

INFORMATIONAL PROPOSAL (For information only, not to be used for bidding)

NEBRASKA DEPARTMENT OF ROADS
LETTING DATE: November 14, 2013

CALL ORDER: 205 CONTRACT ID: 2151X

CONTROL NO./SEQ. NO.: 22151 /000 PROJECT NO.: S-80-9(1189)

TENTATIVE START DATE: 01/06/14 CONTRACT TIME: 510 CALENDAR DAYS

LOCATION: I-80, 126th ST.-96th ST., OMAHA
IN COUNTY: DOUGLAS SARPY

BIDDER

- GROUP 1 GRADING
- GROUP 3 CONCRETE PAVEMENT
- GROUP 4 CULVERTS
- GROUP 6 BRIDGE AT STATION 596+40.00
- GROUP 7 GUARDRAIL
- GROUP 7B FENCE
- GROUP 8B ELECTRICAL
- GROUP 8C SIGNING
- GROUP 10 GENERAL ITEMS

SEE SPECIAL PROVISIONS FOR GROUP TIES

NOTES

THE TOTAL AMOUNT OF WORK WHICH WILL BE ACCEPTED IN
THIS LETTING IS LIMITED TO \$_____.

THE NUMBER OF _____ CONTRACTS WHICH WILL BE
ACCEPTED IN THIS LETTING IS LIMITED TO _____.

NOTICE TO ALL BIDDERS

To report bid rigging activities, call: 1-800-424-9071

The U.S. Department of Transportation (DOT) operates the above toll-free “hotline” Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the “hotline” to report such activities.

The “hotline” is part of the DOT’s continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

LETTING QUESTIONS

Prior to the letting, any questions pertaining to the Special Provisions or the Plans for this project should be submitted to NDOR in a written format through the Bid Express (BidX) website at <https://www.bidx.com/ne/lettings>. Likewise, NDOR will post answers exclusively to the BidX website. All official answers will be identified as “Authorized by NDOR.” **Questions will not be answered verbally.**

STATE OF NEBRASKA
DEPARTMENT OF ROADS

Required Provisions Supplemental to the

Standard Specifications for Highway Construction

I. Application

These contract provisions shall apply to all work performed on the contract by the contractor with his own organization and with the assistance of workmen under his immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

The contractor shall insert in each of his subcontracts all of the stipulations contained in the Special Provisions and these Required Provisions.

A breach of any of the stipulations contained in these Required Provisions may be grounds for termination of the contract.

II. Equal Opportunity

1. **Selection of Labor**

During the performance of this contract, the contractor shall not discriminate against labor from any other state.

2. **Nebraska Fair Employment Practices Act**

The contractor shall not discriminate against any employee or applicant for employment, to be employed in the performance of this contract with respect to his hire, tenure, terms, conditions, or privileges of employment, because of his race, color, religion, sex or national origin. The contractor agrees to post in a conspicuous place or places a notice to be provided by the State Highway Department which sets forth excerpts of the Act.

3. **Nebraska Equal Pay Act**

The contractor shall not discriminate on the basis of sex by paying wages to employees of one sex at a lesser rate than the rate paid to employees of the opposite sex for comparable work on jobs which have comparable requirements. An abstract of the Act is included on the notice which is provided by the State Highway Department.

April 4, 1995

III. Employment of Labor

1. General

No person under the age of sixteen (16) years, and no one whose age or physical condition is such as to make his employment dangerous to his health or safety, or to the health and safety of others shall be employed on any project. This paragraph shall not be construed to deny the employment of older people or physically handicapped persons, otherwise employable, where such persons may be safely assigned to work which they can ably perform.

No person currently serving sentence to a penal or correction institution shall be employed on any project.

Except as specifically provided under this section, workers who are qualified by training or experience to be assigned to projects of this character shall not be discriminated against on any grounds whatsoever.

2. Payrolls

Payrolls and basic records relating thereto will be maintained during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working on the site of the work.

The contractor's and subcontractor's payroll records shall be available for inspection by authorized representatives of the State Highway Department and authorized representatives of Federal Agencies.

The wages of labor shall be paid in legal tender of the United States, except that this condition will be considered satisfied if payment is made by a negotiable check, on a solvent bank, which may be cashed readily by the employee in the local community for the full amount, without discount or collection charges of any kind. Where checks are used for payment the contractor shall make all necessary arrangements for them to be cashed and shall give information regarding such arrangements.

No fee of any kind shall be asked or accepted by the contractor or any of his agents from any person as a condition of employment on the project.

No laborers shall be charged for any tools used in performing their respective duties except for reasonably avoidable loss or damage thereto.

Every employee on the work covered by this contract shall be permitted to lodge, board and trade where and with whom he elects and neither the contractor nor his agents, nor his employees shall directly or indirectly require as a condition of employment that an employee shall lodge, board or trade at a particular place or with a particular person.

No charge shall be made for any transportation furnished by the contractor or his agents to any person employed on the work.

April 4, 1995

No individual shall be employed as a laborer on this contract except on a wage basis, but this shall not be construed to prohibit the rental of teams, trucks or other equipment from individuals. No such rental agreement, or any charges for feed, gasoline, supplies, or repairs on account of such agreement, shall cause any deduction from the wages accruing to any employee except as authorized by the regulations hereinbefore cited.

IV. Safety and Accident Prevention

In the performance of this contract, the contractor shall comply with all applicable Federal, State and local laws governing safety, health and sanitation. The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions, on his own responsibility or as the contracting officer may determine, 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.

V. Subletting or Assigning the Contract

The contractor shall perform with his own organization contract work amounting to not less than 30 percent of the total contract amount except that any items designated in the contract as "Specialty Items" may be performed by subcontract and the amount of any such "Specialty Items" so performed may be deducted from the total contract amount before computing the amount of work required to be performed by the contractor with his own organization.

Any items that have been selected as "Specialty Items" for the contract are listed as such in the Special Provisions found elsewhere in the contract.

No portion of the contract shall be sublet, assigned, or otherwise disposed of except with the written consent of the contracting officer or his authorized representative. Requests for permission to sublet assign or otherwise dispose of any portion of the contract shall be in writing and accompanied by a showing that the organization which will perform the work is particularly experienced and equipped for such work. The contractor shall give assurance that the minimum wage for labor as stated in his proposal shall apply to labor performed on all work sublet, assigned or otherwise disposed of in any way. Consent to sublet, assign or otherwise dispose of any portion of the contract shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract.

April 4, 1995

**SPECIAL PROVISIONS
FOR
STATE
PROJECT NO. S-80-9(1189)**

GENERAL CONDITIONS

Bids for the work contemplated in this proposal form will be received at the office of the Nebraska Department of Roads in Room 104 of the Central Office Building at 1500 Highway 2 at Lincoln, Nebraska, on November 14, 2013, until 1:30 P.M.

- a. Bids submitted by mail should be addressed to the Nebraska Department of Roads, c/o Contract Lettings Section, P.O. Box 94759, Lincoln, NE 68509-4759.
- b. Bids submitted electronically over the internet, shall be submitted using www.bidx.com.

The 2007 Edition of the Standard Specifications for Highway Construction, including all amendments and additions thereto effective at the date of the contract, are made a part of these Special Provisions, through reference.

The Required Provisions dated April 4, 1995, are attached to and are a part of this proposal form.

The attention of bidders is directed to the Required Provisions covering subletting or assigning the contract.

The proposal contains a statement that the contractor is complying with, and will continue to comply with, fair labor standards in the pursuit of his business and in the execution of the work contemplated in this proposal.

Fair labor standards shall be construed to mean such a scale of wages and conditions of employment as are paid and maintained by at least fifty per cent of the contractors in the same business or field of endeavor as the contractor filing this proposal.

GROUPS 1, 3, 4, 6, 7, 7B, 8B, 8C AND 10 ARE TIED TOGETHER AND BIDDING PROPOSAL FORMS FOR THIS WORK WILL BE ISSUED AND A CONTRACT AWARDED TO A CONTRACTOR WHO IS QUALIFIED FOR CONCRETE PAVEMENT.

**NOTICE TO BIDDERS
(Noise Control)**

The Contractor shall be required to abide by the City of Omaha's ordinance concerning Noise Control as found in Chapter 17 of the *Municipal Code For The City Of Omaha*. The Contractor shall be solely responsible for complying with the most current ordinance concerning noise control and for obtaining any variances or permits necessary to conduct their operations in compliance with City code.

NOTICE TO BIDDERS

The Millard Airport is located near the area of construction for the project. It shall be the Contractors responsibility to determine if the height of any equipment used in the construction of the project (or any antennae installed on the equipment) exceeds any local airport's Height Restriction Zoning.

Any Contractor involved in the project shall use the Notice Criteria Tool available at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp> If required the Contractor shall file a Form 7460-1 with the FAA. The form will be required if the contractor uses any equipment (temporary or permanent) over 200' tall, or the equipment breaks a 100:1 slope from the nearest point of the nearest runway of the nearest public-use airport. In addition to buildings or facilities, 'structures' include any trucks or equipment used during the construction of the project.

For more information contact:

Dave Lehnert
Nebraska Department of Aeronautics
Phone (402) 471-7928

STATUS OF UTILITIES

The following information is current as of October 17, 2013.

Aerial and/or underground utility facilities may exist within this project. The Contractor shall determine to his / her satisfaction the extent of utility conflict for facilities located within the construction areas.

At this time, no utilities have been required to relocate their facilities.

Any utility adjustments or interruption of service for the convenience of the Contractor shall be the sole responsibility of the Contractor.

To arrange for utilities to locate and flag their underground facilities, contact Diggers Hotline of Nebraska at 1-800-331-5666 or dial 811.

Utilities known to be in the vicinity of this project:

AT&T Communications
CenturyLink
City of Omaha
Cox Cable of Omaha
Metropolitan Utilities District
Omaha Public Power District
Unite Private Networks

Any work necessary will be concurrent with construction.

STATUS OF RIGHT OF WAY

The right of way for this project has been acquired and physical possession is held by the State of Nebraska and ready for the Contractor's use, except tracts listed below:

Unacquired Right-of-Way Tracts as follows:

Tract Number	Status of Tract	Hearing Date
None	None	None

Right-of-Way Tracts with Pay Items:

Tract Number	Pay Items
None	None

- No encroachments on the old right of way.
- Acquisition of right of way is not required for this project.

**SPECIAL PROSECUTION AND PROGRESS
(Accommodation of Public Vehicular Traffic)**

I. General

When working adjacent to existing driving lanes, the Contractor, during the same work period, shall perform temporary surfacing and pavement widening in a manner as to place surfacing materials to the elevation of the adjacent pavement within all areas where the existing shoulder has been removed. In the event the surfacing is not placed, the drop-off shall be filled with compacted earth materials, to a 4:1 or flatter slope, prior to opening the lane to public vehicular traffic.

When asphaltic concrete is used for temporary surfacing the following construction methods shall be observed. After any intermediate lift of asphalt has been placed, the drop-off shall be filled with an asphalt wedge, to a 3:1 or flatter slope, prior to opening the lane to public vehicular traffic. If proper density is obtained on this asphalt wedge, it may be left in place as additional intermediate lifts are placed. The top lift of asphalt will be placed at a uniform depth, which may require removal of a portion of the asphalt wedge.

II. Peak Hours for Interstate I-80

For I-80, peak hours for this project shall be from 6:00 a.m. to 11:00 p.m. Monday through Friday, from 8:00 a.m. to 11:00 p.m. on Saturday and, and from 11:00 a.m. to 11:00 p.m. on Sunday. All other hours shall be considered as non-peak hours.

The Contractor, during peak hours, shall perform work in a manner as to maintain the number of traffic lanes shown in the plans.

When the Contractor's work is required closer than 12 feet to the nearest driving lane, the work shall be performed during non-peak hours with a lane closure or the work area

shall be protected with temporary concrete barriers.

During ***peak hours***, the Contractor shall perform work in a manner as to maintain the number of traffic lanes shown in the plans.

During ***non-peak hours***, the Contractor may be allowed to reduce the number of lanes shown in the plans, if requested and approved by the Engineer, for the following operations (see **Procedure For I-80 Lane Closure** for restrictions to reducing the number of lanes):

1. One lane of traffic may be closed for the purpose of setting or removing concrete protection barriers.
2. One lane of traffic may be closed for the purpose of building temporary pavement marking.
3. The Contractor will be permitted to close one lane of traffic in order to build and remove temporary surfacing and pavement noted in the phasing plans.
4. The Contractor will be permitted to close one lane of traffic in order to deliver materials to the project.
5. The Contractor will be permitted to close one lane of traffic for specific tasks requiring work immediately adjacent to the traveled lanes, which in the opinion of the Engineer would constitute a hazard for the traveling public.

The request for each weekend closure must be submitted a minimum of two weeks prior to the planned closure period and must be approved by the District 2 Engineer.

III. Procedure for I-80 Lane Closure for Bridge Work

The Contractor may be permitted to close the right lane of the I-80 EB mainline from 11:00 p.m. to 6:00 a.m. of the following morning, for the sole purpose of setting new girders. Before closing any roadway, the Contractor shall notify the Engineer a minimum of two weeks prior to the closing date, and again 48 hours prior to the actual closing. If the 48-hour time period falls on a weekend or a holiday, the notification shall be given 72 hours prior to the actual closing.

IV. Procedure for I-80 Lane Closure

The Contractor shall notify the Engineer in writing of ***each*** specific lane closure. Each notification shall describe the work requiring the closure and the approximate time required for the closure. Lane closures shall be limited to the specific operations described in **SPECIAL PROSECUTION AND PROGRESS (Accommodation of Public Vehicular Traffic)**.

A lane closure that affects the way a ramp movement merges into the thru lane will require the Engineer's approval of the modified merge geometry. The lane closure shall not reduce the length of an entrance ramp to be less than 300 feet parallel plus 300 feet of taper. If these minimum lengths cannot be maintained for the ramp merge, the ramp must be closed for the duration of the lane closure. The Contractor shall submit to the Engineer for approval, a traffic control plan or a detour plan for nighttime ramp modifications or closures.

The Contractor will be required to have a work crew on the site at all times during a lane closure.

A lane closure will not be permitted during inclement weather conditions or during periods of time that atmospheric conditions may constitute a hazard to the traveling public, as determined by the Engineer.

Lane closures during emergency or incident situations will not be assessed.

In cases where multiple charges can be assessed for violations in lane closure procedures, the highest single lane closure assessment will be charged for the appropriate period. The lane closure assessment charge will be in addition to other liquidated damages described elsewhere in this proposal.

V. Procedure for Nighttime Closure on City Streets for Bridge Work

The Contractor shall be permitted to close Eastport Parkway and Harry Andersen Ave., beginning at 10:00 p.m. to 06:00 a.m. of the following morning, for the purpose of removing the bridge deck and setting new girders on the Papillion Creek Bridge. The Contractor will be allowed four nighttime closures to complete the work.

The Contractor shall be permitted to close one lane of traffic in either or both directions on the above referenced streets for specific construction operations. Flaggers shall be available. However, it is expected that lane closures will not be permanent nor occur on a daily basis. Lane closures shall be for specific work operations requested by the Contractor and approved by the Engineer.

The Contractor shall advise the Engineer, the City of Omaha of the purpose and length of any nighttime street closure, a minimum of 48 hours prior to the closure. If the 48-hour time period falls on a weekend or a holiday, the notification shall be given 72 hours prior to the street closure.

The City of Omaha shall be notified of all street closures. The Contractor shall contact Public Works Department, City of Omaha, at (402) 444-5950.

SPECIAL PROSECUTION AND PROGRESS (Phasing)

I. General

The phasing plans depict traffic phasing sequences and geometrics for pavement marking required for the performance of work included in this proposal. Any modification of these sequences, geometrics shall require the **written approval** of the NDOR Traffic Engineer, the Roadway Design Division and the Project Engineer. Prior to opening a modified phasing sequence to traffic, the NDOR Traffic Engineer and the Roadway Design Division shall be notified.

On the phasing plans, the construction build notes for temporary surfacing (to be removed as part of the project) are shown on the phasing plans. Permanent pavement

to be constructed as part of the phase is shown as “begin construction” on the phasing plans and is noted on the Construction plan sheets.

II. Settlement

No settlement or paving delays are required for the construction of embankments on this project.

III. Winter Work Beginning January 6, 2014

- A. Winter work will be allowed for substructure construction on the bridge at Sta. 596+40.0. However, no I-80 lane closures and no disruption to I-80 traffic shall be allowed until March 31, 2014. The Contractor is directed to begin this work on the eastbound portion of this bridge. Work on the westbound substructure shall not hinder the completion of the eastbound substructure.
- B. Median construction for the new overhead sign structure at Sta. 652+00.0 shall be completed prior to March 31, 2014, and before any eastbound widening work can begin, whichever occurs first.
- C. Work on culvert extensions may also begin at this time. However, no I-80 lane closures and no disruption to I-80 traffic shall be allowed.

IV. Roadway Construction Season Beginning March 31, 2014

Beginning March 31, 2014, or as otherwise directed by the Engineer, Phase 1 and Phase 4 may be started simultaneously with phasing traffic set up as depicted in the Phase 4 plans. This also includes beginning superstructure work on the bridge at Sta. 596+40.

V. Closure of EB On-ramp from 126th Street

During Phase 4, the EB on-ramp from 126th Street and the 126th Street SB loop to EB I-80 shall remain open as shown in the plans. If in the opinion of the Engineer, the traffic from the EB on-ramp is causing unsafe conditions or major backups on I-80, this ramp may be closed until the completion of Phase 6.

VI. “I” Street Loop Closure & EB “L” Street On-loop Closure

During Phase 3, the Contractor will be allowed to close the “I” Street loop for 5 weeks (35 calendar days) to complete the loop and reopen it to traffic. However, the EB “L” Street on-loop is to remain open while the “I” Street loop is closed. At no time will both loops be closed simultaneously. The EB “L” Street on-loop is closed during Phase 5 to connect this loop into the NB CD road. The Contractor shall have 4 weeks (28 calendar days) to complete this loop connection and reopen it to traffic.

VII. EB 108th Street to 96th Street – Closing SB Center Street Ramp to EB I-80

- A. During Phase 4 and 5, the Contractor will be allowed to close the SB Center Street Ramp to EB I-80 for 6 weeks (42 calendar days) to complete work depicted in the plans and to reopen it to traffic as depicted in Phase 6 plans.
- B. During those 6 weeks, grading, drainage, pavement and shoulders must be

completed to Sta. 115+00.0

VIII. Installation of Sign Structure at Sta. 652+00± Utilizing a Rolling Roadblock

This work of installing the horizontal component of the sign structure, including all signs, shall be performed in a single night between the hours of 11:00 p.m. and 6:00 a.m. of the following morning, Sunday night through Friday morning. The Contractor shall be required to give the Engineer a 48 hour notice prior to the work night. The Contractor shall also be required to coordinate the rolling road block with law enforcement officials. The Contractor will be allowed either a single or double lane closure, as directed by the Engineer, during this period for equipment and material storage. All lanes, as designated in the plans shall be open to traffic by 6:00 a.m.

IX. Completion of Work

A. Substantial Completion on December 13, 2014

On or before **December 13, 2014**, all work (except as noted below) shall be completed and traffic shifted to the ultimate configuration. After this date, the Contractor will be allowed to complete any remaining work for the following items in 2015:

1. Permanent pavement marking
2. Permanent seeding and mulch

The above list enumerates items of work that may be carried over into 2015, however, it is not intended that all items will be carried over. The Contractor shall make every effort to complete as much of this list by the December 13, 2014 completion date as possible.

B. Project Completion

The Contractor shall have until **May 30, 2015** to complete all remaining work. See **SPECIAL PROSECUTION AND PROGRESS (Liquidated Damages & Assessments)**.

SPECIAL PROSECUTION AND PROGRESS (Liquidated Damages and Assessments)

I. Project Liquidated Damage

The equation used to determine project liquidated damages, as shown in Paragraph 2., Subsection 108.08 in the Standard Specifications, is void and superseded by the following:

$$LD = \frac{R \times (0.03)(C)}{T}$$

Where: LD = Liquidated damages per calendar day (rounded to the nearest dollar).
 C = Original contract amount (includes all work completed and unfinished).
 0.03 = Estimated percentage of work remaining after 12-13-14.
 T = Original number of calendar days (510 CD).
 R = 0.12 for calendar day contracts.

II. Liquidated Damage Assessments

A. General

Liquidated damage assessments described in this provision shall be in addition to other liquidated damage assessments described elsewhere in this proposal or in the Standard Specifications

B. Internal Liquidated Damage

The Contractor's failure to have all lanes of EB I-80 and associated ramps and loops open to traffic in the ultimate configuration, as described the provision titled **SPECIAL PROSECUTION AND PROGRESS (Phasing) Section VIII.A.**, by December 13, 2014, shall result in the assessment of a \$4,345 per calendar day internal liquidated damage assessment. This internal liquidated damage assessment shall begin on December 14, 2014, and shall continue until, and including, the day this traffic is returned to its ultimate configuration on the completed roadways. The following formula was used to determination this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(\text{ADT})(\$ \text{ Pass}) + (\%T)(\text{ADT})(\$ \text{ Trucks})] \times D \\ &= [(1-0.12)(21,544)(\$0.23) + (0.12)(21,544)(\$0.44)] \times 0.79 \\ &= [\$4,360.51 + \$1,137.52] \times 0.79 \\ &= \$4,343.44 \rightarrow \text{Rounded to } \$4,345/\text{calendar day} \end{aligned}$$

Where: %T = percent trucks
 ADT = average daily traffic
 \$ Pass = passenger car factor = \$0.23
 \$ Truck = truck factor = \$0.44
 D = delay (in minutes)

C. Internal Liquidated Damage

The Contractor's failure to have the EB "L" Street On-loop open to traffic in the ultimate configuration, as described the provision titled **SPECIAL PROSECUTION AND PROGRESS (Phasing) Section VI**, within the 28 calendar day limit shall result in the assessment of a \$10,130 per calendar day internal liquidated damage assessment. This internal liquidated damage assessment shall begin on the 29th calendar day and shall continue until, and including, the day this traffic is returned to its ultimate configuration on the completed roadway. The following formula was used to determination this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(\text{ADT})(\$ \text{ Pass}) + (\%T)(\text{ADT})(\$ \text{ Trucks})] \times D \\ &= [(1-0.02)(8,650)(\$0.23) + (0.02)(8,650)(\$0.44)] \times 5.0 \\ &= [\$1,949.71 + \$76.12] \times 5.0 \\ &= \$10,129.15 \rightarrow \text{Rounded to } \$10,130/\text{calendar day} \end{aligned}$$

Where: %T = percent trucks
 ADT = average daily traffic
 \$ Pass = passenger car factor = \$0.23
 \$ Truck = truck factor = \$0.44
 D = delay (in minutes)

D. Internal Liquidated Damage

The Contractor’s failure to have the “I” Street loop open to traffic in the ultimate configuration, as described the provision titled **SPECIAL PROSECUTION AND PROGRESS (Phasing) Section VI**, within the 35 calendar day limit shall result in the assessment of a \$6,730 per calendar day internal liquidated damage assessment. This internal liquidated damage assessment shall begin on the 36th calendar day and shall continue until, and including, the day this traffic is returned to its ultimate configuration on the completed roadway. The following formula was used to determination this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(\text{ADT})(\$ \text{ Pass}) + (\%T)(\text{ADT})(\$ \text{ Trucks})] \times D \\ &= [(1-0.01)(5,800)(\$0.23) + (0.01)(5,800)(\$0.44)] \times 5.0 \\ &= [\$1,320.66 + \$25.52] \times 5.0 \\ &= \$6,730.90 \rightarrow \text{Rounded to } \$6,730/\text{calendar day} \end{aligned}$$

Where: %T = percent trucks
 ADT = average daily traffic
 \$ Pass = passenger car factor = \$0.23
 \$ Truck = truck factor = \$0.44
 D = delay (in minutes)

E. Internal Liquidated Damage

The Contractor’s failure to have the SB Center Street on-ramp to EB I-80 open to traffic in the ultimate configuration, as described the provision titled **SPECIAL PROSECUTION AND PROGRESS (Phasing) Section VII**, within the 42 calendar day limit shall result in the assessment of a \$8,225 per calendar day internal liquidated damage assessment. This internal liquidated damage assessment shall begin on the 43rd calendar day and shall continue until, and including, the day this traffic is returned to its ultimate configuration on the completed roadway. The following formula was used to determination this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(\text{ADT})(\$ \text{ Pass}) + (\%T)(\text{ADT})(\$ \text{ Trucks})] \times D \\ &= [(1-0.02)(7,025)(\$0.23) + (0.02)(7,025)(\$0.44)] \times 5.0 \\ &= [\$1,583.44 + \$61.82] \times 5.0 \\ &= \$8,226.28 \rightarrow \text{Rounded to } \$8,225/\text{calendar day} \end{aligned}$$

Where: %T = percent trucks
 ADT = average daily traffic
 \$ Pass = passenger car factor = \$0.23
 \$ Truck = truck factor = \$0.44
 D = delay (in minutes)

F. EB I-80 Non-Peak Hour Lane Closure Assessment

The Contractor is required to have a work crew on site during a non-peak hour lane closure and if, in the opinion of the Engineer, it is determined the lane closure is no longer needed, the Contractor shall have one hour after notification from the Engineer to remove the lane closure. If the Contractor has not begun to clear the lane closure within the specified time, NDOR may elect to not pay for

the cost of the lane closure.

G. EB I-80 Peak Hour Lane Closure Assessment

If a non-peak hour lane closure extends into a peak hour, the Contractor shall be assessed a \$1,650/lane/peak hour lane closure assessment. Any portion of an hour shall be considered as a whole hour. The following formula was used to determine this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(\text{vpph})(\$ \text{ Pass}) + (\%T)(\text{vpph})(\$ \text{ Trucks})] \times D \\ &= [(1-0.12)(2,154)(\$0.23) + (0.12)(2,154)(\$0.44)] \times 2.0 \\ &= [\$435.97 + \$113.74] \times 2.0 \\ &= \$1,649.10 \rightarrow \text{Rounded to } \$1,650/\text{lane}/\text{hour} \end{aligned}$$

Where: %T = percent trucks
 vpph = vehicles per peak hour
 \$ Pass = passenger car factor = \$0.23
 \$ Trucks = truck factor = \$0.44
 D = delay (in minutes)

**SPECIAL PROSECUTION AND PROGRESS
 (Transportation of Excavation Materials)**

The Contractor’s excavating and hauling equipment will not be allowed to cross any ramps, streets or highways that are within the State right-of-way during peak hours. During non-peak hours, hauling routes that cross public vehicular traffic movements will be controlled by flaggers. When embankment material is to be transported across ramps, the crossing for exit ramps shall be a minimum distance of 400 feet from the gore point. For entrance ramps, the crossing shall be a minimum distance of 300 feet from the gore point.

The Contractor shall not be allowed to build a haul road over the mainline lanes.

**SPECIAL PROSECUTION AND PROGRESS
 (Staging & Material Storage Areas and
 Concrete Protection Barrier Stockpile Sites)**

Portions of State right-of-way for this project may be used for staging and material storage with prior approval of the Engineer. At the completion of the project, each staging and material storage area shall be cleared of all materials and left in a neat, clean and presentable condition. The Contractor shall also prepare the area as necessary, and seed the entire site, including all disturbed areas, in accordance with the special provisions listed in this proposal.

Preparation of the areas to be seeded will not be paid for, but will be subsidiary to items for which direct payment is made. Seeding will be paid for at the contract unit price, per acre, for the item “Seeding, Type B”.

**SPECIAL PROSECUTION AND PROGRESS
(Grading Operations in Conflict with Drainage Structures)**

At various locations throughout the project, existing and new storm sewer pipes will be constructed to an elevation that may be very close to the bottom of the new concrete pavement. Some grading operations such as subgrade preparation work may be affected by these items. The Contractor shall exercise caution when performing any grading operations so that no drainage items are damaged as a result of the grading.

Any structures damaged as a result of the grading operations shall be replaced or repaired by the Contractor at their expense.

**SPECIAL PROSECUTION AND PROGRESS
(Do Not Disturb Utilities - 120th Street Under I-80)**

An existing fiber optics cable runs under and adjacent to the pavement of 120th Street. The Contractor shall exercise caution not to damage the existing fiber optics cable during pile driving operations and construction of new piers at the bridge at Sta. 596+40.0

**SPECIAL PROSECUTION AND PROGRESS
(Temporary Shoring For Drainage)**

At various locations on the project, new drainage construction, as well as the removal of existing drainage structures, will take place in close proximity to existing roadways that are maintaining traffic. If in the opinion of the Engineer, the excavation required for the construction or removal of any drainage item would constitute a hazard to the traveling public by causing the existing roadway embankment to become unstable, temporary shoring shall be placed to protect the roadway.

The extra work, materials, equipment and incidentals required to supply, install and remove the temporary shoring shall not be paid for directly, but shall be considered subsidiary to items for which direct payment is made.

**SPECIAL PROSECUTION AND PROGRESS
(“I” Street On-Loop Detention Cell)**

The Contractor shall grade the detention cell inside the “I” Street on-loop to the limits shown in the plans. The material excavated from the “I” Street on-loop can be used in other areas of the project that needs fill material. The Contractor, as part of the required detention cell construction, shall grade the ditch on the north side of “I” Street to eliminate a dike so water will flow to the west to a culvert just before the Bridge over I-80. The ditch grading length is approximately 200 feet to remove the dike. The existing pipe culvert just east of the dike removal will be plugged and abandoned.

The work in the north ditch along “I” Street must be done during non-peak hours. Peak hours for “I” Street is 06:00 a.m. to 09:00 a.m. and 03:00 p.m. to 06:30 p.m. Monday through Friday. It is desired that this ditch grading can be accomplished without a lane closure on “I” Street.

The Contractor may move his required equipment across “I” Street with proper signing and flaggers during non-peak hours.

**SPECIAL PROSECUTION AND PROGRESS
(Holidays and UNL Football Game Day)**

The Contractor will be required to schedule his operations in a manner to have all traffic lanes open to traffic on the following holidays:

Memorial Day and Labor Day weekends – these holiday weekends shall begin at 3:00 p.m., Friday, and shall include the remainder of Friday and all day Saturday, Sunday and the Monday holiday.

- July 4th - If July 4th falls on a Monday or Friday, the Saturday and Sunday either preceding or following July 4th shall be included as part of the holiday.
- If July 4th falls on either Tuesday, Wednesday or Thursday, only that day will be considered as the holiday.
 - If July 4th falls on a Saturday or Sunday, the day preceding and the day following July 4th shall be included as part of the holiday.
 - The July 4th holiday shall begin at 3:00 p.m. on the day preceding the first day of the July 4th holiday, as defined above.

The Contractor will also be required to have all traffic lanes as depicted in the plans, open to traffic on any day that the University of Nebraska has a home football game (including the Spring game). All lanes shall be open to traffic from 3:00 p.m. of the day before the home football game until 9:00 a.m. of the day following the home football game.

Failure to have all traffic lanes open to traffic, as specified, on these holidays and any UNL home football game day will result in a liquidated damage assessment of \$5,000 per day. This assessment will be in addition to other liquidated damages described elsewhere in this proposal or in the Standard Specifications used for this project.

ENVIRONMENTAL COMMITMENT

Control No.: 22151

Project No.: S-80-9(1189)

Project Name: 126th St – 96th St, Omaha

Below are the Conservation Conditions that will be required for this project. All conditions and regulations of any permit obtained for this project will be followed by the Contractor.

(Responsible Party for the measure is found in parentheses)

Regulated Wetlands and/or Water Resources for this project have been identified and delineated in the field by NDOR. The Contractor shall not drive through, stage, store, waste or stockpile materials and equipment within delineated wetland boundaries (Wetlands – Do Not Disturb) and/or environmentally sensitive areas (Area of Environmental Concern – Do Not Disturb) as shown in the 2-W aerial plan sheets and/or the erosion control plan sheets included in the plan set. (Contractor, District Construction)

All listed 404 permit **Special Conditions** as included in the attached 404 permit document must be complied with including Section 401 Water Quality Certification conditions and/or all other conditions required for compliance state and federal regulations. (Contractor, District Construction)

All **Nationwide Permit General Conditions** and **Nebraska Regional Conditions** will be followed, as applicable. Based on the project scope (NDOR Control No. 22151), the items indicated with checkmarks in the attached document (*NDOR Contractor Requirements Sheet*) appear to be applicable and relevant to the Contractor and Project Manager. (Contractor, District Construction)

NDOR shall notify the Nebraska Regulatory Office of any design changes to the proposed project. Notification must be submitted to the EPU Project Manager, Justin Williams, for a permit compliance review a minimum of 14 days prior to implementation of the proposed design change. (Roadway Design, District Construction, Contractor)

- Note: This condition applies to all design changes to include both those design changes made as Plan Revisions by Roadway Design and those made in the field by District Construction request and approval. This condition is limited to those areas identified as the Wetlands or Waters of the U.S. and/or Waters of the State as shown on the 2-W aerial plan sheets included in the letting plans.

Prior to the commencement of construction activities, NDOR District Project Manager shall provide the following to the COE Wehrspann Regulatory Office address listed below: construction start date, Project Manager's or point of contact's name and the Project Manager's or point of contact's phone number. Reference the COE Permit Number **(2013-1184-WEH)** in all correspondence sent to the COE Regulatory Office.

Phil Rezac
U.S. Army Corps of Engineers
Nebraska Regulatory Office – Wehrspann
8901 South 154th Street, Suite 1
Omaha, NE 68138-3621
(402) 896-0896
phil.m.rezac@usace.army.mil

Concurrent with construction, silt curtains or other sediment control measures will be employed to reduce soil erosion and sedimentation into waters of the U.S. The amount of sediment entering waters of the U.S. and leaving the site shall be reduced to the maximum extent practicable. If the Contractor fails to institute all appropriate measures, the Corps reserves the option to halt all earthmoving operations until the erosion/sedimentation problems are corrected. (Contractor)

Construction mats or timber mats must be used to minimize heavy machinery impacting any wetlands or waters of the U.S. All mats will be removed upon completion of construction and any disturbance of wetlands or waters of the U.S. will be restored by minor grading to preconstruction conditions. Disturbed areas will be seeded and erosion control measures will be implemented as appropriate. (District Construction, Contractor)

Any temporary fill (i.e., bridge debris, construction debris, etc.) discharged below the ordinary high watermark shall be removed on a daily basis. All debris shall be disposed of upland in such a manner that it cannot enter any wetlands or waters of the U.S. (District Construction, Contractor)

All areas adjacent (contiguous, bordering, neighboring) to jurisdictional waters disturbed by construction shall be revegetated with appropriate perennial, native grasses and forbs and maintained in this condition. *Phalaris arundinacea* (Reed Canary Grass), *Lythrum salicaria* (Purple Loosestrife), *Bromus inermis* (Smooth Brome), *Phragmites, sp.* (Common Reed, River Reed) and *Tamarix, sp.* (Salt Cedar), are NOT appropriate choices of vegetation. A cover crop may be planted to aid in the establishment of native vegetation. The disturbed areas shall be reseeded concurrent with the project or immediately upon completion. Revegetation shall be acceptable when ground cover of desirable species reaches 75%. If this seeding cannot be accomplished by September 15 the year of project completion, then an erosion blanket shall be placed on the disturbed areas. The erosion blanket shall remain in place until ground cover of desirable species reaches 75%. If the seeding can be accomplished by September 15, all seeded areas shall be properly mulched to prevent additional erosion. (District Construction, Contractor)

When vegetation has been established, all temporary erosion control materials shall be removed from the project site. Biodegradable or photodegradable materials need not be removed. (District Construction, Contractor)

- The intent of the above Special Condition is that all temporary erosion control measures installed such as silt fence and associated steel posts shall be removed upon completion of the project or upon vegetation establishment reaching the specified success criteria. Biodegradable and photodegradable erosion control measures detailed in the final erosion control plans are intended to remain in place upon completion of the project. Temporary biodegradable/photodegradable erosion control measures such as wood mulch berms and erosion checks may be left in place upon completion of the project.

Temporary Structures/Work/Fill

- The use of dredged material in the construction of temporary structures or used for temporary work or used as temporary fill shall not be allowed. The term “dredged material” means material that is excavated or dredged from waters of the U.S. All temporary fill material shall be obtained from an upland source.
- Plans for the temporary structure/work/fill shall be submitted to and approved by the Nebraska Regulatory Office prior to the commencement of construction.
- At the completion of the construction activity, all temporary fill material shall be removed in its entirety from the water of the U.S. to an upland area and the affected area shall be restored to its pre-construction condition.
- The Nebraska Regulatory Office shall be notified with documentation (i.e., photos) when the site has been restored to its pre-project condition.

NDOR and the Contractor are responsible for ensuring that the Corps is notified of the location of any borrow or waste site that will be used in conjunction with the construction of the authorized activity so the Corps may evaluate the site for potential impacts to aquatic resources, historic properties and endangered species. For a project where there is another lead Federal Agency (e.g., the Federal Highway Administration), the NDOR shall provide the Corps documentation indicating that lead Federal Agency has complied with the National Historic Preservation Act and the Endangered Species Act for the borrow site.

- Note: To comply with this permit condition, the Contractor must submit a Materials Source Site/Waste Site Request Form to the NDOR Construction Division at least 60 days prior to the date the Contractor expects to begin borrow or waste operations at the site.
- The NDOR Construction Division will route the Materials Source Site/Waste Site Request Form submitted by the Contractor to the U.S. Army Corps of Engineers (USACE), the Nebraska Game and Parks Commission (NGPC) including a courtesy copy to the U.S. Fish and Wildlife Service (USFWS), the Nebraska Department of Natural Resources (DNR), and the Nebraska State Historical Society (NSHS).
- If required, NDOR will complete the Platte River depletion calculation for borrow/waste sites that pond and/or exposed groundwater with the Platte River basin. The Contractor shall be responsible for all offsets required by for compliance with the Platte River Recovery Implementation Plan (PRRIP).

- Upon receipt of the response from the resource agencies (FWS, NGPC, NSHS, DNR) and the USACE, NDOR will provide the Contractor notification of approval or denial of the requested site. The Contractor shall comply with all conditions established by the Resource Agencies.
- The Contractor is responsible for contacting the Nebraska Department of Environmental Quality (NDEQ) for authorizations under the National Pollutant Discharge Elimination System (NPDES) and/or any Local Government permits or authorizations required (e.g., local mining permits).

If field modifications are made to what is shown on the letting plans within the areas identified in the attached permit, the EPU Project Manager, Justin Williams, must be notified prior to construction of the modification. Additional consultation and permitting may be required. Any construction activities are prohibited in all other areas shown as non-impacted wetlands or waters of the U.S.

The time limit for completing the work authorized ends on **March 18, 2017**. If more time is needed to complete the authorized activity, the contractor shall submit a request for a time extension for consideration by the Omaha District, Corps of Engineers Regulatory Office before the above date is reached. (District Construction, NDOR Environmental)

In compliance with General Condition 26, the Compliance Certification form must be signed and returned to the Corps of Engineers, with a copy sent to the Environmental Permits Unit, upon completion of the authorized work and any required mitigation. (District Construction, NDOR Environmental)

Contact Person: Justin Williams, Highway Environmental Biologist, (402) 479-3812

General Conservation Conditions

- A-1 Changes in Project Scope.** If there is a change in the project scope, the project limits, or environmental commitments, the NDOR Environmental Section must be contacted to evaluate potential impacts prior to implementation. Environmental commitments are not subject to change without prior written approval from the Federal Highway Administration. (District Construction, Contractor)
- A-2 Conservation Conditions.** Conservation conditions are to be fully implemented within the project boundaries as shown on the plans. (District Construction, Contractor)
- A-3 Early Construction Starts.** Request for early construction starts must be coordinated by the Project Construction Engineer with NDOR Environmental for approval of early start to ensure avoidance of listed species sensitive lifecycle timeframes. Work in these timeframes will require approval from the Federal Highway Administration and could require consultation with the USFWS and NGPC. (District Construction, Contractor)
- A-4 E&T Species.** If federal or state listed species are observed during construction, contact NDOR Environmental. Contact NDOR Environmental for a reference of federal and state listed species. (NDOR Environmental, District Construction, Contractor)
- A-5 Refueling.** Refueling will be conducted outside of those sensitive areas identified on the plans, in the contract, and/or marked in the field. (Contractor)

- A-6 Restricted Activities.** The following project activities shall, to the extent possible, be restricted to between the beginning and ending points (*stationing, reference posts, mile markers, and/or section-township-range references*) of the project, within the right-of-way designated on the project plans: borrow sites, burn sites, construction debris waste disposal areas, concrete and asphalt plants, haul roads, stockpiling areas, staging areas, and material storage sites. Any project related activities that occur outside of these areas must be environmentally cleared/permitted with the Nebraska Game and Parks Commission as well as any other appropriate agencies by the Contractor and those clearances/permits submitted to the District Construction Project Manager prior to the start of the above listed project activities. The Contractor shall submit information such as an aerial photo showing the proposed activity site, a soil survey map with the location of the site, a plan-sheet or drawing showing the location and dimensions of the activity site, a minimum of 4 different ground photos showing the existing conditions at the proposed activity site, depth to ground water and depth of pit, and the "Platte River depletion status" of the site. The District Construction Project Manager will notify NDOR Environmental which will coordinate with FHWA for acceptance if needed. The Contractor must receive Notice of Acceptance from NDOR, prior to starting the above listed project activities. These project activities cannot adversely affect state and/or federally listed species or designated critical habitat. (NDOR Environmental, District Construction, Contractor)
- A-7 Waste/Debris.** Construction waste/debris will be disposed of in areas or a manner which will not adversely affect state and/or federally listed species and/or designated critical habitat. (Contractor)

Contact Person: Melissa Marinovich, Highway Environmental Biologist, (402) 479-3546

WETLANDS 404 PERMIT



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NEBRASKA REGULATORY OFFICE - WEHRSPANN
8901 SOUTH 154TH STREET, SUITE 1
OMAHA, NEBRASKA 68138-3621

RECEIVED

AUG 08 2013

ENVIRONMENTAL SECTION

<http://www.nwo.usace.army.mil/Missions/RegulatoryProgram/Nebraska.aspx>

August 6, 2013

DEPARTMENT OF THE ARMY NATIONWIDE PERMIT VERIFICATION

Permittee:

Tim Weander
Nebraska Department of Roads
District 2 Engineer
4425 S. 108th St.
Omaha, Nebraska 68154

Permit No: 2013-1184-WEH

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions of Department of the Army Nationwide Permit No. 14 found in the February 21, 2012 Federal Register (77 FR 10184), Reissuance of Nationwide Permits. You must comply with all special, regional and general conditions attached herein.

Project Waterway and Location:

West Papillion Creek, unnamed tributary to Hell Creek
Section 18, Township 14 North, Range 12 East
41.190160°, -96.100910°
Douglas & Sarpy Counties, Nebraska

Project Name: Douglas & Sarpy Counties I-80 Eastbound 126th Street to 96th Street 80-9(1189) CN 22151

Date of Receipt: July 1, 2013

Project Description:

The proposed project consists of roadway widening and improvements on Interstate 80, from 126th Street to 96th Street, located within Omaha, Nebraska. The total area of wetlands to be permanently impacted by this project is 0.01 acres. The total area below the Ordinary High Water Mark (OHWM) to be temporarily impacted by this project is 0.003 acres.

Jurisdictional impacts will occur at the following locations:

Site 2 – Sta. 598+23 to 598+48: Fill placed for the construction of the new bridge slope will permanently impact wetlands at this site. Riprap is not proposed. Temporary structures are not proposed. Impacts at this site will permanently impact 0.01 acres of PEMA floodplain depressional wetlands. This site is located in the vicinity of 41.190160°, -96.100910°, in Section 18, Township 14 North, Range 12 East in Sarpy County, Nebraska.

Site 5 – Sta. 5690+85: Construction access will be needed to aid in the installation of a road collector culvert and will temporary impact approximately 30 feet of channel at this site. Riprap is

not proposed. Temporary structures are not proposed. Impacts at this site will temporarily impact 0.003 acres of R4UB riverine channel. This site is located in the vicinity of 41.213690°, -96.090190°, in Section 5, Township 14 North, Range 12 East in Douglas County, Nebraska.

Special Conditions:

1. The permittee shall notify the Nebraska Regulatory Office of any design changes to the proposed project. Notification must be received in our office for review a minimum of 14 days prior to construction.
2. Prior to the commencement of construction activities the following shall be provided to the above Regulatory Office address: project manager's or point of contact's name, telephone number and construction start date.
3. Concurrent with construction, silt curtains or other sediment control measures will be employed to reduce soil erosion and sedimentation into waters of the U.S. The amount of sediment entering waters of the U.S. and leaving the site shall be reduced to the maximum extent practicable. If the permittee fails to institute all appropriate measures, the Corps reserves the option to halt all earthmoving operations until the erosion/ sedimentation problems are corrected.
4. Construction mats or timber mats must be used to minimize heavy machinery impacting any wetlands or waters of the U.S. All mats will be removed upon completion of construction and any disturbance of wetlands or waters of the U.S. will be restored by minor grading to preconstruction conditions. Disturbed areas will be seeded and erosion control measures will be implemented as appropriate.
5. Any temporary fill (i.e. bridge debris, construction debris, etc.) discharged below the ordinary high water mark shall be removed on a daily basis. All debris shall be disposed of upland in such a manner that it cannot enter any wetlands or waters the U.S.

Regional Conditions:

1. All areas adjacent (contiguous, bordering, neighboring) to jurisdictional waters disturbed by construction shall be revegetated with appropriate perennial, native grasses and forbs and maintained in this condition. *Phalaris arundinacea* (Reed Canary Grass), *Lythrum salicaria* (Purple Loosestrife), *Bromus inermis* (Smooth Brome), *Phragmites, sp.* (Common Reed, River Reed) and *Tamarix, sp.* (Salt Cedar), are **NOT** appropriate choices of vegetation. A cover crop may be planted to aid in the establishment of native vegetation. The disturbed areas shall be reseeded concurrent with the project or immediately upon completion. Revegetation shall be acceptable when ground cover of desirable species reaches 75%. If this seeding cannot be accomplished by September 15 the year of project completion, then an erosion blanket shall be placed on the disturbed areas. The erosion blanket shall remain in place until ground cover of desirable species reaches 75%. If the seeding can be accomplished by September 15, all seeded areas shall be properly mulched to prevent additional erosion.
2. When the vegetation has become established, all temporary erosion control materials shall be removed from the project site. Biodegradable or photodegradable materials need not be removed.
3. Temporary Structures / Work / Fill
 - a. The use of dredged material in the construction of temporary structures or used for temporary work or used as temporary fill shall not be allowed. The term "dredged material" means material

that is excavated or dredged from waters of the U.S. All temporary fill material shall be obtained from an upland source.

- b. Plans for the temporary structure/work/fill shall be submitted to and approved by the Nebraska Regulatory Office prior to the commencement of construction.
- c. At the completion of the construction activity, all temporary fill material shall be removed in its entirety from the water of the U.S. to an upland area and the affected area shall be restored to its pre-construction condition.
- d. The Nebraska Regulatory Office shall be notified with documentation (i.e. photos) when the site has been restored to its pre-project condition.

4. The permittee is responsible for ensuring that the Corps is notified of the location of any borrow site that will be used in conjunction with the construction of the authorized activity so that the Corps may evaluate the site for potential impacts to aquatic resources, historic properties, and endangered species. For projects where there is another lead Federal agency, the permittee shall provide the Corps documentation indicating that the lead Federal agency has complied with the National Historic Preservation Act and Endangered Species Act for the borrow site. The permittee shall not initiate work at the borrow site in conjunction with the authorized activity until approval is received from the Corps.

General Conditions:

See attached NWP #14 Fact Sheet.

Further Information:

1. We have prepared a preliminary jurisdictional determination (JD) for the site which is a written indication that waterways within your project area may be a water of the U.S. Such waters have been treated as jurisdictional waters of the U.S. for purposes of computation of impacts and compensatory mitigation requirements. If you concur with the findings of the enclosed preliminary JD, please sign it and return it to the above address within two weeks.

