# Bridge Improvement Grant (BIG) Procedure

# 2019

South Dakota

Department of Transportation

Office of Local Government Assistance

6/28/2018

## I. Objective:

In 2015, the South Dakota Legislature created the Bridge Improvement Grant (BIG) fund that provides $7 million for local government bridges derived from an increase in license plate fees. In addition, the South Dakota Department of Transportation (SDDOT) adds $8 million in state funds, for a total of $15 million annually available in the bridge grant program. The objective of these procedures is to define how these BIG bridge funds will be recommended for award and administered. Funding for the BIG program is not intended to be used for expansion of infrastructure with creation of new routes on new alignments.

## II. Definitions

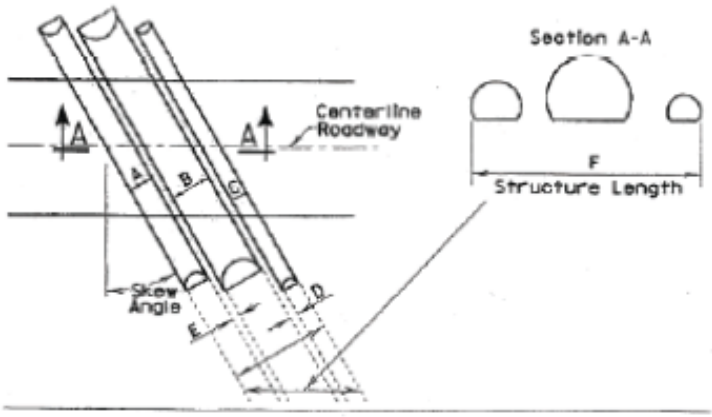
**ADT** - Value of average daily traffic on the bridge. This item will be based on the data in National Bridge Inventory Item 29.

**Bid Ready –** For preservation or rehabilitation/replacement projects, a project application is bid ready if it contains complete plans ready for DOT review (with scope complete as per Appendix B or C), including all necessary certifications (utility, right-of-way, and any others that are required), wetland mitigation proposals, and permits. If the project is to be let by LPA instead of SDDOT, the application must also include an Engineer's Estimate, Bid Proposal, Specifications, and QA/QC Testing documents to be considered bid ready.

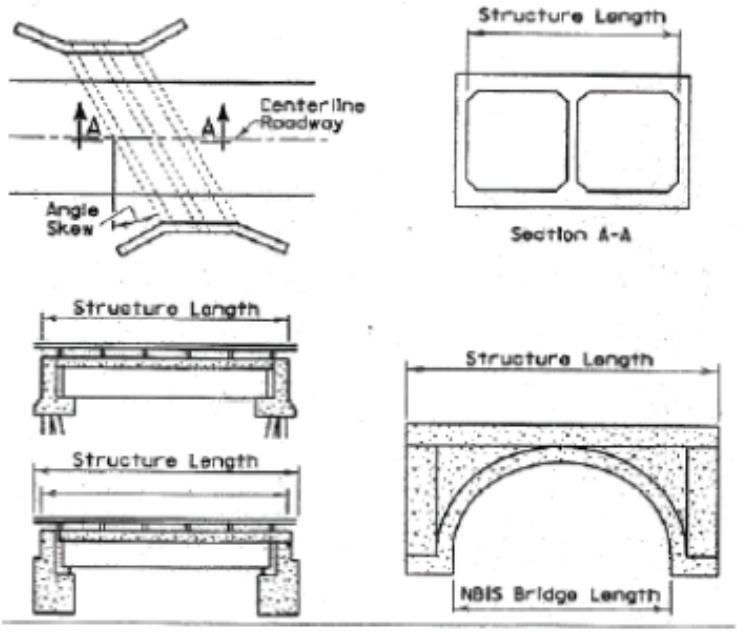
**Bridge -** As defined in the National Bridge Inspection Standards (NBIS): A structure, including supports, erected over a depression or an obstruction, as water, highway, or railway, the structure having a length measured along the center of the roadway of more than twenty feet between undercopings of abutments or extreme ends of openings for multiple boxes and pipes where the clear distance between openings is less than half of the smaller contiguous opening. Refer to Figure II-1.

Figure II-1

**Diagram from "SD Bridge System Code Manual, 1998 Edition"**




Multiple pipes may be considered a bridge if the distance between the pipes is less than half the smallest opening and the structure length is greater than 6.1 meters (20 feet). In the above illustration, distance D and E must be less than half the distance C and distance F must be greater than 6.1 meters (20 feet) for these pipes to be a bridge.



**Bridge Improvement Grant (BIG) –** Grant available to Local Public Agency (LPA) for preliminary engineering, bridge preservation, structure replacement or major rehabilitation.

**Bridge Preservation** – Actions or strategies that prevent, delay or reduce deterioration of bridges or bridge elements, restore the function of existing bridges, keep bridges in good condition and extend their life. Preservation actions may be preventive or condition-driven.

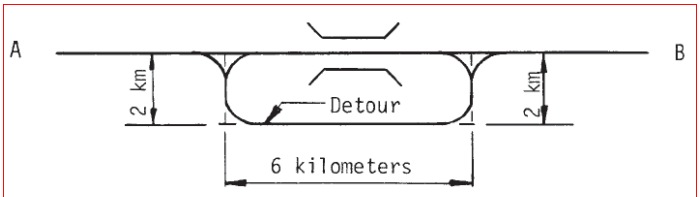
**Culvert Condition –** Condition rating of culvert. This rating will be based on the data in National Bridge Inventory item 62.

**Construction Engineering** – Administration, oversight, and testing of all construction activities by SDDOT or an engineer listed on the SDDOT retainer contract list for the Construction Administration work type. Construction Engineering costs are eligible for grant funds at 80% of actual costs, but are not included in the grant cap.

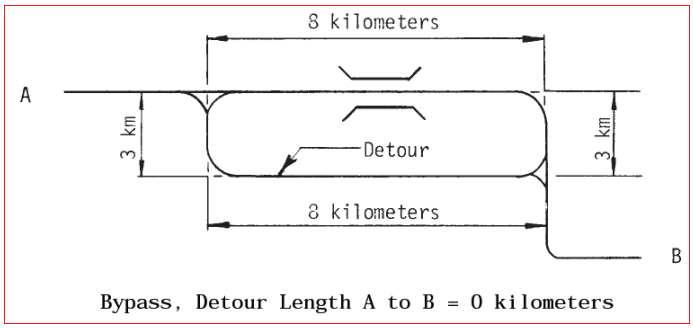
**Deck Condition –** Condition rating of the part of the structure that carries traffic. This rating will be based on the data in the NBI item 58.

**Detour Length** - Minimum additional length of travel required if the bridge in question was closed. Detour route shall be located on a full maintenance road and must allow passage of a legal weight, height, and width vehicle. The NBI detour length for an on-system bridge will be based on the location of the nearest on-system route that will allow the legal load to pass. For an off-system bridge, the detour length will be based on the nearest route that will allow passage for the legal load. NBI detour lengths are determined as impact to through traffic only (points A to B in Figure II-2). User impact will be based on actual length as reported in the NBI. If detour length in the NBI is listed as "99" (indicates greater than 100 miles, or is a dead end), further investigation by SDDOT is required to ensure that an appropriate detour length is used. Refer to Figure II-2 for examples:

Figure II-2




Bypass, Detour Length A to B = 4 kilometers



Bypass, Detour Length A to B = 0 kilometers

**DOT Format (Required on all Engineer's Cost Estimates) –** Cost plus fixed fee (Maximum allowable fixed fee rates: Preliminary Engineering & Replacement Projects – 13%, Preservation & Rehabilitation Projects – 14%.)

**Engineer's Cost Estimate –** A cost estimate of all eligible items to be included with the BIG application. This amount as reviewed and approved by SDDOT will establish the maximum limiting amount of the grant that will be awarded. Non-eligible items need to be listed separately and not included in the grant amount, but are included in the estimated total project costs shown on the application. Lump sum contingency is not eligible if shown as a line item.

**Federal-aid System –** A public highway eligible for assistance from the Federal Highway Administration other than a highway functionally classified as a local road or rural minor collector.

**Full Maintenance Road –** A road on the South Dakota Non- State Public Road Inventory that has not been designated as a Minimum Maintenance Road or a No Maintenance Road.

**Fracture Critical** – Failure of any one main structural member may cause a significant portion or the entire bridge to collapse. This designation is based on data in the NBI.

**Minimum Maintenance Road –** A road that has been lawfully designated by a board of county commissioners or a township board as a minimum maintenance road.

**National Bridge Inventory (NBI) –** A database, compiled by the Federal Highway Administration, with information on all bridges and tunnels in the United States that have roads passing above or below. If LPAs finds inaccuracies or discrepancies with the data, they should work with their consulting engineer and SDDOT to correct the information recorded in the NBI.

**No Maintenance Road –** A township or county road that has been lawfully designated by a township board or county commission as a no maintenance road.

**Off-System** - Public Roads, other than those on a Federal-aid System.

**On-System** - Public Roads, on a Federal-aid System. This designation will be based on data in NBI item 26.

**PE-BIG –** Grant available to perform preliminary engineering work, including but not limited to preservation/rehabilitation/replacement investigation studies, traffic data collection, surveys, bridge hydrologic/ hydraulic (H/H) studies, including the type, location and size recommendation, and foundations investigation.

**Posted** – refers to a bridge that is signed for less than legal loads. This designation will be based on data in NBI item 70.

**Preservation BIG–** Grant for minor repair and preservation work that is within the financial limits set in Section III of this procedure. Examples are scour projects, fatigue retrofits, waterproofing joints, painting, safety upgrade rail/barrier, or deck treatments (such as concrete overlays, polymer overlays, asphalt & membrane overlays, and epoxy chip seals). The goal of a Preservation BIG is to preserve the structure elements and extend the service life of the structure.

**Rehabilitation Projects –** Major repair/rehabilitation work or combination of minor preservation work valued greater than financial limits to be classified as rehabilitation/replacement work as set in Section III of this procedure. Any deck replacement, superstructure, or substructure repair will be considered a major rehabilitation.

**Replacement Projects –** Total replacement of a bridge.

**Scour Critical** – Foundation may be or has the potential to become unstable due to hydraulic undermining. This designation is based on NBI appraisal item 113 (Scour) having a value of 3 or less or having unknown foundations.

**Structurally Deficient** – Classification given to a bridge which has any component in Poor or worse condition or the adequacy of the waterway opening provided by the bridge is determined to be insufficient to the point of causing overtopping with intolerable traffic interruptions.

**Substructure Condition –** Condition rating of the part of the structure that supports the superstructure (piers, bents, abutments). This rating will be based on the data in the NBI item 60.

**Sufficiency Rating** - A method of evaluating bridge data to obtain a numeric value, which is indicative of a bridge's sufficiency to remain in service. The result of this method is a percentage in which 100 percent would represent a perfect bridge and zero percent would represent a completely failed bridge. The value shall be as derived from the equations found in FHWA's "Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges".

**Superstructure Condition –** Condition rating of the part of the structure that supports traffic

(deck, slab, girders). This rating will be based on the data in the NBI item 59.

**Wheel Tax –** Imposition of a tax by County ordinance as authorized in South Dakota Codified Law Ch. 32-5A on vehicles with a gross vehicle weight of over 6000 pounds.

## Ill. Funding Responsibilities

**State Bridge Improvement Grant (BIG) Funds** - Funding will be made available for eligible On and Off-System LPA bridges for preliminary engineering, preservation, rehabilitation, or replacement in accordance with state laws, administrative rules and this Procedure; the funds available for award will be recommended to the Transportation Commission by the SDDOT Director of Planning & Engineering prior to each award. Up to 80 percent of authorized work may be funded through the BIG fund.

**Local Funding Responsibilities** – The LPA will be responsible for a minimum of 20 percent of eligible costs. The LPA will be responsible for 100 percent of non-eligible costs, including costs that exceed the grant amount. Right of Way Costs, utility relocations, roadway surfacing, fencing, aesthetics, off-site environmental mitigation costs, LPA staff wages and expenses, and any costs incurred prior to notice of award date will be considered non-eligible. Final determination of eligible costs will be determined prior to any work being performed. SDDOT and the LPA must execute a grant project agreement before any grant funds will be disbursed.

**Limiting Amounts** – To be eligible to apply for a Preservation BIG, anticipated grant expenditures (including engineering) must meet or exceed $30,000. To be eligible to apply for a BIG for rehabilitation or replacement projects, anticipated grant expenditures (including engineering) must meet or exceed $100,000. Unless the grant applicant justifies otherwise prior to grant award, engineering hours for a PE-BIG should not exceed 325 hours for small drainage areas (unnamed tributaries/creeks), 500 hours for medium drainage areas (named non-navigable creeks and rivers) and 800 hours for large drainage areas (navigable rivers). In any consecutive three-year period, no LPA may be awarded more than $4,000,000 in total BIG funds. The Director of Planning & Engineering may recommend that the Transportation Commission adjust the limiting amounts prior to each selection process. Refer to Table III-1.

Table III-1

GRANT LIMITING AMOUNTS

| | Grant Amount | Local Match | Total | Limits |
|---|---|---|---|---|
| PE-BIG | Up to 80% Approved Design Hours | No less than 20% Approved Design Hours | 100% Approved Design Hours | <326 hours – small drainage areas (unnamed tributaries/creeks)<br><501 hours – medium drainage areas (named creeks/rivers)<br><801 hours – large drainage areas (navigable rivers) |
| Preservation BIG | $30,000 | $7,500 | $37,500 | Minimum |
| Rehab/Repl. BIG | $100,000 | $25,000 | $125,000 | Minimum |
| | $4,000,000 | Maximum total BIG funds in a consecutive 3-year period | | |

## IV. Screening Criteria

SDDOT will perform a preliminary screening of all bridges to determine if the bridges meet the minimum requirements of the BIG program. This preliminary screening does not guarantee eligibility or award. Any application that does not meet the minimum requirements will not be scored or ranked and will be recommended for rejection. SDDOT may verify accuracy of the data within the NBI for the qualified bridges. The SDDOT and LPA may correct any inaccuracies identified in the review of each BIG application.

Bridges owned by cities and towns are eligible for BIG funding. Bridges owned by private individuals, development groups, Federal Agencies, state agencies, or Tribes are not eligible.

In order to be eligible for a BIG, County owned bridges must be listed on the “Project Listing” in that County’s Highway and Bridge Improvement Plan as approved by SDDOT. The County must also have imposed a wheel tax.

The following screening criteria will be considered in the BIG award process:

### A. All Projects:

1. **Bridge Function –** Bridge must serve multiple residences, farms, ranches or a multi-lot development. The bridge cannot be located on a “No Maintenance” or a “Minimum Maintenance Road”, and the roadway served by the bridge cannot terminate into a field

entrance, a driveway, single residence, farm, or ranch.

2. **NBIS (National Bridge Inspection Standards) -** LPA must be in full compliance with Federal and State inspection requirements including but not limited to posting of load restrictions.
3. **County Highway and Bridge Improvement Plan** – A county must have a SDDOT approved transportation plan and bridge must be in the County's 5-year plan. (This requirement does not apply to cities and towns.
4. **Wheel Tax** – A county in which the bridge is located must have an active wheel tax imposed on the residents of the county for vehicles with a gross vehicle weight of more than 6000 pounds.
5. **Bridge Status** – No bridge can be under contract or advertised for bid for any type of improvement at the time of the grant award.

**B. PE-BIG**

**Cost of Project –** Total costs, including engineering, fall within the requirements as established in Section III of this procedure.

**C. Preservation BIG**

1. **Cost of Project –** Total costs, including design, construction and construction engineering fall within the requirements, as established in Section III of this procedure.
2. **Extends Service Life –** Project is projected to extend the service life by at least 10 years.
3. **General Maintenance –** The LPA must show proof of general maintenance on the bridge, including a description of all work performed, a list of materials costs incurred, a statement regarding whether reoccurring maintenance items have appeared on inspection forms, and any other pertinent maintenance information.

   **For Bridge Deck Overlays –** Bridge deck overlays will be considered based on criteria set out in Table IV-1 and the general criteria that follow the table.

Table IV-1

General Criteria

| | | |
|---|---|---|
| #New Polymer Overlay | Structure Age | No restriction |
| | Deck Condition | Element Condition State 1 or 2** |
| New Concrete Overlay | Structure Age | Built in or after 1964* |
| | Deck Condition | Element Condition State 1 or 2** |
| | Structure Type | No simple spans* |
| | Deck Thickness | ≥ 6.75” |
| Existing Concrete Overlay (Replacement 2nd or 3rd Overlays) | Overlay Age | 20 or more years* |
| | Overlay Condition | Element Condition State 3 to 4** |
| | Substrate (Deck/Slab) | Element Condition State 1 or 2 |

Structures submitted for new Rigid Concrete Overlays must also be checked for impact on Load Capacity prior to applying for grant funds.

All overlay applications should include a delamination survey if practical.

* Structure age is only a general guideline. Structures outside of these age parameters can be considered if they are in good condition or if joints can be eliminated (eliminate simple spans). **For existing concrete overlays, overlay condition and substrate condition are the critical factors.**

** American Association of State Highway Transportation Officials (AASHTO) Element Condition States

# New polymer overlays have also been used to seal badly cracked concrete overlays and new slabs/decks with epoxy coated resteel that have a significant cracking problem, too extensive for individual crack repair.

## D. Major Rehabilitation and Replacement BIG

1. **Cost of project –** Total costs, including design, construction and construction engineering fall within the requirements, as established in Section III of this procedure.

2. **Bridge Condition and Alternatives – Bridges m**ust meet all qualification criteria shown in Table IV-2. All bridges must be evaluated for potential rehabilitation prior to any consideration for replacement. The condition, age, structure type, scour criticality, and potential preservation or rehabilitation alternatives shall be reviewed for each bridge. The feasibility of those alternatives and the economics of replacement versus rehabilitation

shall be considered. When the rehabilitation costs are estimated at 60% or more of the replacement costs, then replacement may be justified.

Table IV-2

| Measure | Qualification Criteria |
|---|---|
| Sufficiency Rating | 60 or less |
| Structurally Deficient | NBI Condition Rating of 4 or less for Deck, Superstructure, Substructure, or Culvert |

3.**General Maintenance –** The LPA must show proof of general maintenance on the bridge, including a description of all work performed, a list of materials costs incurred, a statement regarding whether reoccurring maintenance items have appeared on inspection forms, and any other pertinent maintenance information.

## V. Selection Process

The SDDOT will conduct the BIG selection process annually. The process begins with PE-BIG applications that become due August 1, 2018. The Transportation Commission will consider these applications by October 30, 2018. Pre-applications for Preservation grants, if submitted, are due by September 1, 2018. Applications for Preservation, Rehabilitation and Replacement grants are due January 2, 2019, and will be considered by the Transportation Commission by April 30, 2019.

**A. Preliminary Engineering Bridge Improvement Grant (PE-BIG)**

1. A bridge that meets Section IV criteria of this procedure may be eligible for a PE-BIG grant.
2. LPA will complete and submit application to SDDOT by August 1, 2018, for eligible bridge(s).
3. SDDOT's recommendation of award of PE-BIG grants will be based on available funding and the scoring process as detailed in Section VI.

**B. Preservation Bridge Improvement Grant (Preservation BIG)**

1. For a Preservation BIG, LPA may submit a pre-application that details a bridge's preservation needs as determined by LPA's Bridge Inspection Engineer. The pre-application must be submitted by September 1 each year. Included in the pre-application are a draft application form, site map, and a one-page description of the proposed preservation treatment.
2. The SDDOT will determine if a site visit is needed to review the proposed preservation treatment and recommend modifications.
3. LPA will complete and submit final application to SDDOT by January 2 for each year, for eligible bridges.
4. Applications should include all pertinent information including maps, photos, inspection reports, delamination surveys, and information relating to the preservation treatments being recommended so that adequate information is available for the ranking process. A detailed engineer's cost estimate showing design costs, construction costs, and construction engineering costs, shall also be included with the application.
5. SDDOT's recommendation of award of Preservation BIGs will be based on available funding, the scoring process as detailed in Section VI, and SDDOT's determination of project feasibility and constructability and whether the proposed project addresses structural deficiencies.

**C. Bridge Improvement Grant (BIG) for Bridge Rehabilitation or Replacement**

1. LPA will complete and submit application to SDDOT by January 2 each year, for eligible bridge(s).
2. LPA's application must include the Type, Size, and Location (TS&L) report (see Appendix A), and a detailed engineer's cost estimate showing design costs, construction costs, and construction engineering costs.
3. SDDOT will use current inventory condition reports at the time of final application review for the scoring process in Section VI.
4. SDDOT's recommendation of award of BIGs for rehabilitation or replacement will be based on available funding, the scoring process as detailed in Section VI, and SDDOT's determination of project feasibility and constructability and whether the proposed project addresses structural deficiencies.

# VI. Scoring Criteria

## A. Preliminary Engineering and Rehabilitation/Replacement Grants

SDDOT will use engineering judgment when applying the following scoring criteria to rank the competing qualified applications:

1. **Bridge Condition (50 points maximum)**

   a) **Posted** (27 points maximum) – See the definition of "Posted" in the definitions section. Points will be awarded in accordance with Table VI-1.

Table VI-1

| Bridge Inventory Code | Relationship of Operating Rating to Maximum Legal Load | Ranking Points |
|---|---|---|
| 5 | NO POSTING REQUIRED | 0 |
| 4 | 0.1 TO 9.9% BELOW | 6 |
| 3 | 10.0 TO 19.9% BELOW | 12 |
| 2 | 20.0 TO 29.9% BELOW | 18 |
| 1 | 30.0 TO 39.9% BELOW | 24 |
| 0 | > 39.9% BELOW | 27 |

   b) **Substructure Condition** (6 points maximum) – See the definition of "Substructure Condition" in the definitions section of this Procedure. Points will be awarded in accordance with Table VI-2.

   c) **Superstructure Condition** (6 points maximum) – See the definition of "Superstructure Condition" in the definitions section of this Procedure. Points will be awarded in accordance with Table VI-2.

Table VI-2

| Bridge Inventory Code | Ranking Points |
|---|---|
| >5 | 0 |
| 5 | 1 |
| 4 | 2 |
| 3 | 3 |
| 2 | 4 |
| 1 | 5 |
| 0 | 6 |

d) **Culvert Condition** (12 points maximum) **–** See the definition of "Culvert Condition" in the definitions section of this Procedure. Points will be awarded at two times the value as shown in Table VI-2.

e) **Fracture Critical** (5 points or zero points) – See the definition of "Fracture Critical" in the definitions section of this Procedure. Five points will be awarded if the structure is determined to be fracture critical.

f) **Scour Critical** (5 points or zero points) – See the definition of "Scour Critical" in the definitions section of this Procedure. Five points will be awarded if the structure is determined to be scour critical.

g) **Sufficiency Rating** (1-point maximum) – See the definition of "Sufficiency Rating" in the definitions section of this Procedure. A fractional point will be awarded based on the score derived from using the following formula: (100 Sufficiency Rating)/100.

2. **User Impact** (20 points maximum) - User Impact will be a variable that measures impact on users of the bridge and will be calculated by multiplying the ADT for the bridge by the Detour Length. The points will be assigned based on the following formulas with the maximum value for user impact capped at 20 points:

   User Impact (On-System) = ADT x Detour Length (miles) / 350

   User Impact (Off-System) = ADT x Detour Length (miles) / 100

3. **Local Planning** (30 points maximum for counties/ 20 points for cities)

   a) **Wheel Tax** (10 points maximum) – See the definition of "Wheel Tax" in the definitions section of this Procedure. Points will be awarded to counties in accordance with Table VI-3, based on imposition of a wheel tax on vehicles with a gross vehicle weight of 6,000 pounds or greater. This section does not apply to cities.

Table VI-3

| Assessment / Wheel | Points |
|---|---|
| $5 | 10 |
| $4-$4.99 | Actual $ Amount x 2 |
| $3-$3.99 | Actual $ Amount x 2 |
| $2-2.99 | Actual $ Amount x 2 |

| | |
|---|---|
| $1-1.99 | Actual $ Amount x 2 |
| $0-$0.99 | 0 |

b) **Bid Ready (10 points or zero points)** – See the definition of "Bid Ready" in the definitions section of this Procedure. For rehabilitation or replacement projects, 10 points will be awarded if the project is Bid Ready.

c) **LPA Financial Commitment (10 points maximum)** – For any LPA cost share beyond the required 20%, additional points will be awarded as shown in Table VI-4.

**Table VI-4**

| BIG Share (%) | LPA Share (%) | Points |
|---|---|---|
| 80 | 20 | 0.00 |
| 79 | 21 | 0.33 |
| 78 | 22 | 0.67 |
| 77 | 23 | 1.00 |
| 76 | 24 | 1.33 |
| 75 | 25 | 1.67 |
| 74 | 26 | 2.00 |
| 73 | 27 | 2.33 |
| 72 | 28 | 2.67 |
| 71 | 29 | 3.00 |
| 70 | 30 | 3.33 |
| 69 | 31 | 3.67 |
| 68 | 32 | 4.00 |
| 67 | 33 | 4.33 |
| 66 | 34 | 4.67 |
| 65 | 35 | 5.00 |
| 64 | 36 | 5.33 |
| 63 | 37 | 5.67 |
| 62 | 38 | 6.00 |
| 61 | 39 | 6.33 |
| 60 | 40 | 6.67 |
| 59 | 41 | 7.00 |
| 58 | 42 | 7.33 |
| 57 | 43 | 7.67 |
| 56 | 44 | 8.00 |
| 55 | 45 | 8.33 |

| | | |
|---|---|---|
| 54 | 46 | 8.67 |
| 53 | 47 | 9.00 |
| 52 | 48 | 9.33 |
| 51 | 49 | 9.67 |
| 50 or less | 50 or more | 10.00 |

4. **City Scoring** (90 points maximum)– City points will be prorated to a 100-point system in order to align with other LPA projects.

**B. Preservation Grants**

SDDOT will use engineering judgment when applying the following Scoring Criteria to rank the competing qualified applications:

1. **User Impact (5 points maximum) -** User Impact is a variable that measures the impact on the users of the bridge and will be calculated by multiplying the ADT by the Detour Length. Points will be awarded based on application of the following formulas, with the maximum value for user impact capped at 5 points:

   User Impact (On-System) = ADT x Detour Length (miles) / 1400

   User Impact (Off-System) = ADT x Detour Length (miles) / 400

2. **Cost Ratio (10 points maximum)** – If the total estimated cost of bridge preservation is 60% or more of the total estimated cost of bridge replacement, then 0 points will be awarded. One point will be awarded for every 5% increment below 60%, with a maximum of 10 points awarded.
3. **Wheel Tax (10 points maximum)** – Points will be awarded to counties in accordance with Table VI-3. This section does not apply to cities.
4. **LPA Financial Commitment (10 points maximum)** – For any LPA cost share beyond the required 20%, additional points will be awarded as shown in Table VI-4.
5. **Load Rating (zero, 5, or 10 points)** – If the proposed preservation work is not likely to have an impact to the load rating or will have a negative impact, then 0 points will be awarded. If the proposed preservation work is likely to improve but not eliminate the load rating, then 5 points will be awarded. If the proposed work is likely to remove an

existing load restriction, then 10 points will be awarded.

6. **Scour (5 points or zero points)** – If the proposed work addresses scour, 5 points will be awarded.
7. **Substructure Condition (5 points or zero points)** – If the proposed work is likely to improve the substructure condition, then 5 points will be awarded.
8. **Superstructure Condition (5 points or zero points)** – If the proposed work is likely to improve the superstructure condition, then 5 points will be awarded.
9. **Culvert Condition (10 points or zero points)** – If the proposed work is likely to improve the substructure condition of a culvert, then 10 points will be awarded.
10. **Service Life (20 points or zero points)** – If the proposed work is likely to extend the service life of the structure by more than 10 years, then 20 points will be awarded.
11. **Quality of Project (20 points maximum)** – Up to 20 points may be awarded if the proposed preservation work is an appropriate and effective treatment for the bridge. Consideration will be given to a low sufficiency rating, if the structure is Fracture Critical, if general maintenance has been done on the structure, and overall constructability of the project.
12. **City Scoring** (90 points maximum)– Points for cities will be prorated to a 100-point system to align with other LPA projects.

## VII. Project Development Requirements Following Grant Award

After receiving a grant award, LPA and SDDOT will enter into a grant agreement. LPA will select a professional engineering firm from the current SDDOT consultant retainer list for the applicable category of work. In acquiring any necessary real property interests for the bridge project, the LPA will follow the same requirements that apply to LPA projects that are financed with federal funds. The LPA will coordinate any utility notification and relocation. The LPA will also be responsible for any coordination regarding FEMA floodplain impacts. The SDDOT will review all project plans and the project will not be advertised for bids until LPA receives SDDOT's letting authorization.

Unless the LPA and SDDOT agree otherwise in writing, the following responsibilities will be

undertaken by the LPA and SDDOT after grant award:

**A. For Preliminary Engineering Studies**

**1.** The LPA will:

a) Select a professional engineer from SDDOT Consultant Retainer List for Local Government or State Bridge Design;

b) Participate in all planning, scoping, and inspection meetings; and

c) Review and comment on TS&L Report.

**2.** The SDDOT will:

a) Hire the LPA selected consulting firm for preliminary engineering;

b) Invite LPA to all planning, scoping, and inspection meetings;

c) Submit draft TS&L to LPA for review and comment;

d) Prepare the final TS&L Report; and

e) Conduct the foundation investigation and provide recommendations.

**B. For All Bridge Preservation Treatments**

**1.** The LPA will:

a) Select and hire a professional engineer from SDDOT Consultant Retainer Lists for Local Government or State Bridge Design;

b) Require LPA's engineering consultant to submit plans, design calculations, and load ratings to SDDOT for review and comment;

c) Obtain and submit to SDDOT for comment all bid documents, plans, design calculations, scour analyses, load rating and analyses for the bridge inspection file (emergency vehicles (where applicable), 3 South Dakota trucks & 4 special haul vehicles (SU4-7) and notional rating load), and specifications sealed and signed by a professional engineer licensed in the State of South Dakota;

d) Coordinate environmental clearance with Corps of Engineers (COE), if applicable;

e) Obtain all necessary permits (such as COE 404, DOT, Federal Lands, BIA, Tribal, Municipal);

f) Ensure incorporation of construction engineering and testing requirements in the bid documents;

g) After receipt of SDDOT letting authorization, advertise the project for bids and conduct bid letting;
h) Obtain SDDOT concurrence in the proposed bid award;
i) Enter into a construction contract and send a copy to SDDOT;
j) Issue the contractor a Notice to Proceed and send a copy to SDDOT;
k) Unless construction engineering (CE) is to be done by SDDOT, select a construction engineer and send a copy of the draft agreement for construction engineering services to SDDOT prior to execution;
l) Unless CE is to be done by SDDOT, enter into an agreement for CE services after addressing all SDDOT comments to the satisfaction of SDDOT;
m) Pay construction contractor and consultants in accordance with their contracts with LPA;
n) Request reimbursement from SDDOT for eligible expenses based on certified pay application forms; and
o) Provide SDDOT as-built plans, construction change orders, and notification of completion of project.

