement of Mentor Expenses. The direct and indirect expenses of the Mentor, as detailed in the approved Mentor-Protégé Agreement for Contract Assistance and Training will be reimbursed by the Department.

**MONTHLY EMPLOYMENT REPORT (BDE)**
Effective: April 1, 2009 Revised: January 1, 2010

In addition to any other reporting required by the contract, the Contractor shall provide to the Engineer an employment summary for all employees working on the contract from the contract execution date to the last full pay period each month for the duration of the contract. The report may include but is not limited to:

a) Total number of employees.
b) The total hours worked.
c) Total payroll.

The report shall be completed by the Contractor. The Contractor shall also report for each subcontractor. Employee hours worked from home office or other off-site office hours worked related directly to this contract shall be included. Engineering consulting firms performing construction layout and material testing for the Contractor shall also be included.

Hours worked for material suppliers, services provided by purchase orders, Department employees or consulting firms performing inspection or testing for the Department shall not be included in the report.

The report shall contain all hours worked under the contract from the start of the month to the last full pay period each month and shall be submitted no later than five business days after the end of each month.

The report shall be submitted electronically by accessing the Department's website (http://www.dot.il.gov/stimulus/index.html).

Any costs associated with complying with this provision shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed.

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM / EROSION AND SEDIMENT CONTROL DEFICIENCY DEDUCTION (BDE)**

Effective: April 1, 2007 Revised: November 1, 2009

Revise Article 105.03(a) of the Standard Specifications to read:

"(a) National Pollutant Discharge Elimination System (NPDES) / Erosion and Sediment Control Deficiency Deduction When the Engineer is notified or determines an erosion and/or sediment control deficiency(s) exists, or the Contractor's activities represents a violation of the Department's NPDES permits, the Engineer will notify and direct the Contractor to correct the deficiency within a specified time. The specified time, which begins upon notification to the Contractor, will be from 1/2 hour to 1 week based on the urgency of the situation and the nature of the work effort required. The Engineer will be the sole judge.

A deficiency may be any lack of repair, maintenance, or implementation of erosion and/or sediment control devices included in the contract, or any failure to comply with the conditions of the Department's NPDES permits. A deficiency may also be applied to situations where corrective action is not an option such as the failure to participate in a jobsite inspection of the project, failure to install required measures prior to initiating earth moving operations, disregard of concrete washout requirements, or other disregard of the NPDES permit.

If the Contractor fails to correct a deficiency within the specified time, a daily monetary deduction will be imposed for each calendar day or portion of a calendar day until the deficiency is corrected to the satisfaction of the Engineer. The calendar day(s) will begin with notification to the Contractor and end with the Engineer's acceptance of the correction. The base value of the daily monetary deduction is $1000.00 and will be applied to each location for which a deficiency exists. The value of the deficiency deduction assessed for each infraction will be determined by multiplying the base value by a Gravity Adjustment Factor provided in Table A. Except for failure to participate in a required jobsite inspection of the project prior to initiating earthmoving operations which will be based on the total acreage of planned disturbance at the following multipliers: <5 Acres: 1; 5-10 Acres: 2; >10-25 Acres: 3; >25 Acres: 5. For those deficiencies where corrective action was not an option, the monetary deduction will be immediate and will be valued at one calendar day multiplied by a Gravity Adjustment Factor.

| Table A<br>Deficiency Deduction Gravity Adjustment Factors | | | | |
|---|---|---|---|---|
| Types of Violations | Soil Disturbed and Not Permanently Stabilized At Time of Violation | | | |
| | < 5 Acres | 5 - 10 Acres | >10 - 25 Acres | > 25 Acres |
| Failure to Install or Properly Maintain BMP | 0.1 - 0.5 | 0.2 - 1.0 | 0.5 - 2.5 | 1.0 - 5 |
| Careless Destruction of BMP | 0.2 - 1 | 0.5 - 2.5 | 1.0 - 5. | 1.0 - 5 |
| Intrusion into Protected Resource | 1.0 - 5 | 1.0 - 5 | 2.0 - 10 | 2.0 - 10 |
| Failure to properly manage Chemicals, Concrete Washouts or Residuals, Litter or other Wastes | 0.2 - 1 | 0.2 - 1 | 0.5 - 2.5 | 1.0 - 5 |
| Improper Vehicle and Equipment Maintenance, Fueling or Cleaning | 0.1 - 0.5 | 0.2 - 1 | 0.2 - 1 | 0.5 - 2.5 |
| Failure to Provide or Update Written or Graphic Plans Required by SWPPP | 0.2 - 1 | 0.5 - 2.5 | 1.0 - 5 | 1.0 - 5 |
| Failure to comply with Other Provisions of the NPDES Permit | 0.1 - 0.5 | 0.2 - 1 | 0.2 - 1 | 0.5 - 2.5” |

**PAYMENTS TO SUBCONTRACTORS (BDE)**
Effective: June 1, 2000 Revised: January 1, 2006

Federal regulations found at 49 CFR §26.29 mandate the Department to establish a contract clause to require Contractors to pay subcontractors for satisfactory performance of their subcontracts and to set the time for such payments.

State law also addresses the timing of payments to be made to subcontractors and material suppliers. Section 7 of the Prompt Payment Act, 30 ILCS 540/7, requires that when a Contractor receives any payment from the Department, the Contractor shall make corresponding, proportional payments to each subcontractor and material supplier performing work or supplying material within 15 calendar days after receipt of the Department payment. Section 7 of the Act further provides that interest in the amount of two percent per month, in addition to the payment due, shall be paid to any subcontractor or material supplier by the Contractor if the payment required by the Act is withheld or delayed without reasonable cause. The Act also provides that the time for payment required and the calculation of any interest due applies to transactions between subcontractors and lower-tier subcontractors and material suppliers throughout the contracting chain.

This Special Provision establishes the required federal contract clause, and adopts the 15 calendar day requirement of the State Prompt Payment Act for purposes of compliance with the federal regulation regarding payments to subcontractors. This contract is subject to the following payment obligations.

When progress payments are made to the Contractor according to Article 109.07 of the Standard Specifications, the Contractor shall make a corresponding payment to each subcontractor and material supplier in proportion to the work satisfactorily completed by each subcontractor and for the material supplied to perform any work of the contract. The proportionate amount of partial payment due to each subcontractor and material supplier throughout the contracting chain shall be determined by the quantities measured or otherwise determined as eligible for payment by the Department and included in the progress payment to the Contractor. Subcontractors and material suppliers shall be paid by the Contractor within 15 calendar days after the receipt of payment from the Department. The Contractor shall not hold retainage from the subcontractors. These obligations shall also apply to any payments made by subcontractors and material suppliers to their subcontractors and material suppliers; and to all payments made to lower tier subcontractors and material suppliers throughout the contracting chain. Any payment or portion of a payment subject to this provision may only be withheld from the subcontractor or material supplier to whom it is due for reasonable cause.

This Special Provision does not create any rights in favor of any subcontractor or material supplier against the State or authorize any cause of action against the State on account of any payment, nonpayment, delayed payment, or interest claimed by application of the State Prompt Payment Act. The Department will not approve any delay or postponement of the 15 day requirement except for reasonable cause shown after notice and hearing pursuant to Section 7(b) of the State Prompt Payment Act. State law creates other and additional remedies available to any subcontractor or material supplier, regardless of tier, who has not been paid for work properly performed or material furnished. These remedies are a lien against public funds set forth in Section 23(c) of the Mechanics Lien Act, 770 ILCS 60/23(c), and a recovery on the Contractor's payment bond according to the Public Construction Bond Act, 30 ILCS 550.

**PERSONAL PROTECTIVE EQUIPMENT (BDE)**
Effective: November 1, 2008

Revise the first sentence of Article 701.12 of the Standard Specifications to read:

"All personnel on foot, excluding flaggers, within the highway right-of-way shall wear a fluorescent orange, fluorescent yellow/green, or a combination of fluorescent orange and fluorescent yellow/green vest meeting the requirements of ANSI/ISEA 107-2004 for Conspicuity Class 2 garments."