2. If you believe the preliminary JD is inaccurate, you may request this office complete an approved JD prior to your commencement of any work in a water of the U.S. An approved JD is an official determination regarding the presence or absence of waters of the U.S. Completion of an approved JD may require coordination with the U.S. Environmental Protection Agency.

3. Upon completion of the authorized work and any required mitigation, please sign and return the attached Compliance Certification form to the address listed.

4. This verification will be valid until **March 18, 2017**.

5. Although an individual Department of the Army permit will not be required for the project, this does not eliminate the requirement that you obtain any other applicable Federal, state, tribal or local permits as required. Please note that deviations from the original plans and specifications of your project could require additional authorization from this office.

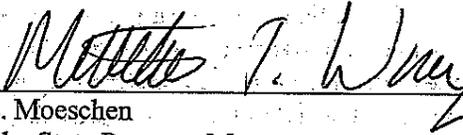
6. You are responsible for all work accomplished in accordance with the terms and conditions of the Nationwide Permit. If a contractor or other authorized representative will be accomplishing the work authorized by the Nationwide Permit in your behalf, it is strongly recommended that they be provided a copy of this letter and the attached conditions so that they are aware of the limitations of the applicable

Nationwide Permit. Any activity that fails to comply with all of the terms and conditions of the Nationwide Permit will be considered unauthorized and subject to appropriate enforcement action.

7. The Omaha District, Regulatory Branch is committed to providing quality and timely service to our customers. In an effort to improve customer service, please take a moment to complete our Customer Service Survey found on our website at <http://per2.nwp.usace.army.mil/survey.html>. If you do not have Internet access, you may call and request a paper copy of the survey that you can complete and return to us by mail or fax.

8. If you have any questions concerning this verification or jurisdictional determination, please contact Mr. Phil Rezac at the above address, by phone at (402) 896-0896, or by email at phil.m.rezac@usace.army.mil and refer to file number 2013-1184-WEH.

Signed



For John L. Moeschel
Nebraska State Program Manager

Enclosures

Copy Furnished:

NDEQ (Garber)

NDOR (Williams)

**NDOR Contractor Requirements Sheet
Wetlands and Waters of the U.S.
Environmental Permitting Unit**

In accordance with Section 404 of the Clean Water Act (discharge of dredged or fill material into waters of the United States), NDOR has evaluated the project for necessary Contractor requirements. The requirements are based on nationwide permit general conditions and Nebraska regional conditions set forth by USACE, which can be viewed online at: <http://www.nwo.usace.army.mil/html/od-rne/nwp.html>. Note that not all of the USACE general and regional conditions appear below, because they are either not relevant to Contractor commitments or will be executed by NDOR. Contractor must also comply with special conditions in the 404 permit.

Based on the project scope (NDOR Control No. 22151), the Contactor requirements indicated with check marks below require action and/or compliance by the Contactor.

Navigation

No activity may cause more than a minimal adverse effect on navigation in navigable waters of the United States.

Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

Aquatic Life Movements and Management of Water Flows

No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

To the maximum extent practicable, the pre- construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

Adverse Effects From Impoundments

If the activity creates and impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

Spawning Areas

Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

Migratory Bird Breeding Areas

Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

Shellfish Beds

No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWP's 4 and 48.

Water Supply Intakes

No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

Equipment

Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

Removal of Temporary Fills

Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

Soil Erosion and Sediment Controls

SWPPP Required

Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

Borrow Site Identification

The Contractor shall notify NDOR of the location of any borrow site that will be used in conjunction with the construction of the authorized activity.

Revegetation of Disturbed Areas

All areas adjacent (contiguous, bordering, neighboring) to jurisdictional waters disturbed by construction shall be revegetated with appropriate perennial, native grasses and forbs and maintained in this condition. *Phalaris arundinacea* (Reed Canary Grass), *Lythrum salicaria* (Purple Loosestrife), *Bromus inermis* (Smooth Brome), *Phragmites, sp.* (Common Reed, River Reed) and *Tamarix, sp.* (Salt Cedar), are NOT appropriate choices of vegetation. A cover crop may be planted to avoid in the establishment of native vegetation. The disturbed areas shall be reseeded concurrent with the project or immediately upon completion. Revegetation shall be acceptable when ground cover of desirable species reaches 75%. If this seeding cannot be accomplished by September 15 the year of project completion, then an erosion blanket shall be placed on the disturbed areas. The erosion blanket shall remain in place until ground cover of desirable species reaches 75%. If the seeding can be accomplished by September 15, all seeded areas shall be properly mulched to prevent additional erosion. When the vegetation has become established, all temporary erosion control materials shall be removed from the project site. Biodegradable or photodegradable materials need not be removed.

Discovery of Previously Unknown Remains and Artifacts

If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the District Engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The District Engineer will initiate the Federal, Tribal and State coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

Temporary Structures/Work/Fill

The use of dredged material in the construction of temporary structures or used for temporary work or used as temporary fill shall not be allowed. The term "dredged material" means material that is excavated or dredged from waters of the U.S. All temporary fill material shall be obtained from an upland source.

At the completion of the construction activity, all temporary fill material shall be removed in its entirety from the water of the U.S. to an upland area and the affected area shall be restored to its pre-construction condition.

The Nebraska Regulatory Office shall be notified with documentation (i.e., photos) when the site has been restored to its pre-project condition.

Stream Channelization Projects

Buffer strips shall be set aside along both sides of the channel no less than 50 feet from the top of each side slope landward. The buffer strips shall be planted to a mixture of perennial, native grasses, forbs and trees required for tree mitigation and maintained in this condition. Reed Canary Grass (*Phalaris arundinacea*), Purple Loosestrife (*Lythrum salicaria*) and Smooth Brome (*Bromus inermis*) are NOT appropriate choices of vegetation. Revegetation will be acceptable when ground cover of desirable species reaches 75%.

Suitable Material

No activity may use unsuitable fill material as defined in the list below. Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

OMAHA DISTRICT PROHIBITED/RESTRICTED MATERIALS:

1. Vehicle bodies, farm machinery and metal junk, including appliances and metal containers, are prohibited.
2. The use of old or used asphalt paving material as a fill material and the use of new or used asphalt for bank stabilization or erosion control is prohibited.
3. The use of organic debris as fill material is prohibited. (Properly anchored trees, treetops, root wads, logs, and hay bales may be allowed on a case-by-case basis.)
4. Any material subject to leaching when in an aquatic environment is prohibited (for example, but not limited to, chemically-treated building material, roofing material, and wood debris).

5. Individual or unanchored tires are prohibited. (Tires may be allowed on a case-by-case basis when placed in the form of a mat or grid with multiple anchoring points to reduce the risk of design failure.)
6. Small aggregate (i.e., less than 6 inches in diameter) may not be placed below the ordinary high water mark (OHWM) of a water body for the purpose of bank stabilization or erosion control when such aggregate will be unstable or subject to frequent failure. Small aggregate may, however, be placed below the OHWM if its purpose is to fill the interstices of a well graded rock riprap revetment or channel lining.
7. Slab material, regardless of source, must be broken before placement so that the dimension of the largest slab will not be more than 3.5 times the dimension of the smallest slab (unless justified by a qualified Engineer) and must be free of exposed rebar, wire and wire mesh.
8. The use of clean brick, broken concrete and cinder block for erosion control or bank stabilization will be considered on a case-by-case basis. If allowed, the broken concrete must be free of exposed rebar, wire, wire mesh, asphalt paving material, paint, and other erodible materials. Broken concrete must range in size from 6 to 36 inches (unless justified by a qualified Engineer).

FLOODPLAIN PERMIT

Nebraska Department of Roads
**Floodplain/Floodway Development
 Permit/Application**

RECEIVED

MAY 23 2013

ENVIRONMENTAL SECTION

Permit Application No. 13-002
Date: 5/8/13

This form is used for any man-made change to improved or unimproved transportation facility, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation, drilling operations, or storage of equipment or materials.

Nebraska Department of Roads will obtain all other necessary federal, state, or local permits (e.g., Corps of Engineers 404 Permit, Local Levee District, etc.)

1.	Name of Applicant: Nebraska Department of Roads PO Box 94759 Lincoln NE 68509-4759
2.	Type and Use of Development: Capital Improvement
3.	Specific Location of Development: Interstate 80 M.M. 442+50 to 447+20
4.	Complete this section if the proposed development involves the improvement of a structure (i.e., walled and roofed building). Pre-improvement Value of Structure: \$ Cost of Improvement: \$

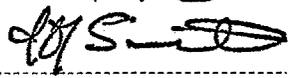
The following section is to be completed by the community official:

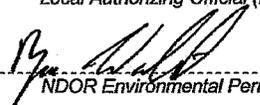
5.	Is the development Substantial Improvement? (see #4)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
6.	Is the development in an identified floodplain?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
If Yes, complete the following:			
a.	Elevation of the Base (100-Year) Flood Ft.	MSL/NGVD 29 or NAVD 88
b.	Elevation/Floodproofing Requirement (if applicable) Ft.	MSL/NGVD 29 or NAVD 88
c.	Is the development in a designed Floodway?		
	<input type="checkbox"/> Yes	New structures for human habitation are prohibited. For any other Floodway development, the NDOR must provide certification by a registered professional engineer that the development would result in no increase along the floodway water surface profile.	
	<input type="checkbox"/> No	If a floodway has not been designated, the NDOR may be required to submit hydraulic data demonstrating that the proposed development will not increase flood heights more than one foot at any location.	

If the development is in a floodplain, the following shall apply:

This permit is issued with the condition that the lowest floor (including basement) of a new or substantially improved nonresidential building will be elevated or floodproofed at least one foot above the base flood elevation. NDOR will provide certification by a registered Engineer, Architect, or Land Surveyor that these provisions are met.

All provisions of the LeVista Floodplain Management Resolution/Ordinance (Number) shall be complied with.
 (County or City)


 Local Authorizing Official (Name & Title) _____ Date 5/21/13


 NDOR Environmental Permits Manager _____ Date 5/8/13

Project Name: 126 th St to 96 th St, Omaha	
Project No.: NH-80-9(902)	
Control No.: 22151	Structure No.: S080 44342

**NOTICE TO BIDDERS
(Storm Water Pollution Prevention Plan)
(A-20-0307)**

The Contractor shall understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site. For reference, the general permit is posted on the Department's website.

Additionally, the Contractor, as evidenced by their signature on this proposal, agrees and understands that, if awarded the contract on this project, he/she:

- 1) becomes a co-permittee, along with the owner(s), to the Nebraska Department of Environmental Quality NPDES General Permit for Storm Water Discharges from construction sites on this project;
- 2) is legally bound to comply with the Clean Water Act to ensure compliance with the terms and conditions of the storm water pollution prevention plan developed under the NPDES permit and the terms of the NPDES permit; and
- 3) will hold the owners harmless for damages or fines arising as a result of noncompliance with the terms of the storm water permits and authorizations associated with the work on this project.

**SPECIAL PROSECUTION AND PROGRESS
(Migratory Birds)
(A-42-1112)**

The Department of Roads will, to the extent practicable, schedule the letting of projects such that clearing and grubbing can occur outside of the primary nesting season in Nebraska which has been determined to generally occur between April 1 and September 1. Work on structures, such as but not limited to bridges and culverts, should occur outside the primary swallow nesting season, April 15 to September 30, unless approved methods of avoiding nesting have been taken on the bridge and/or culvert structures. The nesting dates above are a guide only, nesting can occur outside of those dates. Work outside of those dates is not exempt from compliance with the Migratory Bird Treaty Act.

The Contractor shall, to the extent possible, schedule work on structures, such as but not limited to bridges and culverts, and clearing and grubbing activities to occur outside the primary nesting season in Nebraska. However, if circumstances dictate that project construction or demolition must be done when nesting migratory birds may be present, a survey of the number of active nests and species of birds shall be conducted by qualified personnel representing the Contractor, and assisted by the Project Manager (PM), NDOR Environmental Section staff, or the United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) - Wildlife Services Office. If the survey finds that nests will be impacted by the proposed construction, the Contractor may be responsible for delays.

The following guidance is provided for compliance with the Migratory Bird Treaty Act for construction of NDOR projects:

1. The Contractor shall submit a plan to the NDOR regarding how he intends to accomplish bridge demolition or clearing and grubbing of the project to avoid conflict with nesting migratory birds.
2. The Contractor must submit a temporary erosion control plan tailored to fit the plan for clearing and grubbing.
3. If construction operations result in unavoidable conflict with nesting migratory bird's eggs or young, which will result in "taking" nests and their contents, the Contractor should notify the NDOR Project Manager (PM). The PM shall notify the Environmental Section of Planning and Project Development by telephone at 402-479-4766.
4. The NDOR Environmental Section will then determine if assistance in conducting the survey will be provided by the NDOR Environmental Section (if available) or from the USDA APHIS - Wildlife Services Office and arrange for assistance with the survey of nest numbers, bird species, etc. Results of the survey shall be maintained by the NDOR until project completion.
5. If the nesting survey is required, and the project was awarded prior to the nesting season, and the Contractor did not accomplish clearing/grubbing and/or work on bridge/culvert structures outside the nesting season, the Contractor will reimburse the Department of Roads for each survey required at \$1,000 per survey. If the project was awarded during the nesting season, and construction activities are such that clearing/grubbing and/or work on bridge/culvert structures must be accomplished prior to any other activity on the project, then there will be no charge assessed for the initial survey. The Contractor is responsible for removing all trees surveyed, that do not contain active nests, and for taking appropriate measures on bridge/culvert structures, within 3 days of the survey. Reimbursement for additional surveys may be charged if the Contractor fails to remove the trees within 3 days of the survey, and requires an additional survey. Survey reimbursement will be determined on a project specific basis, considering the project timeline and associated activities.
6. If an active nest is found during the survey, the Contractor should do everything possible to restructure his activities and leave the nest undisturbed until the young fledge. Fledging could occur within a week, or up to a month, after the survey depending on the species of bird and whether the nest contained eggs or young. Also depending on the species of bird and their sensitivity to disturbance, a buffer of up to 30 feet surrounding the tree with the active nest could be required.
7. If construction cannot be rescheduled to allow the birds to fledge, and it is determined as an unavoidable "take" circumstance, the Contractor shall stop all work within 30 feet of the active nest and coordinate with the Construction Project Manager to determine how to proceed. The Construction Project Manager will then coordinate with the NDOR Environmental Section and they will facilitate coordination with the US Fish and Wildlife Service and the Federal Highway Administration (for projects using Federal-aid) to determine the appropriate way to address the active nest. No work shall occur within 30 feet of

the active nest until US Fish and Wildlife Service coordination is complete and the requirements of the Migratory Bird Treaty Act are satisfied.

8. It is the Contractor's responsibility to schedule his work to accommodate the process of conducting a survey(s) and submitting the necessary documentation if avoidance is not practicable. The Contractor shall be responsible for using any legal and practical method to prevent the nesting of birds in order to prevent the need for any survey and prevent the need for additional surveys. It is understood and agreed that the Contractor has considered in the bid all of the pertinent requirements concerning migratory birds (including endangered species) and that no additional compensation, other than time extensions if warranted, will be allowed for any delays or inconvenience resulting in these requirements.

STORM WATER DISCHARGES (A-43-0408)

In compliance with the Federal Water Pollution Control Act, authorization to discharge storm water on this project has been granted under National Pollutant Discharge Elimination System (NPDES) General NPDES Permit Number NER110000 for Storm Water Discharges from Construction Sites to Waters of the State of Nebraska. This permit became effective on January 1, 2008.

Contractors are advised that, under the Construction Storm Water General Permit, ***plant sites, camp sites, storage sites, and borrow or waste sites not shown on the plans may be subject to separate NPDES permit authorization requirements for stormwater discharges from those locations.*** Contractors shall be responsible for verifying the need for NPDES permit coverage with the Nebraska Department of Environmental Quality (NDEQ). When required for these locations, the filing of a "Notice of Intent" shall be made by the Contractor directly to the NDEQ.

Additionally, asphalt (SIC Code 2951) or concrete (SIC Code 3273) batch plants that are owned by a private contractor and are operated on a contract-for-service basis to perform work for the Contractor completing the project may be subject to NPDES General Permit Number NER000000 for Industrial Storm Water Discharges. While the plant may be required for completion of the project, it is not under the control of the Department (or other project owner); and the filing of a "Notice of Intent" shall be made by the Contractor directly to the NDEQ.

The NDEQ may be contacted at 402-471-4220 for additional information.

REQUIRED SUBCONTRACTOR/SUPPLIER QUOTATIONS LIST (A-43-0307)

All bidders must provide to the NDOR the identity of all firms who provided quotations on all projects, including both DBEs and non-DBEs. This information must be on a form provided by the NDOR Contracts Office.

If no quotations were received, the bidder must indicate this in the space provided.

Each bidder will be required to submit one list per letting to cover all projects bid.

**PROPOSAL GUARANTY BID BOND
(A-43-0307)**

Paragraphs 1.a. and 1.b. of Subsection 102.15 in the *Standard Specifications* are void and superseded by the following:

- a. OPTION 1 - (Project Specific Paper Bid Bond). The Bid Bond shall be executed on an original Department Bid Bond Form, which may be obtained from the Department. The original Bid Bond shall be delivered to the Department with the bid. A reproduction or a copy of the original form will not be accepted and will cause the bid not to be opened and read.
- b. OPTION 2 - (Annual Bid Bond). The Department at its discretion may allow a bidder to place an "Annual Bid Bond" on file with the Department. This bond would cover all projects the bidder bids for a 12-month period shown in the bond. The bidder must indicate in the bid submittal to the Department that their "Annual Bid Bond" applies to the submitted bid. The original Annual Bid Bond shall be executed on the Department of Roads Bid Bond Form, which may be obtained from the Department. A reproduction or a copy of the original form will not be accepted.

**WORKER VISIBILITY
(A-43-0507)**

Pursuant to Part 634, Title 23, Code of Federal Regulations, the following modified rule is being implemented:

Effective on January 1, 2008, all workers within the right-of-way who are exposed either to traffic (vehicles using the highway for purposes of travel) or to construction equipment within the work area shall wear high-visibility safety apparel.

High-visibility safety apparel is defined to mean personal protective safety clothing that:

- 1 - is intended to provide conspicuity during both daytime and nighttime usage, and
- 2 - meets the Performance Class 2 or Class 3 requirements of the ANSI/ISEA 107-2004 publication titled "American National Standards for High-Visibility Safety Apparel and Headwear."

**VALUE ENGINEERING PROPOSALS (VEP)
(A-43-0807)**

Subsection 104.03 in the *Standard Specifications* is amended to include the following:

14. A VEP will not be accepted if the proposal is prepared by an Engineer or the Engineering Firm who designed the contract plans.

**SHOP PLANS
(A-43-1108)**

Paragraph 5. of Subsection 105.02 in the *Standard Specifications* is amended to provide that the Contractor may furnish shop plans on half-size plan sheets [11x17 inches (297x420 mm)], provided all information is legible.

**LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC
(A-43-0210)**

Paragraph 4.a. of Subsection 107.01 in the *Standard Specifications* is void and superseded by the following:

4. a. Whenever the Contractor violates any governing Federal, State or local environmental quality regulation and/or is in noncompliance with any environmental commitment, the violating activity must cease immediately until the appropriate remedy can be determined by: the Engineer, the NDOR Environmental Section, the Federal Highway Administration (for projects utilizing Federal-aid) and other agencies, as deemed appropriate. The Engineer, with assistance from the NDOR Environmental Section and the FHWA, will provide a written order confirming the appropriate corrective action to the Contractor. Work can resume to normal conditions once the Engineer determines that the violation or non-compliance has been addressed in accordance with the order for corrective action.

Subsection 107.01 in the *Standard Specifications* is amended to include the following two paragraphs:

5. Should the Contractor encounter any previously unidentified hazardous materials, the Engineer shall be promptly notified. The Contractor shall suspend operations in the area involved until such time that arrangements are made for their proper treatment or removal.
6. The Contractor shall prevent the transfer of invasive plant and animal species. The Contractor shall wash equipment at the Contractor's storage facility prior to entering the construction site. The Contractor shall inspect all construction equipment and remove all attached vegetation and animals prior to leaving the construction site.

**SPECIAL PROSECUTION AND PROGRESS
(Federal Immigration Verification System)
(A-43-1209)**

The Contractor shall register with and use a Federal Immigration Verification System to determine the work eligibility status of newly hired employees physically performing services within the State of Nebraska. The Prime Contractor shall contractually require every subcontractor to register with and use a Federal Immigration Verification System to determine the work eligibility status of newly hired employees physically performing services within the State of Nebraska.

The Federal Immigration Verification System shall be an electronic verification of the work authorization program of the Illegal Immigration Reform and Immigration Responsibility Act of 1996, 8 U.S.C. 1324a, known as the E-Verify Program. The Contractor may use an equivalent Federal program designated by the United States Department of Homeland Security or other Federal agency authorized to verify the work eligibility status of a newly hired employee. The equivalent program shall comply with the Immigration Reform and Control Act of 1986.

The Prime Contractor shall furnish a letter to the NDOR Construction Division in Lincoln on company letterhead and signed by an officer of the company stating that documentation is on file certifying that the Contractor and all subcontractors have registered with and used a Federal Immigration Verification System. The Contractor shall maintain all records of registration and use for a period of three years and make records available upon request. The Contractor shall contractually require subcontractors to maintain all records for a period of three years and make records available upon request.

Payment will not be made to the Contractor for using the Federal Immigration Verification System or the maintenance of the records. This work shall be subsidiary to the work being performed.

The Contractor's Certification shall become part of the final records of the Contract. The Department considers this document to have direct bearing to the beginning interest date and may affect the amount of interest earned.

CONTRACT TIME ALLOWANCE (A-43-0911)

Paragraph 5. of Subsection 108.02 of the *Standard Specifications* is void and superseded by the following:

5. Each week, the Engineer shall post on the Department's website a report of working days or calendar days charged. The Contractor then has 14 days from the day the Engineer's report is posted to provide a written explanation of why he/she does not concur with the working days or calendar days as assessed.

Paragraph 6.b. of Subsection 108.02 of the *Standard Specifications* is amended to include the following:

- (4) If the time allowance for the contract has been established on a calendar day basis, the Contractor is expected to schedule the work and assign whatever resources are necessary to complete the work in the time allowance provided regardless of the weather. Accordingly, regardless of anything to the contrary contained in these *Specifications*, the Department will not consider delays caused by inclement or unseasonable weather as justification for an extension of the contract time allowance unless:
 - i. the weather phenomena alleged to have contributed to or caused the delay is of such magnitude that it results in the Governor issuing a Disaster Declaration, **and**
 - ii. the weather phenomena alleged to have contributed to or caused the delay can clearly be shown to have directly impacted the work on the critical path identified on the Contractor's schedule.

Paragraphs 10.b. and 10.c. of Subsection 108.02 of the *Standard Specifications* are void and superseded by the following:

- b. (1) If the extra work is not in the original contract, time extensions will be granted by determining the actual time necessary to accomplish the extra work.
 - (2) If the extra work is the result of the addition of additional quantities of existing contract items, time extensions will be granted by either:
 - (i) determining the actual time necessary to accomplish the extra work; or
 - (ii) determining the additional time to be granted by comparing the value of the additional quantities of work to the total amount of the original contract when measurement of the actual additional time is not possible or practical.
 - (3) In either case, only the time necessary to perform the extra work of the additional quantities of existing contract items when the extra work or the additional quantities of existing contract items are deemed to be the current controlling operation will be granted as a time extension.
- c. Increases in quantities of work associated with traffic control items measured by the day will not be considered for extending the contract time allowance. Overruns of traffic control items that are measured by methods other than time may be considered for extending the contract time allowance, but they must be deemed to be a controlling operation when the overrun of quantities occurs.

**PARTIAL PAYMENT
(A-43-1110)**

Paragraph 2. of Subsection 109.07 of the *Standard Specifications* is void and superseded by the following:

- 2. When the value of the work completed during a semi-monthly period exceeds \$10,000, the Contractor will receive semi-monthly progress estimates from which the Department shall make such retentions as may be allowed by the contract, provided that the nature and quality of the completed work are satisfactory and provided further that the progress of the work conforms to the requirements of Subsection 108.07.

Paragraph 3.b. of Subsection 109.07 of the *Standard Specifications* is void and superseded by the following:

- b. Under normal circumstances, the Department shall not retain any earnings on a progress estimate. However, the Department reserves the right to retain such amounts as are necessary for material deficiencies, anticipated liquidated damages, unpaid borrow, and for other reasons to protect the Department's interests.

**PARTIAL PAYMENT
(A-43-0611)**

Paragraph 4. of Subsection 109.07 of the *Standard Specifications* is void and superseded by the following:

4. a. (1) Upon presentation by the Contractor of receipted bills, billing invoices, or such other documentation sufficient to satisfy the Engineer and verify the Contractor's or subcontractor's actual costs for the materials, payments may also be allowed for acceptable nonperishable materials purchased expressly to be incorporated into the work and delivered in the vicinity of the project or stored in acceptable storage places within Nebraska.
- (2) Materials not delivered and stored in the immediate vicinity of or on the actual project site must be clearly marked to identify the project on which they are to be used, must be segregated from similar materials at the storage site, and cannot be included in a supplier's inventory of material available for sale for other purposes.
- (3) All items eligible for partial payment as stored materials must be available for verification, sampling, and measurement.
- b. The amount to be included in the payment will be determined by the Engineer, but in no case shall it exceed 100 percent of the value of the materials documented. This value may not exceed the appropriate portion of the value of the contract item or items in which such materials are to be incorporated, nor shall the quantity in any case exceed the total estimated quantity required to complete the project.
- c. Payment will not be approved when the documented value of such materials amounts to less than \$1,000.00, when the progress of the work is not in accordance with the requirements set forth in Subsection 108.07, or when the material can reasonably be expected to be incorporated into the work and eligible for payment as completed work on a progress estimate within 15 days of being placed into storage.
- d. Deductions at rates and in amounts which are equal to the payments will be made from estimates as the materials are incorporated into the work.
- e. Payment for the materials shall not in itself constitute acceptance, and any materials which do not conform to the specifications shall be rejected in accordance with Subsection 106.05.
- f. The Contractor shall be responsible for all damages and material losses until the material is incorporated into the work and the work is accepted.
- g. Partial payment will not include payment for fuels, supplies, form lumber, falsework, other materials, or temporary structures of any kind which will not become an integral part of the finished construction.
- h. No partial payments will be made on living or perishable plant materials until planted.

**BUY AMERICA
(A-43-0212)**

Subsection 106.07 in the *Standard Specifications* is void and superseded by the following:

106.07 -- Buy America

1. The Buy America rule requires that steel or iron materials be produced domestically, and only those products which are brought to the construction site and permanently incorporated into the completed project are covered. Construction materials, forms, etc., which remain in place at the Contractor's convenience, but are not required by the contract, are not covered.
2. To further define the coverage, a domestic product is a manufactured steel construction material that was produced in one of the 50 States, the District of Columbia, Puerto Rico, or in the territories and possessions of the United States.
3. All manufacturing processes to produce steel or iron materials (i.e., smelting, and any subsequent process which alters the steel or iron material's physical form or shape, or changes its chemical composition) must occur within one of the 50 States, the District of Columbia, Puerto Rico, or in the territories and possessions of the United States, to be considered of domestic origin. This includes processes such as casting, rolling, extruding, machining, bending, grinding, drilling, and coating. Coating includes epoxy coating, galvanizing, painting, and any other coating that protects or enhances the value of the material. The manufacturer shall include a statement on the material test report or certification that all material described above except the coating material is a domestic product.
4. Raw materials used in the steel or iron materials may be imported. All manufacturing processes to produce steel or iron materials must occur domestically. Raw materials are materials such as iron ore, limestone, waste products, etc., which are used in the manufacturing process to produce the steel products. Waste products would include scrap; i.e., steel no longer useful in its present form from old automobiles, machinery, pipe, railroad tracks and the like. Also, steel trimmings from mills or product manufacturing are considered waste. Extracting, crushing, and handling the raw materials which is customary to prepare them for transporting are exempt from Buy America. The use of pig iron and processed, pelletized, and reduced iron ore manufactured outside of the United States may be used in the domestic manufacturing process for steel and/or iron materials.
5. Notwithstanding this requirement, a minimum of foreign steel or iron materials will be permitted if its value is less than one-tenth of one percent of the total contract cost or \$2,500, whichever is greater.
6. Upon completion of all work utilizing steel or iron products, the Prime Contractor shall furnish a letter to the State on company letterhead and signed by an officer of the company stating that documentation is on file certifying that all steel or iron materials brought to the construction site and permanently incorporated into the work complied in all respects with the Buy America requirements.

**BORROW, WASTE, STOCKPILE, AND PLANT SITE APPROVAL
(A-43-0512)**

Subsection 107.02 in the Standard Specifications is amended to include the following:

4. Site Approval:
 - a. When borrow is obtained from a borrow site or waste excavation is placed at sites which are not shown in the contract, or the Contractor plans to use a plant or stockpile site which is not shown in the contract, the Contractor shall be solely responsible for obtaining all necessary site approvals. The Department will provide the procedures necessary to obtain approvals from the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Nebraska State Historical Society, Nebraska Game and Parks Commission, and Nebraska Department of Natural Resources on the NDOR website. The Contractor shall also be responsible for obtaining a Discharge Number from the Nebraska Department of Environmental Quality (NDEQ) that allows work under the current Construction Stormwater Permit. The Contractor shall also be responsible for obtaining any and all other permits required by local governments.
 - b. It is anticipated that it may require 60 calendar days or more for the Contractor to obtain the necessary approvals. The Contractor will not be allowed to begin work at borrow or waste sites until the necessary approvals are obtained. No extension of completion time will be granted due to any delays in securing approval of a borrow or disposal site unless a review of the time frames concludes that there were conditions beyond the Contractor's control.

Paragraph 7. of Subsection 205.02 in the Standard Specifications is void and superseded by the following:

7. Borrow and Waste Site Approval:
 - a. Borrow and waste site approvals shall be in accordance with Section 107.02.
 - b. Material shall not be removed from borrow sites until preliminary cross sections and representative soil samples have been taken by the Engineer. The Contractor shall notify the Engineer a sufficient time in advance of the opening of any borrow site so that cross sections may be taken.
 - c. Material shall be removed in a manner that will allow accurate final cross sections to be taken for determining the quantity of excavation. The surfaces of the borrow sites shall be bladed and shaped to drain as shown in the contract or as directed by the Engineer.

**SPECIAL PROSECUTION AND PROGRESS
(Subletting or Assigning of Contract)
(A-43-0813)**

Subsection 108.01 in the Standard Specifications is void and superseded by the following:

108.01 – Subletting or Assigning of Contract

1. a.(1) The Contractor will not be allowed to sublet, assign, sell, transfer, or otherwise dispose of any portion of the contract or any right, title, or interest therein; or to either legally or equitably assign any of the money payable under the contract or the claims without the prior written consent of the Engineer.
 - (2) With the Engineer's consent, the Contractor may sublet up to 70 percent of the work.
 - (3) Any items designated in the contract as "specialty items" may be performed by subcontract.
 - (4) The cost of any subcontracted "specialty items" may be deducted from the total contract cost before computing the percentage of work required to be performed by the Contractor.
 - (5) Subcontracts, or transfer of contract, will not release the Contractor of any liability under the contract and bonds.
- b. Certain items of work may be performed without a subcontract. A list of items not requiring a subcontract is available from the Engineer.
2. The performance of any work by a subcontractor before the date of authorization by the Department shall subject both the Contractor and subcontractor to the imposition of appropriate sanctions by the Department.
3. a. The Contractor's request to sublet work shall be made electronically to the NDR Construction Engineer using project management software identified by the Department. A signed subcontract agreement shall be on file in the Contractor's office when the request is made. The subcontract agreement must provide that the subcontracted work will be completed according to the terms of the contract. The required and Special Provisions contained in the proposal shall be physically included in any subcontract.
 - b. **On all Federal-aid projects, a scanned copy (.pdf format) of the signed subcontract agreement shall be included with the subcontracting request. (Federal-aid projects can be identified by inclusion in the Proposal of Form FHWA-1273 (REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS)).**
 - c. Scanned copies (.pdf format) of all executed subcontracts, written agreements, and/or lease agreements used to meet DBE goals shall be submitted to the NDR Construction Engineer with the subcontracting request. These copies must show labor cost, material prices, overhead and profit.
4. a. Second tier subcontracts will be allowed.

- b. If a DBE firm subcontracts work to another firm, only work subcontracted to another DBE firm can be counted toward meeting a DBE goal.
- c. All requests for second tier subcontracting shall be submitted to and approved by the prime Contractor before they are forwarded to the NDR Construction Engineer for approval.
- 5. All subcontract documents relating to the contract shall be maintained during the course of the work and preserved for a period of three years thereafter. These documents shall be available for inspection by authorized representatives of State and Federal agencies. Scanned copies (.pdf format) of the signed subcontract agreements not specifically identified elsewhere in this Subsection shall be furnished to the Department upon request.
- 6. The Contractor may discuss a proposed subcontract with the Engineer before entering into a signed subcontract agreement, but final approval will not be granted until a formal request and proper certification has been received by the Department.
- 7. On projects requiring submittal of certified payrolls, all subcontractor payrolls shall be checked by the Contractor before submittal to the Engineer.
- 8. a. The prime Contractor, and subcontractors when subletting work to lower tier subcontractors, shall include language which can be identified as a "Prompt Payment Clause" as a part of every subcontract for work and materials.
 - b.(1) The language constituting the "Prompt Payment Clause" will require payment to all first tier subcontractors for all labor and materials --- for work completed to date --- within 20 calendar days of receipt of progress payments from the Department for said work. Similar language in a contract between a subcontractor and a lower-tier subcontractor will require payment to the lower tier subcontractor for all labor and materials --- for work completed to date --- within 10 calendar days of receipt of progress payments from the prime Contractor for said work.
 - (2) The language constituting the "Prompt Payment Clause" will also stipulate the return of retainage within 30 calendar days after the satisfactory completion of the work by the subcontractor as evidenced by inclusion of the work on a progress payment.
 - (3) Additionally, the language constituting the "Prompt Payment Clause" may stipulate the subcontractor's obligation to return to the Contractor or subcontractor, as the case may be, any overpayments which result from adjustments to measured and recorded quantities as part of the preparation of subsequent progress payments or the final records. Overpayments shall be returned to the prime Contractor or subcontractor, as the case may be, within 20 calendar days of receiving notice of the adjusted quantities and the amount of the overpayment.
- c. The prime Contractor of subcontractors, as the case may be, may withhold payment only for just cause and shall not withhold, delay, or postpone payment without first receiving written approval from the Department.

- d.(1) The failure by the prime Contractor to abide by the agreements identified in the “Prompt Payment Clause” without just cause, including the timely return of retainage, is a material breach of this contract which may result in the Department withholding the amount of payment from the prime Contractor that should have been paid to the subcontractor, termination of this contract, or other such remedy as the Department deems necessary.
- (2) Additionally, the failure of any subcontractor to abide by the agreements identified in the “Prompt Payment Clause” without just cause, including the timely return of retainage to lower tier subcontractors, or by failing to return overpayments in a timely manner when the language permitted in Paragraph 8.b.(3) above is included in the subcontract may result in the Department withholding subcontract approval for other work until the overpayments have been returned.

ELECTRONIC SHOP DRAWINGS (A-43-0813)

Subsection 105.02 of the Standard Specifications is amended to include the following:

- 8. a.(1) The Contractor may provide electronic working drawings in a Portable Document Format (PDF). The PDFs shall be sized to print on an 11 x 17 inch sheet of paper and have a minimum resolution of 300 dpi. Each sheet of the shop drawings shall have a space provided for an electronic stamp that measures 2.5 inches x 3.5 inches when printed.

- (2) Electronic working drawing files shall be named with the following file naming format:

Control Number_Brief Description_Date.pdf

For example: 12345_FloorDrains_12May2013.pdf

- (3) The project number, control number, and project location as it appears on the plans shall be shown on each sheet of the shop drawings. Structure numbers shall be included, if applicable.
- b. No electronic working drawings shall be submitted to the Engineer unless they have been checked by the Contractor. The electronic submittal shall be accompanied by a Contractor’s letter of approval in a PDF format. The letter of approval shall clearly indicate that the Contractor is responsible for any errors on the working drawings.
- c.(1) Electronic submittals shall be submitted by email to the following address:

DOR.ShopDrawings@nebraska.gov

- (2) Attachments shall be limited to 25 MB of data per email. Larger files shall be separated and sent in multiple emails.
- (3) Electronic working drawings will only be accepted from the Prime Contractor.

**LIABILITY INSURANCE
(A-55-0611)**

Subsection 107.13 in the Standard Specifications is void and superseded by the following:

107.13 – Liability Insurance

Prior to execution of the contract, the Contractor shall obtain insurance coverage to fully protect it from loss associated with the work, and have at a minimum the insurance described below:

1. General Liability:
Limits of at least:
 - \$ 1,000,000 per Occurrence
 - \$ 2,000,000 General Aggregate
 - \$ 2,000,000 Completed Operations Aggregate
 - \$ 1,000,000 Personal and Advertising Injury
- a. Contractor shall be responsible for the payment of any deductibles.
- b. Coverage shall be provided by a standard form Commercial General Liability Policy (CG0001 or equivalent) covering bodily injury, property damage including loss of use, and personal injury.
- c. The General Aggregate shall apply on a Per Project Basis.
- d. The State of Nebraska, Department of Roads, shall be named as an Additional Insured on a primary and non-contributory basis including completed operations for three (3) years after final acceptance and payment.
- e. Contractor agrees to waive its rights of recovery against the State of Nebraska, Department of Roads. Waiver of Subrogation in favor of the State of Nebraska, Department of Roads shall be added to the policy.
- f. Contractual liability coverage shall be on a broad form basis and shall not be amended by any limiting endorsements.
- g. If work is being performed near a railroad track, the 50' railroad right-of-way exclusion must be deleted.
- h. Products and completed operations coverage in the amount provided above shall be maintained for the duration of the work, and shall be further maintained for a minimum period of three years after final acceptance and payment.
- i. Coverage shall be included for demolition of any building or structure, collapse, explosion, blasting, excavation and damage to property below surface of ground (XCU coverage).

- j. Policy shall not contain a total or absolute pollution exclusion. Coverage shall be provided for pollution exposures arising from products and completed operations as per standard CG0001 Pollution Exclusion or equivalent. If the standard pollution exclusion as provided by CG0001 has been amended, coverage must be substituted with a separate Pollution Liability policy of \$1.0 million per occurrence and \$2.0 million aggregate. If coverage is provided by a “claims made” form, coverage will be maintained for three years after project completion. Any applicable deductible is the responsibility of the Contractor.
2. Automobile Liability:
Limits of at least:
\$ 1,000,000 CSL per Accident
- a. Coverage shall apply to all Owned, Hired, and Non-Owned Autos.
 - b. If work is being performed near a railroad track, the 50-foot railroad right-of-way exclusion must be deleted.
 - c. Contractor agrees to waive its rights of recovery against the State of Nebraska, Department of Roads. Waiver of Subrogation in favor of the State of Nebraska, Department of Roads, shall be added to the policy.
 - d. Automobile liability coverage shall be obtained from an insurance carrier who is licensed with the Nebraska Department of Insurance.
3. Workers' Compensation:
Limit: Statutory coverage for the State where the project is located.
Employer's Liability limits: \$500,000 Each Accident
\$500,000 Disease – Per Person
\$500,000 Disease – Policy Limit
- a. Contractor agrees to waive its rights of recovery against the State of Nebraska, Department of Roads. Waiver of Subrogation in favor of the State of Nebraska, Department of Roads shall be added to the policy.
 - b. Workers' compensation coverage shall be obtained from an insurance carrier who is licensed with the Nebraska Department of Insurance.
 - c. Where applicable, the Longshore and Harborworkers Compensation Act endorsement shall be attached to the policy.
4. Umbrella/Excess:
Limits of at least:
\$1,000,000 per Occurrence
- a. Policy shall provide liability coverage in excess of the specified Employers Liability, Commercial General Liability and Automobile Liability.
 - b. The State of Nebraska, Department of Roads, shall be an “Additional Insured.”
 - c. Contractor agrees to waive its rights of recovery against the State of Nebraska, Department of Roads. Waiver of subrogation in favor of the State of Nebraska, Department of Roads shall be provided.

5. Pollution Liability:
 - a. When "hazardous wastes" or contaminated or polluted materials must be handled and/or moved, the Contractor shall obtain Pollution Liability Coverage with minimum limits of \$1,000,000 per occurrence and \$2,000,000 aggregate.
 - b. If, during the course of construction, hazardous wastes, contaminated or polluted material are discovered on the project, the Contractor shall immediately cease any operation that may disturb these materials, and shall immediately notify the Engineer of all facts related to the discovery of these materials.
 - c. Unforeseen work related to the discovery of hazardous, contaminated or polluted materials on the project, and the extra cost, if any, of pollution liability coverage will be handled as "extra work."
6. Additional Requirements:
 - a. The Contractor shall provide and carry any additional insurance required by the Special Provisions.
 - b. Except as otherwise provided herein, all insurance shall be kept in full force and effect until after the State releases the Contractor from all obligations under the contract.
 - c. If any of the work is sublet, equivalent insurance shall be provided by or on behalf of the subcontractor or subcontractors (at any tier) to cover all operations.
 - d. Any insurance policy shall be written by an insurance company with a Best's Insurance Guide Rating of A – VII or better.
 - e. Prior to execution of the contract, Contractor shall provide the State of Nebraska, Department of Roads evidence of such insurance coverage in effect in the form of an Accord (or equivalent) certificate of insurance executed by a licensed representative of the participating insurer(s). Certificates of insurance shall show the Nebraska Department of Roads as the certificate holders.
 - f. For so long as insurance coverage is required under this agreement, the Contractor shall have a duty to notify the Department when the Contractor knows, or has reason to believe, that any insurance coverage required under this agreement will lapse, or may be cancelled or terminated. The Contractor must forward any pertinent notice of cancellation or termination to the Department at the address listed below by mail (return receipt requested), hand-delivery, or facsimile transmission within 2 business days of receipt by Contractor of any such notice from an insurance carrier. Notice shall be sent to:

Nebraska Department of Roads
Construction Division --- Insurance Section
1500 Highway 2, P.O. Box 94759
Lincoln, NE 68509-4759
Facsimile No. 402-479-4854
 - g. Failure of the owner or any other party to review, approve, and/or reject a certificate of insurance in whole or in part does not waive the requirements of this agreement.

- h. The limits of coverage set forth in this document are suggested minimum limits of coverage. The suggested limits of coverage shall not be construed to be a limitation of the liability on the part of the Contractor or any of its subcontractors/tier subcontractors. The carrying of insurance described shall in no way be interpreted as relieving the Contractor, subcontractor, or tier subcontractors of any responsibility or liability under the contract.
- i. If there is a discrepancy of coverage between this document and any other insurance specification for this project, the greater limit or coverage requirement shall prevail.

CONSTRUCTION DETAILS

FUEL COST ADJUSTMENT PAYMENT (B-1-0708)

Paragraph 16.a. of Subsection 205.05 in the Standard Specifications is amended to provide that the references to fuel cost fluctuation will be 5% instead of the 10% shown.

The fuel use factor, "F", shown in Paragraph 16.c. of Subsection 205.05 is void and superseded by the following:

F = English

The fuel use factor for diesel fuel, in gallons per cubic yard. For the items of work "Excavation", "Excavation, Borrow", and "Excavation, Established Quantity", "F" shall be equal to 0.20. For the item of work "Earthwork Measured in Embankment", "F" shall be equal to 0.27.

Metric

The fuel use factor for diesel fuel, in liters per cubic meter. For the items of work "Excavation", "Excavation, Borrow", and "Excavation, Established Quantity", "F" shall be equal to 0.99. For the item of work "Earthwork Measured in Embankment", "F" shall be equal to 1.32.

Paragraph 16.d. of Subsection 205.05 is void and superseded by the following:

- d. The allowable price differential, "D", for the current estimate will be computed according to the following formula:

When the current price, P, is greater than the base price, P(b).

$D = P - 1.05P(b)$, but not less than zero.

When the current price, P, is less than the base price, P(b).

$D = P - 0.95P(b)$, but not greater than zero.

**WATER
(B-1-0307)**

Paragraph 4.a. of Subsection 205.04 in the Standard Specifications is amended to include the following:

Payment shall be made at the established contract unit price.

**EXCAVATION AND EMBANKMENT
(B-1-0212)**

Paragraph 6. of Subsection 205.02 in the Standard Specifications is void and superseded by the following:

6. Frozen Layers:

- a. Thin Frozen Layer. A thin soil layer that freezes during the construction of an embankment may remain provided that the layer:
 - (i) had proper density and moisture prior to freezing,
 - (ii) can be readily broke up by a single pass of a tamping (sheepsfoot) roller or track mounted excavator,
 - (iii) is thoroughly scarified into pieces having a single dimension of 3 inches or less, and a second dimension of ½ inch or less, and
 - (iv) is not within 10 inches (measured vertically) of any thin frozen layer that was previously scarified and left in place.

- b. Thick Frozen Layer. A soil layer that freezes during the construction of an embankment, but does not meet the Thin Frozen Layer requirements:
 - (i) may remain in the embankment provided that the layer is thawed and has proper density and moisture after thawing, or
 - (ii) shall be completely removed from the embankment prior to placing any additional embankment material.

**TEMPORARY WATER POLLUTION CONTROL
(B-3-0509)**

Section 204 in the Standard Specifications is void.

**CONSTRUCTION STORMWATER MANAGEMENT CONTROL
(B-3-0509)**

General

1. This Section defines some best management practices (BMPs) for erosion and sediment control measures and construction practices the Contractor shall use to prevent soil erosion and avoid water pollution.
2. The Contractor shall exercise every reasonable precaution throughout the life of the contract to prevent silting of the waters of the state, the project site, and adjacent property. Construction of drainage facilities, as well as performance of other contract work which will contribute to the control of siltation, shall be carried out in conjunction with earthwork operations or as soon thereafter as is practicable.
3. a. The Contractor shall take sufficient precautions to prevent pollution of the waters of the state, the project site, and adjacent property with construction debris, petroleum products, chemicals, or other harmful materials.
b. The Contractor shall conduct and schedule the operations to avoid interference with any protected species.
c. The Contractor shall comply with all applicable statutes relating to pollution of the waters of the state and fish and game regulations.
4. All construction debris shall be disposed in a manner that it cannot enter any waterway. Excavation shall be deposited as to protect the waters of the state from siltation.
5. The erosion and sediment control measures shall continue until the permanent drainage facilities have been constructed and the slopes are sufficiently vegetated to be an effective erosion deterrent or until tentative acceptance of the work.
6. All erosion and sediment control measures shall be properly maintained by the Contractor.
7. All erosion and sedimentation resulting from the Contractor's operations and the weather conditions must be corrected by the Contractor.

**LIMITATION OF OPERATIONS
(B-3-0509)**

General

1. The maximum exposed surface area for the Contractor's operations in excavation, borrow, and embankment is 18 acres (72,800 m²) plus an equal area of clearing and grubbing/large tree removal. A written request for an increase in the maximum exposed surface area may be approved by the Engineer unless an equal amount of finished grading and seeding has been completed in the previously opened area. This approval will be based on the soil, moisture, seasonal conditions, the Contractor's operation, or other conditions.

2. The Engineer shall have the authority to reduce the maximum exposed surface area when any of the following conditions warrant:
 - a. Soil and moisture conditions are such that erosion is probable.
 - b. Seasonal conditions may force extended delays.
 - c. Proximity to the waters of the state require more stringent controls.
 - d. Equipment and personnel available on the job is not sufficient to properly maintain erosion and dust control measures.
 - e. Any other environmental condition in the area that may exist which would be affected by erosion from the project.
3. Construction operations in rivers, streams, wetlands, and impoundments shall be restricted to those areas specifically shown in the contract. Rivers, streams, wetlands, and impoundments shall be promptly cleared of all false work, piling, debris, or other obstructions placed therein or caused by the construction operations.
4. Fording and operation of construction equipment within live streams and wetlands will not be allowed, unless explicitly allowed in the contract.