**2.** The SDDOT will:

a) Conduct an initial environmental review and provide information and input to the LPA;
b) Prior to advertisement for bids, review and offer comments on plans, applicable design calculations, scour analyses, load rating and analyses for the bridge inspection file [emergency vehicles (where applicable), 3 South Dakota trucks & 4 special haul vehicles (SU4-7) and notional rating load], specifications, costs estimates, and bid documents as applicable to the project;
c) Review and offer comments on negotiated construction engineering agreement prior to execution by the engineering consultant and the LPA;
d) Review and offer comments on the quality assurance and testing plan for construction testing and inspection;
e) Reimburse LPA for eligible expenses in accordance with the terms and conditions of the grant agreement; and
f) Conduct a final inspection.

**C. For Off-System Bridge Rehabilitation/Replacements**

**1.** The LPA will:

a) Select and hire a professional engineer from the SDDOT Consultant Retainer List for Local Government or State Bridge Design; any Geotechnical sub-consultants must also be on the SDDOT Consultant Retainer List.

b) Provide ROW acquisition and ROW certification;

c) Provide any required utility notification, relocation, and utility certification;

d) Coordinate with FEMA for any necessary FEMA floodplain map revisions;

e) Provide any needed wetland mitigation;

f) Obtain all necessary permits (such as COE 404, DOT, Federal Lands, BIA, Tribal, Municipal);

g) Comply with terms as established in the SDDOT Consultant Retainer Contract, including but not limited to requiring the consultant to submit foundation investigation and recommendations, plans, design calculations, and load ratings to SDDOT for review;

h) Address in writing, to the satisfaction of SDDOT, all SDDOT review comments;

i) Obtain and submit to SDDOT for comment all bid documents, plans, design calculations, scour analyses, load rating and analyses for the bridge inspection file (emergency vehicles (where applicable), 3 South Dakota trucks & 4 special haul vehicles (SU4-7) and notional rating load), and specifications sealed and signed by a professional engineer licensed in the State of South Dakota;

j) After receipt of SDDOT letting authorization, advertise the project for bids, and conduct bid letting;

k) Obtain SDDOT concurrence in the bid;

l) Enter into a construction contract;

m) Issue the contractor a Notice to Proceed;

n) Select a construction engineer and send a copy of the draft agreement for construction engineering services to SDDOT prior to execution;

o) Enter into an agreement for CE services after addressing all SDDOT comments to the satisfaction of SDDOT;

p) Pay contractor and consultants in accordance with their contracts with LPA;
q) Request reimbursement from SDDOT for eligible expenses based on certified pay application forms; and
r) Provide SDDOT with construction change orders, copies of tests and certifications, and notification of completion of project.

**2.** The SDDOT will:

a) Review and offer comments on structure sheets that show the general drawing, plan/profile and scour measures;
b) Review and offer comments on plans, design calculations, scour analyses, load rating and analyses for the bridge inspection file [emergency vehicles (where applicable), 3 South Dakota trucks & 4 special haul vehicles (SU4-7) and notional rating load], specifications, costs estimates, and bid documents as applicable to the project;
c) Concur in bid award, if SDDOT deems it appropriate to do so;
d) Review and offer comments on negotiated construction engineering agreement prior to execution by consultant and LPA;
e) Review and offer comments on shop plans of prefabricated products (if applicable);
f) Reimburse LPA for eligible expenses in accordance with the terms and conditions of the grant agreement;
g) Review and offer comments on quality assurance and testing plan for construction testing and inspection, and
h) Conduct a final inspection.

## D. For On-System Bridge Rehabilitation/Replacements

**1.** The LPA will:

a) Select a professional engineer from SDDOT Consultant Retainer List for Local Government or State Bridge Design;
b) Provide ROW acquisition and ROW certification;
c) Provide any required utility notification, relocation, and utility certification;
d) Coordinate with FEMA for any necessary FEMA floodplain map revisions;

e) Provide any necessary environmental mitigation;
f) Review and offer comments on plans; and
g) Reimburse SDDOT for the LPA's share of project costs.

**2.** The SDDOT will:

a) Hire the consulting firm selected by the LPA for design engineering*;
b) Conduct environmental clearance with all coordinating agencies*;
c) Conduct the foundation investigation, for projects that did not include this work in the preliminary engineering*;
d) Obtain all necessary permits (such as COE 404, DOT, Federal Lands, BIA, Tribal, Municipal)*;
e) Advertise the project for bids, and conduct bid letting;
f) Enter into a construction contract;
g) Issue the contractor a Notice to Proceed;
h) Perform construction engineering services;
i) Bill the LPA for the LPA's share of project costs; and
j) Notify LPA of completion of work.

* If the LPA was awarded a grant on a Bid Ready application, then the LPA will perform the tasks set out in Section D.2.a), D.2.b), D.2.c), and D.2.d), and the LPA will transfer all permits to SDDOT.

## VIII. Reimbursement Process

For BIG funding for Preliminary Engineering Grants and On-System Major Rehabilitation/Replacement Projects, SDDOT will bill the LPA for its cost share monthly or quarterly, depending on the volume of work being performed. The LPA cost share will be 20%, unless a different percentage is approved by the Transportation Commission. Eligible costs include SDDOT staff time, which will be deducted from deducted BIG reimbursements or billed to the LPA.

For Preservation Projects and Off-System Major Rehabilitation/Replacement Projects, the LPA shall provide a copy of engineering firm and contractor pay estimates along with weekly progress reports. Submittals must be received on a quarterly basis at a minimum, but may be submitted more frequently. The SDDOT will reimburse the LPA for the BIG share of the pay estimates for eligible items, up to a capped amount, if applicable. The BIG share will be 80%, unless a different percentage is approved by the Transportation Commission. All Construction Change Orders will need to be submitted to SDDOT for review and approval. Eligible costs include SDDOT staff time, which will be deducted from deducted BIG reimbursements or billed to the LPA.

## IX. Sign

Each BIG grant bridge project will be signed with signs as shown in Appendices. The cost of furnishing and installing the signs is a project expense that may be eligible for BIG reimbursement.

## X. Application Submittal

Applications must be submitted to the SDDOT's ftp site or e-mailed to Wade Dahl at wade.dahl@state.sd.us unless a different e-mail address is designated by SDDOT. If applications are deposited on the state ftp site, e-mail notification must be sent to Wade Dahl.

Applications for PE grants are due August 1, 2018. Applications for Preservation, Rehabilitation, and Replacement Grants are due January 2, 2019. Pre-applications for Preservation grants, if submitted, are due by September 1, 2018.

Multiple grant application submittals must be separated into individual pdf files with a limit of one bridge per application.

## XI. Grant Management

The SDDOT Local Government Engineer is responsible for managing the program and making decisions not specifically addressed in this procedure.

# Appendix A – Survey and Hydraulic Work Order Requirements, Type, Size, and Location (TS&L) Report, Foundation Investigation (Bridges) or Undercut Recommendation (Boxes/Pipe)

## Examples Include (Pages A21-A35):

- Preliminary Hydraulic Data Sheet
- Plan/Profile Sketches and Gradelines
- Drainage Data Sheet and Contour Map
- Photo Documentation and Record Search

## Bridge Improvement Grant
## Work Order Requirements for Survey and Hydraulics

### SCOPE OF SERVICES TEMPLATE – Survey & Hydraulics

1. **Field survey for completion of the Drainage Data Sheet and Contour Map.** The information required for placement on these sheets is listed below. An example is attached containing the required information.
   - ☐ Stationing from south to north or west to east.
   - ☐ Beginning and ending stations of the current structure.
   - ☐ Proposed and inplace gradelines.
   - ☐ Stream profile. (Including a table of stations and elevations for each shot taken.)
   - ☐ Sea level datum is required. Stations, elevations, and offsets from and descriptions of permanent objects will be required for project benchmarks. (The High Accuracy Reference Network (HARN) map and the County Bench Mark map for the State of South Dakota can be found at the following web site – www.state.sd.us/dot/pe/roaddesign/survey.htm)
   - ☐ Include an electronic file containing the plan/profile of the inplace gradeline at the structure.
   - ☐ Landowners with their addresses, phone numbers, and location of property.
   - ☐ Utilities with their addresses, phone numbers, and locations along the project.

2. **Field survey as necessary for preparation of construction plans.** Required information is listed below.
   - ☐ Establishment of transit points, land ties and benchmarks as well as cross sections and topography. (Stations, elevations, and offsets from permanent objects will be required for project benchmarks.)
   - ☐ Project limits as established by consultation with the County Highway Superintendent.
   - ☐ Additional legal survey as required for preparation of right-of-way plats.
   - ☐ The geometrics of horizontal and vertical alignment in accordance with the Local Roads Plan design standards.
   - ☐ Survey notes are to be retained on file with the Consultant for subsequent use in the preparation of construction plans and are to be available to the County upon request.

   It is anticipated that this item will permit the issuance of a separate work order (after the Type, Size and Location (TS&L) Inspection) for the development of construction plans with no further survey needed.

3. **Photo Documentation and Record Search of the Structure as defined in Attachment #2.**

4. **Preliminary Hydraulic Data Sheet, Plan/Profile Sketches (Preliminary Hydraulic Layouts) and gradelines, Electronic Copy of Hydraulic Model, Draft Hydraulic Design Report in accordance with the newest version of the South Dakota Drainage Manual, and cost estimates for existing and all proposed structure alternatives. (More than one feasible alternative is required. This includes options on different alignments if applicable.)** The newest version of the South Dakota Drainage Manual is available at the following location: http://www.sddot.com/business/design/forms/drainage/. Guidance and examples can be found in Chapter 6 of the manual. The current preliminary hydraulic data sheet to be used can be found at the following internet location: *ftp://ftp.state.sd.us Folder Path – DOT/LGA/Forms/Hydraulic Data Sheet – Current.doc.* Directions for filling out the form can be found at the same location. All items will be submitted to the Local Government Assistance Office for distribution to SDDOT personnel for review for compliance with minimum required State and Federal standards. Necessary revisions shall be provided in writing by the SDDOT and shall be forwarded to the Consultant by the Local Government Assistance (LGA) Office. Necessary revisions shall be completed by the consultant and the Revised Draft Hydraulic Design Report submitted within 2 weeks of receipt of revisions from LGA. The Consultant is wholly responsible for the accuracy of the design calculations and the independent check design calculations.

   **Note for Box Culverts/Pipe Options and Plans:** The Corps now requires all culverts/pipe where aquatic organism transport is present to have a flow line sunk 1'. If a box/pipe is included in the options, it should be clearly noted that the flowline has been sunk to the required 1'. If the selected structure is a box culvert or pipe, project plans and the final hydraulic data sheet should show that the box or pipe has been sunk to the required 1'.

5. **Conduct TS&L inspection, assistance in the selection of the type, size and location of the replacement structure, and preparation of TS&L summary letter (See Examples #1 & #2 following the attachments).**

The county or city (owner) shall be in attendance and advance notice given the Local Government Assistance Office so if time allows, a staff member can attend.

6. **Report of Foundation Investigation.** Conduct field investigation and provide design recommendations according to AASHTO LRFD Bridge Design Specifications Section 10. Report shall include boring information, lab results, and design recommendations. See **Examples #3 and #4, following the attachments**, for reports that are typically developed by SDDOT Geotechnical Engineering Activity.

7. **Obtain Traffic Data**. Conduct field study to obtain 24 hour traffic volumes for existing structure. Data shall be gathered using a mechanical or electronic device. Study shall be conducted on a typical weekday (Tuesday-Thursday) from midnight to midnight. Report of traffic data shall include structure number, counter brand, serial number, date collected, and total volume.

8. **For Structure Chosen at TS&L: Final Hydraulic Design Report, Final Hydraulic Data Sheet (use the current data sheet found at the following internet location: ftp://ftp.state.sd.us Folder Path – DOT/LGA/Forms/Hydraulic Data Sheet – Current.doc,) HEC RAS model with existing and proposed conditions, and if the structure selected is a bridge, Scour Memo summarizing hydraulic scour calculation, Scour Calculation, and Berm Slope Protection Recommendations (if applicable.)**

Please refer to the checklist in **Attachment #1** for the TS&L Packet of items that shall be submitted to the Local Government Assistance Office.

**Attachment #3** contains applicable excerpts from the Current SDDOT Consultant Retainer, DOT-900 AGREEMENT FOR PROFESSIONAL ENGINEERING SERVICES.

# Attachment #1
# Bridge Improvement Grant
# Checklist for Survey and Hydraulics Work Order TS&L Packet

**These items must be submitted to DOT/Local Government Assistance.**
**If any of these items are missing, the full packet will be returned for completion and resubmission to this office.**

**Project Number** _____ **County** _____ **PCN** _____

☐ **Survey Sheets and Contour Map including the following information:**

- ☐ Stationing from south to north or west to east
- ☐ Beginning and ending stations of the existing structure
- ☐ Beginning and ending stations of proposed structures
- ☐ Proposed and existing gradelines
- ☐ Stream profile and cross sections (Downstream to upstream direction including a table showing stations and elevations for each shot taken)
- ☐ Elevation and location of buildings and other structures
- ☐ Survey information using sea level datum and showing station, elevation, offset, and physical description of each project benchmark
- ☐ Landowner names, addresses, phone numbers, and legal descriptions of their property
- ☐ Utility names, addresses, phone numbers, and locations along the project

☐ **Photo Documentation and Historical Record Search of the Structure (including list of files or repositories searched) as defined in Attachment #2. (In the event that nothing is found, a letter indicating lack of findings, along with files or repositories searched, shall be submitted to the SDDOT/Local Government Assistance Office.)**

☐ **Preliminary Hydraulic Data Sheet (use current data sheet found at: ftp://ftp.state.sd.us Folder Path – DOT/LGA/Forms/Hydraulic Data Sheet – Current.doc) including the following information:**

- ☐ Calculated flows
- ☐ Inplace conditions (Ordinary High Water Elevation, $HW_{100}$, Vmax, OTfr)
- ☐ Proposed conditions for each option ($HW_2$, $HW_{23}$, $HW_{100}$, Vmax Qot, OTfr, ELovertop)
- ☐ Ordinary High Water Elevation Shown on Cross-Sections (vegetation elevation on stream banks – approx. 2–year flow)
- ☐ Observed High Water Elevation (identifiable high water mark)

☐ **Electronic copy of Hydraulic Model of existing and proposed conditions**

☐ **Plan and profile sketches (preliminary hydraulic layout sheets) for the existing structure and proposed gradelines for each option (More than one feasible alternative is required. This includes options on different alignments if applicable.)**

☐ **Cost Estimates (including design and construction engineering and construction costs for each option)**

☐ **Revised Draft Hydraulic Report**

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☐ **TS&L Summary Letter**

☐ **Report of Foundation Investigation (see Examples 3 and 4 in this appendix)**

☐ **For Structure Chosen at TS&L**

- ☐ **Final Hydraulic Design Report**
- ☐ **Final Hydraulic Data Sheet (use current data sheet found at: ftp://ftp.state.sd.us Folder Path – DOT/LGA/Forms/Hydraulic Data Sheet – Current.doc)**
- ☐ **Hydraulic Model with existing and proposed conditions**
- ☐ **Scour memo, scour calculations, and berm slope protection recommendations (Bridges Only)**

# Attachment #2
# Local Government Assistance
# Photo Documentation and Record Search of the Structure

The information defined below will satisfy one of the requirements of the State Historic Preservation Society in clearing the structure for removal.

**Photo Documentation of the Structure**

- ☐ **Site map and photo log of all photos**
- ☐ **Photos will be taken of:** ***(at minimum)***
  - Full views of the structure's primary elevations
  - Close-ups of any decorative, character-defining or structural features
  - General views of the bridge and its environment
- ☐ **Photos will be labeled as follows:**
  - Photo Number - from photo log and site map
  - Name and Address of property – if property does not have legal address then please note either the Universal Transverse Mercator (UTM) or the legal location down to the quarter section.
  - Month and Year of photograph
  - Description of view, including camera direction (cardinal direction – N, S, E, W)
- ☐ **Photos will be submitted in one of the following formats:**
  - Digital Photographs
    - At least 2000 X 3000 pixels at 300 dpi
    - Saved as TIFFs submitted on CDs
  - 35mm Black and White Photographs
    - 35mm black/white film printed on black/white photographic paper
    - Both prints and negatives submitted

**Historical Record Search of the Structure**

- ☐ **Any or all of the following are needed:**
  - Reports – maintenance or otherwise indicating modifications to the original structure – what was done and why
  - Any Photographs of the original structure (not inspection photos; not photos referenced in this work order)
  - Original Drawings
  - Original Plans
  - Any other documentation

- ☐ **Names of Files or Repositories (courthouse, county historical society, etc.) Searched**

If possible, provide the original copy of this information. If not, submit the information in the following format. High quality clear Xerox copies of any reports, drawings, or plans; and photographs scanned at 600 dpi, saved as TIFFs, and submitted on a CD.

If these documents are not otherwise restricted through state or federal law; submit them to the SDDOT/Local Government Office for submission to the South Dakota State Historical Society for public use and reproduction. In the event that nothing is found, a letter indicating lack of findings, along with files or repositories searched, shall be submitted to the SDDOT/Local Government Assistance Office.

# Attachment #3
## Bridge Improvement Grant
## Excerpts from Current DOT-900 (10/2016)
## AGREEMENT FOR PROFESSIONAL ENGINEERING SERVICES
## (SDDOT Consultant Retainer)

**FURNISHING OF DOCUMENTS (DOT-900, 10/2016, Section B.3.)**

Except where otherwise specifically provided, the CONSULTANT will furnish to the DEPARTMENT all documents, reports, exhibits, electronic files, and other presentations for all phases of the work performed under the terms of this Agreement.

The CONSULTANT will furnish to the DEPARTMENT all design and check design computations. All documents furnished, including all original drawings, software generated electronic files, design computations, and check design computations, will become and remain the property of the DEPARTMENT and may be used by the DEPARTMENT without restriction for any public purpose.

The CONSULTANT will provide survey documents for bench levels and for the checking of bench levels on standard loose-leaf transit field book sheets. The CONSULTANT will provide all other data collected in an electronic format and will include the following files: FWD file, DGN file, DTM file, ALG file, and the RAW data file. The FWD file, DGN file, DTM file, and ALG file, will be compatible with the DEPARTMENT'S current version of InRoads. The RAW data file will be in ASCII format and will include the following information: point number, northing, easting, description, and any pertinent notes corresponding to a particular point.

The CONSULTANT, as requested by the DEPARTMENT, will submit construction documents, either electronic or paper format, and said documents will become and remain the DEPARTMENT'S property.

The CONSULTANT will return all data furnished to the CONSULTANT by the DEPARTMENT to the DEPARTMENT.

Compliance with all of the foregoing will be considered to be within the purview of this Agreement and will not constitute a basis for additional or extra compensation.

**GENERAL REQUIREMENTS (DOT-900, 10/2016, Section C.3.)**

b. Survey for roadway and hydraulic design will be in accordance with the edition of the Department of Transportation Survey Manual currently in place at the time of execution of the Work Order.

c. Wetland delineation will be in conformance with the US Army Corps of Engineers Wetland Delineation Manual and Regional Supplements. Wetland mitigation plans will include construction plans, performance criteria, and a five (5) year monitoring plan.

d. Hydrologic/Hydraulic design will be in accordance with the edition of the South Dakota Drainage Manual (and its revisions) currently in place at the time of execution of the Work Order.

**ROADWAY DESIGN (DOT-900, 10/2016, Section C.4.)**

Unless otherwise modified by the Work Order, the CONSULTANT will meet the following requirements:

a. Roadway design will be in accordance with the edition of the Department of Transportation Road Design Manual (and its revisions) currently in place at the time of execution of the Work Order and the American Association of State Highway and Transportation Officials (AASHTO) Specifications, "A Policy on Geometric Design of Highways and Streets" (2011 or the version in place at the time of execution of the Work Order), and Interims, or the Local Roads Plan.

b. The CONSULTANT will complete and furnish to the DEPARTMENT, at the time the plans are delivered to the DEPARTMENT, a DEPARTMENT provided checklist. This checklist will provide certification that a separate check has been performed, all review revisions have been made, and the plans are correct and complete.

c. The CONSULTANT will furnish basic design criteria in the Scope Summary Report and in the Scope of Services.

d. The CONSULTANT may obtain standard drawings of roadway appurtenances from the DEPARTMENT'S Office of Road Design.

e. The CONSULTANT will contact the DEPARTMENT'S Office of Bridge Design, if a DEPARTMENT structure's drainage area is greater than 1,000 acres. For these structures, the DEPARTMENT'S Office of Bridge Design will make a hydraulics recommendation, or will concur on the hydraulics requirement if hydraulics is part of the work order scope.

f. The DEPARTMENT will furnish basic surfacing design criteria, such as type, thickness, and width of pavement.

g. The DEPARTMENT will furnish material recommendations.

**STRUCTURE DESIGN (DOT-900, 10/2016, Section C.5.)**

Unless otherwise modified by the Work Order, the CONSULTANT will meet the following requirements:

a. Prior to initiating design, the CONSULTANT will be required to submit the QC/QA plan/procedure to be followed for structure design to the DEPARTMENT for approval. The CONSULTANT may not begin structure design work until the QC/QA plan/procedure is approved and documented. If the CONSULTANT has a prior approved structure design QC/QA plan/procedure document on file with the OBD, and no changes to that document are anticipated for the current contract, the CONSULTANT will not need to resubmit a structure design QC/QA plan/procedure document.

b. The CONSULTANT will design bridges, box culverts, and miscellaneous highway structures in accordance with the edition of the "AASHTO LRFD Bridge Design Specifications," currently in place at the time of execution of the Work Order except as modified by the DEPARTMENT'S design practices. Prior to beginning design work, the DEPARTMENT will supply the CONSULTANT with a copy of design practices along with examples of standard detailing procedures and typical plans.

c. The CONSULTANT will design highway structures for a vehicular live loading of HL-93. Additional design criteria may be included in the Scope of Work.

d. The CONSULTANT will load rate each structure, including culverts that are bridge length, in accordance with the edition of the AASHTO "Manual for Bridge Evaluation" with latest Interim Revisions using the LRFR method currently in place at the time of execution of the Work Order. The CONSULTANT will perform an HL-93 Design Load Rating for each structure. The CONSULTANT will analyze the AASHTO HS20 vehicle for Inventory and Operating Ratings. The CONSULTANT will also perform a Legal Load Rating for South Dakota legal trucks, the notional rating load, and the four specialized hauling vehicles. The CONSULTANT will submit a copy of the rating analyses to the DEPARTMENT along with the Final Plans for bid letting purposes. The Bridge Management Engineer from the DEPARTMENT'S Office of Bridge Design will review load ratings. Load ratings must be above the Legal Loads. The CONSULTANT will provide a separate summary table of all load ratings to be included in the Bridge Inspection file.

e. The CONSULTANT will provide the DEPARTMENT a hard copy of design computations, independent check design computations, and load ratings, including computer output if applicable, with the final review set of drawings.

f. The CONSULTANT will review shop plans for fabricated items, and will forward marked-up shop plans to the DEPARTMENT. The DEPARTMENT must authorize any fabrication.

**PLANS, SPECIFICATIONS, AND ESTIMATES, GENERAL (DOT-900, 10/2016, Section C.8.)**

Unless otherwise modified by the Work Order, the CONSULTANT will meet the following requirements:

a. When complete plans, supplemental specifications, or special provisions are prepared, these will become the property of the DEPARTMENT, County, or City.

b. The CONSULTANT will furnish and deliver to the DEPARTMENT original drawings of all sheets comprising the set of plans, together with all reports, drawings, computer files, studies, memoranda, and other data pertaining thereto.

c. The CONSULTANT will furnish to the DEPARTMENT an electronic MS Word file of all special specifications.

d. The CONSULTANT will prepare plans in conformance with the DEPARTMENT'S customary practices. The CONSULTANT will use standard format for notes, tables, and rates of materials.

e. The CONSULTANT will prepare plans on sheets 11" x 17" or 8 ½" x 11" in size, under the guidance of the Road Design Manual's Chapter 18 – Plans Assembly: www.sddot.com/business/design/forms/roaddesign/Default.aspx or as directed by the DEPARTMENT. The CONSULTANT will follow the specific section of the Road Design Manual's Chapter 18 as it relates to plans produced by consultants in order to provide accurate electronic plans and bid items for the DEPARTMENT'S electronic bidding system. The CONSULTANT will utilize the DEPARTMENT'S web site: http://www.sddot.com/business/design/Default.aspx for Plan Preparation (i.e. Road Design Manual, CADD Procedure Manual, and User Guide for Electronic Plan Review), Downloadable Files (i.e. Form Letters, Microstation and InRoad files, and Plan Notes) and other information as necessary to design and prepare plans. The CONSULTANT will follow the properties and procedures set up for the DEPARTMENT'S electronic plans as set forth in document located at the following web site address: http://sddot.com/business/design/forms/cadd/Default.aspx . Electronic plans will be used for bidding purposes and must contain a watermark on each sheet stating "For Bidding Purposes Only." Refer to Paragraph i. below for details on the set of plans to be used for construction.

f. The CONSULTANT will prepare plans with sufficient precision to permit the convenient layout in the field for construction and for other purposes. The plans will also provide for the production of an accurate estimate of quantities for the work to be performed in the construction of the project.

g. The CONSULTANT will furnish such other pertinent information and data with respect to the plans and designs as the DEPARTMENT may request.

h. The DEPARTMENT will require all persons designing, detailing, and checking structure plans to legibly place their names or initials on each plan sheet in the spaces provided for this purpose.

i. The DEPARTMENT will designate the basic premises and criteria for the design. The CONSULTANT will develop plans in accordance with the DEPARTMENT'S standard specifications for roadway and bridge construction.

j. As part of the work embraced in the preparation of plans, the CONSULTANT will prepare and furnish to the DEPARTMENT special provisions in standard DEPARTMENT format, for items of work included in the plans which are not covered by the standard specifications, plan notes, or DEPARTMENT-approved special provisions.

k. The CONSULTANT will ensure scales, lettering, and the general delineation of the plans mirror the DEPARTMENT format and provide readily legible reproductions.

l. The CONSULTANT will ensure each plan sheet bears the South Dakota registered professional seal and endorsement of the CONSULTANT as per the requirements of the South Dakota Board of Technical Professions.

m. The CONSULTANT will use software acceptable to the DEPARTMENT as agreed to in the Work Order.

Note: The DEPARTMENT'S standard software programs are the Bentley Civil Products (InRoads Suite), MicroStation, AASHTOWare products, Adobe Acrobat, Bluebeam, and the Microsoft Office Suite. The DEPARTMENT may require other software on Work Orders.

**CONSTRUCTION ENGINEERING TECHNICAL REQUIREMENTS (DOT-900, 10/2016, Section D1.)**

1. **CONSULTANT'S RESPONSIBILITIES**. The CONSULTANT will be responsible to the DEPARTMENT, and will complete all work to the DEPARTMENT'S satisfaction.

   Subject to availability, the CONSULTANT will provide personnel for the areas of expertise necessary to satisfactorily complete the work specified in the Work Order and this Agreement. The DEPARTMENT will notify the CONSULTANT as to the proper medium that will be used for recording purposes of field data. The CONSULTANT will submit reports in a timely manner as directed by the DEPARTMENT'S Office issuing the Work Order. The responsibilities for these areas are described in **Exhibit 4**, CONSTRUCTION ENGINEERING CONSULTANT RESPONSIBILITIES.

**EXHIBIT 4 (DOT-900, 10/2016)**

**CONSULTANT CONSTRUCTION OVERSITE RESPONSIBILITIES**

**GENERAL**

**The CONSULTANT will:**

1. Be knowledgeable of the requirements of the project plans and specifications, the DEPARTMENT'S Survey Manual, Road Design Manual, South Dakota Drainage Manual, and Computer-Aided Design and Drafting (CADD) Procedures Manual.

2. Assure project personnel are knowledgeable of their duties and responsibilities.

3. Assure project personnel are knowledgeable of the DEPARTMENT'S Materials Manual.

4. Oversee day to day activities to ensure the project is constructed in accordance with plans and specifications.

5. Ensure all documentation and reports are accurate and kept current.

6. Prepare and electronically submit Biweekly Progress Reports, Construction Change Orders, Progress Pay Estimates, Final Pay Estimate, and Final Construction Change Order, all on the current version of the DEPARTMENT'S Construction Management System. The CONSULTANT will submit these reports in a timely manner as directed by the DEPARTMENT'S Office issuing the Work Order.

7. Require all individuals providing acceptance testing and independent assurance testing of construction materials or acceptance inspection to record all data/results electronically on the current version of the DEPARTMENT'S Construction Management System, or as instructed by the DEPARTMENT.

8. Require all individuals providing acceptance testing and independent assurance testing of materials or acceptance inspection to meet the requirements of the DEPARTMENT'S Materials Testing and Inspection Certification Program Manual.

9. Ensure testing equipment identified in the DEPARTMENT'S Materials Testing and Inspection Certification Program Manual is calibrated and documented according to the designated frequencies and procedures designated in the Manual.

10. Perform other duties assigned by the DEPARTMENT as defined in this Agreement.

**The CONSULTANT'S PROJECT ENGINEER will:**

1. Assist with conducting the pre-construction meeting.

2. Prepare biweekly progress reports, construction change orders, progress pay estimates, final estimate, and final construction change order electronically on the current version of the DEPARTMENT'S Construction Management System.

3. Handle equal employment opportunity (EEO) and labor compliance activities.

4. Ensure that subcontractors working on the project are approved by the DEPARTMENT.

**The CONSULTANT'S INSPECTOR will:**

1. Assure the asphalt or concrete plant is properly calibrated.

2. Perform scale accuracy checks.

3. Ensure construction activities remain inside the acquired right-of-way or easement as specified on the plans unless approved by the DEPARTMENT.

**The CONSULTANT'S SURVEY PARTY CHIEF will:**

1. Record field notes for slope stakes, blue tops, paving grades, pipe, structure layout, and other items of the same sort in electronic format, FWD files, DGN files, DTM files, ALG files, and RAW files compatible to the current version of InRoads being used by the DEPARTMENT.

2. Set centerline, offset lines, bluetops, slope stakes, pipe stakes, structure stakes, and other items of the same sort by electronic or manual means.

3. Run bench levels within acceptable tolerances of the DEPARTMENT'S Survey Manual and maintain field notes on standard loose-leaf transit field book sheets.

4. Obtain necessary topographic data within acceptable tolerances of the DEPARTMENT'S Survey Manual.

5. Supervise and assure the survey crew is knowledgeable as to its duties and responsibilities.

**The CONSULTANT'S TEST PERSON AND EQUIPMENT will:**

1. Be knowledgeable of the requirements of the project plans and specifications.

2. Sample and test materials for acceptance as specified by the DEPARTMENT'S Materials Manual. Perform material tests for QC/QA projects in accordance with QC/QA manual and have the proper QC/QA certification.

Recognize and have the ability to take corrective action for calibration of testing equipment.

**ABC ENGINEERING**
**Street Address**
**City, State, ZIP**
**PHONE / FAX**

**EXAMPLE 1**

**Bridge TS&L Letter Template**

Items to be customized for the specific project and conditions are in blue font. Guidance notes are highlighted.

