NO. 42

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

REQUEST FOR PROPOSAL

STATE AID PROJECT NO. SOIA-SAP-CPU-5-983(050)050 (PCN-20038)

0.051 Miles

GRADING, AGGR BASE COURSE, HOT BIT PVMT, CONC PVMT, CURB & GUTTER, SIDEWALKS, DRIVEWAYS, RETAINING WALLS, BRIDGE, TRAFFIC SIGNALS, SIGNING, MARKING,LIGHTING,EROSION CONTROL,STORM SEWER, & INCIDENTALS

DICKINSON - STATE AVENUE (SOUTH OF BROADWAY TO VILLARD STREET)

STARK COUNTY

BID OPENING: The bidder's proposal will be accepted via the Bid Express on-line bidding exchange at www.bidx.com until **09:30AM Central Time on May 08, 2015.**

Prior to submitting a Proposal, the Bidder shall complete all applicable sections and properly execute the Proposal Form in accordance with the specifications.

Proposal Form of:

_____
(Firm Name)

_____
(Address, City, State, Zipcode)

(For official use only)

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The company, firm, corporation, or individual hereby acknowledges that it has designated a responsible person or persons as having the authority to obligate the company, firm, or individual, through electronic or paper submittal, to the terms and conditions described herein and in the contract documents. The designated responsible person submitting this proposal shall be hereafter known as the bidder. By submitting this proposal, the bidder fully accepts and agrees to all the provisions of the proposal. The bidder also certifies that the information given in this proposal is true and the certifications made in this proposal are correct.

The bidder acknowledges that they have thoroughly examined the plans, proposal form, specifications, supplemental specifications, special provisions and agrees that they constitute essential parts of this proposal.

The bidder acknowledges that all line items which contain a quantity shall have a unit price bid. Any line item which is bid lump sum shall contain a lump sum bid price.

The bidder acknowledges that they understand that the quantities of work required by the plans and specifications are approximate only and are subject to increases and decreases; the bidder understands that all quantities of work actually required must be performed and that payment therefore shall be at the prices stipulated herein; that the bidder proposes to timely furnish the specified materials in the quantities required and to furnish the machinery, equipment, labor and expertise necessary to competently complete the proposed work in the time specified.

NON-COLLUSION AND DEBARMENT CERTIFICATION

The bidder certifies that neither he/she, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with this bid.

By submitting this proposal, the bidder certifies to the best of his/her knowledge and belief that he/she and his/her principles:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal Department or agency;
b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or perform a public (Federal, State or Local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property

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c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or Local) with commission of any of the offenses enumerated in paragraph b. of the certification; and
d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or Local) terminated for cause or default

Where the prospective bidder is unable to certify to any of the statements in this certification, the bidder shall submit an explanation in the blanks provided herein. The explanation will not necessarily result in denial of participation in a contract:

Explanation:_____
_____
_____
_____

If the prequalified bidder's status changes, he/she shall immediately submit a new fully executed non-collusion affidavit and debarment certification with an explanation of the change to the Contract Office prior to submitting the bid.

Failure to furnish a certification or an explanation will be grounds for rejection of a bid.

BID LIMITATION (Optional)

The bidder who desires to bid on more than one project on which bids are to be opened on the same date, and who also desires to avoid receiving an award of more projects than the bidder is equipped to handle, may bid on multiple projects and limit the total amount of work awarded to the bidder on selected projects by completing the "Bid Limitation".

The Bid Limitation must be filled in on each proposal form for which the Bidder desires protection. Each such proposal must be covered by a proposal guaranty.

The bid limitation can be made by declaring the total dollar value of work OR total number of projects a bidder is willing to perform.

The Bidder desires to disqualify all of his/her bids on this bid opening that exceed a total dollar value of

$_____

OR

that exceed a total number of _____ projects.

The Bidder hereby authorizes the Department to determine which bids shall be disqualified.

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PERMISSIBLE DISCOUNT (optional)

Only when invited to do so in the Request for Proposal by Special Provision, Bidders are permitted to offer a discount on a specific project (discount project) if they are awarded the contract on one or more additional projects bid at the same bid opening time and date. The bidder must present the proposal so that it can be considered with or without the discount. The bid or discount offered on the "discount project" will not affect the determination of the low bid of any other project.

When discounts are offered, they must be presented as a reduction in the unit price for one or more items of work in the specified proposal (discount project).

Space for Offering Discounts:
_____
_____
_____

Item No:_____

Description:_____

Unit:_____

Proposal Quantity:_____ Unit Price Reduction: $_____ Discount: $_____

Item No:_____

Description:_____

Unit:_____

Proposal Quantity:_____ Unit Price Reduction: $_____ Discount: $_____

Item No:_____

Description:_____

Unit:_____

Proposal Quantity:_____ Unit Price Reduction: $_____ Discount: $_____

TOTAL DISCOUNT_____

It is understood that the discount will only apply if awarded under the conditions as listed above and signed by the bidder.

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RECEIPT OF ADDENDA ACKNOWLEDGEMENT

We hereby acknowledge receipt of the following addenda:

Addendum #_____ Dated_____

Addendum #_____ Dated_____

Addendum #_____ Dated_____

Addendum #_____ Dated_____

Addendum #_____ Dated_____

Addendum #_____ Dated_____

PROPOSAL GUARANTY

A proposal guaranty is required. The proposal guaranty must comply with Section 102.09, "Proposal Guarantee" of the Standard Specifications.

TYPE OF PROPOSAL GUARANTY APPLIED TO THIS PROJECT (Check one):

_____ Annual Bid Bond*

_____ Single Project Bid Bond

_____ Certified or Cashier's Check

*Annual Bid Bond is required when submitting proposals electronically

BID ITEMS

Project: SOIA-SAP-CPU-5-983(050)050 (PCN-20038)

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price $$$$$	Unit Price 000	Amount $$$$$	Amount 00
001	103	0100	CONTRACT BOND	L SUM	1.				
002	107	0100	RAILWAY PROTECTION INSURANCE	L SUM	1.				
003	108	0001	CRITICAL PATH METHOD SCHEDULE	L SUM	1.				
004	201	0352	REMOVAL OF TREES & BRUSH	L SUM	1.				
005	201	0370	REMOVAL OF TREES 10IN	EA	13.				
006	201	0380	REMOVAL OF TREES 18IN	EA	13.				
007	201	0390	REMOVAL OF TREES 30IN	EA	3.				
008	201	0395	STUMP REMOVAL	EA	3.				
009	202	0136	REMOVAL OF PAVEMENT	TON	16,295.				
010	202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	1.				
011	202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	3,782.				
012	202	0210	REMOVAL OF MANHOLES	EA	9.				
013	202	0230	REMOVAL OF INLETS	EA	12.				
014	202	0293	REMOVE RETAINING WALL	LF	13.				
015	202	0295	REMOVAL OF OBSTRUCTIONS	L SUM	1.				
016	202	0310	REMOVAL OF CHAIN LINK FENCE	LF	582.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price $$$$$	Unit Price 000	Amount $$$$$	Amount 00
017	202	0312	REMOVE EXISTING FENCE	LF	2,082.				
018	202	0329	REMOVAL OF RAILROAD RAIL	LF	1,095.				
019	202	0350	REMOVAL OF TEMPORARY BYPASS	EA	3.				
020	203	0101	COMMON EXCAVATION-TYPE A	CY	32,616.				
021	203	0109	TOPSOIL	CY	5,702.				
022	203	0138	COMMON EXCAVATION-SUBCUT	CY	3,414.				
023	210	0101	CLASS I EXCAVATION	L SUM	1.				
024	210	0411	FOUNDATION PREPARATION	L SUM	1.				
025	216	0100	WATER	M GAL	36.				
026	230	0165	SUBGRADE PREPARATION-TYPE A-12IN	STA	58.				
027	251	0100	SEEDING CLASS I	ACRE	6.600				
028	251	2000	TEMPORARY COVER CROP	ACRE	7.500				
029	252	0100	SOD	SY	5,440.				
030	253	0201	HYDRAULIC MULCH	ACRE	14.100				
031	255	0103	ECB TYPE 3	SY	51.				
032	256	0100	RIPRAP GRADE I	CY	17.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price $$$$$	Unit Price 000	Amount $$$$$	Amount 00
033	258	0100	CONCRETE SLOPE PROTECTION	SY	136.				
034	260	0200	SILT FENCE SUPPORTED	LF	175.				
035	260	0201	REMOVE SILT FENCE SUPPORTED	LF	175.				
036	261	0112	FIBER ROLLS 12IN	LF	400.				
037	261	0113	REMOVE FIBER ROLLS 12IN	LF	400.				
038	261	0120	FIBER ROLLS 20IN	LF	16,871.				
039	261	0121	REMOVE FIBER ROLLS 20IN	LF	8,019.				
040	302	0100	SALVAGED BASE COURSE	TON	1,380.				
041	302	0120	AGGREGATE BASE COURSE CL 5	TON	42,456.				
042	401	0050	TACK COAT	GAL	1,003.				
043	401	0060	PRIME COAT	GAL	5,017.				
044	401	0070	FOG SEAL	GAL	1,003.				
045	401	0160	BLOTTER MATERIAL CL 44	TON	150.				
046	430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	4,459.				
047	550	0230	DOWELED EXPANSION JOINT ASSEMBLY	LF	201.				
048	550	0300	8IN NON-REINF CONCRETE PVMT CL AE-DOWELED	SY	10,072.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price $$$$$	Unit Price 000	Amount $$$$$	Amount 00
049	550	0305	9IN NON-REINF CONCRETE PVMT CL AE-DOWELED	SY	16,387.				
050	602	0130	CLASS AAE-3 CONCRETE	CY	1,914.500				
051	602	1130	CLASS AE-3 CONCRETE	CY	482.500				
052	602	1133	CONCRETE BRIDGE APPROACH SLAB	SY	301.400				
053	602	1134	PILE SUPPORTED APPROACH SLAB	SY	301.400				
054	602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	2,012.				
055	602	7000	SPECIAL SURFACE FINISH	SF	40,999.				
056	604	9910	PRESTRESSED I-BEAM-45IN	LF	3,839.				
057	612	0115	REINFORCING STEEL-GRADE 60	LBS	185,823.				
058	612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	219,196.				
059	622	0020	STEEL PILING HP 10 X 42	LF	1,020.				
060	622	0060	STEEL PILING HP 14 X 73	LF	4,675.				
061	624	0120	PEDESTRIAN RAILING-REMOVE & REPLACE	L SUM	1.				
062	624	0123	PEDESTRIAN RAILING	LF	2,608.				
063	702	0100	MOBILIZATION	L SUM	1.				
064	704	0100	FLAGGING	MHR	1,200.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price		Amount	
						$$$$$	000	$$$$$	00
065	704	1000	TRAFFIC CONTROL SIGNS	UNIT	2,856.				
066	704	1051	TYPE II BARRICADE	EA	1.				
067	704	1052	TYPE III BARRICADE	EA	52.				
068	704	1060	DELINEATOR DRUMS	EA	252.				
069	704	1067	TUBULAR MARKERS	EA	152.				
070	704	1080	STACKABLE VERTICAL PANELS	EA	39.				
071	704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	2.				
072	704	1500	OBLITERATION OF PAVEMENT MARKING	SF	2,555.				
073	704	3510	PRECAST CONCRETE MED BARRIER-STATE FURNISHED	EA	262.				
074	706	0400	FIELD OFFICE	EA	1.				
075	706	0500	AGGREGATE LABORATORY	EA	1.				
076	708	1540	INLET PROTECTION-SPECIAL	EA	129.				
077	708	1541	REMOVE INLET PROTECTION-SPECIAL	EA	129.				
078	709	0151	GEOSYNTHETIC MATERIAL TYPE R1	SY	3,917.				
079	709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	19.				
080	714	4092	PIPE CONDUIT 12IN-STORM DRAIN	LF	293.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price $$$$$	Unit Price 000	Amount $$$$$	Amount 00
081	714	4097	PIPE CONDUIT 15IN-STORM DRAIN	LF	2,677.				
082	714	4101	PIPE CONDUIT 18IN-STORM DRAIN	LF	1,465.				
083	714	4107	PIPE CONDUIT 24IN-STORM DRAIN	LF	1,391.				
084	714	4112	PIPE CONDUIT 30IN-STORM DRAIN	LF	2,164.				
085	714	4117	PIPE CONDUIT 36IN-STORM DRAIN	LF	326.				
086	714	4166	PIPE CONDUIT 30IN-JACKED OR BORED	LF	449.				
087	714	7040	SANITARY SEWER SERVICE CONNECTION	EA	1.				
088	714	7041	MODIFY SANITARY SEWER SERVICE	EA	1.				
089	714	8020	PIPE STEEL SMOOTH WALL .344IN 20IN BORED	LF	632.				
090	714	8504	CASING PIPE 24IN	LF	494.				
091	720	0110	RIGHT OF WAY MARKERS	EA	77.				
092	720	0125	ALIGNMENT MONUMENTS	EA	23.				
093	720	0130	IRON PIN R/W MONUMENTS	EA	80.				
094	720	0135	IRON PIN REFERENCE MONUMENTS	EA	6.				
095	722	0100	MANHOLE 48IN	EA	18.				
096	722	0102	MANHOLE 48IN DROP	EA	1.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price $$$$$	Unit Price 000	Amount $$$$$	Amount 00
097	722	0107	MANHOLE 54IN	EA	5.				
098	722	0110	MANHOLE 60IN	EA	5.				
099	722	0115	MANHOLE 66IN	EA	6.				
100	722	0120	MANHOLE 72IN	EA	6.				
101	722	0125	MANHOLE 78IN	EA	2.				
102	722	0130	MANHOLE 84IN	EA	1.				
103	722	2500	MANHOLE SPECIAL	EA	1.				
104	722	3510	INLET-TYPE 2	EA	30.				
105	722	3520	INLET-TYPE 2 DOUBLE	EA	34.				
106	722	3701	INLET SPECIAL-TYPE 2 48IN	EA	12.				
107	722	3713	INLET SPECIAL MOUNTABLE-TYPE B 48IN	EA	1.				
108	722	3720	INLET SPECIAL CATCH BASIN 6IN BEEHIVE 48IN	EA	1.				
109	722	3730	INLET SPECIAL CATCH BASIN 9IN BEEHIVE 48IN	EA	1.				
110	722	3761	INLET SPECIAL-TYPE 2 60IN	EA	8.				
111	722	3771	INLET SPECIAL MOUNTABLE-TYPE B 60IN	EA	1.				
112	722	3900	INLET SLOTTED DRAIN 12IN	LF	35.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price $$$$$	Unit Price 000	Amount $$$$$	Amount 00
113	722	4010	INLET CATCH BASIN 6IN BEEHIVE	EA	4.				
114	722	4020	INLET CATCH BASIN 9IN BEEHIVE	EA	2.				
115	722	4050	INLET MOUNTABLE CURB-TYPE A	EA	1.				
116	722	4060	INLET MOUNTABLE CURB-TYPE B	EA	2.				
117	722	6140	ADJUST GATE VALVE BOX	EA	29.				
118	722	6200	ADJUST MANHOLE	EA	6.				
119	724	0210	FITTINGS-DUCTILE IRON	LBS	5,273.				
120	724	0270	REMOVE GATE VALVE & BOX	EA	6.				
121	724	0300	GATE VALVE & BOX 6IN	EA	14.				
122	724	0310	GATE VALVE & BOX 8IN	EA	1.				
123	724	0314	GATE VALVE & BOX 12IN	EA	14.				
124	724	0411	6IN HYDRANT	EA	8.				
125	724	0430	REMOVE HYDRANT	EA	4.				
126	724	0660	WATER SERVICE LINE 2IN PVC	LF	78.				
127	724	0805	PLUG 6IN WATERMAIN	EA	1.				
128	724	0808	PLUG 12IN WATERMAN	EA	8.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price		Amount	
						$$$$$	000	$$$$$	00
129	724	0810	WATERMAIN 6IN PVC	LF	250.				
130	724	0830	WATERMAIN 8IN PVC	LF	82.				
131	724	0850	WATERMAIN 12IN PVC	LF	2,600.				
132	724	0851	BORE & PUSH 12IN PVC WATER	LF	467.				
133	724	0975	WATER LINE CONNECTION 6IN	EA	4.				
134	724	0980	WATER LINE CONNECTION 8IN	EA	1.				
135	724	0984	WATER LINE CONNECTION 12IN	EA	5.				
136	724	1095	BORE SANITARY SEWER PIPE	LF	357.				
137	724	1100	SANITARY SEWER 4IN	LF	49.				
138	724	1110	8IN SANITARY SEWER PIPE	LF	353.				
139	724	1117	12IN SANITARY SEWER PIPE	LF	445.				
140	724	1129	8IN X 4IN SEWER WYE BRANCH	EA	2.				
141	724	6030	ABANDON WATER MAIN/SERVICE LINE	EA	1.				
142	744	0050	INSULATION BOARD	CF	469.				
143	748	0140	CURB & GUTTER-TYPE I	LF	12,143.				
144	748	0150	MOUNTABLE CURB & GUTTER-TYPE 1 SEC A	LF	361.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price $$$$$	Unit Price 000	Amount $$$$$	Amount 00
145	748	1000	VALLEY GUTTER 36IN	LF	130.				
146	750	0030	PIGMENTED IMPRINTED CONCRETE	SY	2,424.				
147	750	0115	SIDEWALK CONCRETE 4IN	SY	5,180.				
148	750	1000	DRIVEWAY CONCRETE	SY	287.				
149	750	1020	DRIVEWAY CONCRETE 8IN	SY	163.				
150	750	2115	DETECTABLE WARNING PANELS	SF	433.				
151	752	0201	FENCE SMOOTH WIRE 4 STRAND	LF	1,080.				
152	752	0320	FENCE BARBED WIRE 4 STRAND-STEEL POST	LF	964.				
153	752	0600	FENCE CHAIN LINK	LF	725.				
154	752	0910	SAFETY FENCE	LF	1,335.				
155	752	0922	FENCE REMOVE & RESET	LF	37.				
156	752	2100	VEHICLE GATE	EA	1.				
157	752	2120	REMOVE VEHICLE GATE	EA	2.				
158	752	2995	CORNER ASSEMBLY-WOOD POST	EA	10.				
159	752	3100	CORNER ASSEMBLY CHAIN LINK	EA	13.				
160	752	3150	CORNER ASSEMBLY BARBED WIRE-WOOD POST	EA	15.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price $$$$$	Unit Price 000	Amount $$$$$	Amount 00
161	754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	360.				
162	754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	222.				
163	754	0141	BARRICADE ASSEMBLY A	EA	1.				
164	754	0143	REMOVE BARRICADE	EA	1.				
165	754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	874.				
166	754	0592	RESET SIGN PANEL	EA	4.				
167	754	0593	RESET SIGN SUPPORT	EA	4.				
168	754	0805	OBJECT MARKERS - CULVERTS	EA	2.				
169	762	0122	PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	SF	707.				
170	762	0420	SHORT TERM 4IN LINE-TYPE R	LF	18,208.				
171	762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	18,790.				
172	762	1305	PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	LF	17,310.				
173	762	1307	PREFORMED PATTERNED PVMT MK 6IN LINE-GROOVED	LF	1,392.				
174	762	1309	PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	LF	2,718.				
175	762	1325	PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED	LF	305.				
176	764	1999	REMOVE 1-CABLE GUARDRAIL & POSTS	LF	28.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price $$$$$	Unit Price 000	Amount $$$$$	Amount 00
177	764	9010	ATTENUATING CRASH CUSHION TL-2	EA	2.				
178	766	0100	MAILBOX-ALL TYPES	EA	8.				
179	770	0001	LIGHTING SYSTEM	EA	1.				
180	770	4501	TEMPORARY LIGHTING SYSTEM	EA	1.				
181	770	4567	REMOVE LIGHTING SYSTEM	EA	1.				
182	772	0001	TRAFFIC SIGNALS SYSTEM	EA	1.				
183	772	2790	TRAFFIC SIGNAL SYSTEM - SPAN WIRE MOUNTED	EA	1.				
184	772	3125	REMOVE TRAFFIC SIGNAL SYSTEM	EA	1.				
185	930	2010	SELECT GRANULAR BACKFILL	TON	95,004.				
186	930	3000	BRIDGE BENCH MARKS	SET	1.				
187	930	7012	ROADWAY CANOPY	L SUM	1.				
188	930	9550	MECHANICALLY STABILIZED EARTH WALL	SF	38,647.				
189	930	9930	ANTI-GRAFFITI COATING	SF	44,326.				
190	980	0500	RAILROAD BALLAST	TON	1,101.				
191	980	0510	RAILROAD SUB-BALLAST	TON	1,400.				
192	980	0560	RAILROAD TRACK	LF	1,050.				