CONSTRUCTION METHODS (B-3-0509)

General

1. The Contractor shall conduct all construction activities to control sediment and avoid soil erosion.
2. The Contractor shall incorporate all permanent erosion control features into the project at the earliest practicable time.
3. Construction stormwater management control measures for Contractor obtained construction work areas located outside the right-of-way, such as borrow pit operations, haul roads, plant sites, staging areas, equipment storage sites, etc. are the sole responsibility of the Contractor. All construction stormwater management control measures for these areas are at the Contractor's expense. The Contractor is responsible for securing all required permits for use of these areas.
4. The construction stormwater management procedures contained herein shall be coordinated with any permanent erosion control measures specified elsewhere in the contract to the extent practical to assure economical, effective, and continuous erosion and sediment control throughout the construction period.
5. The Contractor shall be responsible to limit erosion and prevent siltation into the waters of the state during the construction period, as well as during the times that work may be suspended.

6. a. The installation of all erosion and sediment control items shall be installed by qualified personnel who are knowledgeable in the principles and practice of various BMP installations.
- b. The installation of all erosion and sediment control items shall be done under the direct supervision of the Contractor's NDOR-Certified Erosion and Sediment Control Inspector. The Contractor's NDOR-Certified Erosion and Sediment Control Inspector shall be present at each site during installation to direct and inspect all erosion and sediment control BMP installations.
- c. The Contractor shall notify the Engineer of all Contractor NDOR-Certified Erosion and Sediment Control Inspectors who will be on the project to direct and inspect all erosion and sediment control BMP installations.
- d. No payment will be made for any erosion and sediment control item unless a Contractor NDOR Certified Erosion and Sediment Control Inspector was present to directly supervise and inspect the work.
- e. No payment will be made for any erosion and sediment control item that is not properly installed. All erosion and sediment control items shall be installed as per the NDOR Standard Plan or the manufacturer's instructions.

ENVIRONMENTAL COMMITMENT DOCUMENT (B-3-0509)

General

This specification establishes the required documentation included in the Environmental Commitment Document and Project Erosion and Sediment Control Inspection. The Department and the Contractor, as co-permittees, will comply with all conditions required by the current NPDES Construction Storm Water General Permit.

Environmental Commitment Document

1. An Environmental Commitment Document will be created by the Department to identify all project specific environmental commitments, when applicable.
 - a. (Pre-Bid) The Department will provide information related to commitments made for but not limited to:
 - i. Storm Water Pollution Prevention Plan.
 - ii. U. S. Army Corps of Engineers 404 Permit.
 - iii. Nebraska Department of Environmental Quality 401 Water Quality Certification.
 - iv. State Title 117 Waters (COE Non-Jurisdictional).
 - v. Floodplain Permit.
 - vi. Historic Clearance.
 - vii. Threatened & Endangered Species Clearance.
 - viii. FHWA Environmental Clearance.
 - ix. NPDES Construction Stormwater Permit (within Right-of-Way limits, only).
 - x. Conservation Measures.

- xi. Migratory Bird Treaty Act.
 - xii. Other pertinent issues.
- b. (Post-Bid) The Contractor shall provide the following information that will be included in the Environmental Commitment Document but not limited to:
- i. Temporary Erosion Control Plan.
 - ii. Spill Prevention and Control Plan.
 - iii. Name and telephone number of the Contractor's representative responsible for the Environmental Commitments.
 - iv. Name and telephone number of the employees that are NDOR-Certified Erosion and Sediment Control Inspectors.
 - v. Construction Schedule/Critical Path.

Temporary Erosion Control Plan

1. The Contractor shall prepare and submit the Temporary Erosion Control Plan prior to the start of any work. The Contractor shall not begin work until the Temporary Erosion Control Plan has been submitted to the Engineer and appropriate erosion control measures are in place. Payment for any work on the contract will be withheld if erosion control measures are not in place or properly maintained.
2. The submittal of the Temporary Erosion Control Plan, the approval to increase the maximum surface area, or any payment for or acceptance of any or all of the work shall not operate as a waiver of the Contractor's responsibility under this specification.
3. The Temporary Erosion Control Plan shall be amended as work progresses and site conditions change.
4. The Temporary Erosion Control Plan will be reviewed at the project progress meeting. All active Contractors will have their Inspectors present, and work as a team to determine Temporary Erosion Control BMP's as they are needed.
5. Payment for preparing the Temporary Erosion Control Plan is subsidiary to items that direct payment is made.

Spill Prevention and Control Plan

1. The Contractor shall prepare and submit the Spill Prevention and Control Plan prior to the start of any work. The Contractor shall not begin work until the Spill Prevention and Control Plan has been submitted to the Engineer and appropriate Spill Prevention and Control measures are in place.
 - a. Spill Prevention and Control Plan should clearly state measures to stop the source of the spill, contain the spill, clean up the spill, dispose of contaminated materials, and train personnel to prevent and control future spills.
 - b. Spill Prevention and Control Plans are applicable to construction sites where hazardous wastes are stored or used. Hazardous wastes include, but not limited to: pesticides, paints, cleaners, petroleum products, fertilizers, and solvents.

2. The Spill Prevention and Control Plan will be included in the Environmental Commitment Document.
3. Direct payment will not be made for the Spill Prevention and Control Plan.

Storm Water Pollution Prevention Plan (SWPPP)

1. The Contractor shall comply with all conditions required by the current NPDES Construction Storm Water General Permit.
2. The Department will prepare the NDOR Project SWPPP for construction activities causing a land disturbance within the Right-of-Way, temporary easements, and permanent easements of one (1) acre or more.
 - a. Areas of construction support activities located on private property, obtained by the Contractor, are not included in the NDOR Project SWPPP.
3. The Engineer and the Contractor will perform inspections as required by the current NPDES Construction Storm Water General Permit. Payment for project inspection is subsidiary to items that direct payment is made.
4. The SWPPP will be maintained and updated by the Engineer as work progresses and site conditions change, to accurately describe the BMPs that are currently in place.
5. The Contractor's participation in SWPPP inspections, maintenance and updates shall begin on the first day construction activities cause land disturbance and end on the date of project completion as evidenced as the completion date in the District Engineer's Letter of Tentative Acceptance.

Project Erosion and Sediment Control Inspection

1. Inspections must be conducted by a NDOR-Certified Erosion and Sediment Control Inspector. The Contractor and the Engineer shall conduct inspections in accordance with the NPDES Construction Storm Water General Permit.
2. The NDOR-Certified Erosion and Sediment Control Inspector certification is obtained by completing an erosion and sediment control inspector training course provided by the Nebraska Department of Roads and passing the examination that accompanies the training.
3. The Contractor's NDOR-Certified Erosion and Sediment Control Inspector shall be responsible for ensuring that all BMPs are installed in accordance with NDOR Specifications, Special Provisions, NDOR Standard Plans, or the manufacturers' recommended installation instructions. The Contractor's NDOR-Certified Erosion and Sediment Control Inspector shall be capable of reading and interpreting these documents. The Inspector shall be familiar with product and structural BMPs. The Contractor's NDOR-Certified Erosion and Sediment Control Inspector is required to inspect, assess, and supervise the maintenance of erosion and sediment control BMPs to ensure compliance with the NPDES Construction Storm Water General Permit while preserving BMP functionality.
4. Payment for project inspection is subsidiary to items that direct payment is made.

**ENVIRONMENTAL COMMITMENT DOCUMENT ENFORCEMENT
(B-3-0509)**

General

1. This specification establishes a disincentive assessment for the Contractor's failure to comply with Environmental Commitments.
2. Deficiencies are described but not limited to:
 - a. Failure to install pollution prevention control BMPs as work progresses or as described in the SWPPP.
 - b. Failure to maintain existing pollution prevention control BMPs.
 - c. Failure to remove non-functioning pollution prevention control BMPs.
 - d. Failure to comply with U. S. Army Corps of Engineers 404 Permit requirements.
 - e. Failure to comply with NPDES Construction Storm Water General Permit requirements.
 - f. Failure to comply with all applicable statutes relating to pollution of the waters of the state.
 - g. Exceeding the maximum exposed surface area for excavation of 18 Acres without written request for permission and written approval.
 - h. Failure to comply with Plans, Specifications, and Contract requirements for the Environmental Commitment Document.

Conditions

1.
 - a. The count of Working Days and Calendar Days shall continue during the time period that corrective work is being performed.
 - i. Delays to the project as a result of the Contractor conducting corrective actions for the Environmental Commitment Document shall not constitute a valid reason for an extension of the contract time allowance.
 - b. The Contractor shall begin maintenance operations, provide adequate equipment and personnel, and diligently pursue the work without cessation until all deficiencies have been corrected.

Corrective Actions

1. a. Deficiencies shall be corrected within seven calendar days of notification. When deficiencies are not corrected within seven calendar days, the Engineer will make a disincentive assessment to the contract as stated herein.
2. If soil, weather, or other conditions prevent the Contractor from completing the corrective actions within seven calendar days, the Contractor shall notify the Engineer in writing. The Contractor's letter shall state the reasons preventing corrective action within the time allowed. The Contractor shall propose a Corrective Action Plan within 48 hours. Corrective work shall continue while the Plan is developed. The Contractor's Corrective Action Plan must contain a course of action and a time frame for completion. If the reasons and the Corrective Action Plan are acceptable to the Engineer, the Contractor will be allowed to proceed with the plan as proposed without incurring a disincentive assessment. If work described in the approved Corrective Action Plan does not commence as proposed, the Engineer may immediately invoke the NDOR Environmental Commitment Control Deficiency Notification Shut-Down Notice.
3. The Engineer may require the Contractor to provide a written Procedures Plan. The Procedures Plan shall detail the process to prevent reoccurrence of deficiencies. The written Procedures Plan shall be provided within seven calendar days of the request. Failure to correct all deficiencies and provide a Procedures Plan may result in payments being withheld until such time that procedures are outlined.

Notification

1. Deficiencies will be documented using the NDOR Environmental Commitment Deficiency Notification Form and the Corrective Action Log.
2. Initial Notice:
 - a. The Initial Notice will notify the Contractor of Environmental Commitment deficiencies and direct that they be corrected.
 - b. If all corrective work is completed within the time allowance shown in the initial notice or time shown in the Contractor's approved Corrective Action Plan, a disincentive assessment will not be imposed upon the Contractor.
3. Shut-Down Notice:
 - a. If all corrective work identified in the Corrective Action Log attached to the Initial Notice has not been completed at the end of the seventh calendar day after the Initial Notice Date, a Shut-Down Notice will become effective on the eighth calendar day after the Initial Notice Date.
 - b. All current operations shall cease as of the date and time cited by the Shut-Down Notice. The Contractor shall only work on Environmental Commitment deficiencies. After the Shut-Down Notice, the penalty day assessment will be counted as a Calendar Day.

Disincentive Assessments

1. If the corrective work is not complete within seven Calendar Days after the Initial Notice, a disincentive assessment of \$250.00 per Deficiency Location per Calendar Day for each Deficiency Location remaining uncorrected will begin on the eighth calendar day after the Initial Notice Date and continue through and count the day the last corrective work was completed for each Deficiency Location.

Corrective Action Incentive

1. The Contractor shall comply with the NPDES Construction Storm Water General Permit to correct all pollution prevention control deficiencies within 7 calendar days from when the Contractor was notified of the Environmental Commitment deficiencies and prior to the next storm event. The Contractor shall begin maintenance operations, provide adequate equipment and personnel, and diligently pursue the work --- without cessation --- until all deficiencies have been corrected.
2. The Department will pay an incentive as outlined in Table A when the Contractor is notified by the Environmental Commitment Deficiency Notification and Corrective Action Log and commences work to correct deficiencies resulting from a storm event that exceeded 0.50 inch of rain. One payment per notification will be made. Multiple deficiencies may be included in one notification.

Table A	
Corrective Action Incentive Payment Schedule	
Incentive to commence corrective work within:	
24 Hours of Notification	\$300.00
48 Hours of Notification	\$200.00

3. An incentive payment will not be paid if corrective work does not commence as outlined in Table A and completed within 7 days, or if an unscheduled visit coincides with a normally scheduled visit.
4. An incentive payment will not be paid for scheduled maintenance visits, expected to occur every 14 days, or pollution prevention BMP installations, maintenance, and removals required due to daily Contractor operations.
5. Immediate Action Deficiencies are not eligible for incentive payment.

Immediate Action Deficiencies

1. Deficiencies that pose an imminent threat to the environment are considered an emergency situation. These deficiencies will be identified in the Immediate Action Deficiencies section of the Environmental Commitment Notification Form. The corrective work for Immediate Action Deficiencies shall begin immediately and continue without cessation until completed.

2. The Contractor will be assessed a disincentive assessment of \$500.00 per Deficiency per Calendar Day for failure to begin corrective actions or failing to continue to completion.
3. Examples of Immediate Action Deficiencies include but not limited to:
 - a. Threatened & Endangered Species habitat protection deficiencies
 - b. U. S. Army Corps of Engineers 404 Permit Noncompliance
 - c. Petroleum Spills/Tank Leakage
 - d. Hazardous Material Spills

Rights Reserved

1. The Department reserves the right to initiate and perform corrective action on any deficiencies and then assess the costs to perform the work against the Contractor.
2. The Contractor shall be liable to the Department for any and all costs incurred by the Department as a result of the Contractor's actions, inactions, or for failure to comply with the NPDES Construction Storm Water General Permit, U. S. Army Corps of Engineers 404 Permit, or any other applicable permit.
3. It is expressly understood that the provisions of this specification will not relieve the Contractor of his/her responsibilities nor shall it relieve the surety of its obligation for and concerning any just claim.

SALVAGING AND PLACING TOPSOIL

Section 207 is amended to include the following:

The Contractor shall remove the top 6" of existing, vegetated soil and stockpile this material in a berm along the perimeter of the project.

The salvaged soil shall be free of roots greater than 1 inch in diameter. Smaller roots and organic matter are acceptable.

The berm may be placed in lieu of temporary silt fence. The berm shall not exceed 3 feet in height. The top of the berm should be a minimum of 1' in width and the side slopes shall be 3:1 or flatter. The berm may not be placed under the canopy of any trees in the project right of way.

Temporary Seeding shall be used on the berm, if it is to be left in place for more than 14 days.

After other grading work is complete, the salvaged soil shall be replaced at a depth of 4", prior to seeding and erosion control operations. If placement locations are not shown in the plan sheets, the optimal placement of these soils are locations where the project cut sections have exposed deep subsoils, or fill soils that contain very low organic matter.

REMOVE PIPE UNDERDRAINS

The Contractor will be required to remove the existing pipe underdrains, filter fabric, granular material, and headwalls along the project where there is widening, the materials excavated during the removal operation shall become the property of the Contractor and removed from the project. Removal of Pipe Underdrains shall not be paid for directly but will be considered subsidiary to the item "Excavation (Established Quantity)".

SAWING PAVEMENT

Paragraph 5. of Subsection 203.04 in the Standard Specifications is void.

SUBGRADE PREPARATION (C-1-0307)

Paragraph 2.a. of Subsection 302.03 in the Standard Specifications is amended to include that trimming on narrow, irregular or roadway grading of 1/2 mile (0.8 km) or less may be accomplished using conventional methods.

BITUMINOUS FOUNDATION COURSE (C-2-0708)

Paragraph 2.b. of Subsection 307.02 in the Standard Specifications is void and superseded by the following:

2. b. All salvaged bituminous material must be less than 3 inches (75 mm) in maximum dimension and shall not contain more than 5 percent by weight of material retained on a 2-inch (50 mm) sieve just prior to its use.
 - (1) Contractor Production
 - (i) All salvaged bituminous material produced by the Contractor from pavement removal or by cold milling material from the existing pavement structure on the project, whether hauled directly to the site of use or temporarily stockpiled, shall be screened to meet the requirements of Paragraph 2.b.
 - (ii) If, after screening, there is insufficient material to produce the plan quantity, the Engineer may order the oversized salvaged bituminous material to be further processed at no cost to the State prior to delivery to the roadway. Processing shall mean crushing, pulverizing, re-screening, or a combination of these methods.
 - (iii) On projects that allow multiple foundation course materials to be used, the Engineer may direct that the remaining salvaged bituminous material continue to be placed for bituminous foundation course to the extent this material is available and can be utilized on the project.
 - (iv) Unless otherwise shown in the plans or special provisions, all Contractor produced salvaged bituminous material including oversized remaining at the end of the bituminous foundation course operation shall become the property of the Contractor and removed from the project.

- (2) State Provided Stockpiles
 - (i) If the salvaged bituminous material is to be obtained from existing stockpiles described in the special provisions or the plans, the salvaged bituminous material shall be screened to meet the requirements of Paragraph 2.b. prior to delivery to the roadway. Any oversized bituminous material remaining from the screening operation shall remain the property of the State.
 - (ii) If, after screening, there is insufficient material to produce the plan quantity, the Engineer may order the oversized bituminous material to be further processed prior to the delivery to the roadway. Processing shall mean crushing, pulverizing, re-screening, or a combination of these methods.

Paragraph 2.b.(3) of Subsection 307.03 is void and superseded by the following:

- (3) The Department shall monitor the rolling pattern with a nuclear density gauge, testing and recording the density every ½ mile (0.8 km). Additional testing of separately placed irregular areas shall be performed as directed by the Engineer.

Paragraph 2.b.(5) of Subsection 307.03 is void.

Method of Measurement

Subsection 307.04 is amended to include the following:

4. a. Screening of salvaged bituminous material will not be measured for payment.
- b. Processing of Contractor produced salvaged bituminous material, ordered by the Engineer, which contains excessive oversized material due to the Contractor's production methods, will not be measured for payment.

Basis of Payment

Paragraph 6. of Subsection 307.05 is void and superseded by the following:

6. Screening of salvaged bituminous material shall be considered subsidiary to the bituminous foundation course item.
7. Processing of salvaged bituminous material, ordered by the Engineer, which contains excessive oversize material due to the Contractor's production methods, shall be considered subsidiary to the bituminous foundation course item.
8. If the Contractor is required to reprocess the oversized bituminous material from State stockpiles, the work of reprocessing will be paid for as "extra work".
9. Payment is full compensation for all work prescribed in this Section.

**AGGREGATE FOUNDATION COURSE-D
(C-3-1109)**

Amend Section 307 of the Standard Specifications to include Aggregate Foundation Course-D.

1. Material Requirements
 - a. Foundation Course-D shall consist of mineral aggregate.
 - b. Aggregate shall conform to the quality requirements of Subsection 1033.02, Paragraphs 1., 2., and 9.
 - c. At least 14 days before beginning foundation course production, the Contractor shall submit a proposed mix design along with a 50 pound (23 kg) sample of each aggregate to the NDR Materials and Research laboratory for approval. The mix design will:
 - (1) Result in an aggregate mix that meets the gradation requirements of Table 1.
 - (2) Propose single defined values for the percentage passing each sieve on the gradations of Table 1.
 - (3) Include the average aggregate(s) gradations used to calculate the mix design.
 - (4) Create a fine aggregate angularity value of 43.0 or greater. The specific gravity for calculation of the Fine Aggregate Angularity (FAA) shall be determined on a combined aggregate sample of the material passing the No. 8 (2.36 mm) sieve and retained on the No. 100 (150 µm) sieve as defined in AASHTO T 304 Method A, except the specific gravity material shall be washed over the No. 100 (150 µm) sieve.
 - d. The NDR Materials and Research laboratory will determine the specific moisture-density values for the proposed foundation course design.

Table 1

Aggregate Foundation Course-D Gradation Requirements		
Sieve Size	Target Value (Percent Passing)	Tolerance
1/2 in (12.5 mm)	100	0
3/8 in (9.5 mm)	100	-4
No. 4 (4.75 mm)	93	±4
No. 10 (2.0 mm)	55	±10
No. 30 (600 µm)	25	±5
No. 40 (425 µm)	20	±4
No. 200 (75 µm)	3	±3

2. Construction Methods

- a. The Contractor shall place compact and profile the foundation course as shown in the plans.
- b. The foundation course shall be spread in a uniform layer and compacted to at least 100 percent of the maximum density as determined by AASHTO T 99.
- c. After compaction the foundation course shall be trimmed such that the thickness will not vary from the plan thickness by more than 1/2 inch (12.5 mm).

**CRUSHED CONCRETE FOUNDATION COURSE
(C-4-0212)**

Section 307 of the Standard Specifications is amended to include the following:

All samples, including field samples, will be washed sieve. All samples will be taken from the project grade prior to spreading and trimming. Material represented by samples with 15 percent or more passing the No. 200 (75 µm) sieve will be subject to removal.

Paragraphs 3.b. and 3.c. of Subsection 307.02 of the Standard Specifications are void.

Paragraph 3.d. of Subsection 307.02 of the Standard Specifications is void and superseded by the following:

The crushed concrete gradation shall be determined as prescribed in NDR T 27 (washed test). The target gradation requirement for the crushed concrete foundation course is shown below:

Material gradation will be accepted by the table below on a lot basis of 2500 cubic yards on the average of 5 consecutive tests, one for each 500 cubic yard subplot. If at the end of the project, the final lot consists of less than 2500 cubic yards, a minimum of 3 samples, or 1 sample for each 500 cubic yards or fraction thereof, whichever is greater shall be taken and tested and acceptance based on the average of those tests.

Crushed Concrete Foundation Course Gradation Requirements	
Sieve Size	(Percent Passing)
1½ inch (37.5 mm)	100 minimum
¾ inch (19.0 mm)	85 maximum
No. 4 (4.75 mm)	20 to 50
No. 200 (75 µm)	0 to 8

Paragraph 3.a. of Subsection 307.03 of the Standard Specifications is amended to include the following:

- a. (1) The Contractor shall roll the crushed concrete foundation course until no further compaction can be obtained and all roller marks are eliminated.
- (2) The Department will establish a rolling pattern for the project and set a density range.
- (3) The Department shall monitor the rolling pattern with a nuclear density gauge, testing and recording the density every 1/2 mile (0.8 km). Additional testing of separately placed irregular areas shall be performed as directed by the Engineer.
- (4) The Contractor shall take immediate action to correct the foundation course density if any density measurements are outside of the specified range.

FOUNDATION COURSE 5”

The Contractor shall have the option of using either Aggregate Foundation Course-D, Crushed Concrete Foundation Course or Bituminous Foundation Course; and the Contractor shall bid the pay item “Foundation Course ____” accordingly.

These different foundation courses may be used interchangeably throughout the project, with the exception being that the same type of foundation course shall be used across the entire width of a pavement section to provide uniform drainage across that template. The Contractor shall make every attempt to use the same type of foundation course in long paving runs and any changes in foundation course type shall be approved by the Engineer.

Regardless of the type of material used it shall be obtained from Contractor sources or from the pavement removal operation on the project.

Regardless of the type of material used it shall be measured and paid for as Foundation Course 5”.

Method of Measurement

Foundation Course shall be measured as prescribed in Paragraph 3 of Subsection 307.04.

Paragraph 3. of Subsection 307.04 is amended to include the following: Any increased depth Foundation Course of more than 5 inches will not be measured for payment. Payment for such increased depth shall be considered as included within payment for Foundation Course 5”.

Basis of Payment

Amend Subsection 307.05 of the Standard Specifications to include the following:

1	Pay Item	Pay Unit
	Foundation Course ____	Square Yard

**TYPE B HIGH INTENSITY WARNING LIGHTS
(D-6-0307)**

All references in the plans to Type B High Intensity Warning Lights shall be considered void. The plans will not be revised to reflect this change.

**TEMPORARY TRAFFIC CONTROL DEVICES
(Type II Barricades, Reflectorized Drums, 42" (1070 mm) Reflective Cones, and
Vertical Panels)
(D-6-1112)**

Paragraph 2.d. of Subsection 422.03 in the Standard Specifications is void and superseded by the following:

- d. (1) Reflectorized drums used for traffic warning or channelization shall be constructed of lightweight, flexible, and deformable materials, be a minimum of 36 inches (900 mm) in height, and have a minimum width of 18 inches (450 mm), regardless of orientation. The predominant color of the drum shall be orange.
- (2) Steel drums shall not be used.
- (3) The markings on drums shall be horizontal, shall be circumferential, and shall display four 6-inch (150 mm) wide bands of retroreflective sheeting, alternating fluorescent orange - white – fluorescent orange - white. The fluorescent orange sheeting shall meet the luminance requirements of the following table.

FHWA Luminance Factor

Sheeting Type	Luminance Factor Y_T		
	Min	Max	Fluorescence Luminance Factor Limit, Y_F
Fluorescent Orange	25	None	15

- e. When approved by the Engineer or shown in the plans, 42" (1070 mm) reflective cones may be used in lieu of Type II Barricades or Reflectorized Drums. 42" (1070 mm) reflective cones shall include a 30-pound (14 kg) rubber base and display four 6-inch (150 mm) wide bands of retroreflective sheeting, alternating fluorescent orange - white - fluorescent orange - white. 42" (1070 mm) reflective cones shall not be used for lane-closure tapers or shifts.
- f. Rubber base-mounted 36-inch vertical panels shall not be used for channelization when the speed limit exceeds 40 miles per hour.

Paragraph 2.b. of Subsection 422.04 of the Standard Specifications is void and superseded by the following:

- b. (i) Type II Barricades, Reflectorized Drums, and 42" (1070 mm) Reflective Cones shall be counted as "Barricades, Type II" and measured for payment by the number of calendar days each is in place and positioned as shown in the plans or as directed by the Engineer.

- (ii) Vertical Panels shall be measured for payment as permanent "Sign Days" (by the each) by the number of calendar days each vertical panel unit is in place and positioned as shown in the plans or as directed by the Engineer.

Paragraph 2.c. of Subsection 422.04 of the Standard Specifications is amended to include Reflectorized Drums.

Paragraphs 3. and 4. of Subsection 422.05 of the Standard Specifications are void and superseded by the following:

- 3. a. The pay item "Barricade, Type II" is used to pay for three items ("Barricades, Type II", "42" (1070 mm) Reflectorized Cones", and "Reflectorized Drums").
- b. "Barricades, Type II", which includes "42" (1070 mm) Reflectorized Cones", and "Reflectorized Drums", is paid for as an "established" contract unit price item. The established unit price is identified on the "Schedule of Items" shown in the Proposal.
- 4. Payment for vertical panels includes all posts, brackets, or hardware necessary to install and maintain the vertical panel units.

WORK ZONE TRAFFIC CONTROL SIGNS (D-6-1212)

The Department has adopted the FHWA 2009 Manual of Uniform Traffic Control (MUTCD) and the 2011 Nebraska Supplement to the MUTCD as the official guidance for work zone traffic control signs. Many work zone traffic control signs have been revised, redesigned, or replaced in the 2009 MUTCD (and 2011 Nebraska Supplement). Accordingly, all work zone signs shall comply with the following:

- 1 - All signs, regardless of age, shall meet the design standards of the 2009 MUTCD (and 2011 Nebraska Supplement).

TEMPORARY PAVEMENT MARKING (D-10-0811)

Paragraph 4.f. of Subsection 422.01 in the Standard Specifications is void.

Paragraph 6.a.(2) of Subsection 422.03 is void and superseded by the following:

- (2) When the markings are no longer needed, the Contractor shall remove them. If removing markings from the final wearing surface, the removal process shall not mar or damage the surface. Removed markings shall no longer be visible on the final wearing surface.

Paragraph 6. of Subsection 422.03 in the Standard Specifications is amended to include the following:

This work shall consist of installing and removing reflectorized temporary pavement lines of the color, width and line configuration shown in the plans or as designated by the Engineer.

Temporary paint markings will be used on this project. The use of Type I tape will not be permitted and Type II tape may be used for short durations only, as directed by the Engineer. Temporary paint stripes shall be a minimum 4" (100 mm) wide, 10' (3 m) long with a 30-foot (9 m) gap or a minimum 4" (100 mm) wide solid line as shown on the plans.

Temporary pavement marking which is no longer applicable shall be removed as directed by the Engineer.

Paragraph 12.a. of Subsection 422.04 is void and superseded by the following:

- a. "Pavement Marking Removal" and "Temporary Pavement Marking Removal" shall be measured by the linear foot (meter) along the centerline of the traveled roadway for each line removed.

Subsection 422.04 is amended to include the following:

- 21. The use of paint for Temporary Pavement Marking shall be measured per linear foot (meter) for the item "Temporary Pavement Marking, Type Paint".
- 22. Temporary pavement marking tape Type II shall be measured per linear foot (meter) for the item "Temporary Pavement Marking, Type II".
- 23. Initial surface preparation requiring sand or shot blasting shall be measured per linear foot (meter) for the item "Temporary Pavement Marking, Surface Preparation". Surface preparation for repainting, consisting of air blasting and brushing, shall be subsidiary to other items for which payment is made.

Paragraph 1. of Subsection 422.05 is amended to include the following:

Pay Item	Pay Unit
Temporary Pavement Marking Removal	Linear Foot (LF)
Temporary Pavement Marking, Type Paint	Linear Foot (LF)
Temporary Pavement Marking, Type II	Linear Foot (LF)
Temporary Pavement Marking, Surface Preparation	Linear Foot (LF)

Paragraph 9.c. of Subsection 422.05 is void.

Paragraph 13. of Subsection 422.05 is void and superseded by the following:

- 13. Removal of temporary pavement markings including overlay broken/solid lines will be paid for except:
 - a. When the temporary markings are intended to be covered up by permanent markings.
 - b. When surface preparation removes the temporary markings.

Section 1069 in the Standard Specifications is amended to include the following:

- 1. Prior to the initial placement of the markings, temporary paint, or Type II tape the pavement upon which the markings are to be placed shall be dry, cleaned and

properly prepared by sand or shot blasting, as a minimum, and to the extent recommended by the manufacturer so that all contaminants, loose debris, and other foreign material are completely removed. Surface preparation for any subsequent application shall consist of air blasting and brushing the roadway surface to remove all loose dirt, mud or other debris and to dry the surface. Each additional application of paint shall be applied over the previously painted stripes.

Prior to placing the temporary pavement markings on the prepared surface, the Contractor shall layout, spot or string line the proposed temporary marking location. The temporary markings shall be aligned in such a way as to provide a smooth and gradual transition to and from the existing markings, and throughout both straight and horizontally curved sections of the project.

2. The material used for temporary paint marking shall be a commercially available acrylic resin Type II traffic paint that dries to no pickup in 4 minutes and shall be applied with a minimum of 6 pounds (0.7 kg) of glass beads per gallon (liter). The paint shall be applied at a minimum width of 4 inches (100 mm) and a wet thickness of approximately 15 mils (380 μ m) {approximately 16.5 gallons (39 liters) of paint per mile (kilometer) of solid line}. The equipment used to paint the line shall be a machine designed for the purpose of applying long line traffic lane markings of the type, width and thickness required, and shall be self-propelled or truck mounted and be equipped with an adjustable guide-on to assure proper placement of the line. Hand application, walk behind equipment or towing of the equipment will not be allowed.

Temporary paint lines shall be used on new or existing concrete pavement and asphaltic concrete pavement.

Any temporary painted line or segment of line, placed before December 1, which fails to adhere to the roadway surface for a minimum of 60 days under normal vehicular traffic or which appears wavy, nonuniform, thin, poorly applied, misaligned, beadless or nonreflective, shall be replaced as directed by the Engineer. For temporary painted pavement markings placed between December 1 and March 15, the minimum time requirement shall be 15 days with the same conditions applicable. No direct payment will be made for replacement within the 60 day or 15 day warranty periods.

After the minimum 60 day or 15 day warranty periods, the Contractor may be required to repaint the temporary traffic markings, as directed by the Engineer. Direct payment will be made for each additional application. However, should the additional application fail within the 60 day or 15 day warranty periods, the provisions as stated in the previous paragraph shall apply.

The Contractor must begin each additional repainting application within 72 hours after notification by the Engineer. Should the Contractor fail to begin repainting within this 72 hour period, the Engineer may use State forces or hire a private contractor to repaint the temporary traffic markings. The Contractor will be assessed any costs above the contract unit price "Temporary Pavement Marking, Type Paint" incurred by the State as a result of performing the corrective action by others, and the project will be shut down until the painting is completed.

When painting is required with air temperatures between 38° F (3° C) and 50° F (10° C), the paint shall be heated according to the manufacturer's

recommendation prior to application on the dry, clean and properly prepared pavement. Any paint application made when the air temperature is below 38° F (3° C) will be paid for by the State, even if the application falls within either the 60 day or 15 day warranty periods previously described.

3. Temporary pavement marking tape Type II shall be a mixture of high quality polymeric materials and pigments, with glass beads throughout the pigmented portion of the film, and a reflective layer of high index of refraction glass beads bonded to the top surface. The film shall be precoated with a pressure-sensitive adhesive. Unless otherwise specified, the temporary pavement marking shall be 4 inches (100 mm) wide and the reflectorizing glass beads shall be incorporated to facilitate removal of the tape easily from asphalt and Portland cement concrete surfaces intact or in large pieces, at temperatures above 40° F (4° C), either manually or with a recommended roll up device. Removal shall be accomplished without the use of heat, solvents, grinding or sandblasting.

TEMPORARY TRAFFIC CONTROL FOR PERMANENT PAVEMENT MARKING (D-13-1007)

Paragraph 4. of Subsection 423.04 in the Standard Specifications is void.

INERTIAL BARRIER SYSTEM (D-14-0509)

Paragraph 9.b.(5) of Subsection 422.03 in the Standard Specifications is void and superseded by the following:

- (5) All inertial barriers shall have 5 to 15 percent (by volume) rock salt mixed with the filler material.

WET REFLECTIVE POLYUREA PAVEMENT MARKING, GROOVED

I. Description

This work shall consist of furnishing and installing wet night retroreflective polyurea pavement markings in accordance with this provision and in conformance to the dimensions and lines shown on the plans or established by the Engineer.

The wet reflective polyurea marking material shall be applied by spray method onto asphaltic cement concrete and Portland cement concrete surfaces. Following an application of glass beads or black aggregate, and upon curing, the resulting marking shall be an adherent reflectorized stripe of the specified thickness and width that is capable of resisting deformation by traffic.

The Contractor shall field verify the pavement marking quantities required for the project prior to purchasing materials. The Department will not be held responsible for the Contractor's shortage or surplus of material. The Contractor's verification of quantities and purchasing material shall not delay the project or the installation of pavement marking when required.

The polyurea pavement marking shall be applied in grooves cut into the surfacing. The grooves shall be made in a single pass dry cut; the equipment used shall be self-vacuuming and leave the cut groove ready for polyurea pavement marking application. The equipment and method used shall be approved by the polyurea pavement marking manufacturer. The polyurea pavement marking shall be applied in the grooves the same day as the cut. Grooves shall be clean and dry prior to polyurea pavement marking application. All conflicting pavement markings remaining after polyurea pavement marking application shall be removed; this removal shall be subsidiary to the pavement marking.

Groove width: pavement marking width + 1 inch to 2 inch maximum
 Groove depth: per manufacturer's recommendations to a minimum of 60 mils
 Groove length: full length of marking + required grooving transition
 Groove position: 2 inches off of joint line (per plan)

Grooving of the surfacing shall be performed in accordance with the polyurea manufacturer's recommendations. Grooving the surfacing shall not be measured and paid for but shall be considered subsidiary to "____ Polyurea Pavement Marking, Grooved".

II. Materials

A. Polyurea

Composition Requirements:

Composition requirements are per manufacturer's specifications. The Wet Reflective Polyurea Pavement Markings approved for use are shown on the NDR Approved Products List. Markings which have not been previously approved by the Department will not be permitted on the project until approved by the Traffic Engineer.

Properties:

1. Color and Weathering Resistance: The mixed polyurea compound, white, yellow and black, when applied to a 3" x 6" aluminum panels at 15±1 mil in thickness with no glass beads or elements and exposed for 500 hours in a Q.U.V. Environmental Testing Chamber, as described in ASTM-G154, Cycle #1, shall conform to the following minimum requirements. The color of the white polyurea system shall not be darker than Federal Standard No. 595A-17778. The color of the yellow polyurea system shall conform to Federal Standard No. 595A-13538. The color of the black polyurea system shall conform to Federal Standard No. 595A-17038.
2. Track-Free Time (Laboratory): When tested in accordance with ASTM D 711, the polyurea marking material shall reach a track-free condition in 10 minutes or less for a 15 mil thickness. This test shall be performed with AASHTO Type 1 beads coated at a rate of 0.099 pounds per square foot. The track-free time shall not increase substantially with decreasing temperature.

3. Adhesion to Concrete: The polyurea coating, when tested according to ACI Method 503, shall have such a high degree of adhesion to the specified concrete surface that there shall be a 100% concrete failure in the performance of this test. The prepared specimens shall be conditioned at room temperature ($75^{\circ}\pm 2^{\circ}$ F) for a minimum of 24 hours and maximum of 72 hours prior to the performance of the tests indicated.
4. Adhesion to Asphalt: The polyurea coating, when tested according to ACI Method 503, shall have such a high degree of adhesion to the specified asphalt surface that there shall be a 100% asphalt failure in the performance of this test. The prepared specimens shall be conditioned at room temperature ($75^{\circ}\pm 2^{\circ}$ F) for a minimum of 24 hours and maximum of 72 hours prior to the performance of the tests indicated.

B. Reflective Media

The reflective media application shall incorporate a double drop technique to maximize wet night reflectivity and color. The reflective media used shall ensure the wet reflective polyurea pavement markings meet the reflectance performance requirements in Section II.D.3. The glass beads for drop-on application shall conform to the following requirements *or be an approved equivalent*.

1. Glass Beads

The required glass beads shall be a 60/40 blend (60% sinkers and 40% floaters) of AASHTO M 247-81 Type I gradation 1.5 index glass beads. The glass beads shall have a minimum of 70% Rounds as measured according to ASTM D1155. Crush Resistance shall be measured according to the procedures of ASTM D1213 and shall be a minimum of 30 pounds retained on US #40 Mesh.

Acid Resistance: A sample of glass beads supplied by the manufacturer shall show resistance to corrosion of their surface after exposure to a 1% solution (by weight) of sulfuric acid. The 1% acid solution shall be made by adding 5.7 cc of concentrated acid into 1000 cc of distilled water.

CAUTION: Always add the concentrated acid into the water, not the reverse. The test shall be performed as follows:

Take a 1" x 2" sample, adhere it to the bottom of a glass tray and place just enough acid solution to completely immerse the sample. Cover the tray with a piece of glass to prevent evaporation and allow the sample to be exposed for 24 hours under these conditions. Then decant the acid solution (do not rinse, touch, or otherwise disturb the bead surfaces) and dry the sample while adhered to the glass tray in a 150° F (66° C) oven for approximately 15 minutes. Microscopic examination (20X) shall show not more than 15% of the beads having a formation of very distinct opaque white (corroded) layer on their entire surface.

2. Wet Reflective Media

Wet reflective media shall be approved for use by the polyurea manufacturer. The Wet Reflective Media approved for use are shown in the NDR Approved Products List.

C. Non-reflective Media

Black aggregate shall be broadcast to saturation on all black lines to provide a matte, non-reflective finish. The gradation of the black aggregate is as follows:

U.S. Sieve	Retained (%)
#20	17-37
#30	45-65
#40	14-25
Pan	0-1

D. Finished Markings

Because of normal variances in road surfaces, application processes and measurement, the properties of markings made from the materials specified herein will vary from one installation to the next. When the materials are applied according to the specifications in Section III, they shall be capable of forming markings with the following reproducibility of properties:

1. On-the-road Track-Free Time: When installed at 77° F and at a wet film thickness of 15±1 mils, the markings shall reach a no-track condition in less than 10 minutes. Track-free shall be considered as the condition where no visual deposition of the polyurea marking to the pavement surface is observed when viewed from a distance of 50 feet, after a free-rolling traveling vehicle's tires have passed over the line. The track-free time shall not increase substantially with decreasing temperature.
2. Skid Resistance: The average initial skid resistance shall be 45 BPN or greater when tested according to ASTM E303.
3. Retroreflectance – Initial retroreflectance are shown in the table below. Typical retroreflectivity averaged over many readings (mcd(ft-2)(fc-1)) metric equivalent (mcd(m-2)(lux-1)).

Average Minimum Initial Reflectance		
	White	Yellow
Dry (ASTM E1710)	500	350
Wet Recovery (ASTM 2177)	350	275
Wet Continuous (ASTM 2176)	100	75

- 3.1.1 Some reasonable variance should be expected (for example, application on very rough road surfaces or differences in glass beads).
- 3.1.2 The initial retroreflectance of a single installation shall be the average value determined to the measurement and sampling procedures outlined in ASTM D6359, using a 30-meter (98.4 feet) retroreflectometer. The 30-meter retroreflectometer shall measure

the coefficient of retroreflected luminance, R_L at an observation angle of 1.05 degrees and an entrance angle of 88.76 degrees. R_L shall be expressed in units of millicandelas per square foot per foot-candle [$\text{mcd}(\text{ft}^{-2})(\text{fc}^{-1})$]. The metric equivalent shall be expressed in units of millicandelas per square meter per lux [$\text{mcd}(\text{m}^{-2})(\text{lux}^{-1})$].

- 3.1.3 Initial performance of pavement marking shall be measured within 14 days after application. The Traffic Engineer shall be notified prior to the placement of pavement markings.
- 3.1.4 Wet retroreflectance values measured under a “condition of continuous wetting” (simulated rain) shall be in accordance with ASTM E2176, and to reduce variability between measurements, the test method shall be performed in a controlled laboratory environment while the marking is positioned with a 3 to 5 degree lateral slope. Measurements shall be reported as the average of the minimum of three locations. Samples of the completed finished product shall be applied to flat panels during application and brought back to the lab for testing.

III. Application

The Contractor shall furnish equipment and apply the materials according to the following specifications:

A. Equipment

Application equipment shall be capable of producing markings that meet the specifications of the manufacturer’s listed on the NDR Approved Products List for Wet Reflective Polyurea Pavement Marking.

At any time throughout the duration of the project, the Contractor shall provide free access to his application equipment for inspection by the Engineer, his authorized representative or a materials representative.

When black and white polyurea are applied together to create a contrast pattern, they shall be applied from one truck in a single pass operation.

B. Application Conditions:

1. **Moisture:** The markings shall only be applied during conditions of dry weather and when the pavement surface is dry and free of moisture.
2. **Air Temperature:** The markings shall only be applied when road and air temperatures are above 40 degrees F, unless manufacturer’s guidelines state otherwise.
3. **Surface Preparation:** Marking operations shall not begin until applicable surface preparation work is completed and approved by the Engineer.
 - 3.1 Prior to applying the markings, the Contractor shall remove any remaining existing markings to expose a minimum of 80% of the pavement surface.

- 3.2 Prior to applying the markings, the Contractor shall remove all curing compounds on new Portland cement concrete surfaces.
- 3.3 Prior to applying the markings, the Contractor shall remove all dirt, sand, dust, oil, grease and any other contaminants from the road surface.
- 3.4 Application over temporary paint is not acceptable.
- 4. **Dimensions:** The pavement markings shall be placed only on properly prepared surfaces and at the widths and patterns as designated on the contract plans. The markings shall be applied in accordance with the "Manual on Uniform Traffic Control Devices" and in accordance with the Engineer's plans.
- 5. **Other Restrictions:** The Engineer and/or Contractor shall determine further restrictions and requirements of weather and pavement conditions necessary to meet the all other application specifications and produce markings that perform to the satisfaction of the Engineer.
- 6. **Binder Thickness:** The polyurea binder (mixed Part A and Part B) coating shall be applied at rates to achieve minimum uniform wet thicknesses as follows:

Surface Type	Recommended Polyurea Pavement Marking Thickness (1 inch=1000 mils)
Existing Smooth Asphalt or Concrete Surface	20±2 mils
New Concrete Surface ¹	20±2 mils
New Asphalt Surface (Standard Asphalt Mix)	20±2 mils
Open Grade Friction Course (OGFC) or Stone Matrix Asphalt (SMA) ²	25±2 mils
Rough Concrete or Asphalt	22±2 mils
Concrete or Asphalt after Grinding Off Pavement Markings ³	22±2 mils

¹ Use thicker binder (20 mils) on new concrete surfaces with heavy tines.
² Very large aggregate sizes for open grade friction course or stone matrix asphalt mixes may require a thickness of 25 mils for proper coverage.
³ Pavement marking thickness determined by the type of surface and roughness/texture created from grinding operation.

7. **Reflective Media Application:** The Contractor shall ensure that the reflective media are properly set in the polyurea coating so that their exposed portions are free of polyurea coating material. The specified reflective media shall be dropped per the manufacturer's specified rates to achieve their recommended coating weights:
8. **Volumetric Proportioning:** The Contractor shall ensure proper proportioning as required by manufacturer's specifications and mixing of the polyurea components so that the markings are adequately hardened throughout and are free of soft or uncured material. Typically, such areas will darken over time from dirt and tire residue.
9. **Overspray:** The Contractor shall ensure the polyurea coating does not exhibit excessive overspray.
10. **Adhesion:** The Contractor shall ensure that the polyurea coating is well adhered to the road surface, and that the reflective media are well adhered to the binder.

IV. **Observation Period**

Following initial completion of all pavement marking, there will be a 180-day observation period before final acceptance. During the observation period, the Contractor, at no expense to the Department of Roads, shall replace any marking that the Engineer determines are not performing satisfactorily due to defective materials and/or workmanship in manufacture and/or application. At the end of the observation period the minimum required retention percentage for marking installed shall be 90%.

Determination of Percentage Retained - The percentage retained shall be calculated as the nominal area of the strip less the area of loss divided by the nominal area and expressed as a percentage of the nominal area. A claim, made by the State against the Contractor, shall be submitted to the Contractor in writing within 30 days after the 180-day observation period. When such a claim is made prior to August 1, the replacement material shall be installed during that same construction season. Replacement material for any claim after August 1, shall be installed prior to June 1, of the following year. Marking replacement shall be performed in accordance with requirement specified herein for the initial application, including but not limited to surface cleaning, sealer application, etc.

Final acceptance of all marking will include an inspection of the appearance of the markings during daylight and darkness. Any markings that fail to have a satisfactory appearance during either period, as determined by the Engineer, shall be reapplied at no expense to the Department of Roads.

Final acceptance of the pavement marking will be: (1) 180 days after the initial completion of all work, or (2) upon completion of all corrective work, whichever occurs last.

V. **Contract Units and Basis for Payment**

- A. Linear pavement markings will be measured in linear feet complete-in-place for the width specified.

B. Arrows and Legends are measured by the each.

Subsection 423.05 of the Standard Specifications is amended to include the item: "___ Polyurea Pavement Marking, Grooved". Payment shall be full compensation for grooving the pavement surface, furnishing and applying all markings, and for all materials, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
___ Polyurea Pavement Marking, Grooved	Linear Feet
___ Polyurea Pavement Marking, Grooved	Each

Payment is full compensation for all work prescribed in this Section.

CONCRETE PROTECTION BARRIERS

Guidance for concrete protection barriers:

1. Type A: 4-loop barriers with a large opening at the bottom.
 Type B: 6-loop barriers with 4 lifting slots and no slots for tie-down rods.
 Type C: 6-loop barriers with 4 lifting slots and 6 slots for tie-down rods.
2. Barriers Type A, B and C may be used on this project and may directly be pinned to each other in the same installation arrangement; however, only Type B or C concrete protection barriers shall be allowed for use on any Interstate roadway or Interstate bridge.
3. Other existing barriers meeting NCHRP 350 or MASH testing guidelines and FHWA approval may only be used with written permission (containing this project name and/or control number) from the District and Roadway Design Division.
4. If new barriers are to be fabricated for use on this project, only Type C barriers shall be fabricated.

Paragraph 5 of Subsection 422.03 in the Standard Specifications is amended to include the following:

- f. (1) Concrete protection barriers that become dislodged or moved out of alignment shall be placed back in alignment as soon as practical. If the dislodged barriers are considered to be a hazard to the traveling public by the Engineer, or the barriers encroach into the traveled lane, the barriers shall be realigned within four (4) hours of the time the Contractor is notified. For each occurrence, failure to realign the barriers within the four (4) hour time period will result in the assessment of a lump sum \$1,000 liquidated damage assessment and the Engineer may proceed to correct the adverse condition(s) in a manner that is deemed appropriate. The Contractor will also be assessed the cost incurred when the action is performed by others. This assessment has not been provided for elsewhere in the contract and shall be considered in addition to other liquidated damage assessments which are a part of the contract.