DATE

ADDRESS BLOCK

RE: BR_ ###(00), COUNTY **OR** CITY, PCN
STRUCTURE NUMBER, LOCATION

Dear NAME:

A Type, Size, and Location inspection was held on DATE, for the above referenced project. The following personnel were in attendance:

ATTENDEE NAMES, TITLES

The following items were discussed and agreed upon by the inspection participants:

The most feasible structure for this site is a 63' 1 span precast channel bridge with a 24' deck (22' clear width) and a 30° LHF **OR** RHF skew. The substructure shall consist of steel pile abutments. (Also note bent type if known – such as 2-column bents, etc.) The bridge location will be shown on the Final Hydraulic Data Sheet and will be centered at approximately station 10+00. T101 rail will be shown in the plans. Approach rail will **OR** will not be needed. Fence anchor eyes will **OR** will not be provided.

The Contractor will remove and dispose of the existing structure. The Contractor shall also salvage the beams, wood planks, and railing for the County **OR** City, which shall be noted in the plans for bidding purposes. Remaining materials shall be disposed of by the Contractor. The abutments and bents shall be removed to 1' below flowline.

The road will be closed during construction with no detour necessary. **OR** An onsite detour on the DIRECTION side of the structure will be shown in the plan.

Project limits will run from approximately 100' north to 100' south of the structure. The current grade shall be maintained. The typical section will include a crown slope of 0.04 ft/ft for gravel surfaces **OR** 0.02 ft/ft for paved surfaces, 4:1 inslopes, 5:1 backslopes, and a standard 10' ditch at 20:1. The approach subgrade shall taper from the structure to match the new subgrade and will provide for a WIDTH finished roadway top. The surfacing will consist of gravel **OR** asphalt, which will be furnished and installed by the County **OR** City. Clear zone for this site has been set at 10' as per the AASHTO Guidelines for Geometric Design of Very Low-Volume Local Roads **OR** __' as per Table 3.1 of the AASHTO Roadside Design Guide. Unless otherwise noted, all design data for the project will meet the current design speed for the roadway.

No channel change and no channel cleanout will be necessary at this site. **OR** No channel change will be necessary at this site. Some channel cleanout of trees and/or brush will be necessary to the northeast and southeast.

The Consultant will provide erosion protection recommendations with the Final Hydraulic Data Sheet. The southwest bank will need to be built up and protected with riprap. (Note location of any out-of-the-ordinary need for riprap and reason why.)

Specific project notes for this project are attached. (ADD ANY PROJECT SPECIFIC NOTES AS ATTACHMENT TO THIS MEMO.)

The Contractor will be responsible for traffic control, topsoiling, and seeding.

The County **OR** City will be responsible for the following items without Grant Participation:

1) Right of way and temporary and permanent easements
2) Coordination of any utility adjustments
3) Furnish and install final surfacing
4) Furnish and install temporary and/or permanent fencing
5) Furnish and install new permanent signing
6) Remove silt fence in permanently seeded areas

The SDDOT Geotechnical Engineering Activity is requested to provide foundation and backfill recommendations by DATE (12-18 months from letter date).

The Consultant will provide the name, address, and phone number of adjacent landowners. Utility Company contact information is also needed in the plans for any utilities that exist within the project area. The DOT Local Government Office (DOT LET) **OR** the County **OR** City (LOCALLY LET) will initiate the 404 permit and other related environmental clearances, and will provide the Consultant with materials recommendations if needed.

The Consultant will outline the two archeological sites on the roadway plan sheet. These sites are located within ¼ mile of the structure and cannot be disturbed. Notes stating this shall be placed in the plans and are located with the other project specific notes. THIS ONLY APPLIES IF SHPO STATES THAT SITES HAVE BEEN FOUND AND MUST BE AVOIDED. TAILOR AS NECESSARY OR DELETE IF NOT NEEDED.

The estimated letting date will be in the fall/spring of YEAR, with an overall completion date of ------. **OR** with the Area Engineer to specify an overall completion date at the time that plans are submitted to Bid Letting by this office. It shall be noted in the proposal, as submitted by this office, that a 45, 60 or 90 working **OR** calendar day maximum amount of time for construction of the project will be allowed. It has been determined by Game, Fish & Parks that an April 1 – June 30 seasonal limitation applies to in-stream work. THIS ONLY APPLIES IF THE GF&P LETTER SPECIFIES IT **AND** THE SITE IS **NOT** A TOPEKA SHINER SITE. **OR** This site is a Topeka Shiner site.

If there are any questions or comments please contact me at NUMBER.

Sincerely,

NAME
TITLE

CC: COUNTY/CITY – CONTACT NAME
LGA – CONTACT NAME

**ABC ENGINEERING**
**Street Address**
**City, State, ZIP**
**PHONE / FAX**

**EXAMPLE 2**

**Box Culvert/Pipe TS&L Letter Template**

Items to be customized for the specific project and conditions are in blue font. Guidance notes are highlighted.

DATE

ADDRESS BLOCK

RE: BR_ ###(00), COUNTY, PCN
STRUCTURE NUMBER, LOCATION

Dear NAME:

A Type, Size, and Location meeting was held on DATE, for the above referenced project. The following personnel were in attendance:

ATTENDEE NAMES, TITLES

The following items were discussed and agreed upon by the inspection participants:

The most feasible structure for this site is a 5 barrel 12' X 5' cast-in-place **OR** precast RCBC with a 0° RHF OR LHF skew, and 0° flared wingwalls at the inlet & 0° flared wingwalls at the outlet. Cutoff wall is to be extended 6" below the recommended outlet protection. The new structure will be centered at approximately sta. 10+07. Fence anchor eyes will **OR** will not be required at this site. The box opening will be outside of the 10' clear zone. (The thickness of the bottom slab shall be the same or greater than the thickness of the top slab.)

REMOVE IF NOT NEEDED – The Corps now requires all culverts/pipe where aquatic organism transport is present to have a flow line sunk 1'. Project plans and the final hydraulic data sheet should show that the box or pipe has been sunk to the required 1'. As aquatic organism transport is present at this location, the flowline of the box culvert **OR** pipe and riprap must be submerged a minimum of 1'. This needs to be documented both on the final hydraulic data sheet and on the structure, general drawing plan sheet.

The Contractor shall remove and dispose of the in-place structure. EXTRA ITEMS AS NEEDED - The Contractor shall also salvage the beams, wood planks, and railing for the County, which shall be noted in the plans for bidding purposes. The Contractor will dispose of items not salvaged. The bent and abutments shall be removed to the bottom of the undercut.

The project limits shall be from approximately 150' south to 150' north of the structure. The road will be closed with no detour necessary. Only local traffic will be allowed access. **OR** An onsite detour on the DIRECTION side of the structure will be shown in the plan.

The typical section will include a crown slope of 0.04 ft/ft for gravel surfaces **OR** 0.02 ft/ft for paved surfaces, 4:1 inslopes, 5:1 backslopes, and a standard 10' ditch at 20:1. The approach subgrade will taper into the existing and provide for a WIDTH finished roadway top (2- WIDTH' lanes and 2- WIDTH' shoulders.) The surfacing will consist of gravel **OR** asphalt, which will be furnished and installed by the County **OR** City. Clear zone for this site has been set at 10' as per the AASHTO

Guidelines for Geometric Design of Very Low-Volume Local Roads **OR** __' as per Table 3.1 of the AASHTO Roadside Design Guide. Unless otherwise noted, all design data for the project will meet the current design speed of the roadway.

The Consultant will provide inlet and outlet recommendations on the Final Hydraulic Data Sheet. The inlet & outlet protection shall be riprap. (Any extra riprap needed? If so, where and why?)

No channel change and no channel cleanout will be necessary at this site. **OR** No channel change will be necessary at this site. Some channel cleanout of trees and/or brush will be necessary. A temporary diversion channel will be installed south of the structure.

The Contractor will be responsible for traffic control, topsoil stripping, and seeding.

The County **OR** City will be responsible for the following items without Grant Participation:

1) Right of way and temporary and permanent easements
2) Coordination of any utility adjustments
3) Furnish and install final surfacing
4) Furnish and install temporary and/or permanent fencing
5) Furnish and install new permanent signing
6) Remove silt fence in permanently seeded areas

The SDDOT Geotechnical Engineering Activity Office is requested to provide undercut recommendations by DATE (6 months from letter).

The Consultant will provide names, addresses, and phone numbers of the adjacent landowners. Utility Company contact information is also needed in the plans for any utilities that exist within the project area. The DOT Local Government Office (DOT LET) **OR** the County **OR** City (LOCALLY LET) will initiate the 404 permit and other related environmental clearances, and will provide the consultant with materials recommendations.

The Consultant will outline the two archeological sites on the roadway plan sheet. These sites are located within ¼ mile of the structure and cannot be disturbed. Notes stating this shall be placed in the plans and are located with the other project specific notes. THIS ONLY APPLIES IF SHPO STATES THAT SITES HAVE BEEN FOUND AND MUST BE AVOIDED. TAILOR AS NECESSARY OR DELETE IF NOT NEEDED.

The estimated letting date will be in the fall/spring of YEAR, with an overall completion date of ------. **OR** with the Area Engineer to specify an overall completion date at the time that plans are submitted to Bid Letting by this office. It shall be noted in the proposal, as submitted by this office, that a 30, 45, 60 working **OR** calendar day maximum amount of time for construction of the project will be allowed. It has been determined by Game, Fish & Parks that an April 1 – June 30 seasonal limitation applies to in-stream work. THIS ONLY APPLIES IF THE GF&P LETTER SPECIFIES IT **AND** THE SITE IS **NOT** A TOPEKA SHINER SITE.

If there are any questions or comments please contact me at NUMBER.

Sincerely,

NAME
TITLE

cc: COUNTY/CITY – CONTACT NAME
LGA – CONTACT NAME

**EXAMPLE 3**

## REPORT OF FOUNDATION INVESTIGATION

**PROJECT:** BRO 8048(03) Mellette County PCN 02DY

**LOCATION:** Structure No. 48-102-010, 18.9 miles North & 0.8 miles West of Cedar Butte over the White River.

**METHOD OF INVESTIGATION:**

All soundings are made according to the Standard South Dakota Subsurface Investigation Techniques and AASHTO Specifications. Auger holes are drilled with a 4-1/2 inch continuous flight auger. Penetration and Push Test holes are drilled with a 6-5/8 inch continuous hollow stem auger. Push core samples are obtained by hydraulically ramming a 2 foot long lined split spoon sampler into the soil to obtain 2 inch nominal diameter soil samples. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to obtain 2 inch nominal diameter samples and to measure the resistance to penetration of the soil. Corings with the SDDOT drive rig are performed by using a California retractable plug sampler, which is driven with a 490 pound hammer. The drill stem is P.K. rod, which is 2-7/8 inch O.D., and 2 inch nominal diameter cores are obtained. All laboratory tests are performed in accordance with standard AASHTO or SDDOT laboratory procedures.

**RECOMMENDATIONS:**

Abutments:

I. Steel HP10 X 42 Piling

A. A LRFD maximum factored pile bearing resistance of 77 tons can be used for design.

B. The anticipated tip elevations are:

| Station | Elevation |
|---|---|
| 22+06 | 1910 |
| 25+27 | 1892 |

C. The nominal pile bearing resistance shall be 192 tons verified by the SDDOT's Modified ENR formula.

Bents:

I. Drilled Shafts

A. A LRFD maximum factored resistance value of 2,800 psf can be used for design below elevation 1912 ft. or maximum scour whichever is lower.

B. Permanent casings will be required to elevation 1915 ft.

C. The point of fixity within the bedrock can be assumed to be the elevation 1912 ft.

**DISCUSSION:**

The proposed structure location is underlain by brown sand-silt (alluvium) overlying brown silt-sand with gravel (alluvium). The alluvial sediments rest upon gray silt-clay (Pierre Shale). The D50 of the brown sand-silt, brown silt-sand with gravel, and gray silt-clay (Pierre Shale) can be assumed to be 0.06 mm, 1.0 mm, and 0.004 mm. The D95 of the brown sand-silt, brown silt-sand with gravel, and gray silt-clay (Pierre Shale) can be assumed to be 1.0 mm, 6.0 mm, and 0.06 mm.

Steel HP10X42 piling along with the anticipated tip elevations, are listed in the recommendations for use in the abutments. Drilled Shafts are listed in the recommendations for use at the bents.

The piling were evaluated for drivability and group effects at the LRFD Strength Limit State. Settlement of the substructure units and horizontal movement of the abutment piling were evaluated at the LRFD Service Limit State.

Drivability –

A drivability analysis was performed for the steel HP10X42 piling using the wave equation analysis program (GRLWEAP). A group of pile hammers that were evaluated and found to produce acceptable driving stresses is listed later in this report for inclusion in the plans.

Pile Group Effects:

Axial Loading –
Abutments

For a single row of piling, AASHTO requires the center-to-center pile spacing to be at least 30" or 2.5 times the width of the pile, whichever is greater. Therefore, for the steel HP10x42 piling at the abutment the center-to-center spacing shall be at least 30".

Settlement –

The steel pile tips will be founded in the Pierre Shale. Unconfined compression test results of the Pierre Shale exceed the proposed bridge loadings. Past experience for piling driven into hard shale soil bedrocks has shown little, if any, settlement has occurred. Therefore, 1/4 inch or less of total settlement can be used to design the substructure units.

Horizontal Movement –

AASHTO states that if the center-to-center spacing of the piling in the substructure unit is greater than 5 times the width of the pile then group effects can be ignored. Therefore, if the designed spacing is greater than 5 times the pile width a group efficiency factor of 1.0 can be used with no reduction in pile loading required. If this minimum pile spacing is not met a reduction factor will need to be calculated according to the AASHTO code.

Horizontal movement at the substructure units can be calculated using the following soil parameters:

Sand-silt (alluvium); phi angle = 24 degrees, cohesion = 50 psf, wet unit weight = 118 pcf
Silt-sand with gravel (alluvium); phi angle = 32 degrees, cohesion = 0 psf, wet unit weight = 130 pcf
Silt-clay (Pierre Shale); phi angle = 18 degrees, cohesion = 1,000 psf, wet unit weight = 130 pcf

For the drilled shafts, a LRFD maximum factored resistance value (skin friction) of 2,800 psf is recommended below elevation 1912 for the bents or maximum scour whichever is lower. The point of fixity within the bedrock can be assumed to be 1912 for the bents.

Each drilled shaft shall have a minimum of 3 access tubes for a shaft diameter of 3.0' and less. The number of access tubes needed shall be increased by 1 for each foot increase in shaft diameter above the 3.0'. The access tubes shall be furnished and installed according to the South Dakota Department of Transportation's 2004 Standard Specifications for Roads and Bridges. These access tubes shall be equally spaced in the shaft reinforcement prior to placing the reinforcement cage.

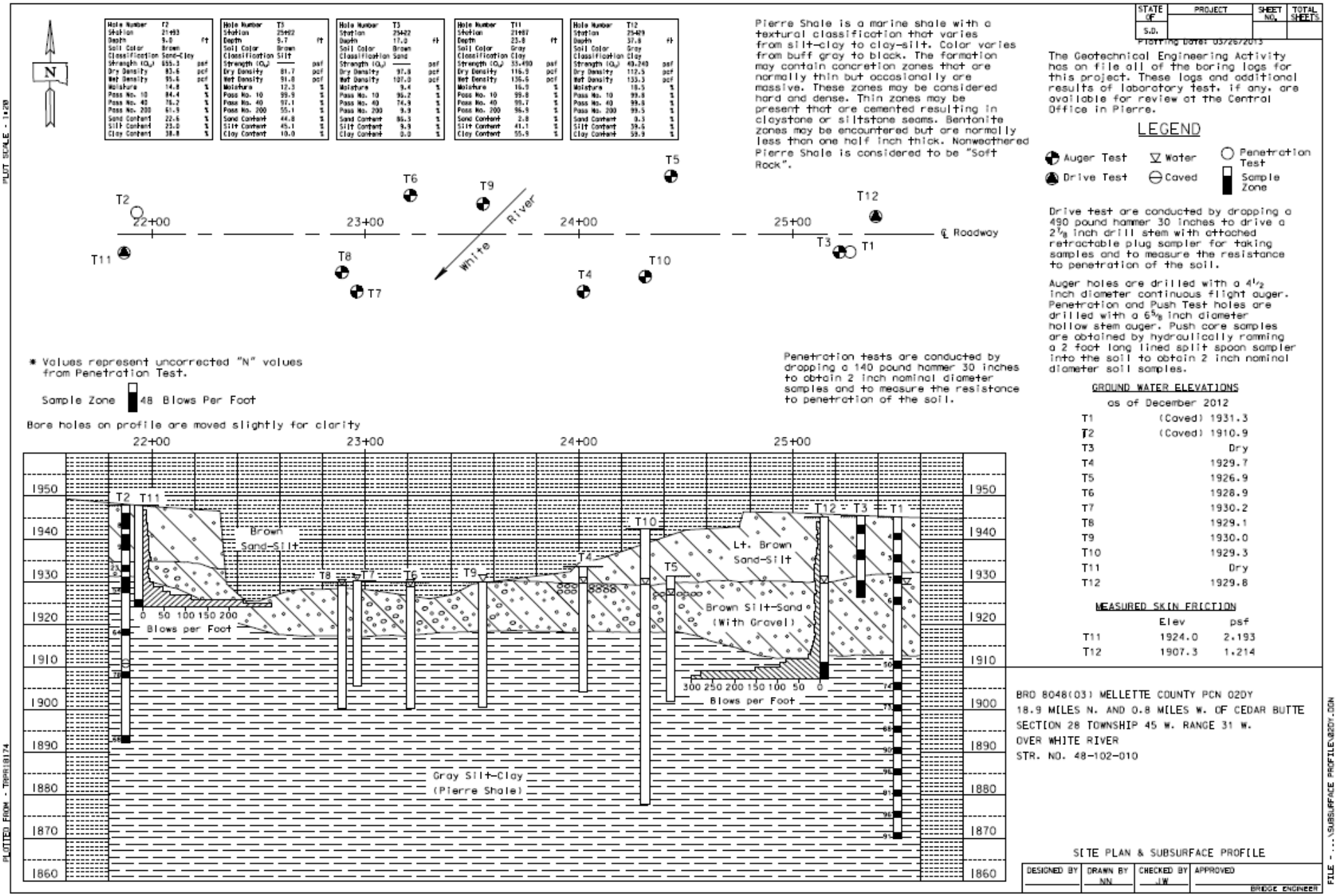
A representative of the CONSULTING FIRM (NAME AND NUMBER) shall be present during drilling operations to confirm the elevations provided in this report and to observe the placement of the drilled shafts. In addition to the notes below, contact the CONSULTANT REPRESENTATIVE for the most current drilled shaft construction notes to be included in the plans.

**The following notes shall be placed in the plans**:

A drivability analysis was performed using the wave equation analysis program (GRLWEAP). The pile hammers listed below were evaluated and found to produce acceptable driving stresses. Pile hammers not listed will require evaluation and approval prior to use from the CONSULTANT REPRESENTATIVE NAME AND PHONE NUMBER.

*Hammers need to be sized according to site specific soil parameters and structure design requirements. The following list of hammers is owned and readily available by contractors that do work in SD. Select and specify in the report which hammers are acceptable for use on individual projects.*

| | | | | |
|---|---|---|---|---|
| ICE 180 | Delmag D12-42 | FEC 1500 | Delmag D16-32 | Delmag D19-32 |
| Delmag D19-42 | MVE M-19 | ICE 42S | MKT DE 42/35 | APE D19-42 |
| Delmag D25-32 | Delmag D30-32 | SPI D30 | Delmag D46-32 | |


STATE OF S.D.
PROJECT
SHEET NO.
TOTAL SHEETS
Plotting Date: 03/26/2013
PLOT SCALE - 1:20
N
Hole Number T2 Station 21+93 Depth 9.0 ft Soil Color Brown Classification Sand-Clay Strength (Qu) 855.3 psf Dry Density 83.6 pcf Wet Density 95.6 pcf Moisture 14.8 % Pass No. 10 84.4 % Pass No. 40 76.2 % Pass No. 200 61.9 % Sand Content 22.6 % Silt Content 23.8 % Clay Content 38.8 %
Hole Number T3 Station 23+02 Depth 5.7 ft Soil Color Brown Classification Silt Strength (Qu) psf Dry Density 81.7 pcf Wet Density 91.8 pcf Moisture 12.3 % Pass No. 10 99.9 % Pass No. 40 97.1 % Pass No. 200 55.1 % Sand Content 44.8 % Silt Content 45.1 % Clay Content 10.0 %
Hole Number T3 Station 23+22 Depth 17.0 ft Soil Color Brown Classification Sand Strength (Qu) psf Dry Density 97.8 pcf Wet Density 107.0 pcf Moisture 9.4 % Pass No. 10 95.2 % Pass No. 40 74.9 % Pass No. 200 9.9 % Sand Content 86.5 % Silt Content 9.9 % Clay Content 3.6 %
Hole Number T11 Station 21+87 Depth 23.8 ft Soil Color Gray Classification Clay Strength (Qu) 33.490 psf Dry Density 116.9 pcf Wet Density 136.6 pcf Moisture 16.8 % Pass No. 10 99.8 % Pass No. 40 99.7 % Pass No. 200 96.9 % Sand Content 2.8 % Silt Content 41.1 % Clay Content 55.9 %
Hole Number T12 Station 25+09 Depth 37.8 ft Soil Color Gray Classification Clay Strength (Qu) 40.240 psf Dry Density 112.5 pcf Wet Density 133.3 pcf Moisture 18.5 % Pass No. 10 99.8 % Pass No. 40 99.8 % Pass No. 200 99.5 % Sand Content 0.3 % Silt Content 39.5 % Clay Content 59.9 %
Pierre Shale is a marine shale with a textural classification that varies from silt-clay to clay-silt. Color varies from buff gray to black. The formation may contain concretion zones that are normally thin but occasionally are massive. These zones may be considered hard and dense. Thin zones may be present that are cemented resulting in claystone or siltstone seams. Bentonite zones may be encountered but are normally less than one half inch thick. Nonweathered Pierre Shale is considered to be "Soft Rock".
The Geotechnical Engineering Activity has on file all of the boring logs for this project. These logs and additional results of laboratory test, if any, are available for review at the Central Office in Pierre.
LEGEND
Auger Test
Drive Test
Water
Caved
Penetration Test
Sample Zone
T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12
22+00 23+00 24+00 25+00
White River
℄ Roadway
Drive test are conducted by dropping a 490 pound hammer 30 inches to drive a 2 7/8 inch drill stem with attached retractable plug sampler for taking samples and to measure the resistance to penetration of the soil.
Auger holes are drilled with a 4 1/2 inch diameter continuous flight auger. Penetration and Push Test holes are drilled with a 6 5/8 inch diameter hollow stem auger. Push core samples are obtained by hydraulically ramming a 2 foot long lined split spoon sampler into the soil to obtain 2 inch nominal diameter soil samples.
* Values represent uncorrected "N" values from Penetration Test.
Sample Zone 48 Blows Per Foot
Penetration tests are conducted by dropping a 140 pound hammer 30 inches to obtain 2 inch nominal diameter samples and to measure the resistance to penetration of the soil.
Bore holes on profile are moved slightly for clarity
22+00 23+00 24+00 25+00
1950 1940 1930 1920 1910 1900 1890 1880 1870 1860
Brown Sand-Silt
Lt. Brown Sand-Silt
Brown Silt-Sand (With Gravel)
Gray Silt-Clay (Pierre Shale)
0 50 100 150 200 Blows per Foot
300 250 200 150 100 50 0 Blows per Foot
GROUND WATER ELEVATIONS
as of December 2012
T1 (Caved) 1931.3
T2 (Caved) 1910.9
T3 Dry
T4 1929.7
T5 1926.9
T6 1928.9
T7 1930.2
T8 1929.1
T9 1930.0
T10 1929.3
T11 Dry
T12 1929.8
MEASURED SKIN FRICTION
T11 Elev 1924.0 psf 2.193
T12 Elev 1907.3 psf 1.214
BRO 8048(03) MELLETTE COUNTY PCN 02DY
18.9 MILES N. AND 0.8 MILES W. OF CEDAR BUTTE
SECTION 28 TOWNSHIP 45 W. RANGE 31 W.
OVER WHITE RIVER
STR. NO. 48-102-010
SITE PLAN & SUBSURFACE PROFILE
DESIGNED BY
DRAWN BY NN
CHECKED BY JW
APPROVED
BRIDGE ENGINEER
PLOTTED FROM - TRPR0174
FILE - ...\SUBSURFACE PROFILE\02DY.DGN

**RECOMMENDATIONS**

**EXAMPLE 4**

**Re:** BRO 8027(29), Gregory County, PCN 00QR
Str. No. 27-030-081, located 2.0 West & 0.1 South of the Jct of SD44/SD47
RCBC Undercut Recommendation

Soils maps of the area indicate the soils at the location of the proposed structure have the following characteristics.

Station 16+86 (Str. No. 27-030-081)

CLASSIFICATION: A-7
Clay & Silty Clay
AVERAGE LIQUID LIMIT: 66
SHRINK-SWELL POTENTIAL: High to Very High
FROST ACTION POTENTIAL: Low
CORROSIVITY: High for steel, Low to Moderate for concrete

**RECOMMENDATIONS:**

Provide 24 inches of undercut and backfill.

**DISCUSSION:**

The project consists of replacing an existing single span 22' steel stringer bridge with a 2 barrel 13' x 6' cast-in-place RCBC. The proposed box culvert will be in the same location as the existing bridge location. The existing surfacing on the road is gravel and will be resurfaced with gravel upon completion. Minimal grading at the proposed box culvert location is anticipated, therefore, the material shall be compacted using the Ordinary Compaction Method.

A subsurface investigation was conducted for the proposed RCBC. The subsurface investigation consisted of placing a boring near both the proposed inlet and outlet ends of the structure and logging the material to 3 feet below the flow line. Samples were collected from below the flow line for soils classification. A dynamic cone penetrometer was used at both the inlet and outlet ends to identify the change in relative density of the subsurface material below flow line.

Subsurface soils at the proposed site consist of brown silt-clay to 3' below the existing flow line.

The 2' undercut depth is recommended to remove the low strength soils with high shrink-swell potential from below the box culvert.

**The following paragraphs shall be placed in the plans:**

Compaction of earth embankment and box culvert backfill material shall be governed by the Ordinary Compaction Method.

Any questions about the recommendations or the subsurface conditions can be directed to the CONSULTANT CONTACT NAME AND PHONE NUMBER.

# HYDRAULIC DATA SHEET

County _____ Project No. _____ PCN _____ Sec. _____ Township _____ Range _____
Station 23+41.8 Over North Branch of CREEK Drainage Area 52.3 Sq. Mi. Direction of Flow East
Preliminary X Final _____ Q-Design Yr. Frequency 25-year Observed H.W. Elev 1283.1
STRUCTURE NO. ##-###-### LOCATION LOCATION

| Cross Section | Qd. cfs | W.W. Area sq.ft. | V fps | So. ft./ft. | Bottom | | H.W. ft. | dn ft. | C.L. FL Elev. | D.H.W. Elev. | | Ch Ch | Degree Skew |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Structure | Ch. | | | | Culv. Inlet | Bridge | | |
| Trapezoid 2:1 S:S | 1979 | 335 | 5.9 | .0018 | | Natural | | 8.1 | 1273.18* | | 1281.8 | No** | 0º |
| Rectangle II | 1979 | 330 | 6.0 | .0018 | 4B=40’ | | 8.7 | 8.3 | 1273.18* | 1281.9 | | No** | 0º |
| Rectangle III | 1979 | 360 | 5.5 | .0018 | 4B=44’ | | 8.7 | 8.3 | 1273.18* | 1281.9 | | No** | 0º |

Type: I. Berm Type Bridge II. RCBC w/30º Flared Wing walls at Inlet and 0º Flared at Outlet III. Precast CBC with 0º Flared Wing walls at Inlet and Outlet

Size: I. 82.0 ft. (single span with 45 M Section) II. 4-10’x10’ (effective opening 4-10’x9’) III. 4-11’x10’ (effective opening 4-11’x9’)

Proposed Location I. Center at Sta. 23+26, berm toes located at Sta. 23+12± (elev. 1274.0) & Sta. 23+40 ± (Elev. 1274.0) II. Center at Sta. 23+37 III. Center at Sta. 23+37

Notes or Remarks: Discharges were obtained from Methods Outlined in Water Resources Report 98-4055 for ungaged sites near a gaging station on the same stream. Stream gage # 06478260 for years of record from 1956-1978. $Q_2$ = 91 cfs; $Q_{25}$ = 1979 cfs; $Q_{100}$ = 4997 cfs; $Q_{500}$ = 11,811 cfs. Structure width and flowline elevation for the box culvert options meet the criteria called for in the US Army Corp. of Engineers 2012 Regional Conditions for aquatic organisms.

INPLACE CONDITIONS:$Q_2$ Elev. = 1275.0, $HW_{25}$ = 1281.8, $HW_{100}$ = 1286.9 *** Overtop Freq. = $Q_{85}$ = 4500 cfs, $V_{max}$ = $V_{85}$ = 9.1 fps

PROPOSED CONDITIONS: I. $Q_2$ Elev. = 1274.9, $V_2$ = 2.8 fps, $HW_{100}$ = 1284.8, ***Overtop Freq. = $Q_{274}$ = 8000 cfs, $V_{max}$ = $V_{100}$ = 11.7 fps II. $Q_2$ Elev. = 1274.4, ($Q_2$ Depth =1.1 ft. and $V_2$ = 2.1 fps at culvert outlet), $HW_{100}$ = 1287.2, ***Overtop Freq. = $Q_{185}$ = 6450 cfs, $V_{max}$ = $V_{100}$ = 13.9 fps III. $Q_2$ Elev. = 1274.4, ($Q_2$ Depth =1.1 ft. and $V_2$ = 1.9 fps at culvert outlet), $HW_{100}$ = 1287.2, ***Overtop Freq. = $Q_{180}$ = 6400 cfs, $V_{max}$ = $V_{100}$ = 12.6 fps

Additional Remarks:

*Elevation of the Stream flowline at the centerline of the proposed roadway. The box culvert flowline has been lowered 12” below stream flowline and this embedded depth is assumed to not convey any water.

**Minor channel shaping will be required at channel inlet and outlet.

***The existing roadway overtops at Elev. 1286.23 near Sta. 23+75 and the proposed gradeline overtops at Elev. 1290.8 at Sta. 23+50.

Δ Hutchinson County is participating in NFIP.

♦ The area is not mapped and is considered NSFHA (No Special Flood Hazard Area)

PRELIMINARY _X_ FINAL ____ SCOUR RECOMMENDATIONS: I. Riprap will be required on both bridge berms. Foundation Report has not been received. Contraction Scour for proposed bridge is estimated at 6.0 ft. for the 100 year event. Scour estimate is based on assumed $D_{50}$ = .2mm. II & III. Provide 33 in. thick Class B riprap on newly graded 2:1 bank slopes from elev. 1280.0 down to culvert Flowline and across channel at outlet. Extend riprap 18.0 ft. downstream of wings. Provide Type B drainage fabric beneath all riprap. Natural Stream bed material will not need to be placed over riprap and culvert invert.