**RAILROAD PROTECTIVE LIABILITY INSURANCE (5 AND 10) (BDE)**
Effective: January 1, 2006

Description. Railroad Protective Liability and Property Damage Liability Insurance shall be carried according to Article 107.11 of the Standard Specifications, except the limits shall be a minimum of $5,000,000 combined single limit per occurrence for bodily injury liability and property damage liability with an aggregate limit of $10,000,000 over the life of the policy. A separate policy is required for each railroad unless otherwise noted

Relocation I-70 New Mississippi River Bridge.

| NAMED INSURED & ADDRESS | NUMBER & SPEED OF PASSENGER TRAINS | NUMBER & SPEED OF FREIGHT TRAINS |
|---|---|---|
| Terminal Railroad Association<br>1000 St. Louis Union Station, Suite 200<br>St. Louis, MO 63103 | None | 5 MPH / Yard Limit |

DOT/AAR: N/A
RR Divisions: St. Louis
RR Mile: Wiggins yard between 1st St & MS River
RR Sub-Division: N/A

For Freight/Passenger Information Contact: Rick McQueen Ph (314) 539-4724
For Insurance Information Contact: Rick McQueen Ph (314) 539-4724

| NAMED INSURED & ADDRESS | NUMBER & SPEED OF PASSENGER TRAINS | NUMBER & SPEED OF FREIGHT TRAINS |
|---|---|---|
| Norfolk Southern Railway<br>1200 Peachtree Street<br>Atlanta, GA. 30309 | None | 5 MPH / Yard Limit |

DOT/AAR No: N/A
RR Division: St. Louis
RR Mile Post: D-Main 484.28
RR Sub-Division: N/A

For Freight/Passenger Information Contact: Matt Davidson Ph (314) 630-7047
For Insurance Information Contact: Matt Davidson Ph (314) 630-7047

| NAMED INSURED & ADDRESS | NUMBER & SPEED OF PASSENGER TRAINS | NUMBER & SPEED OF FREIGHT TRAINS |
|---|---|---|
| Kansas City Southern Railway<br>427 W. 12th Street<br>Kansas City, MO 64105 | None | 20 MPH / Yard Limit |

DOT/AAR: N/A
RR Divisions: St. Louis
RR Mile: 275.6 to 281.0.
RR Sub-Division: East St. Louis

For Freight/Passenger Information Contact: Wendell Campbell (Train Master)
Ph (618) 482-4056
For Insurance Information Contact: Srikanth Honnur Ph ( 816) 983-1138

| NAMED INSURED & ADDRESS | NUMBER & SPEED OF PASSENGER TRAINS | NUMBER & SPEED OF FREIGHT TRAINS |
|---|---|---|
| Union Pacific Railroad<br>100 North Broadway<br>St. Louis, MO | 10 /60 MPH | Varies/60 MPH |

DOT/AAR No: N/A
RR Division: St. Louis
RR Mile Post: 275.6 to 281.0.
RR Sub-Division: N/A

For Freight/Passenger Information Contact: Dave Mc Kernan Ph (314) 331-0682
For Insurance Information Contact: Dave Mc Kernan Ph (314) 331-0682

Approval of Insurance. The original and one certified copy of each required policy shall be submitted to the following address for approval:

Illinois Department of Transportation
Bureau of Design and Environment
2300 South Dirksen Parkway, Room 326
Springfield, Illinois 62764

The Contractor will be advised when the Department has received approval of the insurance from the railroad(s). Before any work begins on railroad right-of-way, the Contractor shall submit to the Engineer evidence that the required insurance has been approved by the railroad(s). The Contractor shall also provide the Engineer with the expiration date of each required policy.

Basis of Payment. Providing Railroad Protective Liability and Property Damage Liability Insurance will be paid for at the contract unit price per Lump Sum for RAILROAD PROTECTIVE LIABILITY INSURANCE.

**REFLECTIVE SHEETING ON CHANNELIZING DEVICES (BDE)**
Effective: April 1, 2007 Revised: November 1, 2008

Revise the seventh paragraph of Article 1106.02 of the Standard Specifications to read:

"At the time of manufacturing, the retroreflective prismatic sheeting used on channelizing devices shall meet or exceed the initial minimum coefficient of retroreflection as specified in the following table. Measurements shall be conducted according to ASTM E 810, without averaging. Sheeting used on cones, drums and flexible delineators shall be reboundable as tested according to ASTM D 4956. Prestriped sheeting for rigid substrates on barricades shall be white and orange. The sheeting shall be uniform in color and devoid of streaks throughout the length of each roll. The color shall conform to the latest appropriate standard color tolerance chart issued by the U.S. Department of Transportation, Federal Highway Administration, and to the daytime and nighttime color requirements of ASTM D 4956.

| Initial Minimum Coefficient of Retroreflection candelas/foot candle/sq ft (candelas/lux/sq m) of material | | | | |
|---|---|---|---|---|
| Observation Angle (deg.) | Entrance Angle (deg.) | White | Orange | Fluorescent Orange |
| 0.2 | -4 | 365 | 160 | 150 |
| 0.2 | +30 | 175 | 80 | 70 |
| 0.5 | -4 | 245 | 100 | 95 |
| 0.5 | +30 | 100 | 50 | 40" |

Revise the first sentence of the first paragraph of Article 1106.02(c) of the Standard Specifications to read:

"Barricades and vertical panels shall have alternating white and orange stripes sloping downward at 45 degrees toward the side on which traffic will pass."

Revise the third sentence of the first paragraph of Article 1106.02(d) of the Standard Specifications to read:

"The bottom panels shall be 8 x 24 in. (200 x 600 mm) with alternating white and orange stripes sloping downward at 45 degrees toward the side on which traffic will pass."

**REINFORCEMENT BARS - STORAGE AND PROTECTION (BDE)**
Effective: August 1, 2008 Revised: April 1, 2009

Revise Article 508.03 of the Standard Specifications to read:

"**508.03 Storage and Protection.** Reinforcement bars shall be stored off the ground using platforms, skids, or other supports; and shall be protected from mechanical injury and from deterioration by exposure. Epoxy coated bars shall be stored on wooden or padded steel cribbing and all systems for handling shall have padded contact areas. The bars or bundles shall not be dragged or dropped.

When epoxy coated bars are stored in a manner where they will be exposed to the weather more than 60 days prior to use, they shall be protected from deterioration such as that caused by sunlight, salt spray, and weather exposure. The protection shall consist of covering with opaque polyethylene sheeting or other suitable opaque material. The covering shall be secured and allow for air circulation around the bars to minimize condensation under the cover.

Covering of the epoxy coated bars will not be required when the bars are installed and tied, or when they are partially incorporated into the concrete."

**SUBCONTRACTOR MOBILIZATION PAYMENTS (BDE)**
Effective: April 2, 2005

To account for the preparatory work and operations necessary for the movement of subcontractor personnel, equipment, supplies, and incidentals to the project site and for all other work or operations that must be performed or costs incurred when beginning work approved for subcontracting in accordance with Article 108.01 of the Standard Specifications, the Contractor shall make a mobilization payment to each subcontractor.

This mobilization payment shall be made at least 14 days prior to the subcontractor starting work. The amount paid shall be equal to 3 percent of the amount of the subcontract reported on form BC 260A submitted for the approval of the subcontractor's work.

This provision shall be incorporated directly or by reference into each subcontract approved by the Department.

**TEMPORARY EROSION CONTROL (BDE)**
Effective: November 1, 2002 Revised: January 1, 2010

Add the following to Article 280.02 of the Standard Specifications to read:

"(k) Filter Fabric .....1080.03"

Revise the third paragraph of Article 280.03 of the Standard Specifications to read:

"Erosion control systems shall be installed prior to beginning any activities which will potentially create erodible conditions. Erosion control systems for areas outside the limits of construction such as storage sites, plant sites, waste sites, haul roads, and Contractor furnished borrow sites shall be installed prior to beginning soil disturbing activities at each area. These offsite systems shall be designed by the Contractor and be subject to the approval of the Engineer."

Add the following paragraph after the third paragraph of Article 280.03 of the Standard Specifications:

"The temporary erosion and sediment control systems shown on the plans represent the minimum systems anticipated for the project. Conditions created by the Contractor's operations, or for the Contractor's convenience, which are not covered by the plans, shall be protected as directed by the Engineer at no additional cost to the Department. Revisions or modifications of the erosion and sediment control systems shall have the Engineer's written approval."

Revise Article 280.04(a) of the Standard Specifications to read:

"(a) Temporary Ditch Checks. This system consists of the construction of temporary ditch checks to prevent siltation, erosion, or scour of ditches and drainage ways. Temporary ditch checks shall be constructed with rolled excelsior, products from the Department's approved list, or with aggregate placed on filter fabric when specified. Filter fabric shall be installed according to the requirements of Section 282. Riprap shall be placed according to Article 281.04. Manufactured ditch checks shall be installed according to the manufacturer's specifications. Spacing of ditch checks shall be such that the low point in the center of one ditch check is at the same elevation as the base of the ditch check immediately upstream. Temporary ditch checks shall be sufficiently long enough that the top of the device in the middle of the ditch is lower than the bottom of the terminating ends of the ditch side slopes."