- f. (2) The Contractor shall use NDOR stockpile sites to pick up only 12.5 foot concrete protection barriers from the Greenwood Maintenance Yard (1266 barriers), the Plattsmouth Maintenance Yard (200 barriers) and at the "I" Street on-loop (582 barriers). When no longer needed on the project, the barriers shall be inspected for damage and returned to the stockpile areas where they were originally located.

TRAFFIC CONTROL MANAGEMENT

Description and General Requirements

Paragraph 1. of Subsection 422.01 in the Standard Specifications is void and superseded by the following:

1. a. This work consists of furnishing, installing at the locations shown on the plans, operating, maintaining, and when work is complete, removing the temporary traffic control devices described in this Section. This work shall also consist of providing Traffic Control Management by furnishing one or more qualified individuals who shall be specifically responsible for performing or supervising the installation, inspection, maintenance, and removal of those devices.
- b. When project conditions warrant, the Engineer may suspend the need for Traffic Control Management and will notify the Contractor accordingly. The Contractor shall be given at least three days' notice of the suspension, but the work may be suspended in a lesser time if mutually acceptable to the Department and the Contractor. During periods when no payment is being made for Traffic Control Management under this special provision, this provision will not apply.
- c. Traffic Control Management shall be utilized from March 31, 2014 to December 13, 2014 and from March 30, 2015 to May 30, 2015 or as otherwise directed by the Engineer.

Paragraphs 2.i., 2.j.(2)(ii), and 2.k. of Subsection 422.01 of the Standard Specifications are void.

Paragraph 2. of Subsection 422.01 of the Standard Specifications is amended to include the following:

- p.(1) The Contractor shall designate an individual, other than the Project Superintendent, to be the Traffic Control Manager for the project. This person shall be qualified by having attended and having satisfactorily passed the examination which accompanies the training for the courses for Traffic Control Supervisor or Traffic Control Technician offered by the American Traffic Safety Services Association (ATSSA). The training shall have been completed no more than 4 years prior to working on the project. Formal certification by ATSSA in these disciplines is encouraged, but not mandated. Other training or certifications may be accepted if approved by the Engineer. The Traffic Control Manager shall also possess a current Flagger Certification Card. Documentation of the Traffic Control Manager's training or certifications shall be provided to the Engineer prior to the installation of any traffic control devices on the project.

- (2) The Contractor may also designate one or more Assistant Traffic Control Managers for the project. These individuals shall possess a valid Flagger Certification Card and be qualified by having attended and having satisfactorily passed the examination which accompanies the training for the course for Traffic Control Technician or Traffic Control Supervisor offered by the American Traffic Safety Services Association (ATSSA) --- the training having been completed no more than 4 years prior to working on the project --- or by certification according to the Department's certification program for Assistant Traffic Control Managers --- the training having been completed no more than 2 years prior to working on the project . Documentation of the Assistant Traffic Control Manager's training or certifications shall be provided to the Engineer.
- (3) In order to be qualified according to the Department's Certification Program, the prospective Assistant Traffic Control Manager must:
 - i. View the 47-minute video "Training and Certification of Assistant Traffic Control Managers."
 - ii. Correctly answer 80 percent of the questions on an examination that accompanies the video.
- (4) Upon satisfactory completion of the training and examination procedure, the prospective Assistant Traffic Control Manager shall be issued an Assistant Traffic Control Manager Certification Card by the examining Contractor. The Assistant Traffic Control Manager's name, last four digits of social security number, and test score shall be reported to the Construction Engineer on DR Form 90a, "Certification Report for Assistant Traffic Control Managers."
- (5) The video examination forms, Assistant Traffic Control Manager Cards, and Certification Reports for Assistant Traffic Control Managers shall be furnished by the Department.
- q. The Traffic Control Manager or Assistant Traffic Control Manager shall be available and reasonably accessible (within 30 minutes) to the project during normal working hours on every day that work is being performed on the project and always on-call at other times. During other than normal working hours, these individuals shall respond and be on the project within 60 minutes of notice being given that traffic control items on the project are in need of attention. The Contractor may elect to have an employee or employees perform this function simultaneously on more than one project, but shall not be relieved from the sanctions or disincentives that may be imposed for failure to meet the deadlines specified herein.
- r. The Traffic Control Manager's or Assistant Traffic Control Manager's activities on the project shall be dedicated to the purpose of monitoring and maintaining the traffic control devices. The performance of other crafts or trades will be permitted, but shall be secondary to the performance of duties associated with traffic control.
- s. The Contractor shall provide prior to the installation of any traffic control devices on the project two to four telephone numbers where the Traffic Control Manager or an Assistant Traffic Control Manager may be reached 24 hours a day, seven days a week.

- t. The Traffic Control Manager or Assistant Traffic Control Manager shall have available at all times an approved, current version of the Traffic Control Plan.
- u. If corrective action is not taken by the Contractor within the times specified in Paragraph 2.q., the Engineer may suspend all work on the project until the problem is corrected. The Engineer shall make reasonable allowance for existing weather conditions in the case of materials whose installation is governed by temperature or other atmospheric conditions.

Construction Methods

Subsection 422.03 of the Standard Specifications is amended to include the following:

- 20. The Traffic Control Manager's or Assistant Traffic Control Manager's duties shall include:
 - a. Insuring that all traffic control devices, including flagging operations, are functioning properly, are clean, and are correctly located as shown on the Traffic Control Plan or as directed by the Engineer. This provision in no way restricts the cleaning, repair and maintenance of traffic control devices to the Traffic Control Manager or his or her assistants.
 - b. Inspecting all traffic control devices on every calendar day that traffic control devices are in place, whether in use or covered. Inspections shall take place a minimum of twice daily, at least two inspections shall be eight hours apart, and at least one weekly inspection shall be during the hours of darkness. However, during or following periods of inclement weather or when the situation warrants for other reasons, inspections shall be done more frequently. Additionally, when flagger control is being utilized, at least one inspection each week shall be performed during flagging operations for monitoring purposes. The Traffic Control Manager or Assistant Traffic Control Manager shall perform the inspections.
 - c. Monitoring the cleaning and maintenance of all traffic control devices and the placement of temporary pavement markings.
 - d. Completing a Traffic Control Inspection Form provided by the Engineer at the completion of each inspection. These forms shall be submitted daily to the Engineer, either in person or via facsimile transmission.
 - e. Monitoring flagging operations on the project to insure signing and flagging techniques are in compliance with Department and ATSSA requirements (flagger location and proper spacing / signage as per the plans). The Traffic Control Manager or Assistant Traffic Control Manager shall not act as a flagger, except in an emergency or when providing relief for short periods of time.
 - f. Coordinating all traffic control operations, including those of subcontractors and suppliers.
 - g. Coordinating traffic-related activities with the appropriate law enforcement, fire, and emergency medical agencies.

- h. Attending all project scheduling meetings.

Method of Measurement

Subsection 422.04 of the Standard Specifications is amended to include the following:

- 21.(1) Traffic Control Management is measured by the day for the actual number of days management and inspection are required and provided. Payment will only be made for one day of Traffic Control Management during each midnight-to-midnight period regardless of the number of Traffic Control Managers or Assistants required to adequately perform the work.
- (2) No measurement will be made when the Engineer has suspended the need for Traffic Control Management and notified the Contractor accordingly.

Basis of Payment

Paragraph 1. of Subsection 422.05 of the Standard Specifications is amended to include the following:

Pay Item	Pay Unit
Traffic Control Management	Day (d)

Paragraph 15. of Subsection 422.05 of the Standard Specifications is renumbered to be Paragraph 16. Subsection 422.05 of the Standard Specifications is amended to include the following:

- 15. With regard to inspection, maintenance and repair of temporary traffic control devices, an assessment in the amount of \$500 per occurrence per day shall be charged to the Contractor when any of the following occur (these assessments shall be in addition to any other liquidated damages which may be assessed):
 - a. The Contractor fails to respond within the timeframe specified in Paragraph 2.q. of the amended Subsection 422.01 of the Standard Specifications. Response time shall begin when:
 - 1) The Engineer notifies the Contractor of deficiencies in person;
 - 2) The Engineer makes notification of deficiencies via the 24-hour phone number(s) provided by the Contractor; or
 - 3) The Engineer leaves a message or receives no answer at the number(s) provided;
 - b. The Contractor fails to begin corrective actions to repair, replace, remove, relocate, or clean any traffic control devices or pavement markings within two hours of the completion of an inspection that uncovers deficiencies or within two hours of notification of deficiencies by the Engineer (including flagging operations).
 - c. The Contractor fails to begin corrective actions to repair, replace, remove, relocate, or clean any traffic control devices or pavement markings within two hours of documented notification by an official law enforcement agency (including flagging operations).

- d. The Contractor fails to correct improper flagging procedures.
- e. The Contractor fails to make or report the inspections prescribed in this specification.
- f. The Engineer observes and documents any occurrence of the Contractor or his or her subcontractors flagrantly disregarding the necessary maintenance of traffic control devices that are in obvious need of attention.

CONSTRUCTION LIGHTING

Description

- 1. If the Contractor elects to perform work during nighttime hours, the Contractor shall furnish, place, maintain, provide fuel, and operate sufficient lighting equipment to permit proper workmanship and inspection when the contract requires nighttime work. Nighttime work occurs between from one half hour before sunset to one half hour after sunrise.
- 2. The Contractor shall have a supervisor on site during all nighttime operations to ensure proper maintenance of traffic control.

Equipment Requirements

- 1. Lighting shall be accomplished by the use of portable floodlights, standard equipment lights, existing streetlights, temporary streetlights, or other lighting methods acceptable to the Engineer.
- 2. Equipment shall be operated within all manufacturers operating parameters.

Construction Methods

- 1. General
 - a. The Contractor shall submit a lighting plan in accordance with Subsection 105.02 for review by the Engineer.
 - (1) Lighting levels shall meet the Categories required for the type of work as shown in Table 1.
 - (2) Glare control shall be maintained by proper direction control of luminaires. Arrange the lighting to prevent interference with traffic or produce undue glare to property owners.
 - (3) Light trespass onto private property shall be avoided.
 - (4) The use of vehicle headlights or hand held lighting devices will not be allowed.

Table 1

Lighting Category	Minimum Illumination (lx)	Area to be Illuminated	Type of Work Activity	Sample Activities
I	54	Illumination throughout the work area	General area lighting Visual tasks of large size, med. contrast, low required accuracy	Grading
II	108	Illumination of work area and areas adjacent to equipment	Visual tasks of medium size, low to med. contrast, medium required accuracy	Paving Bridges Culverts Milling
III	216	Illumination of task	Visual tasks of small size, low contrast, high required accuracy	Flagging Traffic Control Crack Filling

2. Do not start night work prior to the Engineer’s review of the lighting plan.
3. The Department will furnish, place and maintain variable message signs to alert approaching motorists of lighted construction zones ahead.

Method of Measurement

1. Construction Lighting will not be measured and paid for but shall be considered subsidiary to other items of work for which direct payment is made.

UTILITY CONTACT

Paragraph 1 of Subsection 413.03 in the Standard Specifications is amended to include the following:

The utility contact person for this project is:

Mr. Robert “Bert” Adams, Utilities Coordinator Omaha Public Power District
(402) 636-3333

REMOVE HIGH MAST TOWER

There is one High Mast Tower to be removed on this project. The tower shall remain in place and in working order as long as possible. The tower and all its components including winch housing, lowering system and luminaires will not be salvaged but will become the property of the contractor and must be removed from the project site

Completely remove the existing tower foundation, including reinforcing steel and anchor bolts, to a minimum depth of two feet below grade: backfill excavation with clean soil, compact the soil to the density requirements of the project and abandon unused cable in place. All rubble and waste resulting from the foundation removal will be taken from the project.

Method of Measurement and Basis of Payment

The work of removing the high mast tower in a manner as described in the plans and these special provisions complete and accepted by the Engineer shall be measured for payment as a single unit and paid for at the contract unit price, per each for the item "Remove High Mast Lighting Unit". This price and payment shall be full compensation for removing the tower and all of its components; for removing the concrete foundation to a minimum of two feet below grade; all necessary excavation, backfilling and disposal of surplus materials; for the termination and abandonment of existing underground feeders and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

HIGH MAST TOWER FOUNDATION

Section 407 of the Standard Specifications is amended to include the following:

The Contractor shall design a concrete foundation showing foundation length, foundation diameter, reinforcement and anchor bolts for each of the high mast lighting units requiring a new foundation under this project. Foundation design shall be based on test results of soil borings taken from the area of each of the new tower locations. Soil borings, soil analysis and foundation design must be performed by individuals proficient in that line of work.

The Contractor shall submit two complete Geotechnical Engineering Reports showing the soil analysis of the borings taken at each of the tower locations; eight complete sets of foundation design drawings together with two complete sets of foundation design computations.

The foundation design drawings and computations must be signed and stamped by a registered Professional Engineer, licensed in Nebraska. Acceptance by the State of the foundation design(s) will be based upon this seal and signature. By applying his seal and signature to the design drawings and calculations, the Engineer affirms that the foundations are of proper design and material to meet the structural requirements of the specifications.

The tower manufacturer shall provide all required anchor bolts. Each anchor bolt shall be provided with seven (7) heavy hex nuts and two hardened steel flat washers.

The minimum foundation anchorage design acceptable will be one detailing six - 2-inch diameter anchor bolts of AASHTO M-314, Grade 55 or Equivalent Steel. The Contractor's actual design may require a greater number of anchor bolts, anchor bolts of larger diameter or both. In all cases, however, anchor bolts must meet AASHTO M-314, Grade 55 Requirements.

The Contractor shall furnish an extra anchor bolt (together with two nuts and two washers) from each heat of steel used on the project (or multiple projects) to the Materials and Research Division for destructive testing.

Anchor bolts shall be straight rods threaded a minimum of 18 to 24 inches on the top end and a minimum of 6 - 12 inches on the bottom end. The use of "J" or "L" shaped anchor bolts will not be allowed. Threads on the straight rod anchor bolts shall be rolled in accordance with standard industry practice. The use of cut threads shall not be permitted. Galvanizing of the anchor bolts, heavy hex nuts and flat washers will not be allowed. Prior to shipment, the top 12 inches of the anchor bolt shall be cleaned and painted with zinc rich paint to a minimum dry film thickness of 4 mils. After installation, and in accordance with approved methods, the contractor shall paint all exposed anchor bolt, nut and washer surfaces with zinc rich paint to a minimum

dry film thickness of 4 mils. Zinc rich paints allowed for use shall be listed on the NDR approved products list.

The heavy hex nuts for the anchor bolts shall meet the requirements of ASTM A563 Grade C3 or DH3.

The plain hardened steel washers shall conform to the requirements of ASTM F436, Type 3. If Type 3 plain hardened steel washers are not available for the specified bolt diameter, mechanically deposited zinc coated hardened steel washers conforming to the requirements of ASTM F436 shall be used. Only flat washers shall be used. The use of lock washers will not be permitted.

The straight rod tower anchor bolts shall be caged and retained by two steel alignment templates in a manner as detailed in the plans. The two steel alignment templates shall have a minimum thickness of ½" and shall conform to the requirements of ASTM A36. The anchor bolts shall be secured to the steel templates with nuts to prevent the anchor bolts from moving while the concrete is being poured. The use of removable exterior templates will not be allowed. Welding on anchor bolts will not be permitted. The anchor bolt cage shall be centered in the concrete foundation. Once the concrete has set, no adjustments or realignments shall be made to the anchor bolts. Field straightening of anchor bolts will not be allowed. The anchor bolts shall be truly vertical with no more than 1/8" deviation in 12 inches of length permitted. Anchor bolt projection above the tower base plate shall allow for the thickness of a hardened flat washer; for the capture of a full hold-down nut and a full-lock nut plus 1/2" while allowing no more than two anchor bolt diameters between the top of the concrete foundation and the bottom of the tower base plate.

The manufacturer of the anchor bolts shall furnish certifications and test reports covering the steel used. The test reports shall show the following:

1. Chemical analysis of the steel used.
2. Yield strength in pounds per square inch.
3. Tensile strength in pounds per square inch.
4. Percent elongation in 2 inches of material.
5. Percent reduction in area.

Each tower footing shall be neatly excavated to its design dimensions; only the top two feet may be formed. The excavation shall be dry with all loose dirt removed before concrete can be placed.

Top of the concrete footing shall be level, less than 1/4" out of level in 3 feet and approximately 3" above final grade.

Concrete for tower foundations shall be Class 47B-3000.

Reinforcing steel for tower foundations shall be deformed grade 60 billet steel conforming to the requirements of ASTM A615.

Foundation details as shown in the plans shall not be changed unless specifically requested by the Contractor in a letter to the Lighting Engineer. Any request for a change to the contract plans will be reviewed by the Department and a written determination issued addressing the request.

Method of Measurement and Basis of Payment

The tower grounding system is subsidiary to the item "Reinforcing Steel". Soil borings and soil analysis for the tower foundation are subsidiary to the item "Foundation Design." "Excavation for High Mast Foundation" is subsidiary to "Concrete for Foundation."

Each High Mast Foundation to be constructed under this contract shall be taken to require 15 cubic yards of concrete, 1,213 pounds of reinforcing steel and an anchor bolt cage containing six - 2-inch diameter x 6 feet long anchor bolts with templates as shown in the plans. Each Contractor will base his/her bid on these quantities. These are estimated quantities. Actual design quantities will vary.

Final payment for concrete, reinforcing steel and anchor bolts will be based on the shop plan quantities. The quantity of concrete for which payment will be made shall be the quantity arrived at using the design dimensions of the tower foundation. No payment will be made for concrete placed outside of these dimensions.

Payment for the above listed items shall be full compensation for the taking and testing of soil samples; for designing and installing the foundation; for all excavation and backfilling; for the furnishing and placing of reinforcing steel, anchor bolts, conduit and concrete, for all forming, finishing and curing of the concrete and for all labor, equipment, materials, tools and incidentals necessary to complete the work.

HIGH MAST LIGHT TOWER COMPLETE WITH LOWERING SYSTEM

GENERAL:

Each new high mast tower to be installed under this contract shall be furnished complete with base plate, hand hole with cover, anchor bolts with nuts and lowering system with internal motor. All items must be compatible and work together to provide a reliable and efficient lighting unit.

DESIGN LOADS AND ALLOWABLE STRESSES:

The tower together with all of its components, including a light ring with 12 high mast luminaires shall be designed to withstand natural wind loading and Vortex Shedding in accordance with the current edition of the "AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals". The design to withstand natural wind loading shall be based upon a basic wind velocity of 90 mph, with a 50 year recurrence interval and a Fatigue Category of 1. The tower, together with all of its components, shall also be designed to withstand Vortex Shedding – induced loads based upon a yearly mean wind velocity of 11.2 mph. Each tower light ring and lowering system shall be designed to support twelve high mast luminaries, but shall be detailed and manufactured to support the number of fixtures shown on the plans for the particular tower in question.

TOWER SHAFT AND BASE:

The tower shall be of sectional construction, either round or multi-sided polygon in cross-section, and shall be fabricated of galvanized, high strength, low alloy steel, conforming to the requirements of ASTM A572 (Grade as required by design). Each individual tower section shall contain no more than two longitudinal welds and shall contain no transverse or circumferential,

mechanical or welded splices. Each section shall be uniformly tapered and shall be joined by slip fit (telescoping) joints. The overlap length of the telescoping joint shall be a minimum of 1-1/2 times the outside diameter of the lower section measured at its male end. The wall thickness of the bottom tower section shall be as required by design, but in no case less than 0.375" (3/8") for towers 120 ft. in height or less, or 0.4375" (7/16") for towers over 120 ft. in height. The bottom tower section shall have a single hand hole with a door to provide access to the winch, cable drum(s), and electrical components. The hand hole shall be sized and so arranged to permit removal of the lowering mechanism without excessive dismantling of the equipment. The hand hole shall have rounded corners and shall be reinforced to maintain the original strength of the tower shaft. The hand hole cover (door) shall be provided with a stainless steel loose joint butt hinge or other hinge arrangement acceptable to the Engineer. The hinge shall be heavy duty and of sufficient strength to support the weight of the hand hole cover. The cover shall be gasketed in a manner that will prevent the entry of water into the tower. The cover shall be held closed with stainless steel cover hold downs, deep slot stainless steel screws or hex head stainless steel bolts. The cover shall be provided with a padlock hasp for securing the equipment within the tower from vandals. There shall be a minimum of 18" between the bottom of the hand hole and the top of the tower base plate. The bottom tower section shall be furnished complete with two grounding nuts welded inside the tower section at points 90 degrees and 270 degrees from the hand hole opening. The grounding nuts shall be threaded to accept grounding lugs and shall be readily accessible through the hand hole.

The bottom tower section shall be provided with an integrally welded base plate using steel that meets or exceeds the specifications of the adjacent tower section. The base plate shall be drilled for the required foundation anchor bolts. The center of the anchor bolt holes shall be located in the base plate a minimum of 3-1/2" from the outside wall of the tower base section. High mast tower designs that enclose the tower anchor bolts will not be allowed. The surface around each anchor bolt hole (both top and bottom) shall be milled flat and smooth to receive the anchor bolt nut and washer. The base plate shall be attached to the tower shaft with 100% penetration circumferential welds.

The tower base plate thickness shall be as required by the tower design, but in no case shall the thickness be less than the tower anchor bolt diameter plus 1/4". The base plate shall be designed to be supported and secured solely by nuts. The space between the base plate and foundation shall be grouted as required by the plans and specifications. The top of the tower shall be designed to support the head assembly of the lowering system. Drawings shall be provided with the tower which show assembly sequence, lift point and recommended erection procedure. Tower and lowering system shall be compatible. No field welding will be allowed in the assembly of the tower shaft or in attaching the head assembly to the top of the tower. All sections of the shaft will be match marked to facilitate assembly and to ensure that each shaft is assembled with the proper tapered sections.

ANCHOR BOLTS:

The tower manufacturer shall provide all required anchor bolts. Each anchor bolt shall be provided with seven heavy hex nuts and two hardened steel flat washers. The seven required heavy hex nuts will be applied as follows: two lower alignment template nuts, two upper alignment template nuts, one leveling nut, one hold down nut and one lock (jam) nut.

The minimum foundation anchorage design acceptable will be one detailing six – 2-inch diameter anchor bolts of AASHTO M-314, Grade 55 or equivalent steel. The Contractor's actual design may require a greater number of anchor bolts, anchor bolts of larger diameter or both. In all cases, however, anchor bolts must meet AASHTO M-314, Grade 55 requirements.

The Contractor shall furnish an extra anchor bolt (together with two nuts and two washers) from each heat of steel used on the project (or multiple projects) to the Materials and Research Division for destructive testing.

Anchor bolts shall be straight rods threaded a minimum of 18 to 24 inches on the top end and a minimum of 6 to 12 inches on the bottom end. Threads on the anchor bolts shall be rolled in accordance with standard industry practice. The use of cut threads shall not be permitted. Galvanizing of the anchor bolts, heavy hex nuts and flat washers will not be allowed. Prior to shipment, the top 12 inches of the anchor bolt shall be cleaned and painted with zinc rich paint to a minimum dry film thickness of 4 mils. After installation, and in accordance with approved methods, the Contractor shall paint all exposed anchor bolt, nut and washer surfaces with zinc rich paint to a minimum dry film thickness of 4 mils. Zinc rich paints allowed for use shall be as listed on the NDR approved products list. The method of zinc rich paint application shall be approved by the NDR Materials and Research Division.

The heavy hex nuts for the anchor bolts shall meet the requirements of ASTM A563, Grade C3 or DH3.

The plain hardened steel washers shall conform to the requirements of ASTM F436, Type 3. If Type 3 plain hardened steel washers are not available for the specified bolt diameter, mechanically deposited zinc coated hardened steel washers conforming to the requirements of ASTM F436 shall be used. Only flat washers shall be used. The use of lock washers will not be permitted.

Tower anchor bolts shall be caged and retained by two 1/2" thick (min.) steel alignment templates in a manner as detailed in the plans. The use of "J" or "L" shaped anchor bolts will not be allowed. The template material shall conform to the requirements of ASTM A36. The anchor bolts shall be secured to the steel templates with nuts to prevent the anchor bolts from moving while the concrete is being poured. The use of removable exterior templates will not be allowed. Welding on anchor bolts will not be permitted. The anchor bolt cage shall be centered in the concrete foundation. Once the concrete has set, no adjustments or realignments shall be made to the anchor bolts. Field straightening of anchor bolts will not be allowed. The anchor bolts shall be truly vertical with no more than 1/8" deviation in 12 inches of length permitted. The centerline of the anchor bolt circle shall be a minimum of 3-1/2" from the outside surface of the lower tower section. Anchor bolt projection above the tower base plate shall allow for thickness of a hardened flat washer; for the capture of a full hold-down nut and a full-lock nut plus 1/2" while allowing no more than two anchor bolt diameters between the top of the concrete foundation and the bottom of the tower base plate.

The manufacturer of the anchor bolts shall furnish certifications and test reports covering the steel used. The test reports shall show the following:

1. Chemical analysis of the steel used.
2. Yield strength in pounds per square inch.
3. Tensile strength in pounds per square inch.
4. Percent elongation in 2 inches of material.
5. Percent reduction in area.

LOWERING SYSTEM GENERAL:

Only a two-drum bottom tethered or a single-drum top latching high mast lowering system will be accepted. All towers that are a part of this project must be equipped with the same system.

The lowering system shall be a luminaire ring hoisting and lowering device consisting of a galvanized or stainless steel head assembly, galvanized or stainless steel luminaire ring, winch drum(s) and winching assembly, Internal Power Unit, luminaire ring hoist cables (if applicable), winch cable(s), power cable, circuit breakers, lightning rod and arrestors, power connections to the power unit assembly and a luminaire ring guide system to protect the tower and luminaire ring assembly during raising and lowering operations.

Luminaire ring hoist cables shall be 3/16" stainless steel anti-rotational aircraft cable manufactured to the requirements of military specification MIL-DTL-83420M. The system of three hoist cables shall provide a safety factor of five.

The winch cable(s) shall be a 1/4" stainless steel anti-rotational aircraft cable manufactured to the requirements of military specification MIL-DTL-83420M. The winch cable shall have a safety factor of three.

All electrical components of the lowering assembly are to be U.L. approved.

The lowering system shall be of a design that will allow the luminaires to be lowered to within 3 ft. of the tower base plate for servicing.

The lowering assembly shall be a system which has been in use for at least five years and proven itself to be a reliable and functional unit. All changes or design modifications to the system during this five-year period shall be noted by the manufacturer.

Any of the design changes, considered by the Lighting Engineer, to be critical of the proper operation of the lowering system and which, in his opinion, have not been in use long enough to establish an acceptable service record, will be sufficient cause for rejection of the entire system.

MAST HEAD ASSEMBLY:

The mast head assembly shall contain steel sheaves for the support of the hoisting cables and a roller assembly or a large diameter deep groove pulley on which the power cable will ride.

All sheaves shall be precisely sized and formed to fit the cables which they will carry. The cross-section of the groove shall have a radius of 0.005" to 0.009" greater than half the nominal cable diameter and a minimum radius of six inches (6") as specified by the Wire Rope Technical Board. All sheaves shall have permanently lubricated bearings or oil impregnated bronze bushings mounted on stainless steel shafts. Hoist cable sheaves that are not completely enclosed and captured shall have retainers or keepers to prevent the cables from disengaging the sheaves under slack conditions.

The main power cable shall be supported by one of the two following methods:

- (a) A series of rollers placed between two vertical side plates. The roller assembly shall be of such design as to support the power cable in a 7-inch minimum bending radius. Keeper bars shall be positioned along the assembly to keep the cable in its track during raising and lowering of the light ring.

- (b) A large 14" minimum diameter deep groove power cable pulley (sheave) which is totally enclosed by a tight-fitting cover. The tight-fitting cover shall act as a restraint to the power cable leaving the pulley groove.

The mast head assembly shall include a stainless steel, galvanized steel or aluminum cover that will effectively protect the mechanism from the elements.

LUMINAIRE RING ASSEMBLY:

The luminaire ring assembly shall be fabricated of galvanized or stainless steel and shall contain the required number of 2" diameter luminaire mounting arms. A weather-tight junction box containing a pre-wired 600-volt terminal block shall be mounted to the ring. The junction box shall be provided with a locking type receptacle capable of receiving the plug of the pigtail lead when testing the luminaires in the lowered position. Pre-wiring shall consist of Type "ST" distribution cable with the insulation suitable for at least 105 degree C. and properly sized to power each luminaire. The terminal block shall contain a sufficient number of terminals to allow connecting all luminaires plus an approved lightning arrestor. The power cord shall be Type "G" or Type "SEOOW" with five #8, 133-strand copper conductors. Strain relief shall be provided at both ends of the power cable by using proper sized cable clamps. The use of Kellem type grips alone will not be allowed. The proper cable shall be MSHA approved.

All power cord connections shall be made using weather-tight, twist lock type plugs, connector bodies and receptacles. Connector bodies shall be as small as possible in physical size to prevent hang up inside the tower.

Two 240 volt, 30 amp., double pole circuit breakers shall be furnished in the base of each tower. Two 240-volt circuits will be run to each tower. Connect half the luminaires to each circuit in a manner that will provide alternate feed to the luminaires.

UPPER LATCH BARRELS:

The latch barrels, for a top latching system, shall be cast, high strength, copper-free aluminum. Latching shall be accomplished by the alternate raising and lowering of the luminaire ring assembly using the winch and hoisting assembly. There shall be no moving latch parts or springs attached to the head frame assembly. The latch mechanism shall not be impaired by the formation of ice and shall not require adjustment after the original installation. Indicator flags shall be used to show when the luminaire support ring is in the latched or unlatched position.

WINCHING ASSEMBLY:

The winch assembly shall consist of a worm gear speed reducer with either one or two output shafts with cable drum attached. The winch shaft shall be securely anchored and capable of supporting five (5) times the maximum lifted load. The winch shall include an integral drag brake to prevent unwinding, slipping or free spooling of the winch cable. The drum(s) shall be provided with keepers to ensure that the cable will properly wrap onto the drum. The winch, when powered by the internal power unit, shall raise the luminaire ring at a minimum rate of 12 ft./min.

Single drum units will require the use of a transition device (clevis assembly) to properly attach the winch cable to the hoisting cables. The clevis shall not allow either the winch cable or any of the hoist cables to independently rotate. No bearings of any type will be allowed in the clevis. The clevis shall be beveled or tapered on the bottom of the plate to insure that the transition device will not hang up on the inside of the tower.

FINAL POSITIONING OF LUMINAIRE RING:

Means shall be provided to accurately position, stabilize and hold the luminaire ring in place when in the raised position.

The luminaire ring shall be held in its raised position by either a top-latching or bottom-tethered system. If a top-latching system is supplied, each latch must be capable of supporting three (3) times the weight of the luminaire ring with its full compliment of luminaires attached. Rotation of the luminaire ring to achieve position latching with this system will not be allowed.

With the bottom-tethered system, compression springs shall keep the luminaire ring assembly securely in place against the masthead while the load of the luminaire ring assembly is transferred from the winch assembly to chain or turnbuckle tension latches at the bottom of the tower.

Latching or unlatching of either system shall impart no more than one "G" acceleration in any direction on the luminaires and lamps.

INTERNAL POWER UNIT:

An internal power unit shall be supplied with each lowering system supplied under this contract. The power unit shall be a heavy duty, reversing gear, single phase, continuous duty motor, rated ONE FULL HP (746 WATTS) or greater. The motor shall be operated by a push-button or lever control mounted at the end of a 20-ft. (min.) Type "SO" power cord.

The internal power unit will not be paid for separately, but will be considered as part of the complete system.

PIGTAIL LEAD:

The pigtail lead used to power the lowered light ring and the internal motor when servicing shall be a minimum of twelve feet in length. The female pigtail end shall be supplied with a weather-tight rubber cap. The cap will protect the pigtail end when not in use and stored in the tower base. The rubber cap shall be loosely attached to the pigtail lead with a cord or other restraint to prevent its becoming lost.

LUMINAIRE RING GUIDE:

Centering arms or a rubber bumper ring shall be mounted to the inside of the luminaire ring to protect the tower, luminaire ring and luminaires from damage during raising and lowering. If centering arms are employed, they must be interconnected or of a design that precludes any possibility of the tower shaft slipping behind the arms and causing a "hang-up".

MISCELLANEOUS:

Tower shall be supplied with lightning rod and lightning arrestor.

The manufacturer shall supply all drawings, installation instructions, maintenance manuals and technical information required for the proper installation and maintenance of a complete operating assembly.

The entire assembly shall meet all applicable local, county, state and national codes.

The manufacturer's representative shall be present, on site, to advise the Contractor during the installation and testing of at least one complete lowering system. Duties of the manufacturer's representative shall include, but not be limited to, the following:

- (1) Directing all adjustments to the lowering system to insure positive latching and unlatching. (This will consist of a minimum of three complete raising and lowering cycles.)
- (2) Educating the maintaining utility in (a) the methods of proper maintenance to avoid hoist malfunctions, (b) the proper procedures to follow in the event of a hoist malfunction.

Contractor shall make necessary adjustments to all high mast luminaires to ensure correct luminaire positioning with minimum light trespass.

WARRANTY:

The manufacturer shall guarantee all equipment (including luminaires and lamps) from failure due to defects in material or workmanship for two (2) full years from date of shipment and shall warrant to repair or replace any equipment that fails within that time. In addition, the manufacturer shall provide a "Pass-Through Warranty," for use by the Electrical Contractor or Utility assigned by the State as maintaining authority. ("Pass-Through Warranty" means that the Manufacturer, Manufacturer's Representative and Distributor shall accept defective warranted material directly from the State appointed maintainer, on behalf of the State without State personnel coordinating the return.)

APPROVAL:

The Contractor shall provide the Project Engineer with eight copies of all design drawings and calculations for the complete high mast tower assembly including anchor bolts and lowering system. These documents will be reviewed and, if found to meet specification requirements, will be approved and proper distribution made.

All documents must be signed and stamped (seal) by a registered Professional Engineer licensed in the State of Nebraska.

Errors in the documents not detected during their review shall not relieve the Contractor from completing his/her work in strict compliance with the requirements of the projects plans and specifications.

DEVIATION FROM SPECIFICATIONS:

No deviations, substitutes, additions or omissions from the above specifications will be allowed without the Lighting Engineer's approval. The Lighting Engineer's decision in this matter will be final.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT:

A new high mast tower, complete, in place and accepted by the Engineer will be measured for payment as a single unit and paid for at the contract unit price, per each, for the item "High Mast Lighting Unit, Type *****". This price and payment shall be full compensation for furnishing and installing the tower complete with base plate, hand hole with cover, anchor bolts with nuts and

lowering system with internal motor; for supplying all required design calculations and drawings and for all labor, equipment, tools, materials and incidentals necessary to complete the work.

INSTALLATION OF HIGH MAST TOWERS

INSPECTION

No high mast tower work shall be performed by the Contractor without the Project Engineer or his designated representative being present for inspection. Parts of the high mast tower work will also be inspected by the Physical Tests Section of the Materials and Research Division. Members of the Physical Tests Section will visit the project site to observe the Contractor's methodology of anchor bolt installation and anchor bolt tensioning and will randomly test nuts on the tower for proper tightness. The Contractor shall notify the Physical Tests Engineer as to the date of tower installation a minimum of three days prior to the tower being installed. The Physical Tests Engineer may be reached at (402) 479-4746. Only a tower that has been properly inspected during its installation will be considered by the State for acceptance and final payment.

PROPER TENSIONING OF HIGH MAST TOWER ANCHOR BOLTS AND WINCH HOUSING CONNECTING BOLTS

- (a) In order to provide the proper tension to both anchor bolts and connecting bolts, the Contractor will be required to have on hand the following items:
- (1) A standard combination wrench (box end/open end) 36 inches in length, for snug tightening of nuts - provide one wrench for each size nut being installed.
 - (2) A deep well impact socket for final tightening, for each size nut being installed.
 - (3) A torque multiplier (plate reaction style) with the following minimum requirements:

Gear Ratio:	60:1
Torque Ratio:	52:1
Output Capacity:	8000 ft.-lb.
- In lieu of a plate reaction style torque multiplier (as described above), the Contractor may use a hydraulic torque wrench or other device as approved by the Materials & Research Division.
- (b) Anchor bolt hold-down nuts and winch housing connecting bolt nuts shall be tightened by the turn-of-the-nut method as described below, but only after first determining that the leveling nut and flat, hardened washer for each anchor bolt are in full contact with the underside of a level base plate.

Turn-of-the-Nut Method

- (1) Lubricate all bolt and nut threads with high pressure lubricant before tightening. Use SAE 90 Gear Oil or approved equal.
- (2) Using the appropriate combination wrench, apply full effort of a workman to the end of the wrench to "snug tighten" all hold down nuts. After the anchor bolt

hold-down nuts have been snug tightened, all leveling nuts should be snug tightened to assure that full contact has been maintained with the bottom of the tower base plate.

- (3) Mark the location of one corner of each of the hold down nuts on the tower base plate.
 - (4) Using the torque multiplier and the mark placed on the tower base plate, tighten each hold down nut onto its anchor bolt by giving the nut 1/6th of a turn (this is equal to turning the nut onto its bolt a distance equal to the length of one flat or until the next corner of the nut is even with the mark on the base plate).
 - (5) Install a "lock nut" ("jam nut") on each of the anchor bolts by repeating steps (1) thru (4) above.
 - (6) After the anchor bolt hold-down nuts are fully tightened, all leveling nuts should be retightened to assure that full contact has been maintained with the bottom of the base plate.
 - (7) "Snug tighten" and "final tighten" all nuts in a star pattern.
- (c) Winch housing connecting bolt nuts shall be tightened by the same turn-of-the-nut method as described for anchor bolts with the exception that the bolt head must be held stationary while torque is being applied to the nut.
- (d) Anchor bolt nuts, leveling nuts and connecting bolt nuts shall be rechecked for tightness by the Contractor, in the presence of the Engineer, no less than 14 days nor more than 30 days following their installation.

HIGH MAST LUMINAIRES

High Mast Luminaires shall have a die cast aluminum housing of the closed filtered design. The reflector shall be designed to direct light rays away from the arc tube. Ballast shall have its power factor over 90% and shall be capable of operating at a temperature of -29 degree C. Ballast shall operate at 240 VAC and be fused. Luminaires shall be equipped with a protected starter and shall be furnished with an HPS lamp of the wattage called for in the plans. All fixtures shall have a heat and shock resistant tempered glass lens, shall be specifically designed for high mast tower application and be UL listed "suitable for wet locations".

High Mast Luminaires designated HML-A-.40KW are 400 watt HPS units with an asymmetric distribution pattern and cutoff control characteristics. These units shall be installed with the major axis of the distribution pattern in line with the arrows shown on the plans. The asymmetrical reflectors shall be clearly marked for easy orientation.

High Mast Luminaires designated HML-V-.40KW are 400 watt HPS units with a symmetrical distribution pattern and cutoff control characteristics.

High Mast Luminaires designated HML-A-1KW are 1,000 watt HPS units with an asymmetric distribution pattern and cutoff control characteristics. These units shall be installed with the major axis of the distribution pattern in line with the arrows shown on the plans. The asymmetrical reflectors shall be clearly marked for each orientation.

High Mast Luminaires designated HML-V-1KW are 1,000 watt HPS units with symmetrical distribution pattern and cutoff control characteristics.

High Mast Luminaires will be paid for as "Luminaire, Type HML-*-*".

The high mast luminaire manufacturer shall guarantee all luminaires from failure due to defects in material or workmanship for two full years from date of shipment and shall warrant to repair or replace any luminaires that fail within that time.

REMOVE PULL BOX

It is the intent of this special provision to provide for the complete removal of all unused ull boxes from this project site. All pull boxes not removed by general excavation and grading. Shall be individually removed by the lighting contractor. The number of units shown to be removed by the lighting contractor will be approximate. Payment will be made for the actual number of pull boxes removed and approved by the Engineer.

Existing pull boxes are PB-5 (composite) and PB-6 (composite). The units will not be salvaged for reuse, but will become the property of the Contractor and must be taken from the project site. All voids resulting from the pull box removals shall be filled with clean soil and compacted to the density requirements of the project. Abandon existing conduit in place.

Method of Measurement and Basis for Payment

The item "Remove Pull Box" shall be paid for as a complete unit for each pull box to be removed. This work shall include, but not be limited to the following: Removal of existing pull box, disposal of the pull box and all surplus material and debris; all necessary excavation backfill and compaction.

RELOCATE LIGHTING UNIT

There are four types of ground mounted roadway lighting units to be relocated under this project.

TYPE "A"- This lighting unit (EP-1) is of the conventional style; carries a 200 watt luminaire on a 12 ft. mastarm mounted 40 ft. above the roadway. The pole is mounted on a concrete foundation using a breakaway transformer base.

TYPE "B"- These lighting units (EP-2 thru EP-7) are of the conventional style; carry a 200 watt luminaire on a 12 ft. mastarm mounted 40 ft. above the roadway. The pole is mounted on a power driven foundation using a breakaway transformer base.

TYPE "C"- These lighting units (EP-8 thru EP-14) are of the davit style; carry a 200 watt luminaire on a 6 ft. mastarm mounted 45 ft. above the roadway. The pole is mounted on a concrete foundation using a breakaway transformer base.

TYPE "D"- These lighting units (EP-15 thru EP-39) are of the davit design; carry a 200 watt luminaire on a 6 ft. mastarm mounted 45 ft. above the roadway. The pole is mounted on a power driven foundation using a breakaway transformer base.

The Contractor shall relocate the existing lighting units as indicated on the plans and these special provisions. Lighting units shall be carefully dismantled, stored and protected from damage until installed at their new location. The Engineer may designate specific areas for temporary storage of the salvaged material. It will be the contractors responsibility to protect all materials from damage during removal and storage.

On the type "A" and "C" units (EP-1 & EP-8 thru EP-14) the Contractor shall remove the concrete foundation, including steel and anchor bolts, to a minimum depth of two feet below finish grade, backfill the excavation with clean soil and compact the soil to the density requirements of the project. All debris resulting from the removal operation shall be taken from the project by the Contractor. The Contractor may, at his option, remove the concrete foundation as a complete unit.

On the type "C" units the Contractor shall supply new 7 ft. power driven foundations/

On the type "B" and "D" units (EP-2 thru EP-7 & EP-15 thru EP-39) the Contractor shall remove the power foundation and backfill the resulting void with clean soil and shall compact the soil to the density requirements of the project. Poles EP-4 thru EP-7 when relocated shall be anchor mounted to a foundation.

The luminaires of all relocated units shall be cleaned and provided with a new lamp.

Method of Measurement and Basis of Payment

Relocated lighting units (of any of the four types) will be measured for payment as individual units. Each relocated lighting unit, in place and accepted by the Engineer, shall be paid for at the contract unit price, per each, for the item "Relocate Street Lighting Unit, Type ***". This price and payment shall be full compensation for the removal, salvage, storage, preparation and reinstallation of the salvaged lighting unit; for the removal and disposal of the existing concrete foundation (were required); for the furnishing and installation of a new power driven foundation (if required); for the furnishing and installation of a new lamp; for the disposal of all surplus materials; for the termination and abandonment of existing underground feeders and for all materials, labor, equipment, tools and incidentals necessary to complete the work.

LUMINAIRE REQUIREMENTS (COBRA-HEAD)

Paragraph 2. of Subsection 415.02 in the Standard Specifications is void and superseded by the following:

2. Lamps provided shall be as shown in the plans.

Paragraph 7. of Subsection 1073.02 in the Standard Specifications is amended to include the following:

1. Conventional Roadway Luminaires
 - A. Housing

Luminaire housing shall be "cobra-head" style, of pressure die-cast or formed and welded aluminum, Large Housing Series. The casting shall

be sound, complete, with smooth edges and free of flash. The lower portion of the housing shall be hinged for easy access.

The optical compartment shall be effectively sealed and filtered using a dacron polyester filter. The seal/filter combination shall be provided between the reflector and lens and between the socket assembly and reflector. The seal/filter combination shall be under compression when the assembly is in operating position. Seal/filter combination shall be of heat resisting material selected to last the functional life of the unit, but shall be easily replaceable should they become damaged. The optical compartment door shall be secured in position with a positive latch mechanism. The hinge arrangement shall be designed to prevent accidental disengagement when it is in the open position.

Finish shall be a gray Polyester Powder Coat or an electrodeposited epoxidized acrylic paint coat capable of successfully withstanding 1,000 hours of salt spray test per ASTM B 117.

Attachment hardware used to secure components to the aluminum housing shall be organically coated. Stainless steel or galvanized hardware is not allowed.

Housing must be legibly and durably marked with the lamp size, using ANSI NEMA lamp identification label.

Luminaire must be UL listed as suitable for wet locations.

B. Slipfitter

The slipfitter shall accept 1 1/4 inch to 2 inch (32 mm to 50 mm) pipe.

C. Reflector

The reflector shall be hydroformed aluminum with an approved aluminum oxide or silica coating bonded to the inside and outside surfaces.

D. Socket

The socket shall be a mogul base porcelain.

E. Lens

The lens shall be made of clear tempered flat glass, heat resistant and free from imperfections.

F. Terminal Block

A terminal block will be required.

G. Ballast

The ballast shall be of the (CWA) Auto Regulator lead type for the high pressure sodium lamp size as indicated in the plans.

Ballast shall be dual volt 120/240 or multi tap, ballast to be factory wired to 240 volt.

The ballast and starting aid shall not incur significant life reduction should the lamp continue in open or shorted circuit condition for a six-month period.

Regulation and Operation:

At nominal line voltage and nominal lamp voltage, the ballast design center will not vary more than 5% from rated lamp wattage. Lamp wattage variation shall not exceed 10% for a $\pm 10\%$ line voltage variation.

The ballast/lamp combination must provide reliable starting to -40 degrees F (-40 degrees C).

Ballast starting current must not exceed normal operating current.

Power factor must range between 65% and 90% through all operational modes.

H. Photometric and Performance Requirement

- a. The luminaire shall have "cutoff" control characteristics as follows: Candela per 1000 lamp lumens shall not exceed 100 (10%) at a vertical angle of 80 degrees above nadir, and 25 (2.5%) at an angle of 90 degrees above nadir horizontal.
- b. Vertical distribution shall be IES-medium, lateral distribution shall be IES-type II or type III, as indicated in the plans. Maximum candlepower shall be between 66 degrees and 75 degrees from nadir.
- c. The illumination pattern on the roadway surface from each individual luminaire shall be uniformly gradient without hot spots, shadows or striations as determined by the Engineer.

I. Substitutions and Variations

No substitutions or variations of the above will be allowed.

J. Approval Requirements

In addition to the requirements for approval of the roadway lighting luminaires as outlined in Subsection 1073.02, the Contractor may be asked to supply electric files of IES formatted photometrics for each type of luminaire he/she proposes to furnish for the project. The electronic files must be compatible with the NDOR Operating System.

The Contractor shall be prepared, upon request, to furnish a working sample of any luminaire proposed for this project (sample will be returned to the Contractor or counted as part of the contract quantity).

The right is reserved to reject any and all proposals. The State of Nebraska will decide all questions which may arise as to the quality or acceptability of the luminaire submitted for approval under this specification.

Manufacturers allowed to submit luminaires for approval are as follows:

Cooper
General Electric
Hubbell
American Electric

OBSTRUCTION LIGHT

Paragraph 1. of Subsection 412.05 in the Standard Specifications is amended to include the following:

Pay Item	Pay Unit
Obstruction Light	Each (ea)

RELOCATE SIGN

Paragraph 1. of Subsection 417.05 in the Standard Specifications is amended to include the following:

Pay Item	Pay Unit
Relocate Sign	Each (ea)

RELOCATE INERTIAL BARRIER SYSTEM

Paragraph 19 b. of Subsection 422.04 in the Standard Specifications is void and superseded by the following:

- b. "Relocate Inertial Barrier System" is the pay item for moving the inertial barrier system to a new location after initial installation and operation.

Paragraph 1. of Subsection 422.05 is amended to include the following:

1.	Pay Item	Pay Unit
	Relocate Inertial Barrier System	Each (ea)

REMOVABLE WET REFLECTIVE TAPE, TYPE 4

I. Description

This work shall consist of furnishing and installing retroreflective preformed patterned pavement markings in accordance with this provision and in reasonably close conformance to the dimensions and lines shown on the plans and/or required by the engineer.