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Item No.	Spec No.	Code No.	Description	Unit	Approx. Quantity	Unit Price		Amount	
						$$$$$	000	$$$$$	00
193	**980**	**0565**	**CONCRETE FORM LINER**	**SF**	**40,999.**				
			TOTAL SUM BID						

Project: SOIA-SAP-CPU-5-983(050)050 (PCN-20038)

Type of Work: GRADING, AGGR BASE COURSE, HOT BIT PVMT, CONC PVMT, CURB & GUTTER, SIDEWALKS, DRIVEWAYS, RETAINING WALLS, BRIDGE, TRAFFIC SIGNALS, SIGNING, MARKING,LIGHTING,EROSION CONTROL,STORM SEWER, & INCIDENTALS

County: STARK

Length: 0.0511 Miles

TIME FOR COMPLETION:

The undersigned Bidder agrees, if awarded the contract, to prosecute the work with sufficient forces and equipment to complete the contract work within the allowable time specified as follows:

WORKING DAY CONTRACT: **NA** working days are provided. The Department will begin charging working days beginning **NA** or the date work begins on the project site, whichever is earlier.

CALENDAR DAY CONTRACT: **NA** calendar days are provided. The completion date will be determined by adding **NA** calendar days to **NA** or the date work begins on the project site, whichever is earlier.

COMPLETION DATE CONTRACT The project completion date is **10/08/2016 *** . The Department provides a minimum of **NA** working days. The Department will begin charging working days beginning **NA** or the date work begins on the project site, whichever is earlier.

***ALL WORK SHALL BE COMPLETED BY 10/8/16 UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS. REFER TO PLAN NOTE 704-P02 FOR PHASING REQUIREMENTS AND SP 170(14) FOR LIQUIDATED DAMAGES ASSOCIATED WITH THE SCHEDULE REQUIREMENTS FOR THE TEMPORARY BYPASS FROM STA 208+90 TO STA 211+00. REFER TO SP 170(14) FOR LIQUIDATED DAMAGES ASSOCIATED WITH MAINTENANCE REQUIREMENTS FOR THE ROADWAY, INCLUDING THE TEMPORARY BYPASS FROM STA 208+90 TO STA 211+00.**

Project: SOIA-SAP-CPU-5-983(050)050 (PCN-20038)

Type of Work: GRADING, AGGR BASE COURSE, HOT BIT PVMT, CONC PVMT, CURB & GUTTER, SIDEWALKS, DRIVEWAYS, RETAINING WALLS, BRIDGE, TRAFFIC SIGNALS, SIGNING, MARKING,LIGHTING,EROSION CONTROL,STORM SEWER, & INCIDENTALS

County: STARK

Length: 0.0511 Miles

CONTRACT EXECUTION:

The undersigned Bidder agrees, if awarded the contract, to execute the contract form and furnish a contract bond within fifteen calendar days, as determined by NDCC Section 1-02-15, after date of notice of award, in accordance with the provisions of Sections 103.05 and 103.06 of the Standard Specifications.

AFFIDAVIT:

STATE OF _____)
) ss.
COUNTY OF _____)

The undersigned bidder, being duly sworn, does depose and say that they are an authorized representative of _____
CONTRACTOR NAME

of _____ , a
MAILING ADDRESS

☐ Individual ☐ Partnership ☐ Joint Venture ☐ Corporation

and that they have read, understand, acknowledge, and accept the entire proposal form; and that all statements made by said bidder are true and correct.

_____ , TITLE _____
BIDDER MUST SIGN ON THIS LINE

_____
TYPE OR PRINT SIGNATURE ON THIS LINE

Subscribed and sworn to before me this day.

_____
COUNTY

(Seal)

_____ _____
STATE DATE

_____
NOTARY PUBLIC

My commission expires _____

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

Job #42, Project No. SOIA-SAP-CPU-5-983(050)050

Grading, Aggregate Base Course, Concrete Pavement, Curb & Gutter, Sidewalks, Driveways, Retaining Walls, Bridge, Traffic Signals, Signing, Marking, Lighting, Erosion Control, Storm Sewer, and Incidentals

INDEX OF PROVISIONS

Road Restriction Permits

Price Schedule for Miscellaneous Items dated October 1, 2014 (PS-1)

On-The-Job Training Program dated November 1, 2013

Appendix A of the Title IV Assurances dated October 1, 2014

Appendix E of the Title IV Assurances dated October 1, 2014

On-The-Job Training Program dated October 6, 2014

SP 3(14) Temporary Erosion & Sediment Best Management Practices

SP 40(14) Local Agency Contracts

SP 54(14) Concrete Final Surface Finish

SP 126(14) Mechanically Stabilized Earth Wall

SP 128(14) City of Dickinson Water and Sewer Requirements

SP 144(14) Concrete Form Liner

SP 145(14) Industry Track Work

SP 146(14) Anti-Graffiti Coating

SP 161(14) Painting Over Galvanized Steel

SP 170(14) Temporary Bypass Requirements

SP Fuel Cost Adjustment Clause dated September 8, 2006

NOTICE

TO: All prospective bidders on all North Dakota Department of Transportation Highway Construction Projects.

Contractors moving construction equipment to NDDOT highway construction projects are subject to the Road Restriction Policy with the following modifications:

A. The contractor may purchase up to 10 single trip permits for each NDDOT highway construction project at a cost ranging from $20 to $70 each. These permits must be purchased from the Motor Carrier Division of the Highway Patrol at the central office of the NDDOT in Bismarck, North Dakota.

B. The $1 per mile fee will not be charged for Gross Vehicle Weights (GVW) exceeding 105,500 pounds, 105,500 pounds, and 105,000 pounds for highways Restricted by Legal Weights, 8 Ton, and 7 Ton highways respectively.

C. The $5 per ton per mile fee will be charged only for loads exceeding a GVW of 130,000 pounds, 120,000 pounds, 110,000 pounds and 80,000 pounds for highways Restricted by Legal Weights, 8 Ton, 7 Ton, and 6 Ton highways respectively.

D. The maximum weights per axle for each of the class restrictions still apply. If it is shown that more axles cannot be added, movement may be authorized; however, a $1 per ton per mile fee will be charged for all weight in excess of the restricted axle limits.

E. These construction equipment single trip permits apply to State and US Highways only.

F. The District Engineers and Highway Patrol will select the route of travel.

G. Contractors moving equipment to other than NDDOT highway construction projects are subject to all fees as shown in the Road Restriction Permit Policy.

H. Contractors must call the Highway Patrol prior to movement of all overweight loads on all State and US Highways.

NDDOT ROAD AND VEHICLE RESTRICTIONS Date Revised 05-22-10

ROAD RESTRICTION PERMITS

Permits shall be issued for the movement of non-divisible vehicles and loads on state highways which exceed the weight limits during spring road restrictions. The issuance of permits may be stopped or posted weights changed at any time based on the varying conditions of the roadways. Permits can be obtained from the Highway Patrol.