Revise the last sentence of the first paragraph of Article 280.04(g) of the Standard Specifications to read:

"The temporary mulch cover shall be according to either Article 251.03 or 251.04 except for any reference to seeding."

Revise Article 280.07(b) of the Standard Specifications to read:

"(b) Temporary Ditch Checks. This work will be measured for payment along the long axis of the device in place in feet (meters) except for aggregate ditch checks which will be measured for payment in tons (metric tons). Payment will not be made for aggregate in excess of 108 percent of the amount specified by the Engineer."

Revise Article 280.07(f) of the Standard Specifications to read:

"(f) Temporary Mulch. This work will be measured for payment according to Article 251.05(b)."

Add the following paragraph after the ninth paragraph of Article 280.07 of the Standard Specifications:

"Temporary or permanent erosion control systems required for areas outside the limits of construction will not be measured for payment."

Revise Article 280.08(b) of the Standard Specifications to read:

"(b) Temporary Ditch Checks. This work will be paid for at the contract unit price per foot (meter) for TEMPORARY DITCH CHECKS except for aggregate ditch checks which will be paid for at the contract unit price per ton (metric ton) for AGGREGATE DITCH CHECKS."

Revise Article 280.08(f) of the Standard Specifications to read:

"(f) Temporary Mulch. Temporary Mulch will be paid for according to Article 251.06."

Delete the tenth (last) paragraph of Article 280.08 of the Standard Specifications.

Revise the second sentence of the first paragraph of Article 1081.015(e) of the Standard Specifications to read:

"The upstream facing of the aggregate ditch check shall be constructed of gradation CA 3. The remainder of the ditch check shall be constructed of gradation RR 3."

**FUEL COST ADJUSTMENT (BDE) (RETURN FORM WITH BID)**
Effective: April 1, 2009 Revised: July 1, 2009

Description. Fuel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Department, for fluctuations in fuel prices when optioned by the Contractor. The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form or failure to indicate contract number, company name and sign and date the form shall make this contract exempt of fuel cost adjustments for all categories of work. Failure to indicate "Yes" for any category of work will make that category of work exempt from fuel cost adjustment.

General. The fuel cost adjustment shall apply to contract pay items as grouped by category. The adjustment shall only apply to those categories of work checked "Yes", and only when the cumulative plan quantities for a category exceed the required threshold. Adjustments to work items in a category, either up or down, and work added by adjusted unit price will be subject to fuel cost adjustment only when the category representing the added work was subject to the fuel cost adjustment. Added work paid for by time and materials will not be subject to fuel cost adjustment. Category descriptions and thresholds for application and the fuel usage factors which are applicable to each are as follows:

(a) Categories of Work.

(1) Category A: Earthwork. Contract pay items performed under Sections 202, 204, and 206 including any modified standard or nonstandard items where the character of the work to be performed is considered earthwork. The cumulative total of all applicable item plan quantities shall exceed 25,000 cu yd (20,000 cu m). Included in the fuel usage factor is a weighted average 0.10 gal/cu yd (0.50 liters/cu m) factor for trucking.

(2) Category B: Subbases and Aggregate Base Courses. Contract pay items constructed under Sections 311, 312 and 351 including any modified standard or nonstandard items where the character of the work to be performed is considered construction of a subbase or aggregate, stabilized or modified base course. The cumulative total of all applicable item plan quantities shall exceed 5000 tons (4500 metric tons). Included in the fuel usage factor is a 0.60 gal/ton (2.50 liters/metric ton) factor for trucking.

(3) Category C: Hot-Mix Asphalt (HMA) Bases, Pavements and Shoulders. Contract pay items constructed under Sections 355, 406, 407 and 482 including any modified standard or nonstandard items where the character of the work to be performed is considered HMA bases, pavements and shoulders. The cumulative total of all applicable item plan quantities shall exceed 5000 tons (4500 metric tons). Included in the fuel usage factor is 0.60 gal/ton (2.50 liters/metric ton) factor for trucking.

(4) Category D: Portland Cement Concrete (PCC) Bases, Pavements and Shoulders. Contract pay items constructed under Sections 353, 420, 421 and 483 including any modified standard or nonstandard items where the character of the work to be performed is considered PCC base, pavement or shoulder. The cumulative total of all applicable item plan quantities shall exceed 7500 sq yd (6000 sq m). Included in the fuel usage factor is 1.20 gal/cu yd (5.94 liters/cu m) factor for trucking.

(5) Category E: Structures. Structure items having a cumulative bid price that exceeds $250,000 for pay items constructed under Sections 502, 503, 504, 505, 512, 516 and 540 including any modified standard or nonstandard items where the character of the work to be performed is considered structure work when similar to that performed under these sections and not included in categories A through D.

(b) Fuel Usage Factors.

English Units

| Category | Factor | Units |
|---|---|---|
| A - Earthwork | 0.34 | gal / cu yd |
| B – Subbase and Aggregate Base courses | 0.62 | gal / ton |
| C – HMA Bases, Pavements and Shoulders | 1.05 | gal / ton |
| D – PCC Bases, Pavements and Shoulders | 2.53 | gal / cu yd |
| E – Structures | 8.00 | gal / $1000 |

Metric Units

| Category | Factor | Units |
|---|---|---|
| A - Earthwork | 1.68 | liters / cu m |
| B – Subbase and Aggregate Base courses | 2.58 | liters / metric ton |
| C – HMA Bases, Pavements and Shoulders | 4.37 | liters / metric ton |
| D – PCC Bases, Pavements and Shoulders | 12.52 | liters / cu m |
| E – Structures | 30.28 | liters / $1000 |

(c) Quantity Conversion Factors.

| Category | Conversion | Factor |
|---|---|---|
| B | sq yd to ton | 0.057 ton / sq yd / in depth |
| | sq m to metric ton | 0.00243 metric ton / sq m / mm depth |
| C | sq yd to ton | 0.056 ton / sq yd / in depth |
| | sq m to metric ton | 0.00239 m ton / sq m / mm depth |
| D | sq yd to cu yd | 0.028 cu yd / sq yd / in depth |
| | sq m to cu m | 0.001 cu m / sq m / mm depth |

Method of Adjustment. Fuel cost adjustments will be computed as follows.
$CA = (FPI_P - FPI_L) \times FUF \times Q$

Where: CA = Cost Adjustment, $
$FPI_P$ = Fuel Price Index, as published by the Department for the month the work is performed, $/gal ($/liter)
$FPI_L$ = Fuel Price Index, as published by the Department for the month prior to the letting, $/gal ($/liter)
FUF = Fuel Usage Factor in the pay item(s) being adjusted
Q = Authorized construction Quantity, tons (metric tons) or cu yd (cu m)

The entire FUF indicated in paragraph (b) will be used regardless of use of trucking to perform the work.

Progress Payments. Fuel cost adjustments will be calculated for each calendar month in which applicable work is performed; and will be paid or deducted when all other contract requirements for the items of work are satisfied. The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Final Quantities. Upon completion of the work and determination of final pay quantities, an adjustment will be prepared to reconcile any differences between estimated quantities previously paid and the final quantities. The value for the balancing adjustment will be based on a weighted average of $FPI_P$ and Q only for those months requiring the cost adjustment. The cost adjustment will be applicable to the final measured quantities of all applicable pay items.

Basis of Payment. Fuel cost adjustments may be positive or negative but will only be made when there is a difference between the $FPI_L$ and $FPI_P$ in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(FPI_L - FPI_P) \div FPI_L\} \times 100$$

Return With Bid

## ILLINOIS DEPARTMENT OF TRANSPORTATION

**OPTION FOR FUEL COST ADJUSTMENT**

The bidder shall submit this completed form with his/her bid. Failure to submit the form or properly complete contract number, company name, and sign and date the form shall make this contract exempt of fuel cost adjustments in all categories. Failure to indicate "Yes" for any category of work at the time of bid will make that category of work exempt from fuel cost adjustment. After award, this form, when submitted shall become part of the contract.