II. Materials - General

The preformed patterned markings shall consist of white or yellow films with clear microcrystalline ceramic beads incorporated to provide immediate and continuing retroreflection during both wet and dry conditions. This film shall be manufactured without the use of lead chromate pigments or other similar, lead-containing chemicals.

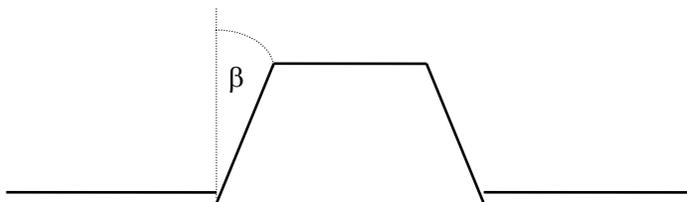
The quality of the pavement marking shall be such that the performance requirements for the marking shall be met. The markings shall be precoated with a pressure sensitive adhesive and shall be capable of being adhered to Asphalt concrete or Portland cement concrete at temperatures as low as 50°F (10°C) in accordance with the manufacturer's recommendations. When stored in a cool dry area indoors, the materials shall be suitable for use for one year after the date of purchase.

III. Classification

The removable retroreflective pavement marking tape must be designed and constructed in such a manner that it can be readily removed when the markings are no longer applicable. The tape shall be capable of performing for the duration of a normal construction season and shall then be capable of being removed intact or in large pieces. The tape shall be wet and dry reflective throughout its useful life. (A normal construction season is defined as the time after the last snowplowing in the spring and before the first snowplowing in the fall/winter.)

IV. Composition and Retroreflectivity Requirements

Composition: The retroreflective pliant polymer pavement markings shall consist of a mixture of high-quality polymeric materials, pigments and glass beads distributed throughout its base cross-sectional area, with a reflective layer of microcrystalline ceramic beads bonded to a durable polyurethane topcoat surface. The patterned surface shall have approximately 20% \pm 10% of the surface area raised and presenting a near vertical face (β angle of 0° to 60°) to traffic from any direction. (See diagram below.) The channels between the raised areas shall be substantially free of exposed beads or particles.



Retroreflectance: The white and yellow markings shall have the initial expected retroreflectance values as shown in Table 1 under dry, wet, and rainy conditions. The photometric quantity to be measured shall be coefficient of retroreflected luminance (R_L) and shall be expressed as millicandelas per square foot per foot-candle $[(\text{mcd} \cdot \text{ft}^{-2}) \cdot \text{fc}^{-1}]$. The metric equivalent shall be expressed as millicandelas per square meter per lux $[(\text{mcd} \cdot \text{m}^{-2}) \cdot \text{lx}^{-1}]$.

Retroreflectance values shall be measured under dry conditions in accordance with the testing procedures of ASTM D4061.

Retroreflectance values shall be measured under wet conditions in accordance with

ASTM E2176 or ASTM E2177. Wet retroreflectance values measured under a “condition of continuous wetting” (simulated rain) shall be in accordance with ASTM E2176, and to reduce variability between measurements, test method shall be performed in controlled laboratory environment while the marking is positioned with a 3 to 5 degree lateral slope. A wetting agent shall be used to improve wetting of the pavement marking by the water. It is recommended that a 0.1% by volume liquid soap solution be used. Measurements shall be reported as an average for each roll tested, in a minimum of three locations.

Wet retroreflectance values measured under a “condition of wetness” shall be in accordance with ASTM E2177, and the test may be performed with the marking installed on the road. New markings shall be tested using a wetting agent, as previously described. Laboratory measurements shall be performed using a 3 to 5 degree lateral slope. Measurements shall be reported as an average for each roll tested, in a minimum of three locations

Table 1
Expected Initial R_L under dry, wet, and rainy conditions

White	Dry	Wet & Rainy
Entrance Angle	88.76°	88.76°
Observation Angle	1.05°	1.05°
Retroreflected Luminance $R_L [(mcd \cdot m^{-2}) \cdot lx^{-1}]$	500	250
Yellow	Dry	Wet & Rainy
Entrance Angle	88.76°	88.76°
Observation Angle	1.05°	1.05°
Retroreflected Luminance $R_L [(mcd \cdot m^{-2}) \cdot lx^{-1}]$	300	200

Note: The test instrument shall use an Entrance Angle of 88.76° and Observation Angle of 1.05° which represents a simulated driver viewing geometry at a 30 meter distance.

Beads: Index of Refraction: All “dry-performing” microcrystalline ceramic beads bonded to the polyurethane-coated, patterned surface of the material shall have a minimum index of refraction of 1.70 when tested using the liquid oil immersion method. All “wet-performing” microcrystalline ceramic beads bonded to the polyurethane-coated, patterned surface of the material shall have a minimum index of refraction of 2.30 when tested using the liquid oil immersion method. The glass beads mixed into the pliant polymer shall have a minimum index of refraction of 1.5 when tested by the liquid oil immersion method.

Testing Procedure For Refractive Index of Beads By Liquid Immersion

Equipment Required:

1. Microscope (minimum 100X magnification)
2. Light source - preferably sodium light or other monochromatic source, but not absolutely essential
3. Refractive index liquids

4. Microscope slide and slide cover
5. Mortar and pestle

Procedure:

1. Using the mortar and pestle, crush a few representative beads and place a few of these crushed particles on a microscope slide.
2. Place a drop of a refractive index liquid, with an index as close to that of the glass as can be estimated, on the particles.
3. Cover the slide with a microscope slide cover and view the crushed particles by transmitted light normal to the slide surface (illuminated from the bottom).
4. Adjust the microscope mirror to allow a minimum light intensity for viewing. This is particularly important if sodium light is not used.
5. Bring a relatively flat and transparent particle into focus.
6. By slightly raising and lowering the objective (microscope tube), look for one or both of the following:
 - a. Becke Line - This light line will appear to move either into the particle or away from it. In general, if the objective is raised, the line will move toward the material of higher refractive index; if the objective is lowered, the line will move toward the material of lower index.
 - b. Variation in Particle Brightness - When raising the object from a sharp focus, the particle will appear to get brighter or darker than the surrounding field. If it becomes brighter, the glass has a higher refractive index than the liquid. If it becomes darker, the glass has a lower refractive index than the liquid. In both cases, the opposite will be true if the object is lowered.
7. This test can be used to confirm that the beads are above or below a specified index. It can also be used to give an accurate determination of the index (± 0.001). This is done by using several refractive index liquids until a match or near match of indices occurs. The index of the glass will equal that of the liquid when no Becke line and no variation in bead brightness can be observed.

The size and quality of the beads shall be such that the performance requirements for the retroreflective pliant polymer shall be met.

Acid Resistance: The beads shall show resistance to corrosion of their surface after exposure to a 1% solution (by weight) of sulfuric acid. The 1% acid solution shall be made by adding 5.7cc of concentrated acid into 1000cc of distilled water. CAUTION: Always add the concentrated acid into the water, not the reverse.

The test shall be performed as follows:

Take a 1-inch x 2-inch sample, adhere it to the bottom of a glass tray and place just enough acid solution to completely immerse the sample. Cover

the tray with a piece of glass to prevent evaporation and allow the sample to be exposed for 24 hours under these conditions. Then decant the acid solution (do not rinse, touch or otherwise disturb the bead surfaces) and dry the sample while adhered to the glass tray in a 150° F. (66° C.) oven for approximately 15 minutes.

Microscopic examination (20X) shall show no more than 15% of the beads having a formation of a very distinct opaque white (corroded) layer on their entire surface.

Color: The preformed markings shall consist of white film with pigments selected and blended to conform to standard highway colors.

Removability: The pavement markings shall be removable from Asphalt concrete and Portland cement concrete intact or in large pieces, at temperatures above freezing without the use of heat, solvents, grinding or blasting without permanently scarring the roadway surface.

Skid Resistance: The patterned surface of the retroreflective pliant polymer shall provide an initial average skid resistance value upon manufacturing of 45 BPN when tested according to ASTM E303 except values shall be taken in one direction and then at a 45° angle from that direction. These two values shall then be averaged to find the skid resistance of the patterned surface.

Patchability: The pavement marking material shall be capable of use for patching worn areas of the same type in accordance with manufacturer's instructions.

Thickness: The patterned material without adhesive shall have a minimum caliper of 0.075 inches (1.651mm) at the thickest portion of the patterned cross-section and a minimum caliper of 0.020 inches (.508mm) at the thinnest portion of the cross-section.



V. **Installation**

The markings shall be applied in accordance with the manufacturer's installation instructions. Marking configurations shall be in accordance with the "Manual on Uniform Traffic Control Devices." Tape shall not be installed unless the surface and air temperatures are in compliance with the manufacturer's specifications. Pavement markings shall be applied to clean, dry surfaces in accordance with the manufacturer's installation instructions or a method approved by the Engineer.

The Contractor shall have on the project at all times during the application of the removable pavement markings at least one employee with a valid American Traffic Safety Services Association (ATSSA) certification. The ATSSA certification may be for either a "Certified Pavement Marking Technician" or a "Certified Pavement Marking Specialist." The Contractor shall provide the Engineer a copy of the employee's certification prior to the beginning of work.

VI. Observation

During the project phase the markings are intended for, the Contractor, at no expense to the Department of Roads, shall replace any markings that the Engineer determines are not performing satisfactorily due to defective materials and/or workmanship in manufacture and/or application. The installation of all markings will include an inspection of the appearance of the markings during daylight and darkness. Any markings that fail to have a satisfactory appearance during either period, as determined by the Engineer, shall be reapplied at no expense to the Department of Roads.

VII. Removal

Upon completion of the project or phase, the Contractor shall remove the tape in whole. The removal procedure shall not damage the roadway surface.

VIII. Contract Units and Basis For Payment

Subsection 422.01 of the 2007 Standard Specifications is amended to include the item: "Removable Wet Reflective Tape, Type 4". The price shall be full compensation for furnishing, installing, and removing all markings, and for all materials (including adhesive), labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
___ Removable Wet Reflective Tape, Type 4	Linear Foot

TYPE C SIGNS

1.0 Description

This work shall consist of all materials and labor necessary to provide, fabricate, and install highway signs at the locations shown in the plans.

2.0 Material Requirements

2.1 Materials for highway signs shall conform to the requirements of Section 1070 and the *Manual on Uniform Traffic Control Devices for Streets and Highways*.

2.1.1 "Type C Signs" are large guide and information signs mounted on overhead structures and constructed of molded extruded panels or reinforced aluminum, horizontally joined panels having a retroreflectorized background and direct applied letters, numerals, symbols, and border.

2.2 Type C overhead signs are to be mounted over the roadway on sign structures, including cantilever structures, with vertical supports installed on reinforced concrete foundations or on sign brackets attached to existing roadway bridges.

2.3 Reflective background sheeting, letters, numerals, symbols, and the border for "Type C Signs" shall be reflective materials meeting the requirements of ASTM D4956 Type XI.

3.0 Construction Methods

The construction methods shall follow the methods for Type B overhead signs as stated in Subsection 417.03

4.0 Method of Measurement

Providing, fabricating, and installing Type C signs shall be measured by the square foot.

5.0 Contract Units and Basis for Payment

Section 417 of the 2007 Standard Specifications is amended to include the item: "Type C Signs". The price shall be full compensation for providing, fabricating, and installing Type C Signs, and for all materials, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Type C Sign	Square Foot (SF)

**SURFACING UNDER GUARDRAIL
(E-3-1212)**

Amend Section 503 in the Standard Specifications to include Surfacing Under Guardrail.

At the Contractor's option, the surfacing may be constructed using Class "47B-3000" Concrete, Class "AX-3000" Concrete, Class "PR-3000" Concrete (Class 47B-20 Concrete, Class AX-20 Concrete, Class PR-20 Concrete), or any commercially produced hot mix asphaltic concrete, which has been approved by the Engineer. These materials may be used interchangeably during the course of the work except that surfacing at any individual location must be completed with the same material with which the work was begun.

If concrete is used in the surfacing, it shall reach a minimum strength of 3000 psi (20 Mpa) before opening to traffic.

Amend Subsection 302.04 in the Standard Specifications to provide that the work of subgrade preparation for surfacing under guardrail will not be measured for payment, but shall be considered subsidiary to the item "Surfacing Under Guardrail".

Subsection 304.04 in the Standard Specifications is amended to provide that the work of earth shoulder construction associated with surfacing under guardrail will not be measured for payment, but shall be considered subsidiary to the item "Surfacing Under Guardrail."

Subsection 503.05 in the Standard Specifications is amended to provide that P.G. Binder used in the asphaltic concrete will not be measured for payment, but shall be considered subsidiary to the item "Surfacing Under Guardrail".

Subsection 504.04 in the Standard Specifications is amended to provide that the application of a tack coat, including furnishing emulsified asphalt, will not be measured for payment, but shall be considered subsidiary to the item "Surfacing Under Guardrail".

The work and materials required for any drainage curb placed on surfacing under guardrail will not be measured and paid for, but will be considered subsidiary to the item "Surfacing Under Guardrail".

The work and materials required for surfacing under guardrail will be paid for at the contract unit price per square yard (square meter) for the item "Surfacing Under Guardrail". Payment will be full compensation for the work prescribed in these Special Provisions and the Standard Specifications.

CONCRETE PAVEMENT CORING (F-17-0110)

Paragraphs 3. a. and 3.b. of Subsection 603.05 of the Standard Specifications are void and superseded by the following:

3. a. (1) A pay factor will be applied to each unit based on the compressive strength of 1 core per unit tested in accordance with AASHTO T 24.
- (2) Concrete cores must have a minimum age of 28 days before testing.
- (3) The paved area shall be divided into units, and each unit will be considered separately.
- (4) Units are 750 linear feet (230 m) of pavement for each separately placed width or width of each class of concrete whether or not placed separately starting at the beginning of the pavement.
- b. (1) When any unit core fails to have the required minimum compressive strength, the Contractor will have the option to obtain, at no cost to the Department, two additional cores from that unit provided that:
 - (i) The cores shall be cut by the contractor. (The cutting to be witnessed by the Engineer)
 - (ii) The cores shall be cut within seven (7) days of being notified of the strength deficiency, and
 - (iii) The cores shall be cut within 6 inches of the original unit core in the longitudinal direction.
- (2) The Engineer will take possession of the cores and have them tested within 24 hours at the Materials and Research laboratory.
- (3) The results of all three cores sampled at the location will be averaged for the final compressive strength calculation and pay factor.
- (4) The Department may agree to cut the additional cores if requested to do so by the Contractor, but will do so only if the Department's coring crew is available on the project and has sufficient time to cut and transport the cores for testing during normal working hours within seven (7) days of the Contractor being notified of the strength deficiency.

Paragraph 4.a.(4) of Section 603.05 in the Standard Specifications is void and replaced by the following:

A separately placed width is the width between field constructed longitudinal joints, between a longitudinal construction joint and the edge, or between two pavement edges. A separately placed width may include more than one pay class of concrete, such as doweled and non-doweled.

**PORTLAND CEMENT CONCRETE PAVEMENTS
GENERAL REQUIREMENTS
(F-20-0611)**

Paragraph 7.b. of Subsection 601.02 in the Standard Specifications is void and superseded by the following:

- b. The finishing machine shall travel at a controlled speed such that it produces a uniform, well consolidated pavement that does not contain large voids.

Paragraph 10.d. of Subsection 601.02 is void and superseded by the following:

- d. The Contractor shall always have a tachometer available to monitor vibrator frequency. The vibrator frequency shall be within the manufacturer's specifications not to exceed 9,000 vpm.

Paragraph 12.d.(1) of Subsection 601.02 is void and superseded by the following:

- (1) The mechanical joint saw shall have an adjustable guide to insure a true line is cut. The mechanical joint saw blade shall be water-cooled, or specifically designed for early-entry sawing if air cooled.

Paragraph 12.d.(2) of Subsection 601.02 is void.

Paragraph 12.d.(3) of Subsection 601.02 is void and superseded by the following:

- d. (3) The joint cut shall be made with a diamond-toothed blade.

**CONCRETE PAVEMENT
(F-21-0611)**

Paragraph 2.a. of Subsection 603.03 in the Standard Specifications is amended to include the following:

- (6) The base material shall be moistened through a uniform, lightly applied spray pattern prior to concrete placement as directed by the Engineer.

Paragraphs 2.d. and e. of Subsection 603.03 are void and superseded by the following:

- d. After being consolidated with internal mechanical vibration, the concrete shall be struck off to a uniform height approximately 0.5 inch (12 mm) above the finished surface and then finished to the final elevation by means of a vibrating mechanical or vibrating hand operated screed.

- e. Finished concrete shall be of uniform density with no segregation, honeycombing, or large voids.

Paragraph 3.f. of Subsection 603.03 is void and superseded by the following:

- f. (1) A wet burlap, carpet, or canvas drag will be drawn over the entire surface in a longitudinal direction for a final finish, dampening of this drag material will be accomplished through a uniform, lightly applied spray pattern.
- (2) The drag shall be suspended from a mandrel, or similar device, to insure a uniform texture.
- (3) The drag shall be lifted from the surface of the concrete pavement when the paving train is not in motion for 30 minutes or more and carefully reset before resuming the dragging operations.
- (4) Drags shall be rinsed or washed as necessary to obtain a uniform surface. Drags that cannot be cleaned shall be replaced.

Paragraphs 4.e., f., g., and h. of Subsection 603.03 are void and superseded by the following:

- e. For areas with pavement widening, dowel baskets shall be placed in all transverse contraction joints which are 6 feet (1.8 mm) or wider.
- f. If normal vibration is found inadequate to thoroughly consolidate the plastic concrete within and around the dowel basket assemblies, adjustments to the material and/or operations shall be made.
- g. Precautions shall be taken to assure that the sawed contraction joint is located directly over the center of the dowel bars.
- h. Transverse cracks which form in the concrete pavement panels between load transfer joints shall be stitched as shown in the plans, described in the Special Provision or repaired as directed by the Engineer. No payment will be made for this work.

Paragraph 6.b.(7)(i) of Subsection 603.03 is void and superseded by the following:

- (7) (i) The concrete shall be textured by dragging a wet burlap, carpet, or canvas belt over the full width of the surface in a longitudinal direction. Dampening of this drag material will be accomplished through a uniform, lightly applied spray pattern.

Paragraph 6.c.(4)(i) of Subsection 603.03 is void and superseded by the following:

- (4) (i) The concrete shall be textured by dragging a wet burlap, carpet, or canvas belt over the full width of the surface in a longitudinal direction. Dampening of this drag material will be accomplished through a uniform, lightly applied spray pattern.

Paragraph 7.a.(3) of Subsection 603.03 is void and superseded by the following:

- (3) (i) The curing compound shall be applied in 2 equal applications immediately following each other or other methods approved by the Engineer.
- (ii) The total rate of applications shall be at a minimum of 1 Gal/100 SF (0.3 L/m²) of surface area for tined surfaces or 1 Gal/150 SF (0.2 L/m²) of surface area for all other finishes.

Paragraph 8.a.(6) of Subsection 603.03 is voided and superseded by the following:

- (6) Any panels that contain random cracking will be considered unacceptable. The Engineer will decide whether to replace or repair the panel. The Contractor shall replace or repair these panels at the direction of the Engineer at no cost to the Department. A 20% deduction will be assessed on any repaired panel. Any panel that is replaced will not be assessed a 20% deduction.

Paragraph 8.d.(3) of Subsection 603.03 is void.

Paragraphs 8.d.(4), (5) and (6) of Subsection 603.03 are void and superseded by the following:

- (4) Before sealing, the joint wall (not the bottom of joint) surfaces shall be sandblasted or water-blasted to remove all dirt, curing compound residue, laitance, and any other foreign material. After sandblasting, the entire joint shall be cleaned with compressed air having a minimum pressure of 90 psi (620 kPa). The compressed air shall be free of oil, water, and other contaminants. The joints shall be dry at the time of sealing.
- (5) (i) Transverse contraction joints in Portland cement concrete pavements shall be sealed so that the joint is filled to approximately 1/8" to 3/8" (3 to 9 mm) below the top of the joint with an approved hot poured sealant.
 - (ii) All overflow material shall be removed from the surface of the pavement.
 - (iii) If adhesion is not satisfactory, the material shall be rejected.
- (6) The Contractor shall give the Engineer one copy of the hot pour manufacturer's sealing recommendations.

Paragraph 9.b. of Subsection 603.03 in the 2007 edition of the NDOR Standard Specifications for Highway Construction is void and superseded by:

- b. When the pay item "Portland Cement Concrete Smoothness Testing" is not included in the contract, the Contractor shall test the hardened concrete for surface irregularities with a California Profilograph. Areas showing high spots (bumps) in excess of 0.30 inches in a 25 foot span will be plainly marked on the pavement and on the printed pavement profile trace. All identified high spots shall be ground to the required profile. The grinding shall be performed so that the cement-aggregate bond is not broken. The equipment and profilograph test procedure requirements of Section 602 of the Standard Specifications for Highway Construction shall apply to this surface testing.

Paragraph 9.c of Subsection 603.03 is amended to include:

- c. At the Engineer's option, the use of a 10 foot straightedge to locate high spots in excess of 1/8 inch may be allowed in lieu of bump detection using a profilograph testing.

Paragraphs 11.c., d. and e. of Subsection 603.03 are void and superseded by the following:

- c. The Contractor's forces may be allowed on the concrete pavement when the concrete has reached a minimum age of 14 days or when the concrete has reached a compressive strength of 3000 psi (24 MPa) when tested in accordance with ASTM C 39.
- d. With the approval of the Engineer, the Contractor may elect to increase the early strength of the concrete by adding cement and/or reducing the water/cement ratio, and then the pavement may be opened to traffic provided it has attained a compressive strength of 3500 psi (24 MPa). The concrete in the area where the early strength is required shall be paid for at the bid price.
- e. When required by the Special Provisions or when requested by the Contractor, the maturity method, as provided for in ASTM C 1074, may be used in lieu of the requirements of Subsection 603.03, Paragraph 10.c. and d. to determine the strength of concrete pavement for the purpose of early opening to traffic. Requests by the Contractor for use of the maturity method shall be on a project basis and shall be made in writing to the Materials and Research Engineer. The Contractor shall be responsible to coordinate with the Materials & Research Division to develop the maturity curve.

Paragraph 3.a. and b. of Subsection 603.05 is void and superseded by the following:

- 3. a. A pay factor will be applied to each unit based on the compressive strength of 1 core per unit tested in accordance with AASHTO T 24. Concrete cores must have a minimum age of 28 days before testing. The Contractor will have the option to obtain two additional cores for any unit core that fail to have the required minimum compressive strength provided that the cores are:
 - (1) Obtained and tested within seven (7) days of being notified of the strength deficiency, under the supervision of the Engineer.
 - (2) Cut within 6 inches of the original unit core in the longitudinal direction.

The results of all three cores sampled at the location will be averaged for the final compressive strength calculation and pay factor.

- b. The paved area shall be divided into units. Each unit will be considered separately. Units are 750 linear feet (230 m) of pavement for each separately placed width, or width of each class of concrete whether or not placed separately starting at the beginning of the pavement.

Paragraph 4.a.(7) of Subsection 603.05 is void and superseded by the following:

- (7) At the option of the Engineer, cores may not be required from irregular areas with widths less than 8 feet (2.4 m) or from an individual pavement type that involve less than 5,000 square yards (4200 m²) of pavement.

Paragraph 4.c.(4) of Subsection 603.05 is void and superseded by the following:

- (4) If the average thickness of the cores is deficient by more than 0.25 inch (6 mm) but not more than 0.50 inch (12.5 mm) an adjusted unit price will be paid in accordance with Table 603.04. Cores deficient by more than 0.50 inch (12.5 mm) will be treated as prescribed in Paragraph 4.d. of this Subsection.

1 ½ INCH CONDUIT IN BRIDGE (G-1-0508)

Description

This work will consist of furnishing and installing a complete electrical conduit system and anchor bolt assembly as shown in the plans. The anchor bolt assembly will include nuts, washers, anchor bolts and miscellaneous hardware. The electrical conduit system will include all conduit, junction boxes, expansion fittings, drains, liquid-tight flexible conduit, couplings and all other miscellaneous hardware. This work will also include all equipment, tools, labor, excavation, backfill, materials and incidentals necessary to complete the work.

Material Requirements & Construction Methods

The material requirements and construction methods shall be in accordance with the general note for electrical conduit installation shown on the plans.

Method of Measurement

The electric conduit system will be measured for payment by the number of feet (meters) shown in the plans within the limits defined for the system.

Basis of Payment

The electrical conduit system, in place and accepted by the Engineer, will be paid for at the contract unit price per foot (meter) for the item, "1 ½ inch CONDUIT in BRIDGE" ("38 mm CONDUIT in BRIDGE").

Payment is full compensation for all work prescribed in this provision.

**CONCRETE CONSTRUCTION
(G-5-1111)**

Section 704 in the Standard Specifications is amended to include the following:

All concrete rails on bridges and approach slabs shall be cast-in-place. Slip-forming will not be permitted for concrete rails on bridges and approach slabs.

Paragraph 8. of Subsection 704.03 is amended to provide that forms for 42 inch bridge rails shall be made of steel.

The fourth subparagraph of Paragraph 8.j. of Subsection 704.03 is void and superseded by the following:

Steel stay-in-place form material shall conform to the requirements of ASTM A 653/A 653M Coating Designation G165/Z500.

Paragraphs 8.a., b. and c. of Subsection 704.05 are void and superseded by the following:

8. Payment Deductions:

- a. The 28-day compressive strength is determined by the average strength of all cylinders made on a specific day to determine the 28-day compressive strength of all of a group's class of concrete poured that day. Concrete with a 28-day compressive strength not meeting the design compressive strength is subject to removal.
- b. If the 28-day compressive strength is less than the design compressive strength, cores may be taken within 45 days after the concrete was poured. The average of the cores will be used to determine the compressive strength. If the average of the cores is equal to or greater than 85% of the design compressive strength, the concrete is acceptable for use and is not subject to removal or a pay reduction. Cores will be taken by the Department at no cost to the Contractor.
- c. If either the 28-day compressive strength or the average core strength is less than the design strength and the Engineer determines that the concrete is acceptable for use, the concrete is subject to a payment deduction. The pay deduction is shown below:

$$\frac{2 \times (\text{Design Compressive Strength} - 28\text{-day Compressive Strength})}{\text{Design Compressive Strength}} = \text{Percent Reduction}$$

Or

$$\frac{2 \times (\text{Design Compressive Strength} - \text{Average Core Compressive Strength})}{\text{Design Compressive Strength}} = \text{Percent Reduction}$$

**PILES AND PILE DRIVING
(G-6-0611)**

Paragraph 1.m.(1) of Subsection 703.03 of the Standard Specifications for Highway Construction is void and superseded by the following:

All welding to be done on steel piles shall be in accordance with the plans and the applicable requirements of Section 708 in the Standard Specifications. Welder qualification certification is required and must be submitted to the Bridge Fabrication Manager for approval prior to any welding.

All field welding on steel piles shall be done in the SMAW process using electrode E7018.

For bridges with design live load "HL-93", the tables in paragraph 4.c. of Subsection 703.03 (on pages 444 and 445) in the Standard Specifications are void and superseded by the following:

Dynamic Formulas (English and Metric)	
Diesel Hammers:	
$P = \frac{4.0 E}{S+0.5}$	For all piles driven from the top with a single-acting diesel hammers (English)
$P = \frac{3.27 E}{S+12.7}$	For all piles driven from the top with a single-acting diesel hammers (Metric)
Where:	
P = the bearing capacity, in kips (English) or kN (Metric)	
w = the mass of the ram, in kips (English) or kg (Metric)	
M = the mass of the pile and driving cap, in kips (English) or kg (Metric)	
s = the average penetration per blow, in inches (English) or millimeters (Metric), of the last 10 blows for diesel hammers	
H = the height of fall of the ram, in feet (English) or meters (Metric) (less twice the height of bounce for gravity and steam hammers)	
E = the energy per blow in foot-kips (English) or meter-kilogram (Metric). For single-acting diesel hammers, $E + W \times H$	
Unless permitted by the NDR Geotechnical Section, all piles driven with hammers other than single-acting diesel hammers shall be tested with the Pile Driving Analyzer to verify capacity.	
$P = \frac{4.9 WH}{S+0.35} \times \frac{W}{W+M}$	For gravity hammers
$P = \frac{4.9 E}{S+0.1} \times \frac{W}{W+M}$	For steam hammers
$P = \frac{2.2 E}{S+0.1}$	For driving mandrel driven pile shells

Paragraph 7.a. of Subsection 703.03 is void and superseded by the following:

- a. "Practical Refusal" occurs when actual bearing capacity is 2.0 times the Design Pile Bearing.

Paragraph 2. of Subsection 703.05 is void and superseded by the following:

2. a. (1) Provided that the Contractor furnishes the Engineer signed purchase orders for bearing and sheet piling, authorized "cutoff" of bearing and sheet piling shall be made at the invoice price per linear foot (meter) of bearing piling, and per square foot (meter) of sheet piling.
 - (2) The signed purchase orders shall be furnished at the pre-construction conference.
- b. In those cases where signed purchase orders for bearing and sheet piling are not furnished at the pre-construction conference, authorized "cutoff" of bearing and sheet piling shall be made at 60 percent of the piling's contract unit price.
- c. No payment is made for "cutoff" beyond the order length.
- d. When bearing or sheet pile are authorized for cutoff and are suitable for use as spliced material for the same purpose on the project, the length of material subsequently driven as service piling shall be deducted from the payment for cutoff. No piece of piling can qualify for more than one measurement as pay cutoff.

Paragraph 3. of Subsection 703.05 is void and superseded by the following:

3. Splices ordered by the Engineer shall be paid for at 5 times the unit bid price (2 times the unit bid price for Metric projects) for HP steel piling, pipe, piling, and cast-in-place piling; and at 20 times the unit bid price (7 times the unit bid price for Metric projects) for driving and build-up splices for precast/prestressed concrete piling.

REINFORCING STEEL SUPPORTS (G-8-0508)

Paragraph 3.b.(2) of Subsection 707.03 of the Standard Specifications is void and superseded by the following:

Reinforcing steel in concrete slabs shall be positioned on plastic coated supports or chairs to accurately maintain the specified clearance to the surface of the concrete. Supports shall be spaced at distances not greater than 3 feet for #4 top bars or 4 feet for all other reinforcing.

PREFORMED EXPANSION JOINT (G-11-1212)

Section 734 of the Standard Specifications is void and superseded by the following:

Description

1. This work shall consist of furnishing and installing a Preformed Expansion Joint in a preformed gap at the locations and limits shown on the plans.
2. The Preformed Expansion Joint shall be either a Precompressed Polyurethane Foam Joint or a Preformed Silicone Joint, as indicated in the plans.
 - a. When the item is "Precompressed Polyurethane Foam Joint, Type ____" the joint shall be a Precompressed Polyurethane Foam Joint of the type indicated in the plans.
 - b. When the item is "Preformed Silicone Joint, Type ____", the joint shall be a Preformed Silicone Joint of the type indicated in the plans.
 - c. When the item is "Preformed Expansion Joint, Type ____", the joint may be either a Precompressed Polyurethane Foam Joint or a Preformed Silicone Joint of the type indicated in the plans.

Material Requirements

1. Precompressed Polyurethane Foam Joints:
 - a. PPF Joint shall be precompressed self-expanding polyurethane foam with factory applied silicone facing on top of the foam.
 - b. PPF joints shall be ordered for the joint material dimension shown in the plans.
 - c. Approved PPF Joint systems are shown on the NDOR Approved Products List under Precompressed Polyurethane Foam Joint, Type A or B.
2. The approved Preformed Silicone Joint systems are shown on the NDOR Approved Products List under Preformed Silicone Joint, Type A or B.
3. Primers, epoxy adhesives, and silicone sealants shall comply with the manufacturer's recommendations.
4. Materials shall be resistant to ozone, ultraviolet rays, petroleum products, solvents, industrial cleaners, corrosive vapors and acids.
5. Joint material shall be delivered to the Contractor's storage area and to the job site in the Manufacturer's original undamaged containers with wrapping intact. Storage of joint material shall be in a dry, enclosed area, off the ground, between 60°F (16°C) and 75°F (24°C) and out of direct sunlight until immediately prior to installation.

Construction Methods

1. The installation of the Preformed Expansion Joint and the adhesives shall be completed according to the manufacturer's specifications. Additional field applied silicone is required on both sides of the top of the joint. Any installation that fails to meet the manufacturer's specifications shall be removed and replaced at no cost to the Department.

2. The installation instructions and specifications shall be given to the Engineer 7 days prior to the installation.
3. The Preformed Expansion Joint shall be installed in the presence of the Engineer.
4. The joint opening in the concrete shall be cleaned by sandblasting and shall be dry and free of oil and other deleterious materials before the installation of the Preformed Expansion Joint.
5. The installation of the Preformed Expansion Joint shall be completed between 45°F (7°C) and 90°F (32°C).
6. Any joint material damaged during corrective grinding shall be replaced at no cost to the Department.

Method of Measurement

1. The Preformed Expansion Joint shall be measured for payment by the linear foot (meter) of the joint properly installed and accepted by the Engineer.
2. Pay limits for the Preformed Expansion Joints shall be the horizontal distance from end to end along the centerline of the joint assembly at the locations shown in the plans and 1 foot (0.3 m) upward at the gutter line if shown.

Basis of Payment

- | | | | | | | | | | |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|--------------------------------------|------------------------------|--------------------------------------------------|------------------------------|-------------------------------------|------------------------------|
| 1. | <table border="0"> <tr> <td style="text-align: center;">Pay Item</td> <td style="text-align: center;">Pay Unit</td> </tr> <tr> <td>Preformed Expansion Joint, Type ____</td> <td>Linear Foot (LF) [Meter (m)]</td> </tr> <tr> <td>Precompressed Polyurethane Foam Joint, Type ____</td> <td>Linear Foot (LF) [Meter (m)]</td> </tr> <tr> <td>Preformed Silicone Joint, Type ____</td> <td>Linear Foot (LF) [Meter (m)]</td> </tr> </table> | Pay Item | Pay Unit | Preformed Expansion Joint, Type ____ | Linear Foot (LF) [Meter (m)] | Precompressed Polyurethane Foam Joint, Type ____ | Linear Foot (LF) [Meter (m)] | Preformed Silicone Joint, Type ____ | Linear Foot (LF) [Meter (m)] |
| Pay Item | Pay Unit | | | | | | | | |
| Preformed Expansion Joint, Type ____ | Linear Foot (LF) [Meter (m)] | | | | | | | | |
| Precompressed Polyurethane Foam Joint, Type ____ | Linear Foot (LF) [Meter (m)] | | | | | | | | |
| Preformed Silicone Joint, Type ____ | Linear Foot (LF) [Meter (m)] | | | | | | | | |
| 2. | Payment is full compensation for furnishing and installing the Preformed Expansion Joint and for all labor, equipment, tools and incidentals necessary to complete the work. | | | | | | | | |

**SHIM CONCRETE PAYMENT
(G-13-1110)**

Paragraph 1. of Subsection 706.04 in the Standard Specifications is void and superseded by the following:

1. a. The Department will pay plan quantity when items are constructed according to the plan geometrics.
- b. The Contractor may request that the Department recalculate the quantity for the concrete haunch, using the girder shim shots on a prestressed concrete girder bridge.

Subsection 706.05 is amended to include the following:

If the recalculated concrete quantity of the concrete haunch on a prestressed concrete girder bridge is greater than the plan quantity, the additional concrete quantity will be paid at 1.33 times the concrete invoice price. The Contractor shall furnish the Engineer signed invoices for the Concrete Class _____ for Bridges prior to the request for recalculating the concrete haunch quantity.

**PRECAST OR PRECAST/PRESTRESSED CONCRETE
STRUCTURAL UNITS
(G-14-0412)**

Section 705 in the Standard Specifications is void and superseded by the following:

Description

1. This work consists of all labor, materials, and equipment required in the production of Precast or Precast/Prestressed Structural Units.
2. Contract plans shall be supplemented by Contractor-provided working drawings submitted in accordance with Subsection 105.02.

Material Requirements

1. The materials used shall meet the requirements prescribed in Table 705.01.

Table 705.01

Material Requirements	
Applicable Material	Section
Concrete	1002
Admixtures	1007
Water	1005
Fine Aggregate	1033
Course Aggregate	1033
Fly Ash	1008
Spiral Reinforcing Wire	1023
Prestressed Steel Strand	1026
Post-Tensioning Assembly Steel	1025

2. The concrete class used in the manufacture of Precast or Precast/Prestressed Structural Units shall be shown in the plans.
3. The Contractor shall be responsible for the Concrete Mix Design. Concrete Mix Designs shall be proportioned in accordance with ACI Standard 318 and the following additional requirements:
 - a. The mix designs or change to a mix design shall be submitted for approval to the Engineer 4 weeks before beginning any concrete work. Refer to Table 705.03 for required testing for any mix design.
 - b. Concrete shall consist of Type I, Type II, or Type III Portland cement, aggregate, air-entraining admixture, and water. Concrete may also contain Class C or Class F fly ash, Slag Cement or Silica Fume and ASTM C 494 approved Type A, Type B, Type D, and Type F admixtures.
 - c. No change shall be made in the approved Concrete Mix Design during the progress of the work without the prior written permission of the Portland Cement Concrete (PCC) Engineer.
4. Reinforcement shall be furnished, handled, stored, and placed in accordance with the requirements of Section 707.

5. Welding of reinforcing steel is prohibited unless specifically authorized by the Engineer.
6. Prestressing steel other than that specified in the plans or Special Provisions may be furnished with the approval of the Engineer. The yield and ultimate strength and other pertinent characteristics of this steel shall be submitted to the Engineer.
7. The area of broken wires shall not exceed 2% of the cross sectional area of the stressing strands when the number of strands is 14 or less.
8. No more than 1 broken wire will be allowed in a single strand.
9. Bars for post-tensioning shall be of high tensile strength steel. They shall be equipped with wedge type end anchorages which will develop the minimum specified ultimate bar stress on the nominal bar area. The physical properties of the bar steel determined by static tensile tests shall conform to the requirements in Table 705.02.

Table 705.02

High Strength Steel Post-Tensioning Requirements	
Ultimate Stress	145,000 psi (1000 MPa) minimum
Stress at 0.7% Elongation	130,000 psi (900 MPa) minimum
Stress at 0.3% Elongation ..	75,000 psi (500 MPa) minimum
Elongation in 20 Diameters	4% minimum
Modulus of Elasticity	25,000,000 psi (172,00 MPa) minimum
Diameter Tolerance	Plus or Minus 0.1 inch (2.5 mm)

10. Materials specified for testing shall be furnished 30 days before the anticipated time of use. All materials required for testing shall be furnished by the Contractor to the Engineer without additional costs to the Department. The Engineer shall select a representative sample length for the various prestressed steel as follows:
 - a. Six feet (1.8 m) for wires requiring heading.
 - b. For wires not requiring heading, sufficient length to make up one parallel-lay cable 6 feet (1.8 m) long consisting of the same number of wires as the cable to be furnished.
 - c. Six feet (1.8 m) between near ends of fittings for a strand furnished with fittings.
 - d. Six feet between threads at the ends of bars furnished with threaded ends.
11. If the anchorage assemblies are not attached to prestress steel samples, 2 anchorage assemblies shall be furnished for testing, complete with distribution plates of each size or type of prestress steel to be used.
12. Any defective material shall be rejected.

13. Concrete quality control shall be the responsibility of the Contractor. Concrete shall be sampled and tested as shown in Table 705.03.
 - a. The Contractor's test results are the basis for acceptance. If the Department's quality assurance testing is not within 10% of the Contractor's test results on any given sets of three cylinders, the Engineer will initiate an investigation to find the cause of the variation between the Contractor's and the Department's test results. While the investigation is in progress, the Department will continue with quality assurance testing as shown in Table 705.03. Any structural units represented by these tests will be subject to rejection.
 - b. If more than one set of cylinders is required per Table 705.03 for a single Precast or Precast/Prestressed Concrete Structural Unit, each set of three cylinders will be averaged separately. All averaged sets must meet the minimum design strengths.
 - c. If 40 cubic yards makes more than one Precast or Precast/Prestressed Concrete Structural Unit and the Contractor elects to make the minimum set of cylinders, that single set of cylinders will be used to determine the girder strength for all of the Precast or Precast/Prestressed Concrete Structural Units that set of cylinders represents. If the Contractor elects to make more than the minimum cylinders required, in order to represent each Precast or Precast/Prestressed Concrete Structural Unit, only the set of cylinders representing the corresponding unit will be used to determine the strength of that unit.

Table 705.03 Precast Plant Approval		
Plant Certification	<p>Contractor <u>Prestressed:</u> Shall submit PCI Certification every two years to the PCC Engineer. <u>Precast:</u> Precast plants that are not PCI certified will be NRMCA certified.</p>	<p>NDOR Approve and add to site Manager.</p>
Quality Control & Quality Assurance at Plant Site		
Frequency	Daily	Weekly
Number of Acceptance Cylinders to be fabricated	<p>Contractor Quality Control</p> <ul style="list-style-type: none"> - Will make a minimum of six cylinders for every 40 cubic yards. - NDOR personnel will record results and enter into site manager. These samples will be identified, and tagged by NDOR. NDOR shall have access to these QC samples at all times. 	<p>NDOR Personnel Quality Assurance</p> <ul style="list-style-type: none"> - Will make a minimum of three sets of three cylinders per mix design per week of production. - The NDOR samples will be taken at the same location within a load of concrete as the Contractor's QC samples. NDOR shall choose the location of these samples within the load/girder. - Enter results into Site-manager.
Required Testing for Acceptance Cylinders	<p>Contractor Laboratory</p> <ul style="list-style-type: none"> - 7 Day Compressive Strength: three cylinders averaged at Contractor's discretion. - 28 Day Compressive Strength: three cylinders averaged. - 56 Day Compressive Strength: The remaining three cylinders will be tested for 56 day compressive strengths; only if the 28 day compressive strength failed to meet specification requirements. <p>NOTE: No cylinders are to be discarded until all design strengths are met and the prestressed unit(s) is accepted.</p> <ul style="list-style-type: none"> - Air Content – ASTM C 231 - Slump Flow – ASTM C 1621 - Visual Stability Index (VSI) Appendix of ASTM C 1611 is required. 	<p>NDOR Laboratory:</p> <ul style="list-style-type: none"> - 28 Day Compressive strength: Three cylinders averaged. • The 28 day compressive strength is to be used for validation of the Contractor's strength. • NOTE: If the Contractor's and Department's 28 day test results are not within 10%, the Engineer will investigate the variation. • NDOR will be on-site to witness the testing for all Acceptance Cylinders. <ul style="list-style-type: none"> - Air Content – ASTM C 231 - Witness Slump Flow & Visual Stability Index
Inspection at Plant Site		
Frequency	Weekly	
Required Inspection	Refer to policy in the Material & Sampling Guide for the following: <ul style="list-style-type: none"> • Precast/Prestressed Concrete Plant Inspection-NDOR Inspector • Precast/Prestressed Concrete Plant Inspection-Fabricator Inspector 	

Table 705.04 Mix Design Approval/ Change Cement or Aggregate Source		
Trial Mix	<p>Contractor Data from 15 trial tests as a minimum (New Mix Design) Data from 5 trial tests as a minimum (Change in Cement or Aggregate)</p>	<p>NDOR Contractor is responsible to notify PCC Engineer 4 weeks in advance.</p>
Testing	<p>Contractor</p> <ul style="list-style-type: none"> - Compression Strength – AASHTO T 22 - Flexure Strength of concrete (using simple beam with third-point Loading) - ASTM C 78 - Air Content – ASTM C 231 - Slump Flow – ASTM C 1611 - Passing Ability by J-Ring Method - ASTM C 1621 - Visual Stability Index (VSI) - Appendix of ASTM C 1611 is required. 	<p>NDOR Sampling and Testing two of the Contractor's trial test.</p> <ul style="list-style-type: none"> - Compression Strength – AASHTO T 22 - Flexure Strength of concrete (using simple beam with third-point Loading) - ASTM C 78 - Air Content – ASTM C 231 - Witness (Slump Flow & J Ring)
Approval	<p>Contractor Submit data from lab testing to PCC Engineer.</p>	<p>NDOR</p> <ul style="list-style-type: none"> - Data review / ensure specification are met - Approve mix design - Add to Site Manager with NDOR Mix Design Number
Change to Admixtures in Approved Mix Design		
Testing/Approval	<p>Contractor Contractor is responsible to notify the PCC Engineer 3-4 weeks in advance.</p> <ul style="list-style-type: none"> - Air Content – ASTM C 231 - Slump Flow – ASTM C 1621 - Passing Ability by J-Ring Method - ASTM C 1621 - Visual Stability Index (VSI) - Appendix of ASTM C 1611 is required. 	<p>NDOR</p> <ul style="list-style-type: none"> - Air Content – ASTM C 231 - Witness Slump Flow, Passing Ability and Visual Stability Index

14. Plant Approval Requirements:

- a. All Prestressed Concrete Structural Units shall be produced in a Precast/Prestressed Concrete Institute (PCI) certified plant.
- b. All concrete for Precast/Prestressed Concrete Structural Units shall be produced at a PCI or NRMCA certified plant.
 - (1) Whenever there is reason to suspect a problem with the equipment, any or all of the equipment may be inspected.
- c. The method of manufacture and quality of concrete are also subject to Department approval/inspection.

- d. A Contractor proposing to furnish Precast or Precast/Prestressed Structural Units shall submit the following additional details to the Department concerning the method of manufacture:
 - (1) Type, number, size, and location of the prestressing elements, and the name of the manufacturer of the post-tensioning or pretensioning elements.
 - (2) Complete information as to type, size, and method of installation of devices for anchoring post-tensioning elements.
 - (3) The proposed manufacturing methods and the plans and design details of proposed casting beds and forms.
 - e. The use of portable pretensioning beds for the manufacture of concrete structural units or piles will not be allowed.
15. Mix Design Approval Requirements:
- a. The results of 15 individual trial mixes shall be produced using the same process as the plants normal production run. All test results of individual trial mixes shall be given to the Engineer. The test results collected shall include the following:
 - (1) The release and 28-day compressive strength test results shall conform to AASHTO T 22.
 - (2) The water/cement ratio.
 - (3) The air content (between 2.0 percent and 6.0 percent inclusive).
 - (4) The cement, fly ash, Slag Cement and Silica Fume content.
 - (5) The amount of fine aggregate, coarse aggregate, and sand and gravel.
 - (6) Slump Flow test results shall conform to ASTM C 1611
 - (7) Passing Ability by J-Ring Method test results shall conform to ASTM 1621.
 - (8) Visual Stability Index (VSI) test results shall conform to the Appendix of ASTM C 1611.
 - (9) Flexure Strength of concrete at 28-day test results shall conform to (using simple beam with third-point loading) ASTM C 78.
 - b. Any change of cement or aggregate source which must be on the NDR Approved Product List shall require 5 new individual trial mixes. Refer to Table 705.04 for required testing procedures.
 - c. Any changes using admixtures, the Contractor shall verify the properties of the concrete. Refer to Table 705.04 for the required testing procedures.

- d. The compressive strength test results of 15 individual trial mixes shall be performed by the Contractor. An individual trial mix shall consist of two sets of three cylinders with three cylinders being averaged at release and at 28-day. One set shall be taken within the first third of the load and the second set shall be taken within the two thirds of the load.
- e. All tests for elastic modulus and compressive strength will be conducted using 4 inch x 8 inch (100 mm x 200 mm) cylinders.
- f. The flexure strength test results of 15 individual trial mixes shall be performed by the Contractor. An individual trial mix shall consist of two sets of two beams with two beams being averaged at 28-day. One set shall be taken within the first third of the load and the second set shall be taken within the two thirds of the load.