RESTRUCTION CLASSIFICATIONS WITH ALLOWABLE AXLE WEIGHTS AND GROSS VEHICLE WEIGHTS	PERMIT AND TON/MILE FEES
Highways Restricted by Legal Weight Single Axle -- 20,000 lbs. Tandem Axle -- 34,000 lbs. Triple Axle -- 48,000 lbs. 4 Axles or more -- 15,000 lbs. per axle Gross Vehicle Weight -- 105,500 lbs. Note: The above weights apply to state highways restricted by legal weights, other than interstate highways, in areas where road restrictions are in force. When the gross weight of an axle grouping exceeds 48,000 pounds, the $1 per ton per mile shall apply to all weight in excess of 15,000 pounds per axle.	Permit Fee: $20-$70 per trip Ton Mile Fee: 105,501 lbs. to 130,000 lbs. GVW -- $1 per mile Over 130,000 lbs. GVW – $1 per mile **plus** $5 per ton per mile for that weight exceeding 130,000 lbs. GVW Exceeding axle limits -- $1 per ton per mile
8-Ton: Single Axle -- 16,000 lbs. Tandem Axle -- 32,000 lbs. 3 Axles or more -- 14,000 lbs. per axle Gross Vehicle Weight -- 105,500 lbs.	Permit Fee: $20-$70 per trip Ton Mile Fee: 105,501 lbs. to 120,000 lbs. GVW -- $1 per mile Over 120,000 lbs. GVW – $1 per mile **plus** $5 per ton per mile for that weight exceeding 120,000 lbs. GVW Exceeding restricted axle limits -- $1 per ton per mile
7-Ton: Single Axle -- 14,000 lbs. Tandem Axle -- 28,000 lbs. 3 Axles or more -- 12,000 lbs. per axle Gross Vehicle Weight -- 105,500 lbs.	Permit Fee: $20-$70 per trip Ton Mile Fee: 105,500 lbs. to 110,000 lbs. GVW -- $1 per mile Over 110,000 lbs. GVW – $1 per mile **plus** $5 per ton per mile for that weight exceedi ng 110,000 lbs. GVW Exceeding restricted axle limits -- $1 per ton per mile
6-Ton: Single Axle -- 12,000 lbs. Tandem Axle -- 24,000 lbs. 3 Axles or more -- 10,000 lbs. per axle Gross Vehicle Weight -- 80,000 lbs.	Permit Fee: $20-$70 per trip Ton Mile Fee: $5 per ton per mile for all weight exceeding 80,000 lbs. GVW Exceeding restricted axle limits -- $1 per ton per mile
5-Ton: Single Axle -- 10,000 lbs. Tandem Axle -- 20,000 lbs. 3 Axles or more -- 10,000 lbs. per axle Gross Vehicle Weight -- 80,000 lbs.	No overweight movement allowed

SINGLE UNIT FIXED LOAD VEHICLES SUCH AS TRUCK CRANES AND WORKOVER RIGS

A. Permit Fee and Ton Mile Fee for Self-Propelled Fixed Load Vehicles.

1. Permit Fee: $25 per trip

2. $1 per ton per mile for all weight in excess of restricted axle limits or in excess of legal limits on state highways in areas where road restrictions are in force. When the gross weight of an axle grouping exceeds 48,000 pounds, the $1 per ton per mile shall apply to all weight in excess of 15,000 pounds per axle (see weight classification chart in section C.)

3. $5 **per ton per mile** for all movements exceeding the following gross vehicle weight limits:

   a. 105,500 lbs. GVW on unrestricted state highways, other than interstate highways, in areas where road restrictions are in force.
   b. 105,500 lbs. GVW on 8-ton highways.
   c. 105,500 lbs. GVW on 7-ton highways.
   d. 80,000 lbs. GVW on 6-ton highways.
   e. No overweight movement allowed on 5-ton highways

B. Permit Fees for Work-Over Rigs and Special Mobile Equipment Exceeding 650 but not 670 Pounds Per Inch Width of Tire.

1. Permit Fee:
   a. $50 per trip on work-over rigs up to 650 pounds per inch width.
   b. $75 per trip on work-over rigs that exceed 650 but not 670 pounds per inch width of tire.
2. The work-over rig shall be stripped to the most minimum weights.
3. A minimal number of state highway miles shall be used.
4. District engineer approval shall be obtained prior to movement when vehicle exceeds restricted axle weights by more than 5,000 pounds.
5. A validation number ending in TM must be obtained from the Highway Patrol prior to using a self-issue single trip movement approval form.
6. The ton mile shall be waived.

10/1/2014

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
PRICE SCHEDULE FOR MISCELLANEOUS ITEMS (PS-1)

The Contractor agrees to accept the following unit prices for each listed item of work and or material when no project contract unit price exists for that item. Each price listed will be full compensation for the cost of labor, material and equipment necessary to provide the item of work and/or material, complete in place, including (but not limited to) royalty, disposal of unsuitable material, equipment rental, sales tax, use tax, overhead, profit, and incidentals.

Each listed item is referenced to the Standard Specifications by Section number and Section name.

SECTION NO.	SECTION NAME	ITEM NAME	PRICE PER ITEM
107.08	Haul Roads	Water	$27 per M Gal
107.08	Haul Roads	Bitumen for Mix	Invoice Price [1] + 10%
107.08	Haul Roads	Bituminous Mix	$42 per Ton [2]
107.08	Haul Roads	Aggregate Base	$17 per Ton [2]
203.01 B	Rock Excavation	Rock Excavation	$11 per CY
203.01 C	Shale Excavation	Shale Excavation	Common Excavation Price + $1.00 per CY
203.01 D	Muck Excavation	Muck Excavation	$9 per CY
203.05 H.3	Embankment	Overhaul	$1.40 per CY - Mile
260	Silt Fence	Mucking Silt Fence	$3.90 per LF
260	Silt Fence	Removal of Silt Fence [3]	$4.25 per LF
261	Fiber Rolls	Mucking of Fiber Rolls	$3.90 per LF
261	Fiber Rolls	Removal of Fiber Rolls [3]	$4.25 per LF
420.04 E	Bituminous Seal Coat	Blotter Sand	$27 per Ton [2]
430.04 G	Hot Mix Asphalt (Exc. Material Hauled to Disposal Area)	Bituminous Mixture	Machine Placed: Bid or Invoice Price + $31 per ton Hand Placed: Bid or Invoice Price + $48 per Ton
704	Temporary Traffic Control	Flagging	$32 per MHR

[1] Price paid for bituminous material will be invoice price plus freight costs.

[2] Price Includes haul up to 10 miles. Payment for haul exceeding 10 miles will be according to Section 109.03 E, “Force Account.” The haul distance for aggregate base and bituminous mix will be based on the average haul. The haul distance for blotter sand will be from the point where the haul begins to the point where it enters the project.

[3] This is only for pre-existing items that were not installed under the Contract.

Effective October 1, 2014

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
APPENDIX A OF THE TITLE VI ASSURANCES

During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the Contractor) agrees as follows:

1. Compliance with Regulations: The Contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, the Federal Highway Administration, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. Non-discrimination: The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

3. Solicitations for Subcontracts, Including Procurements of Materials and Equipment: In all solicitations, either by competitive bidding, or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the Contractor's obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.

4. Information and Reports: The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the Federal Highway Administration to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the Recipient or the Federal Highway Administration as appropriate, and will set forth what efforts it has made to obtain the information.

5. Sanctions for Noncompliance: In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to:

   a. withholding payments to the Contractor under the contract until the Contractor complies; and/or
   b. cancelling, terminating, or suspending a contract, in whole or in part.

6. Incorporation of Provisions: The Contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the Recipient or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

Effective October 1, 2014

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
APPENDIX E OF THE TITLE VI ASSURANCES

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the Contractor) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

Pertinent Non-Discrimination Authorities:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.,* 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq.),* (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.),* as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.),* (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

2015 NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

ON-THE-JOB TRAINING SPECIAL PROVISION

I. PURPOSE

The purpose of the On-the-Job Training (OJT) Program is to provide training in the highway construction industry for minority, female, and economically disadvantaged individuals, hereafter known as the targeted group. Pursuant to 23 Code of Federal Regulations Part 230, Subpart A, Appendix B - Training Special Provisions, this program provides for on-the-job training aimed at developing full journeyworkers in the type of trade or job classification involved.

II. INTRODUCTION

A. The OJT Program was originally prepared through the cooperative efforts of the Associated General Contractors of North Dakota (AGC); the Federal Highway Administration (FHWA); and the North Dakota Department of Transportation (Department).

B. Successful operation of the OJT Program requires that contractors follow uniform and basic procedures in training, keeping records of trainee progress toward journeyworker status, and reporting each trainee's successful completion or termination from the OJT Program.

C. The bidder's signature on the proposal sheet indicates the bidder agrees to take part in the OJT Program and to follow this On-the-Job Training (OJT) Program Special Provision. Contractors that do not follow this special provision will be subject to sanctions up to and including revocation of bidding privileges.

D. Projects funded solely with county funds and emergency relief projects that are not included in the Department's bid openings will not contain this OJT Program Special Provision (i.e., no training program hours will count toward completion of an approved training program or be eligible for reimbursement).

III. DEFINITIONS

Apprenticeship Program: Approved labor union and U.S. Department of Labor training programs which may be used to fulfill trainee positions assigned under the OJT Program. (See Section VI. D.)

Carryover Position: Unfulfilled trainee position carried forward from a prior Construction Season.

Carryover Trainee: Trainee scheduled to continue required training hours under an approved training program from a prior Construction Season.

Journeyworker: A worker employed in a trade or craft who has attained a level of skill, abilities, and competencies recognized within the industry.

OJT Supportive Services (OJTSS) Consultant: A consultant under contract with the Department to provide in-person oversight, support, and guidance to contractors and trainees in an effort to increase the effectiveness of approved training programs.

Targeted Group: Individuals eligible to receive training under the OJT Program. For trainee positions assigned by the Department, trainees must be minority, female, or economically disadvantaged as defined by Job Service North Dakota (JSND).

Trainee: A person who receives on-the-job training, whether through an apprenticeship program or other program approved or accepted by FHWA.

Trainer/Supervisor: Prime contractor employee assigned to mentor, train, supervise, and support an assigned OJT Program trainee.

IV. FUNDING

The Department will establish an OJT fund annually from which contractors may bill the Department directly for eligible trainee hours. The funds for payment of trainee hours on federal-aid projects will be made available based on 23 USC 504(e) to a maximum of $100,000. The funds for payment of trainee hours on state-aided projects will be allocated to a maximum of $10,000.

V. ASSIGNED TRAINEE POSITIONS

A. Trainee positions will be assigned to contractors and will not be project specific. The number of trainee positions assigned will be determined by applying a formula based on calculations involving specific project specification numbers on applicable projects funded with federal highway dollars awarded by the Department to a contractor from October 1 to September 30.

B. The dollar value of projects subject to Tribal Employment Rights Ordinances (TERO), concrete pavement repair (CPR) projects, electrical projects, rest area projects, signing projects, striping projects, and state-aid highway projects will be excluded when determining the number of trainee positions assigned.

C. In early March, a summary of the trainee positions required and links to the OJT Program package will be sent to prime contractors with assigned positions. The links to the OJT Program package are also provided to prime contractors and subcontractors upon request. In addition, the summary and links are sent to prime contractors as they become eligible for trainee positions throughout the remainder of the year.

The number of trainee positions assigned to each contractor will increase proportionately, as shown in the following table, for any applicable federally funded projects awarded to them. Projects awarded after September 30 will be included in the following year's OJT Program.

D. The number of trainee positions will be assigned and will increase as follows:

For all federal highway dollars awarded from October 1 to September 30,

$ 4,500,000	- 8,000,000	= 1 trainee
$ 8,000,001	- 15,000,000	= 2 trainees
$15,000,001	- 23,000,000	= 3 trainees
$23,000,001	- and above	= 4 trainees

A maximum of four (4) trainee positions in a federal fiscal year will be assigned to any prime

contractor regardless of dollar amount. Carryover positions from a prior construction season are not included in the four trainee maximum, e.g., a contractor with one carryover and four assigned positions will have a total five trainees.

E. Contractors not qualifying for the OJT Program, or contractors desiring to train more than the allotted number of trainees, may apply to the Department for additional trainee positions. Approval of additional positions will be at the sole discretion of the Department. The Department will take into consideration whether there is enough work for the trainee to successfully complete the curriculum and whether the contractor will be exceeding the allowable ratio of trainees to journeyworkers (generally considered to be one trainee or apprentice to every three to five journeyworkers).

F. The additional positions may be filled by individuals outside of the targeted groups. The contractor may pay the reduced training rates to additional trainees outside of the targeted groups and receive hourly reimbursement for those individuals.

VI. APPROVALS REQUIRED

A. Training Programs: Contractors must have training programs approved by the Civil Rights Division in order to pay the trainees less than the appropriate Davis-Bacon wage established for the job classification concerned and to be eligible for reimbursement under the OJT Program. No training program hours will count toward the fulfillment of an assigned trainee position or be eligible for reimbursement without prior approval. No retroactive approval will be granted.

1. The contractor will notify the Civil Rights Division using the *Request for On-the-Job Training Program Approval SFN 9762.* This form is available on the Department's website at:

   http://www.dot.nd.gov/forms/sfn09762.pdf

2. A completed request form and the training curriculum must be submitted for each trainee in the OJT Program. Requests must be submitted by April 1 or within fifteen (15) calendar days of notification of additional trainee assignments.

B. Trainees: Contractors must have trainees approved by the Civil Rights Division in order to pay the trainees less than the appropriate Davis-Bacon wage established for the job classification concerned and to be eligible for reimbursement under the OJT Program. No training program hours will count toward completion of an approved training program or be eligible for reimbursement without prior trainee approval. No retroactive approval will be granted.

1. The contractor will notify the Civil Rights Division using the *Request for On-the-Job Trainee Approval SFN 60226*. This form is available on the Department's website at:

   http://www.dot.nd.gov/forms/sfn60226.pdf

2. A completed request form and the trainee's employment application must be submitted for each trainee employed under the OJT Program.