Vertical Datum Used: NAVD 88: X NGVD 29: _____ Unknown: _____
Topeka Shiner Stream: Yes X No _____
Community Participating in NFIP Program: Yes X Δ No _____
Site in Identified NFIP Floodplain: Yes _____ No X ♦

Prepared by: *Signature*
Date: DATE
Checked by: *Signature*
Date: DATE

# PRELIMINARY HYDRAULIC DATA LAYOUT

To Define the Minimum Channel Configuration at Bridge

Project BR_ ####(00)

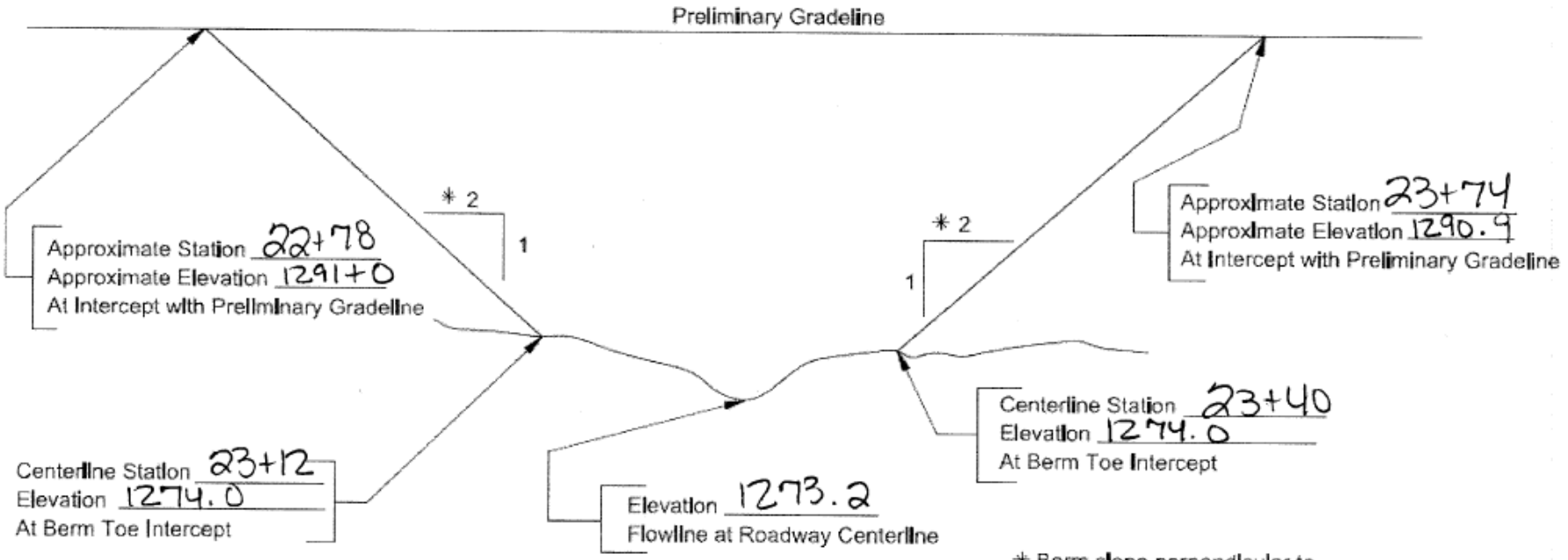
County _____

PCN _____

Station 23+26

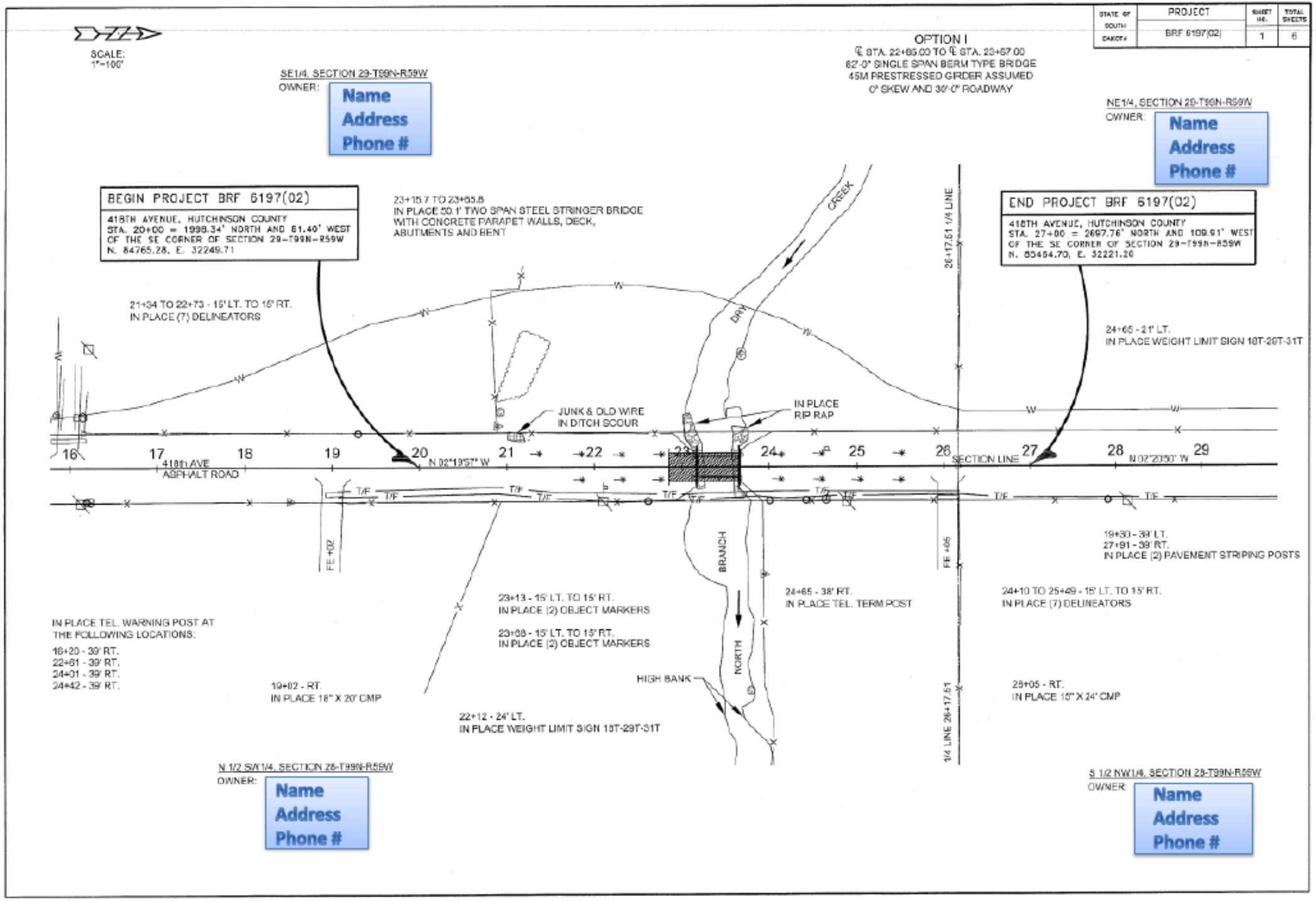
Skew 0°

Date Prepared DATE

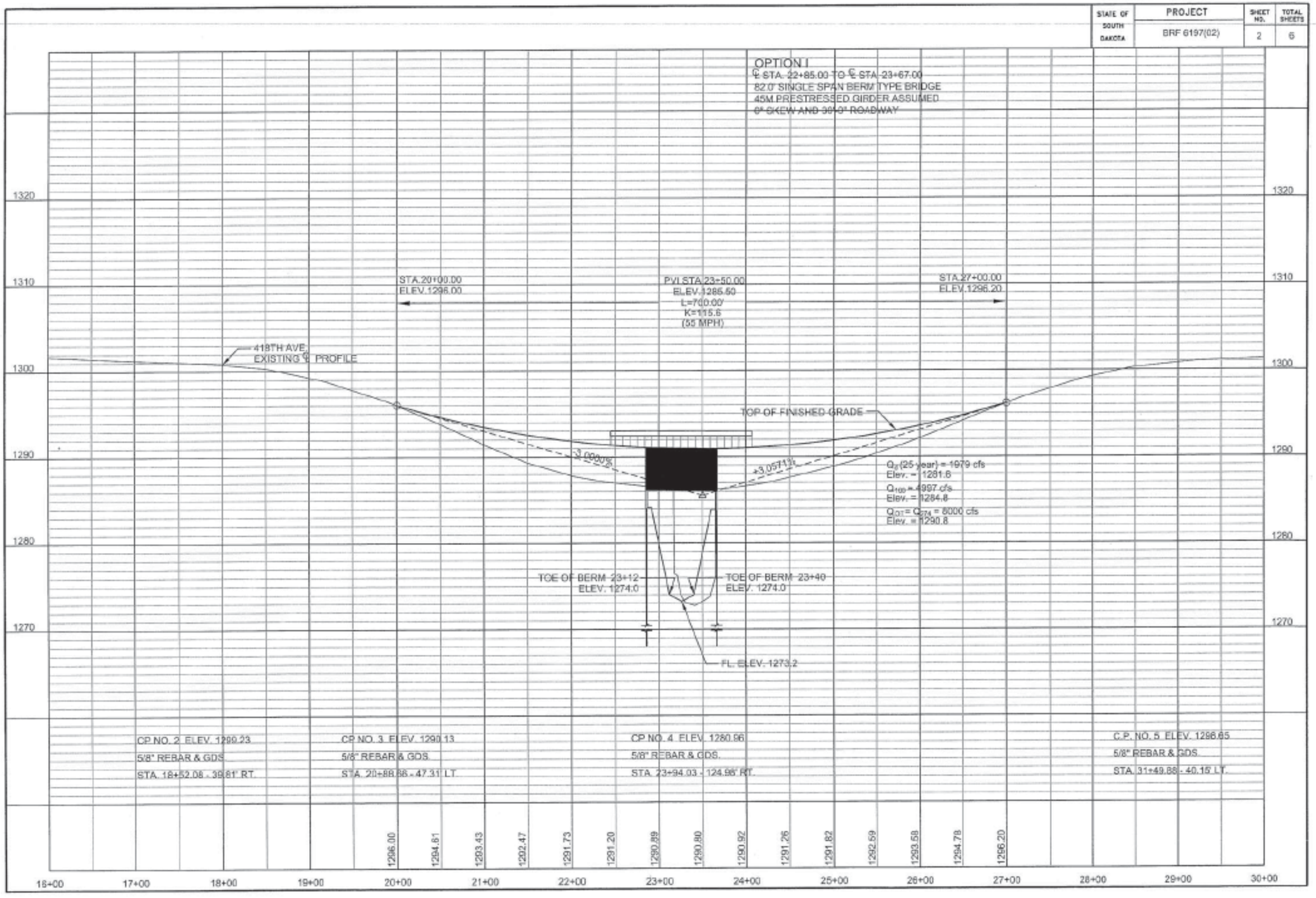


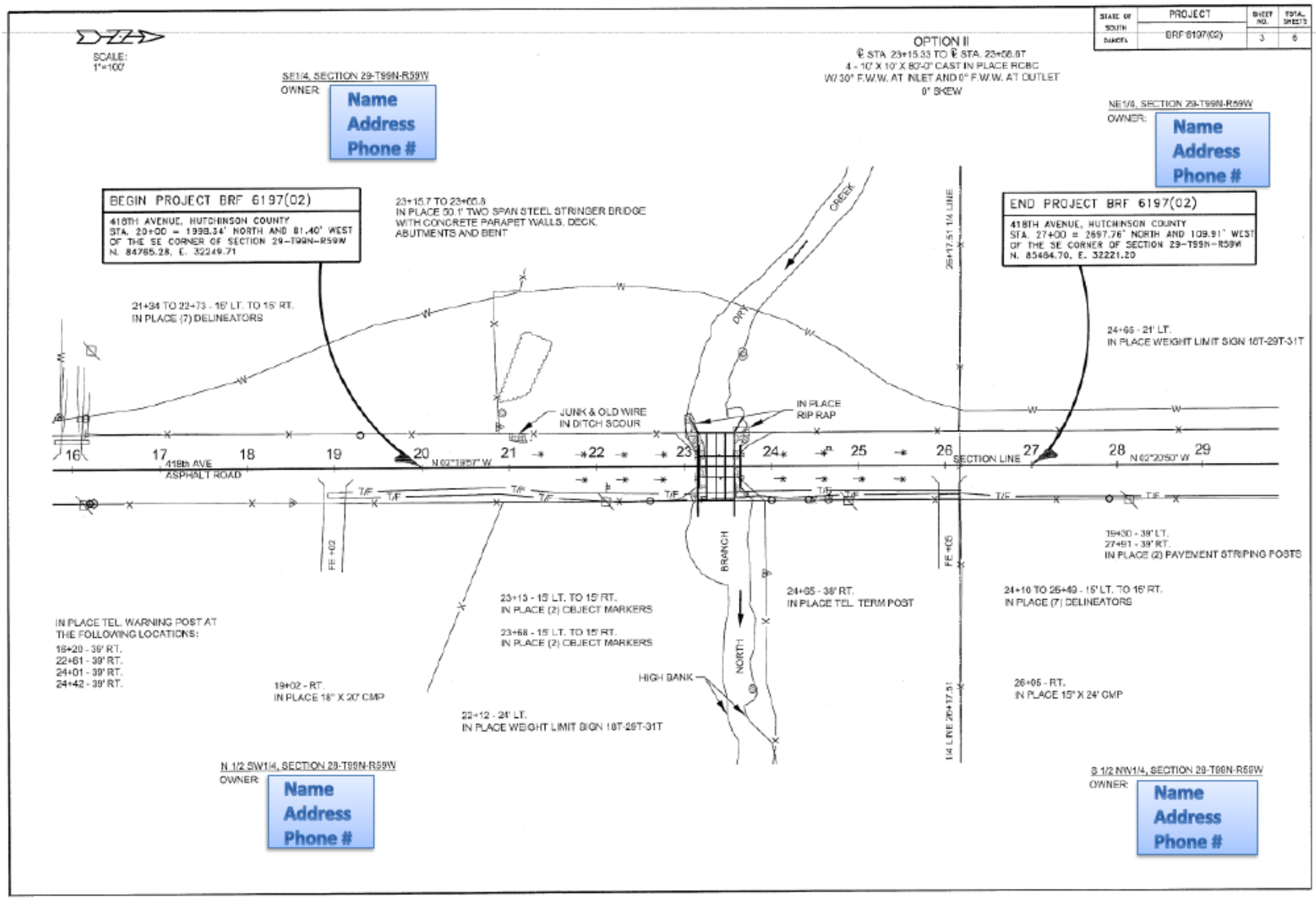

* Berm slope perpendicular to channel centerline. If bridge is skewed, berm slope must be adjusted to meet skew.

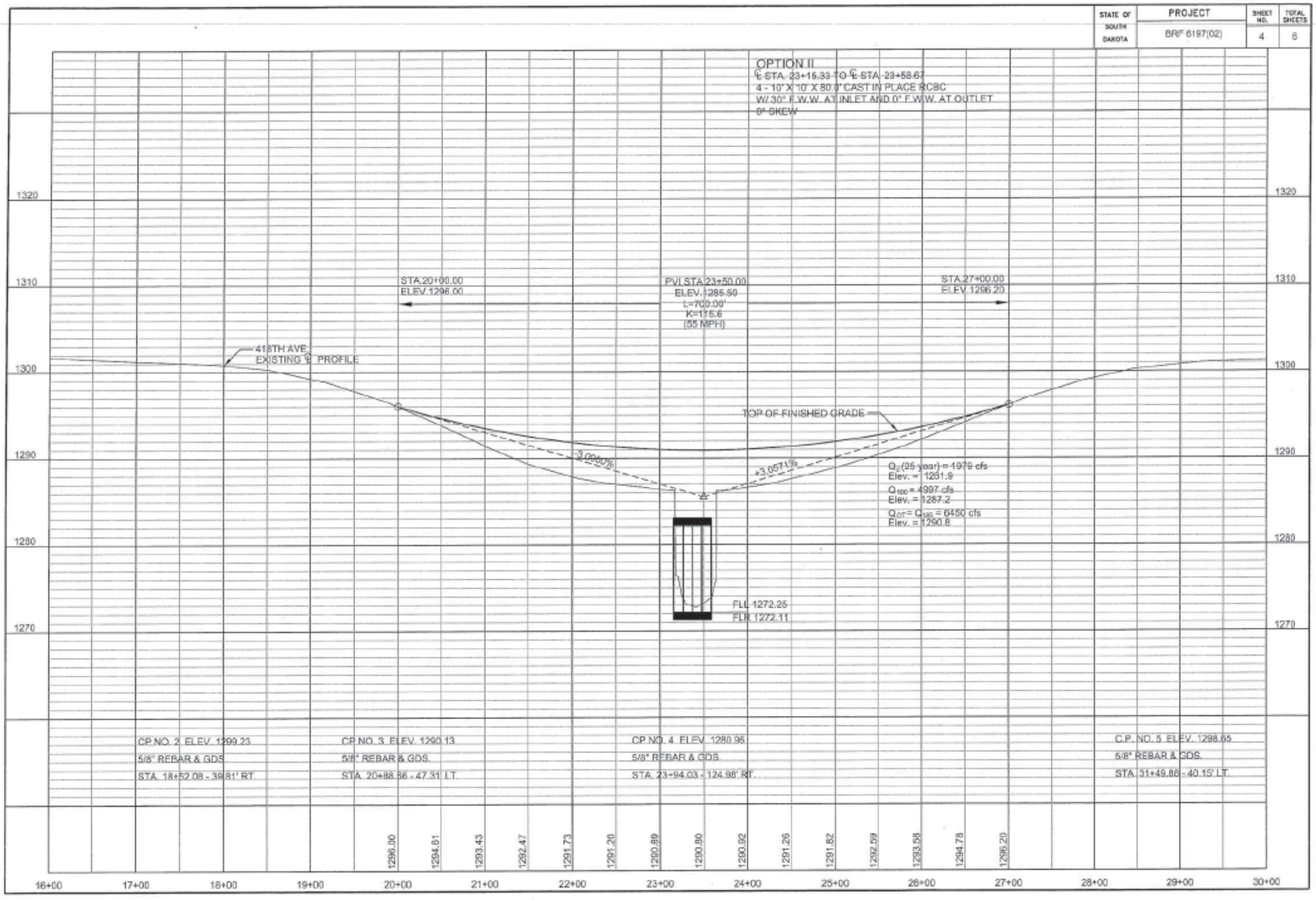
This idealized drawing is not to scale.
See project roadway profile for more details.

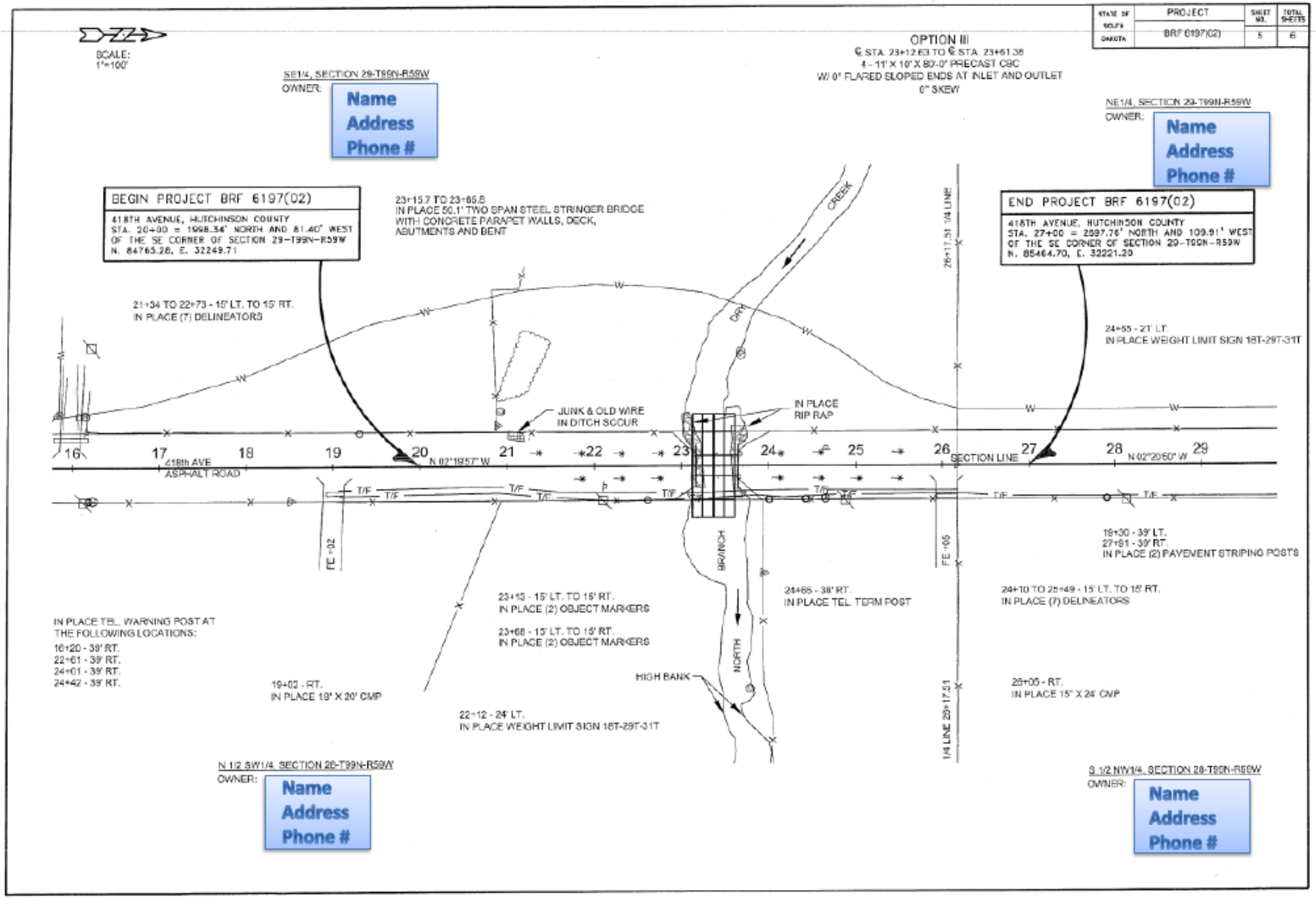

STATE OF SOUTH DAKOTA
PROJECT
BRF 6197(02)
SHEET NO. 1
TOTAL SHEETS 6
SCALE: 1"=100'
OPTION I
℄ STA. 22+85.00 TO ℄ STA. 23+67.00
82'-0" SINGLE SPAN BERM TYPE BRIDGE
45M PRESTRESSED GIRDER ASSUMED
0° SKEW AND 36'-0" ROADWAY
SE1/4, SECTION 29-T99N-R59W
OWNER:
Name
Address
Phone #
NE1/4, SECTION 29-T99N-R59W
OWNER:
Name
Address
Phone #
BEGIN PROJECT BRF 6197(02)
418TH AVENUE, HUTCHINSON COUNTY
STA. 20+00 = 1998.34' NORTH AND 81.40' WEST
OF THE SE CORNER OF SECTION 29-T99N-R59W
N. 84765.28, E. 32249.71
END PROJECT BRF 6197(02)
418TH AVENUE, HUTCHINSON COUNTY
STA. 27+00 = 2697.76' NORTH AND 109.91' WEST
OF THE SE CORNER OF SECTION 29-T99N-R59W
N. 85464.70, E. 32221.20
23+15.7 TO 23+65.8
IN PLACE 50.1' TWO SPAN STEEL STRINGER BRIDGE
WITH CONCRETE PARAPET WALLS, DECK,
ABUTMENTS AND BENT
21+34 TO 22+73 - 15' LT. TO 15' RT.
IN PLACE (7) DELINEATORS
24+65 - 21' LT.
IN PLACE WEIGHT LIMIT SIGN 18T-29T-31T
JUNK & OLD WIRE
IN DITCH SCOUR
IN PLACE
RIP RAP
CREEK
BRY
26+17.51 1/4 LINE
16
17
418th AVE
ASPHALT ROAD
18
19
20
N 02°19'57" W
21
22
23
24
25
26
SECTION LINE
27
28
N 02°20'50" W
29
T/F
FE +02
FE +05
BRANCH
NORTH
HIGH BANK
19+30 - 39' LT.
27+91 - 39' RT.
IN PLACE (2) PAVEMENT STRIPING POSTS
24+65 - 38' RT.
IN PLACE TEL. TERM POST
24+10 TO 25+49 - 15' LT. TO 15' RT.
IN PLACE (7) DELINEATORS
IN PLACE TEL. WARNING POST AT
THE FOLLOWING LOCATIONS:
16+20 - 39' RT.
22+81 - 39' RT.
24+01 - 39' RT.
24+42 - 39' RT.
19+02 - RT.
IN PLACE 18" X 20' CMP
23+13 - 15' LT. TO 15' RT.
IN PLACE (2) OBJECT MARKERS
23+88 - 15' LT. TO 15' RT.
IN PLACE (2) OBJECT MARKERS
22+12 - 24' LT.
IN PLACE WEIGHT LIMIT SIGN 18T-29T-31T
28+05 - RT.
IN PLACE 15" X 24' CMP
1/4 LINE 26+17.51
N 1/2 SW1/4, SECTION 28-T99N-R59W
OWNER:
Name
Address
Phone #
S 1/2 NW1/4, SECTION 28-T99N-R59W
OWNER:
Name
Address
Phone #

| STATE OF SOUTH DAKOTA | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | BRF 6197(02) | 2 | 6 |