Construction Methods

- 1. The Contractor shall construct Precast or Precast/Prestressed Structures and piles as shown in the plans.
- 2. The Contractor shall provide the Engineer a 4-week production schedule that is updated as necessary. If the Engineer is given less than 1 NDOR work day notice of a schedule change, then the fabricator may not proceed until the Engineer has reviewed the change. The Engineer may observe any or all of the procedures and shall have access to all reported data at any time during fabrication. The Engineer shall report any inconsistencies to the job superintendent.
- 3. The concrete producer shall report the following information for each load of concrete used to fabricate girders:
 - a. Brand, mill, type, certified test number, and weight of cement.
 - b. Brand, mill, class, certified test number, and weight of fly ash.
 - c. Type, source, location, weight, and free moisture content for each aggregate. Aggregate moisture shall be determined according to NDR T 506 for each half day.
 - d. Source, type, name, and amount of each admixture.
 - e. Water added during batching and at placement site.
 - f. Time water and cement are initially mixed into the batch.
 - g. Time placement is completed.

4. Tensioning:

a. Methods:

- (1) In all methods of tensioning, the stress induced in the prestressing elements shall be measured by the Contractor both with jacking gauges and by elongation of the elements; and these results shall be the same within a 5% tolerance.
- (2) Means shall be provided for measuring the elongation of reinforcement to at least the nearest 1/8 inch (3 mm).
- (3) All steel stressing devices, whether hydraulic jacks or screw jacks, shall be equipped with accurate reading calibrated pressure gauges, rings, or other devices as applicable to the jack being used.
- (4) All devices shall be calibrated and, if necessary, recalibrated so as to allow the stress in the prestressing steel to be computed at all times.
- (5) A certified calibration curve shall accompany each device.
- (6) Safety measures must be taken by the Contractor to prevent accidents due to possible breaking of the prestressing steel or the slipping of the grips during the prestressing process.

b. Measurement:

- (1) Pressure gauges, load cells, dynamometers, and any other devices used in determination of loads and/or pressures shall be accurate in their effective range within a 2% tolerance.
- (2) Such equipment shall be calibrated by an approved testing laboratory.
- (3) The Contractor's laboratory shall furnish calibration curves for each device and shall certify the curves as being accurate and verifiable.
- (4) The calibration of tensioning devices shall be accomplished in place.
- (5) The configuration of jacks, gauges, and other components during calibration shall be exactly the same as during the actual stressing operation.
- (6) The method of calibration shall be as approved by the Engineer.
- (7) Tensioning devices shall be calibrated at least once a year and at any time a system appears to be operating in an erratic or inaccurate manner or gauge pressure and elongation measurements fail to correlate.

- c. If the strand tension indicated by the gauge pressure and by elongation methods fail to agree within 5%, the operation shall be carefully checked and the source of error determined before proceeding further.

- d. Measurement Consideration:
- (1) The Contractor's elongation and jacking pressure measurements shall make appropriate allowance for friction and all possible slippage or relaxation of the anchorage.
 - (2) For pretensioned members, independent references shall be established adjacent to each anchorage by the Contractor to indicate any yielding or slippage that may occur between the time of initial stressing and final release of the cables.
 - (3) The Contractor may tension straight post-tensioned tendons from one end. Curved tendons shall generally be stressed by simultaneous jacking from both ends.
- e. In all stressing operations, the Contractor shall keep stressing force symmetrical about the member's vertical axis.
5. Stressing Procedure:
- a. Prestressing methods are shown in the plans. When the Contractor elects to use a method other than that shown in the plans, the Contractor shall submit complete shop plans for the proposed method.
 - b. Pretensioning Method:
 - (1) The amount of stress to be given each strand by the Contractor shall be as shown in the plans.
 - (2) All strands to be prestressed in a group shall be brought to a uniform initial tension before being given their full pretensioning. This uniform initial tension of approximately 1,000 to 2,000 pounds (450 to 900 kg) shall be measured by a dynamometer or other approved means so that it can be used as a check against the computed and measured elongation.
 - (3) After initial tensioning, either single strand or multiple strand groups shall be stressed until the required elongation and jacking pressure are attained and reconciled within the 5% tolerance.
 - (4) With the strand stressed in accordance with the plan requirements and these *Specifications*, and with all other reinforcing in place, the Contractor shall cast the concrete to the lengths desired. Strand stress shall be maintained between anchorages until the concrete has reached the compressive strength specified in the plans.
 - c. Post-tensioning Method - For all post-tensioned elements, the Contractor shall set the anchor plates exactly normal in all directions to the axis of the bar or tensioning strand. Parallel wire anchorage cones shall be recessed within the beams. Tensioning shall not be done until the concrete has reached the compressive strength specified in the plans.

- d. Combined Method - In the event that the girders are manufactured with part of the reinforcement pretensioned and part post-tensioned, the applicable portions of the requirements listed above shall apply to each type.
6. Forms:
- a. Forms for Precast or Precast/Prestressed Concrete Structural Units shall conform to the requirements for concrete formwork as provided in Subsection 704.03.
 - b. Precast or precast/prestressed forms shall be accessible for the vibration and consolidation of concrete.
 - c. If the ambient temperatures are above 90°F (32°C), precautions shall be taken so the forms, reinforcing steel and steel beams of structural units will be the ambient temperature.
7. Placing Concrete:
- a. The Contractor shall provide the Department a 4-week production schedule that is updated as necessary. Unscheduled production changes may delay fabrication. Unscheduled production may result in rejection of Precast or Precast/Prestressed Concrete Structural Units.
 - b. The Engineer may observe any or all of the procedures. The Contractor shall provide access to all reported data at any time during fabrication. The Engineer will report any inconsistencies to the job superintendent.
 - c. Concrete shall not be placed before completing the forming and placing of reinforcement.
 - d. Placing Procedure:
 - (1) Concrete shall be placed continuously in each unit, taking care to avoid horizontal or diagonal planes of weakness.
 - (2) However, if there is a delay in delivery of concrete or for some other reason placement is interrupted for more than 30 minutes, then the concrete shall be rejected.
 - e. Consolidation:
 - (1) Whether concrete requires vibration or self-consolidating concrete is used, special care shall be exercised to work and consolidate the concrete around the reinforcement and to avoid the formation of stone pockets, honeycombs and other defects.
 - (2) Self-consolidated concrete (SCC) shall not be vibrated. Rodding of Self-Consolidated Concrete (SCC) is permissible in areas of tight reinforcement.
 - (3) The other concrete shall be consolidated by vibrating.

- f. The concrete shall be a homogenous mixture and shall not contain cement balls.
 - g. The forms shall be overfilled, the excess concrete screeded off, and the top surfaces finished to a uniform, even texture.
 - h. Each Precast or Precast/Prestressed Concrete Structural Unit shall be stamped or marked with an identification number and its manufacture date.
 - i. Environmental Limitations:
 - (1) The optimum range of concrete temperatures from the time the concrete is completely mixed until the beginning of the presteam segment of the steam curing cycle shall be 50° to 95°F (10° to 35°C). Failure to operate within the optimum range shall be cause for curtailment of operations. During the presteam segment of the curing cycle, the temperature of the concrete shall not exceed 100°F (38°C) nor fall below 50°F (10°C). These temperature restrictions apply when heat is supplied to the curing enclosure prior to initial set.
 - (2) When placing concrete under cold weather conditions (ambient air temperature less than 36°F [2°C]), the Cold Weather Specifications in Sections 1002 and 704 shall be followed.
 - (3) Forms and reinforcing materials shall be preheated to a minimum temperature of 40°F (4°C) and a maximum temperature not to exceed that of the concrete at the time of placement.
 - (4) The Contractor may preheat the drums of the mixer-trucks to the limits set for forms and reinforcing, but under no condition shall heat be applied to the drums while they contain any of the batch materials or concrete.
8. Curing:
- a. General:
 - (1) The Contractor shall cure the concrete with wet burlap, waterproof covers, polyethylene sheets, or liquid membrane-forming compounds. Curing with liquid membrane-forming compounds shall be accomplished in accordance with the requirements of Section 1012 and Subsection 704.03, except that liquid membrane-forming compounds shall not be used on that portion of precast/prestressed concrete girders, twin tees, or bridge beams upon which concrete will be cast later.
 - (2) Water spray curing or other moist curing methods may be used subject to the approval of the Engineer.
 - (3) The period of concrete curing shall be determined by the results of the compressive strength test on cylinders made during the progress of the work and cured to closely approximate the concrete strength of the product it represents.

- (4) Side forms may be removed 12 hours after placing the concrete, provided curing is continued with one of the approved Department curing procedures.
- b. Steam or radiant heat will be allowed for accelerated curing provided the following procedure is adhered to:
- (1) Curing chambers shall be reasonably free of leakage and shall have a minimum clearance of 3 inches (75 mm) in order to insure adequate circulation of heat. The relative humidity within the curing enclosure shall be maintained between 70 and 100 percent.
 - (2) Temperature:
 - (i) One approved continuous recording thermometer for each 115 feet (35 m) of casting bed, with a minimum of 2 continuous recording thermometers, shall be located in each enclosure or curing chamber.
 - (ii) Continuous temperature record charts for each casting shall be available to the Engineer for examination and approval at any time.
 - (iii) If the temperature records or other temperature readings taken by the Engineer indicate that manual control of heat is producing temperature changes in excess of those specified, the Engineer may reject the Precast or Precast/Prestress Structural Unit.
 - (iv) Temperature of the curing concrete shall be 50°F to 105°F (10°C to 40°C) and shall be maintained near placement temperature until the concrete has reached initial set as determined by ASTM C 403 "Time of Setting of Concrete Mixture by Penetration Resistance". These temperature restrictions apply when heat is supplied to the curing enclosure prior to initial set.
 - (v) The temperature rate of rise shall not exceed 60°F (15.5°C) per hour.
 - (3) The concrete shall be completely enclosed with a waterproof curing chamber during accelerated curing periods.
 - (4) Steam jets shall not be directed at the concrete or the steel forms.
 - (5) If the temperature of the concrete rises above 175°F (79°C), the concrete shall be rejected.
 - (6) The temperature in the concrete shall be maintained so that at any given time the difference between the highest and lowest temperature station readings will not be more than 30°F (-1°C). If the temperature varies more than 30°F (16°C), the product shall be rejected.
 - (7) Eight hours after placing the concrete, individual sections may be uncovered to remove their forms. The curing may be discontinued during this operation. The section shall not be left uncovered longer than necessary and never longer than 30 minutes. Waterproofed covers shall be used to recover the product.

- (8) After the heat source has been turned off, the curing cover shall be maintained in place during the curing period until the release strength has been reached.
 - (9) Detensioning shall be accomplished before the temperatures of the units drop more than 60°F from the peak cure strength temperature and while they are still moist.
 - (10) Master slave heat curing system may be used for curing quality control cylinders.
- c. After detensioning, prestressed concrete girders shall be inspected for cracking. If any cracks are discovered between quarter points in the middle of the girder on the bottom flange face, the girder shall be rejected.
9. Defects and Repair Procedures:
- a. After the forms are removed, stone pockets, honeycombs, or other defects may be exposed. The Engineer shall determine if these defects affect the item's structural integrity and whether the item will be rejected.
 - b. Precast or Precast/Prestressed Concrete Structural Units which have chipped, spalled, honeycombed, or otherwise defective areas which are not considered detrimental to the structural integrity may be used after being repaired by the Grooming and Repair Procedures for Precast Concrete Products in the NDR Materials Sampling Guide.
10. Surface Finish:
- a. On structures serving as highway grade separations, the following shall apply:
 - (1) The exterior face of all exterior girders or beams plus the bottoms and chamfers on all lower flanges shall be given the following finish:
 - (i) All uneven form joints in excess of 1/8 inch (3 mm) shall be ground smooth.
 - (ii) The surface shall be steel brushed to remove scale, laitance, and to open partially obstructed holes.
 - (iii) The surface shall be dampened.
 - (iv) Grout shall be applied to the surface.
 - (v) The grout shall consist of 1.5 parts of fine sand, 1 part of Portland cement, and sufficient water to produce a consistency of thick paint. The cement used in the grout shall be a blend of regular Type I and white Portland cement to duplicate the lighter appearance of the steam cured units.
 - (vi) If necessary, an admixture which will not discolor the concrete may be used in the grout to reduce shrinkage if approved by the Engineer. Admixtures containing iron particles shall not be used.
 - (vii) The surface shall be float finished with a cork or other suitable float. This operation shall completely fill all holes and depressions on the surface.

- (viii) When the grout is of such plasticity that it will not be pulled from holes or depressions, sponge rubber or burlap shall be used to remove all excess grout.
- (ix) Surface finishing during cold weather shall not be performed unless the temperature is 40°F (4°C) and rising. The surface shall be protected against temperature drops below 40°F (4°C) for a period of 12 hours after finishing.
- (x) A uniform appearance will be required. In the event the appearance produced by the above procedure is not uniform, both in texture and coloration, the Precast or Precast/Prestress Structural Unit will be rejected. The Contractor may request other methods approved by the Engineer to create a uniform appearance.

11. Grouting for Post-Tensioned Units:

- a. The Contractor shall install steel in flexible or other approved tubes which shall be cast in the concrete and shall be pressure-grouted after the post-tensioning process has been completed.
- b. Bonding grout shall be made to the consistency of thick paint and shall be mixed in the proportions as follows: Portland cement (Type I), 100 pounds (45 kg); fly ash (ASTM C 618), 34 pounds (15 kg); water, 45 to 62 pounds (20 to 28 kg) (adjust at site); and nonshrink admixture approved by the PCC Engineer.
- c. The final grouting pressure shall be at least 80 psi (550 kPa).
- d. The Contractor shall make provisions to demonstrate to the Engineer that grouting material has completely filled all areas within the conduit.

12. Handling, Transporting, and Storing:

- a. (1) Prestressed Concrete Structural Units must be at least 9 days old before they can be set on the bridge substructure. Surveying for shim shots, forming the bridge deck or diaphragms and placing construction material on the girder is not allowed until the girders have attained the minimum age and design strength specified in the plans.
- (2) The Contractor shall be responsible for exercising extreme care in lifting, handling, storing and transporting the Prestressed Concrete Structural Units to prevent cracking or damage. Prestressed concrete bridge girders shall be maintained in an upright position and supported within 18 inches of the ends at all times. When supported at the proper positions, no part of the units shall be allowed to rest on the ground. Prestressed concrete bridge girders shall be set on a level area to prevent field bowing and adequate supports shall be placed under their bearing devices to prevent settlement into the ground. Proper support bearings shall be used to avoid twisting of the prestressed concrete bridge girders. Prestressed Concrete Structural Units shall be lifted by devices designed by the Contractor.
- (3) The Contractor must provide any temporary intermediate diaphragms and/or bracing necessary to provide lateral and torsional stability for the

girders during construction of the concrete slab. The temporary intermediate diaphragms/bracing shall be removed after the concrete has attained its design strength. The cost of furnishing, installing and removing the temporary intermediate diaphragms and/or bracing shall be subsidiary to the pay item "Class 47BD-4000 Concrete for Bridges".

- (4) (i) The girders shall be transported in an upright position and the points of support and direction of the reactions with respect to the girder shall be approximately the same during the transportation and storage as when the girder is in its final position. If the Contractor finds it necessary to transport the precast girders in some other position, the Contractor shall be prepared to prove that no internal damage results.
- (ii) Adequate padding shall be provided between tie chains and cables to prevent chipping of the concrete.
- (iii) Live loads shall not be allowed on the superstructure units until the floor slab is placed and attains the design strength shown in the plans.

13. Inspection Facilities:

The Contractor shall arrange with the producer of Precast or Precast/Prestressed Concrete Structural Units to provide an office, laboratory and bathroom for the Department's inspector. The areas shall meet the following requirements:

- a. Thermostatically controlled heating and air conditioning shall be provided so that temperature can be maintained between 68° and 77°F (20° and 25°C).
- b. The floors shall be tile or a similar floor covering.
- c. Interior and exterior walls shall be well maintained and painted.
- d. All exterior doors shall have cylinder locks, and all keys shall be turned over to the Engineer.
- e. Ceiling lighting shall provide a minimum of 465 foot-candles (5000 lx) of light on all working surfaces.
- f. Electrical outlets shall be spaced no more than 6 feet (1.8 m) apart with no less than 1 outlet on any wall of the office or lab.
- g. A single trunk telephone and a means to the Internet with a minimum of 1.5 mb of download stream shall be installed in the office, and the installation charges shall be paid by the Contractor. The monthly service charges will be paid by the Department.
- h. A fire extinguisher and First-Aid kit shall be provided.
- i. A ventilated bathroom with a toilet and sink shall be provided in the structure. A fresh water supply and drain will be required in the lab area.
- j. The lab, office, and bathroom shall be separate rooms with interconnecting doors.
- k. The minimum lab area is 230 square feet (21 m²).

- l. The minimum toilet area is 20 square feet (2 m²).
- m. The minimum office area is 160 square feet (15 m²).
- n. The Contractor shall clean and maintain the rooms and shall supply all heating fuel, electricity, and water.
- o. The Contractor shall also supply for the sole use of the inspectors all desks, work tables, chairs, files, lockers, and sanitary supplies necessary and commensurate with the inspection of his/her plant. It is anticipated that the following minimum amount of office and lab equipment will be required: One desk with approximately 3 foot x 6 foot (0.9 m x 1.8 m) top; one upright locker or wardrobe, with shelves, approximately 5 feet (1.5 m) deep; two 4-drawer file cabinets; 1 chair per inspector; 10 square feet (1 m²) of work surface per inspector in the office area; and a lab counter (approximately 3 x 18 feet [0.9 m x 5.5 m]) with storage space beneath.

Method of Measurement

- 1. Precast or Precast/Prestressed Concrete piles shall be measured in accordance with the requirements of Section 703.
- 2. Precast or Precast/Prestressed Concrete superstructures will be measured for payment by the lump sum.

Basis of Payment

- 1. Prestressed and/or Precast Concrete piles shall be measured and paid for as prescribed in Section 703.

	Pay Item	Pay Unit
2.	Precast/Prestressed Concrete _____ Superstructure at Station _____ *	Lump Sum (LS)

* Reinforcing steel, prestressing tendons, and all other components of the Precast or Precast/Prestressed Concrete superstructure are subsidiary to this pay item.

- 3. The cost of furnishing and maintaining the inspection facilities will not be paid for directly, but shall be subsidiary to "Precast/Prestressed Concrete _____ Superstructure at Station _____".
- 4. If a Precast or Precast/Prestressed Structural item's 56-day compressive strength is less than the design strength, then the Engineer will determine if the item can be used. If the item is to be used, a payment deduction of 25% will be taken if the 56-day compressive strength is less than 95 percent of the design strength.
- 5. All equipment calibrations and tests are subsidiary to "Precast/Prestressed Concrete _____ Superstructure at Station _____".
- 6. Payment is considered full compensation for all work prescribed in this Section, including the cost of prestressing and precasting.

DEBONDING PRESTRESSING STRANDS (G-15-0612)

General

Where shown, debond prestressing strands by encasing the strands in plastic sheathing along the entire length shown and sealing the ends of the sheathing with waterproof tape.

Materials

Sheathing must:

1. Be split or un-split flexible polymer plastic tubing
2. Have a minimum wall thickness of 0.025 inch
3. Have an inside diameter exceeding the maximum outside diameter of the strand by 0.025 to 0.14 inch
4. Not react with the concrete or steel

Split sheathing must have a minimum overlap of 3/8 inch.

Waterproofing tape must be flexible adhesive tape.

Construction

Distribute the debonded strands symmetrically about the vertical centerline of the girder. The debonded lengths of pairs of strands must be equal. Do not terminate debonding at any one cross section of the member for more than 40 percent of the debonded strands or 4 strands, whichever is greater. Do not debond the outside strands. Thoroughly seal the ends of the sheathing encasing the strand with waterproof tape before placing the concrete to prevent the intrusion of water or cement paste. Do not debond the extended strands.

Payment

Full compensation for Debonding Prestressing Strands shall be considered as included in the contract price paid for the Pay Item "Precast-Prestressed Concrete Superstructure at Sta ____", and no separate payment will be made.

EXPANSION BEARINGS, TFE TYPE (G-16-0612)

Paragraph 2.a. of Subsection 712.02 of the Standard Specifications is void and superseded by the following:

2. Expansion Bearings, TFE Type:
 - a. (1) The upper assembly shall consist of a sole plate conforming to the requirements of ASTM A709/A709M grade 50W (345W) weathering steel with an ASTM A240/A240M Type 304 stainless steel plate (13 gage) attached to the lower surface. As an alternate, the sole plate may be grade 36 (250) steel, metallized. If the grade 36 alternate is used, all flame cut edges of the sole plate shall be ground to reduce hardness and

facilitate blast cleaning. All corners of the sole plate shall be rounded to a 1/16 inch (1.5 mm) radius. All exposed plain steel surfaces shall be blast cleaned to a near white finish and zinc metallized with a minimum thickness of 8 mils (200 mm). Zinc metallizing must be performed in accordance with the American Welding Specification AWS C2.2.

INTERLOCKING CONCRETE PAVER BLOCKS

Interlocking Concrete Paver Blocks shall conform to the Standard Specifications for Highway Construction except as amended.

1. Material Requirements

Subsection 705.02 of the Standard Specifications is amended to include the following:

Blocks shall be precast in a plant for which the method of manufacture and quality of concrete are subject to the approval of the Department of Roads. The blocks shall meet the following requirements (expressed as an average value of three samples):

Compressive Strength (Min.)	4000 psi
Water Absorption (Percent – Max..)	7.0%
Density (Min.)	130 lbs/ft ³
Height (Nominal ± 10%)	6 inch

The compressive strength shall be determined from a 2-inch cube cut from a block. A minimum of three blocks per a day's pour shall be submitted to Materials and Research Division for testing. Blocks may be either closed (Maximum 10% open area) or open celled (Minimum 20% open area) as identified in the plans. When no cell style is identified the default shall be open celled.

Interlocking concrete pavers shall be as shown on the NDR Approved Products List.

Geotextile Filter Fabric for Interlocking Concrete Paver Block: Geotextile for use under Interlocking Concrete Paver Block applications shall be either a woven monofilament polypropylene geotextile meeting the AASHTO M 288 Class 2 Geotextile Strength Property Requirements or a nonwoven monofilament geotextile meeting the Class 1 requirements. The geotextile shall also meet the requirements of Table 6 in the AASHTO M 288 specifications unless otherwise noted in the plans.

The geotextile shall be free of defects, rips, holes, or flaws.

Fill Material for Interlocking Concrete Paver Block: Fill material for the open spaces between paver blocks shall consist of select soil from the construction site.

The requirements provided here for reference only and shall not be construed to supersede the AASHTO specification.

AASHTO M 288

	Class 1		Class 2	
	Elongation		Elongation	
	<50 %	≥50%	<50%	≥50%
Grab Strength (ASTM D 4632)	315 lbs.	200 lbs.	250 lbs.	160 lbs.
Sewn Seam Strength (ASTM D 4632)	280 lbs.	180 lbs.	225 lbs.	140 lbs.
Tear Strength (ASTM D 4533)	110 lbs.	80 lbs.	90 lbs.	55 lbs.
Puncture Strength (ASTM D 6241)	600 lbs.	430 lbs.	490 lbs.	310 lbs.

AASHTO M 288

	Table 6		
	Percent in Situ Soil Passing No. 200 Sieve		
	<15 %	15-50%	>50%
Permittivity (ASTM D 4491)	0.7 sec. ⁻¹	0.2 sec. ⁻¹	0.1 sec. ⁻¹
Apparent Open Size (ASTM D 4751)	No. 40	No. 60	No. 70
Ultraviolet Stability (ASTM D 44355)	50% after 500 h of exposure		

2. CONSTRUCTION METHODS

Subsection 705.02 of the Standard Specifications is amended to include the following:

Prior to placing pavers, the previously constructed subgrade shall be cleaned of all foreign substances. The surface of the subgrade shall be inspected for adequate compaction and surface tolerances. Ruts, soft spots, areas having inadequate compaction, and deviations of the surface from the specified tolerances shall be corrected prior to placing pavers.

Areas on which pavers are to be placed shall be trimmed and dressed to conform to plan cross sections within an allowable tolerance of plus or minus 2 inches from the theoretical slope lines and grades. Ruts and ditches shall be filled and leveled. Where such areas are below the allowable minus tolerance limit, they shall be brought to grade by filling with material similar to the adjacent material and well compacted. Immediately prior to placing pavers, the prepared subgrade will be inspected by the Engineer and no material shall be placed thereon until the area has been approved.

Geotextile filter fabric shall be laid flat but not stretched on the soil and shall be secured with Type 1 Erosion Control Anchoring Devices (See Approved Product List – Erosion Control). Fabric shall be laid with the long dimension horizontal. Overlaps of fabric at transverse and longitudinal joints shall be 12 inches minimum. Anchors shall be placed 3 inches in from the edge of the geotextile and through both thicknesses of overlapped geotextile along the midpoint of the overlap at not greater than 6-foot intervals. Additional pins shall be installed where needed to prevent slippage.

Geotextile installation shall proceed at such a rate that geotextile is covered with blocks within 2 days of laying of the fabric.

Placement of the block matrix may be by either hand or as cable tied machine placed mats. Placement of the block matrix shall be done in a manner that avoids damage to the drainage layer, geotextile or subgrade during installation. Final acceptance and approval of the installation will be made by the Engineer.

Joint spacing between adjacent blocks in the matrix shall be maintained so that binding of blocks does not occur and so that block-to-block interlock is achieved. In areas of curvature or grade change, orientation of an individual block to adjacent blocks in the matrix shall be such that block-to-block interlock and intimate contact with the geotextile is maintained.

Placement of the block matrix in channels shall preferentially begin at the upstream end and proceed downstream. Contractor may at his risk and with agreement of the Engineer place the block matrix starting from the downstream end and proceeding upstream, but shall also provide a temporary toe trench and anchoring at the upstream edge of the ACB System to protect against water undermining the system during flow events. Placement of the block matrix on side slopes and steep slopes exceeding 20% (1:5 V:H) shall begin at the toe of the slope and proceed upslope. Block placement shall not bring block-to-block interconnections into tension.

Individual blocks within the block matrix shall not protrude above the plane of the finished matrix more than 0.5 inches. Blocks that protrude more than 0.5 inches shall be removed and replaced until it protrudes no more than 0.5 inches. If necessary, additional blocks shall be removed and replaced to provide a planar surface.

Block matrices placed as cable tied, machine placed mats shall use manufacturer approved lifting equipment and cables. Mats shall be placed side by side or end to end such that they abut each other. Mats seams or openings between mats that are 2 inches or greater shall be filled with flowable fill.

Equipment shall not be allowed on the installed pavers that would break or otherwise damage the pavers.

Backfilling of the paver blocks shall be completed as soon as practicable after the Engineer has approved the block matrix installation. The surrounding sides of the installed paver blocks shall be filled with material similar to the adjacent material. The fill material for the open spaces through and between the pavers and shall be placed on the surface of the pavers and raked, brushed or tamped into the open spaces. Enough fill material shall be applied to fill the open spaces and excess fill material shall be removed from the surface.

3. METHOD OF MEASUREMENT AND BASIS OF PAYMENT

The item "Interlocking Concrete Paver Block" shall be measured and paid for by the square foot, surfaced measured. The price bid shall be full compensation for excavation, geotextile filter fabric, fillers, pavers, and all miscellaneous materials and labor required to complete the work.

EXPANSION DEVICE INSTALLATION

Any expansion device installation that fails to meet manufacturer's installation specifications will be removed and replaced with a properly installed joint at the expense of the Contractor. No payment will be made unless the manufacturer's representative certifies the installation.

ELASTOMERIC BEARINGS

Description

1. This work shall consist of furnishing and installing elastomeric bearing devices at the locations shown in the plans.
2. Prior to fabrication, the Contractor shall submit shop drawings to the Engineer for review.

Material Requirements

1. The elastomeric bearings shall consist of a laminated bearing pad conforming to the requirements of Section 1068 of the Standard Specifications.
2. The bearings shall be suitably packaged to prevent damage during shipment and storage.

Construction Methods

The contractor shall provide and install the elastomeric bearings as prescribed in the plans.

Method of Measurement

The elastomeric bearings are measured by the each.

Basis of Payment

- | 1. | Pay Item | Pay Unit |
|----|---------------------|-----------|
| | Elastomeric Bearing | Each (EA) |
2. Payment is full compensation for all work prescribed in this Section.

PREPARATION OF BRIDGE AT STATION 596+40.00

General Items

The item, "Preparation of Bridge at Station 596+40.00" shall be in accordance with the pertinent provisions of Section 704 of the Standard Specifications.

This item includes all work prescribed in the plans necessary to prepare the existing bridge for widening and rehabilitating including the following:

The removal of some of the existing concrete bridge railings and slab.

The saw cutting and breaking back of the existing slab, and turndowns to the limits shown on the plans.

The breaking back of the existing concrete slope protection to the limits shown on the plans. The drilling of holes for dowel bars and the furnishing and placing of resin adhesives for the dowel bars as shown or noted on the plans.

The cleaning and roughening of the existing concrete that comes into contact with the new work.

The cleaning, straightening and extending of the existing reinforcing steel into the new work.

The field cutting of reinforcing steel and the application of epoxy coating to the cut bar ends as specified in the plans.

EXISTING REINFORCEMENT ENCOUNTERED DURING REPAIR

When existing reinforcing steel is broken or has a section loss greater than 20%, the contractor shall lap splice the existing bar with a bar of matching size. Lap splices shall be as given in the following table:

Bar #	Non-epoxy Length (in.)	Epoxy Length (in.)
4	15	18
5	20	24
6	26	31
7	33	39
8	45	54
9	59	71
10	74	89
11	95	139

The bar used to splice, shall lap, by the length given above, with a portion of the existing bar of which 80% or more of the full section is present, on either side of a break or deteriorated or damaged segment. All existing reinforcing steel exposed, during removal of defective concrete, and to be incorporated into the new work, shall be blast cleaned to remove all rust and corrosion and reformed, as required, to assume its original (intended) shape. For any reinforcing bar that has more than 2/3 of its diameter exposed, the existing concrete shall be removed so that a minimum clearance of 3/4" is provided all around the bar for the placement of new concrete.

All material, labor, tools, equipment and incidentals shall be subsidiary to other work for which payment is made.

DOWELING INTO CONCRETE STRUCTURES - POST INSTALLED ADHESIVE ANCHORS

Materials

1. This provision is concerned with reinforcing bars adhered to hardened concrete. The adhesive anchor system used for post-installed anchorage of reinforcing steel to concrete shall conform to requirements of the most recently published ACI 355.4, *Acceptance criteria for Qualification of Post-Installed Anchors in Concrete and Commentary*.
2. With regard to epoxy resin adhesives for the anchor system, one of the following requirements shall be met:
 - a. Adhesives for post-installed anchors are acceptable for use if they are given on the Approved Products List and they also comply with minimum requirements as stated in this provision.

- b. Adhesives for post-installed anchors shall meet ACI 355.4 and also comply with minimum requirements as stated in this provision. Bulk mixed adhesives are not permitted.
- 3. The adhesive anchors, shall be supplied as an entire system. The system shall include, but not be limited to, the new adhesive cartridge, a clean mixing nozzle, extension tube, a dispensing gun and all manufacturer recommended supplies for properly cleaning the drilled hole.
- 4. Anchorage design is in accordance with Appendix D of ACI 318-11. For adhesive anchors, the following minimum values for bond stress were assumed for design using the above adhesive anchor assemblies:

$$T = 2050 \text{ psi}$$

- 5. Epoxy resin adhesives used for doweling reinforcing bars into hardened concrete shall be capable of providing the full tensile resistance of the reinforcement at the embedment depths specified in the plans. The ultimate tensile force for 60 ksi reinforcement is given in the table below for various bar sizes. If the particular product used requires a greater embedment depth to achieve the required pull-out capacity than that shown in the plans, the Engineer shall be informed.

#3	7,425 lb.
#4	13,500 lb.
#5	20,925 lb.
#6	29,700 lb.

General Installation Guidelines

- 1. Concrete shall have a minimum compressive strength (f'_c) of 2500 psi at the time of adhesive anchor installation.
- 2. Concrete at time of anchor installation shall have a minimum age of 21 days.
- 3. Concrete temperature at the time of anchor installation shall be 50°F (10°C) or warmer.
- 4. Anchor embedment depth and projection (length protruding) from the concrete surface are shown on the drawing or detail for the particular anchor being installed. The Engineer shall be consulted in cases where this information is unclear or absent from the plans.
- 5. Adhesives shall be stored and installed within the service temperature ranges recommended by the manufacturer.

Installation Techniques

- 1. Post-installed adhesive anchors shall be installed in accordance with the Manufacturers Printed Installation Instructions (MPII) with the exception, as follows. When the instructions of this provision are more stringent than the MPII, adhesive anchors shall be installed in accordance with these provisions, as a minimum requirement.
- 2. Installation of adhesive anchors, horizontally or upwardly inclined or those used to support sustained tension loads, shall be performed by personnel certified by the

ACI/CRSI Adhesive Anchor Installer Certification Program. It is recommended that all adhesive anchors are installed under the supervision of a certified installer.

3. The installer's qualifications, when required, shall be submitted to the Engineer, prior to any work being done on the project.
4. The Contractor shall provide all equipment required to install the adhesive anchor, including but not limited to drills, setting tools, clean-out brushes, blow-out bulbs, oil-free compressed air, shop vacuums, wrenches, etc.
5. Anchors shall be installed in holes drilled with a rotary impact hammer drill or rock drill.
6. Anchor holes shall be thoroughly cleaned prior to adhesive injection, as required by the MPII. At a minimum, this consists of cleaning with compressed air free of oil and moisture using a nozzle extended to the bottom of the hole. This shall be supplemented with brush or other tool cleaning to remove all concrete dust and loose material followed by a second compressed air cleaning. This is commonly known as "blow-brush-blow" (BBB).
7. Drilled and cleaned anchor holes shall be protected from contamination until the adhesive is installed.
8. A drilled hole shall be re-cleaned if, in the opinion of the Engineer, the hole has become contaminated after cleaning.
9. Unless otherwise indicated on the MPII, adhesive shall be dispensed through a tube or cartridge extension, beginning at the maximum depth of the hole that is withdrawn as adhesive is injected until the hole is entirely filled. This shall be followed by insertion and rotation of the anchor to the specified depth. Where necessary, spaces around anchors, at the surface, shall be sealed to prevent loss of the adhesive during curing where holes are drilled in a range from horizontally to upward.
10. Anchors to be installed in the adhesive shall be clean and free of any surface contaminants or imperfections, e.g., oil, loose rust, paint or other coatings.
11. Installed adhesive anchors shall be securely fixed in place to prevent displacement during curing of the adhesive. Unless shown otherwise on the drawings, anchors shall be installed perpendicular to the concrete surface. Anchors displaced before full adhesive cure shall be considered damaged and replaced at the Contractor's expense.
12. Reinforcing bars shall not be bent after being adhered to the concrete unless permitted by the Engineer.

Basis of Payment

Pay shall be made subsidiary to other items for which payment is made.

PENETRATING CONCRETE SEALERS

Description

This work shall consist of furnishing and applying Penetrating Concrete Sealers to Portland Cement Concrete at the locations shown in the plans or ordered by the Engineer in accordance with the requirements of these Specifications.

Material Requirements

The penetrating concrete sealer must be from Nebraska's Approved Products List.

Application Methods Prior to Application

1. Concrete to be sealed shall have cured for a minimum of 28 days.
2. All surfaces shall be cleaned of sand, surface dust, dirt, oil, grease, chemical films, cure compounds or coatings and other contaminants with a high pressure water washer capable of delivering water at not less than 2,000 psi. If high pressure water does not remove surface contaminants, then sand blasting will be required at the Engineer's discretion.
3. Surfaces shall be allowed to air dry for a minimum of 48 hours.
4. A 2ft x 2ft clear plastic sheet shall be taped around all of its edges to a representative region of the cleaned concrete for not less than 20 minutes. If upon removal of the plastic sheet, moisture is observed on its surface, additional drying time shall be required before application of Penetrating Concrete Sealer.
5. The Engineer shall consult NDOR Materials and Research Division to determine if a Rilem Tube Absorption Test should be performed.
6. Test applications of the Penetrating Concrete Sealer may be required at the discretion of the Engineer.

Application

1. Air, Material and surface temperatures shall be 40° F (4° C) or higher during application. Concrete Sealers shall not be applied when temperatures are expected to fall below 30° F (-1 C°) within 12 hours or when rain is expected within 6 hours. Do not apply sealer materials during wet weather conditions or if adverse weather conditions are anticipated within 12 hours of the completion of sealer application.
2. The limits of Application
 - i) All bridges: Entire deck and approach sections from End of Paving to End of Paving.
 - ii) Open Rail Bridges, Penetrating Concrete Sealer shall be applied to:
 - (1) Outside edge of deck
 - (2) Underside of deck for a minimum of 8 inches from the outside edge
 - iii) Closed Rail Bridges, Penetrating Concrete Sealer shall be applied to:
 - (1) Inside faces of rail

- (2) Top face of rail
 - (3) Inside face of concrete deck drains
 - (4) Underside of deck for at least 8 inches around perimeter of open concrete deck drains
- iv) Bridges over non-gravel roadways, Penetrating Concrete Sealer shall be applied to all surfaces of any substructure within 20ft of edge of traffic lane to a height of 10ft.
3. Horizontal Application: Penetrating Concrete Sealer shall be applied with low pressure sprayer (10 – 25 psi) or roller so as to thoroughly saturate the concrete surface. Sufficient quantity is indicated when Concrete Sealer stands for a few seconds before completely penetrating the concrete surface.
 4. Vertical Application: Apply from bottom up with low pressure sprayer (10 – 25 psi) or roller so as to thoroughly saturate the concrete surface and create a uniform wet appearance.
 5. Precise Application Rates will vary with concrete mix, porosity, finish and environment, but may be estimated at 200 – 300 sq. ft. per gallon.
 6. Drying time shall be a minimum of 2 hours for light traffic or by manufactures recommendation and maybe extended at the discretion of the Engineer.

Method of Measurement

1. Penetrating Concrete Sealer” is measured by the Square Foot

Basis of Payment

1.	Pay Item	Pay Unit
	Penetrating Concrete Sealer	SQ. FT.

MULTI-LAYER EPOXY POLYMER OVERLAY

DESCRIPTION

The work shall consist of preparing the surface of the reinforced concrete bridge deck, and furnishing and placing a multi-layer epoxy polymer overlay (EPO).

MATERIALS

The EPO shall be comprised of a two component epoxy (resin and hardener), combined with aggregate as described in the following:

1. **Epoxy:**
 - a. The epoxy shall be Type III, for use in bonding skid resistant materials to hardened concrete.
 - b. Type III epoxy shall comply with AASHTO M 235 (ASTM C 881), and shall meet additional requirements shown in Table 1.0, and is the class appropriate for the temperature at the time of application, as designated by the manufacturer.

- c. Provide Grade 1 or 2, 100 percent solids, thermosetting, moisture-insensitive epoxy.

Table 1.0

ADDITIONAL REQUIREMENTS FOR TYPE III EPOXY POLYMER OVERLAY		
Property	Requirement	Test Method
Viscosity	7-25 poises	ASTM D2393, Brookfield RVT, Spindle 3 at 20 RPM
Gel Time	15-45 min.	ASTM C 881, ¶ 11.2.1 modified, 50 to 100 ml sample.
Compressive Strength*, 3 hr.	1000 psi min.	ASTM C 109, w/ plastic inserts
Compressive Strength*, 24 hr.	5000 psi min.	ASTM C 109, w/ plastic inserts
Tensile Strength, 7 days	2000-5000 psi	ASTM D 638
Elongation, 7 days	30-70%	ASTM D 638
Pull-Off Strength, after 24 hr. min. Cure Time of Layer 2.	250 psi min.	ASTM C1583-04

*Mixed with aggregate.

- d. The Contractor shall submit for approval the following information:
- (1) Name, address and telephone number of the epoxy manufacturer. Include the name of the preferred contact person.
 - (2) Brand name of the material.
 - (3) Type, Grade and Class of the material.
 - (4) Manufacturer's certificate of compliance stating that epoxy components consist of 100% solids.
 - (5) Information regarding recommended usage and application instructions.
 - (6) Material Safety Data Sheets.
 - (7) Test results shall be submitted by a Cement and Concrete Reference (CCRL) or AASHTO Materials Reference (AMRL) accredited Laboratory. The certified lab will show test results of AASHTO M 235 (ASTM C 881) and requirements of Table 1.0.
 - (8) A Fourier Transform Infrared Spectrophotometry (FTIR) spectrum in transmittance mode must be included and a bulk sample of each component tested and sent to Materials and Research Division.
 - (9) Six 3 oz. resin samples, representative of the material must be provided for testing to the Materials and Research Division. All liquid components will be "fingerprinted" using infrared spectroscopy for use in screening future verification samples to verify that materials submitted for use are of an identical formulation as originally approved. These samples shall be submitted at the same time as other required submittals.
 - (10) Verification that the testing apparatus used for bond tests has been calibrated within the last year according to ASTM C900-06, Annex A1.

2. Aggregate:

- a. Provide a singly crushed siliceous gravel or chat that is free of dirt, clay and foreign of organic material.
- b. The Engineer shall collect a 60 lb. sample of the aggregate for use in quality assurance testing. This sample shall be collected from the material delivered to the jobsite.

- c. The aggregates provided shall meet the requirements of Tables 2.0 & 3.0 below:

Table 2.0

QUALITY REQUIREMENTS FOR EPOXY POLYMER OVERLAY		
Property	Requirement	Test Method
Sodium Sulfate Soundness, Maximum Loss	12%	AASHTO T104
Maximum Wear	30%	AASHTO T96
Acid Insoluble Residue, Minimum	55%	NDOR C25
Fine Aggregate Angularity, Minimum	40%	AASHTO T304, Method C
Moisture Content, Maximum	0.20%	AASHTO T255

Table 3.0

GRADATION REQUIREMENTS FOR AGGREGATES (percent passing)				
Sieve	4	8	16	30
% Passing	100	30-75	0-5	0-1

EQUIPMENT

The Contractor may request the use of other equipment or methods. The Contractor shall submit a list to the Engineer of all equipment to be used at least two weeks prior to construction. Equipment must comply with the following requirements.

1. **Surface Preparation Equipment:** Steel Shot-blasting equipment capable of producing a surface relief equal to the International Concrete Repair Institute (ICRI) Concrete Surface Profile (CSP) 6 to 7. The shot-blast equipment shall be capable of providing a uniform surface texture. The equipment shall be inspected before use, and worn blasting wheels and liners are required to be replaced. Loose shot shall be collected using a magnet, magnetic broom, air blast, vacuum or stiff bristle broom. Wet sand blasting is not allowed.
2. **Mechanical Distribution Equipment:**
 - a. All equipment to enter or cross the prepared surface, such as work vehicles, trailers, carts, etc., that contain motor oil, transmission fluid, gear oil, radiator fluid, lubricants, etc. shall be accompanied by a protection membrane such as plastic tarps or rolled plastic placed on the prepared deck surface under equipment to protect the prepared deck surface from contamination.
 - b. An epoxy distribution system shall be capable of accurate and complete mixing of the epoxy resin and hardening agent, verification of the mix ratio and uniform and accurate distribution of the epoxy at the specified rate on 100% of the prepared surface.
 - c. To minimize the formation of air bubbles produced during mechanical mixing of the epoxy components, the mixer shall only use "Jiffy" or "Sika" paddle types, or approved equal.
 - d. An aggregate spreader shall be capable of uniform and accurate application of the dry aggregate over 100% of the prepared surface.
 - e. An air compressor shall be capable of producing a sufficient amount of oil-free and moisture-free compressed air to remove all dust and loose material.

3. **Hand Application Equipment:**
 - a. Calibrated containers for accurate measurement of epoxy components shall be used.
 - b. To minimize the formation of air bubbles produced during mechanical mixing of the epoxy components, the mixer shall only use paddle types "Jiffy" or "Sika" paddle types, or approved equal.
 - c. Notched squeegees and brooms shall be capable of spreading the epoxy material according to this specification and the manufacturer's recommendations.
 - d. Adequate additional hand tools may be used to facilitate the placement of the EPO according to this specification and the manufacturer's recommendations.
4. Do not use power driven tools heavier than a 15 pound chipping hammer, during surface preparation.

CONSTRUCTION METHOD

1. **Preparation of Surface:**
 - a. The Contractor shall determine the size of shot, flow of shot, forward speed of shot blast machine and number of passes to achieve a surface preparation that will satisfy the required pull-off strength of the EPO.
 - b. Deteriorated and/or delaminated concrete shall be removed and repaired with EPO slurry (epoxy and aggregate combined) or approved patch material. No Magnesium Phosphate patch materials will be permitted.
 - c. In all cases, the EPO shall not be placed on any Portland cement concrete less than 28 days old.
 - d. All bridges will require, at minimum, a single-pass shot blast of the preparation surface. The Contractor shall produce a surface relief equal to the International Concrete Repair Institute (ICRI) Concrete Surface Profile 6 to 7. The width of overlap of successive passes of the machine shall be as minimal as possible to limit double exposure. The contractor must make available to the Engineer, a set of ICRI surface profile cards to verify the shot blast profile. Inaccessible areas shall be abrasive blasted.
 - e. Metal deck drains and areas of the curb or railing above the proposed surface from the shot blast shall be protected.
 - f. All dirt, paint, oil, asphalt, laitance, carbonation, curing materials and other deleterious material from the surface of the deck and bridge rails (6" above deck or first break in the case of a continuous rail) shall be removed.
 - g. The Contractor shall clean all prepared surfaces by air blasting with dry, oil free air or vacuuming. Sweeping with brooms for final cleaning is not acceptable.
 - h. Any contamination of the prepared deck surface or surface of subsequent layers shall be removed. Contaminated areas shall be sand-blasted or bush hammered to produce an acceptable surface for placement of the EPO.
 - i. The Contractor shall prevent rain water from transporting objectionable materials from surrounding paving onto the bridge deck.
 - j. Visible moisture on the prepared deck at the time of placing the EPO is unacceptable. The Contractor shall identify moisture in the concrete by taping an 18"x18" plastic sheet to the deck per ASTM D4263. The plastic sheet test shall be performed only when surface temperatures and ambient conditions are within the established parameters for application of the overlay system. In the event of rain, the concrete shall be allowed to air dry for a minimum of 24 hours prior to performing the plastic sheet test. This test shall be performed by the contractor and observed by the Engineer. The NDOR will allow a 6 hour test duration in lieu of the 16 hours specified in ASTM D4263.

- k. The first layer shall be placed within 24 hours of preparing the deck surface. Deck surfaces exposed for more than 24 hours must be abrasive blasted or sand blasted prior to application of the EPO.
2. **Proportioning:** All epoxy materials shall be proportioned according to the manufacturer's recommendations.
3. **Placing the Epoxy Polymer Overlay:**
- a. The EPO shall be placed in two separate layers to the surfaces shown in the Contract at application rates shown in Table 4.0:

Table 4.0

EPOXY POLYMER OVERLAY APPLICATION RATES		
Layer	Epoxy Rate	Aggregate Rate*
1	Not Less Than .22 gal./sq. yd.	10 lb./ sq. yd. min.
2	Not Less Than .45 gal./sq. yd.	14 lb./ sq. yd. min.

*Apply enough aggregate to completely cover the epoxy.

- b. Notched squeegees or mechanical application equipment shall be used to place the mixed epoxy on the deck surfaces immediately and uniformly at the prescribed rate.
- c. The Contractor shall continually monitor the gel time of the mixed epoxy. The EPO shall not be placed if conditions are such that gel time is less than 10 minutes.
- d. Deck drains shall be closed so the epoxy and aggregate shall not enter the drains.
- e. A paintbrush or roller shall be used to apply the epoxy on the face of curbs to the top of the curb. On bridges with continuous concrete barrier rails, apply the epoxy to the first break in the geometry of the barrier or 6 inches above the deck or existing overlay whichever is greater. On bridges with open concrete barriers, apply the epoxy to the following surfaces:
 - (1) All 4 faces of the posts a minimum of 6 inches above the deck or existing EPO.
 - (2) The outside edge of deck
 - (3) A minimum of 8 inches on the underside of the deck or slab overhangs.
- f. A single layer of Epoxy and aggregate shall be applied to curbs, barriers or posts during placement of layer 1. No aggregate is required for the outside edge or underside of deck overhangs.
- g. The bridge deck and all mixed epoxy and aggregate components must be a minimum of 60°F at the start of application. See paragraph 4.a.
- h. The dry aggregate shall be applied to cover the epoxy completely within 10 minutes of application.
- i. Any first layer surfaces of epoxy that do not receive enough aggregate before gelling of the epoxy occurs must be removed and replaced.
- j. Excess aggregate from the first layer after sufficiently cured shall be vacuumed or swept. If damage or tearing occurs, halt sweeping or vacuuming operation.
- k. Traffic must not be allowed on the first EPO layer.
- l. The epoxy and aggregate for the second layer shall be placed at the prescribed rate and in the same manner as the first layer and placed within 24 hours after the placement of the first layer.
- m. Second layer surfaces that do not receive enough aggregate before gelling of the epoxy may be re-coated with epoxy and aggregate.