3. Written JSND certification of an individual as economically disadvantaged must also be

provided to the Civil Rights Division as part of the approval process for trainees.

C. The contractor may request to train an individual in a classification not included in this OJT Program package. The request must be submitted, in its entirety, for approval by the Department and FHWA before the trainee begins work under the OJT Program. No retroactive approval will be granted.

Training programs for classifications not covered by the Davis-Bacon and Related Acts (DBRA) will be considered on a limited basis. Customized training curricula will not necessarily be added to the OJT Program; however, previously approved programs are available to contractors upon request; for example, in 2013 the Department approved programs for GPS Survey Technician and Project Management.

If approved, each new classification must comply with the provisions specified in this OJT Program package. The request must include:

1. A training curriculum, including the classification requested, minimum number of hours required, and type of training the individual will receive to achieve journeyworker status.

2. A minimum wage scale.

D. Union apprenticeship and on-the-job training programs registered with the Bureau of Apprenticeship and Training (BAT), U.S. Department of Labor, are recognized by the Department. These programs may be used for trainee positions assigned under the OJT Program, provided the trainees or apprentices are minority, female, or economically disadvantaged. Nonminority males not certified as economically disadvantaged may be used when the contractor has requested and received approval, from the Department, for additional trainee positions. However, contractors must produce indenture papers to be eligible for reimbursement, to pay the trainees or apprentices less than the appropriate Davis-Bacon wage established for the job classification concerned, and to receive credit for fulfilling assigned trainee positions.

E. The contractor may train an individual on a combination of equipment if each piece of equipment falls within the same groups of power equipment operators identified in the training curricula (groups 1-3 and groups 4-6). These power equipment operator groups are referenced to the federal Davis-Bacon wage rates contained in the contract proposal. As an example, a "utility operator" may receive training on a broom, a front-end loader less than 1½ cubic yards, or other piece of equipment that is used around a paver if each piece falls within either groups 1-3 or groups 4-6. When multiple wage rates apply, the trainee's wage will be based on the equipment being operated at the time or on the highest of the applicable wage rates.

F. Use of the classification "pickup machine operator (asphalt dump-person)" as a group 4 power equipment operator is considered standard industry practice. The classification is defined as: "Operates the controls on the pickup machine that runs in front of the paver, trips the levers on the dump trucks, and balances the loads for the paver. The pickup machine operates on similar principles as a shouldering machine."

VII. DEPARTMENT'S RESPONSIBILITIES

A. Once the trainees have been approved, the Department's OJT supportive services (OJTSS) consultant will monitor the excerpts from the weekly certified payrolls submitted with the monthly vouchers for reimbursement. This includes weekly payrolls from contractors working on state funded only projects. The OJTSS consultant will assure that when the trainees have completed the specified number of hours, their wages are increased accordingly. The OJTSS consultant will also assure that applicable fringe benefits are paid either directly to the trainees or into approved plans, funds, or programs on their behalf.

B. The OJTSS consultant will also be visiting the targeted group trainees and monitoring their progress under the OJT Program. To facilitate the on-site visits, the OJTSS consultant will contact contractors for the location of the trainees.

VIII. CONTRACTOR'S RESPONSIBILITIES

The contractor:

A. Will appoint an individual within their company who will be available to respond to weekly contacts by the OJTSS consultant in order to monitor the status of assigned trainee positions (e.g., program and trainee approvals, trainees' progress, etc.). Upon assignment of a trainee position, the OJTSS consultant will immediately send a Request for On-the-Job Trainee Approval (SFN 60226) to the contractor to obtain the name, direct phone number, and email address of the individual. The individual must reply to communications from the Department and the OJTSS consultant in a timely manner.

B. Will ensure trainees are aware they are in a training program and what that means to the contractor and the trainee.

C. Will make trainees available to the OJTSS consultant for on-site visits at least twice each construction season.

D. Will identify all approved trainees on the payrolls, for example: "grp. 4 roller operator trainee." This includes trainees in job classifications not covered by DBRA.

E. Will assign each trainee to a particular person–either a supervisor or an employee proficient in the skill–who shall see that timely, instructional experience is received by the trainee. This person will be familiar with the OJT Program, ensure proper records are kept, and ensure the required training hours are completed in accordance with the training curriculum.

F. Will make the trainer and project superintendent available to the OJTSS consultant for on-site visits at least twice each construction season.

G. May terminate the training period of a trainee who has completed 90% or more of their hours and advance the trainee to journeyworker status after providing notice to the Department.

H. Will notify the Department when a trainee completes the OJT Program. The Department will issue a certificate of completion to the trainee upon receipt of all required paperwork.

I. May upgrade trainees from one power equipment operator group or truck driver group to another, with the approval of the Civil Rights Division. Trainees upgraded will not be required to

complete the entire number of hours assigned to the new training curriculum. The minimum number of hours required will be:

Power Equipment Operator Groups 4-6 to Groups 1-3 = 400 hrs.
Class C Truck Driver to Class B = 200 hrs.
Class B Truck Driver to Class A = 200 hrs.

Depending on the variety of experience the trainee has gained under the previous curriculum, the difference in the hours may be deducted from the actual operation of the piece of equipment or truck. The contractor will need to review the trainee's past performance in order to make this determination.

J. May upgrade commercial driver's license (CDL)-holding trainee candidates having over-the-road driving experience, with little or no highway construction experience, from the Class B truck driver training curriculum to a Class C truck driver trainee, with the approval the Civil Rights Division.

K. May transfer trainees from one project to another in order to complete the OJT Program. If transfers are made, the Civil Rights Division must be notified and provided with the name of the trainer. The training hours will count toward overall OJT Program completion.

L. May use trainees on municipal, private, or other non-highway work and work performed out of state. The training hours will count toward overall OJT Program completion; however, no program reimbursement will be made for those hours. In addition, the hours will be limited to no more than 25% of the total hours required under the training curriculum.

M. May delegate or reassign trainee positions to subcontractors, with the acceptance of the subcontractors and the approval of the Civil Rights Division. The prime contractor must verify that the trainee will be able to accumulate enough hours to complete his or her training program. If approved, the subcontractor must obtain training program and trainee approval from the Civil Rights Division before the trainee begins work under the OJT program. Program reimbursement will be made directly to the prime contractor. The trainee position will remain the responsibility of the prime contractor.

N. May use trainees on projects subject to TERO requirements as part of the core crew or as part of the skilled labor supplied by the contractor.

O. May not use one trainee to fill multiple trainee positions. For instance, a subcontractor may not use the same trainee in the same training program to simultaneously fill two or more trainee positions reassigned to them by prime contractors.

P. May use a trainee on a piece of equipment in groups 1-3 or groups 4-6 for one assigned trainee position, then once that trainee has completed the program, the trainee may be trained on a different piece of equipment in groups 1-3 or groups 4-6 to fulfill a second assigned trainee position. When a trainee is used for a second time within a group, the contractor must pay that trainee at the higher wage rate as described in paragraph B under Wage Rates (page 8).

Q. Will provide training year-round as possible.

IX. CLASSROOM TRAINING

A. Classroom training may be used to train employees. The contractor will submit a proposed classroom training curriculum to the Civil Rights Division for approval. The classroom training curriculum must define the type of training the individual will receive and the minimum number of hours required. The Department will determine the number of hours of credit each trainee will receive toward their training. Each classroom training curriculum must be pre-approved by the Civil Rights Division if the contractor wishes to count the classroom hours as training hours. No retroactive approval will be granted.

B. Contractors will be reimbursed for classroom training hours after the trainee has completed 80 hours of work on highway construction projects.

C. Reimbursement for classroom training will be limited to 60 hours per trainee per construction season. Qualified testing technicians and concrete testing technicians/inspectors will not be included in the 60-hour limit. Reimbursement for classroom training required under the Department's Transportation Technician Qualification Program will be at the Department's discretion.

D. The minimum wage scale to be used for classroom training will be that of the first federal-aid highway construction project on which the trainee will be employed. If the trainee is already employed on a federal-aid highway construction project, the trainee will be paid in accordance with the minimum wage scale applicable to that project. However, if the first project on which the trainee will be employed is a state funded only contract, the minimum wage scale to be used for the classroom training will be that of the appropriate Davis-Bacon wage in effect at the time of award of the state funded contract.

X. WAGE RATES

A. The minimum wage rates shall not be less than 80% of the journeyworker rate for the first two quarters of training, 85% of the journeyworker rate for the third quarter, and 90% of the journeyworker rate for the fourth quarter. In no case shall the minimum wage be less than that of the group 1 laborer classification in the federal Davis-Bacon wage rates contained in the contract proposal. Trainees shall be paid full fringe benefit amounts, where applicable. The contractor has the option of paying the fringe benefits into approved plans, funds, or programs or directly to their employees. A trainee working on a state funded only project, must be paid the Davis-Bacon wage rate in effect at the time of award of the state funded project for the type of work the trainee is performing.

B. Under the power equipment operator training curricula only, once a trainee has completed a training curriculum in either groups 1-3 or groups 4-6, the contractor may enroll the trainee in another training curriculum on a different piece of equipment in either groups 1-3 or groups 4-6. The minimum wage rate under the second program shall not be less than 85% of the journeyworker rate for the first two quarters of training, 90% of the journeyworker rate for the third quarter, and 95% of the journeyworker rate for the fourth quarter.

C. At the completion of the OJT Program, the trainee shall receive the wages of a skilled journeyworker.

D. For the purpose of the OJT Program, a quarter is 25% of the hours worked by each trainee and does not represent three months of the year. The first two quarters of a 550-hour training curriculum would end after 275 hours, the third quarter after 138 hours, and the fourth after 137 hours.

XI. RECRUITMENT AND SELECTION PROCEDURES

A. Prerequisite for Trainees:

To be qualified for enrollment in the OJT Program, trainees must possess basic physical fitness for the work to be performed, dependability, willingness to learn, ability to follow instructions, and an aptitude to maintain a safe work environment.

B. Licenses:

Truck driver trainees must possess appropriate driver permits or licenses for the operation of Class A, B, and C trucks. When an instructional permit is used in lieu of a license, the trainee must be accompanied by an operator who:

1. Holds a license corresponding to the vehicle being operated;

2. Has had at least one year of driving experience; and

3. Is occupying the seat next to the driver.

C. Recruitment:

1. Notices and posters setting forth the contractor's Equal Employment Opportunity Policy and the availability of the OJT Program will be placed in areas readily accessible to employees, applicants for employment, and potential employees.

2. The contractor must employ members of the targeted group (minority, female, or economically disadvantaged individuals) for all trainee positions assigned in accordance with the OJT Program. Additional positions requested by the contractor may be filled by individuals outside of the targeted groups.

3. The contractor will conduct systematic and direct recruitment through public and private employee referral sources.

   - Recruitment resources are available on the Department's website at: https://www.dot.nd.gov/divisions/civilrights/docs/BestEffortsRecruitment.pdf

4. Present employees will be screened for upgrading. A present employee may qualify as a trainee; however, no work hours will be reimbursed or counted toward program completion prior to training program and trainee approval by the Civil Rights Division.

D. Selection:

1. The selection and employment of a person, meeting the aforementioned criteria, by a

participating contractor shall qualify the person for the OJT Program.

2. Employment of trainees will be in accordance with the workforce requirements of the contractor. Each contractor will hire and train the trainees for use in their own organization.

3. A contractor may not employ an individual as a trainee in a job classification in which that individual has successfully completed a training course leading to journeyworker status or in which the individual has been previously employed as a journeyworker.

4. Contractors must submit the *Request for On-the-Job Trainee Approval (SFN 60226)* and the trainee's employment application to the Civil Rights Division for review and approval. Approval must be obtained before the trainee may begin work under the OJT Program. No retroactive approval will be granted.

5. The economically disadvantaged certification can only be obtained from JSND. Written certification of individuals under this category can be provided to the contractor at the time of the interview if the applicant is referred by JSND. Any person wishing to obtain this certification must apply to JSND and complete the Application for Eligibility (SFN 7857). This certification must be provided to the Civil Rights Division with the other required information as part of the approval process for trainees. A contractor that has an individual who may qualify must contact the Workforce Investment Act Program Manager at JSND. JSND contacts are also available on the Department's website at:

   http://www.dot.nd.gov/divisions/civilrights/docs/jobservice-workforce-invest-contacts.pdf

6. Nonminority males used to fill additional trainee positions approved by the Department do not have to be certified as economically disadvantaged.

XII. BASIS OF PAYMENT

A. Contractors will be paid $4.00 for each hour of training provided in accordance with the OJT Program.

B. Program reimbursement will be made directly to the prime contractor. To request reimbursement, prime contractors must complete the *Voucher for On-the-Job Training Program Hourly Reimbursement (SFN 51023)* for each trainee employed under the OJT Program. Attached to each voucher must be excerpts from the weekly certified payrolls showing the trainee's hours, rate of pay, and how applicable fringe benefits are paid. This includes excerpts from weekly payrolls for state funded only projects. Vouchers without excerpts from payrolls will not be paid until the excerpts are provided. If the excerpts from the payrolls are not provided within one week, the voucher will not be approved. The voucher is available on the Department's website at:

   http://www.dot.nd.gov/forms/sfn51023.pdf

C. The completed vouchers must be submitted to the Civil Rights Division for approval and processing by the fifteenth (15th) calendar day of every following month the trainee is employed under the OJT Program.

Regardless, all vouchers for trainee hours worked on state funded only projects from July 1 to June 30 must be received by the Civil Rights Division no later than July 15 in order to be reimbursed. All vouchers for trainee hours worked on federally funded projects from October 1 to September 30 must be received by the Civil Rights Division no later than October 15 in order to be reimbursed. This is due to state and federal end-of-the-year budget fiduciary requirements.

XIII. FAILURE TO PROVIDE THE REQUIRED TRAINING OR HIRE THE TRAINEE AS A JOURNEYWORKER

A. No payment shall be made to a contractor for failure to provide the required training or failure to hire the trainee as a journeyworker when such failure is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirements of this OJT Program Special Provision.