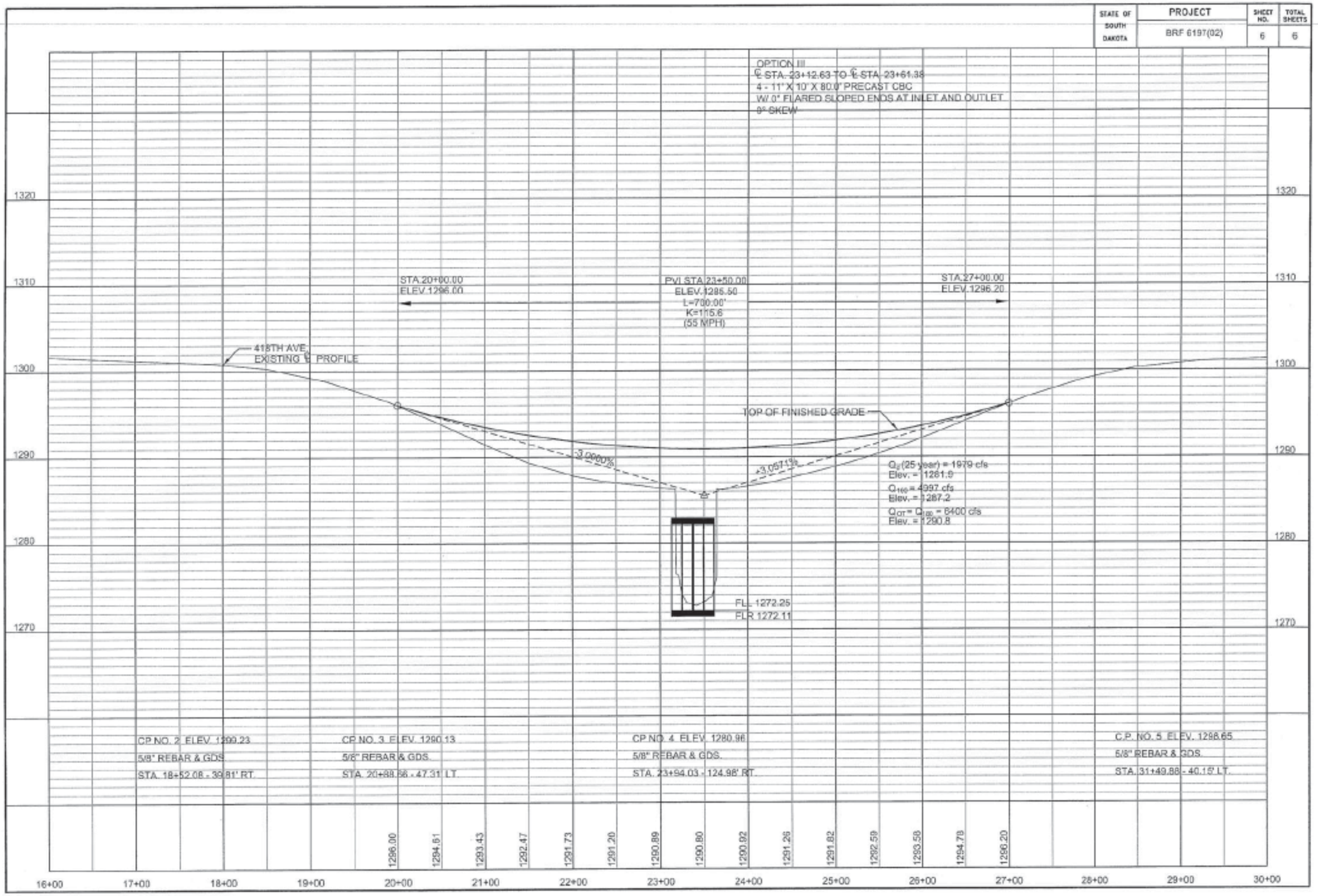


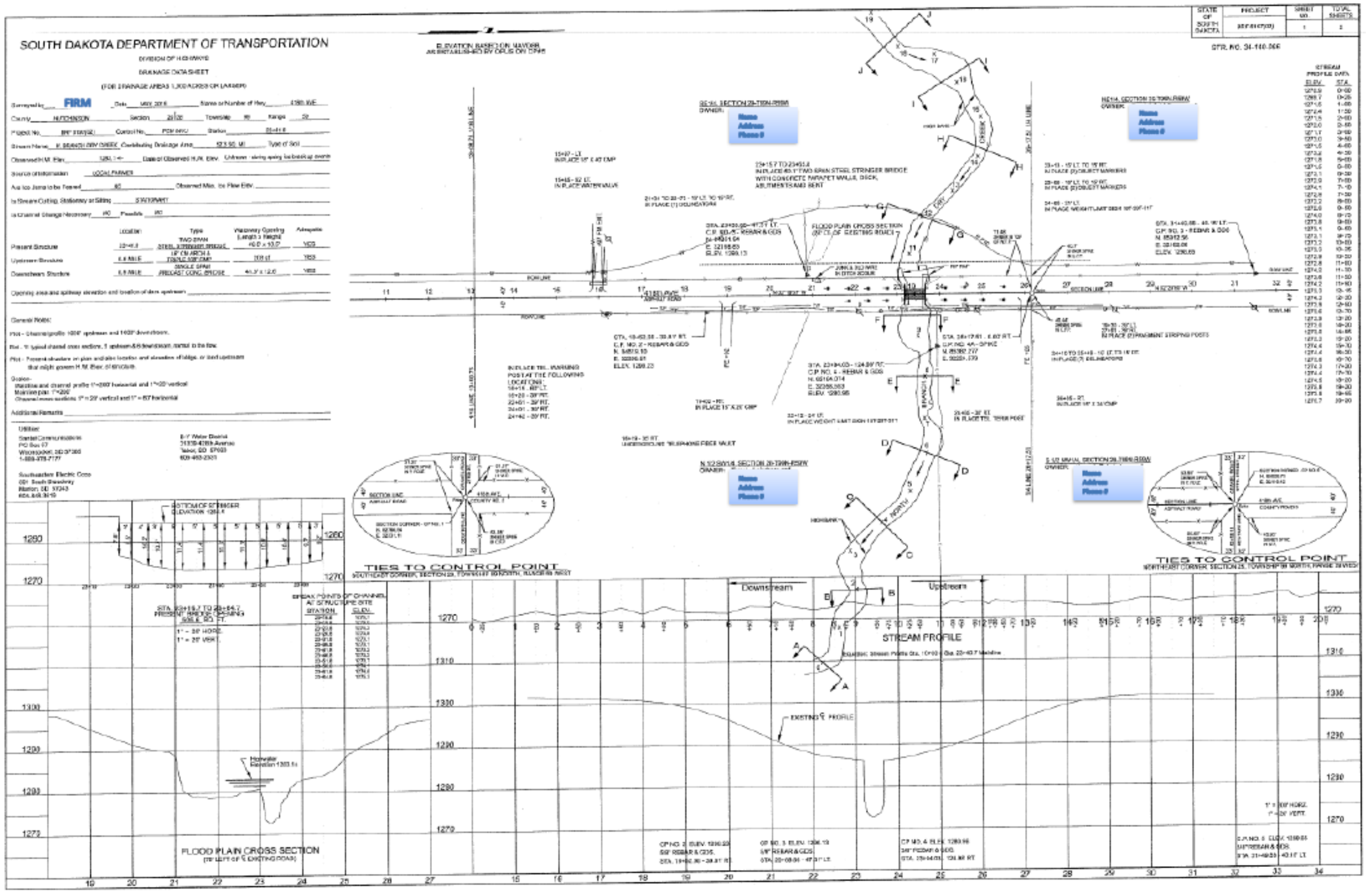

SCALE:
1"=100'
STATE OF SOUTH DAKOTA
PROJECT
BRF 6197(02)
SHEET NO.
3
TOTAL SHEETS
6
OPTION II
℄ STA. 23+15.33 TO ℄ STA. 23+66.67
4 - 10' X 10' X 80'-0" CAST IN PLACE RCBC
W/ 30° F.W.W. AT INLET AND 0° F.W.W. AT OUTLET
0° SKEW
SE1/4, SECTION 29-T99N-R59W
OWNER:
Name
Address
Phone #
NE1/4, SECTION 29-T99N-R59W
OWNER:
Name
Address
Phone #
BEGIN PROJECT BRF 6197(02)
418TH AVENUE, HUTCHINSON COUNTY
STA. 20+00 = 1998.34' NORTH AND 81.40' WEST
OF THE SE CORNER OF SECTION 29-T99N-R59W
N. 84765.28, E. 32249.71
END PROJECT BRF 6197(02)
418TH AVENUE, HUTCHINSON COUNTY
STA. 27+00 = 2697.76' NORTH AND 109.91' WEST
OF THE SE CORNER OF SECTION 29-T99N-R59W
N. 85464.70, E. 32221.20
23+15.7 TO 23+66.8
IN PLACE 50.1' TWO SPAN STEEL STRINGER BRIDGE
WITH CONCRETE PARAPET WALLS, DECK,
ABUTMENTS AND BENT
21+34 TO 22+73 - 16' LT. TO 15' RT.
IN PLACE (7) DELINEATORS
24+65 - 21' LT.
IN PLACE WEIGHT LIMIT SIGN 16T-29T-31T
JUNK & OLD WIRE
IN DITCH SCOUR
IN PLACE
RIP RAP
DRY CREEK
25+17.51 1/4 LINE
16
17
418th AVE
ASPHALT ROAD
18
19
20
N 02°19'57" W
21
22
23
24
25
26
SECTION LINE
27
28
N 02°20'50" W
29
T/F
FE +02
FE +05
BRANCH
NORTH
HIGH BANK
19+30 - 39' LT.
27+91 - 39' RT.
IN PLACE (2) PAVEMENT STRIPING POSTS
24+10 TO 25+49 - 15' LT. TO 15' RT.
IN PLACE (7) DELINEATORS
24+65 - 36' RT.
IN PLACE TEL. TERM POST
23+13 - 15' LT. TO 15' RT.
IN PLACE (2) OBJECT MARKERS
23+68 - 15' LT. TO 15' RT.
IN PLACE (2) OBJECT MARKERS
IN PLACE TEL. WARNING POST AT
THE FOLLOWING LOCATIONS:
18+20 - 39' RT.
22+61 - 39' RT.
24+01 - 39' RT.
24+42 - 39' RT.
19+02 - RT.
IN PLACE 18" X 20' CMP
22+12 - 24' LT.
IN PLACE WEIGHT LIMIT SIGN 16T-29T-31T
26+05 - RT.
IN PLACE 15" X 24' CMP
1/4 LINE 25+17.51
N 1/2 SW1/4, SECTION 29-T99N-R59W
OWNER:
Name
Address
Phone #
S 1/2 NW1/4, SECTION 29-T99N-R59W
OWNER:
Name
Address
Phone #


STATE OF SOUTH DAKOTA
PROJECT
BRF 6197(02)
SHEET NO. 4
TOTAL SHEETS 6
OPTION II
℄ STA. 23+15.33 TO ℄ STA. 23+58.67
4 - 10' X 10' X 80.0' CAST IN PLACE RCBC
W/ 30° F.W.W. AT INLET AND 0° F.W.W. AT OUTLET
0° SKEW
STA 20+00.00
ELEV 1296.00
PVI STA 23+50.00
ELEV 1285.50
L=700.00'
K=115.6
(55 MPH)
STA 27+00.00
ELEV 1296.20
418TH AVE.
EXISTING ℄ PROFILE
TOP OF FINISHED GRADE
-3.000%
+3.057%
Q25 (25 year) = 1979 cfs
Elev. = 1281.9
Q100 = 4997 cfs
Elev. = 1287.2
QOT = Q100 = 6450 cfs
Elev. = 1290.8
FLL 1272.25
FLR 1272.11
C.P. NO. 2 ELEV. 1299.23
5/8" REBAR & GDS.
STA. 18+52.08 - 39.81' RT.
C.P. NO. 3 ELEV. 1290.13
5/8" REBAR & GDS.
STA. 20+88.86 - 47.31' LT.
C.P. NO. 4 ELEV. 1280.96
5/8" REBAR & GDS.
STA. 23+94.03 - 124.98' RT.
C.P. NO. 5 ELEV. 1298.65
5/8" REBAR & GDS.
STA. 31+49.88 - 40.15' LT.
1320
1310
1300
1290
1280
1270
1296.00
1294.61
1293.43
1292.47
1291.73
1291.20
1290.89
1290.80
1290.92
1291.26
1291.82
1292.59
1293.58
1294.78
1296.20
16+00
17+00
18+00
19+00
20+00
21+00
22+00
23+00
24+00
25+00
26+00
27+00
28+00
29+00
30+00


STATE OF SOUTH DAKOTA
PROJECT
BRF 6197(02)
SHEET NO. 5
TOTAL SHEETS 6
SCALE: 1"=100'
OPTION III
℄ STA. 23+12.63 TO ℄ STA. 23+61.38
4 - 11' X 10' X 80'-0" PRECAST CBC
W/ 0° FLARED SLOPED ENDS AT INLET AND OUTLET
0° SKEW
SE1/4, SECTION 29-T99N-R59W
OWNER:
Name
Address
Phone #
NE1/4, SECTION 29-T99N-R59W
OWNER:
Name
Address
Phone #
BEGIN PROJECT BRF 6197(02)
418TH AVENUE, HUTCHINSON COUNTY
STA. 20+00 = 1998.34' NORTH AND 81.40' WEST
OF THE SE CORNER OF SECTION 29-T99N-R59W
N. 84765.28, E. 32249.71
END PROJECT BRF 6197(02)
418TH AVENUE, HUTCHINSON COUNTY
STA. 27+00 = 2697.76' NORTH AND 109.91' WEST
OF THE SE CORNER OF SECTION 29-T99N-R59W
N. 85464.70, E. 32221.20
23+15.7 TO 23+65.8
IN PLACE 50.1' TWO SPAN STEEL STRINGER BRIDGE
WITH CONCRETE PARAPET WALLS, DECK,
ABUTMENTS AND BENT
21+34 TO 22+73 - 15' LT. TO 15' RT.
IN PLACE (7) DELINEATORS
24+55 - 21' LT.
IN PLACE WEIGHT LIMIT SIGN 18T-29T-31T
JUNK & OLD WIRE
IN DITCH SCOUR
IN PLACE
RIP RAP
CREEK
DRY
26+17.51 1/4 LINE
16
17
418th AVE
ASPHALT ROAD
18
19
20
N 02°19'57" W
21
22
23
24
25
26
SECTION LINE
27
28
N 02°20'50" W
29
T/F
FE +02
FE +05
BRANCH
NORTH
HIGH BANK
19+30 - 39' LT.
27+81 - 39' RT.
IN PLACE (2) PAVEMENT STRIPING POST'S
24+85 - 38' RT.
IN PLACE TEL. TERM POST
24+10 TO 25+49 - 15' LT. TO 15' RT.
IN PLACE (7) DELINEATORS
23+13 - 15' LT. TO 15' RT.
IN PLACE (2) OBJECT MARKERS
23+68 - 15' LT. TO 15' RT.
IN PLACE (2) OBJECT MARKERS
IN PLACE TEL. WARNING POST AT
THE FOLLOWING LOCATIONS:
16+20 - 39' RT.
22+61 - 39' RT.
24+01 - 39' RT.
24+42 - 39' RT.
19+02 - RT.
IN PLACE 19' X 20' CMP
22+12 - 24' LT.
IN PLACE WEIGHT LIMIT SIGN 18T-29T-31T
25+05 - RT.
IN PLACE 15" X 24' CMP
1/4 LINE 25+17.51
N 1/2 SW1/4, SECTION 20-T99N-R59W
OWNER:
Name
Address
Phone #
S 1/2 NW1/4, SECTION 28-T99N-R59W
OWNER:
Name
Address
Phone #

| STATE OF SOUTH DAKOTA | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | BRF 6197(02) | 6 | 6 |






BIG Procedure Appendix A-29

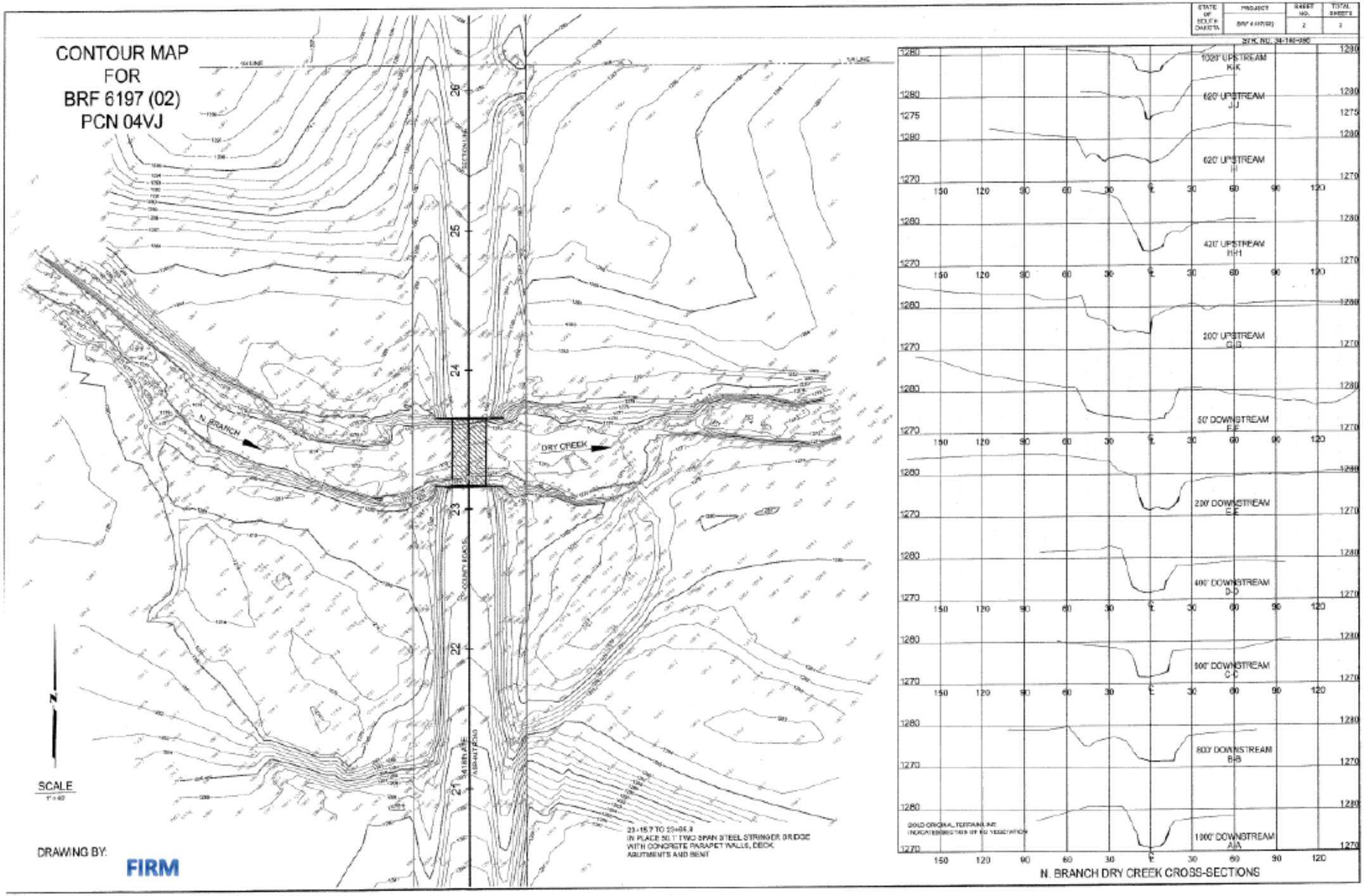

CONTOUR MAP
FOR
BRF 6197 (02)
PCN 04VJ
N. BRANCH
DRY CREEK
26
25
24
23
22
21
SCALE
DRAWING BY:
FIRM
23+15.7 TO 23+65.8
IN PLACE 50.1' TWO SPAN STEEL STRINGER BRIDGE
WITH CONCRETE PARAPET WALLS, DECK,
ABUTMENTS AND BENT
1020' UPSTREAM
K-K
620' UPSTREAM
J-J
420' UPSTREAM
H-H
200' UPSTREAM
G-G
50' DOWNSTREAM
F-F
200' DOWNSTREAM
E-E
400' DOWNSTREAM
D-D
600' DOWNSTREAM
C-C
800' DOWNSTREAM
B-B
1000' DOWNSTREAM
A-A
N. BRANCH DRY CREEK CROSS-SECTIONS

Photo Documentation and Record Search for Hutchinson County Structure No. 34-140-096

The offices and individuals contacted include:

| | | |
|---|---|---|
| Hutchinson County Assessor | Tony Dewald | No Information |
| Hutchinson County Auditor | Diane Murtha | No Information |
| Hutchinson County Highway Superintendent | Joel Baumiller | Inspections Reports (We already had) |
| Hutchinson County Register of Deeds | Unknown | No Information |
| Hutchinson County Treasurer | Tamara Miller | No Information |
| Heritage Hall Museum (in Freeman) | Kelsey Ortman | No Information |
| Heritage Hall Archives (in Freeman) | Kelsey Ortman | No Information |

The Hutchinson County Assessor, Tony Dewald, was contacted on May 25th, 2015 by Diane Murtha. Murtha reported that Dewald had not found any information regarding the structure.

The Hutchinson County Auditor, Diane Murtha, was contacted on May 6th, 2015 by email. Murtha noted that she had not found any information regarding the structure. She also noted that she had talked to the Department of Equalization and the Register of Deeds, neither of which could provide information about the structure.

The Hutchinson County Highway Superintendent, Joel Baumiller, was contacted on May 6th, 2015 by email. Baumiller then responded by phone that same day and was not able to provide information other than the inspection reports that we ( FIRM¶ ) already had. The reports provided the approximated date of completion of the structure (1935) as well as information specific to the construction and condition of the structure. The inspection report is attached.

The Hutchinson County Register of Deeds, Unknown, was contacted on May 25th, 2015 by Diane Murtha. Murtha reported that the Register of Deeds had not found any information regarding the structure.

The Hutchinson County Treasurer, Tamara Miller, was contacted on May 6th, 2015 by email. Miller has not yet responded.

The Heritage Hall Museum and Heritage Hall Archives, run by Kelsey Ortman, were contacted on May 25th, 2015 by email. Ortman reported that she had not found any information regarding the structure.

The State Historic Preservation Office's CRGRID was also used to find any historic survey's conducted on the structure. It revealed the structure was Surveyed in 2004. The survey summary and report are attached.

**SOUTH DAKOTA STATE HISTORIC PRESERVATION OFFICE**

**RECORD SEARCH SUMMARY - BRIDGE** 04-16-2015

SOUTH DAKOTA STATE HISTORICAL SOCIETY

| SHPO ID | Bridge Name | UTM Zone | UTM Easting | UTM Northing | Date Built |
|---|---|---|---|---|---|
| HT00001571 | 34-140-096 | 14 | 594245.0000 | 4801719.0000 | 1935 |
| **Survey Date** | **Street** | **City** | **County** | **Location Description** | **TWP** |
| 6/25/2004 12:00:00 AM | 418 AVE | Parkston | HT | 8E 2.6S PARKSTON | 99N |
| **Rng** | **Sec** | **Quarter1** | **Quarter2** | **DOE** | **Nomination Status** |
| 59W | 28 | NW | SW | NR Eligible | |

**SOUTH DAKOTA STATE HISTORIC PRESERVATION OFFICE**

**HISTORIC SITES SURVEY BRIDGE FORM** 04-16-2015

SOUTH DAKOTA STATE HISTORICAL SOCIETY

| SHPOID | SiteID | BridgeID |
|---|---|---|
| HT00001571 | 48635 | 2211 |

## SITE INFORMATION

| | | | |
|---|---|---|---|
| *Survey Date: | 6/25/2004 12:00:00 AM | *Quarter1: | NW |
| *Surveyor: | Jennie Goff / Renewable Technologies, Inc. | *Quarter2: | SW |
| *Property Address: | 418 AVE | *Township: | 99N |
| *County: | HT | *Range: | 59W |
| *City: | Parkston | *Section: | 28 |
| | | Acres: | |
| | | Quadname: | Parkston SE (1968) |

**Legal Description:** North Branch of Dry Creek

**Location Description:** 8E 2.6S PARKSTON

| | | | |
|---|---|---|---|
| Owner Code1: | | Owner Name: | |
| Owner Code2: | | Owner Address: | |
| Owner Code3: | | Owner City: | |
| | | Owner State: | |
| | | Owner Zip: | |

## HISTORIC SIGNIFICANCE

| | | | |
|---|---|---|---|
| *DOE: | NR Eligible | Register Name: | 34-140-096 |
| *DOE Date: | 6/25/2004 12:00:00 AM | Multiple Property Name | |
| Nomination Status: | | SignificanceLevel1: | |
| Listed Date: | | SignificanceLevel2: | |
| Ref Num: | | NR Criteria 1: | |
| Period: | | NR Criteria 2: | |
| Category: | | NR Criteria 3: | C |
| Historic District Rating: | | NR Criteria 4: | |

**Significance Notes :** This bridge retains historic integrity, although it has minor condition problems due to collison damage. It is a good example of pre-World War II steel stringer bridge construction in South Dakota, reflecting both the history and technology of such projects. Bridge 34-140-096 is eligible for listing in the National Register of Historic Places under criterion C, as an example of the steel stringer type for the Depression period.

* = REQUIRED FIELD

**SOUTH DAKOTA STATE HISTORIC PRESERVATION OFFICE**

**HISTORIC SITES SURVEY BRIDGE FORM** 04-16-2015

SOUTH DAKOTA STATE HISTORICAL SOCIETY

## BRIDGE DETAILS

***Bridge Name:** 34-140-096
**Other Name:**
***Date Built:** 1935
**Structural System:**
**Type:** Stringer
**Style:** No Style
**Materials:** Steel
**Occupied:**
**Accessible:**
**Altered/Moved Notes:**

**Significant Person:**
**Length:** 50
**Number Of Spans:** 2
**ApproachSpanType:** N/A
***UTM Zone:** 14
***UTM Easting:** 594245.0000
***UTM Northing:** 4801719.0000
**Restricted:** N

**Physical Notes:** This structure is a two span steel stringer bridge that carries 418th Avenue (paved) over the North Branch of Dry Creek. It is located in rural Hutchinson County about 8.5 miles southeast of Parkston in a region of cultivated fields and rolling grassland. The superstructure consists of 12 steel I-beam stringers supporting a concrete deck. Precast concrete balustrade rails with elliptical openings flank the bridge. A short portion of the south end of the west rail has been damaged by a vehicle collision. Abutments, backwalls, and wingwalls are solid concrete. The intermediate pier is open concrete, consisting of two rectangular (in cross section) vertical posts with a solid, cantilevered cap. Recessed panels bearing the date "1935" are found on the insides of the curbs. Other than the moderate rail damage, the structure remains essentially as-built.

**Link to National Register Nomination:**

**No National Register Nomination Available**

* = REQUIRED FIELD

# Appendix B – Structure Design Work Order Requirements

## Bridge Improvement Grant
## Work Order Requirements for Structure Design

### SCOPE OF SERVICES TEMPLATE – Design

1. **Preparation of sketches of the structure as selected during the TS&L.** Within four (4) weeks of the notice to proceed date, the Consultant shall submit general drawing sheets, a riprap layout, and plan/profile of the selected option to the Local Government Assistance Office for review.

2. **Survey and plans for the above referenced project as described in the TS&L letter and Final Hydraulics Data Sheet, design calculations, independent design check, and load ratings.** Review plans (100% complete) are to be submitted in PDF format. Specifications shall follow the most current edition of the Standard Specification for Roads and Bridges. South Dakota Department of Transportation Bid Items, Standard plates and plan notes, from the SDDOT website, must be used in development of the **11" x 17" Non Section Method** plan set.

   The consultant shall provide design calculations, independent check, and load ratings for the structure as set forth in the Master Retainer Contract. In addition, load ratings for the Special Hauling Vehicles and Emergency Vehicles specified in **Attachment #2** shall also be submitted. The Consultant is wholly responsible for the accuracy and safe keeping of the design calculations and the independent design check.

3. **Incorporation into the plans of any changes that may be requested in the SDDOT plan review comments or provide written explanation for items not changes.**

4. **Review of shop fabrication drawings as may be required and submittal of the approved shop drawings to the Consultant.** This item is to be completed within two (2) weeks of receipt of shop or fabrication drawings from the contractor and shall be noted accordingly in the plans.

7. **Provide Quality Assurance / Quality Control Testing Plan based on SDDOT Materials Manual.** This document must be reviewed by the SDDOT prior to the notice to proceed being issued to the contractor. See **Appendix D** for requirements.

Please refer to the checklist in **Attachment #1** for the items required to be submitted to the Local Government Assistance Office.

**Attachment #3** contains applicable excerpts from the Current SDDOT Consultant Retainer, DOT-900 AGREEMENT FOR PROFESSIONAL ENGINEERING SERVICES.

**NOTE: Foundation investigation will need to be included for projects that did not have this work included in the preliminary engineering. See Appendix C, Examples #1 and #2 for requirements.**

**Attachment #1**
**Local Government Assistance**
**Checklist for Structure Design Work Order**

**These items must be submitted to DOT/Local Government Assistance.**
**If any of these items are missing, the full packet will be returned for completion and resubmission to this office.**

**Project Number** _____ **County** _____ **PCN** _____

- ☐ **Plan/profile, general drawing sketches, and riprap layout as selected during the TS&L**
- ☐ **Review Plans (100% complete & ready for review) in PDF Format**
- ☐ **Design calculations, independent design check, and load ratings**

---

**To be submitted after plan review is complete**

- ☐ **Memo Addressing Plan Review Comments**
- ☐ **Final Plans – Electronic PDF file of the engineered, stamped set of plans**
- ☐ **Quality Assurance / Quality Control Testing Plan**

**Attachment #2**

## Bridge Improvement Grant

### Load Rating Requirements for the Special Hauling Vehicles

U.S. Department of Transportation
Federal Highway Administration

# Memorandum

Subject: **ACTION**: Load Rating of Specialized Hauling Vehicles
Date: November 15, 2013

*/s/ Original Signed by*
From: Joseph S. Krolak
Acting Director, Office of Bridge Technology

In Reply Refer To:
HIBT-10

To: Federal Lands Highway Division Engineers
Division Administrators

The purpose of this memorandum is to clarify FHWA's position on the analysis of *Specialized Hauling Vehicles* (SHVs) as defined in the AASHTO Manual for Bridge Evaluation (MBE) during bridge load rating and posting to comply with the requirements of the *National Bridge Inspection Standards* (NBIS). The intent of the load rating and posting provisions of the NBIS is to insure that all bridges are appropriately evaluated to determine their safe live load carrying capacity considering all unrestricted legal loads, including State routine permits, and that bridges are appropriately posted if required, in accordance with the MBE.

The SHVs are closely-spaced multi-axle single unit trucks introduced by the trucking industry in the last decade. Examples include dump trucks, construction vehicles, solid waste trucks and other hauling trucks. SHVs generally comply with Bridge Formula B and are for this reason considered legal in all States, if a States' laws do not explicitly exclude the use of such vehicles.

NCHRP Project 12-63 (Report 575, 2007) studied the developments in truck configurations and State legal loads and found that AASHTO Type 3, 3-S2 and 3-3 legal vehicles are not representative of all legal loads, specifically SHVs. As a result, legal load models for SHVs were developed and adopted by AASHTO in 2005 , recognizing that there is an immediate need to incorporate SHVs into a State's load rating process, if SHVs operate within a State. The SHV load models in the MBE include SU4, SU5, SU6 and SU7 representing four- to seven-axle SHVs respectively, and a Notional Rating Load (NRL) model that envelopes the four single unit load models and serves as a screening load. If the load rating factor for the NRL model is 1.0 or greater, then there is no need to rate for the single-unit SU4, SU5, SU6 and SU7 loads. However, if the load rating factor for the NRL is less than 1.0, then the single-unit SU4, SU5, SU6 and SU7 loads need to be considered during load rating and posting.

The SHVs create higher force effects, and thus result in lower load ratings for certain bridges, especially those with a shorter span or shorter loading length such as transverse floor beams, when compared to AASHTO Type 3, 3-S2 and 3-3 legal loads and HS20 design load. Therefore, SHVs, i.e., SU4, SU5, SU6 and SU7 or NRL, are to be included in rating and posting analyses in accordance with Article 6A.2.3 and Article 6B.9.2 of the 1st Edition of the MBE (Article 6B.7.2 of the 2nd Edition of the MBE), unless one of the following two conditions is met:

**Condition A**: The State verifies that State laws preclude SHV use; or

**Condition B**: The State has its own rating vehicle models for legal loads and verifies that the State legal load models envelope the ***applicable*** AASHTO SHV loading models specified in Appendix D6A and Figure 6B.9.2-2 of the 1st Edition of the MBE (Figure 6B.7.2-2 of the 2nd Edition of the MBE), and the State legal load models have been included in rating/posting analyses of all bridges. The SHV types, e.g. six- or seven-axle SHVs, precluded by State laws need not be considered.

The SHV load models apply to Allowable Stress Rating, Load Factor Rating, and Load and Resistance Factor Rating in accordance with Section 6A and 6B of the MBE.

The FHWA recognizes that there are bridges in the inventory that have not been rated for SHVs and that it is not feasible to include SHVs in the ratings for the entire inventory at once. FHWA is establishing the following timelines for rating bridges for SHVs, if neither Condition A or B is met:

**Group 1**: Bridges with the shortest span not greater than 200 feet should be re-rated after their next NBIS inspection, but no later than December 31, 2017, that were last rated by:

a) either Allowable Stress Rating (ASR) or Load Factor Rating (LFR) method and have an operating rating for the AASHTO Routine Commercial Vehicle either Type 3, Type 3S2, or Type 3-3 less than 33 tons (English), 47 tons (English), or 52 tons (English) respectively; or
b) Load and Resistance Factor Rating (LRFR) method and have a legal load rating factor for the AASHTO Routine Commercial Vehicle, either Type 3, Type 3S2 or Type 3-3, less than 1.3.

**Group 2**: Rate those bridges not in Group 1 no later than December 31, 2022.

For either group, if a re-rating is warranted due to changes of structural condition, loadings, or configuration, or other requirements, the re-rating should include SHVs.

The selection of load rating method should comply with FHWA's Policy Memorandum *Bridge Load Ratings for the National Bridge Inventory*, dated October 30, 2006.

A State may utilize an alternative approach in lieu of the above to address the load rating for SHVs for bridges in their inventory; however, the approach must be reviewed and formally accepted by FHWA.

The timeline presented above will be incorporated into the review of Metric 13 under the National Bridge Inspection Program (NBIP); specifically, it is expected that all bridges meeting Group 1 criteria be load rated for SHVs by the end of 2017. Please work with your State to assist them in developing appropriate actions to meet those timelines. If your State is currently developing or implementing a Plan of Corrective Actions (PCA) for load rating bridges, the PCA should be reviewed and modified as necessary to take into account the rating of SHVs for those bridges and these timelines.

We request that you share this memorandum with your State or Federal agency partner. All questions that cannot be resolved at the Division Office level should be directed to Lubin Gao at lubin.gao@dot.gov or at 202-366-4604.

**Load Rating Requirements for the Emergency Vehicles**

U.S. Department of Transportation
Federal Highway Administration

# Memorandum

Subject: **ACTION:** Load Rating for the FAST Act's Emergency Vehicles

Date: November 3, 2016

From: /Original signed by/
Joseph L. Hartmann, Ph.D., P.E.
Director, Office of Bridges and Structures

In Reply Refer To: HIBS-1

To: Division Administrators
Federal Lands Highway Division Directors

On December 4, 2015, the President signed into law the *Fixing America's Surface Transportation Act* (FAST Act) (Pub. L.114-94). Section 1410 of the FAST Act amended 23 U.S.C. 127, *Vehicle weight limitations—Interstate System*, by revising the weight limits for certain vehicles on the Interstate System. The purpose of this memorandum is to provide guidance on maintaining compliance with the load rating and posting requirements of 23 CFR Part 650—specifically for the amended weight limits in 23 U.S.C. 127(r), *Emergency Vehicles*, for bridges on the Interstate System and within reasonable access to the Interstate System. Reasonable access is defined in a September 30, 1992 Non-Regulatory Supplement to 23 CFR Part 658 as at least one-road-mile from access to and from the National Network of highways, which includes the Interstate System, or further if the limits of a State's reasonable access policy for food, fuel, repairs, and rest extend to facilities beyond one-road-mile.