- n. All longitudinal joints will be at the edge of one lane or as indicated by the Engineer. No joints will be allowed on the wheel path.
- o. The EPO shall be produced and placed within the specified limits in a continuous and uniform operation.
- p. All construction joints shall be taped to provide a clean straight edge for adjacent EPO placement. This includes joints between previously placed EPO materials and at centerline.
- q. The exposed edges at the ends of the bridge and at expansion joints shall be finished to minimize bridge deck roughness.
- r. A bond breaker shall be applied to all expansion joints.

4. Curing: Minimum curing times are noted in Table 5.0:

Table 5.0

EPOXY POLYMER OVERLAY CURE TIMES							
	Average Temperature of Deck, Mixed Epoxy, and Aggregate, F deg.						
Layer	55-59	60-64	65-69	70-74	75-79	80-85	85+
	Minimum Cure Time (hours)						
1	5	4	3	2.5	2	1.5	1
2	6.5	6.5	5	4	3	3	3

- a. The average temperatures listed in Table 5.0 are to be taken immediately prior to placement of epoxy on deck surfaces. The second layer shall be cured for 8 hours if the air temperature falls below 55°F during the curing period. The cure times listed for the 55-59°F temperature range are provided for the case where the deck, mixed epoxy, and aggregate satisfy the 60°F min. temperature at the start of placement and subsequently decrease during placement.
- b. The work shall be planned and performed in such a way as to provide for the minimum curing times specified in this provision or as specified by the epoxy manufacturer.

5. Temperature Limitations:

- a. The minimum temperature of deck, mixed epoxy, and aggregate at the start of placement of the EPO shall be 60°F.
- b. If the manufacturer’s temperature requirements are more restrictive than provided in this provision they will govern.
- c. The EPO must not be placed when conditions are such that the deck temperature will exceed 100°F.
- d. The EPO must not be placed if conditions are such that gel time is less than 10 minutes.
- e. The EPO must not be placed if the air temperature is expected to drop below 55°F within 8 hours of placement.

6. Correction of Unbonded or Damaged Areas: Any areas of the EPO discovered to be un-bonded by sounding or chaining and areas of the EPO damaged by the contractor’s operation shall be repaired before payment is made. A squared perimeter of areas to be repaired shall be saw cut to the top of the concrete surface and the EPO shall be removed with small air tools (15 pounds maximum) or shot blasting. The underlying concrete area shall be shot blasted to remove contaminants, and the EPO shall be

replaced according to standard placement procedures. There is no additional cost to the Department for unbonded or damaged areas.

BOND (PULL-OFF) TESTING

1. The Contractor shall record the results of the pull-off tests.
2. The Contractor shall perform pull-off tests of three specimens on each lot of the completed overlay in accordance with ASTM C1583-04 under the observation of the Engineer. **A lot shall be defined as one lane of traffic for each span of the bridge measured in square yards, with the following stipulations:**
 - a. Shoulders 8 feet and under shall be included in the lot containing the adjacent lane.
 - b. Shoulders exceeding 8 feet shall be considered a separate lot for each span.
 - c. Each lane of the bridge approach shall be considered a separate lot.
3. The location of the three pull-off specimens per lot shall be determined by the Engineer.
4. The loading disk used in the pull-off tests shall be adhered to the finished surface of the EPO following core drilling operation to a depth at least 1/2" into the concrete substrate.
5. The pull-off tests shall not start any sooner than 24 hours after placement of the second layer of the EPO.
6. The pull-off test shall not be performed when the deck temperature exceeds 85° F.

METHOD OF MEASUREMENT

1. Epoxy Polymer Overlay will be measured for payment by the square yard of deck surface and bridge approach surface area overlaid as determined by field measurement.
2. Epoxy Polymer Overlay applied to bridge rails or barriers and epoxy applied to the deck edge or deck underside will not be measured directly and will be considered subsidiary to the Multi-Layer Epoxy Polymer Overlay.

BASIS OF PAYMENT

- | | | |
|----|-----------------------------------|--------------------------------|
| 1. | Pay Item | Pay Unit |
| | Multi-Layer Epoxy Polymer Overlay | Square Yard (yd ²) |
2. For each lot, the EPO unit price is multiplied by bond strength pay factor for the item "Multi-Layer Epoxy Polymer Overlay"
 3. The bond strength of the three (3) pull-off specimens will be averaged to determine the pay factor for each lot with the following exception:

If the tensile strength of a specimen is less than 250 psi and failure is in the concrete at a depth of at least 1/4 inch over more than 50% of the test surface, then the tensile strength used for that single specimen will be 250 psi.

4. The pay factors for the average bond strength test are as shown in Table 6.0:

Table 6.0

BOND STRENGTH PAY FACTORS	
Average Bond Strength of Lot *	Percent Pay
Greater than 245 psi	100%
235 psi - 245 psi	90%
225 psi - 234 psi	75%
Less than 225 psi	40% or Reject

*245 psi allows for a 2% margin of error (with 250 psi required)

5. Any lot rejected by the Engineer will be removed and replaced at no additional cost to the Department.
6. Payment is full compensation for all work in this Section.

FIXED BEARINGS AND EXPANSION BEARINGS, PTFE TYPE

In Section 712 of the Standard Specifications, the abbreviation TFE is void and shall be replaced with the abbreviation PTFE.

**JACKING CULVERT PIPE, SEWER PIPE,
AND CASING**

Subsection 731.05 in the Standard Specifications is amended to include the following:

Pay Item	Pay Unit
Jacking ____ inch(mm) Culvert Pipe, Type ____, Class ____	Linear Foot (LF) [Meter (m)]

**MECHANICALLY STABILIZED EARTH (MSE) WALLS WITH MODULAR BLOCK
FACING UNITS**

Subsection 715.04 in the Standard Specifications is amended to include the following:

4. The quantity of "Excavation For MSE Wall" is measured by the cubic yard and computed using the plan dimensions. No adjustment in the pay quantity will be made if the computed quantity, based on the working drawings, varies from the plan quantity.

Subsection 715.05 is amended to include the following:

Pay Item	Pay Unit
Excavation For MSE Wall	Cubic Yards (CY)

SEEDING

Subsection 803.02 in the Standard Specifications is amended to include the following:

Type "B"	Minimum Purity	Broadcast Application Rate in lb. of Pure Live Seed/Acre	Approved Mechanical Drill Application Rate in lb. of Pure Live Seed/Acre
Canada wildrye – Mandan, Neb native	85		4
Virginia wildrye – Omaha	85		4
Slender wheatgrass	85		4
Fox sedge (<i>Carex vulpinoidea</i>)	85		0.5
Big bluestem–Bonanza, Kaw, Roundtree, Pawnee	60		2.5
Inland saltgrass (<i>Distichlis spicata</i>)	60		1.5
Prairie cordgrass (<i>Spartina pectinata</i>)	85		1
Switchgrass–Blackwell, Pathfinder, Shawnee, Trailblazer	90		1
Oats (wheat in the fall)	90		15

All seeds shall be origin Nebraska, adjoining states, or as specified. A Contractor proposing to use a substitute variety or origin shall submit for the Engineer's consideration a seed tag representing the seed, which shows the variety, origin and analysis of the seed.

Rate of application of commercial inorganic fertilizer shall be:

	Rate of Application per Acre (Minimum)
Available Nitrogen (N ₂)	19 or 36 lbs.
Available Phosphoric Acid (P ₂ O ₅)	92 or 96 lbs.

Rate of application of granular sulphur coated urea fertilizer shall be:

Nitrogen (Total Available)	0 lbs.
----------------------------	--------

The Contractor may, at his option, apply granular urea formaldehyde in lieu of the sulphur coated urea fertilizer at the following rate:

Nitrogen (Total Available)	0 lbs.
----------------------------	--------

EROSION CONTROL

Subsection 807.02 in the Standard Specifications is amended to include the following:

Erosion Control	Minimum Purity	Application Rate in lb of Pure Live Seed/1000 sq. yard
Fine-leaf perennial ryegrass	85	4.7
Turf-type tall fescue	85	81.8
Kentucky bluegrass	85	6.5

All seed shall be origin Nebraska, adjoining states, or as specified. A Contractor proposing to use a substitute variety, or origin shall submit for the Engineer's consideration a seed tag representing the seed which shows the variety, origin and analysis of the seed.

Rate of application of commercial inorganic fertilizer shall be:

	Rate of Application per 1000 SY (Minimum)
Available Nitrogen (N ₂)	4 or 9 lb.
Available Phosphoric Acid (P ₂ O ₅)	23 or 24 lb.

Rate of application of granular sulphur coated urea fertilizer shall be:

Nitrogen (Total Available)	0 lb.
----------------------------	-------

EROSION CONTROL

Subsection 807.01 is void and superseded by the following:

This work shall consist of the preparation of slopes and waterways and the furnishing and application of soil retention blankets at the locations shown in the plans.

Subsection 807.02

Paragraphs 2, 2.a., 2.b., and 2.c. are void and superseded by the following:

Wire staples shall be used for anchoring the soil retention blanket. The staples shall be a minimum of 13 gauge U-shaped steel wire with a 1 inch or larger throat with at least 6 inch long legs.

Paragraph 5 is void.

Subsection 807.03

Paragraph 6c is void.

Paragraphs 7.a.i. and 7.a.ii. are void.

Paragraph 8 is void.

Paragraph 1. of Subsection 807.05 is amended to include the following:

Pay Item	Pay Unit
Erosion Control, Class_____	Square Yard (SY)

EROSION CHECKS

Subsection 808.01 is void and superseded by the following:

This work shall consist of seeding, trenching, furnishing and placing soil retention blankets, and furnishing and placing hay bales to construct erosion checks at the locations shown in the plans. There are two separate and distinct types of erosion checks – “Erosion Checks” which are permanent and placed as shown in the plans or as directed by the Engineer after final grading is complete; and “Temporary Silt Checks” which are temporary and placed as shown in the plans or as directed by the Engineer when rough grading is begun or as necessary.

Subsection 808.02

Paragraph 4 is void.

Paragraph 5a. is void and superseded by the following:

The “Temporary Silt Checks” shall be on the NDR Approved Products List.

Paragraph 5b. is void and superseded by the following:

The wire staples for “Temporary Silt Checks” shall be a minimum of 13 gauge steel wire with a 1 inch (25 mm) or larger throat and 6 inch (150 mm) legs.

Subsection 808.03

Paragraph 3 is void.

Paragraph 4 is void.

Paragraph 6b. is void.

Paragraph 7 is void and superseded by the following:

The hay bales shall then be placed in the trench over the soil retention blanket with bale ties up and backfilled to the level of the finished ditch elevation.

Paragraph 12, 12a, 12b, 12c, and 12d are void and superseded by the following:

Paragraph 12. Temporary Silt Checks

- a. The "Temporary Silt Checks" shall be installed at the locations shown in the plans, and as directed by the Engineer. The upstream edge shall be slightly buried and pinned with wire staples on approximately 24 inch (600 mm) spacings. The pins may be may be left slightly exposed for easier removal. The triangular portion shall be pinned on 3 foot (1 m) centers.
- b. The "Temporary Silt Check" shall be in place immediately after the rough grading is completed in that area.
- c. The "Temporary Silt Check" shall be left in place until the finish grading begins. Reinstall the "Temporary Silt Checks" as soon as finish grading is complete unless the permanent erosion control is initiated immediately after finish grading. "Temporary Silt Checks" should be in place at all times after finish grading until the permanent "Erosion Checks" are in place.
- d. At the completion of the project, the "Temporary Silt Checks" shall remain the property of the Contractor.

Subsection 808.04

Paragraph 2 is void and superseded by the following:

"Temporary Silt Checks" shall be measured by the linear foot (meter) for the initial installation. The removing or relocating of the "Temporary Silt Checks" will not be measured for payment, but will be considered subsidiary to the initial installation.

Subsection 808.05

Paragraphs 1, 2, and 3 are void and superseded by the following:

- | 1. Pay Item | Pay Unit |
|--------------------------------|------------------------------|
| Erosion Check | Bale |
| Erosion Checks, Type _____ | Bale |
| Erosion Checks, Type Wattle | Linear Foot (LF) [Meter (m)] |
| Erosion Check "Type Synthetic" | Linear Foot (LF) [Meter (m)] |
| Temporary Silt Check | Linear Foot (LF) [Meter (m)] |
| Erosion Checks, Type _____ | Linear Foot (LF) [Meter (m)] |
2. If cleanout of an "Erosion Check" or "Temporary Silt Check" is required, it will be paid as equipment rental as prescribed in Subsections 809.04 and 809.05.
 3. Payment for "Temporary Silt Checks" includes any costs incurred to reinstall the "Temporary Silt Checks" once the area is finished graded.

TEMPORARY SEEDING

Subsection 803.02 in the 2007 Standard Specifications is amended to include the following:

Type "Temporary"	Minimum Purity (%)	Broadcast Application Rate in lb. of Pure Live Seed/Acre	Approved Mech. Drill Application Rate in lb. of Pure Live Seed/Acre
Oats	90	80	64

- Hydrostraw or Hydrostraw Cuar Plus Formulation, Hydrostraw, LLC at 2000 lbs/acre.
- Mat-Fiber or Mat-Fiber Plus, Mat, Inc. at 2000 lbs/acre.
- GeoSkin, North American Green at 2000 lbs/acre.
- Enviro-Blanket, USG at 2000 lbs/acre.
- Excel Fibermulch II, American Excelsior 2000 lbs of wood fiber mulch/acre.
- Enviro-Gold or Enviro-Gold Plus, Central Fiber at 2000 lbs/acre
- Or Approved Equal

Temporary seeding is required on the temporary road embankments and other places as shown on the plans or as directed by the Engineer. The seeding and mulching shall be applied as soon as the embankment is completed. Seeding seasons do not apply to temporary seeding.

"Temporary Seeding" will be measured and paid for by the acre. The mulch will not be measured for payment but shall be considered subsidiary to the "Temporary Seeding".

All seed shall be origin Nebraska, adjoining states, or as specified. A contractor proposing to use a substitute variety, or origin shall submit for the Engineer's consideration a seed tag representing the seed which shows the variety, origin and analysis of the seed.

Rate of application of commercial inorganic fertilizer shall be:

	Rate of Application Per Acre (Minimum)
Available Nitrogen (N2)	60 lb.
Available Phosphoric Acid (P2O5)	0 lb.

TEMPORARY EROSION CONTROL BLANKET

Description

This work shall consist of providing and installing Temporary Erosion Control Blanket at the locations shown on the plans, shown on the Contractor's Temporary Erosion Control Plans, or as directed by the Engineer.

Material Requirements

1. The Temporary Erosion Control Blanket shall be any product on the Approved Products List for Erosion Control, Erosion Control "Class 1B, 1C, or 1D". The minimum weight shall be 0.50 lbs/sy. All netting shall have a life of 1-year or less.

2. Staples shall be shown on the Approved Products List for 6" Erosion Control Staples/Pins.

Construction Methods

1. The Temporary Erosion Control Blanket shall be constructed as shown on the Erosion Control Plan when grading is completed on a slope for an extended period of time.
2. The Temporary Erosion Control Blanket may be used alone or in conjunction with Cover Crop or Temporary Seeding.

Method of Measurement

All work involved in constructing Temporary Erosion Control Blankets as described above will be included and is paid by the square yard (square meter) of blanket installed.

Pay Item	Pay Unit
Temporary Erosion Control	Square Yards (Meter)

Payment is full compensation for all work prescribed in this section.

COVERCROP SEEDING

Subsection 812.01

Paragraph 2 is void and superseded by the following:

Cover crop seeding shall be applied to any disturbed area requiring erosion protection. It is intended to be used in staged construction areas, surcharge areas, or other disturbed areas that have not been permanently seeded.

Subsection 812.02

Paragraph 4 is void.

Subsection 812.04 is void and superseded by the following:

Subsection 812.04

1. Cover crop seeding is measured by the acre of ground surface seeded. The areas will be calculated from surface measurements of the length and width \pm 1 yard (\pm 900 mm).

**FABRIC SILT FENCE
(HIGH POROSITY AND LOW POROSITY)**

Paragraph 3. Of Subsection 809.03 in the Standard Specifications is amended to include the following:

Silt Fence may be installed mechanically with a silt fence plow in lieu of the trenching procedures.

Paragraph 4. of Subsection 809.03 in the Standard Specifications is amended to include the following:

At the completion of the project, the silt fence shall be left in good working condition.

**GUARDRAIL END TREATMENT, TYPE I
(I-1-0813)**

Section 902 in the Standard Specifications is amended to include "Guardrail End Treatment, Type I".

This work consists of furnishing and installing a guardrail end treatment system according to the details and at the locations shown in the plans.

The Contractor has the option of installing one of the following systems:

- | | |
|----------------|-----------------------------------------------------------------------------------------------------------------|
| 1.) ET-31 | Manufactured by Trinity Industries, Inc.
2525 N. Stemmons Freeway
Dallas, TX 75207
(800) 644-7976 |
| 2.) SKT-SP-MGS | Manufactured by Road Systems, Inc.
3616 Old Howard County Airport
Big Springs, TX 79720
(915) 263-2435 |

The Contractor will be required to furnish two sets of shop plans to the Department of the system to be installed. The guardrail end treatment shall be installed in accordance with the recommendations of the manufacturer.

Payment shall be full compensation for all work required to provide and install the system.

IMPACT ATTENUATOR SYSTEM

Paragraph 18. of Subsection 422.03 in the Standard Specifications is void and superseded by the following:

The Contractor shall furnish and install impact attenuator systems at the locations shown in the plans. The systems shall meet NCHRP 350 standards for test-level 3 (TL-3). The systems shall be non-gating redirective crash cushions.

Approved Impact Attenuator Systems are shown on the NDR "Approved Products List."

The system shall be furnished and installed as specified by the manufacturer. The system installation Contractor shall certify, in a letter to the Engineer, that the system was installed correctly. Along with the certification, the Contractor shall send maintenance instructions for the installed system.

The item "Impact Attenuator ____" shall be measured by the each and shall include furnishing and installing the impact attentuator system and any attachment materials,

barrier transition sections, replacement cartridge kits, the certification letter, and the maintenance instructions.

END ANCHORAGE ASSEMBLY

Section 902 in the Standard Specifications is amended to include the item "End Anchorage Assembly".

Paragraph 1. of Subsection 902.05 is amended to include the following:

Pay Item	Pay Unit
Anchorage Assembly	Each (ea)

CONCRETE SLOPE PROTECTION AT HARRISON STREET

The Contractor shall verify the elevations of the existing abutment drain pipes prior to constructing the slope protection to ensure that the new slope protection does not block the drain pipes.

The item "Concrete Slope Protection" shall be measured and paid for by the square yard. The price bid shall be full compensation for any materials, tools, labor and incidentals required to build the concrete slope protection, remove portions of the existing slope protection, filter fabric, rebar and riprap, and any extra earthwork necessary.

DRAINAGE

I. General

Any changes to the project plans or cross-sections shall require the Contractor to consider the ramifications these changes will have on the project drainage.

The work of maintaining drainage during the construction shall not be paid for directly, but shall be considered subsidiary to items for which direct payment is made.

II. Temporary Bulkhead for Storm Sewer

This work shall consist of furnishing and installing a temporary bulkhead for storm sewers as needed for phasing.

Temporary bulkheads shall be constructed of 3/4-inch exterior grade plywood. The outside diameter of the bulkhead shall be the outside diameter of the sewer pipe plus 12 inches.

The work of furnishing and installing the temporary bulkheads shall be considered incidental to the work related to furnishing and installing of storm sewer, and shall not be paid for directly.

III. Manholes & Inlets

At several locations throughout the project existing manholes and inlets will be removed and replaced with new structures to accommodate the new drainage system. Before constructing the new manhole or inlet, the existing pipes that connect to the new structures shall be inspected by the Engineer for damage.

Pipes that have been damaged at the ends as a result of the removal of the existing manhole or inlet shall be repaired or replaced by the Contractor.

In order to build the new structures, the existing drainage pipes may need to be shifted, modified or removed beyond where they will be positioned ultimately to drain into or away from the structure.

The work of modifying, extending, shifting, salvaging or working around the existing drainage pipe in order to ultimately position the pipe to drain into or away from the new structure is subsidiary to the work of building the new manhole or inlet.

IV. Modify Inlet

The plans show modifying four existing inlets. These inlets need to remain in service but will have new pavement constructed over them as a part of this project. The inlets will be modified as shown in the plans.

The removal shall be done in a manner so as to leave the exposed area smooth and level so that when the concrete cap is placed, soil is not allowed to infiltrate the inlet. The concrete cap shall be placed in a manner approved by the Engineer. Details of the concrete cap are shown in the plans. The existing grates shall become the property of the Contractor.

The Item "Modify Inlet" shall be measured and paid for as one each basis. Payment shall be considered full compensation for all work prescribed.

V. Warehouse Drive - Reconstruction of Inlet No. 45 at Sta. 58+74.23 - 93.72' Rt.

This inlet is located at the edge of the existing drive of the Marianna Warehouse. The drainage area around this inlet and concrete pipe has experienced severe erosion and undermining. Any erosion present at the time of construction shall be corrected by backfilling and compacting. This work shall not be paid for directly, but shall be considered subsidiary to items for which direct payment is made. There are underground utilities near the Inlet and existing concrete pipe and extreme caution will need to be exercised during construction activities. The Contractor must organize his work so access to the Inlet and require paving block work is accomplished mostly from the interstate ROW. NDOR has acquired a "Letter of Access" to allow this work to be completed on the property of the warehouse. The Contractor shall coordinate construction activities with Marianna, the contact person there is Ms. Colleen Sorben, phone number 402-593-0211.

GRANULAR SUBDRAINS & LONGITUDINAL SUBDRAIN

Subsection 915.02 of the Standard Specifications is void and superseded by the following:

Aggregate that is used in granular & longitudinal subdrains shall consist of crushed gravel or crushed rock and shall conform to the requirements of Paragraphs 1. and 2. of Subsection 1033.02.

Crushed gravel shall have a fine aggregate angularity value of 43.0 or greater. The specific gravity for calculation of the Fine Aggregate Angularity (FAA) shall be determined on a combined aggregate sample of the material passing the No. 8 (2.36 mm) sieve and retained on the No. 100 (150 µm) sieve as defined in AASHTO T 304 Method A, except the specific gravity material shall be washed over the No. 100 (150 µm) sieve. Gravel aggregate shall have a soundness loss of not more than 12 percent by weight at the end of 5 cycles using sodium sulfate solution.

Crushed rock shall conform to the requirements of Paragraph 7.f. of Subsection 1033.02. Crushed rock shall have a percentage loss of not more than 14 at the end of 16 cycles of the freezing and thawing test.

The crushed gravel or crushed rock shall meet the following gradation requirements.

Granular & Longitudinal Subdrains Gradation Requirements		
Sieve Size	Target Value (Percent Passing)	Tolerance
1 inch	100	0
No. 4	40	±20
No. 10	15	±15
No. 200	4	±4

Paragraph 2. of Subsection 915.03 of the Standard Specifications is void and superseded by the following:

The Contractor shall provide and place aggregate in the trench as prescribed in the plans but shall be placed at the midpoint of the adjacent concrete slab (midway between contraction joints) or as directed by the Engineer.

Paragraph 5. of Subsection 915.03 is void and superseded by the following:

Excavated material shall become the property of the Contractor and removed from the project or used for shoulder construction on the project.

Earth Shoulder Construction shall be completed prior to granular subdrain installation.

Section 915 in the Standard Specifications is amended to include Longitudinal Subdrains. Longitudinal subdrains shall be constructed as shown in the plans and in accordance with applicable portions of Section 915 and these Special Provisions. The filter fabric and work required to place it will not be measured for payment but shall be considered subsidiary to item Longitudinal Subdrain.

Paragraph 1. of Subsection 915.05 is amended to include the following:

Pay Item	Pay Unit
Longitudinal Subdrain	Linear Foot (LF)

CONCRETE DITCH LINING

Paragraph 1. of Subsection 908.05 in the Standard Specifications is amended to include the following:

Pay Item	Pay Unit
Concrete Ditch Lining	Square Yards (SY)

TEMPORARY RIGHT OF WAY FENCE

If the existing right of way (ROW) fence is removed before the new fence is built, the Contractor shall install and maintain a temporary ROW fence.

In areas where the new ROW fence can be constructed without conflicts, the new fence shall be completed before the existing fence is removed.

New ROW fence, temporary ROW fence and removal of ROW fence shall be accomplished one section or area of the project at a time. The Contractor shall not remove more fence in one day than can be replaced in that same day.

The temporary ROW fence can be let down to allow access during a day's construction but shall be replaced if work crews are not in the area. The temporary ROW fence must be in place at the end of each day's operation.

The Contractor shall furnish the temporary ROW fence and fence materials. The fence material shall be a lightweight orange colored plastic and be at least 4 feet high. The Contractor will also furnish metal "T" posts and ties. The post shall be set at approximately 10-foot intervals and the fabric tied with 3 ties per post.

After the new ROW fence is in place, the temporary ROW fence may be removed.

The work of installing, maintaining and removing the temporary ROW fence will not be paid for directly, but will be subsidiary to the item "5 foot Chain-Link Fence".

POSTS AND FASTENERS FOR HIGHWAY SIGNING (J-3-0411)

Paragraph 1.G.(3) of Subsection 1071.02 in the Standard Specifications is void and superseded by the following:

- (3) Light-duty posts shall be painted black or dark green.

**TIMBER AND LUMBER
(J-5-0711)**

Paragraphs 2.a. and 2.b. of Subsection 1075.02 in the Standard Specifications are void and superseded by the following:

2. a. The creosote, pentachlorophenol and copper naphthenate preservative treatment for timber and lumber shall be by the Empty-cell (Rueping) Process; and, where allowed, the ammoniacal copper arsenate (ACA), chromated copper arsenate (CCA), and ammoniacal copper zinc arsenate (ACZA) preservative treatment for timber and lumber shall be by the Full-cell (Bethel) Process. Treatment shall conform to the requirements as specified in T1-Use Category System: User Specification for Treated Wood of the American Wood-Preservers' Association Standards and AASHTO M 133. Preservatives shall meet the requirements of Section 1076.
- b. Preservative Treatment. The preservative treatment and minimum retentions for timber and lumber shall conform to the requirements as specified in U1-Use Category System: User Specification for Treated Wood of the American Wood Preservers' Association Standards as amended herein. Minimum retentions for all timber and lumber shall conform to Use Category UC4C. Minimum retentions for fence posts shall conform to Use Category UC4A. Timber and lumber to be treated with ammoniacal copper arsenate or ammoniacal copper zinc arsenate shall be dried to the fiber saturation point required to put the timber into satisfactory condition to accept the preservative and attain the required preservative retention and penetration. After treatment, with the exception of offset blocks and posts for guardrail terminals systems, the material shall be redried and have a moisture content of not more than 30 percent at the time or shipment to the job site.

Paragraph 1.b. of Subsection 1075.05 is void and superseded by the following:

- b. Species. Unless otherwise specified, sawn wood guardrail posts shall be either Douglas Fir (Coast Region) or Southern Yellow Pine.

Wood offset blocks shall be either Douglas Fir (Coast Region), Southern Yellow Pine (major or minor species), or Ponderosa Pine.

**PORTLAND CEMENT CONCRETE
(J-15-0813)**

Paragraph 1. of Subsection 1002.02 in the Standard Specifications is amended to include the following:

- b. Concrete mixes will be in accordance of Table 1002.02.

Paragraph 3. of Subsection 1002.02 is void and superseded by the following:

3. Type 1PF and 1PN cement shall be used for all classes of concrete except for pavement repair. Pavement repair shall include Type I/II Portland cement for Class PR1 concrete and Type III Portland cement shall be used in Class PR3 concrete. Type 1P cement shall meet all requirements of ASTM C 595.

Tables 1002.02, 1002.02M and 1002.03 in Subsection 1002.02 are void and superseded by the following:

**ENGLISH
TABLE 1002.02**

Concrete Mixes (Cubic Yard Batch)

Class of Concrete (1)	Base Cement Type*	Portland Cement (Min. lb/cy)	Pre-Blended Class F Fly Ash or Pozzolan* (Min. lb/cy)	Slag Cement (Min. lb/cy)	Class C Fly Ash (Min. lb/cy)	Silica Fume (Min. lb/cy)	Total Cementitious Materials (Min. lb/cy)	Total Agg. (Min. lb/cy)	Total Agg. (Max. lb/cy)	Coarse Agg. (%) (3)	Type of Coarse Agg.****	Air Content (% Min.-Max.) (2)	Water/Cement Ratio Max. (4)	Required Strength (Min. psi) (7)
47B**	1PF/1PN	423	141	0	0	0	564	2850	3150	30±3	Limestone	7.5 -10.0	0.48	3500
47B***	1PF/1PN	423	141	0	0	0	564	2850	3150	30±3	Limestone	6.0 - 8.5	0.48	3500
47BD	1PF/1PN	494	164	0	0	0	658	2500	3000	30±3	Limestone	6.0 - 8.5	0.42	4000
PR1	I/II	752	0	0	0	0	752	2500	2950	30±3	Limestone	6.0 - 8.5	0.36	3500
PR3	III	799	0	0	0	0	799	2500	2950	30±3	Limestone	6.0 - 8.5	0.45	3500
SF	I/II	564	0	0	0	25	589	2850	3200	50±3	Limestone	6.0 - 8.5	0.36	4000
47BHE	1PF/1PN	564	188	0	0	0	752	2500	3000	30±3	Limestone	6.0 - 8.5	0.40	3500
BX ₍₆₎	1PF/1PN	423	141	0	0	0	564	2850	3150	0	0 (5)	6.0 - 8.5	0.48	3500
47BFS** ₍₆₎	1PF/1PN	338	113	113	0	0	564	2850	3150	30±3	Limestone	7.5 -10.0	0.48	3500
47BFS*** ₍₆₎	1PF/1PN	338	113	113	0	0	564	2850	3150	30±3	Limestone	6.0 - 8.5	0.48	3500
47BDFS ₍₆₎	1PF/1PN	396	131	131	0	0	658	2850	3000	30±3	Limestone	6.0 - 8.5	0.42	3500

(1) Each class shall identify the minimum strength requirement. (For example, 47B-3500, where the last four digits indicate the strength in pounds per square inch. In the chart, strength of 3500 psi is indicated for 47B-3500; however, other strengths may be authorized elsewhere in the contract. The classes shown in the chart are typical examples.)

All classes of concrete shall be air-entrained, and a water-reducing admixture shall be used.

A slump test shall be performed to check for consistency and/or workability. Any increase in slump must be pre-approved by the Engineer.

A water reducer admixture shall be used at the manufacturer's recommendations.

(2) As determined by ASTM C 138 or ASTM C 231.

FOR INFORMATION ONLY. The Contractor may develop a Quality Control Program to check the quantity of air content on any given project; such as checking the air content behind the paver.

(3) Coarse aggregate shall be limestone unless otherwise specified.

(4) The Contractor is responsible to adjust the water/cement ratio so that the concrete supplied achieves the required compressive strength without exceeding the maximum water/cement ratio. The minimum water/cement ratio for any slip form concrete pavement is 0.38, unless the Contractor obtains written approval from the NDR Materials & Research Division prior to any placement on the project. The Contractor may request approval from Materials & Research in writing to change the water/cement ratio to 0.36.

(5) Single aggregate (sand-gravel) used for these classes of concrete.

(6) 47BFS is an acceptable substitute for 47B and 47BDFS is an acceptable substitute for 47BD.

(7) For acceptance of each class of concrete, refer to the specifications.

(8) For temporary surfacing, straight Type I/II cement is allowed.

(*) Mixes with Type 1PF and 1PN are pre-blended or interground with Class F fly ash or Class N Pozzolan by the cement mill producer at a rate of 25%±2%, no additional Class F fly ash or Class N Pozzolan is added at the batch plant. Lithium Nitrate may be used in place of Class F fly ash or Class N Pozzolan, see Section 1007 of the Standard Specifications as modified in these Special Provisions.

(**) For slip form applications.

(***) For hand-pours and substructures applications.

(****) Quartzite aggregate can be used in place of limestone providing the aggregate meets Paragraph 3.b. of Subsection 1033.02.

**METRIC
TABLE 1002.02**

Concrete Mixes (Cubic Meter Batch)														
Class of Concrete (1)	Base Cement Type*	Portland Cement (Min. kg/m ³)	Pre-Blended Class F Fly Ash or Pozzolan* (Min. kg/m ³)	Slag Cement (Min. kg/m ³)	Class C Fly Ash (Min. kg/m ³)	Silica Fume (Min. kg/m ³)	Total Cementitious Materials (Min. kg/m ³)	Total Agg. (Min. kg/m ³)	Total Agg. (Max. kg/m ³)	Coarse Agg. (%) (3)	Type of Coarse Agg.****	Air Content (% Min.-Max.) (2)	Water/Cement Ratio Max. (4)	Required Strength (Min. Mpa) (7)
47B**	1PF/1PN	251	84	0	0	0	335	1691	1869	30±3	Limestone	7.5 -10.0	0.48	25
47B***	1PF/1PN	251	84	0	0	0	335	1691	1869	30±3	Limestone	6.0 - 8.5	0.48	25
47BD	1PF/1PN	293	97	0	0	0	390	1483	1780	30±3	Limestone	6.0 - 8.5	0.42	30
PR1	I/II	446	0	0	0	0	446	1483	1750	30±3	Limestone	6.0 - 8.5	0.36	25
PR3	III	474	0	0	0	0	474	1483	1750	30±3	Limestone	6.0 - 8.5	0.45	25
SF	I/II	335	0	0	0	15	349	1483	1899	50±3	Limestone	6.0 - 8.5	0.36	30
47BHE	1PF/1PN	335	112	0	0	0	446	1483	1780	30±3	Limestone	6.0 - 8.5	0.40	25
BX ⁽⁸⁾	1PF/1PN	251	84	0	0	0	335	1691	1869	0	0 (5)	7.5 - 8.5	0.48	25
47BFS** ⁽⁶⁾	1PF/1PN	201	67	67	0	0	335	1691	1869	30±3	Limestone	7.5 -10.0	0.48	25
47BFS*** ⁽⁶⁾	1PF/1PN	201	67	67	0	0	335	1691	1869	30±3	Limestone	6.0 - 8.5	0.48	25
47BDFS ⁽⁶⁾	1PF/1PN	234	78	78	0	0	390	1483	1780	30±3	Limestone	6.0 - 8.5	0.42	30

- (1) Each class shall identify the minimum strength requirement. (For example, 47B-25, where the last two digits indicate the strength in MPa. In the chart, strength of 25 MPa is indicated for 47B-25; however, other strengths may be authorized elsewhere in the contract. The classes shown in the chart are typical examples.)
All classes of concrete shall be air-entrained, and a water-reducing admixture shall be used.
A slump test shall be performed to check for consistency and/or workability. Any increase in slump must be pre-approved by the Engineer.
A water reducer admixture shall be used at the manufacturer's recommendations.
- (2) As determined by ASTM C 138 or ASTM C 231.
FOR INFORMATION ONLY. The Contractor may develop a Quality Control Program to check the quantity of air content on any given project; such as checking the air content behind the paver.
- (3) Coarse aggregate shall be limestone unless otherwise specified.
- (4) The Contractor is responsible to adjust the water/cement ratio so that the concrete supplied achieves the required compressive strength without exceeding the maximum water/cement ratio. The minimum water/cement ratio for any slip form concrete pavement is 0.38, unless the Contractor obtains written approval from the NDR Materials & Research Division prior to any placement on the project. The Contractor may request approval from Materials & Research in writing to change the water/cement ratio to 0.36..
- (5) Single aggregate (sand-gravel) used for these classes of concrete.
- (6) 47BFS is an acceptable substitute for 47B and 47BDFS is an acceptable substitute for 47BD.
- (7) For acceptance of each class of concrete, refer to the specifications.
- (8) For temporary surfacing, straight Type I/II cement is allowed.
- (*) Mixes with Type 1PF and 1PN are pre-blended or interground with Class F fly ash or Class N Pozzolan by the cement mill producer at a rate of 25%±2%, no additional Class F fly ash or Class N Pozzolan is added at the batch plant. Lithium Nitrate may be used in place of Class F fly ash or Class N Pozzolan, see Section 1007 of the Standard Specifications as modified in these Special Provisions.
- (**) For slip form applications.
- (***) For hand-pours and substructures applications.
- (****) Quartzite aggregate can be used in place of limestone providing the aggregate meets Paragraph 3.b. of Subsection 1033.02.

Table 1002.03	
Table of Acceptable Concrete Class	
Class	Acceptable Class for
BX	47B, 47BD, or 47B-HE
47B	47BD, or 47B-HE

Paragraph 5, 6, 7, 8, 9, and 10 of Subsection 1002.02 are void and superseded by the following:

5. Class PR1 and PR3 Concrete:
 - a. The calcium chloride for use in PR concrete shall be either:
 - (1) A commercially prepared solution with a concentration of approximately 32 percent by weight.
 - (2) A Contractor prepared solution made by dissolving 4.5 pounds (0.54 Kg) of Grade 2 or 6.2 pounds (0.74 Kg) of Grade 1 calcium chloride per gallon (liter) of water to provide a solution of approximately 32 percent by weight.
 - b. The 7.4 pounds (10.89 Kg) of water in each gallon (liter) of solution shall be considered part of the total water per batch of concrete.
 - c. The calcium chloride solution shall be added, just prior to placement, at a rate of 0.375 gallons/100 pounds of cement (1.4 lb. calcium chloride per 100 lb. cement) [3.13 L/100 Kg of cement (1.4 Kg calcium chloride per 100 Kg cement)].
 - d. Class A, Flaked or Pellet Calcium Chloride shall be added at a rate not to exceed 2.0 percent of the weight of the cement for Grade 1, or 1.6 percent of the weight of the cement for Grade 2. Grade 1 Calcium Chloride purity is between 70 and 90 percent and Grade 2 Calcium Chloride is between 91 and 100 percent.
 - e. Where mixing trucks are used:
 - (1) For Class PR3 concrete, calcium chloride shall be thoroughly mixed into the concrete before placement. The minimum mixing time is 2 minutes.
 - (2) For Class PR1 concrete, calcium chloride shall be added first and then the concrete mixed at least 2 minutes or as required by manufacturer. Next, the Type F high range water-reducer admixture is added and the concrete is mixed an additional 5 minutes.
 - f. Where continuous batching equipment is employed, such as a concrete mobile mixer, the calcium chloride solution and Type F high range water-reducer admixture shall be incorporated in the concrete through a flow meter.

6. Class High Early (HE) Concrete
 - a. High Early (HE) strength concrete shall be cured as prescribed in Subsection 603.03, Paragraph 7. The Contractor shall take necessary curing measures so the required strength is achieved.
 - b. High Early concrete shall achieve a compressive strength of 3,500 psi (25 MPa) at 48 hours after placement.
 - c. The 48-hour compressive strengths shall be used to determine pay factor deductions for high early concrete in accordance with Table 603.03.
 - d. A non-calcium chloride accelerator shall be used when the ambient temperature at the time of the placement of concrete is 70°F or less.
 - e. When requested by the Contractor, the maturity method, as provided in NDR C 1074, may be used in lieu of the requirements of Subsection 603.03, Paragraphs 11.c. and d. to determine the strength of concrete pavement for the purpose of early opening to traffic and acceptance. Requests by the Contractor for use of the maturity method shall be on a project basis and shall be made in writing to the Engineer.
7. The yield of the concrete proportions shall be determined and adjusted by the Producer or Engineer.

Subsection 1002.02 is amended to include the following:

11. All Classes of Concrete with the exception of PR1 and PR3 shall have a Durability Factor not less than 70 and a mass loss not greater than five percent after 300 freeze/thaw cycles when tested in accordance with ASTM C 666. The freeze/thaw testing shall be conducted according to Procedure A.

Paragraph 1. and 2. of Subsection 1002.03 is void and superseded by the following:

1. The Contractor shall identify the plant that will supply the concrete 14 days before use and be entirely responsible for its calibration, batching of concrete, aggregate and sampling of cement per NDR Sampling Guide.
 - a. The Contractor shall be responsible for the following:
 - 1) Batching concrete.
 - 2) Contractor shall sample aggregate from the conveyor belt or stockpile. Gradations from a split sample shall be reported to the Engineer at the frequency required by the Materials Sampling Guide.
 - i. Contractor shall retain possession of the split samples on-site at the Contractor's facility until such a time as determined by the Engineer.
 - a) At the pre-construction meeting:
 - 1) Contractor shall determine the location of testing and report the names of the technician performing the sampling and testing.

- 2) Engineer will notify the Contractor of the retrieval of the split samples.
 - ii. The Contractor shall immediately seal the split sample after splitting and before testing has begun. The cloth sample bag shall be supplied by the Contractor.
 - iii. The sampling splitting and placement of the security seal of aggregate samples shall be witnessed by certified Department personnel.
 - iv. Contractor shall secure the split sample using a consecutively numbered security seal of 75 pounds breaking strength provided by the Department. The Contractor shall use the consecutively numbered security seals to identify and track each Aggregate Class. Samples that are not consecutively numbered will be investigated for custody of the sample and the Engineer may cease production until it is determined what action will be required.
 - v. The Contractor shall report the security seal tracking number with the split sample gradation.
 - b. The following training shall be required for personnel who oversee the batching of the concrete:
 - 1) Concrete technician personnel.
 - i. Concrete Plant Technician
 - 2) Portland cement sampler.
 - i. NDR Portland Cement Sampler.
2. Portland Cement Concrete shall be supplied by certified Ready Mix Plants that are in compliance with the requirements in the *Quality Control Manual*, Section 3, -- Certification of Ready Mixed Concrete Production Facilities published by the National Ready Mixed Concrete Association. Refer to NDR Material Sampling Guide for the policy on stationary and portable plants.

Paragraph 4. of Subsection 1002.03 is void and superseded by the following:

4.
 - a. Mix times shall meet the requirements of ASTM C 94. Mixing time tests shall be repeated whenever the concrete appearance indicates that mixing was inadequate.
 - b. Batch plants that are transporting the concrete in non-agitating trucks, the mixing time will not be less than 60 seconds, and for agitating trucks, the mixing time will not be less than 45 seconds.
 - c. The Certification of stationary and portable ready mix plants will conform to the tests that are required in the NDR Materials Sampling Guide.

Paragraph 6. of Subsection 1002.03 is void and superseded by the following:

6. Batch tickets shall be prepared as prescribed in the National Ready Mixed Concrete Associations *Quality Control Manual*. The Contractor shall keep all gradations and batch tickets until final acceptance by the Department. Projects that have less than 200 cubic yards of concrete placed will be allowed to have handwritten tickets. The concrete batch tickets shall show batch weights,

aggregate moisture, admixtures used, water, and mix design calculations. A copy of the batch ticket shall be given to the Engineer upon delivery of concrete.

Paragraph 8. of Subsection 1002.03 is void and superseded by the following:

8. Aggregate from a dry pit and coarse aggregate shall be uniformly saturated with water before it is used. The wetting shall begin 24 hours before concrete mixing to allow complete saturation.

Paragraph 1.b. of Subsection 1002.04 is void.

Paragraph 6 of Subsection 1002.04 is void and superseded by the following:

6. Compressive strength tests shall be made in accordance with ASTM C 39. Compressive strength cylinders shall be cured in accordance with ASTM C 31 paragraph 10. The compressive strength requirements shall be as specified. In general, 7-day compressive strength should be 70 percent of the 28-day compressive strength.

Subsection 1002.04 is amended to include the following:

8. Aggregate Acceptance, Verification, Sampling and Testing:
 - a. The aggregate will be accepted based on the Contractor's testing results except as noted below.
 - b. The aggregate verification sampling and testing by the Department will be randomly selected and tested according to subplot sizes in Table 1002.5

Table 1002.05

Aggregate Class	Lot	Sublot
E and F	3000 tons	1000 tons
A, B and C	6000 tons	2000 tons

- c. The results of Contractor split sample will be verified by the Department's verification tests. Any samples outside of the tolerances as specified according to the Materials Sampling Guide, Section 28 under the *Acceptable Tolerance Limits for Independent Assurance* will result in an Independent Assurance (IA) review of testing and may result in the Department test results being applied.
- d. On any given Lot, if the results of the gradation from the verification test are within Department's specification, the Contractor's results will be used for the entire lot. On any given Lot, if the gradation results from the verification test are outside Department's specification, further investigation will be initiated by the Engineer for that subplot. Any or all of the remaining Department subplot samples may be tested and the Department subplot test results may be applied to the respective subplot and the acceptance will apply.

- e. When verification tests are within testing tolerance but results show a consistent pattern of deviation from the split sample results, the Engineer will exercise one or more of the following:
 - Cease production
 - Request additional verification testing
 - Initiate a complete IA review

- f. Independent Assurance (IA) Review of Testing:
 - 1) The Contractor shall allow the Department personnel access to the Contractor's laboratory to conduct IA review of technician testing procedures and apparatus. Any deficiencies discovered in the Contractor's testing procedures will be reported to the Contractor and corrected by the Contractor.
 - 2) During IA review, the Department personnel and the Contractor shall split a sample for the purpose of IA testing. The samples selected will be tested in the Department's Branch Laboratory. Any IA test results found to be outside of defined testing tolerances as stated in Paragraph 8.c. of Subsection 1002.04 will be reported to the Contractor. The Contractor shall immediately correct any deficiencies found during the IA review.

- g. If the project personnel and the Contractor cannot reach agreement on the accuracy of the test results, the Department Central Laboratory will be asked to resolve the dispute, which will be final. All dispute resolutions will be in accordance with the Quality Assurance Program requirements in the NDR Materials Sampling Guide.

PORTLAND CEMENT (J-15-0812)

Section 1004 in the Standard Specifications is void and superseded by the following:

1004.01 – Description

- 1. Portland cement is the binder in concrete, locking the aggregate into a solid structure. It is manufactured from lime, silica, and alumina (with a small amount of plaster of gypsum).
- 2. Equivalent alkali referred to herein is hereby defined as the sum of the sodium oxide (Na_2O_e) and the potassium oxide (K_2O) calculated as sodium oxide (equivalent alkali as $\text{Na}_2\text{O}_e = \text{Na}_2\text{O} + 0.658 \text{K}_2\text{O}$).

1004.02 – Material Characteristics

- 1. Type I, Type II and Type III Portland cement shall conform to the requirements in ASTM C 150 with the following additional requirements:
 - a. Portland cement shall not contain more than 0.60 percent equivalent alkali.
 - b. Processing additions may be used in the manufacture of the cement, provided such materials have been shown to meet the requirements of ASTM C 465 and

the total amount does not exceed 1 percent of the weight of Portland cement clinker.

2. Type 1PF or 1PN shall be a Type 1P made exclusively with Class "F" fly ash or Class N as the pozzolan. Type 1P cement shall conform to the requirements as prescribed in ASTM C 595 and the following requirements:
 - a. The pozzolan content shall be 25 ± 2 percent of the cementitious materials by weight.
 - b. The pozzolan shall be Class F fly ash or Class N pozzolan.
 - c. Additional fly ash substitution shall not be allowed with Type 1P cement containing Class F fly ash or Class N pozzolan.

1004.03 – Procedures

1. The Contractor shall provide adequate protection for the cement against dampness.
 - a. Cement shall be hauled or stored in railroad cars, dry bulk trailers or in suitable moisture-proof buildings.
 - b. The use of tarpaulins for the protection of the cement against moisture will not be allowed.
2. No cement which has become caked or lumpy shall be used.
3. Cement which has been spilled shall not be used.
4. Accepted cement which has been held in storage at the concrete mix plant more than 90 days shall be retested.
5. Cement coming directly from the manufacturer shall not be used until the temperature is 150°F (66°C) or less.