B. If payments have been made, the Department will withhold the amount paid from the contractor's progress payment.

C. It is normally expected that a trainee will begin his or her training as soon as feasible after start of work utilizing the skill involved and remain employed as long as training opportunities exist in his or her work classification or until he or she has completed his or her training program.

D. It is not required that all trainees be employed for the entire length of the construction season. A contractor will have fulfilled its responsibilities under this OJT Program Special Provision if it has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled for a significant period.

XIV. UNFULFILLED TRAINEE POSITIONS

A. Any contractor that has not fulfilled the assigned number of trainee positions during a construction season must contact the Civil Rights Division by October 1 of the current construction season and provide documentation as to why the assigned trainee positions were not completed. The Civil Rights Division will decide, on a case-by-case basis, whether to carry the trainee positions over to the next construction season.

B. Carryover trainee positions should be among the first positions filled at season startup. Contractors must notify the Department of the trainee's rehiring and submit *Request for On-the-Job Trainee Approval (SFN 60226)*, marking 'Check if Carryover Trainee' in the Approved Training Program section of the form, See Attachment 2.

C. Sanctions, up to and including revocation of bidding privileges, may be imposed by the Department for failure on the part of the contractor to provide sufficient documentation as to why assigned trainee positions were not fulfilled.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

TEMPORARY EROSION AND SEDIMENT BEST MANAGEMENT PRACTICES

1. GENERAL

Install, maintain and remove appropriate Temporary Best Management Practices (BMPs).

Definitions:

A. Temporary Erosion and Sediment BMPs are to be installed and maintained before and during the term of the land disturbance activity. These items are removed when permanent erosion and sediment BMPs are installed.

B. Permanent Erosion and Sediment BMPs are to be installed and maintained once the project is completed so that the applicable permits can be terminated.

In some instances, individual temporary and permanent erosion and sediment BMPs for a site may consist of identical BMPs. In these cases, the temporary erosion and sediment BMPs may be used as the permanent erosion and sediment BMPs if they meet the following criteria:

1. The BMP was installed correctly,
2. Is in a functional condition,
3. Has had all accumulated sediment removed.

C. The Stormwater Pollution Prevention Plan (SWPPP) is the document that identifies potential sources of sediment or other pollution from construction activity and ensures practices are used to reduce the contribution of pollutants from construction site runoff.

D. Contractor Controlled Areas are areas not included in the contract, but are obtained and solely controlled by the Contractor (e.g., concrete or asphalt batch plants, concrete washout areas, equipment staging yards, material storage areas, excavated material disposal areas, Contractor furnished borrow areas, etc.).

E. Maintenance is any action taken to keep a BMP in working condition. These actions may consist of repairing failures of the BMP itself.

F. **Noncompliance** is any action or inaction that violates the regulations imposed by the applicable permits or the requirements of this special provision and other contract documents. Failure of a BMP does not necessarily constitute noncompliance as long as the BMP is repaired, replaced or supplemented within the timelines established in the applicable permits and no sediment is discharged from the site or into a water of the state.

2. CONSTRUCTION REQUIREMENTS

Develop a SWPPP specific to the project. The creation of the SWPPP is a cooperative effort between the NDDOT who creates the project plan sheets and the Contractor who creates a complete SWPPP which incorporates the plan sheets and the Contractor's means and methods. The project plan sheets by themselves do not meet the requirements of a complete SWPPP and should not be considered as such. The Contractor has the flexibility to modify the design and implementation of the temporary erosion and sediment controls to match the Contractor's means and methods and/or field conditions. These changes must be documented in the SWPPP and meet all regulatory requirements.

Obtain appropriate permit coverage for the activities conducted in Contractor Controlled Areas. A permit will be required for these areas regardless of their size. The NDDOT will have no responsibility for these areas.

Install perimeter erosion and sediment BMPs according to the plans/SWPPP prior to site disturbance.

Change the location of temporary erosion and sediment BMPs to fit the field conditions.

Update the SWPPP as work progresses, or as directed by the Engineer. Update the SWPPP to show changes due to revisions in work schedules or sequence of construction. Update the site map to reflect erosion and sediment BMPs that have been installed, changed, or removed.

Do not rely on perimeter BMPs as the sole method of controlling erosion. As the project progresses, install temporary erosion and sediment BMPs within the perimeter BMPs to control erosion resulting from the construction of the project.

Use temporary erosion and sediment BMPs to prevent contamination of adjacent streams or other watercourses, lakes, ponds or other areas of water impoundment.

Coordinate temporary erosion and sediment BMPs with the construction of permanent erosion and sediment BMPs to provide continuous erosion control. Do not install temporary erosion and sediment BMPs when permanent erosion and sediment BMPs are able to be installed. Once the permit is terminated or transferred to the Department, the maintenance of the permanent erosion and sediment BMPs becomes the responsibility of the NDDOT.

Install stabilization BMPs (mulch, seeding and mulch, etc.) in areas that have been disturbed where work has temporarily or permanently ceased following the timelines established in the applicable permits. If implementation of stabilization is precluded by snow cover, undertake such measures as soon as conditions allow.

Maintain the effectiveness of the temporary erosion and sediment BMPs as long as required to contain sediment runoff. Inspect the temporary erosion and sediment BMPs and complete the inspection and maintenance reports every 14 days and within 24 hours of a rainfall event of 0.25 inch or more. During prolonged rainfall (more than 1 day), conduct an inspection within 24 hours of the first day of the event and within 24 hours after the end of the event. Inspections are required only during normal business hours. Install a rain gauge to monitor rainfall amounts as required by the appropriate permit.

Correct any deficiencies in the BMPs within the timelines established in the applicable permits. If conditions do not permit access to the BMP, corrective actions can be taken by installing additional BMPs. Correct the original deficiencies as soon as conditions allow access to their location without causing additional damage to the slopes. In the inspection logs, document the conditions that prohibit access.

Provide copies of all inspections, documentation, record keeping, maintenance, remedial actions, and repairs required by the applicable permits to the Engineer. Provide inspection and maintenance reports within 3 working days after an inspection has been conducted.

Provide immediate written notification to the Engineer of proposed changes to the erosion control plan or SWPPP. The Engineer will review the proposed changes and determine if they are adequate. Documentation of maintenance and inspections that does not affect the erosion control plan or SWPPP does not require approval by the Engineer.

Remove the temporary devices when directed by the Engineer or when permanent erosion and sediment controls are installed.

3. Erosion and Sediment Control Supervisor.

A. General. Designate an erosion and sediment control supervisor. Provide the name and contact information for the supervisor at the preconstruction meeting. If this erosion and sediment control supervisor becomes unavailable on the project, designate a replacement supervisor. Notify the Engineer if this supervisor changes and provide the contact information for the new supervisor.

B. Qualifications. The supervisor shall be:

1. An employee of the Prime Contractor;

2. Familiar with installation, maintenance and removal of BMPs and the requirements of the erosion and sediment control plans, applicable permit requirements, specifications, plans and this provision; and

3. Competent to supervise personnel in erosion and sediment control operations.

C. Duties. The supervisor shall:

1. Provide erosion and sediment control as required by the SWPPP, Plans, and Specifications.

2. Be on the site to supervise the installation, operation, inspection, maintenance, and removal of the erosion and sediment BMPs.

3. Update the SWPPP as work progresses to show changes due to revisions in work schedules or sequence of construction, or as directed by the Engineer. Update the site map to reflect erosion and sediment BMPs that have been installed, changed, or removed.

4. Propose changes to improve erosion and sediment control.

5. Be accessible to the job site within 24-hours.

6. Provide the Engineer with documentation of all erosion and sediment control activities and inspections as required above.

3. PERFORMANCE

Correct all areas of noncompliance within 24 hours after notification of noncompliance. If corrective actions are not taken within 24 hours, the Engineer may:

1. Assess a liquidated damage of $500 per day per instance;

2. Have deficiencies corrected by another Contractor and deduct the cost of the work from the monies due or to become due to the Contractor;

3. Suspend all work; or

4. Withhold payment on other contract items/pay estimates.

These actions will be applied until deficiencies have been corrected.

4. BASIS OF PAYMENT

BMP installation will be paid for at the contract unit price for erosion and sediment control for the appropriate items and sections. The plans will detail the required BMPs for temporary and permanent installations. The same bid items may be used for temporary and permanent BMPs.

BMP items will be measured as specified in the “Method of Measurement” portion of the appropriate section of the specifications.

BMP item removal will be paid for at the contract unit price for “Remove _____”in the appropriate section of the specifications.

Include the costs for labor, materials, maintenance, equipment, disposal, adherence to the permit, and SWPPP modifications in the respective pay items.

When the Engineer directs the replacement of temporary erosion and sediment BMPs that are no longer functional because of deterioration or functional incapacity and those items were installed as specified in the Contract or as directed by the Engineer, the Department will pay for replacement BMPs

No payment will be made for replacing temporary erosion and sediment BMPs that the Engineer determines are ineffective because of improper installation, lack of maintenance, or the Contractor’s failure to pursue timely installation of permanent erosion and sediment BMPs as required in the Contract.

No payment will be made for replacing temporary erosion and sediment BMPs due to contractor operations. Include the cost to move Flotation Silt Curtain as work progresses in the price bid for “Flotation Silt Curtain”.

Erosion and sediment controls for Contractor Controlled Areas are the responsibility of the Contractor and will not be paid for by the Department.

Removal of sediment from silt fence and fiber rolls will be paid for at the price listed in the “Price Schedule PS-1.”

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

LOCAL AGENCY CONTRACTS

References to NDDOT, Department, Director, or Engineer in the Standard Specifications for Road and Bridge Construction and other portions of the Contract must be construed as referring to the Owner of the project.

If the Contractor intends to file a claim for additional compensation for work or material not covered by the Contract, the Contractor is required to prosecute the claim in accordance with the 2014 Standard Specifications for Road and Bridge Construction, Section 104.05, “Claims for Adjustment”. The provisions of Section 104.05 D, “Conditions Precedent to Contractor’s Demand for Arbitration”, are not applicable to this Contract, nor are the provisions of North Dakota Century Code §24-02-26 et seq. regarding arbitration applicable, as the North Dakota Department of Transportation is not a party to the Contract.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

CONCRETE FINAL SURFACE FINISH

DESCRIPTION

This Special Provision replaces the content of 550.04 H.1.d, “Final Surface Finish” with the following:

d. Final Surface Finish.

(1) General.

Uniformly texture the surface by dragging a seamless strip of stiff-fiber artificial grass carpet longitudinally along the full width of the pavement in a single pass.

Use and maintain a taut string line for operating the carpet drag. Attach the leading edge of the carpet drag to a bridge. If the Engineer determines it is not feasible to use a bridge or string line, other texturing methods will be allowed.

Maintain a clean carpet free of encrusted concrete.

Provide a minimum texture depth of 0.031 inches.

(2) Roadways with Speed Limits Less than 45 MPH.

The Engineer will test the texture achieved by the carpet drag in accordance with ASTM E 965 and the Field Sampling and Testing Manual. The Engineer will determine the test location.

If three or more lots have texture depths less than 0.031 inches but greater than or equal to 0.025 inches, perform diamond grinding on those lots.

Perform diamond grinding any lot having a texture depth of less than 0.025 inches.

Perform grinding as specified in Section 550.04 M.4, “Grinding.”

The Engineer will determine the limits of any failing test by running additional tests at 100 foot intervals before and after the failing test. The Engineer will determine the location of the additional tests.

(3) Roadways with Speed Limits 45 MPH or Greater.

Run a clean, metal tine longitudinally along the surface immediately following the carpet drag. Exclude areas within 3 inches of the edge of the slab and longitudinal joints. Run the tine continuously across transverse joints.

Use a tine that provides:

- 1/8 inch ±1/64 inch groove width;
- 3/16 inch ±1/16 inch groove depth; and
- 3/4 inch spacing of between grooves.

If the concrete has becomes too stiff to receive the metal tine finish, use diamond bladed equipment to produce the longitudinal grooves.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

MECHANICALLY STABILIZED EARTH WALL

SOIA-SAP-CPU-5-983(050)050 – PCN 20038

1.0 DESCRIPTION

This work consists of furnishing and installing mechanically stabilized earth (MSE) walls to the lines and grades designated in the Plans and as specified herein or established by the Engineer.

2.0 PRE-QUALIFICATION

For a wall system to be considered it must be pre-qualified. The project specifications shall list the wall systems that have been pre-qualified and can be considered for bidding. The pre-qualification shall be based on conformance of the design method and construction specifications to the current AASHTO, and FHWA requirements for MSE walls, past construction experience and performance of the system, and the manufacturer's QA/QC plan of the MSE wall system and its components. The pre-qualification of the MSE wall system shall not be regarded as final design acceptance.

The Contractor shall select one of the following, pre-qualified, earth retaining wall systems to be constructed for the MSE retaining walls designated in the plans:

SSL MSE PLUS™
SSL, LLC
209 N. Main Street, Suite 200
Monticello, IN 47960-2132
(574) 583-2222

TRICON™
TRICON PRECAST LTD.
15055 Henry Road
Houston, Texas 77060
(218) 931-9832

This document was originally issued and sealed by Todd A. Lang, Registration Number PE-5295 on 03/27/15 and the original document is stored at the North Dakota Department of Transportation.

RECo
8614 Westwood Center Drive
Suite 1100
Vienna, Virginia 22182-2233
(703) 821-1815

Other manufacturer's systems may be submitted for approval.

Application for pre-qualification shall include a completed technical evaluation report from the Highway Innovative Technology Evaluation Center (HITEC) for compliance with AASHTO requirements for the system and its components. As an alternate to the HITEC review, the manufacturer shall obtain an independent review similar to HITEC review by a MSE wall system expert approved by the Engineer. Any changes to the system or its components that occur after the technical evaluation shall be reevaluated by HITEC or a MSE wall system expert approved by the Engineer. The application shall contain the following information:

A. System or component development and year it was commercialized.

B. System or component supplier organizational structure, specifically engineering and construction support staff.

C. Laboratory test results conducted to support the performance of the system and its individual components.

D. Complete manufacturer Quality Assurance/Quality Control plan of the system and its components including test methods, minimum test requirements, test frequency, and lot size for each product.