An emergency vehicle as defined in the FAST Act is designed to be used under emergency conditions to transport personnel and equipment to support the suppression of fires and mitigation of other hazardous situations (23 U.S.C. 127(r)(2)). The gross vehicle weight limit for emergency vehicles is 86,000 pounds under section 127(r). The statute imposes the following additional limits, depending upon vehicle configuration:

- 24,000 pounds on a single steering axle
- 33,500 pounds on a single drive axle
- 62,000 pounds on a tandem axle
- 52,000 pounds on a tandem rear drive steer axle

Emergency vehicles are typically operated by fire departments and are primarily equipped for firefighting, but are also used to respond to and mitigate other hazardous situations in

an emergency. These vehicles may not meet Federal Bridge Formula B. They can create higher load effects compared to the AASHTO legal loads (i.e., Types 3, 3S2, 3-3, and SU4 to SU7) which are currently included in the AASHTO Manual for Bridge Evaluation (MBE). The Federal Highway Administration (FHWA) has determined that, for the purpose of load rating, two emergency vehicle configurations produce load effects in typical bridges that envelop the effects resulting from the family of typical emergency vehicles that is covered by the FAST Act:

1. Type EV2 - for single rear axle emergency vehicles

   Front Single Axle: 24,000 pounds
   Rear Single Axle: 33,500 pounds
   Wheelbase: 15 ft.

2. Type EV3 – for tandem rear axle emergency vehicles

   Front Single Axle: 24,000 pounds
   Rear Tandem Axle: 62,000 pounds (two 31,000 pound axles spaced at 4 ft.)
   Wheelbase: 17 ft. (distance from front axle to the centerline of rear tandem axle)

Load ratings (or rating factors) should be determined for these emergency vehicle configurations i.e., Types EV2 and EV3, at the operating or legal load rating level in accordance with the methods specified in the AASHTO MBE, First Edition with two exceptions:

1. Multiple presence: If necessary, when combined with other unrestricted legal loads for rating purposes, the emergency vehicle needs only to be considered in a single lane of one direction of a bridge.

2. Live load factor: A live load factor of 1.3 may be utilized in the Load and Resistance Factor Rating (LRFR) or Load Factor Rating (LFR) method.

Under 23 CFR 650.313(c), all highway bridges must be load rated and, if necessary, posted in accordance with the MBE. Recognizing that States and Federal agencies cannot immediately load rate every Interstate System bridge and bridges within reasonable access to the Interstate, FHWA recommends utilizing the following approach to prioritize load rating and posting for emergency vehicles:

Group 1: Bridges that meet any one of the following criteria do not need to be immediately load rated for emergency vehicles.

a. An operating or legal load rating factor for the AASHTO Type 3 vehicle of at least 1.85;

b. an inventory rating factor for the HS 20 design load of at least 1.0 using the LFR method, or

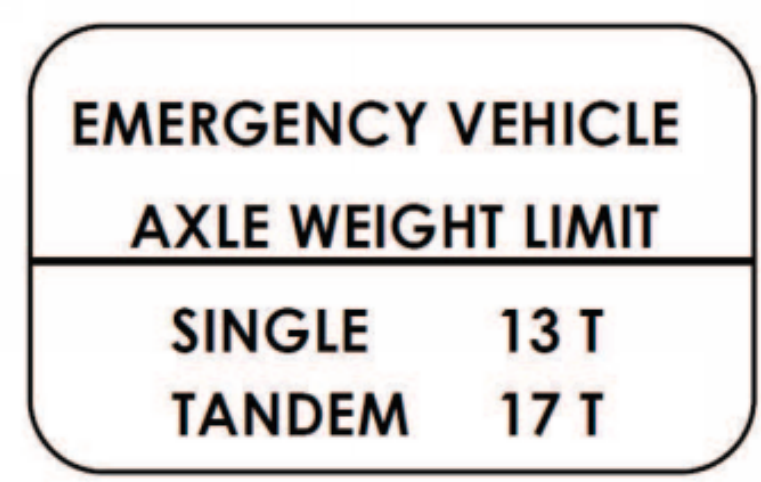
c. an inventory rating factor for the HL-93 design load of at least 0.9 using the LRFR method.

However, the bridges in this group shall be rated for the emergency vehicles when a normal re-rating is warranted, including changes in structural condition and other loadings.

Group 2: Bridges not in Group 1 should be rated for the emergency vehicles following their next inspection to incorporate the latest condition of the bridge, but no later than December 31, 2019. Emergency vehicles should be included in any new load ratings for these bridges when the load ratings occur before December 31, 2019.

If a State or Federal agency wants to utilize an alternative approach in lieu of the above to group bridges in an inventory for the purpose of prioritization, it should seek FHWA's review and concurrence of the alternative approach. Regardless of the prioritization approach used, the selection of load rating method should comply with FHWA's Policy Memorandum *Bridge Load Ratings for the National Bridge Inventory, dated October 30, 2006*.

When a load rating results in an operating rating factor less than 1.0 for the emergency vehicles, the bridge shall be appropriately posted for both the governing single axle weight limit and tandem axle weight limit derived from the above emergency vehicle configurations, i.e., Types EV2 and EV3 (23 CFR 650.313(c)). When posting is necessary, the following sign format, using the appropriate weight limits, should be considered:




If a State law allows or exempts emergency vehicles to operate without restriction off the Interstate System as legal loads, 23 CFR 650.313(c) requires bridges on these highways to be load rated and posted, if necessary, for these vehicles. Unless State law relies on a different definition of emergency vehicle than that included in the FAST Act (23 U.S.C. 127(r)(2)), States can perform load ratings on these highways using the two emergency vehicle configurations included in this memorandum.

Division Offices should work with their State DOT or Federal agency partners to develop

an action plan by March 31, 2017, with defined tasks, completion dates, and progress reporting requirements. Although this guidance focuses on highway bridges, 23 CFR 650.513(g) also requires States and Federal agencies to load rate and post highway tunnels, if necessary. Therefore, the action plan should also incorporate highway tunnels. States and Federal agencies should load rate tunnels for the emergency vehicle configurations above by December 31, 2019. Each Division Office should coordinate this action plan with its Bridge Safety Engineer.

We request that you share this memorandum with your State DOT or Federal agency partners immediately. If you have any questions or need more information, please contact Lubin Gao at (202)366-4604 or Lubin.Gao@dot.gov , or your Bridge Safety Engineer.

cc:
Directors of Field Services
Director of Technical Service
HIBS-10
HIBS-30
HRDI-1
Team Manager, RC Structures TST
Branch Chief, FLH Bridge Engineer

# Attachment #3
## Bridge Improvement Grant
## Excerpts from Current DOT-900 (10/2016)
## AGREEMENT FOR PROFESSIONAL ENGINEERING SERVICES
## (SDDOT Consultant Retainer)

**FURNISHING OF DOCUMENTS (DOT-900, 10/2016, Section B.3.)**

Except where otherwise specifically provided, the CONSULTANT will furnish to the DEPARTMENT all documents, reports, exhibits, electronic files, and other presentations for all phases of the work performed under the terms of this Agreement.

The CONSULTANT will furnish to the DEPARTMENT all design and check design computations. All documents furnished, including all original drawings, software generated electronic files, design computations, and check design computations, will become and remain the property of the DEPARTMENT and may be used by the DEPARTMENT without restriction for any public purpose.

The CONSULTANT will provide survey documents for bench levels and for the checking of bench levels on standard loose-leaf transit field book sheets. The CONSULTANT will provide all other data collected in an electronic format and will include the following files: FWD file, DGN file, DTM file, ALG file, and the RAW data file. The FWD file, DGN file, DTM file, and ALG file, will be compatible with the DEPARTMENT'S current version of InRoads. The RAW data file will be in ASCII format and will include the following information: point number, northing, easting, description, and any pertinent notes corresponding to a particular point.

The CONSULTANT, as requested by the DEPARTMENT, will submit construction documents, either electronic or paper format, and said documents will become and remain the DEPARTMENT'S property.

The CONSULTANT will return all data furnished to the CONSULTANT by the DEPARTMENT to the DEPARTMENT.

Compliance with all of the foregoing will be considered to be within the purview of this Agreement and will not constitute a basis for additional or extra compensation.

**GENERAL REQUIREMENTS (DOT-900, 10/2016, Section C.3.)**

b. Survey for roadway and hydraulic design will be in accordance with the edition of the Department of Transportation Survey Manual currently in place at the time of execution of the Work Order.

c. Wetland delineation will be in conformance with the US Army Corps of Engineers Wetland Delineation Manual and Regional Supplements. Wetland mitigation plans will include construction plans, performance criteria, and a five (5) year monitoring plan.

d. Hydrologic/Hydraulic design will be in accordance with the edition of the South Dakota Drainage Manual (and its revisions) currently in place at the time of execution of the Work Order.

**ROADWAY DESIGN (DOT-900, 10/2016, Section C.4.)**

Unless otherwise modified by the Work Order, the CONSULTANT will meet the following requirements:

a. Roadway design will be in accordance with the edition of the Department of Transportation Road Design Manual (and its revisions) currently in place at the time of execution of the Work Order and the American Association of State Highway and Transportation Officials (AASHTO) Specifications, "A Policy on Geometric Design of Highways and Streets" (2011 or the version in place at the time of execution of the Work Order), and Interims, or the Local Roads Plan.

b. The CONSULTANT will complete and furnish to the DEPARTMENT, at the time the plans are delivered to the DEPARTMENT, a DEPARTMENT provided checklist. This checklist will provide

certification that a separate check has been performed, all review revisions have been made, and the plans are correct and complete.

c. The CONSULTANT will furnish basic design criteria in the Scope Summary Report and in the Scope of Services.

d. The CONSULTANT may obtain standard drawings of roadway appurtenances from the DEPARTMENT'S Office of Road Design.

e. The CONSULTANT will contact the DEPARTMENT'S Office of Bridge Design, if a DEPARTMENT structure's drainage area is greater than 1,000 acres. For these structures, the DEPARTMENT'S Office of Bridge Design will make a hydraulics recommendation, or will concur on the hydraulics requirement if hydraulics is part of the work order scope.

f. The DEPARTMENT will furnish basic surfacing design criteria, such as type, thickness, and width of pavement.

g. The DEPARTMENT will furnish material recommendations.

**STRUCTURE DESIGN (DOT-900, 10/2016, Section C.5.)**

Unless otherwise modified by the Work Order, the CONSULTANT will meet the following requirements:

a. Prior to initiating design, the CONSULTANT will be required to submit the QC/QA plan/procedure to be followed for structure design to the DEPARTMENT for approval. The CONSULTANT may not begin structure design work until the QC/QA plan/procedure is approved and documented. If the CONSULTANT has a prior approved structure design QC/QA plan/procedure document on file with the OBD, and no changes to that document are anticipated for the current contract, the CONSULTANT will not need to resubmit a structure design QC/QA plan/procedure document.

b. The CONSULTANT will design bridges, box culverts, and miscellaneous highway structures in accordance with the edition of the "AASHTO LRFD Bridge Design Specifications," currently in place at the time of execution of the Work Order except as modified by the DEPARTMENT'S design practices. Prior to beginning design work, the DEPARTMENT will supply the CONSULTANT with a copy of design practices along with examples of standard detailing procedures and typical plans.

c. The CONSULTANT will design highway structures for a vehicular live loading of HL-93. Additional design criteria may be included in the Scope of Work.

d. The CONSULTANT will load rate each structure, including culverts that are bridge length, in accordance with the edition of the AASHTO "Manual for Bridge Evaluation" with latest Interim Revisions using the LRFR method currently in place at the time of execution of the Work Order. The CONSULTANT will perform an HL-93 Design Load Rating for each structure. The CONSULTANT will analyze the AASHTO HS20 vehicle for Inventory and Operating Ratings. The CONSULTANT will also perform a Legal Load Rating for South Dakota legal trucks, the notional rating load, and the four specialized hauling vehicles. The CONSULTANT will submit a copy of the rating analyses to the DEPARTMENT along with the Final Plans for bid letting purposes. The Bridge Management Engineer from the DEPARTMENT'S Office of Bridge Design will review load ratings. Load ratings must be above the Legal Loads. The CONSULTANT will provide a separate summary table of all load ratings to be included in the Bridge Inspection file.

e. The CONSULTANT will provide the DEPARTMENT a hard copy of design computations, independent check design computations, and load ratings, including computer output if applicable, with the final review set of drawings.

f. The CONSULTANT will review shop plans for fabricated items, and will forward marked-up shop plans to the DEPARTMENT. The DEPARTMENT must authorize any fabrication.

**PLANS, SPECIFICATIONS, AND ESTIMATES, GENERAL (DOT-900, 10/2016, Section C.8.)**

Unless otherwise modified by the Work Order, the CONSULTANT will meet the following requirements:

a. When complete plans, supplemental specifications, or special provisions are prepared, these will become the property of the DEPARTMENT, County, or City.

b. The CONSULTANT will furnish and deliver to the DEPARTMENT original drawings of all sheets comprising the set of plans, together with all reports, drawings, computer files, studies, memoranda, and other data pertaining thereto.

c. The CONSULTANT will furnish to the DEPARTMENT an electronic MS Word file of all special specifications.

d. The CONSULTANT will prepare plans in conformance with the DEPARTMENT'S customary practices. The CONSULTANT will use standard format for notes, tables, and rates of materials.

e. The CONSULTANT will prepare plans on sheets 11" x 17" or 8 ½" x 11" in size, under the guidance of the Road Design Manual's Chapter 18 – Plans Assembly: www.sddot.com/business/design/forms/roaddesign/Default.aspx or as directed by the DEPARTMENT. The CONSULTANT will follow the specific section of the Road Design Manual's Chapter 18 as it relates to plans produced by consultants in order to provide accurate electronic plans and bid items for the DEPARTMENT'S electronic bidding system. The CONSULTANT will utilize the DEPARTMENT'S web site: http://www.sddot.com/business/design/Default.aspx for Plan Preparation (i.e. Road Design Manual, CADD Procedure Manual, and User Guide for Electronic Plan Review), Downloadable Files (i.e. Form Letters, Microstation and InRoad files, and Plan Notes) and other information as necessary to design and prepare plans. The CONSULTANT will follow the properties and procedures set up for the DEPARTMENT'S electronic plans as set forth in document located at the following web site address: http://sddot.com/business/design/forms/cadd/Default.aspx . Electronic plans will be used for bidding purposes and must contain a watermark on each sheet stating "For Bidding Purposes Only." Refer to Paragraph i. below for details on the set of plans to be used for construction.

f. The CONSULTANT will prepare plans with sufficient precision to permit the convenient layout in the field for construction and for other purposes. The plans will also provide for the production of an accurate estimate of quantities for the work to be performed in the construction of the project.

g. The CONSULTANT will furnish such other pertinent information and data with respect to the plans and designs as the DEPARTMENT may request.

h. The DEPARTMENT will require all persons designing, detailing, and checking structure plans to legibly place their names or initials on each plan sheet in the spaces provided for this purpose.

i. The DEPARTMENT will designate the basic premises and criteria for the design. The CONSULTANT will develop plans in accordance with the DEPARTMENT'S standard specifications for roadway and bridge construction.

j. As part of the work embraced in the preparation of plans, the CONSULTANT will prepare and furnish to the DEPARTMENT special provisions in standard DEPARTMENT format, for items of work included in the plans which are not covered by the standard specifications, plan notes, or DEPARTMENT-approved special provisions.

k. The CONSULTANT will ensure scales, lettering, and the general delineation of the plans mirror the DEPARTMENT format and provide readily legible reproductions.

l. The CONSULTANT will ensure each plan sheet bears the South Dakota registered professional seal and endorsement of the CONSULTANT as per the requirements of the South Dakota Board of Technical Professions.

m. The CONSULTANT will use software acceptable to the DEPARTMENT as agreed to in the Work Order.

Note: The DEPARTMENT'S standard software programs are the Bentley Civil Products (InRoads Suite), MicroStation, AASHTOWare products, Adobe Acrobat, Bluebeam, and the Microsoft Office Suite. The DEPARTMENT may require other software on Work Orders.

**CONSTRUCTION ENGINEERING TECHNICAL REQUIREMENTS (DOT-900, 10/2016, Section D1.)**

1. **CONSULTANT'S RESPONSIBILITIES**. The CONSULTANT will be responsible to the DEPARTMENT, and will complete all work to the DEPARTMENT'S satisfaction.

   Subject to availability, the CONSULTANT will provide personnel for the areas of expertise necessary to satisfactorily complete the work specified in the Work Order and this Agreement. The DEPARTMENT will notify the CONSULTANT as to the proper medium that will be used for recording purposes of field data. The CONSULTANT will submit reports in a timely manner as directed by the DEPARTMENT'S Office issuing the Work Order. The responsibilities for these areas are described in **Exhibit 4**, CONSTRUCTION ENGINEERING CONSULTANT RESPONSIBILITIES.

**EXHIBIT 4 (DOT-900, 10/2016)**

**CONSULTANT CONSTRUCTION OVERSITE RESPONSIBILITIES**

**GENERAL**

**The CONSULTANT will:**

1. Be knowledgeable of the requirements of the project plans and specifications, the DEPARTMENT'S Survey Manual, Road Design Manual, South Dakota Drainage Manual, and Computer-Aided Design and Drafting (CADD) Procedures Manual.

2. Assure project personnel are knowledgeable of their duties and responsibilities.

3. Assure project personnel are knowledgeable of the DEPARTMENT'S Materials Manual.

4. Oversee day to day activities to ensure the project is constructed in accordance with plans and specifications.

5. Ensure all documentation and reports are accurate and kept current.

6. Prepare and electronically submit Biweekly Progress Reports, Construction Change Orders, Progress Pay Estimates, Final Pay Estimate, and Final Construction Change Order, all on the current version of the DEPARTMENT'S Construction Management System. The CONSULTANT will submit these reports in a timely manner as directed by the DEPARTMENT'S Office issuing the Work Order.

7. Require all individuals providing acceptance testing and independent assurance testing of construction materials or acceptance inspection to record all data/results electronically on the current version of the DEPARTMENT'S Construction Management System, or as instructed by the DEPARTMENT.

8. Require all individuals providing acceptance testing and independent assurance testing of materials or acceptance inspection to meet the requirements of the DEPARTMENT'S Materials Testing and Inspection Certification Program Manual.

9. Ensure testing equipment identified in the DEPARTMENT'S Materials Testing and Inspection Certification Program Manual is calibrated and documented according to the designated frequencies and procedures designated in the Manual.

10. Perform other duties assigned by the DEPARTMENT as defined in this Agreement.

**The CONSULTANT'S PROJECT ENGINEER will:**

1. Assist with conducting the pre-construction meeting.

2. Prepare biweekly progress reports, construction change orders, progress pay estimates, final estimate, and final construction change order electronically on the current version of the DEPARTMENT'S Construction Management System.

3. Handle equal employment opportunity (EEO) and labor compliance activities.

4. Ensure that subcontractors working on the project are approved by the DEPARTMENT.

**The CONSULTANT'S INSPECTOR will:**

1. Assure the asphalt or concrete plant is properly calibrated.

2. Perform scale accuracy checks.

3. Ensure construction activities remain inside the acquired right-of-way or easement as specified on the plans unless approved by the DEPARTMENT.

**The CONSULTANT'S SURVEY PARTY CHIEF will:**

1. Record field notes for slope stakes, blue tops, paving grades, pipe, structure layout, and other items of the same sort in electronic format, FWD files, DGN files, DTM files, ALG files, and RAW files compatible to the current version of InRoads being used by the DEPARTMENT.

2. Set centerline, offset lines, bluetops, slope stakes, pipe stakes, structure stakes, and other items of the same sort by electronic or manual means.

3. Run bench levels within acceptable tolerances of the DEPARTMENT'S Survey Manual and maintain field notes on standard loose-leaf transit field book sheets.

4. Obtain necessary topographic data within acceptable tolerances of the DEPARTMENT'S Survey Manual.

5. Supervise and assure the survey crew is knowledgeable as to its duties and responsibilities.

**The CONSULTANT'S TEST PERSON AND EQUIPMENT will:**

1. Be knowledgeable of the requirements of the project plans and specifications.

2. Sample and test materials for acceptance as specified by the DEPARTMENT'S Materials Manual. Perform material tests for QC/QA projects in accordance with QC/QA manual and have the proper QC/QA certification.

Recognize and have the ability to take corrective action for calibration of testing equipment.

# Appendix C – Structure Preservation or Rehabilitation Work Order Requirements

## Bridge Improvement Grant
## Work Order Requirements for Structure Preservation or Rehabilitation

**Note**: Not all preservation or rehabilitation work will require hydraulic analysis or foundation investigation. For this reason, several of the related items below have been marked "*if needed*." If the Subject project does not require hydraulic analysis and/or foundation investigation, simply do not include these items in the breakdown of estimated costs.

### SCOPE OF SERVICES TEMPLATE – Structure Preservation or Rehabilitation

1. **Field survey for completion of the Drainage Data Sheet and Contour Map.** The information required for placement on these sheets is listed below. An example is attached containing the required information.
   - ☐ Stationing from south to north or west to east.
   - ☐ Beginning and ending stations of the current structure.
   - ☐ Proposed and inplace gradelines.
   - ☐ Stream profile. (Including a table of stations and elevations for each shot taken.)
   - ☐ Sea level datum is required. Stations, elevations, and offsets from and descriptions of permanent objects will be required for project benchmarks. (The High Accuracy Reference Network (HARN) map and the County Bench Mark map for the State of South Dakota can be found at the following web site – www.state.sd.us/dot/pe/roaddesign/survey.htm)
   - ☐ Include an electronic file containing the plan/profile of the inplace gradeline at the structure.
   - ☐ Landowners with their addresses, phone numbers, and location of property.
   - ☐ Utilities with their addresses, phone numbers, and locations along the project.

2. **Field survey as necessary for preparation of construction plans.** Required information is listed below.
   - ☐ Establishment of transit points, land ties and benchmarks as well as cross sections and topography. (Stations, elevations, and offsets from permanent objects will be required for project benchmarks.)
   - ☐ Project limits as established by consultation with the County Highway Superintendent.
   - ☐ Additional legal survey as required for preparation of right-of-way plats.
   - ☐ The geometrics of horizontal and vertical alignment in accordance with the Local Roads Plan design standards.
   - ☐ Survey notes are to be retained on file with the Consultant for subsequent use in the preparation of construction plans and are to be available to the County upon request.

3. **(*If needed*.) Preliminary Hydraulic Data Sheet, Plan/Profile Sketches (Preliminary Hydraulic Layouts) and gradelines, Electronic Copy of HEC-RAS File, Draft Hydraulic Design Report in accordance with the newest version of the South Dakota Drainage Manual, and cost estimates for existing and all proposed structure alternatives. (More than one feasible alternative is required. This includes options on different alignments if applicable.)** The newest version of the South Dakota Drainage Manual is available at the following location: http://www.sddot.com/business/design/forms/drainage/. Guidance and examples can be found in Chapter 6 of the manual. The current preliminary hydraulic data sheet to be used can be found at the following internet location: *ftp://ftp.state.sd.us Folder Path – DOT/LGA/Forms/Hydraulic Data Sheet – Current.doc.* Directions for filling out the form can be found at the same location. All items will be submitted to the Local Government Assistance Office for distribution to SDDOT personnel for review for compliance with minimum required State and Federal standards. Necessary revisions shall be provided in writing by the SDDOT and shall be forwarded to the Consultant by the Local Government Assistance (LGA) Office. Necessary revisions shall be completed by the consultant and the Revised Draft Hydraulic Design Report submitted within 2 weeks of receipt of revisions from LGA. The Consultant is wholly responsible for the accuracy of the design calculations and the independent check design calculations.

4. **(*If needed*.) Conduct TS&L inspection, assistance in the selection of the type of preservation or rehabilitation, and preparation of TS&L summary letter.** The county or city (owner) shall be in attendance and advance notice given the Local Government Assistance Office so if time allows, a staff member can attend.

5. **(*If needed*.) Report of Foundation Investigation.** Conduct field investigation and provide design recommendations according to AASHTO LRFD Bridge Design Specifications Section 10. Report shall include

boring information, lab results, and design recommendations. See **Examples #1 and #2, following the attachments**, for reports that are typically developed by SDDOT Geotechnical Engineering Activity.

6. **(*If needed*.) For Structure Option: Final Hydraulic Design Report, Final Hydraulic Data Sheet (use the current data sheet found at the following internet location: ftp://ftp.state.sd.us Folder Path – DOT/LGA/Forms/Hydraulic Data Sheet – Current.doc,) HEC RAS model with existing and proposed conditions and if the bridge scour protection is needed, Scour Memo summarizing hydraulic scour calculation, Scour Calculation, and Berm Slope Protection Recommendations (if applicable.)**

7. **Survey and plans for the above referenced project as described in the application or TS&L letter (if applicable) and Final Hydraulics Data Sheet, design calculations, independent design check, and load ratings.** Review plans (100% complete) are to be submitted in PDF format. Specifications shall follow the most current edition of the Standard Specification for Roads and Bridges. South Dakota Department of Transportation Bid Items, Standard plates and plan notes, from the SDDOT website, must be used in development of the **11" x 17" Non Section Method** plan set.

   If applicable to the type of rehabilitation, the consultant shall provide design calculations, independent check, and load ratings for the structure as set forth in the Master Retainer Contract. In addition, load ratings for the Special Hauling Vehicles and Emergency Vehicles specified in **Attachment #3** shall also be submitted. The Consultant is wholly responsible for the accuracy and safe keeping of the design calculations and the independent design check.

8. **Incorporation into the plans of any changes that may be requested in the SDDOT plan review comments or provide written explanation for items not changes.**

9. **Review of shop fabrication drawings as may be required and submittal of the approved shop drawings to the Consultant.** This item is to be completed within two (2) weeks of receipt of shop or fabrication drawings from the contractor and shall be noted accordingly in the plans.

10. **Provide Quality Assurance / Quality Control Testing Plan based on SDDOT Materials Manual.** This document must be reviewed by the SDDOT prior to the notice to proceed being issued to the contractor. See **Appendix D** for requirements.

Please refer to the checklist in **Attachment #1** for the TS&L Packet of items that shall be submitted to the Local Government Assistance Office.

**Attachment #2** contains applicable excerpts from the Current SDDOT Consultant Retainer, DOT-900 AGREEMENT FOR PROFESSIONAL ENGINEERING SERVICES.

# Attachment #1
# Bridge Improvement Grant
# Checklist for Structure Preservation or Rehabilitation Work Order

**These items must be submitted to DOT/Local Government Assistance.**
**If any of these items are missing, the full packet will be returned for completion and resubmission to this office.**

**Project Number** _____ **County** _____ **PCN** _____

**CROSS OFF ANY NON-APPLICABLE ITEMS**

☐ **Survey Sheets and Contour Map including the following information:**

- ☐ Stationing from south to north or west to east
- ☐ Beginning and ending stations of the existing structure
- ☐ Beginning and ending stations of proposed structures
- ☐ Proposed and existing gradelines
- ☐ Stream profile and cross sections (Downstream to upstream direction including a table showing stations and elevations for each shot taken)
- ☐ Elevation and location of buildings and other structures
- ☐ Survey information using sea level datum and showing station, elevation, offset, and physical description of each project benchmark
- ☐ Landowner names, addresses, phone numbers, and legal descriptions of their property
- ☐ Utility names, addresses, phone numbers, and locations along the project

☐ **Preliminary Hydraulic Data Sheet (use current data sheet found at: ftp://ftp.state.sd.us Folder Path – DOT/LGA/Forms/Hydraulic Data Sheet – Current.doc) including the following information:**

- ☐ Calculated flows
- ☐ Inplace conditions (Ordinary High Water Elevation, $HW_{100}$, Vmax, OTfr)
- ☐ Proposed conditions for each option ($HW_2$, $HW_{23}$, $HW_{100}$, Vmax Qot, OTfr, ELovertop)
- ☐ Ordinary High Water Elevation Shown on Cross-Sections (vegetation elevation on stream banks – approx. 2–year flow)
- ☐ Observed High Water Elevation (identifiable high water mark)

☐ **Electronic copy of HEC-RAS model of existing and proposed conditions**

☐ **Plan and profile sketches (preliminary hydraulic layout sheets) for the existing structure and proposed gradelines for each option (More than one feasible alternative is required. This includes options on different alignments if applicable.)**

☐ **Cost Estimates (including design and construction engineering and construction costs for each option.)**

☐ **Revised Draft Hydraulic Report**

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☐ **TS&L Summary Letter**

- ☐ **Report of Foundation Investigation (see Examples 3 and 4 in this appendix)**
- ☐ **For Structure Chosen at TS&L**
  - ☐ **Final Hydraulic Design Report**
  - ☐ **Final Hydraulic Data Sheet (use current data sheet found at: ftp://ftp.state.sd.us Folder Path – DOT/LGA/Forms/Hydraulic Data Sheet – Current.doc)**
  - ☐ **HEC RAS model with existing and proposed conditions**
  - ☐ **Scour memo, scour calculations, and berm slope protection recommendations (Bridges Only)**
- ☐ **Plan/profile, general drawing sketches, and riprap layout as selected during the TS&L**
- ☐ **Review Plans (100% complete & ready for review) in PDF Format**
- ☐ **Design calculations, independent design check, and load ratings**

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**To be submitted after plan review is complete**

- ☐ **Memo Addressing Plan Review Comments**
- ☐ **Final Plans – Electronic PDF file of the engineered, stamped set of plans**
- ☐ **Quality Assurance / Quality Control Testing Plan**

# Attachment #2
## Bridge Improvement Grant
## Excerpts from Current DOT-900 (10/2016)
## AGREEMENT FOR PROFESSIONAL ENGINEERING SERVICES
## (SDDOT Consultant Retainer)

**FURNISHING OF DOCUMENTS (DOT-900, 10/2016, Section B.3.)**

Except where otherwise specifically provided, the CONSULTANT will furnish to the DEPARTMENT all documents, reports, exhibits, electronic files, and other presentations for all phases of the work performed under the terms of this Agreement.

The CONSULTANT will furnish to the DEPARTMENT all design and check design computations. All documents furnished, including all original drawings, software generated electronic files, design computations, and check design computations, will become and remain the property of the DEPARTMENT and may be used by the DEPARTMENT without restriction for any public purpose.

The CONSULTANT will provide survey documents for bench levels and for the checking of bench levels on standard loose-leaf transit field book sheets. The CONSULTANT will provide all other data collected in an electronic format and will include the following files: FWD file, DGN file, DTM file, ALG file, and the RAW data file. The FWD file, DGN file, DTM file, and ALG file, will be compatible with the DEPARTMENT'S current version of InRoads. The RAW data file will be in ASCII format and will include the following information: point number, northing, easting, description, and any pertinent notes corresponding to a particular point.

The CONSULTANT, as requested by the DEPARTMENT, will submit construction documents, either electronic or paper format, and said documents will become and remain the DEPARTMENT'S property.

The CONSULTANT will return all data furnished to the CONSULTANT by the DEPARTMENT to the DEPARTMENT.

Compliance with all of the foregoing will be considered to be within the purview of this Agreement and will not constitute a basis for additional or extra compensation.