1004.04 – Acceptance Requirements

1. a. Cements for use on NDR projects must be on the NDR Approved Products List.
 - b. Cements will be placed on the NDR Approved Products List based on conformance with the NDR Acceptance Policy for Portland and Blended Cements. This information can be found on the NDR Materials and Research website.
2. Portland cement chemical and physical test requirements shall conform to NDR Acceptance Policy for Portland and Blended Cements contained in the NDR's Materials Sampling Guide.
3. All cements shall be sampled and tested at the rate as described in the NDR's Materials Sampling Guide.
 - a. NDR will inform the Contractor when a sample is required.

- b. A sample shall be taken by a Contractor's Certified Portland Cement Sampler and must be under the supervision of NDR certified personnel.
 - c. The sample shall be taken at the plant from a bulk shipment of a rail car, dry bulk trailer, batch plant silo or from the line between the bulk truck and the silo. Upon sampling, NDR will take custody of the sample.
4. a. Blended cements shall be tested according to the provisions of ASTM C 1567. The mortar bars shall be composed of the Type 1PF/1PN cement and sand/gravel from a Platte River Valley source approved by NDR Materials and Research Division. The mortar bars for the ASTM C 1567 shall not exceed 0.10% expansion at 28-days. To accommodate precision within multi-laboratory testing, expansion up to and including 0.13% will be accepted for use. If the expansion is above 0.13%, the material will be noncompliant.
- b. Noncompliant material from the terminal or mill will be temporarily removed from the Approved Products List pending further investigation.
5. If the noncompliant cement is removed from the Approval Products List, all shipments from the supplier will be held until the investigation of the failing samples have been completed by the NDR Materials and Research Division. These procedures shall be in accordance with NDR Acceptance Policy for Portland and Blended Cements in the NDR's Material Sampling Guide.

WATER FOR CONCRETE (J-15-0512)

Section 1005 in the Standard Specifications is void and superseded by the following:

1005.01 – Description

Water shall be free from objectionable quantities of oil, acid, alkali, salt, organic matter, or other deleterious materials and shall not be used until the source of supply has been approved.

1005.02 – Material Characteristics

1. Water which contains more than 0.25 percent total solids by weight shall not be used.
2. When required by the Engineer, the quality of mixing water shall be determined by ASTM C 1603, ASTM C 114 and ASTM C 1602.
3. Upon written request by the concrete producer and approval by Materials and Research, the concrete producer may utilize up to 10% wash water for batching fresh concrete, only in mixes using 1P under the following conditions:
 - a. Wash water shall conform to the requirements in NDR's Material Sampling Guide.
 - b. Wash water must be clarified wash water that has been passed through a settling pond system.

- c. Wash water must be scalped off of a settling basin that has been undisturbed for a minimum of 12 hours.
- d. Wash water must be metered into each load.
- e. Wash water quantities shall be shown on the batch ticket.

CALCIUM CHLORIDE (J-15-0307)

Section 1006 of the Standard Specifications is void and superseded by the following:

1006.01 – Description

Calcium Chloride shall be Type S (Solid) or Type L (Liquid). Calcium Chloride can be used for, but not limited to, dust control and acceleration of the set of concrete.

1006.02 – Material Characteristics

The requirements for calcium chloride shall be as shown in ASTM D 98.

1006.03 – Acceptance Requirements

Acceptance shall be based on sampling and testing in accordance with AASHTO T 143 and requirements contained in the NDR Materials Sampling Guide.

SECTION 1007 -- CHEMICAL ADMIXTURES (J-15-0211)

Section 1007 in the Standard Specifications is void and superseded by the following:

1007.01 -- Description

- 1. Admixtures are materials added to Portland cement concrete to change characteristics such as workability, strength, imperviousness, freezing point, and curing.
- 2. The Department's concrete admixture types are:
 - a. Type A - Water-Reducing Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump.
 - b. Type B - Retarding Admixture - An admixture that slows the setting of concrete.
 - c. Type C - Accelerating Admixture - An admixture that speeds the setting and early strength development of concrete.
 - d. Type D - Water-Reducing and Retarding Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump and slows the setting of concrete.

- e. Type E - Water-Reducing and Accelerating Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump and speeds the setting and early strength development of concrete.
- f. Type F - Water-Reducing, High Range Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump by 12 percent or greater.
- g. Type G - Water-Reducing, High Range and Retarding Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump by 12 percent or greater and slows the setting of concrete.
- h. Air-Entraining - An admixture that encapsulates air in the concrete.
- i. Lithium Nitrate – An admixture used to control the Akali-Silica-Reaction (ASR) in concrete.

1007.02 -- Material Characteristics

- 1. Type A through G admixtures shall meet the requirements in ASTM C 494.
- 2. Air-entraining admixtures shall meet the requirements in ASTM C 260.
- 3. Use of admixtures other than those cited may be requested by the Contractor.
- 4. Admixtures shall not contain more than 1 percent of chlorides calculated as calcium chloride.
- 5. Admixtures shall be used at the manufacturer's recommended dosage rates.
- 6. The air-entraining admixture characteristics shall produce concrete with satisfactory workability and a total air content as prescribed in Table 1002.02.
- 7. a. When using the Lithium Nitrate admixture, the Contractor shall submit to the Engineer:
 - (i) A five pound sample of cement that will be used on the project.
 - (ii) The Manufacturer's method for determining the recommendation for the required dose rate based on the equivalent alkali content.
 - (iii) Water content of the Lithium Nitrate admixture solution.
- b. The Engineer will report the equivalent alkali content to the Contractor. The Contractor shall use the reported equivalent alkali content to determine the required dose rate based on the manufacturer's recommendation.

1007.03 -- Procedures

1. The process for adding admixtures to a ready mix truck on the project site involves positioning the load of concrete up to the truck chute, stopping short of discharge.
 - a. The admixture is then poured over the surface of the concrete and mixed for at least 5 minutes.
 - b. No more than 1.3 gallons (5L) of water shall be used to rinse the admixture from the fins and top chute. This water must be shown on the proportioning report and shall not exceed the water cement ratio.
 - c. When Lithium Nitrate is used, the portion of the admixture that is water will be shown on the proportioning report and shall not exceed the water cement ratio.
 - d. The Contractor is responsible for the addition of the admixture.
2. a. If the air content is less than the minimum specified, addition of air-entraining admixtures is allowed.
 - b. The Contractor shall take measures based on manufacturer's recommendations, that are within compliance of NDR Specifications, to bring the load of concrete into NDR prescribed limits according to Table 1002.02.
 - c. If the air content is then outside the limits in Table 1002.02, the load of concrete shall be rejected.

1007.04 -- Acceptance Requirements

1. a. Approved chemical admixtures are shown on the NDR Approved Products List.
 - b. Admixture approval shall be based upon annual certifications and certified test results submitted to the NDR Materials and Research Division.
2. The admixture must be essentially identical in concentration, composition, and performance to the admixture tested for certification.
3. Admixtures not identified on the NDR Approved Products List may be used under the following conditions:
 - a. A certificate of compliance and certified test results must be submitted to the NDR Materials and Research Division, and;
 - b. Approval for use must be given by the NDR Materials and Research Division.

**FLY ASH AND CALCINED NATURAL POZZOLAN
(J-15-0512)**

Subsection 1008.02 in the Standard Specifications is void and superseded by the following:

1008.02 – Material Characteristics

1. All fly ash and calcined clay natural pozzolan will be acceptance tested by the NDR Materials and Research Division. This includes production plant samples and field samples.
2. Fly ash shall conform to the requirements of Class C, Class F, and Class N pozzolan as defined in ASTM C 618 except that the maximum loss on ignition for Class F pozzolan shall be 3.0 percent. Either class of fly ash shall not contain more than 1.5 percent of available alkalis as Na_2O_e .
3. Fly ash produced in furnace operations utilizing liming materials or soda ash (sodium carbonate) as an additive will not be acceptable.

**SILICA FUME
(J-15-0307)**

Paragraph 2 of Subsection 1009.03 in the Standard Specifications is void and superseded by the following:

2. Silica fume shall be protected from temperatures in excess of 90°F (32°C).

**LIQUID MEMBRANE-FORMING COMPOUNDS FOR CURING CONCRETE
(J-15-0307)**

Subsection 1012.03 in the Standard Specifications is void and superseded by the following:

1012.03 – Acceptance Requirements

1. All curing compounds to be approved must be from the current calendar year with no carry-over from the previous years.
2. Approved compounds are on the NDR Approved Products List.
3. Products not on the NDR Approved Products List shall be sampled and tested in accordance with requirements of the NDR Materials Sampling Guide.

BITUMINOUS LIQUID COMPOUNDS FOR CURING CONCRETE (J-15-1007)

Section 1013 in the Standard Specifications is void and superseded by the following:

1013.01 – Description

The compound shall consist essentially of an asphaltic base and shall be of a consistency suitable for spraying at temperatures existing at the time of construction operations. It shall form a continuous, uniform film. It shall be free of precipitated matter caused by conditions of storage or temperature. The compounds shall be relatively nontoxic.

1013.02 – Material Characteristics

- a. When tested in accordance with AASHTO T 155, the loss of water shall not be more than 0.11 lb/ft² (0.55 kg/m²) of surface area at 3 days, unless otherwise specified by the Engineer.
- b. The Contractor has the option of using bituminous tack coat. The tack coat shall conform to all requirements of Section 504.

1013.03 – Acceptance Requirements

Products shall be sampled and tested in accordance with requirements of the NDR Materials Sampling Guide.

JOINT AND CRACK SEALING FILLER (J-15-0813)

Section 1014 in the Standard Specifications is void and superseded by the following:

1014.01 – Description

Joint sealing filler shall be either a cold applied silicone product or an asphalt product (hot pour) conforming to the requirements of this Section. The type of joint filler to be used shall be as specified in the plans or special provisions. If not specified, any of the joint sealing fillers in this Section may be used.

Crack sealing filler shall be a hot pour sealer conforming to the requirements of this Section.

1014.02 -- Material Characteristics

1. NE-3405 and NE-3405LM (hot pour)
 - a. NE-3405 joint and crack sealer shall conform to the requirements of ASTM D6690, Type II. The material shall conform to the requirements of Table 1 with the following exception:
 - (i) The test of Bond, non-immersed, ASTM D5329, 3 specimens through 3 cycles shall be run at 0°F (-18°C), 100% extension.

- b. NE-3405LM (Low Modulus) joint and crack sealer shall conform to the requirements of ASTM D6690, Type IV. The material shall conform to the requirements of Table 1.
- c. The test of Bond, non-immersed, ASTM-D5329, will be tested on concrete blocks that will be constructed by the NDR Concrete Laboratory. The concrete blocks will be made of a 47B concrete mixture as prescribed in Section 1002 in the NDR Standard Specifications. The design is amended so that no fly ash is used in the mixture. All other specifications for Portland Cement Concrete apply.
- d. Sample conditioning, preparation and heating shall be in accordance with ASTM D 5167 with the following exceptions:
 - (i) The following sentence of Section 8.1.2, "Also, if present, remove container liner by cutting it away", is void and superseded by the following:

"Also, if present, as much of the polyethylene bag as possible, shall be removed by cutting it away. Wholly-meltable type container in contact with the sample section shall be left in place."
 - (ii) The last sentence of Section 8.1.2 "Solid Materials" is void and superseded by the following:

The entire vertical section which has been cut, shall be placed into the pot for melting.
 - (iii) The Section of 8.2.2.1 "Solid Materials" is void.
 - (iv) The Section of 8.2.3 is void and superseded by the following:

After the solid segment is added to the melter, the material shall be allowed to minimally melt to a uniform viscous state suitable for the installation of the stirrer or paddle. The sample shall then be stirred for one full hour. The oil bath temperature shall be regulated to bring the material to the maximum heating temperature within the one hour of stirring.
 - (v) The Section of 8.2.4.1 is void and superseded by the following:

During the one full hour of stirring, check the temperature of the material at maximum 15 minute intervals using a Type K thermocouple with the calibration verified in accordance with Section 6.1.7 to ensure conformance with specified temperature requirements. Stop the mechanical stirrer when measuring temperatures. If material temperatures ever exceed the maximum heating temperature, or ever drop below the minimum application temperature after the maximum heating temperature was reached, discard the sample and re-do the heating. Maintain appropriate records of times and temperatures to verify conformance with specification requirements.
 - (vi) The Section of 8.2.4.2 is void.

- e. ASTM D 5329 shall include the following changes:
- (i) Sections 6.4 and 12.4 "Specimen Preparation" shall have the reference of "177 ml (6 oz.)" replaced with "3 oz."
 - (ii) Section 6 "Cone Penetration, Non-Immersed" shall be superseded with the following exceptions:
 - 1. Section 6.5 "Procedure" is void and superseded by the following:

Place the specimen in a water bath maintained at 77 +/- 0.2°F (25 +/- 0.1°C) for two hours immediately before testing. Remove the specimen from the bath and dry the surface by shaking gently to remove free water from the surface of the specimen. Using the apparatus described in Section 6.3, make one determination at or near the center of the specimen. Take care to ensure the cone point is placed on a point in the specimen that is representative of the material itself, and is free of dust, water, bubbles, or other foreign material.
 - 2. Section 6.6 "Report" is void and superseded by the following:

Record the value as penetration of the specimen in dmm units.
 - (iii) Section 12 "Resilience" shall be superseded with the following exceptions:
 - 1. Section 12.5 "Procedure", void the sentence "Make determinations at three points equally spaced from each other and less than 13mm (½ inch) from the container rim" and supersede with the sentence "Make one determination at or near the center of the tin."
 - 2. Section 12.6 "Report" is void.

2. Silicone Joint Sealer (cold applied)
 - a. Silicone joint sealers may be either self-leveling or non-sag and shall meet the requirements in Table 1014.01.

Table 1014.01

Silicone Joint Sealer Requirement		
Property	Requirement	Test
As supplied:		
Specific Gravity	1.010-1.515	ASTM D792
Work Time, minimum	10 minutes	
Tack-Free, at 25°C	20-360 minutes	
Cure Time, at 25°C, maximum	14 days	
Full Adhesion, maximum	21 days	
As cured, at 25°C + 1.5		
Elongation, minimum	800%	ASTM D412
Durometer		
Non-Sag, Shore A	10-25	ASTM D2240
Self-Leveling, Shore 00, minimum	40	ASTM D2240
Joint Movement Capacity	+100% to -50%	ASTM C719
Tensile Stress, at 150% Elongation	45 psi	ASTM D412

1014.03 -- Packaging

1. NE-3405 and NE-3405LM
 - a. The joint and crack sealer can be packaged in either cardboard box of wholly-meltable type containers.
 - (i) Cardboard box containers shall be manufactured from double wall kraft board producing a minimum bursting test certification of 350 PSI (241 N/cm²) and using water-resistant adhesives. The use of metal staples or fasteners of any kind will be prohibited for closing the lids of the boxes. Tape or other like material is acceptable.
 1. The joint and crack sealer shall be in meltable [300°F (149°C)] polyethylene bag(s).
 - (ii) Wholly-meltable type containers, and any of their components, shall be fully meltable and integrational with the joint and crack sealer by the time the manufacturer's minimum application temperature is reached.
 1. The wholly-melted and integrated container must not adversely affect the test specifications of the joint and crack sealer.
2. Silicone Joint Sealer
 - a. Each container shall include information regarding manufacturer and product name.

1014.04 -- Acceptance Requirements

1. NE-3405 and NE-3405LM
 - a. Acceptance of the manufactured material is based on pre-approval by either on or off-site sampling. Acceptable hot pour sealant lots are listed on the NDR Approved Products List.
 - (i) NDR on-site field sampling shall be in accordance with the NDR Materials Sampling Guide.
 - (ii) Off-site (Proxy) sampling shall be in accordance with ASTM D 6690.
 1. Proxy sampling shall be overseen by an outside party approved by the NDR, preferably another DOT Agency. Proxy samples shall include a manufacturer's Certificate of Compliance. Proxy samples shall also include a dated signature of origin by the Representative that is not affiliated with the manufacturer, and can either be on the Certificate of Compliance, or separate letter.
 2. For convenience in both sampling and shipping samples, sample containers smaller than a manufacturer's usual production containers are allowed, as long as the sample is 1500 grams min.
 3. Samples shall be sent to the NDR Bituminous Laboratory, or alternatively, sent to an NDR-approved independent laboratory for testing which will be at no cost to the Department. If a NDR-approved independent laboratory will be used for testing purposes, the NDR Bituminous Laboratory must be notified so that NDR concrete blocks for Bond testing can be sent to it.
2. Silicone Joint Sealer
 - a. Acceptance of applied silicone joint sealers shall be in accordance with the NDR *Materials Sampling Guide*.
 - b. Acceptable silicone joint sealer manufacturer products are listed on the NDR Approved Products List.
 - (i) For products that are not listed, approval may be based upon test results from an independent laboratory submitted to the NDR Concrete Materials Section by the manufacturer, and testing by the NDR. Approval must be made prior to product use.

EPOXY COMPOUNDS AND ADHESIVES (J-15-0308)

Section 1018 in the Standard Specifications is void and superseded by the following:

1018.01 – Description

This specification provides requirements for two-component, epoxy-resin bonding systems for use in non-load bearing applications and resin adhesives for application to Portland cement concrete.

1018.02 – Material Characteristics

1. Epoxy-resin bonding systems shall conform to the requirements of ASTM C 881. Approved systems are shown on the NDR Approved Products List.
2. The classification of Epoxy-Resin Bonding Systems is as follows:
 - a. Type I For use in non-load bearing applications for bonding hardened concrete and other material to hardened concrete.
 - Type II For use in non-load bearing applications for bonding freshly mixed concrete to hardened concrete.
 - Type III For use in bonding skid resistant materials to hardened concrete, and as a binder in epoxy mortars or epoxy concretes.
 - b. Grade 1 Low viscosity.
 - Grade 2 Medium viscosity.
 - Grade 3 Non-sagging consistency.
 - c. Class A For use below 40°F (4°C); the lowest allowable temperature to be defined by the manufacturer of the product.
 - Class B For use between 40°F and 60°F (4°C and 15°C).
 - Class C For use above 60°F (15°C); the highest allowable temperature to be defined by the manufacturer of the product.
 - Class D For use between 40°F and 65°F (4°C and 18°C).
 - Class E For use between 60°F and 80°F (15°C and 26°C)
 - Class F For use between 75°F and 90°F (24°C and 32°C)
3. Resin adhesives for embedding dowel bars, threaded rods, rebars and other fixtures in hardened concrete are shown on the NDR Approved Products List.

1018.03 – Procedures

1. The compounds shall be of the type and grade specified in the plans or as directed by the Engineer.
2. The class of the compounds shall be selected for use according to climatic conditions at the time of application.
3. All bonding surfaces shall be clean and free of all oil, dirt, grease, or any other materials which would prevent bonding.
4. Mixing and application shall be in strict accordance with the manufacturer's instructions.

1018.04 – Acceptance Requirements

1. Epoxy-resin bonding systems and resin adhesives approved for use are shown on the NDR Approved Products List.
2. Epoxy-resin bonding systems that are not on the NDR Approved Products List may be accepted based on a manufacturer's certificate of compliance.

**DEFORMED METAL CENTER JOINT AND METAL KEYWAY
(J-15-0307)**

Paragraph 1 a. of Subsection 1027.01 in the Standard Specifications is void and superseded by the following:

a. Metal Center Joint:

Metal center joint sections shall be manufactured from sheets no less than 18 gauge [0.05 inch (1.3 mm)] thick and shall be of the size and trapezoidal shape shown in the plans. The sections shall be punched along the centerline of the narrow face of the trapezoid to admit the tie bars required by the plans and also at intervals of not greater than 2 feet (600 mm) to receive pins that are driven vertically into the subgrade to support the metal center joint.

**AGGREGATES
(J-15-1112)**

Table 1033.02B of Subsection 1033.02 in the Standard Specifications is void and superseded by the following:

Table 1033.02B	
Aggregate Classes and Uses	
Aggregate Class	Concrete Description
A	Overlay Concrete SF
B	47B, 47B-HE, 47BD, PR 1, and PR 3
C	BX

Table 1033.03B of Subsection 1033.03 in the Standard Specifications is void and superseded by the following:

Table 1033.03B	
Aggregate Classes and Uses	
Aggregate Class	Concrete Description
E	47B, and 47B-HE 47BD, PR 1, and PR 3
F	Overlay Concrete SF

Paragraph 3.a.(3) of Subsection 1033.02 is void and superseded by the following:

- (3) Aggregates from a dry pit shall be washed and have a sand equivalent not less than 90 percent.

**SLAG CEMENT
(J-15-0512)**

Description

Slag cement shall meet the requirements of ASTM C 989, Grade 120.

Material Characteristics

1. All Slag cement will be acceptance tested by the NDR Materials and Research Division. This includes production plant samples and field samples.

Procedures

1. Slag cement shall be protected, stored, handled, and sampled in the same manner as specified for Portland Cement in Sections 1002 and 1004 and the NDR *Materials Sampling Guide*.
2. Each shipment of Slag cement sent to the project or ready mix plant shall be accompanied with a certificate of compliance from the supplier or manufacturing plant. The certificate must include the following information:
 - a. Name of the supplier or manufacturer.
 - b. Source of the Slag cement.
 - c. Consignee and destination of the shipment.
 - d. Project number to be used on, if available, and date shipped.
 - e. Railroad car number or truck identification number.
 - f. Weight of the shipment.
 - g. Certified test number representing the material being shipped.
 - h. An unrepeatable order number or other identification number so that each shipment is separately identified.
 - i. The NDR specifications that the product is in compliance with.
3. The following signed certification statement, or similar wording, must also be included on the form:

"This is to certify that this shipment of Slag Cement meets the Specification Requirements of the Nebraska Department of Roads for Slag Cement, Grade 120."

Signed _____

For _____
(Supplier)

4. Two copies of the certificate of compliance shall be sent with the shipment for the Engineer. The Engineer will retain one copy for his/her file and send the other copy to the NDR Materials and Research Division to serve as notification of receipt and identification of the Slag cement.

5. Slag cement may be used as soon as it is received; provided it is accompanied by the proper certificate of compliance and the results of previous tests indicate a satisfactory product.

Acceptance Requirements

1.
 - a. Approved Slag cement will be on the NDR Approved Products List.
 - b. Slag cement may be added to the NDR Approved Products List if it is in conformance with the NDR Acceptance Policy for Slag cement. This information is available upon request from the Department's Concrete Materials Section.
2.
 - a. Should any sample indicate noncompliance with the specifications, use of material from that source based on certification only may be withheld. It will be necessary that the Slag cement be held in special silos or bins at the plant or some facility under control of the company furnishing the Slag cement until such time that test results show compliance.
 - b. When it can be shown that continuing production from that plant has a high assurance of meeting specifications, material acceptance may once again be based on certification only.
3.
 - a. If tests made on field samples taken by the Department fail to meet any of the specification requirements, all shipments from the supplier will be held until tests have been completed by the NDR Materials and Research Division and approval for use is issued.
 - b. This procedure will be continued until it can reasonably be assured that the Slag cement from the supplier will again continue to meet contract requirements.

DOWEL BARS (J-15-0812)

Paragraph 1.c. of Subsection 1022.01 in the Standard Specifications is void and superseded by the following:

1. c. Both Type A and Type B coated dowel bars shall be coated with a bond breaker shown on the NDR Approved Products List, dipped in asphalt or paraffin, or greased in accordance with the specified requirements as shown in the Standard Plans.

**EPOXY COATED REINFORCING STEEL
(J-15-0509)**

Paragraph 5. of Subsection 1021.03 in the Standard Specifications is void and superseded by the following:

5. In order to protect the coated reinforcement from damage, the Contractor shall use padded or nonmetallic slings and padded straps. Bundled bars shall be handled in a manner which will prevent excessive sagging of bars which will damage the coating. If circumstances require storing coated steel reinforcing bars outdoors for more than two months, protective storage measures shall be implemented to protect the material from sunlight, salt spray and weather exposure. Coated steel reinforcing bars, whether individual bars or bundles of bars, or both, shall be covered with opaque polyethylene sheeting or other suitable opaque protective material. For stacked bundles, the protective covering shall be draped around the perimeter of the stack. The covering shall be secured adequately, and allow for air circulation around the bars to minimize condensation under the covering. Coated steel reinforcing bars, whether individual bars or bundles of bars, or both, shall be stored off the ground on protective cribbing. The bundled bars shall not be dropped or dragged. If, in the opinion of the Engineer, the coated bars have been extensively damaged, the material will be rejected. The Contractor may propose, for the approval of the Engineer, alternate precautionary measures.

**REINFORCED CONCRETE PIPE, MANHOLE RISERS,
AND FLARED END SECTIONS
(J-21-0108)**

The AASHTO reference made in paragraphs 4.a. and 4.b. of Subsection 1037.02 in the Standard Specifications is amended to read AASHTO M 170 / M 170M-95.

The AASHTO reference made in paragraph 5. of Subsection 1037.02 is amended to read AASHTO M 206 / M 206M-95.

The AASHTO reference made in paragraph 6. of Subsection 1037.02 is amended to read AASHTO M 207 / M 207M-95.

Paragraph 8. of Subsection 1037.02 is void and superseded by the following:

8. Concrete flared-end sections shall be of the design shown in the plans and in conformance with the applicable requirements of AASHTO M 170 / M 170M-95, Class II pipe, AASHTO M 206 / M 206M-95, Class A-II pipe, or AASHTO M 207 / M 207M-95, Class HE-II pipe for the diameter of pipe on which it is to be installed.

**PROPOSAL GUARANTY
(A-40-0307)**

As an evidence of good faith in submitting a bid for this work, the bidder shall indicate the type of bid bond applied to this project in accordance with the Proposal Guaranty Bid Bond Section of these Special Provisions.

* * * * *

205INFNOV13

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SCHEDULE OF ITEMS

CONTRACT ID: 2151X

PROJECT(S): S-80-9(1189)

CALL ORDER NO. : 205

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0001 GROUP 1 GRADING						
0001	0030.10 MOBILIZATION	LUMP	LUMP			.
0002	1000.00 LARGE TREE REMOVAL	3.000 EACH		.		.
0003	1009.00 GENERAL CLEARING AND GRUBBING	LUMP	LUMP			.
0004	1010.01 EXCAVATION (ESTABLISHED QUANTITY)	123903.000 CY		.		.
0005	1010.26 EXCAVATION FOR MSE WALL	14.000 CY		.		.
0006	1011.00 WATER	220.000 MGAL	30.00000		6600.00	
0007	1041.00 SALVAGING AND PLACING TOPSOIL	61331.000 SY		.		.
0008	1101.00 REMOVE PAVEMENT	38487.000 SY		.		.
0009	1101.25 SAWING PAVEMENT	1992.000 LF		.		.
0010	1102.00 REMOVE ASPHALT SURFACE	557.000 SY		.		.

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SCHEDULE OF ITEMS

CONTRACT ID: 2151X

PROJECT(S): S-80-9(1189)

CALL ORDER NO. : 205

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0011	1111.00 REMOVE FENCE	845.000 LF	.		.	
0012	1136.07 REMOVE PIER PROTECTION	18.000 LF	.		.	
0013	3017.50 INTERLOCKING CONCRETE PAVER BLOCK	24065.000 SF	.		.	
0014	4093.80 WALL MATERIALS	135.000 SF	.		.	
0015	4095.15 COMPACTED EARTH LEVELING PAD	37.000 LF	.		.	
0016	7017.00 REMOVE GUARDRAIL	1855.000 LF	.		.	
0017	8024.50 SELECT GRANULAR BACKFILL FOR RETAINED EARTH STRUCTURE	15.000 CY	.		.	
0018	L006.00 COVER CROP SEEDING	37.000 ACRE	.		.	
0019	L006.50 TEMPORARY SEEDING	6.000 ACRE	.		.	
0020	L019.13 EROSION CONTROL, CLASS 1D	68178.000 SY	.		.	
0021	L019.20 EROSION CONTROL, CLASS 2A	4015.000 SY	.		.	

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CONTRACT ID: 2151X

PROJECT(S): S-80-9(1189)

CALL ORDER NO. : 205

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0022	L021.51 EROSION CHECKS, TYPE WATTLE	8823.000 LF	.		.	
0023	L022.11 FABRIC SILT FENCE-LOW POROSITY	2301.000 LF	.		.	
	SECTION 0001 TOTAL				.	

SECTION 0002 GROUP 3 CONCRETE PAVEMENT

0024	0030.30 MOBILIZATION	LUMP	LUMP			.
0025	1020.01 DELINEATOR, TYPE I	34.000 EACH	.		.	
0026	1020.02 DELINEATOR, TYPE II	115.000 EACH	.		.	
0027	3008.05 TIE BARS	8810.000 EACH	.		.	
0028	3013.13 CONCRETE CLASS 47BD-4000 BARRIER CURB TYPE A	964.000 LF	.		.	
0029	3013.14 CONCRETE CLASS 47BD-4000 BARRIER CURB TYPE B	4788.000 LF	.		.	
0030	3013.16 CONCRETE CLASS 47BD-4000 BARRIER CURB TYPE C	3041.000 LF	.		.	

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SCHEDULE OF ITEMS

CONTRACT ID: 2151X

PROJECT(S): S-80-9(1189)

CALL ORDER NO. : 205

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0031	3013.31 CONCRETE CLASS 47BD-4000 BARRIER TRANSITION SECTION TYPE A	2.000 EACH	.		.	
0032	3013.32 CONCRETE CLASS 47BD-4000 BARRIER TRANSITION SECTION TYPE B	1.000 EACH	.		.	
0033	3013.33 CONCRETE CLASS 47BD-4000 BARRIER TRANSITION SECTION TYPE C	1.000 EACH	.		.	
0034	3013.34 CONCRETE CLASS 47BD-4000 BARRIER TRANSITION SECTION TYPE D	1.000 EACH	.		.	
0035	3013.35 CONCRETE CLASS 47BD-4000 BARRIER TRANSITION SECTION TYPE E	1.000 EACH	.		.	
0036	3017.43 6" CONCRETE CLASS 47B-3000 MEDIAN SURFACING	66.000 SY	.		.	
0037	3027.04 CONCRETE CLASS 47BD-4000 MEDIAN BARRIER TRANSITION SECTION	2.000 EACH	.		.	
0038	3075.52 10" CONCRETE PAVEMENT, CLASS 47B-3500	1007.000 SY	.		.	
0039	3075.82 13" CONCRETE PAVEMENT, CLASS 47B-3500	30876.000 SY	.		.	

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SCHEDULE OF ITEMS

CONTRACT ID: 2151X

PROJECT(S): S-80-9(1189)

CALL ORDER NO. : 205

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0040	3075.86 13" DOWELED CONCRETE PAVEMENT, CLASS 47B-3500	39276.000 SY	.		.	
0041	4020.25 CONCRETE DITCH LINING	244.000 SY	.		.	
0042	4115.26 CLASS 47BD-4000 CONCRETE FOR BARRIER	17.500 CY	.		.	
0043	6107.00 CONCRETE SLOPE PROTECTION	290.000 SY	.		.	
0044	6131.50 EPOXY COATED REINFORCING STEEL FOR BARRIER	1280.000 LB	.		.	
0045	7500.43 ARROW, PREFORMED PAVEMENT MARKING, TYPE 4 GROOVED	6.000 EACH	.		.	
0046	7515.03 5" BLACK POLYUREA PAVEMENT MARKING, GROOVED	15750.000 LF	.		.	
0047	7515.36 5" WHITE WET REFLECTIVE POLYUREA PAVEMENT MARKING, GROOVED	56000.000 LF	.		.	
0048	7515.38 12" WHITE WET REFLECTIVE POLYUREA PAVEMENT MARKING, GROOVED	12000.000 LF	.		.	
0049	7516.35 5" YELLOW WET REFLECTIVE POLYUREA PAVEMENT MARKING, GROOVED	36500.000 LF	.		.	

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CONTRACT ID: 2151X

PROJECT(S): S-80-9(1189)

CALL ORDER NO. : 205

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0050	8029.25 FOUNDATION COURSE 5"	70152.000 SY	.		.	
0051	8060.05 GRANULAR SUBDRAIN	79.000 EACH	.		.	
0052	8060.06 LONGITUDINAL SUBDRAIN	8271.000 LF	.		.	
0053	9111.00 WATER	260.000 MGAL	.		.	
0054	9170.00 EARTH SHOULDER CONSTRUCTION	189.936 STA	.		.	
0055	9173.20 SUBGRADE PREPARATION	71122.000 SY	.		.	
0056	9188.50 SURFACING UNDER GUARDRAIL	1020.000 SY	.		.	
0057	L001.02 SEEDING, TYPE B	6.000 ACRE	.		.	
0058	L032.75 MULCH	13.500 TON	.		.	
	SECTION 0002 TOTAL				.	

SECTION 0003 GROUP 4 CULVERTS

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CONTRACT ID: 2151X

PROJECT(S): S-80-9(1189)

CALL ORDER NO. : 205

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0059	0030.40 MOBILIZATION	LUMP	LUMP			.
0060	1119.00 REMOVE INLET	15.000 EACH	.		.	
0061	1119.50 REMOVE JUNCTION BOX	1.000 EACH	.		.	
0062	4004.50 CAST IRON GRATE AND FRAME	37108.000 LB	.		.	
0063	4005.00 CAST IRON RING AND COVER	345.000 LB	.		.	
0064	4012.16 MODIFY INLET	4.000 EACH	.		.	
0065	4016.00 MANHOLE AT STATION 599+49.66 RT.	1.000 EACH	.		.	
0066	4018.00 TAPPING EXISTING STRUCTURE	4.000 EACH	.		.	
0067	4035.00 REMOVE FLARED-END SECTION	17.000 EACH	.		.	
0068	4035.25 REMOVE AND SALVAGE FLARED-END SECTION	2.000 EACH	.		.	
0069	4040.00 REMOVE HEADWALLS FROM CULVERTS	2.000 EACH	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0070	4043.50 REMOVE SEWER PIPE	660.000 LF	.		.	
0071	4044.00 PREPARATION OF STRUCTURE AT STATION 58+74.23	1.000 EACH	.		.	
0072	4050.01 EXCAVATION FOR PIPE, PIPE-ARCH CULVERTS, AND HEADWALLS	278.000 CY	.		.	
0073	4105.59 CLASS 47B-3000 CONCRETE FOR INLET AND JUNCTION BOX	92.700 CY	.		.	
0074	4107.07 CLASS 47B-3000 CONCRETE FOR CONCRETE COLLARS	9.080 CY	.		.	
0075	4130.06 CLASS 47B-3000 CONCRETE FOR PIPE CULVERT PLUG	0.110 CY	.		.	
0076	4155.50 REINFORCING STEEL FOR INLET AND JUNCTION BOX	5455.000 LB	.		.	
0077	4157.00 REINFORCING STEEL FOR COLLARS	739.000 LB	.		.	
0078	4310.18 18" FLARED-END SECTION	5.000 EACH	.		.	
0079	4360.18 18" METAL FLARED-END SECTION	2.000 EACH	.		.	
0080	4460.18 18" CONCRETE FLARED-END SECTION	2.000 EACH	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0081	4460.24 24" CONCRETE FLARED-END SECTION	9.000 EACH	.		.	
0082	4461.18 INSTALL 18" CONCRETE FLARED-END SECTION	2.000 EACH	.		.	
0083	4670.05 CULVERT SANDFILL	55.700 CY	.		.	
0084	4875.18 JACKING 18" STORM SEWER PIPE, TYPE 1 CLASS IV	93.000 LF	.		.	
0085	4880.24 JACKING 24" CULVERT PIPE, TYPE 2 CLASS IV	130.000 LF	.		.	
0086	P120.24 24" CULVERT PIPE, TYPE 2	176.000 LF	.		.	
0087	P128.24 24" CULVERT PIPE, TYPE 2 CLASS IV	130.000 LF	.		.	
0088	P369.18 18" SLOTTED CULVERT PIPE, TYPE 3,4 OR 5	222.000 LF	.		.	
0089	P700.18 18" STORM SEWER PIPE, TYPE 1,7 OR 8	1079.000 LF	.		.	
0090	P702.18 18" STORM SEWER PIPE, TYPE 1	231.000 LF	.		.	
0091	P702.24 24" STORM SEWER PIPE, TYPE 1	66.000 LF	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0092	P704.18 18" STORM SEWER PIPE, TYPE 3,4,5 OR 6	158.000 LF	.		.	
0093	P705.18 18" STORM SEWER PIPE, TYPE 1 CLASS IV	93.000 LF	.		.	
	SECTION 0003 TOTAL				.	

SECTION 0004 GROUP 6 BRIDGE AT STATION 596+40.00
469'-0" 6 SPAN PRESTRESSED CONCRETE GIRDER BRIDGE

0094	0030.60 MOBILIZATION	LUMP	LUMP		.	
0095	3050.15 CONCRETE FOR PAVEMENT APPROACHES CLASS 47BD-4000	385.300 CY	.		.	
0096	3051.10 EPOXY COATED REINFORCING STEEL FOR PAVEMENT APPROACHES	65480.000 LB	.		.	
0097	6000.10 ABUTMENT NO.1 EXCAVATION	LUMP	LUMP		.	
0098	6000.11 ABUTMENT NO.2 EXCAVATION	LUMP	LUMP		.	
0099	6000.20 PIER NO.1 EXCAVATION	LUMP	LUMP		.	
0100	6000.21 PIER NO.2 EXCAVATION	LUMP	LUMP		.	

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CALL ORDER NO. : 205

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0101	6000.22 PIER NO.3 EXCAVATION	LUMP	LUMP			.
0102	6000.23 PIER NO.4 EXCAVATION	LUMP	LUMP			.
0103	6000.24 PIER NO.5 EXCAVATION	LUMP	LUMP			.
0104	6005.32 PREFORMED EXPANSION JOINT, TYPE A	171.700 LF		.		.
0105	6005.60 ELASTOMERIC BEARING	21.000 EACH		.		.
0106	6005.65 EXPANSION BEARING, PTFE TYPE	6.000 EACH		.		.
0107	6010.22 CLASS 47B-3000 CONCRETE FOR BRIDGE	495.800 CY		.		.
0108	6010.26 CLASS 47BD-4000 CONCRETE FOR BRIDGE	375.500 CY		.		.
0109	6011.11 PRECAST/PRESTRESSED CONCRETE SUPERSTRUCTURE AT STATION 596+40.00	LUMP	LUMP			.
0110	6016.20 MULTI-LAYER EPOXY POLYMER OVERLAY	4453.000 SY		.		.

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0111	6030.00 PREPARATION OF BRIDGE AT STATION 596+40.00	1.000 EACH	.		.	
0112	6104.00 BROKEN CONCRETE RIPRAP	180.000 TON	.		.	
0113	6107.00 CONCRETE SLOPE PROTECTION	199.000 SY	.		.	
0114	6131.23 PENETRATING CONCRETE SEALER	2125.000 SF	.		.	
0115	6131.50 EPOXY COATED REINFORCING STEEL	155485.000 LB	.		.	
0116	6139.50 SUBSURFACE DRAINAGE MATTING	46.000 SY	.		.	
0117	6210.14 HP 12 INCH X 53 LB STEEL PILING	5675.000 LF	.		.	
0118	6601.15 1 1/2" CONDUIT IN BRIDGE	562.500 LF	.		.	
0119	8091.00 GRANULAR BACKFILL	190.000 CY	.		.	
	SECTION 0004 TOTAL				.	

SECTION 0005 GROUP 7 GUARDRAIL

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0120	0030.70 MOBILIZATION	LUMP	LUMP			.
0121	7011.20 W-BEAM GUARDRAIL	1481.250 LF	.		.	
0122	7019.50 IMPACT ATTENUATOR WITH 14" PROTECTION	1.000 EACH	.		.	
0123	7019.51 IMPACT ATTENUATOR WITH 24" PROTECTION	2.000 EACH	.		.	
0124	7020.00 BRIDGE APPROACH SECTIONS	2.000 EACH	.		.	
0125	7022.00 END ANCHORAGE ASSEMBLY	4.000 EACH	.		.	
0126	7024.25 GUARDRAIL END TREATMENT, TYPE I	4.000 EACH	.		.	
	SECTION 0005 TOTAL					.

SECTION 0006 GROUP 7B FENCE

0127	0030.71 MOBILIZATION	LUMP	LUMP			.
0128	7110.05 5 FOOT CHAIN-LINK FENCE	819.000 LF	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0129	7115.05 END POST FOR 5 FOOT CHAIN-LINK FENCE	8.000 EACH	.		.	
0130	7116.05 CORNER POST FOR 5 FOOT CHAIN-LINK FENCE	7.000 EACH	.		.	
0131	7117.05 PULL POST FOR 5 FOOT CHAIN-LINK FENCE	1.000 EACH	.		.	
	SECTION 0006 TOTAL				.	

SECTION 0007 GROUP 8B ELECTRICAL

0132	0030.80 MOBILIZATION	LUMP	LUMP		.	
0133	7311.00 CONCRETE FOR FOUNDATION	30.000 CY	.		.	
0134	A001.12 PULL BOX, TYPE PB-5	6.000 EACH	.		.	
0135	A001.16 PULL BOX, TYPE PB-6	3.000 EACH	.		.	
0136	A008.43 STREET LIGHTING UNIT, TYPE SL-S-45-6-0.20	2.000 EACH	.		.	
0137	A009.52 STREET LIGHTING UNIT, TYPE SL-BT-45-6-0.20	2.000 EACH	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0138	A010.20 LUMINAIRE, TYPE HML-A-1KW	6.000 EACH	.		.	
0139	A010.26 LUMINAIRE, TYPE HML-V-1KW	6.000 EACH	.		.	
0140	A018.26 HIGH MAST LIGHTING UNIT, TYPE T-120	2.000 EACH	.		.	
0141	A018.81 FOUNDATION DESIGN	2.000 EACH	.		.	
0142	A018.83 REINFORCING STEEL	2426.000 LB	.		.	
0143	A018.84 ANCHOR BOLTS	12.000 EACH	.		.	
0144	A020.30 LIGHTING CONTROL CENTER, TYPE R	1.000 EACH	.		.	
0145	A070.10 1 1/2-INCH CONDUIT IN TRENCH	7070.000 LF	.		.	
0146	A070.14 2-INCH CONDUIT IN TRENCH	208.000 LF	.		.	
0147	A072.14 2-INCH CONDUIT UNDER ROADWAY	27.000 LF	.		.	
0148	A074.12 1 1/2-INCH CONDUIT, JACKED	32.000 LF	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0149	A080.10 STREET LIGHTING CABLE, NO. 2 USE	796.000 LF	.		.	
0150	A080.15 STREET LIGHTING CABLE, NO. 4 USE	1368.000 LF	.		.	
0151	A080.22 STREET LIGHTING CABLE, NO. 6 BARE	9014.000 LF	.		.	
0152	A080.24 STREET LIGHTING CABLE, NO. 6 USE	18799.000 LF	.		.	
0153	A630.04 REMOVE HIGH MAST LIGHTING UNIT	1.000 EACH	.		.	
0154	A630.20 REMOVE PULL BOX	9.000 EACH	.		.	
0155	A700.20 RELOCATE STREET LIGHTING UNIT TYPE A	1.000 EACH	.		.	
0156	A700.21 RELOCATE STREET LIGHTING UNIT TYPE B	6.000 EACH	.		.	
0157	A700.22 RELOCATE STREET LIGHTING UNIT TYPE C	7.000 EACH	.		.	
0158	A700.23 RELOCATE STREET LIGHTING UNIT TYPE D	25.000 EACH	.		.	
0159	A779.40 OBSTRUCTION LIGHT	4.000 EACH	.		.	
	SECTION 0007 TOTAL				.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0008 GROUP 8C SIGNING						
0160	0030.82 MOBILIZATION	LUMP	LUMP			.
0161	7308.00 REMOVE SIGN, STRUCTURE, AND FOUNDATION	EACH	1.000	.		.
0162	7308.10 REMOVE SIGN	EACH	26.000	.		.
0163	7311.01 CONCRETE FOR FOUNDATION	CY	22.000	.		.
0164	7311.10 REINFORCING STEEL	LB	1500.000	.		.
0165	7311.20 SIGN STRUCTURE FOUNDATION DESIGN, LOCATION NO. 22	EACH	1.000	.		.
0166	7312.00 OVERHEAD SIGN SUPPORT, LOCATION NO. 22	EACH	1.000	.		.
0167	7322.00 TYPE B SIGN	SF	368.000	.		.
0168	7323.00 TYPE C SIGN	SF	3998.000	.		.
0169	7340.00 STRUCTURAL STEEL FOR SIGN SUPPORTS	LB	2595.000	.		.

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0170	7360.24 24" SIGN SUPPORT FOOTING	4.000 EACH	.		.	
0171	7360.30 30" SIGN SUPPORT FOOTING	6.000 EACH	.		.	
0172	7390.02 RELOCATE SIGN	6.000 EACH	.		.	
0173	7390.10 REMOVE SIGN, POST, AND FOOTING	5.000 EACH	.		.	
0174	A600.50 REMOVE LUMINAIRE	33.000 EACH	.		.	
	SECTION 0008 TOTAL				.	

SECTION 0009 GROUP 10 GENERAL ITEMS

0175	0001.08 BARRICADE, TYPE II	61467.000 BDAY	0.50000		30733.50	
0176	0001.10 BARRICADE, TYPE III	4659.000 BDAY	.		.	
0177	0001.75 TEMPORARY SIGN DAY	1575.000 EACH	.		.	
0178	0001.90 SIGN DAY	21915.000 EACH	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0179	0001.99 CONTRACTOR FURNISHED SIGN DAY	1763.000 EACH	.		.	
0180	0002.27 REMOVABLE WET REFLECTIVE TAPE TYPE 4	31700.000 LF	.		.	
0181	0002.28 TEMPORARY PAVEMENT MARKING REMOVAL	92000.000 LF	.		.	
0182	0002.30 PAVEMENT MARKING REMOVAL	65500.000 LF	.		.	
0183	0002.44 TEMPORARY PAVEMENT MARKING, TYPE PAINT	122000.000 LF	.		.	
0184	0002.47 TEMPORARY PAVEMENT MARKING SURFACE PREPARATION	122000.000 LF	.		.	
0185	0002.97 FLASHING ARROW PANEL	596.000 DAY	.		.	
0186	0003.10 FLAGGING	50.000 DAY	.		.	
0187	0003.51 INSTALL CONCRETE PROTECTION BARRIER	20000.000 LF	.		.	
0188	0003.56 RELOCATE CONCRETE PROTECTION BARRIER	17900.000 LF	.		.	
0189	0003.57 RELOCATE INERTIAL BARRIER SYSTEM	9.000 EACH	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0190	0003.58 INERTIAL BARRIER SYSTEM	8.000 EACH	.		.	
0191	0003.64 REPLACEMENT MODULE	28.000 EACH	.		.	
0192	0005.10 TRAFFIC CONTROL MANAGEMENT	320.000 DAY	.		.	
0193	0010.04 FIELD OFFICE	1.000 EACH	.		.	
0194	0030.00 MOBILIZATION	LUMP		LUMP		.
0195	9110.01 RENTAL OF LOADER, FULLY OPERATED	50.000 HOUR	.		.	
0196	9110.03 RENTAL OF DUMP TRUCK, FULLY OPERATED	50.000 HOUR	.		.	
0197	9110.07 RENTAL OF SKID LOADER, FULLY OPERATED	50.000 HOUR	.		.	
0198	9110.27 RENTAL OF CRAWLER MOUNTED HYDRAULIC EXCAVATOR, FULLY OPERATED	50.000 HOUR	.		.	
0199	L010.98 TEMPORARY EROSION CONTROL	1000.000 SY	.		.	
0200	L022.75 TEMPORARY SILT CHECK	2500.000 LF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
0201	L022.90 TEMPORARY SILT FENCE	3000.000 LF	.		.	
0202	L022.92 TEMPORARY EARTH CHECK	1000.000 LF	.		.	
	SECTION 0009 TOTAL				.	
	TOTAL BID				.	