E. Limitations and disadvantages of the system or the components.

F. List of prior publicly funded projects completed within the past 5 years in climates similar to North Dakota, including contact person(s), dates of construction, addresses and telephone numbers.

G. Sample material and construction control specifications showing material type, quality, certifications, field-testing, acceptance and rejection criteria and placement procedure.

H. A documented field construction manual describing in complete detail the sequence of construction steps.

3.0 DESIGN REQUIREMENTS

The design shall consider the internal, external, and compound stability of the wall mass including overturning, sliding, bearing pressure and stability of temporary construction slopes. The design shall be in accordance with the MSE wall design and construction provisions of the AASHTO LRFD Bridge Design Specifications and all the Interim Revisions and the Federal Highway Administration requirements as reported in publication No. FHWA-NHI-10-024, entitled "Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes - Volume I". The design shall be performed using the Simplified Method.

The design shall meet the following requirements:

A. The MSE wall system shall be selected from the pre-qualified wall system list.

B. No buried utilities other than what is required for highway drainage shall be placed within the reinforced earth zone. The placement of the drainage system shall occur only during the construction backfilling.

C. Retaining walls supporting roadways shall have an impervious layer placed below the roadway surface to prevent any surface water from entering into the wall system.

D. Wall height shall be less than 50 feet.

E. All retaining wall system aesthetics shall meet the project aesthetic requirements in the Plans and shall be approved by the Engineer.

F. The ground on the exposed side of the wall facing shall slope away from the wall. The slope shall not exceed 1V:4H. The surface water on the backfill side of the wall shall be drained away from the wall to prevent runoff next to the facing panels.

G. Design life for corrosion protection of all components of the wall shall be 100 years; otherwise the design life shall be 75 years.

H. For calculating pullout resistance, the load due to live load surcharge shall be ignored. For calculating the maximum tension in the reinforcement live load surcharge shall be included.

I. Differential settlement shall be less than 1/100 and adequate joint width/or slip joints shall be provided to accommodate movements without panel cracking. If the differential settlement requirement cannot be met, load surcharge or other soil improvement techniques shall be used to reduce differential settlement to the required limit.

J. No drilling or driving of posts (sign, guardrail, etc.) or other roadside hardware through the reinforced backfill shall occur after placement of backfill.

4.0 MATERIALS

A. Select Granular Backfill: Backfill material used in the reinforced zone and as shown on the plans shall meet the requirements of this Special Provision including the following:

Field sampling and testing procedures shall be in accordance with NDDOT's *Field Sampling and Testing Manual*. Laboratory procedures shall be in accordance with Specifications Sections 106.10.

1. Plasticity Index (ND T 90) shall not exceed 6.

2. Angle of friction (φ) not less than 34° as determined by AASHTO T236. The tests shall be performed on specimen portion passing through No. 10 sieve, utilizing a sample of material compacted to 95% of ND T 99, Method D with over size correction as per note 7, at the optimum water content.

3. The material shall be free of poor durability particles and deleterious materials. Poor durability and deleterious particles include, but are not limited to, shale, coal and lignite, clay lumps, cinders and clinkers, shells, chert, organic matter, salt, alkali, loam, soft and friable particles, and other substances not listed that may possess undesirable characteristics.

4. The magnesium sulfate soundness loss shall be less than 20% after five cycles (AASHTO T104).

5. Electrochemical requirements:
   a. Resistivity (at 100% saturation)> 3000 ohm-cm (AASHTO T288)
   b. Water-soluble chloride content < 100 ppm (AASHTO T291)
   c. Water-soluble sulfate content < 200 ppm (AASHTO T290)
   d. pH between 5 and 10 (AASHTO T 289)
   e. Organic content < 1% (AASHTO T267)

   If the resistivity is greater than or equal to 5000 ohm-cm, the chloride and sulfate requirements will be waived.

6. Gradation testing shall be in accordance with ND T 27. The percent passing the 3” sieve shall be 100%. The percent passing the No. 40 sieve shall be less than 60%. The percent passing the No. 200 sieve shall be less than 10%.

7. No salvage of bituminous, concrete fragments or crushed carbonates shall be allowed.

B. Soil Reinforcement:

1. Ribbed reinforcing strips shall be hot rolled from bars to the required size and shape. Their physical and mechanical properties shall conform to ASTM A 572 grade 65 (AASHTO M-223).

2. Reinforcing mesh and bar mats shall be shop fabricated from cold drawn steel wire conforming to ASTM A-82 (AASHTO M-32) and shall be welded in accordance with ASTM A-185 (AASHTO M-55). The bar mats shall be A-36 steel. The transverse wire diameter shall be less than or equal to the longitudinal wire diameter.

3. Ribbed reinforcing strips and bar mats shall be galvanized after fabrication in accordance with Specifications Section 854.

4. Geogrid reinforcement shall be oriented, drawn, long chain high-density polyethylene or polypropylene containing stabilizers and inhibitors added to the base plastic for resistance to ultraviolet and heat degradation. Geogrid reinforcements and their connection devices shall be the same

connection devices and reinforcement as approved by the Engineer.

C. Connectors and Joint Materials:

1. All galvanized steel will conform with Section 854 of the Specifications.

2. Fasteners shall consist of hexagonal cap screw bolts and nuts conforming to ASTM A-325 (AASHTO M-164) and shall be galvanized.

3. Tie strips shall be shop fabricated hot rolled steel conforming to the requirements of ASTM A570, grade 50 and be galvanized.

4. Alignment pins (rods used to align face panels during construction) shall be polyvinyl chloride or fiberglass or galvanized A-36 steel .

5. Connector pins shall be fabricated from A-36 steel and shall be galvanized.

6. Connector bars shall be fabricated of cold drawn steel wire conforming to ASTM A-82 (AASHTO M-32) Grade 65 and shall be galvanized.

7. Bearing pads shall be preformed EPDM rubber conforming to ASTM D-2000 for 4AA, 812 rubbers, neoprene elastomeric pads having Durometer Hardness of 55 ±5, or high-density polyethylene pads with a minimum density of 0.034 lb/inches^3 in accordance with ASTM D1505.

8. Joints shall be covered with a geosynthetic meeting the minimum requirements for filtration applications as specified in Specifications Section 709, Type S1 with minimum width and lap of 12 inches and shall be attached to the rear face of the wall by an adhesive (suitable for use on concrete surfaces in cold weather application) to insure that it doesn't move out of place during backfill operations.

9. Filler for horizontal and vertical joints between panels shall be flexible open cell polyether foam strips.

D. Impervious Layer: The impervious layer material shall be a puncture-hole free and flexible geomembrane. It shall meet the following physical and chemical requirements, specified as a minimum not average roll properties:
Thickness – (ASTM D-5199) min. 30 mil.

Density – (ASTM D-1505) min. 0.034 lb/inches^3
Carbon Black Content – (ASTM D-4218) min. 2.0%
Tensile Properties (ASTM D-638) each direction:
Stress at yield min. 66-lb/inches width
Stress at break min. 114-lb/inches width
Strain at yield min. 13%
Strain at break min. 700%
Tear Resistance – (ASTM D-1004) min. 25 lb
Puncture Resistance – ASTM D4833, Class 2
Permittivity – (ASTM D-4491) min. 1.5 sec-1
Bonded Seam Strength – (ASTM D-4437) min. 66-lb/inches width.

E. Facing Panels: The precast concrete panels shall be wet-cast and conform to the following requirements:

1. Concrete reinforcement shall be wire mesh that is galvanized in accordance with Specifications Section 854, or rebar that is epoxy coated in accordance with Specifications Section 836.02.

2. Steel connection elements, tie strip guides or other galvanized devices shall not be in contact with or be attached to the facing panel reinforcement steel.

3. The date of manufacture, production lot number, and piece mark shall be clearly scribed on the back face of each panel.

4. Panel colors shall be consistent and free of stains, and panels shall be free of defects, cracks, or chips. Panels that contain visible defects such as, but not limited to, vertical or horizontal seams, conspicuous stains, form marks, or color streaks shall be repaired to the satisfaction of the Engineer or removed and replaced at the Contractor's expense.

5. The panel size shall be 4' high and 10' wide as shown in the plans.

6. All units shall be manufactured within the following tolerances:

   a. Lateral position of panel connection device shall be within 1 inch. Embedment measured from the back face of the panel shall be within 1/4 inch, -1/2 inch. All other panel dimensions shall be within 3/16 inch.

b. Squareness as determined by the difference between the two diagonals shall not exceed 1/2 inch.

c. Surface defects on smooth formed surfaces measured over a length of 5 feet shall not exceed 1/8 inch.

7. The panel shall be cast on a level surface and a random sample of the concrete shall be taken in accordance with AASHTO T141.

8. Concrete shall be Class AAE-4 (Type III Portland Cement; Design Strength of 4300 psi; 3-4 inch slump; Coarse Aggregate Gradation 4) in accordance with Specifications Section 802. The plant and the QA/QC plan of the manufacturer shall be pre-qualified by the Engineer.

9. Panels in storage shall be supported on firm blocking to protect the panel connection devices and the exterior finish.

F. Rejection: Panels may be rejected because of failure to meet any of the requirements specified above. In addition, any or all of the following defects shall be sufficient cause for rejection:

1. Defects that indicate imperfect molding.
2. Bending or misalignment of connections.
3. Defects indicating honeycombing or open texture concrete.
4. Cracked or severely chipped panels.
5. Color variation on front face of panel due to excess form oil or other reasons.
6. Tie strips, connecting pins, PVC pipe, and lifting devices set to improper dimensions and tolerances shown on the plans and specified above.

G. Acceptance of Material: The Contractor shall furnish the Engineer a Certificate(s) of Compliance certifying the above materials comply with the applicable contract specifications. A copy of all test results performed by the Contractor necessary to assure contract compliance shall be furnished to the Engineer.

Acceptance shall be based on the Certificate(s) of Compliance, accompanying test reports, visual inspection, and/or any additional testing information requested by the Engineer.

5.0 EQUIPMENT

Equipment shall meet the following:

	Section
Rollers	151
Earthwork and Aggregate Equipment	153
Concrete Equipment	155

6.0 SUBMITTAL

The Contractor shall submit a proposal for a mechanically stabilized earth wall to be built to the lines and grades shown in the plans and as described herein.

The Contractor shall submit the shop drawings and design computations of the proposed mechanically stabilized earth wall to the Engineer for final approval a minimum of 21 calendar days prior to ordering material for the Mechanically Stabilized Earth Wall. All drawings and calculations shall be signed by a professional engineer, licensed in North Dakota.

The drawings shall include, but not be limited to, the following:

A. Plan drawings for each wall containing the following:

1. Location relative to roadway centerline, bridges, piles, existing and other proposed retaining walls, beginning and ending stations, slopes, or other objects.

2. Locations for all drainage structures, pipes, signs, light poles, and other conflicting existing and planned structures as provided in the contract documents.

3. Limits of soil reinforcement and location where changes in length and/or size of reinforcement occur.

4. Location of existing and planned utilities as provided in the contract documents.

5. Existing ground elevations.

6. Limits for any construction constraints such as right-of-way, easements, staged construction, etc.

B. Typical cross section drawings for each wall identifying:

1. Location and batter of the wall face.

2. Wall treatment, including impervious geomembrane, traffic barrier(s), cast-in-place moment slab, runoff collection, subsurface and surface drainage, etc.

3. Elevation of leveling pad.

4. Reinforcement type, dimensions, and vertical spacing.

5. Depth of embedment.

6. Limits of excavation.

7. Panel joint cover location and generic material type.

C. Elevation views showing:

1. Top and bottom wall elevations, in-place ground line, and finished grade elevation at top and bottom of wall.

2. Details and dimensions for foundation and leveling pad, including steps in the footing or leveling pad.

3. Location of drainage structures and construction details around these structures.

4. Dimensions and locations of reinforcement.

5. Maximum applied bearing pressure under the wall for each reinforcement length.

6. Panel row and column numbers.

7. Panel configuration for standard and special cut panels.

8. Summary of quantities for each wall.

9. Panel dimensions and shape.

D. Horizontal and vertical curve data affecting the wall. Match lines or other details to relate wall stationing to centerline stationing.

E. Connection details and dimensions between concrete panels, embedded devices, and soil reinforcement.

F. Details for construction, including but not limited to:

1. Termination at cast-in-place structures and any adjacent slope construction.

2. Reinforcement placement around obstructions, including light and sign supports.

3. Panel and soil reinforcement at corners.

4. All internal drainage facilities.

5. Other details such as coping or barrier, guardrail, fencing, or noise wall.

6. Panel slip-joint details and nosing features.

G. Architectural details, including form liner pattern, joint layout and surface finish and color. (See the Plan details for requirements.)

H. Name of wall manufacturer and their QA/QC documents.

I. Test panel construction

J. General Notes required for constructing the wall:

1. Design assumptions regarding material properties, material qualities, and construction method.

2. Wall layout information.

3. Requirements for backfill compaction.

4. Materials used in construction.

5. Geosynthetic filter fabric behind the joints.

6. Reinforcement handling, storage, preparation, and placement information and requirements.

K. If the wall company/Contractor obtains additional borings and/or geotechnical data for the design of the walls, they shall submit a copy of geotechnical report showing:

1. Plan view of sampling and field-testing locations across project site.

2. Subsurface profile across project site.

3. Boring logs.

4. All laboratory test data and results.

5. Engineering properties of the foundation soil, the reinforced soil, and the retained soil as appropriate to ensure the proper long-term performance of the MSE wall structure.