**Contract No.:** _____

**Company Name:**_____

**Contractor's Option:**

Is your company opting to include this special provision as part of the contract plans for the following categories of work?

| | | |
|---|---|---|
| Category A Earthwork. | Yes | ☐ |
| Category B Subbases and Aggregate Base Courses | Yes | ☐ |
| Category C HMA Bases, Pavements and Shoulders | Yes | ☐ |
| Category D PCC Bases, Pavements and Shoulders | Yes | ☐ |
| Category E Structures | Yes | ☐ |

**Signature:** _____ **Date:** _____

**STEEL COST ADJUSTMENT (BDE) (RETURN FORM WITH BID)**
Effective: April 2, 2004 Revised: April 1, 2009

Description. Steel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Department, for fluctuations in steel prices when optioned by the Contractor. The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form or failure to indicate contract number, company name, and sign and date the form shall make this contract exempt of steel cost adjustments for all items of steel. Failure to indicate "Yes" for any item of work will make that item of steel exempt from steel cost adjustment.

Types of Steel Products. An adjustment will be made for fluctuations in the cost of steel used in the manufacture of the following items:

Metal Piling (excluding temporary sheet piling)
Structural Steel
Reinforcing Steel

Other steel materials such as dowel bars, tie bars, mesh reinforcement, guardrail, steel traffic signal and light poles, towers and mast arms, metal railings (excluding wire fence), and frames and grates will be subject to a steel cost adjustment when the pay items they are used in has a contract value of $10,000 or greater.

Documentation. Sufficient documentation shall be furnished to the Engineer to verify the following:

(a) The dates and quantity of steel, in lb (kg), shipped from the mill to the fabricator.

(b) The quantity of steel, in lb (kg), incorporated into the various items of work covered by this special provision. The Department reserves the right to verify submitted quantities.

Method of Adjustment. Steel cost adjustments will be computed as follows:

SCA = Q X D

Where: SCA = steel cost adjustment, in dollars
Q = quantity of steel incorporated into the work, in lb (kg)
D = price factor, in dollars per lb (kg)

$D = MPI_M - MPI_L$

Where: $MPI_M$ = The Materials Cost Index for steel as published by the Engineering News-Record for the month the steel is shipped from the mill. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

$MPI_L$ = The Materials Cost Index for steel as published by the Engineering News-Record for the month prior to the letting. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

The unit weights (masses) of steel that will be used to calculate the steel cost adjustment for the various items are shown in the attached table.

No steel cost adjustment will be made for any products manufactured from steel having a mill shipping date prior to the letting date.

If the Contractor fails to provide the required documentation, the method of adjustment will be calculated as described above; however, the $MPI_M$ will be based on the date the steel arrives at the job site. In this case, an adjustment will only be made when there is a decrease in steel costs.

Basis of Payment. Steel cost adjustments may be positive or negative but will only be made when there is a difference between the $MPI_L$ and $MPI_M$ in excess of five percent, as calculated by:

$\text{Percent Difference} = \{(MPI_L - MPI_M) \div MPI_L\} \times 100$

Steel cost adjustments will be calculated by the Engineer and will be paid or deducted when all other contract requirements for the items of work are satisfied. Adjustments will only be made for fluctuations in the cost of the steel as described herein. No adjustment will be made for changes in the cost of manufacturing, fabrication, shipping, storage, etc.

The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

**Attachment**

| Item | Unit Mass (Weight) |
|---|---|
| Metal Piling (excluding temporary sheet piling) | |
| Furnishing Metal Pile Shells 12 in. (305 mm), 0.179 in. (3.80 mm) wall thickness) | 23 lb/ft (34 kg/m) |
| Furnishing Metal Pile Shells 12 in. (305 mm), 0.250 in. (6.35 mm) wall thickness) | 32 lb/ft (48 kg/m) |
| Furnishing Metal Pile Shells 14 in. (356 mm), 0.250 in. (6.35 mm) wall thickness) | 37 lb/ft (55 kg/m) |
| Other piling | See plans |
| Structural Steel | See plans for weights (masses) |
| Reinforcing Steel | See plans for weights (masses) |
| Dowel Bars and Tie Bars | 6 lb (3 kg) each |
| Mesh Reinforcement | 63 lb/100 sq ft (310 kg/sq m) |
| Guardrail | |
| Steel Plate Beam Guardrail, Type A w/steel posts | 20 lb/ft (30 kg/m) |
| Steel Plate Beam Guardrail, Type B w/steel posts | 30 lb/ft (45 kg/m) |
| Steel Plate Beam Guardrail, Types A and B w/wood posts | 8 lb/ft (12 kg/m) |
| Steel Plate Beam Guardrail, Type 2 | 305 lb (140 kg) each |
| Steel Plate Beam Guardrail, Type 6 | 1260 lb (570 kg) each |
| Traffic Barrier Terminal, Type 1 Special (Tangent) | 730 lb (330 kg) each |
| Traffic Barrier Terminal, Type 1 Special (Flared) | 410 lb (185 kg) each |
| Steel Traffic Signal and Light Poles, Towers and Mast Arms | |
| Traffic Signal Post | 11 lb/ft (16 kg/m) |
| Light Pole, Tenon Mount and Twin Mount, 30 - 40 ft (9 – 12 m) | 14 lb/ft (21 kg/m) |
| Light Pole, Tenon Mount and Twin Mount, 45 - 55 ft (13.5 – 16.5 m) | 21 lb/ft (31 kg/m) |
| Light Pole w/Mast Arm, 30 - 50 ft (9 – 15.2 m ) | 13 lb/ft (19 kg/m) |
| Light Pole w/Mast Arm, 55 - 60 ft (16.5 – 18 m) | 19 lb/ft (28 kg/m) |
| Light Tower w/Luminaire Mount, 80 - 110 ft (24 – 33.5 m) | 31 lb/ft (46 kg/m) |
| Light Tower w/Luminaire Mount, 120 - 140 ft (36.5 – 42.5 m) | 65 lb/ft (97 kg/m) |
| Light Tower w/Luminaire Mount, 150 - 160 ft (45.5 – 48.5 m) | 80 lb/ft (119 kg/m) |
| Metal Railings (excluding wire fence) | |
| Steel Railing, Type SM | 64 lb/ft (95 kg/m) |
| Steel Railing, Type S-1 | 39 lb/ft (58 kg/m) |
| Steel Railing, Type T-1 | 53 lb/ft (79 kg/m) |
| Steel Bridge Rail | 52 lb/ft (77 kg/m) |
| Frames and Grates | |
| Frame | 250 lb (115 kg) |
| Lids and Grates | 150 lb (70 kg) |

# RETURN WITH BID

## ILLINOIS DEPARTMENT OF TRANSPORTATION

**OPTION FOR STEEL COST ADJUSTMENT**

The bidder shall submit this completed form with his/her bid. Failure to submit the form or properly complete contract number, company name, and sign and date the form shall make this contract exempt of steel cost adjustments for all items of steel. Failure to indicate "Yes" for any item of work will make that item of steel exempt from steel cost adjustment. After award, this form, when submitted shall become part of the contract.

**Contract No.:** _____

**Company Name:**_____

**Contractor's Option:**

Is your company opting to include this special provision as part of the contract plans for the following items of work?

| | | |
|---|---|---|
| Metal Piling | Yes | ☐ |
| Structural Steel | Yes | ☐ |
| Reinforcing Steel | Yes | ☐ |
| Dowel Bars, Tie Bars and Mesh Reinforcement | Yes | ☐ |
| Guardrail | Yes | ☐ |
| Steel Traffic Signal and Light Poles, Towers and Mast Arms | Yes | ☐ |
| Metal Railings (excluding wire fence) | Yes | ☐ |
| Frames and Grates | Yes | ☐ |

**Signature:** _____ **Date:** _____

Illinois Department of Transportation
**PROJECT LABOR AGREEMENT**

This Project Labor Agreement ("PLA") is entered into this _____ day of _____, by and between the Illinois Department of Transportation ("IDOT" or "Department") in its proprietary capacity, and each relevant Illinois AFL-CIO Building Trades Council made signatory hereto by the Illinois AFL-CIO Statewide Project Labor Agreement Committee on behalf of itself and each of its affiliated members (individually and collectively, the "Union"). This PLA shall apply to Construction Work (as defined herein) to be performed by IDOT's Prime Contractor and each of its relevant subcontractors of whatever tier ("Subcontractor" or "Subcontractors") on Contract 76D61 (hereinafter, the "Project").

## ARTICLE 1 - INTENT AND PURPOSES

1.1. This PLA is entered into in furtherance of Illinois Executive Order No. 2003-13. It is mutually understood and agreed that the terms and conditions of this PLA are intended to promote the public interest in obtaining timely and economical completion of the Project by encouraging productive and efficient construction operations; by establishing a spirit of harmony and cooperation among the parties; and by providing for peaceful and prompt settlement of any and all labor grievances or jurisdictional disputes of any kind without strikes, lockouts, slowdowns, delays or other disruptions to the prosecution of the work.