**GENERAL REQUIREMENTS (DOT-900, 10/2016, Section C.3.)**

b. Survey for roadway and hydraulic design will be in accordance with the edition of the Department of Transportation Survey Manual currently in place at the time of execution of the Work Order.

c. Wetland delineation will be in conformance with the US Army Corps of Engineers Wetland Delineation Manual and Regional Supplements. Wetland mitigation plans will include construction plans, performance criteria, and a five (5) year monitoring plan.

d. Hydrologic/Hydraulic design will be in accordance with the edition of the South Dakota Drainage Manual (and its revisions) currently in place at the time of execution of the Work Order.

**ROADWAY DESIGN (DOT-900, 10/2016, Section C.4.)**

Unless otherwise modified by the Work Order, the CONSULTANT will meet the following requirements:

a. Roadway design will be in accordance with the edition of the Department of Transportation Road Design Manual (and its revisions) currently in place at the time of execution of the Work Order and the American Association of State Highway and Transportation Officials (AASHTO) Specifications, "A Policy on Geometric Design of Highways and Streets" (2011 or the version in place at the time of execution of the Work Order), and Interims, or the Local Roads Plan.

b. The CONSULTANT will complete and furnish to the DEPARTMENT, at the time the plans are delivered to the DEPARTMENT, a DEPARTMENT provided checklist. This checklist will provide certification that a separate check has been performed, all review revisions have been made, and the plans are correct and complete.

c. The CONSULTANT will furnish basic design criteria in the Scope Summary Report and in the Scope of Services.

d. The CONSULTANT may obtain standard drawings of roadway appurtenances from the DEPARTMENT'S Office of Road Design.

e. The CONSULTANT will contact the DEPARTMENT'S Office of Bridge Design, if a DEPARTMENT structure's drainage area is greater than 1,000 acres. For these structures, the DEPARTMENT'S Office of Bridge Design will make a hydraulics recommendation, or will concur on the hydraulics requirement if hydraulics is part of the work order scope.

f. The DEPARTMENT will furnish basic surfacing design criteria, such as type, thickness, and width of pavement.

g. The DEPARTMENT will furnish material recommendations.

**STRUCTURE DESIGN (DOT-900, 10/2016, Section C.5.)**

Unless otherwise modified by the Work Order, the CONSULTANT will meet the following requirements:

a. Prior to initiating design, the CONSULTANT will be required to submit the QC/QA plan/procedure to be followed for structure design to the DEPARTMENT for approval. The CONSULTANT may not begin structure design work until the QC/QA plan/procedure is approved and documented. If the CONSULTANT has a prior approved structure design QC/QA plan/procedure document on file with the OBD, and no changes to that document are anticipated for the current contract, the CONSULTANT will not need to resubmit a structure design QC/QA plan/procedure document.

b. The CONSULTANT will design bridges, box culverts, and miscellaneous highway structures in accordance with the edition of the "AASHTO LRFD Bridge Design Specifications," currently in place at the time of execution of the Work Order except as modified by the DEPARTMENT'S design practices. Prior to beginning design work, the DEPARTMENT will supply the CONSULTANT with a copy of design practices along with examples of standard detailing procedures and typical plans.

c. The CONSULTANT will design highway structures for a vehicular live loading of HL-93. Additional design criteria may be included in the Scope of Work.

d. The CONSULTANT will load rate each structure, including culverts that are bridge length, in accordance with the edition of the AASHTO "Manual for Bridge Evaluation" with latest Interim Revisions using the LRFR method currently in place at the time of execution of the Work Order. The CONSULTANT will perform an HL-93 Design Load Rating for each structure. The CONSULTANT will analyze the AASHTO HS20 vehicle for Inventory and Operating Ratings. The CONSULTANT will also perform a Legal Load Rating for South Dakota legal trucks, the notional rating load, and the four specialized hauling vehicles. The CONSULTANT will submit a copy of the rating analyses to the DEPARTMENT along with the Final Plans for bid letting purposes. The Bridge Management Engineer from the DEPARTMENT'S Office of Bridge Design will review load ratings. Load ratings must be above the Legal Loads. The CONSULTANT will provide a separate summary table of all load ratings to be included in the Bridge Inspection file.

e. The CONSULTANT will provide the DEPARTMENT a hard copy of design computations, independent check design computations, and load ratings, including computer output if applicable, with the final review set of drawings.

f. The CONSULTANT will review shop plans for fabricated items, and will forward marked-up shop plans to the DEPARTMENT. The DEPARTMENT must authorize any fabrication.

**PLANS, SPECIFICATIONS, AND ESTIMATES, GENERAL (DOT-900, 10/2016, Section C.8.)**

Unless otherwise modified by the Work Order, the CONSULTANT will meet the following requirements:

a. When complete plans, supplemental specifications, or special provisions are prepared, these will become the property of the DEPARTMENT, County, or City.

b. The CONSULTANT will furnish and deliver to the DEPARTMENT original drawings of all sheets comprising the set of plans, together with all reports, drawings, computer files, studies, memoranda, and other data pertaining thereto.

c. The CONSULTANT will furnish to the DEPARTMENT an electronic MS Word file of all special specifications.

d. The CONSULTANT will prepare plans in conformance with the DEPARTMENT'S customary practices. The CONSULTANT will use standard format for notes, tables, and rates of materials.

e. The CONSULTANT will prepare plans on sheets 11" x 17" or 8 ½" x 11" in size, under the guidance of the Road Design Manual's Chapter 18 – Plans Assembly: www.sddot.com/business/design/forms/roaddesign/Default.aspx or as directed by the DEPARTMENT. The CONSULTANT will follow the specific section of the Road Design Manual's Chapter 18 as it relates to plans produced by consultants in order to provide accurate electronic plans and bid items for the DEPARTMENT'S electronic bidding system. The CONSULTANT will utilize the DEPARTMENT'S web site: http://www.sddot.com/business/design/Default.aspx for Plan Preparation (i.e. Road Design Manual, CADD Procedure Manual, and User Guide for Electronic Plan Review), Downloadable Files (i.e. Form Letters, Microstation and InRoad files, and Plan Notes) and other information as necessary to design and prepare plans. The CONSULTANT will follow the properties and procedures set up for the DEPARTMENT'S electronic plans as set forth in document located at the following web site address: http://sddot.com/business/design/forms/cadd/Default.aspx . Electronic plans will be used for bidding purposes and must contain a watermark on each sheet stating "For Bidding Purposes Only." Refer to Paragraph i. below for details on the set of plans to be used for construction.

f. The CONSULTANT will prepare plans with sufficient precision to permit the convenient layout in the field for construction and for other purposes. The plans will also provide for the production of an accurate estimate of quantities for the work to be performed in the construction of the project.

g. The CONSULTANT will furnish such other pertinent information and data with respect to the plans and designs as the DEPARTMENT may request.

h. The DEPARTMENT will require all persons designing, detailing, and checking structure plans to legibly place their names or initials on each plan sheet in the spaces provided for this purpose.

i. The DEPARTMENT will designate the basic premises and criteria for the design. The CONSULTANT will develop plans in accordance with the DEPARTMENT'S standard specifications for roadway and bridge construction.

j. As part of the work embraced in the preparation of plans, the CONSULTANT will prepare and furnish to the DEPARTMENT special provisions in standard DEPARTMENT format, for items of work included in the plans which are not covered by the standard specifications, plan notes, or DEPARTMENT-approved special provisions.

k. The CONSULTANT will ensure scales, lettering, and the general delineation of the plans mirror the DEPARTMENT format and provide readily legible reproductions.

l. The CONSULTANT will ensure each plan sheet bears the South Dakota registered professional seal and endorsement of the CONSULTANT as per the requirements of the South Dakota Board of Technical Professions.

m. The CONSULTANT will use software acceptable to the DEPARTMENT as agreed to in the Work Order.

Note: The DEPARTMENT'S standard software programs are the Bentley Civil Products (InRoads Suite), MicroStation, AASHTOWare products, Adobe Acrobat, Bluebeam, and the Microsoft Office Suite. The DEPARTMENT may require other software on Work Orders.

**CONSTRUCTION ENGINEERING TECHNICAL REQUIREMENTS (DOT-900, 10/2016, Section D1.)**

1. **CONSULTANT'S RESPONSIBILITIES**. The CONSULTANT will be responsible to the DEPARTMENT, and will complete all work to the DEPARTMENT'S satisfaction.

   Subject to availability, the CONSULTANT will provide personnel for the areas of expertise necessary to satisfactorily complete the work specified in the Work Order and this Agreement. The DEPARTMENT will notify the CONSULTANT as to the proper medium that will be used for recording purposes of field data. The CONSULTANT will submit reports in a timely manner as directed by the DEPARTMENT'S Office issuing the Work Order. The responsibilities for these areas are described in **Exhibit 4**, CONSTRUCTION ENGINEERING CONSULTANT RESPONSIBILITIES.

**EXHIBIT 4 (DOT-900, 10/2016)**

**CONSULTANT CONSTRUCTION OVERSITE RESPONSIBILITIES**

**GENERAL**

**The CONSULTANT will:**

1. Be knowledgeable of the requirements of the project plans and specifications, the DEPARTMENT'S Survey Manual, Road Design Manual, South Dakota Drainage Manual, and Computer-Aided Design and Drafting (CADD) Procedures Manual.

2. Assure project personnel are knowledgeable of their duties and responsibilities.

3. Assure project personnel are knowledgeable of the DEPARTMENT'S Materials Manual.

4. Oversee day to day activities to ensure the project is constructed in accordance with plans and specifications.

5. Ensure all documentation and reports are accurate and kept current.

6. Prepare and electronically submit Biweekly Progress Reports, Construction Change Orders, Progress Pay Estimates, Final Pay Estimate, and Final Construction Change Order, all on the current version of the DEPARTMENT'S Construction Management System. The CONSULTANT will submit these reports in a timely manner as directed by the DEPARTMENT'S Office issuing the Work Order.

7. Require all individuals providing acceptance testing and independent assurance testing of construction materials or acceptance inspection to record all data/results electronically on the current version of the DEPARTMENT'S Construction Management System, or as instructed by the DEPARTMENT.

8. Require all individuals providing acceptance testing and independent assurance testing of materials or acceptance inspection to meet the requirements of the DEPARTMENT'S Materials Testing and Inspection Certification Program Manual.

9. Ensure testing equipment identified in the DEPARTMENT'S Materials Testing and Inspection Certification Program Manual is calibrated and documented according to the designated frequencies and procedures designated in the Manual.

10. Perform other duties assigned by the DEPARTMENT as defined in this Agreement.

**The CONSULTANT'S PROJECT ENGINEER will:**

1. Assist with conducting the pre-construction meeting.

2. Prepare biweekly progress reports, construction change orders, progress pay estimates, final estimate, and final construction change order electronically on the current version of the DEPARTMENT'S Construction Management System.

3. Handle equal employment opportunity (EEO) and labor compliance activities.

4. Ensure that subcontractors working on the project are approved by the DEPARTMENT.

**The CONSULTANT'S INSPECTOR will:**

1. Assure the asphalt or concrete plant is properly calibrated.

2. Perform scale accuracy checks.

3. Ensure construction activities remain inside the acquired right-of-way or easement as specified on the plans unless approved by the DEPARTMENT.

**The CONSULTANT'S SURVEY PARTY CHIEF will:**

1. Record field notes for slope stakes, blue tops, paving grades, pipe, structure layout, and other items of the same sort in electronic format, FWD files, DGN files, DTM files, ALG files, and RAW files compatible to the current version of InRoads being used by the DEPARTMENT.

2. Set centerline, offset lines, bluetops, slope stakes, pipe stakes, structure stakes, and other items of the same sort by electronic or manual means.

3. Run bench levels within acceptable tolerances of the DEPARTMENT'S Survey Manual and maintain field notes on standard loose-leaf transit field book sheets.

4. Obtain necessary topographic data within acceptable tolerances of the DEPARTMENT'S Survey Manual.

5. Supervise and assure the survey crew is knowledgeable as to its duties and responsibilities.

**The CONSULTANT'S TEST PERSON AND EQUIPMENT will:**

1. Be knowledgeable of the requirements of the project plans and specifications.

2. Sample and test materials for acceptance as specified by the DEPARTMENT'S Materials Manual. Perform material tests for QC/QA projects in accordance with QC/QA manual and have the proper QC/QA certification.

Recognize and have the ability to take corrective action for calibration of testing equipment.

**Attachment #3**

## Bridge Improvement Grant

### Load Rating Requirements for Special Hauling Vehicles

U.S. Department of Transportation
Federal Highway Administration

# Memorandum

Subject: **ACTION**: Load Rating of Specialized Hauling Vehicles
Date: November 15, 2013

*/s/ Original Signed by*
From: Joseph S. Krolak
Acting Director, Office of Bridge Technology

In Reply Refer To:
HIBT-10

To: Federal Lands Highway Division Engineers
Division Administrators

The purpose of this memorandum is to clarify FHWA's position on the analysis of *Specialized Hauling Vehicles* (SHVs) as defined in the AASHTO Manual for Bridge Evaluation (MBE) during bridge load rating and posting to comply with the requirements of the *National Bridge Inspection Standards* (NBIS). The intent of the load rating and posting provisions of the NBIS is to insure that all bridges are appropriately evaluated to determine their safe live load carrying capacity considering all unrestricted legal loads, including State routine permits, and that bridges are appropriately posted if required, in accordance with the MBE.

The SHVs are closely-spaced multi-axle single unit trucks introduced by the trucking industry in the last decade. Examples include dump trucks, construction vehicles, solid waste trucks and other hauling trucks. SHVs generally comply with Bridge Formula B and are for this reason considered legal in all States, if a States' laws do not explicitly exclude the use of such vehicles.

NCHRP Project 12-63 (Report 575, 2007) studied the developments in truck configurations and State legal loads and found that AASHTO Type 3, 3-S2 and 3-3 legal vehicles are not representative of all legal loads, specifically SHVs. As a result, legal load models for SHVs were developed and adopted by AASHTO in 2005 , recognizing that there is an immediate need to incorporate SHVs into a State's load rating process, if SHVs operate within a State. The SHV load models in the MBE include SU4, SU5, SU6 and SU7 representing four- to seven-axle SHVs respectively, and a Notional Rating Load (NRL) model that envelopes the four single unit load models and serves as a screening load. If the load rating factor for the NRL model is 1.0 or greater, then there is no need to rate for the single-unit SU4, SU5, SU6 and SU7 loads. However, if the load rating factor for the NRL is less than 1.0, then the single-unit SU4, SU5, SU6 and SU7 loads need to be considered during load rating and posting.

The SHVs create higher force effects, and thus result in lower load ratings for certain bridges, especially those with a shorter span or shorter loading length such as transverse floor beams, when compared to AASHTO Type 3, 3-S2 and 3-3 legal loads and HS20 design load. Therefore, SHVs, i.e., SU4, SU5, SU6 and SU7 or NRL, are to be included in rating and posting analyses in accordance with Article 6A.2.3 and Article 6B.9.2 of the 1st Edition of the MBE (Article 6B.7.2 of the 2nd Edition of the MBE), unless one of the following two conditions is met:

**Condition A**: The State verifies that State laws preclude SHV use; or

**Condition B**: The State has its own rating vehicle models for legal loads and verifies that the State legal load models envelope the ***applicable*** AASHTO SHV loading models specified in Appendix D6A and Figure 6B.9.2-2 of the 1st Edition of the MBE (Figure 6B.7.2-2 of the 2nd Edition of the MBE), and the State legal load models have been included in rating/posting analyses of all bridges. The SHV types, e.g. six- or seven-axle SHVs, precluded by State laws need not be considered.

The SHV load models apply to Allowable Stress Rating, Load Factor Rating, and Load and Resistance Factor Rating in accordance with Section 6A and 6B of the MBE.

The FHWA recognizes that there are bridges in the inventory that have not been rated for SHVs and that it is not feasible to include SHVs in the ratings for the entire inventory at once. FHWA is establishing the following timelines for rating bridges for SHVs, if neither Condition A or B is met:

**Group 1**: Bridges with the shortest span not greater than 200 feet should be re-rated after their next NBIS inspection, but no later than December 31, 2017, that were last rated by:

a) either Allowable Stress Rating (ASR) or Load Factor Rating (LFR) method and have an operating rating for the AASHTO Routine Commercial Vehicle either Type 3, Type 3S2, or Type 3-3 less than 33 tons (English), 47 tons (English), or 52 tons (English) respectively; or
b) Load and Resistance Factor Rating (LRFR) method and have a legal load rating factor for the AASHTO Routine Commercial Vehicle, either Type 3, Type 3S2 or Type 3-3, less than 1.3.

**Group 2**: Rate those bridges not in Group 1 no later than December 31, 2022.

For either group, if a re-rating is warranted due to changes of structural condition, loadings, or configuration, or other requirements, the re-rating should include SHVs.

The selection of load rating method should comply with FHWA's Policy Memorandum *Bridge Load Ratings for the National Bridge Inventory*, dated October 30, 2006.

A State may utilize an alternative approach in lieu of the above to address the load rating for SHVs for bridges in their inventory; however, the approach must be reviewed and formally accepted by FHWA.

The timeline presented above will be incorporated into the review of Metric 13 under the National Bridge Inspection Program (NBIP); specifically, it is expected that all bridges meeting Group 1 criteria be load rated for SHVs by the end of 2017. Please work with your State to assist them in developing appropriate actions to meet those timelines. If your State is currently developing or implementing a Plan of Corrective Actions (PCA) for load rating bridges, the PCA should be reviewed and modified as necessary to take into account the rating of SHVs for those bridges and these timelines.

We request that you share this memorandum with your State or Federal agency partner. All questions that cannot be resolved at the Division Office level should be directed to Lubin Gao at lubin.gao@dot.gov or at 202-366-4604.

**Load Rating Requirements for Emergency Vehicles**

U.S. Department of Transportation
Federal Highway Administration

# Memorandum

Subject: **ACTION:** Load Rating for the FAST Act's Emergency Vehicles

Date: November 3, 2016

From: /Original signed by/
Joseph L. Hartmann, Ph.D., P.E.
Director, Office of Bridges and Structures

In Reply Refer To: HIBS-1

To: Division Administrators
Federal Lands Highway Division Directors

On December 4, 2015, the President signed into law the *Fixing America's Surface Transportation Act* (FAST Act) (Pub. L.114-94). Section 1410 of the FAST Act amended 23 U.S.C. 127, *Vehicle weight limitations—Interstate System*, by revising the weight limits for certain vehicles on the Interstate System. The purpose of this memorandum is to provide guidance on maintaining compliance with the load rating and posting requirements of 23 CFR Part 650—specifically for the amended weight limits in 23 U.S.C. 127(r), *Emergency Vehicles*, for bridges on the Interstate System and within reasonable access to the Interstate System. Reasonable access is defined in a September 30, 1992 Non-Regulatory Supplement to 23 CFR Part 658 as at least one-road-mile from access to and from the National Network of highways, which includes the Interstate System, or further if the limits of a State's reasonable access policy for food, fuel, repairs, and rest extend to facilities beyond one-road-mile.

An emergency vehicle as defined in the FAST Act is designed to be used under emergency conditions to transport personnel and equipment to support the suppression of fires and mitigation of other hazardous situations (23 U.S.C. 127(r)(2)). The gross vehicle weight limit for emergency vehicles is 86,000 pounds under section 127(r). The statute imposes the following additional limits, depending upon vehicle configuration:

- 24,000 pounds on a single steering axle
- 33,500 pounds on a single drive axle
- 62,000 pounds on a tandem axle
- 52,000 pounds on a tandem rear drive steer axle

Emergency vehicles are typically operated by fire departments and are primarily equipped for firefighting, but are also used to respond to and mitigate other hazardous situations in

an emergency. These vehicles may not meet Federal Bridge Formula B. They can create higher load effects compared to the AASHTO legal loads (i.e., Types 3, 3S2, 3-3, and SU4 to SU7) which are currently included in the AASHTO Manual for Bridge Evaluation (MBE). The Federal Highway Administration (FHWA) has determined that, for the purpose of load rating, two emergency vehicle configurations produce load effects in typical bridges that envelop the effects resulting from the family of typical emergency vehicles that is covered by the FAST Act:

1. Type EV2 - for single rear axle emergency vehicles

   Front Single Axle: 24,000 pounds
   Rear Single Axle: 33,500 pounds
   Wheelbase: 15 ft.

2. Type EV3 – for tandem rear axle emergency vehicles

   Front Single Axle: 24,000 pounds
   Rear Tandem Axle: 62,000 pounds (two 31,000 pound axles spaced at 4 ft.)
   Wheelbase: 17 ft. (distance from front axle to the centerline of rear tandem axle)

Load ratings (or rating factors) should be determined for these emergency vehicle configurations i.e., Types EV2 and EV3, at the operating or legal load rating level in accordance with the methods specified in the AASHTO MBE, First Edition with two exceptions:

1. Multiple presence: If necessary, when combined with other unrestricted legal loads for rating purposes, the emergency vehicle needs only to be considered in a single lane of one direction of a bridge.

2. Live load factor: A live load factor of 1.3 may be utilized in the Load and Resistance Factor Rating (LRFR) or Load Factor Rating (LFR) method.

Under 23 CFR 650.313(c), all highway bridges must be load rated and, if necessary, posted in accordance with the MBE. Recognizing that States and Federal agencies cannot immediately load rate every Interstate System bridge and bridges within reasonable access to the Interstate, FHWA recommends utilizing the following approach to prioritize load rating and posting for emergency vehicles:

Group 1: Bridges that meet any one of the following criteria do not need to be immediately load rated for emergency vehicles.

a. An operating or legal load rating factor for the AASHTO Type 3 vehicle of at least 1.85;

b. an inventory rating factor for the HS 20 design load of at least 1.0 using the LFR method, or

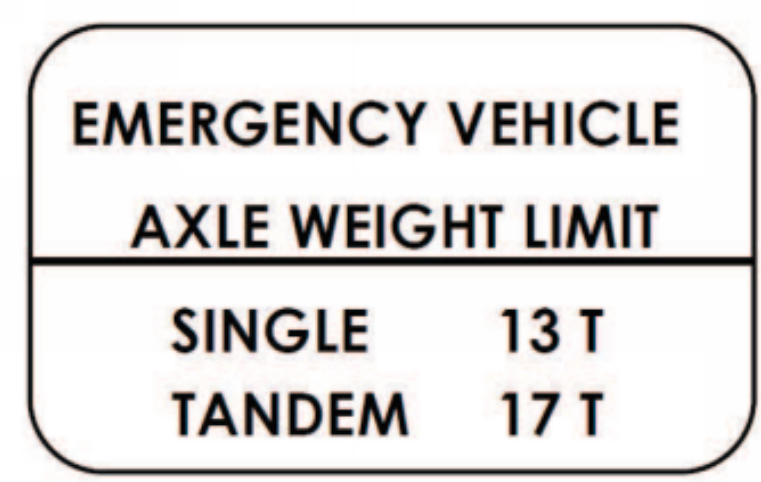
c. an inventory rating factor for the HL-93 design load of at least 0.9 using the LRFR method.

However, the bridges in this group shall be rated for the emergency vehicles when a normal re-rating is warranted, including changes in structural condition and other loadings.

Group 2: Bridges not in Group 1 should be rated for the emergency vehicles following their next inspection to incorporate the latest condition of the bridge, but no later than December 31, 2019. Emergency vehicles should be included in any new load ratings for these bridges when the load ratings occur before December 31, 2019.

If a State or Federal agency wants to utilize an alternative approach in lieu of the above to group bridges in an inventory for the purpose of prioritization, it should seek FHWA's review and concurrence of the alternative approach. Regardless of the prioritization approach used, the selection of load rating method should comply with FHWA's Policy Memorandum *Bridge Load Ratings for the National Bridge Inventory, dated October 30, 2006*.

When a load rating results in an operating rating factor less than 1.0 for the emergency vehicles, the bridge shall be appropriately posted for both the governing single axle weight limit and tandem axle weight limit derived from the above emergency vehicle configurations, i.e., Types EV2 and EV3 (23 CFR 650.313(c)). When posting is necessary, the following sign format, using the appropriate weight limits, should be considered:




If a State law allows or exempts emergency vehicles to operate without restriction off the Interstate System as legal loads, 23 CFR 650.313(c) requires bridges on these highways to be load rated and posted, if necessary, for these vehicles. Unless State law relies on a different definition of emergency vehicle than that included in the FAST Act (23 U.S.C. 127(r)(2)), States can perform load ratings on these highways using the two emergency vehicle configurations included in this memorandum.

Division Offices should work with their State DOT or Federal agency partners to develop

an action plan by March 31, 2017, with defined tasks, completion dates, and progress reporting requirements. Although this guidance focuses on highway bridges, 23 CFR 650.513(g) also requires States and Federal agencies to load rate and post highway tunnels, if necessary. Therefore, the action plan should also incorporate highway tunnels. States and Federal agencies should load rate tunnels for the emergency vehicle configurations above by December 31, 2019. Each Division Office should coordinate this action plan with its Bridge Safety Engineer.

We request that you share this memorandum with your State DOT or Federal agency partners immediately. If you have any questions or need more information, please contact Lubin Gao at (202)366-4604 or Lubin.Gao@dot.gov , or your Bridge Safety Engineer.

cc:
Directors of Field Services
Director of Technical Service
HIBS-10
HIBS-30
HRDI-1
Team Manager, RC Structures TST
Branch Chief, FLH Bridge Engineer

**EXAMPLE 1**

## REPORT OF FOUNDATION INVESTIGATION

**PROJECT:** BRO 8048(03) Mellette County PCN 02DY

**LOCATION:** Structure No. 48-102-010, 18.9 miles North & 0.8 miles West of Cedar Butte over the White River.

**METHOD OF INVESTIGATION:**

All soundings are made according to the Standard South Dakota Subsurface Investigation Techniques and AASHTO Specifications. Auger holes are drilled with a 4-1/2 inch continuous flight auger. Penetration and Push Test holes are drilled with a 6-5/8 inch continuous hollow stem auger. Push core samples are obtained by hydraulically ramming a 2 foot long lined split spoon sampler into the soil to obtain 2 inch nominal diameter soil samples. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to obtain 2 inch nominal diameter samples and to measure the resistance to penetration of the soil. Corings with the SDDOT drive rig are performed by using a California retractable plug sampler, which is driven with a 490 pound hammer. The drill stem is P.K. rod, which is 2-7/8 inch O.D., and 2 inch nominal diameter cores are obtained. All laboratory tests are performed in accordance with standard AASHTO or SDDOT laboratory procedures.

**RECOMMENDATIONS:**

Abutments:

I. Steel HP10 X 42 Piling

A. A LRFD maximum factored pile bearing resistance of 77 tons can be used for design.

B. The anticipated tip elevations are:

| Station | Elevation |
|---|---|
| 22+06 | 1910 |
| 25+27 | 1892 |

C. The nominal pile bearing resistance shall be 192 tons verified by the SDDOT's Modified ENR formula.

Bents:

I. Drilled Shafts

A. A LRFD maximum factored resistance value of 2,800 psf can be used for design below elevation 1912 ft. or maximum scour whichever is lower.

B. Permanent casings will be required to elevation 1915 ft.

C. The point of fixity within the bedrock can be assumed to be the elevation 1912 ft.

**DISCUSSION:**

The proposed structure location is underlain by brown sand-silt (alluvium) overlying brown silt-sand with gravel (alluvium). The alluvial sediments rest upon gray silt-clay (Pierre Shale). The D50 of the brown sand-silt, brown silt-sand with gravel, and gray silt-clay (Pierre Shale) can be assumed to be 0.06 mm, 1.0 mm, and 0.004 mm. The D95 of the brown sand-silt, brown silt-sand with gravel, and gray silt-clay (Pierre Shale) can be assumed to be 1.0 mm, 6.0 mm, and 0.06 mm.

Steel HP10X42 piling along with the anticipated tip elevations, are listed in the recommendations for use in the abutments. Drilled Shafts are listed in the recommendations for use at the bents.

The piling were evaluated for drivability and group effects at the LRFD Strength Limit State. Settlement of the substructure units and horizontal movement of the abutment piling were evaluated at the LRFD Service Limit State.

Drivability –

A drivability analysis was performed for the steel HP10X42 piling using the wave equation analysis program (GRLWEAP). A group of pile hammers that were evaluated and found to produce acceptable driving stresses is listed later in this report for inclusion in the plans.

Pile Group Effects:

Axial Loading –
Abutments
For a single row of piling, AASHTO requires the center-to-center pile spacing to be at least 30" or 2.5 times the width of the pile, whichever is greater. Therefore, for the steel HP10x42 piling at the abutment the center-to-center spacing shall be at least 30".

Settlement –
The steel pile tips will be founded in the Pierre Shale. Unconfined compression test results of the Pierre Shale exceed the proposed bridge loadings. Past experience for piling driven into hard shale soil bedrocks has shown little, if any, settlement has occurred. Therefore, 1/4 inch or less of total settlement can be used to design the substructure units.

Horizontal Movement –
AASHTO states that if the center-to-center spacing of the piling in the substructure unit is greater than 5 times the width of the pile then group effects can be ignored. Therefore, if the designed spacing is greater than 5 times the pile width a group efficiency factor of 1.0 can be used with no reduction in pile loading required. If this minimum pile spacing is not met a reduction factor will need to be calculated according to the AASHTO code.

Horizontal movement at the substructure units can be calculated using the following soil parameters:

Sand-silt (alluvium); phi angle = 24 degrees, cohesion = 50 psf, wet unit weight = 118 pcf
Silt-sand with gravel (alluvium); phi angle = 32 degrees, cohesion = 0 psf, wet unit weight = 130 pcf
Silt-clay (Pierre Shale); phi angle = 18 degrees, cohesion = 1,000 psf, wet unit weight = 130 pcf

For the drilled shafts, a LRFD maximum factored resistance value (skin friction) of 2,800 psf is recommended below elevation 1912 for the bents or maximum scour whichever is lower. The point of fixity within the bedrock can be assumed to be 1912 for the bents.

Each drilled shaft shall have a minimum of 3 access tubes for a shaft diameter of 3.0' and less. The number of access tubes needed shall be increased by 1 for each foot increase in shaft diameter above the 3.0'. The access tubes shall be furnished and installed according to the South Dakota Department of Transportation's 2004 Standard Specifications for Roads and Bridges. These access tubes shall be equally spaced in the shaft reinforcement prior to placing the reinforcement cage.