6. Required soil modification.

7. Global stability analysis.

8. Allowable and ultimate bearing pressure beneath the wall footing and the reinforced earth mass.

9. Settlement analysis for the foundation soil beneath the wall and the reinforced earth mass.

10. Groundwater, any free water conditions, anticipated high water conditions, and any required drainage schemes.

11. Recommendations concerning items that may be appropriate to ensure the

proper long-term performance of the MSE wall structure.

L. Copy of calculations showing:

1. Table of Contents page for design computations.

2. Design notes page with explanation of symbols and details of any computer programs used. Tabulate all calculated minimum factors of safety to ensure internal, external and global stability.

3. Panel design including the design of reinforcement connectors and internal rebar.

4. Soil reinforcement including corrosion computations at the specified corrosion rates from FHWA-NHI-10-024.

5. Ultimate and allowable bearing pressures beneath the wall and the reinforced earth mass along with estimated settlements.

6. Rail/slab detail above wall, when applicable.

7. Stability analysis. This shall include external and internal stability, and applicable compound stability. Also, the designer shall perform global stability analysis if it is not provided in the geotechnical report.

8. Magnitude, direction, and location of the forces from any external loads such as traffic surcharge, lighting, signs, bridges, etc.

9. A set of project-typical hand calculations verifying the computer generated output.

10. Verification of the design properties/parameters from material tests. Include results from creep, durability, construction induced damage, junction strength tests, and any other applicable tests. Indicate the appropriate standardized test designation followed for each test.

11. Other design calculations.

M. Indicate the following performance requirements:

1. Anticipated settlement of the structure.

2. Battering sequence for panel installation.

3. Monitoring and measurement requirements.

N. All appropriate design computations.

All submissions shall be processed through the Contractor.

The Contractor shall submit 3 sets of the wall drawings with the initial submission. One set will be returned to the Contractor within 21 days with any indicated corrections. If corrections are required, the Contractor shall make the necessary corrections and resubmit 3 sets within 21 days. When the drawings are approved, the Contractor shall furnish 5 - 11x17 inch sets.

7.0 CONSTRUCTION REQUIREMENTS

A. General Requirements: All MSE wall system-facing panels shall be constructed in accordance with approved shop drawings, including the architectural features specified.

The wall supplier shall provide a technical representative on the project site during the erection of the first full height section, and the following sections if needed until the Engineer determines that the Contractor has demonstrated the ability to construct the wall system without technical assistance. Also, the manufacturer's representative shall be available to provide instructions, guidance in pre-construction activities, and on-site technical assistance anytime during construction at no additional cost to the Department.

Every step in the sequential construction of the MSE wall system shall comply with the construction requirements and tolerances in this Special Provision and the manufacturer's drawings. All instructions from the manufacturer shall be followed.

B. Foundation Preparation: The foundation for the structure shall be graded level for a width equal to the length of the reinforcement element plus 20 inches or as shown on the plans. Prior to wall construction remove unsuitable foundation material and backfill with select granular fill per these specifications. Compact backfill with a smooth-wheel, steel vibratory drum

roller in accordance with 151.01 C. All materials shall be compacted according to Specification Section 203.04 E.2.a “ND T180”. The MSE wall system shall not bear directly on a rocky foundation. A minimum of 6 inches of select backfill shall be placed on the rocky foundation as bedding for the panels. Compaction as specified above.

C. Backfill Placement: Backfill placement shall closely follow erection of each row of panels. Backfill shall be placed in a way that does not cause damage or disturbance to the wall or soil reinforcement.

Soil reinforcement shall be maintained in a horizontal position along its length. Soil reinforcement shall be placed perpendicular to the wall face, except as shown in the plans. The backfilling and compaction operation shall be as specified by the wall designer and this Special Provision. Compaction within 3 feet of the back face of the concrete panels shall be achieved by means of a minimum of 3 passes with a lightweight mechanical tamper, roller, or vibratory system. The maximum lift size shall be 1 foot.

No drilling or pile driving through the reinforced backfill shall occur after placement of backfill.

At the end of each day’s operations, slope the last lift of backfill to direct surface runoff away from the wall. Do not allow surface runoff from adjacent areas to enter the wall construction area.

D. Leveling Pad: The Contract Plans show the minimum dimensions and other details for the leveling pad. A minimum of 24 hours of curing is required before placing panels.

E. Wall Erection: All MSE wall system-facing panels shall be constructed in accordance with approved shop drawings, including the architectural features specified. Precast panels shall be placed so that their final position is vertical or battered as shown on the plans.

For erection, panels shall be handled by means of lifting devices connected to the upper edge of the panel. Panels shall be placed in successive horizontal lifts in the sequence shown on the plans as backfill placement proceeds. Construction shall always begin from existing structures toward the open end of the wall. Wooden wedges shall maintain the position of panels and their adjacent panels shall be clamped together to prevent individual panel

displacement. After setting the batter of the panels, horizontal and vertical alignments shall be checked with surveying methods using suitable measuring points. External bracing shall be required for the initial lift. Placement of a panel on top of a panel not completely backfilled shall not be permitted.

Soil reinforcement shall be placed in accordance with the plans. Pretension flexible reinforcement to remove any slack in the reinforcement. No alteration or cutting of reinforcement is permitted unless clearly detailed in the plans. Connections must be made in accordance with the manufacturer's recommendations. Concrete facing vertical and horizontal alignment tolerances shall not exceed 3/4 inch per 10 feet. The completed wall shall have overall vertical tolerance not to exceed 1/2 inch per 10 feet. Reinforcement placement elevations shall not vary more than 1 inch from a horizontal line through the panel connection. Facing elements that are out of alignment shall not be pulled back into place.

F. Barriers and Copings Construction: This final construction sequence shall be undertaken after the final panels have been placed and the backfill has been completed to its final grade.

G. Any wall or geosynthetic materials damaged during fill placement operations shall be removed and replaced at the Contractor's expense. Any misalignment or distortion of the wall due to placement of fill outside the limits of this specification shall be corrected at the Contractor's expense.

Reinforcement Aggregate shall be compacted simultaneously with laydown operations. All equipment shall be operated to produce uniform density throughout the entire section. The desired degree of compaction will be considered obtained when the surface is tightly bound and shows no rutting or displacement under roller operation. The moisture content of the fill material prior to and during compaction shall be uniformly distributed throughout each layer.

The maximum loose lift thickness shall not exceed 12 inches. Compaction within 3 feet of the face of the wall shall be achieved by a minimum of three passes with a lightweight mechanical tamper or a vibratory plate compactor. All vehicles shall be prohibited from being within 3 feet of the face of the wall until the retaining wall is complete.

At the end of each day's operation, the Contractor shall slope the last level of

Reinforcement Aggregate fill away from the wall facing to rapidly direct runoff away from the wall face.

8.0 METHOD OF MEASUREMENT

A. Mechanically Stabilized Earth Wall. The Mechanically Stabilized Earth Wall will be measured by the square foot of front face. The square foot area for payment for the wall will be based on the vertical height and length of the retaining wall shown in the plans. The vertical height will be taken as the difference in elevation measured from the top of the wall to 2 feet below the finished grade at the bottom of the wall.

B. Select Granular Backfill will be measured by the ton completed and in place. The Engineer will not measure beyond the excavation limits for payment.

9.0 BASIS OF PAYMENT

Payment will be made at the Contract Unit Price for the following:

Item No.	Pay Item	Pay Unit
930-9550	Mechanically Stabilized Earth Wall	Square Foot
930-2010	Select Granular Backfill	Ton

This payment will be full compensation for all labor, equipment, and materials necessary to complete the work. Extra materials, manufacturer's field representative, and other associated work will be included with this item.

This document was originally issued and sealed by Todd A. Lang, Registration Number PE-5295 on 03/27/15 and the original document is stored at the North Dakota Department of Transportation.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

CITY OF DICKINSON WATER AND SEWER REQUIREMENTS

SOIA-SAP-CPU-5-983(050)050

This document was originally issued and sealed by Lindsay M. Krebs Registration Number PE-8776, on April 2, 2015 and the Original Document is stored at the North Dakota Department of Transportation.

SUBMITTALS SECTION

GENERAL

SECTION INCLUDES

A. Submittal procedures, schedules, lists and instructions for proper and prompt submittal and review of construction related documents.

SUBMITTAL PROCEDURES

A. Transmit each submittal in accordance with Engineer's accepted format.

B. Identify Project, Contractor, Subcontractor or Supplier, pertinent drawing and detail number, and specification section number, as appropriate.

C. Apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

D. Schedule submittals to expedite the Project, and deliver to Engineer at business address.

E. Coordinate submission of related items.

F. For each submittal, allow 15 days for review, excluding delivery time to and from the Contractor.

G. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed Work.

H. Provide space for Contractor and Engineer review stamps.

I. If directed to revise and resubmit, identify all changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with provisions.

K. Submittals not requested will not be recognized or processed.

CONSTRUCTION PROGRESS SCHEDULES

A. Submit preliminary schedule in duplicate within 10 days after effective date of the Agreement.

B. Revise and resubmit as required.

C. Submit revised schedules (if necessary) with each Application for Payment, identifying changes since previous version.

D. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

E. Indicate estimated percentage of completion for each item of work at each submission.

F. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and required by allowances.

PROPOSED PRODUCTS LIST

A. Within 10 days after effective date of the Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

SHOP DRAWINGS

A. Submit for review the number of opaque copies that Contractor requires, plus two copies that will be retained by Engineer.

B. After review, distribute in accordance with the SUBMITTAL PROCEDURES herein.

PRODUCT DATA

A. Submit the number of copies that the Contractor requires, plus two copies that will be retained by the Engineer.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this project.

C. After review distribute in accordance with the submittal procedures herein. Provide copies for record documents to be used in operation and maintenance manual.

MANUFACTURER INSTALLATION INSTRUCTIONS

A. When required, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer in quantities specified in product data herein.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

MANUFACTURER CERTIFICATES

A. When specified in individual specification sections, submit certification by manufacturer to Engineer, in quantities specified for product data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer.

MEASUREMENT AND PAYMENT

All work described herein is incidental to other related items of work and no measurement or additional payment will be considered.

QUALITY CONTROL SECTION

GENERAL

SECTION INCLUDES

A. Instructions and requirements for quality assurance-control of installation.

REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date for receiving bids, except where a specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. The contractual relationship, duties, and responsibilities of the parties in the contract nor those of the Engineer will not be altered from the Contract Documents by mention or inference otherwise in any reference document.

SUBMITTALS

A. Submit a certified written report of each inspection, test or similar service, to the Engineer, in duplicate.

B. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

QUALITY ASSURANCE

A. Monitor quality control over Suppliers, Manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with Manufacturer’s instructions, including each step in sequence.

C. Should Manufacturer’s instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

EXECUTION

INSPECTION AND TESTING LABORATORY SERVICES

A. Employ and pay an independent agency to perform specified quality control services.

B. Owner will engage and pay for the services of an independent agency to perform inspections and tests specified as the Owner's responsibility.

C. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work and the Contractor is also required to engage an entity for the same or related element, do not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.

DUTIES OF INDEPENDENT TESTING AGENCY

A. Perform inspections, sampling and testing of materials and construction specified with qualified personnel.

B. Cooperate with and notify the Engineer and Contractor promptly of irregularities or deficiencies observed in the work during performance of its services.

C. Not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work or perform any duties of the Contractor.

ASSOCIATED SERVICES

A. Cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:

1. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
2. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
3. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
4. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
5. Security and protection of samples and test equipment at the project site.

REPORT DATA

A. Date of issue.

B. Project title and number.

C. Name, address and telephone number of testing agency.

D. Dates and locations of sample and tests or inspections.

E. Names of individuals making the inspection or test.

F. Designation of the Work and test method.

G. Identification of product and specification section.

H. Complete inspection or test data.

I. Test results and an interpretation of test results.

J. Ambient conditions at the time of sample taking and testing.

K. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.

L. Name and signature of laboratory inspector.

M. Recommendations on retesting.

MANUFACTURER'S FIELD SERVICES AND REPORTS

A. When specified in individual specification sections, require material or product Suppliers or Manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Engineer in advance of required observations. Observer subject to approval of Engineer.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to Manufacturer's written instructions.

D. Submit report within 30 days of observation to Engineer for information.

TOLERANCES

A. Monitor tolerance control of installed products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with Manufacturer's tolerances.

C. Adjust products to appropriate dimensions; position before securing products in place.

COORDINATION AND SCHEDULING

A. Coordinate the sequence of activities to accommodate required services with a minimum of delay and avoid the necessity of removing and replacing construction to accommodate inspections and tests.

B. Responsible for scheduling times for inspections, tests, taking samples and similar activities.

RETESTING

A. The Contractor is responsible for retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with the specification requirements, regardless of whether the original test was the Contractor's responsibility.

B. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.

MEASUREMENT AND PAYMENT

All work required herein is incidental to other related work. No measurements or additional payments will be made for work defined herein.

CAST-IN-PLACE CONCRETE SECTION

GENERAL

SECTION INCLUDES

A. Preparation, placement, curing and jointing of cast-in-place concrete as required for typical concrete construction.

REFERENCES

A. ACI 301 – Structural Concrete for Buildings.

B. ACI 302 – Guide for Concrete Floor and Slab Construction.

C. ACI 304 – Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

D. ACI 305R – Hot Weather Concreting.

E. ACI 306R – Cold Weather Concreting.

F. ACI 308 – Standard Practice for Curing Concrete.

G. ACI 318 – Building Code Requirements for Reinforced Concrete.

H. ANSI/ASTM D1751 – Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.

I. ASTM C33 – Concrete Aggregates.

J. ASTM C94 – Ready-Mixed Concrete.

K. ASTM C150 – Portland Cement.

L. ASTM C260 – Air Entraining Admixtures for Concrete.

M. ASTM C309 – Liquid Membrane Forming Compounds for Curing Concrete.

N. ASTM C494 – Chemical Admixtures for Concrete.

O. ASTM C618 – Fly Ash and Raw or Calcinated Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.

P. ASTM D4397 – Polyethylene Sheeting for Construction.

PERFORMANCE REQUIREMENTS

A. 28 day compressive strength of 4000 psi for standard concrete.

B. 48 hour compressive strength of 2500 psi for high early strength concrete (when required).

C. 48 hour compressive strength of 2400 psi for non-shrink grout (where required).

SUBMITTALS

A. Provide a concrete mix design prepared by an independent testing laboratory.

B. Provide manufacturers data on admixtures.

C. Provide written explanation from Ready-Mix Supplier as to how concrete will be delivered and what, if any, special measures will be required.