1.2. As a condition of the award of the contract for performance of work on the Project, IDOT's Prime Contractor and each of its Subcontractors shall be required to sign a "Contractor Letter of Assent", in the form attached hereto as Exhibit A, prior to commencing Construction Work on the Project. Each Union affiliate and separate local representing workers engaged in Construction Work on the Project in accordance with this PLA are bound to this agreement by the Illinois AFL-CIO Statewide Project Labor Agreement Committee which is the central committee established with full authority to negotiate and sign PLAs with the State on behalf of all respective crafts. Upon their signing the Letter of Assent, the Prime Contractor, each Subcontractor, and the individual Unions shall thereafter be deemed a party to this PLA. No party signatory to this PLA shall, contract or subcontract, nor permit any other person, firm, company or entity to contract or subcontract for the performance of Construction Work for the Project to any person, firm, company or entity that does not agree in writing to become bound by the terms of this PLA prior to commencing such work.

1.3. It is understood that the Prime Contractor(s) and each Subcontractor will be considered and accepted by the Unions as separate employers for the purposes of collective bargaining, and it is further agreed that the employees working under this PLA shall constitute a bargaining unit separate and distinct from all others. The Parties hereto also agree that this PLA shall be applicable solely with respect to this Project, and shall have no bearing on the interpretation of any other collective bargaining agreement or as to the recognition of any bargaining unit other than for the specific purposes of this Project.

1.4. In the event of a variance or conflict, whether explicit or implicit, between the terms and conditions of this PLA and the provisions of any other applicable national, area, or local collective bargaining agreement, the terms and conditions of this PLA shall supersede and control. For any work performed under the NTL Articles of Agreement, the National Stack/Chimney Agreement, the National Cooling Tower Agreement, the National Agreement of the International Union of Elevator Constructors, and for any instrument calibration work and loop checking performed under the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians, the preceding sentence shall apply only with respect to Articles I, II, V, VI, and VII.

1.5. Subject to the provisions of paragraph 1.4 of this Article, it is the parties' intent to respect the provisions of any other collective bargaining agreements that may now or hereafter pertain, whether between the Prime Contractor and one or more of the Unions or between a Subcontractor and one or more of the Unions. Accordingly, except and to the extent of any contrary provision set forth in this PLA, the Prime Contractor and each of its Subcontractors agrees to be bound and abide by the terms of the following in order of precedence: (a) the applicable collective bargaining agreement between the Prime Contractor and one or more of the Unions made signatory hereto; (b) the applicable collective bargaining agreement between a Subcontractor and one or more of the Unions made signatory hereto; or (c) the current applicable area collective bargaining agreement for the relevant Union that is the agreement certified by the Illinois Department of Labor for purposes of establishing the Prevailing Wage applicable to the Project. The Union will provide copies of the applicable collective bargaining agreements pursuant to part (c) of the preceding sentence to the Prime Contractor. Assignments by the Contractors amongst the trades shall be consistent with area practices; in the event of unresolved disagreements as to the propriety of such assignments, the provisions of Article VI shall apply.

1.6. Subject to the limitations of paragraphs 1.4 and 1.5 of this Article, the terms of each applicable collective bargaining agreement as determined in accordance with paragraph 1.5 are incorporated herein by reference, and the terms of this PLA shall be deemed incorporated into such other applicable collective bargaining agreements only for purposes of their application to the Project.

1.7. To the extent necessary to comply with the requirements of any fringe benefit fund to which the Prime Contractor or Subcontractor is required to contribute under the terms of an applicable collective bargaining agreement pursuant to the preceding paragraph, the Prime Contractor or Subcontractor shall execute all "Participation Agreements" as may be reasonably required by the Union to accomplish such purpose; provided, however, that such Participation Agreements shall, when applicable to the Prime Contractor or Subcontractor solely as a result of this PLA, be amended as reasonably necessary to reflect such fact. Upon written notice from any applicable fringe benefit fund, IDOT will withhold from the Prime Contractor payment of any delinquencies arising from this Project.

1.8. In the event that the applicable collective bargaining agreement between a Prime Contractor and the Union or between the Subcontractor and the Union expires prior to the completion of this Project, the expired applicable contract's terms will be maintained until a new applicable collective bargaining agreement is ratified. The wages and fringe benefits included in any new applicable collective bargaining agreement will apply on and after the effective date of the newly negotiated collective bargaining agreement, except to the extent wage and fringe benefit retroactivity is specifically agreed upon by the relevant bargaining parties.

## ARTICLE II – APPLICABILITY, RECOGNITION, AND COMMITMENTS

2.1 The term Construction Work as used herein shall include all "construction, prosecution, completion, or repair" work performed by a "laborer or mechanic" at the "site of the work" for the purpose of "building" the specific structures and improvements that constitute the Project. Terms appearing within quotation marks in the preceding sentence shall have the meaning ascribed to them pursuant to 29 CFR Part 5.

2.2 By executing the Letters of Assent, Prime Contractor and each of its Subcontractors recognizes the Unions signatory to this PLA as the sole and exclusive bargaining representatives for their craft employees employed on the jobsite for this Project. Unions who are signatory to this PLA will have recognition on the Project for their craft.

2.3 The Prime Contractor and each of its Subcontractors retains and shall be permitted to exercise full and exclusive authority and responsibility for the management of its operations, except as expressly limited by the terms of this PLA or by the terms and conditions of the applicable collective bargaining agreement.

2.4 Except to the extent contrary to an express provision of the relevant collective bargaining agreement, equipment or materials used in the Project may be pre-assembled or pre-fabricated, and there shall be no refusal by the Union to handle, transport, install, or connect such equipment or materials. Equipment or materials delivered to the job-site will be unloaded and handled promptly without regard to potential jurisdictional disputes; any such disputes shall be handled in accordance with the provisions of this PLA.

2.5 Unions commit to furnishing qualified and skilled craft persons as required by the Prime Contractor and its Subcontractors in fulfillment of their obligations to complete the Project. In order to promote the long-term development of a skilled and knowledgeable work force, the parties are encouraged to utilize apprentices to the maximum extent permitted by the applicable collective bargaining agreement.

2.6 The parties are mutually committed to promoting a safe working environment for all personnel at the job site. It shall be the responsibility of each employer to which this PLA applies to provide and maintain safe working conditions for its employees, and to comply with all applicable federal, state, and local health and safety laws and regulations.

2.7 The use or furnishing of alcohol or drugs and the conduct of any other illegal activity at the job-site is strictly prohibited. The parties shall take every practical measure consistent with the terms of applicable collective bargaining agreements to ensure that the job-site is free of alcohol and drugs.

2.8 All parties to this PLA agree that they shall not discriminate against any employee based on race, creed, color, national origin, union activity, age, or gender as required by all applicable federal, state, and local laws.

2.9 The Parties hereto agree that engineering consultants and materials testing employees, to the extent subject to the terms of this PLA, shall be fully expected to objectively and responsibly perform their duties and obligations owed to the Department without regard to the potential union affiliation of such employees or of other employees on the Project.

## ARTICLE III - ADMINISTRATION OF AGREEMENT

3.1 In order to assure that all parties have a clear understanding of the PLA and to promote harmony, a post-award pre-job conference will be held among the Prime Contractor, all Subcontractors and Union representatives prior to the start of any Construction Work on the Project. No later than the conclusion of such pre-job conference, the parties shall, among other matters, provide to one another contact information for their respective representatives (including name, address, phone number, facsimile number, e-mail). Nothing herein shall be construed to limit the right of the Department to discuss or explain the purpose and intent of this PLA with prospective bidders or other interested parties prior to or following its award of the job.

3.2 Representatives of the Prime Contractor and the Unions shall meet as often as reasonably necessary following award until completion of the Project to assure the effective implementation of this PLA.

3.3 Not less than once per month, Prime Contractor and all Subcontractors shall make available in writing to the Unions a Project status report that shall include, though not necessarily be limited to, planned activities for the next 30 day period and estimated numbers of employees by craft required for the next 30 day period. The purpose of this Project status report is to promote effective workforce planning and to facilitate resolution of any potential jurisdictional or other problems.