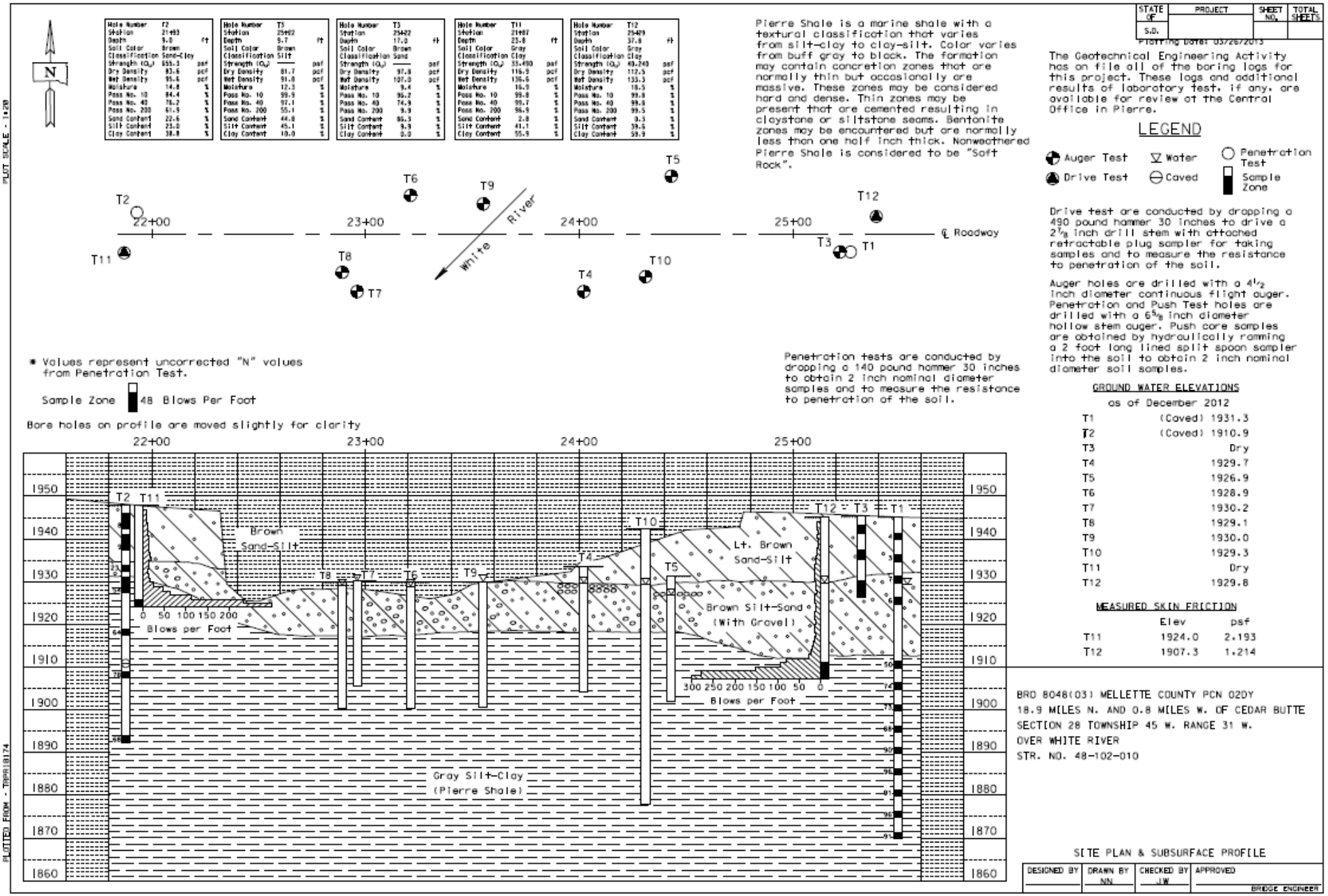
A representative of the CONSULTING FIRM (NAME AND NUMBER) shall be present during drilling operations to confirm the elevations provided in this report and to observe the placement of the drilled shafts. In addition to the notes below, contact the CONSULTANT REPRESENTATIVE for the most current drilled shaft construction notes to be included in the plans.

**The following notes shall be placed in the plans**:

A drivability analysis was performed using the wave equation analysis program (GRLWEAP). The pile hammers listed below were evaluated and found to produce acceptable driving stresses. Pile hammers not listed will require evaluation and approval prior to use from the CONSULTANT REPRESENTATIVE NAME AND PHONE NUMBER.

*Hammers need to be sized according to site specific soil parameters and structure design requirements. The following list of hammers is owned and readily available by contractors that do work in SD. Select and specify in the report which hammers are acceptable for use on individual projects.*

| | | | | |
|---|---|---|---|---|
| ICE 180 | Delmag D12-42 | FEC 1500 | Delmag D16-32 | Delmag D19-32 |
| Delmag D19-42 | MVE M-19 | ICE 42S | MKT DE 42/35 | APE D19-42 |
| Delmag D25-32 | Delmag D30-32 | SPI D30 | Delmag D46-32 | |


PLOT SCALE - 1:20
PLOTTED FROM - TMP18174
FILE - ...\SUBSURFACE PROFILE\BZDY.DGN
STATE OF S.D.
PROJECT
SHEET NO.
TOTAL SHEETS
PLOTTING DATE: 03/26/2013
Hole Number T2 Station 21+93 Depth 9.0 ft Soil Color Brown Classification Sand-Clay Strength (Qu) 855.3 psf Dry Density 83.6 pcf Wet Density 95.6 pcf Moisture 14.8 % Pass No. 10 84.4 % Pass No. 40 76.2 % Pass No. 200 61.9 % Sand Content 22.6 % Silt Content 23.8 % Clay Content 38.8 %
Hole Number T3 Station 23+02 Depth 5.7 ft Soil Color Brown Classification Silt Strength (Qu) psf Dry Density 81.7 pcf Wet Density 91.8 pcf Moisture 12.3 % Pass No. 10 99.9 % Pass No. 40 97.1 % Pass No. 200 55.1 % Sand Content 44.8 % Silt Content 45.1 % Clay Content 10.0 %
Hole Number T3 Station 23+22 Depth 17.0 ft Soil Color Brown Classification Sand Strength (Qu) psf Dry Density 97.8 pcf Wet Density 107.0 pcf Moisture 9.4 % Pass No. 10 95.2 % Pass No. 40 74.9 % Pass No. 200 9.9 % Sand Content 86.5 % Silt Content 9.9 % Clay Content 3.6 %
Hole Number T11 Station 21+87 Depth 23.8 ft Soil Color Gray Classification Clay Strength (Qu) 33,490 psf Dry Density 116.9 pcf Wet Density 136.6 pcf Moisture 16.8 % Pass No. 10 99.8 % Pass No. 40 99.7 % Pass No. 200 96.9 % Sand Content 2.8 % Silt Content 41.1 % Clay Content 55.9 %
Hole Number T12 Station 25+09 Depth 37.8 ft Soil Color Gray Classification Clay Strength (Qu) 40,240 psf Dry Density 112.5 pcf Wet Density 133.3 pcf Moisture 18.5 % Pass No. 10 99.8 % Pass No. 40 99.8 % Pass No. 200 99.5 % Sand Content 0.3 % Silt Content 39.6 % Clay Content 59.9 %
N
T2 T11 T6 T9 T8 T7 T5 T4 T10 T12 T3 T1
22+00 23+00 24+00 25+00
White River
℄ Roadway
Pierre Shale is a marine shale with a textural classification that varies from silt-clay to clay-silt. Color varies from buff gray to black. The formation may contain concretion zones that are normally thin but occasionally are massive. These zones may be considered hard and dense. Thin zones may be present that are cemented resulting in claystone or siltstone seams. Bentonite zones may be encountered but are normally less than one half inch thick. Nonweathered Pierre Shale is considered to be "Soft Rock".
The Geotechnical Engineering Activity has on file all of the boring logs for this project. These logs and additional results of laboratory test, if any, are available for review at the Central Office in Pierre.
LEGEND
Auger Test
Drive Test
Water
Caved
Penetration Test
Sample Zone
Drive test are conducted by dropping a 490 pound hammer 30 inches to drive a 2 7/8 inch drill stem with attached retractable plug sampler for taking samples and to measure the resistance to penetration of the soil.
Auger holes are drilled with a 4 1/2 inch diameter continuous flight auger. Penetration and Push Test holes are drilled with a 6 5/8 inch diameter hollow stem auger. Push core samples are obtained by hydraulically ramming a 2 foot long lined split spoon sampler into the soil to obtain 2 inch nominal diameter soil samples.
* Values represent uncorrected "N" values from Penetration Test.
Sample Zone 48 Blows Per Foot
Penetration tests are conducted by dropping a 140 pound hammer 30 inches to obtain 2 inch nominal diameter samples and to measure the resistance to penetration of the soil.
Bore holes on profile are moved slightly for clarity
22+00 23+00 24+00 25+00
1950 1940 1930 1920 1910 1900 1890 1880 1870 1860
Brown Sand-Silt
Lt. Brown Sand-Silt
Brown Silt-Sand (With Gravel)
Gray Silt-Clay (Pierre Shale)
0 50 100 150 200 Blows per Foot
300 250 200 150 100 50 0 Blows per Foot
GROUND WATER ELEVATIONS
as of December 2012
T1 (Caved) 1931.3
T2 (Caved) 1910.9
T3 Dry
T4 1929.7
T5 1926.9
T6 1928.9
T7 1930.2
T8 1929.1
T9 1930.0
T10 1929.3
T11 Dry
T12 1929.8
MEASURED SKIN FRICTION
T11 Elev 1924.0 psf 2.193
T12 Elev 1907.3 psf 1.214
BRO 8048(03) MELLETTE COUNTY PCN 02DY
18.9 MILES N. AND 0.8 MILES W. OF CEDAR BUTTE
SECTION 28 TOWNSHIP 45 W. RANGE 31 W.
OVER WHITE RIVER
STR. NO. 48-102-010
SITE PLAN & SUBSURFACE PROFILE
DESIGNED BY
DRAWN BY NN
CHECKED BY JW
APPROVED
BRIDGE ENGINEER

**RECOMMENDATIONS**

**EXAMPLE 2**

**Re:** BRO 8027(29), Gregory County, PCN 00QR
Str. No. 27-030-081, located 2.0 West & 0.1 South of the Jct of SD44/SD47
RCBC Undercut Recommendation

Soils maps of the area indicate the soils at the location of the proposed structure have the following characteristics.

Station 16+86 (Str. No. 27-030-081)

CLASSIFICATION: A-7
Clay & Silty Clay
AVERAGE LIQUID LIMIT: 66
SHRINK-SWELL POTENTIAL: High to Very High
FROST ACTION POTENTIAL: Low
CORROSIVITY: High for steel, Low to Moderate for concrete

**RECOMMENDATIONS:**

Provide 24 inches of undercut and backfill.

**DISCUSSION:**

The project consists of replacing an existing single span 22' steel stringer bridge with a 2 barrel 13' x 6' cast-in-place RCBC. The proposed box culvert will be in the same location as the existing bridge location. The existing surfacing on the road is gravel and will be resurfaced with gravel upon completion. Minimal grading at the proposed box culvert location is anticipated, therefore, the material shall be compacted using the Ordinary Compaction Method.

A subsurface investigation was conducted for the proposed RCBC. The subsurface investigation consisted of placing a boring near both the proposed inlet and outlet ends of the structure and logging the material to 3 feet below the flow line. Samples were collected from below the flow line for soils classification. A dynamic cone penetrometer was used at both the inlet and outlet ends to identify the change in relative density of the subsurface material below flow line.

Subsurface soils at the proposed site consist of brown silt-clay to 3' below the existing flow line.

The 2' undercut depth is recommended to remove the low strength soils with high shrink-swell potential from below the box culvert.

**The following paragraphs shall be placed in the plans:**

Compaction of earth embankment and box culvert backfill material shall be governed by the Ordinary Compaction Method.

Any questions about the recommendations or the subsurface conditions can be directed to the CONSULTANT CONTACT NAME AND PHONE NUMBER.

# Appendix D - Construction Management Plan

**Use and Limitation:** The Consultant shall use this document as a guide in preparing a construction management plan to be included in the bid documents for their specific project. Consultants are cautioned that the provision of this suggested sample construction management plan is not an implied or explicit guarantee of grant obligation compliance. The Consultant is solely responsible for the preparation and submittal of compliant construction management plan in accordance with the grant conditions.

# Construction Management Plan

*[Date]*

*[Location]*

*[Project Number]*
*[PCN Number]*

**Prepared For**
***[ ]***

**Prepared By**
***[ ]***

## PROJECT INFORMATION

This Construction Management Plan (CMP) details the measures and procedures required to assure compliance with the quality assurance and acceptance provisions of the Bridge Improvement Grant construction contract for Project No. *[ ] with* ***[County or City name], South Dakota***. The work to be accomplished in this project consists of:

| | |
|---|---|
| PROJECT SPONSOR: | ***[Name & contact information for sponsor]*** |
| CONTRACT ADMINISTRATION: | ***[Name of firm Responsible for Const. Observation & QA testing]*** |
| | ***[Name of QA firm]*** – Field tests |
| | ***[Name & contact info for QA lab]*** – Lab tests |

# RESPONSIBILITIES

### *Project Manager/Engineer*

The Project Manager / Engineer, on behalf of the sponsor is the person with overall responsibility for contract administration of this project. The Project Manager / Engineer has the authority to take the necessary actions to monitor compliance with the contract documents.

### *Construction Observer*

The responsibilities of the Construction Observer shall include monitoring all aspects of the job, sampling materials for acceptance, conducting tests on embankment and excavation areas, reviewing and analyzing all test results, assuring that work is within specification limits, advising the Contractor's Superintendent and Project Engineer of nonconformance and possible corrective actions, and measuring quantities for payment.

### *Quality Acceptance Laboratory*

[As appropriate, clarify which firm is responsible for what QA duties], testing lab duties shall include sampling materials for acceptance and conducting tests on: [embankment, excavation, subbase, base, rip rap, class A45 concrete, pile, PCC]. (If responsibilities for testing of materials are split between different organizations, list which firm is responsible for which QA tests.)

[QA Lab name] personnel assigned to construction testing have received certified training from the [Name of appropriate certifications] (e.g. Troxler Nuclear Equipment Seminar and the American Concrete Institute (ACI)).

All QA testing shall be performed by an (ASTM C1077 and D3666) accredited laboratory and a copy of the current accreditation shall be supplied to the Engineer and Owner, for approval, prior to submitting test results.

# QUALITY ASSURANCE INSPECTION PROCEDURES

1. Quality Assurance Tests: A list of tests and certifications required by the contract specifications can be found in the attached Appendix A. The list includes the referenced specification section and testing requirements. All parties will be informed of their responsibilities. This information will be reviewed at the preconstruction conference and monitored throughout the project.
2. Submittals: The Engineer shall maintain a file containing certifications and submittals required by contract as provided by the contractor, as well as approvals from the Engineer.
3. [Names of firm(s) responsible for QA test reports] will provide acceptance test reports to the [Owner / Engineer] as soon as the results are available, electronically. Typed copies shall be made available within [one] working day [delivered via electronic mail].
4. Material Test Reports: Material test results shall be verbally made available to the [Owner / Engineer] within [one hour] after the test report is completed and typed copies shall be made available within one working day [delivered via electronic mail].

    - Calibration check on equipment used to determine the noncompliance item, if applicable.
    - Confirmation of noncompliance through retesting and/or follow-up observations.
    - If a solution to the nonconformance issue is not reached in a reasonable time frame, additional qualified contractor personnel will be contacted to assist in identifying and correcting the problem.
    - If a severe nonconformance problem is detected and a reasonable solution cannot be implemented in a reasonable time frame, the Construction Superintendent will consult with the Project Engineer and the work will be suspended.
    - The work will not begin again until the Construction Superintendent and Project Engineer concur that a solution to the problem has been found and successfully implemented.

5. Test Reports Which Require Corrective Actions: Should test results or observations indicate noncompliance with the project contract, plans, or specifications, the following communication and follow-up action will be implemented, as applicable:

    - Verbal notification to the sponsor, Construction Superintendent, work area foreman and/or plant operator.

- On restarting the work, the nonconforming testing element or observation will be monitored at an appropriate higher frequency for a reasonable amount of time, e.g. double the testing frequency listed.
- After the area in noncompliance has been repaired, acceptance retesting will resume. The test reports will include the failed test number for tracking.

6. Daily Reports: The project manager or his representative will maintain a daily diary summarizing pertinent construction items. Items recorded shall include (as a minimum):
   a) Date
   b) Weather Conditions
   c) Brief Summary of Work Performed
   d) Number of workers on site
   e) Type and Amount of Major Equipment being utilized
   f) Running total of working/calendar days used on project
   g) Significant Directives/Communication with contractor (e.g. regarding construction procedures or material quality)
   h) Summary of QA tests performed that day
   i) Arrival / Departure Time of On Site Inspection Staff
7. B i - Weekly Reports: A summary of bi-weekly construction status shall be prepared and submitted to [owner] every [list day, e.g. Friday]. Report shall include summary of work completed in that 2 week period, summary of QA test results, discussion of any controversial issues that came up, and work anticipated during next reporting period. A sample report is included in Appendix B.

8. The resident observer and acceptance testing lab personnel shall maintain all acceptance test reports and provide copies to the owner/engineer as soon as results are available.

9. [Name of firm responsible for final construction report] will prepare a final project construction material testing and acceptance report that includes a summary of: all acceptance tests results, quantity of materials, and all bi-weekly reports. (Actual test reports will be available upon request). This will be submitted to the SDDOT with the final pay application.

# APPENDIX A

List of Tests

Include listing of all QC/QA tests and certifications required by the contract specifications.

Recommend including the following information in your listing:

- Material
- Specification
- Specification reference section
- Test Required
- Minimum Testing Frequency
- Test Requirements
- Notes

| Material | Specification | Spec Section | Test Required | Min. Test Frequency | Requirements | Notes |
|---|---|---|---|---|---|---|

## SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

BI-Weekly Progress Report No. _____

Project No. _____ PCN _____ Period Ending _____ 20 ____

County _____ Contract Time _____

Type of Work _____ Working Days This Period _____

Prime Contractor _____ Working Days to Date _____

Percent Complete _____

**WORK IN PROGRESS THIS PERIOD**

General Comments _____

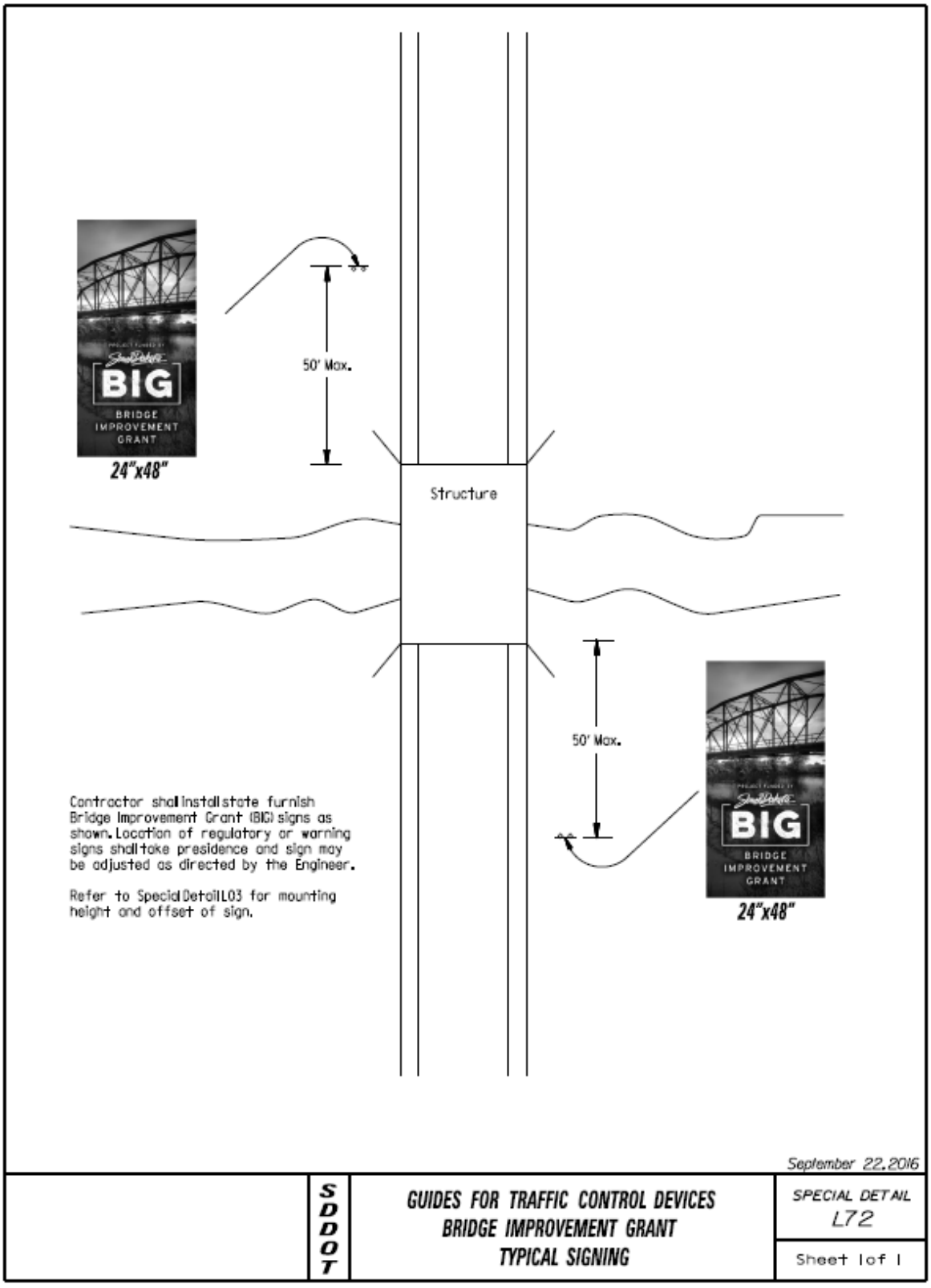
Contractor Working (Indicate after each: 1-1st Week; 2-2nd Week; 3-Both Weeks **E if contractor/sub is Exempt - i.e. 1E,2E)**

Work Started: _____
Work Suspended: _____
Work Resumed: _____
Field Work Completed: _____

| Day | Date | Working Day No. | Weather and Comments | Temperature | |
|---|---|---|---|---|---|
| | | | | High | Low |
| Sunday | | | | | |
| Monday | | | | | |
| Tuesday | | | | | |
| Wednesday | | | | | |
| Thursday | | | | | |
| Friday | | | | | |
| Saturday | | | | | |
| Sunday | | | | | |
| Monday | | | | | |
| Tuesday | | | | | |
| Wednesday | | | | | |
| Thursday | | | | | |
| Friday | | | | | |
| Saturday | | | | | |

_____
Prepared by

# Appendix E - Bridge Improvement Grant Sign Layout


BIG
BRIDGE
IMPROVEMENT
GRANT
24"x48"
50' Max.
Structure
50' Max.
BIG
BRIDGE
IMPROVEMENT
GRANT
24"x48"
Contractor shall install state furnish Bridge Improvement Grant (BIG) signs as shown. Location of regulatory or warning signs shall take presidence and sign may be adjusted as directed by the Engineer.
Refer to Special Detail L03 for mounting height and offset of sign.
September 22, 2016
SDDOT
GUIDES FOR TRAFFIC CONTROL DEVICES
BRIDGE IMPROVEMENT GRANT
TYPICAL SIGNING
SPECIAL DETAIL
L72
Sheet 1 of 1

# Appendix F – Bridge Improvement Grant Checklists

# Bridge Improvement Grant - Local Administration Check List (Source of Info – BIG Procedures and BIG Funding Agreement)

Multiple grants can be let together but all estimates, bids, and payments must be sent to LGA per grant (not combined)

Responsibilities of County/City

- ☐ Hire a Professional Engineer (PE) from SDDOT Consultant Retainer Lists for Local Gov't or State Bridge Design Categories
    - Prepare contract between county/city and consultant which must contain:
        - Scope of services as included in DOT funding agreement (contains retainer requirements)
        - Reference must be made to the project number and/or structure number associated with the grant

## PRIOR TO ADVERTISEMENT

- ☐ Obtain and submit (as needed) to DOT for review (signed and sealed by a PE):
    - Final Hydraulic Design Report, Final Hydraulic Data Sheet, HEC RAS model with existing and proposed conditions and if the bridge scour protection is needed, Scour Memo summarizing hydraulic scour calculation, Scour Calculation, and Berm Slope Protection Recommendations (if applicable) *
    - Foundations report (as defined in the funding agreement attachment) preferably from a firm on the SDDOT Consultant Retainer category for Local – Geotechnical Services *
    - review plans (100% complete – anything less won't be reviewed)
    - bid documents / specifications (only engineer's construction estimate and any special out of the ordinary specs)
    - design calculations, scour analyses *, load rating and analysis for bridge inspection file
    - all necessary permits
        - Corp of Engineers 404 Permit *
        - DOT Utility Cert
        - DOT ROW Cert
        - Federal Lands, BIA, Tribal, Municipal, etc.
    - BIG Construction Management Plan
    - Draft contract (showing hours) for construction engineering – consultant must be a PE selected from the SDDOT Consultant Retainer List for State Construction Administration to do Construction Engineering
- ☐ Obtain DOT approval letter to advertise (***All applicable documents noted above must be revised as needed and approved by DOT before this letter will be sent from the DOT***)
- ☐ Advertise project for bids and conduct bid letting

* Not applicable in all cases (for example, simple deck overlay)

## PRIOR TO SIGNING CONTRACT WITH CONTRACTOR

- ☐ Submit to DOT for review bid tabulation showing engineer's estimate and all bidders, in addition to the county/city's recommendation for award
- ☐ Obtain DOT bid concurrence letter
- ☐ Enter into construction contract and issue notice to proceed
- ☐ Invite DOT to final inspection
- ☐ Obtain and supply to DOT as-built plans and notification of completion of project
- ☐ Submit all design, construction, and CE billings to DOT for reimbursement

# REIMBURSEMENT PROCESS

## Bridge Improvement Grant - Local Administration Check List

## (Source of Info – BIG Procedures and BIG Funding Agreement)

Multiple grants can be let together but all estimates, bids, and payments must be sent to LGA per grant (not combined)

Responsibilities of County/City

- ☐ Submit to DOT for Reimbursement of Design Billings
  - Copy of contract as noted above must accompany first billing by county/city
  - "BIG Direct Payment Invoice" must accompany each billing
  - Copy of bill(s) from consultant
  - Proof of payment by county/city (copy of check or commission minutes)
  - Billings must be at least quarterly but not more frequently than monthly

- ☐ Submit to DOT for Reimbursement of Construction Engineering (CE) Billings – ***NOTE: CE billings must be processed separately from design billings as CE does not count against the grant cap.***
  - Copy of contract as noted above must accompany first billing by county/city
  - "BIG Direct Payment Invoice" must accompany each billing
  - Copy of bills(s) from consultant
  - Proof of payment by county/city (copy of check or commission minutes)
  - Billings must be at least quarterly but not more frequently than monthly

- ☐ Submit to DOT for Reimbursement of Contractor Billings
  - Copy of construction contract as noted above must accompany first billing by county/city
  - "Pay Estimate for BIGs" & "BIG Direct Pymts Invoice" for Construction must accompany each billing
    - Any applicable Change Orders must be sent in as well, as approved and signed by contractor, consultant, and county/city
  - Billings must be at least quarterly but not more frequently than monthly

# FINALLING PROCESS

## Bridge Improvement Grant - Local Administration Check List

## (Source of Info – BIG Procedures and BIG Funding Agreement)

Multiple grants can be let together but all estimates, bids, and payments must be sent to LGA per grant (not combined)

Responsibilities of County/City

- ☐ Submit to DOT for Reimbursement a FINAL Design Billing
  - o Submit "BIG Direct Payment Invoice" with Final Billing box checked (blue box on lower right)
  - o Copy of bill(s) from consultant
  - o Proof of payment by county/city (copy of check or commission minutes)

- ☐ Submit to DOT for Reimbursement a FINAL Construction Engineering (CE) Billing – ***NOTE: CE billings must be processed separately from design billings as CE does not count against the grant cap.***
  - o Submit "BIG Direct Payment Invoice" with Final Billing box checked (blue box on lower right)
  - o Copy of bills(s) from consultant
  - o Proof of payment by county/city (copy of check or commission minutes)

- ☐ Submit to DOT copy of testing documents as defined in the BIG Construction Management Plan prior to or with FINAL Contractor Billing

- ☐ Submit to DOT for Reimbursement a FINAL Contractor Billing
  - o Copy of construction contract as noted above must accompany first billing by county/city
  - o "Pay Estimate for BIGs" & "BIG Direct Pymts Invoice" for Construction must accompany each billing
    - ▪ Any applicable Change Orders must be sent in as well, as approved and signed by contractor, consultant, and county/city

# Bridge Improvement Grants
# LOCATION OF DOCUMENTS

| Document | LGA Location | External Location for Download |
|---|---|---|
| SDDOT Consultant Retainer Lists for Local Gov't or State Bridge Design and Local Gov't Geotechnical Services | http://sddot.com/business/design/consultant/ - bottom of the page | http://sddot.com/business/design/consultant/ - bottom of the page |
| BIG Scopes of Services | M:\DOT\FPA\LGA\Project_Info_&_Funding\Forms\Scopes of Services & Current Retainer List\03 Structure Scopes\BIG Scopes | Not Available – Generated by LGA Project Manager |
| DOT Utility Cert for BIGs | M:\DOT\FPA\LGA\Project_Info_&_Funding\Forms\Certifications & ROW Forms \ ***"BIG Utilities Cert"*** | ftp server – folder path \DOT\LGA\00 BIG Documents DO NOT DELETE\BIG ROW and Utility Certs |
| DOT Right-of-Way Cert for BIGs | M:\DOT\FPA\LGA\Project_Info_&_Funding\Forms\Certifications & ROW Forms \ ***"BIG ROW5-CERT" or "BIG No ROW Needed Cert"*** | ftp server – folder path \DOT\LGA\00 BIG Documents DO NOT DELETE\BIG ROW and Utility Certs |
| BIG Construction Management Plan | M:\DOT\FPA\LGA\Project_Info_&_Funding\Forms\BIG Construction Management Plan Template \ ***"BIG Construction Management Plan"*** | ftp server – folder path \DOT\LGA\00 BIG Documents DO NOT DELETE |
| DOT BIG Letting Authorization | M:\DOT\FPA\LGA\Project_Info_&_Funding\Forms\BIG Let Auth and Concur in Award of Letting \ ***"BIG Letting Authorization"*** | Not Available – Generated by LGA Project Manager |
| DOT BIG Award Concurrence | M:\DOT\FPA\LGA\Project_Info_&_Funding\Forms\BIG Let Auth and Concur in Award of Letting \ ***"BIG Award Concurrence"*** | Not Available – Generated by LGA Project Manager |
| BIG Direct Pymts Invoice (NOTE: File contains worksheets for Prel. Engr., Construction Engr., and CONSTRUCTION BILLINGS) | M:\DOT\FPA\LGA\Project_Info_&_Funding\Forms\BIG PE CE & Construction Reimbursement Docs\ ***"BIG Direct Pymts Invoice PCN"*** | ftp server – folder path \DOT\LGA\00 BIG Documents DO NOT DELETE\BIG Reimbursement Docs |
| Pay Est SHELL BIGs (Submitted with Constr. Billing BIG Direct Pymts Invoice noted above.) | M:\DOT\FPA\LGA\Project_Info_&_Funding\Forms\BIG PE CE & Construction Reimbursement Docs\ ***"Pay Est SHELL BIGs"*** | ftp server – folder path \DOT\LGA\00 BIG Documents DO NOT DELETE\BIG Reimbursement Docs |
| LGA Bridge Networks (Shows Potential Timeline of each type of BIG) | M:\DOT\FPA\LGA\Project_Info_&_Funding\Forms\Bridge LGA Bridge Networks\ ***"LGABridgeNetworks"*** | ftp server – folder path \DOT\LGA\00 BIG Documents DO NOT DELETE |