3.4 Not later than the earlier of (a) five business days following the pre-job conference, or (b) commencement of Construction Work, the Unions and Prime Contractor (on behalf of itself and all its subcontractors of whatever tier) shall confer and jointly designate a slate of three (3) permanent arbitrators (each a “Permanent Arbitrator”) for the purpose of hearing disputes pursuant to Articles V and VII of this PLA. The slate of Permanent Arbitrators shall be selected from among the following individuals: Thomas F. Gibbons, Thomas G. Pagan, Robert Perkovich, Byron Yaffee, and Glenn A. Zipp. In the event that the Unions and Prime Contractor are not able to agree on a full slate of three Permanent Arbitrators, the Department, after consultation with the Unions and Prime Contractor, shall designate such additional Permanent Arbitrators as may be necessary to establish the full slate.

A single Permanent Arbitrator shall be selected from the slate of three on a rotating basis to adjudicate each arbitrable matter as it arises. In the event a Permanent Arbitrator is not available to adjudicate a particular matter in the order of rotation, the arbitration assignment shall pass to the next available Permanent Arbitrator.

## ARTICLE IV - HOURS OF WORK AND GENERAL CONDITIONS

4.1 The standard work day for Construction Work on the Project shall be an established consecutive eight (8) hour period between the hours of 7:00 a.m. and 5:00 p.m. with one-half hour designated as unpaid period for lunch. The standard work week shall be five (5) consecutive days of work commencing on Monday. Starting time shall be established at the pre-job conference, and shall be applicable to all craft employees on the Project unless otherwise expressly agreed in writing. In the event Project site or other job conditions dictate a change in the established starting time and/or a staggered lunch period for portions of the Project or for specific crafts, the Prime Contractor, relevant Subcontractors and business managers of the specific crafts involved shall confer and mutually agree to such changes as appropriate. If proposed work schedule changes cannot be mutually agreed upon between the parties, the hours fixed at the time of the pre-job meeting shall prevail.

4.2 Shift work may be established and directed by the Prime Contractor or relevant Subcontractor as reasonably necessary or appropriate to fulfill the terms of its contract with the Department. If used, shift hours, rates and conditions shall be as provided in the applicable collective bargaining agreement.

4.3 The parties agree that chronic and/or unexcused absenteeism is undesirable and must be controlled in accordance with procedures established by the applicable collective bargaining agreement. Any employee disciplined for absenteeism in accordance with such procedures shall be suspended from all work on the Project for not less than the maximum period permitted under the applicable collective bargaining agreement.

4.4 Except as may be otherwise expressly provided by the applicable collective bargaining agreement, employment begins and ends at the Project site; employees shall be at their place of work at the starting time; and employees shall remain at their place of work until quitting time.

4.5 Except as may be otherwise expressly provided by the applicable collective bargaining agreement, there shall be no limit on production by workmen, no restrictions on the full use of tools or equipment, and no restrictions on efficient use of manpower or techniques of construction other than as may be required by safety regulations.

4.6 The parties recognize that specialized or unusual equipment may be installed on the Project. In such cases, the Union recognizes the right of the Prime Contractor or Subcontractor to involve the equipment supplier or vendor's personnel in supervising the setting up of the equipment, making modifications and final alignment, and performing similar activities that may be reasonably necessary prior to and during the start-up procedure in order to protect factory warranties. The Prime Contractor or Subcontractor shall notify the Union representatives in advance of any work at the job-site by such vendor personnel in order to promote a harmonious relationship between the equipment vendor's personnel and other Project employees.

4.7 For the purpose of promoting full and effective implementation of this PLA, authorized Union representatives shall have access to the Project job-site during scheduled work hours. Such access shall be conditioned upon adherence to all reasonable visitor and security rules of general applicability that may be established for the Project site at the pre-job conference or from time to time thereafter.

## ARTICLE V - GRIEVANCE AND ARBITRATION PROCEDURES

5.1 Except as provided in Articles VI or VII, it is specifically agreed among the parties that any grievance or dispute arising out of the interpretation or application of this PLA shall be settled by means of the expedited arbitration process set forth in Paragraph 5.2 below. No such grievance or dispute shall be recognized unless called to the attention of the Prime Contractor and relevant Subcontractor by the Union or to the Union by the Prime Contractor or relevant Subcontractor within five (5) working days after the alleged violation was committed or discovered by the grieving party.

5.2 Grievances shall be settled according to the following procedure:

5.2.A. Step 1. The dispute shall be referred to the Steward of the craft union involved and a representative of the Prime Contractor and relevant Subcontractor at the job-site.

5.2.B. Step 2. In the event that the Steward and the contractors' representatives at the job-site cannot reach agreement within two (2) working days after a meeting is arranged and held, the matter shall be referred to the Union Business Manager and to executive representatives of the Prime Contractor and relevant Subcontractor.

5.2.C. Step 3. In the event the dispute is not resolved within five (5) working days after completion of Step 2, the relevant parties shall request a Permanent Arbitrator as determined in accordance with paragraph 3.4 of this PLA, who shall, within ten (10) working days, hear the grievance and make a written decision. Such decisions shall be final and binding on all parties. The parties shall each pay the expense of their own representative. The expense of the Permanent Arbitrator shall be divided equally between (1) the Prime Contractor and/or relevant Subcontractor, and (2) the involved Union.

5.3 Any failure of a party to comply fully with such final and binding decision of the Permanent Arbitrator may result in removal of the non-complying party from the site, in a holdback from the Prime Contractor or Subcontractor of any amounts awarded, or in such other relief as the Department may reasonably determine is necessary to promote final resolution of the dispute.

5.4 In the event any dispute or grievance should arise, the parties expressly agree that it shall be resolved without occurrence of any strike, work stoppage, slow-down or other prohibited activities as provided in Article VII of this PLA. Individuals or parties violating this section shall be subject to immediate discharge or other discipline.

## ARTICLE VI - JURISDICTIONAL DISPUTES

6.1 As used in this Agreement, the term "jurisdictional dispute" shall be defined as any dispute, difference or disagreement involving the assignment of particular work to one class or craft of employees rather than to a different class or craft of employees, regardless of that Contractor's contractual relationship to any other employer, contractor, or organization on the site.

6.2 It is agreed by and between the parties to this Agreement that any and all jurisdictional disputes shall be resolved in the following manner; each of the steps hereinafter listed shall be initiated by the parties in sequence as set forth:

(a) Negotiation by and between the Local Business Representative of the disputing Union and Employer shall take place within two (2) business days. Business days are defined as Monday through Friday excluding contract holidays. Such negotiations shall be pursued until it is apparent that the dispute cannot be resolved at the local level.

(b) The International Representatives of the disputing Union shall meet or confer and attempt to resolve said dispute. This meeting shall take place within two (2) business days. Business days are defined as Monday through Friday excluding contract holidays.

(c) The parties to the Jurisdictional Dispute shall submit the dispute directly to an Arbitrator after complying with paragraph (2b) above. The parties shall meet with the Arbitrator within three (3) business days. Business days are defined as Monday through Friday excluding contract holidays. An Arbitrator will be selected based on availability from the slate of permanent Arbitrators. The Arbitrator's bench decision will be given the day of the hearing and will be final and legally binding on this project only. The Arbitrator's bench decision will be implemented without delay. The cost of Arbitration will be shared equally by the disputing parties. Any party to the dispute can require that a "long form" written decision be provided from the Arbitrator, however the cost of the "long form" written decision will be the responsibility of the party making the request.

Notes:

- A jurisdictional dispute may be submitted based upon a pre-job assignment.

- If any party to the jurisdictional disputes does not fully comply with the steps and time limits with each step, then the party in non-compliance will lose by "automatic default".

- Time limits at any step can be extended if all parties to the jurisdictional dispute mutually agree in writing.

- All parties to a jurisdictional dispute can mutually agree to waive the time limits in steps (a) and (b) and proceed directly to an expedited arbitration hearing.

(d) In rendering his decision, the Arbitrator shall determine:

(1) First whether a previous agreement of record or applicable agreement, including a disclaimer agreement, between the National or International Unions to the dispute governs;

(2) Only if the Arbitrator finds that the dispute is not covered by an appropriate or applicable agreement of record or agreement between the crafts to the dispute, he shall then consider whether there is a previous decision of record governing the case;

(3) If the Arbitrator finds that a previous decision of record governs the case, the Arbitrator shall apply the decision of record in rendering his decision except under the following circumstances. After notice to the other parties to the dispute prior to the hearing that it intends to challenge the decision of record, if a trade challenging the decision of record is able to demonstrate that the recognized and established prevailing practice in the locality of the work has been contrary to the applicable decision of record, and that historically in that locality the work in dispute has not been performed by the other craft or crafts, the Arbitrator may rely on such prevailing practice rather than the decision of record. If the craft relying on the decision of record demonstrates that it has performed the work in dispute in the locality of the job, then the Arbitrator shall apply the decision of record in rendering his decision. If the Arbitrator finds that a craft has improperly obtained the prevailing practice in the locality through raiding, the undercutting of wagers or by the use of vertical agreements, the Arbitrator shall rely on the decision of record rather than the prevailing practice in the locality.

(4) If no decision of record is applicable, the Arbitrator shall then consider the established trade practice in the industry and prevailing practice in the locality; and

(5) Only if none of the above criteria is found to exist, the Arbitrator shall then consider that because efficiency, cost or continuity and good management are essential to the well being of the industry, the interest of the consumer or the past practice of the employer shall not be ignored.

The Arbitrator shall set forth the basis for his decision and shall explain his findings regarding the applicability of the above criteria. If lower-ranked criteria are relied upon, the Arbitrator shall explain why the higher-ranked criteria were not deemed applicable. The Arbitrator's decision shall only apply to the job in dispute.

(6) Agreements of record are applicable only to the party's signatory to such agreements. Decisions of record are applicable to all trades.

(7) The Arbitrator is not authorized to award back pay or any other damages for a mis-assignment of work. Nor may any party bring an independent action for back pay or any other damages, based upon a decision of an Arbitrator.

6.3 The signatory parties to this Agreement agree that jurisdictional disputes cannot and shall not interfere with the efficient and continuous operations required for the successful application of this Agreement. In the event a dispute arises, the Contractor's assignment shall be followed until the dispute is resolved.

6.4 Equipment or material delivered to the job site will be unloaded promptly without regard to jurisdictional disputes which will be handled as per the provisions of this Agreement. The Contractor will supply the Union with delivery schedules, allowing as much time as possible to insure the appropriate crafts will be available to unload the materials or equipment.

6.5 All signatory affiliates agree that upon request, a representative shall be assigned without delay to attempt a settlement in the event of a question on assignments.

## ARTICLE VII - WORK STOPPAGES AND LOCKOUTS

7.1 During the term of this PLA, no Union or any of its members, officers, stewards, employees, agents or representatives shall instigate, support, sanction, maintain, or participate in any strike, picketing, walkout, work stoppage, slow down or other activity that interferes with the routine and timely prosecution of work at the Project site or at any other contractor's or supplier's facility that is necessary to performance of work at the Project site. Hand billing at the Project site during the designated lunch period and before commencement or following conclusion of the established standard workday shall not, in itself, be deemed an activity that interferes with the routine and timely prosecution of work on the Project.

7.2 Should any activity prohibited by paragraph 7.1 of this Article occur, the Union shall undertake all steps reasonably necessary to promptly end such prohibited activities. No Union complying with its obligations under this Article shall be liable for acts of employees for which it has no responsibility or for the unauthorized acts of employees it represents. Any employee who participates in or encourages any activity prohibited by paragraph 7.1 shall be immediately suspended from all work on the Project for a period equal to the greater of (a) 60 days; or (b) the maximum disciplinary period allowed under the applicable collective bargaining agreement for engaging in comparable unauthorized or prohibited activity.

7.3 During the term of this PLA, the Prime Contractor and its Subcontractors shall not engage in any lockout at the Project site of employees covered by this Agreement.

7.4 Upon notification of violations of this Article, the principal officer or officers of the local area Building and Construction Trades Council, and the Illinois AFL-CIO Statewide Project Labor Agreement Committee as appropriate, will immediately instruct, order and use their best efforts to cause the affiliated union or unions to cease any violations of this Article. A Trades Council and the Committee otherwise in compliance with the obligations under this paragraph shall not be liable for unauthorized acts of its affiliates.

7.5 In the event that activities in violation of this Article are not immediately halted through the efforts of the parties, any aggrieved party may invoke the special arbitration provisions set forth in paragraph 7.6 of this Article.

7.6 Upon written notice to the other involved parties by the most expeditious means available, any aggrieved party may institute the following special arbitration procedure when a breach of this Article is alleged:

7.6.A The party invoking this procedure shall notify the individual designated as the Permanent Arbitrator pursuant to Article III of the nature of the alleged violation; such notice shall be by the most expeditious means possible. The initiating party may also furnish such additional factual information as may be reasonably necessary for the Permanent Arbitrator to understand the relevant circumstances. Copies of any written materials provided to the arbitrator shall also be contemporaneously provided by the most expeditious means possible to the party alleged to be in violation and to all other involved parties.

7.6.B Upon receipt of said notice the Permanent Arbitrator shall set and hold a hearing within twenty-four (24) hours if it is contended the violation is ongoing, but not before twenty-four (24) hours after the written notice to all parties involved as required above.

7.6.C The Permanent Arbitrator shall notify the parties by facsimile or any other effective written means, of the place and time chosen by the Permanent Arbitrator for this hearing. Said hearing shall be completed in one session. A failure of any party or parties to attend said hearing shall not delay the hearing of evidence or issuance of an Award by the Permanent Arbitrator.

7.6.D The sole issue at the hearing shall be whether a violation of this Article has, in fact, occurred. An Award shall be issued in writing within three (3) hours after the close of the hearing, and may be issued without a written opinion. If any party desires a written opinion, one shall be issued within fifteen (15) days, but its issuance shall not delay compliance with, or enforcement of, the Award. The Permanent Arbitrator may order cessation of the violation of this Article, and such Award shall be served on all parties by hand or registered mail upon issuance.

7.6.E Such Award may be enforced by any court of competent jurisdiction upon the filing of the Award and such other relevant documents as may be required. Facsimile or other hardcopy written notice of the filing of such enforcement proceedings shall be given to the other relevant parties. In a proceeding to obtain a temporary order enforcing the Permanent Arbitrator's Award as issued under this Article, all parties waive the right to a hearing and agree that such proceedings may be ex parte. Such agreement does not waive any party's right to participate in a hearing for a final order of enforcement. The Court's order or orders enforcing the Permanent Arbitrator's Award shall be served on all parties by hand or by delivery to their last known address or by registered mail.

7.7 Individuals found to have violated the provisions of this Article are subject to immediate termination. In addition, IDOT reserves the right to terminate this PLA as to any party found to have violated the provisions of this Article.

7.8 Any rights created by statue or law governing arbitration proceedings inconsistent with the above procedure or which interfere with compliance therewith are hereby waived by parties to whom they accrue.

7.9 The fees and expenses of the Permanent Arbitrator shall be borne by the party or parties found in violation, or in the event no violation is found, such fees and expenses shall be borne by the moving party.

## ARTICLE VIII – MISCELLANEOUS

8.1 If any Article or provision of this PLA shall be declared invalid, inoperative or unenforceable by operation of law or by final non-appealable order of any tribunal of competent jurisdiction, such provision shall be deemed severed or limited, but only to the extent required to render the remaining provisions of this PLA enforceable consistent with the intent of the parties. The remainder of this PLA or the application of such Article or provision to persons or circumstances other than those as to which it has been held invalid, inoperative or unenforceable shall not be affected thereby.

8.2 The term of this PLA shall commence as of and from the date of the notice of award to the Prime Contractor and shall end upon final acceptance by IDOT of all work on the Project by the parties hereto.

8.3 This PLA may not be changed or modified except by the subsequent written agreement of the parties. All parties represent that they have the full legal authority to enter into this PLA. This PLA may be executed by the parties in one or more counterparts.

8.4 Any liability arising out of this PLA shall be several and not joint. IDOT shall not be liable to any person or other party for any violation of this PLA by any other party, and no Contractor or Union shall be liable for any violation of this PLA by any other Contractor or Union.

8.5 The failure or refusal of a party to exercise its rights hereunder in one or more instances shall not be deemed a waiver of any such rights in respect of a separate instance of the same or similar nature.

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**Execution Page**

***Illinois Department of Transportation***

_____
Christine M. Reed, P.E., Director of Highways

_____
Ann Schneider, Director Finance & Administration

_____
Ellen Schanzle-Haskins, Chief Counsel

_____ _____
Gary Hannig, Secretary (Date)

***Illinois AFL-CIO Statewide Project Labor Agreement Committee, representing the local unions listed below:***

_____ _____
(Date)

**List Union Locals:**

**** RETURN WITH BID ****

Exhibit A – Contractor Letter of Assent

_____
(Date)

To All Parties:

In accordance with the terms and conditions of the contract for Construction Work on [Contract 76D61], this Letter of Assent hereby confirms that the undersigned Prime Contractor or Subcontractor agrees to be bound by the terms and conditions of the Project Labor Agreement established and entered into by the Illinois Department of Transportation in connection with said Project.

It is the understanding and intent of the undersigned party that this Project Labor Agreement shall pertain only to the identified Project. In the event it is necessary for the undersigned party to become signatory to a collective bargaining agreement to which it is not otherwise a party in order that it may lawfully make certain required contributions to applicable fringe benefit funds, the undersigned party hereby expressly conditions its acceptance of and limits its participation in such collective bargaining agreement to its work on the Project.

_____
(Authorized Company Officer)

_____
(Company)

**** RETURN WITH BID ****

# REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS


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**ATTACHMENTS**


**A**. Employment Preference for Appalachian Contracts (included in Appalachian contracts only)


## I. GENERAL

**1.** These contract provisions shall apply to all word performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

**2.** Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

**3.** A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

**4.** A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;
Section IV, paragraphs 1, 2, 3, 4 and 7;
Section V, paragraphs 1 and 2a through 2g.

**5.** Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6 and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.

**6.** Selection of Labor: During the performance of this contract, the contractor shall not:

**a.** Discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or

**b.** Employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

## II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

**1. Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60 (and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

**a.** The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

**b.** The contractor will accept as his operating policy the following statement: "It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job-training."

**2. EEO Officer:** The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for an must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

**3. Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

**a.** Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

**b.** All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

**c.** All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.

**d.** Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees,

applicants for employment and potential employees.
**e.** The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

**4. Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

**a.** The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employees referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish which such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.
**b.** In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)
**c.** The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

**5. Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

**a.** The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
**b.** The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
**c.** The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
**d.** The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

**6. Training and Promotion:**

**a.** The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.
**b.** Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.
**c.** The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
**d.** The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

**7. Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

**a.** The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.
**b.** The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.
**c.** The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA and shall set forth what efforts have been made to obtain such information.
**d.** In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or quailifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

**8. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

**a.** The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.
**b.** Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees.
Contractors shall obtain lists of DBE construction firms from SHA

personnel.

**c.** The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

**9. Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

**a.** The records kept by the contractor shall document the following:

**(1)** The number of minority and non-minority group members and women employed in each work classification on the project;

**(2)** The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;

**(3)** The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

**(4)** The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

**b.** The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.

**III. NONSEGREGATED FACILITIES**

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

**a**. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

**b**. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

**c.** The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of $10,000 or more and that it will retain such certifications in its files.

**IV. PAYMENT OF PREDETERMINED MINIMUM WAGE**

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

**1. General:**

**a.** All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

**b.** Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.

**c.** All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

**2. Classification:**

**a.** The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

**b.** The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

**(1)** the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

**(2)** the additional classification is utilized in the area by the construction industry;

**(3)** the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

**(4)** with respect to helpers, when such a classification prevails in the area in which the work is performed.

**c.** If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the

contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

**d**. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the question, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advised the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

**e.** The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

**3. Payment of Fringe Benefits**:

**a.** Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

**b**. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any cost reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

**4. Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:**

**a.** Apprentices:

**(1)** Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

**(2)** The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

**(3)** Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

**(4)** In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

**b**. Trainees:

**(1)** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.

**(2)** The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

**(3)** Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which cases such trainees shall receive the same fringe benefits as apprentices.

**(4)** In the event the Employment and Training Administration

withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

**c**. Helpers:

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV. 2. Any worker listed on a payroll at a helper wage rate, who is not a helper under a approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

**5. Apprentices and Trainees** (Programs of the U.S. DOT):

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

**6. Withholding:**

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainee's and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

**7. Overtime Requirements**:

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

**8. Violation**:

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of $10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

**9. Withholding for Unpaid Wages and Liquidated Damages:**

The SHA shall; upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

## V. STATEMENTS AND PAYROLLS

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

**1. Compliance with Copeland Regulations** (29 CFR 3):

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

**2. Payrolls and Payroll Records:**

**a.** Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

**b.** The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

**c**. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely

all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for submitting payroll copies of all subcontractors.

**d**. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

**(1)** that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;

**(2)** that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;

**(3)** that each laborer or mechanic has been paid not less that the applicable wage rate and fringe benefits or cash equivalent for the classification of worked performed, as specified in the applicable wage determination incorporated into the contract.

**e**. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.

**f**. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U/S. C. 1001 and 31 U.S.C. 231.

**g**. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

**VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR**

**1.** On all federal-aid contracts on the national highway system, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than $1,000,000 (23 CFR 635) the contractor shall:

**a.** Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

**b**. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

**c.** Furnish, upon the completion of the contract, to the SHA resident engineer on /Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

**2**. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

**VII. SUBLETTING OR ASSIGNING THE CONTRACT**

**1.** The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractors' own organization (23 CFR 635).

**a**. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.

**b**. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.

**2.** The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

**3.** The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.

**4**. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

**VIII. SAFETY: ACCIDENT PREVENTION**

**1.** In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

**2.** It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in

surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S. C. 333).

**3**. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

## IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

**NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS**

18 U.S.C. 1020 reads as follows:

*"Whoever, being an officer, agent or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or*

*Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or*

*Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;*

*Shall be fined not more than $10,000 or imprisoned not more than 5 years or both."*

## X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $100,000 or more).

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

**2.** That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

**3.** That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

**4.** That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

## XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

**1**. Instructions for Certification - Primary Covered Transactions:

(Applicable to all Federal-aid contracts - 49 CFR 29)

**a.** By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
**b.** The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
**c.** The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.
**d.** The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is
submitted if any time the prospective primary participant learns that
its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
**e.** The terms "covered transaction," "debarred," "suspended," "ineligible,""lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal

is submitted for assistance in obtaining a copy of those regulations.

**f.** The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

**g.** The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification in all lower tier covered transactions

and in all solicitations for lower tier covered transactions.

**h.** A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded from Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

**i**. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

**j.** Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

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**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Primary Covered Transactions**

**1**. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

**a.** Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

**b.** Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and

d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

**2**. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

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**2. Instructions for Certification - Lower Tier Covered Transactions**:

(Applicable to all subcontracts, purchase orders and other lower tier transactions of $25,000 or more - 49 CFR 29)

**a**. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

**b.** The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

**c.** The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

**d.** The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

**e.** The prospective lower tie participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

**f.** The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

**g.** A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

**h.** Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealing.

**i.** Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

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**Certification Regarding Debarment, Suspension, Ineligibility And Voluntary Exclusion-Lower Tier Covered Transactions**:

**1**. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

**2.** Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

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**XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING**

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 - 49 CFR 20)

**1.** The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

**a.** No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

**b.** If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

**2**. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

**3.** The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

**MINIMUM WAGES FOR FEDERAL AND FEDERALLY ASSISTED CONSTRUCTION CONTRACTS**

This project is funded, in part, with Federal-aid funds and, as such, is subject to the provisions of the Davis-Bacon Act of March 3, 1931, as amended (46 Sta. 1494, as amended, 40 U.S.C. 276a) and of other Federal statutes referred to in a 29 CFR Part 1, Appendix A, as well as such additional statutes as may from time to time be enacted containing provisions for the payment of wages determined to be prevailing by the Secretary of Labor in accordance with the Davis-Bacon Act and pursuant to the provisions of 29 CFR Part 1. The prevailing rates and fringe benefits shown in the General Wage Determination Decisions issued by the U.S. Department of Labor shall, in accordance with the provisions of the foregoing statutes, constitute the minimum wages payable on Federal and federally assisted construction projects to laborers and mechanics of the specified classes engaged on contract work of the character and in the localities described therein.

General Wage Determination Decisions, modifications and supersedes decisions thereto are to be used in accordance with the provisions of 29 CFR Parts 1 and 5. Accordingly, the applicable decision, together with any modifications issued, must be made a part of every contract for performance of the described work within the geographic area indicated as required by an applicable DBRA Federal prevailing wage law and 29 CFR Part 5. The wage rates and fringe benefits contained in the General Wage Determination Decision shall be the minimum paid by contractors and subcontractors to laborers and mechanics.

**NOTICE**

The most current **General Wage Determination Decisions** (wage rates) are available on the IDOT web site. They are located on the Letting and Bidding page at http://www.dot.state.il.us/desenv/delett.html.

In addition, ten (10) days prior to the letting, the applicable Federal wage rates will be e-mailed to subscribers. It is recommended that all contractors subscribe to the Federal Wage Rates List or the Contractor's Packet through IDOT's subscription service.

PLEASE NOTE: if you have already subscribed to the Contractor's Packet you will automatically receive the Federal Wage Rates.

The instructions for subscribing are at http://www.dot.state.il.us/desenv/subsc.html.

If you have any questions concerning the wage rates, please contact IDOT's Chief Contract Official at 217-782-7806.