QUALITY ASSURANCE

A. Acquire cement and aggregate from same source for all work.

B. Provide written documentation for cement, listing manufacturer, and certifying that cement meets specifications.

REGULATORY REQUIREMENTS

A. Conform to applicable building codes.

DELIVERY, STORAGE AND HANDLING

A. Deliver and place concrete in a manner that provides minimum segregation.

ENVIRONMENTAL REQUIREMENTS

A. Avoid over spraying with curing compound.

B. Properly dispose of all excess curing compound.

C. Utilize appropriate protection against inclement weather.

PRODUCTS

MANUFACTURERS

A. Cement: Dakota, Holnam.

B. Air Entrainment Admixture: Euclid Chemical.

C. Water Reducing: Euclid Chemical.

D. Non-Shrink Grout: TAMMS Industries.

E. Joint Filler: TAMMS Industries.

F. Curing Compound: TAMMS Industries.

G. Retarding Agent: Euclid Chemical.

H. Vapor Barrier: Up North Plastics.

I. Water Stop (if required): American Colloid Company, Building Material Division.

MATERIALS

A. Cement: Type II – Air Entraining sulfate resistant, Portland type.

B. Water: Clean and not detrimental to concrete.

C. Fly Ash: Class C.

D. Non-Shrink Grout: Horn non-corrosive multi flow industrial grout.

E. Air Entrainment: Euclid Air Mix 250.

F. Water Reducing Agent: Euclid Eucon WR91.

G. Retarding Agent: Euclid Eucon Retarder 100.

H. Joint Filler: Hornboard Asphalt Impregnated Fiber Expension Board.

I. Curing Compound: Clearseal 150 Concrete Cure, Sealer and Hardner.

J. Vapor Barrier: 6 mil thick, black polyethylene.

K. Water Stop (if required): Flexible Butyl Rubber Strip with a bentonite waterproofing compound.

CONCRETE MIX

A. Class AE concrete: Cement – 6 sacks per cubic yard concrete (7.2 sacks for High Early Strength).

B. Fine Aggregate gradation and testing shall be in accordance with NDDOT Standard Specifications for Road and Bridge Construction Section 816.01.

C. Coarse Aggregate gradation and testing shall be in accordance with NDDOT Standard Specifications for Road and Bridge Construction Section 816.02, No. 3.

D. Air Entrainment Range: 5 – 7 percent.

E. Fly Ash Content: Maximum 15 percent of cement content.

F. Slump: 3 inch maximum.

G. Admixtures:

1. Use accelerating admixtures in cold weather only when approved by Engineer.
2. Use of admixtures will not relax cold weather placement requirements.
3. Use set retarding admixtures during hot weather only when approved by Engineer.

EXECUTION

PREPARATION

A. Verify that forms are secure and rigid and at the proper grade and alignment.

B. Verify requirements for concrete cover over reinforcement.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

D. Verify that subgrade is moist, not wet.

E. Verify that areas of heavy clay or highly expansive subgrade soils are covered with 3 inches of sandy soils properly compacted.

F. Prepare previously placed concrete by cleaning with steel brush and applying an approved bonding agent in accordance with manufacturer's instructions.

G. Notify Engineer a minimum 24 of hours prior to commencement of operations.

CONSTRUCTION

A. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

B. Separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler.

C. Install vapor barrier under interior slabs on grade. Lap joints minimum 6 inches and seal watertight by taping edges and ends.

D. Repair vapor barrier damaged during placement of concrete reinforcing. Repair with vapor barrier material; lap over damaged areas minimum 6 inches and seal watertight.

E. Place joint filler in slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

F. Install construction joint in coordination with slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

G. Place concrete continuously between predetermined expansion, control, and construction joints.

H. Do not interrupt successive placement; do not permit cold joints to occur.

I. Place floor slabs, sidewalks and flatwork in saw cut pattern indicated on plans or by Engineer in field.

J. Saw cut joints immediately after placing. Cut width as shown on plan. Depth of cut must be 1/4 of slab thickness. Joints must remain open the full depth of the cut.

K. Contractor's Stamp: The Contractor shall mark in each 3,000 square feet of pavement, every 100 LF for continuous pours of new curb and gutter and/or sidewalk, every curb and gutter and/or sidewalk patch done per lot and each driveway by stamping the Contractor's name, address and year in which the pavement was constructed. The stamped letter should be 1 inch high and ¼ inch deep. Contractor's stamp must be approved by the Engineering Department prior to the beginning of construction. Contractor shall be responsible for changing the date on the stamp each year.

L. Notify Engineer when forms are to be removed.

M. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.

N. Patch, fill, touchup, repair or replace imperfections as directed by Engineer. Do not begin this work prior to Engineer approval.

O. Fill in form tie holes with grout.

PLACEMENT TOLERANCES

A. Place all concrete true to the line and grade shown on the plans or staked in the field.

B. Vertical tolerances not to exceed 0.02 feet when checked with a 10 foot straight edge.

C. Horizontal tolerances not to exceed 0.04 feet at any point, be visibly out of line or "crooked" as determined by the Engineer.

D. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface.

CONCRETE FINISHING

A. Finish all concrete surfaces as noted on the plans. Where finish is not defined in the plans, apply the following schedule:

B. Formed Surface (not exposed to view) - Rough Form Finish

C. Formed Surface (exposed to view) - Smooth (Rubbed) Finish

D. Interior Flat Slabs - Smooth Troweled Finish

E. Exterior Flat Slabs - Broomed Finish

FIELD QUALITY CONTROL

A. Take 3 concrete test cylinders for every individual pour or for each 50 cubic yards (CY) of concrete placed, whichever is less. One cylinder for 7 day break, one cylinder for 28 day break, one cylinder for hold.

B. Take 1 additional test cylinder (4th cylinder) during cold weather concreting. This cylinder will be cured on job site under same conditions as concrete it represents. This cylinder shall be broken at 7 days unless otherwise determined by the engineer.

C. Take 1 slump test and 1 air test for each set of test cylinders taken.

D. Immediately remove from project site and properly dispose of any concrete which does not meet standards.

E. Record date, time, location, weather, and project for each set of tests taken.

F. A copy of each test results shall be sent to the field engineer and the city engineer.

CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Avoid premature drying by either applying an approved curing compound at a rate approved by Engineer or by completely covering concrete with an approved moisture barrier to reduce evaporation.

C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

D. Grade site to maintain positive drainage away from new concrete.

3.7 CLEANUP AND PROJECT CLOSEOUT

A. Clean site of all debris and dispose of properly.

B. Seal all joints, as required.

3.8 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of embedded utilities and components, which are concealed from view on plans.

B. Provide Engineer with 1 set of "As Constructed" field plans in legible condition.

C. Maintain records of concrete placement (i.e. date, location, quantity, and weather).

MEASUREMENT AND PAYMENT

MEASUREMENT

A. Measure concrete as defined below unless otherwise stated on the bid form.

B. Do not measure concrete for building construction.

C. Measurement for curb and gutter will be by the linear foot (LF) of curb and gutter as measured along the face of the curb.

D. Measurement for sidewalk, driveway or other flatwork outside of a building will be by the square foot (SF) or square yard (SY).

E. Excavation required for the installation of new concrete items is incidental to related items.

F. Consider concrete testing (i.e. mix design and breaking of test cylinders) incidental unless a separate item is shown on the bid form.

PAYMENT

A. If there is not a defined item on the bid form cast-in-place concrete, forming and excavation will be incidental.

B. Concrete as listed on the bid form will be paid by the units shown and approved by the Engineer and payment for each item listed must include material, labor and equipment.

TRENCHING, BACKFILLING AND COMPACTION SECTION

GENERAL

SECTION INCLUDES

A. Excavating trenches for utilities from 5 feet (1.5 m) outside building to 5 feet (1.5 m) from utility holes or other terminal points indicated.

B. Backfilling and compacting from top of utility bedding to subgrade elevations.

C. Surfacing repair and replacement.

DEFINITIONS

A. Utility: Any buried pipe, conduit, or cable.

REFERENCES

A. OSHA Handbook for excavation supports.

B. ASTM D698 (AASHTO T99) - Test Methods for Moisture Density Relations of Soils Using a 5.5 lb. (2.49 Kg) Rammer and a 12 inch (304.8 mm) Drop.

C. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

D. ASTM D2487 - Classification of Soils for Engineering Purposes.

E. ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

F. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

SUBMITTALS

A. Submit written details to Engineer in advance of construction for the following items:
1. Traffic control (pedestrian and vehicular).
2. Erosion control.
3. Highway or railroad crossing.
4. Backfilling and compaction details.
5. Other (as defined in plans or in the plan notes).

B. Submittals are requested to document how Contractor will handle specific situations.

QUALITY ASSURANCE

A. If unstable soils or water are encountered, notify Engineer and consult with a qualified soils or hydrology specialist to determine best means of completing work safely and within specifications.

REGULATORY REQUIREMENTS

A. North Dakota Department of Health Clean Air Standards and Storm Water Monitoring Programs.

ENVIRONMENTAL REQUIREMENTS

A. Report any indication of soil contamination to Engineer immediately.

B. Minimize dust, noise and erosion control by whatever means necessary.

C. Request approval from Engineer before trenching or backfilling in frost.

D. Develop and enforce an erosion and pollution control program.

PRODUCTS

BACKFILL

A. Type I Backfill – Material removed during trenching operations can be used for backfill if sandy in texture and easy to compact.

B. Type II Backfill – Imported aggregate material equal to NDDOT Class 2.

C. Type III Backfill – Flowable Fill Concrete (CDF) with a compressive strength of 300 psi, using air-entrained concrete.

EXECUTION

PREPARATION

A. Install temporary signing and barricades in accordance with the Manual of Uniform Traffic Control Devices for Streets and Highways, latest edition.

B. Protect plant life, lawns, rock outcropping and other features remaining as a portion of final landscaping.

C. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.

D. Maintain and protect above and below grade utilities, which are to remain.

E. If existing concrete or asphalt surfacing cannot be smoothly trenched, leaving a smooth, straight edge, it must first be sawcut, to the full depth of surfacing on each side of trench.

TRENCH EXCAVATION

A. Remove all topsoil along area to be trenched.

B. Excavate to the required depth by trenching subsoil as required for utilities to be installed.

C. Cut trenches sufficiently wide to enable installation, allow inspection and to properly backfill.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Hand trim where necessary. Remove all loose matter.

F. Remove lumped subsoil, boulders, and all rock.

G. If an area is trenched deeper than required, backfill with Type II backfill to required grade and compact.

H. Stockpile excavated material in area designated on site and remove excess material not being used, from site.

BACKFILLING

A. Backfill trenches to contours and elevations with approved, compactible materials.

B. Systematically backfill in appropriate lifts to allow maximum time for natural settlement. Compact as necessary.

C. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

D. Backfill Lift Thickness:
1. Type 1 – 4 to 6 inches.
2. Type 2 – 6 to 8 inches.

E. Employ a placement method that does not disturb or damage adjacent foundation perimeter drainage, conduit or duct in trench.

F. Maintain optimum moisture content of fill materials to attain required compaction density.

G. Remove surplus fill materials from site.

H. Leave imported fill material stockpile areas completely free of Type I fill materials.

I. Replace topsoil or surfacing as shown on plans or as directed by the Engineer.

TOLERANCES

A. Top Surface of Backfilling under Paved Areas and Slabs on Grade: Plus or minus ¼ inch (6 mm) from required elevations.

B. Top Surface of General Backfilling: Plus or minus ½ inch (12 mm) from required elevations.

C. Maintain all backfill lift thickness: Plus or minus 1 inch of specified thickness.

FIELD QUALITY CONTROL

A. Contractor shall obtain the services of a certified laboratory, approved by the Engineer, to obtain proctor and density tests on all backfill. A copy of all test results shall be sent to the Field Engineer and the City Engineer.

B. Provide one passing density test for every 500 cubic yards of backfill material for areas other than trenches. The Engineer will choose the locations for the tests based upon random locations.

C. In trench areas, one passing density test is required at mid-depth of trench and at 1 foot below finished grade elevation at 250 foot (horizontal) intervals. If additional excavation is required to complete test Contractor will excavate as necessary.

D. For a failed test, the Engineer will define the limits of the failed area and all backfill within the defined area shall be removed or scarified, re-compacted, and retested at contractor's expense.

E. If continued test failures are encountered, contact the Engineer to determine appropriate action necessary to correct the problem and retest the area.

CLEANUP AND PROJECT CLOSEOUT

A. Shape all backfilled and graded areas to provide positive drainage until permanent surfacing is installed.

B. Clear the entire construction site of all surplus and salvaged material. Dispose of all dirt, rubbish, asphalt, concrete, rock, excess earth and demolition items as directed by the Engineer.

C. Scrape and sweep with a pickup broom all adjacent hard surface streets and parking areas utilized during construction.

PROJECT RECORD DOCUMENTS

A. Provide Engineer with a set of "as constructed" plans for entire project showing locations of all underground utilities and appurtenances (both existing and newly installed).

B. Identify different soil conditions encountered and note any newly discovered buried utilities.

BACKFILL SCHEDULE

A. Backfill streets, parking lots and other hard surfaces with Type III Backfill unless otherwise shown on the plans or special provisions.

B. Backfill all other areas with Type I backfill unless otherwise directed or approved by Engineer or as shown on the plans or special provisions.

MEASUREMENT AND PAYMENT

MEASUREMENT

A. All trenching and backfilling is considered incidental to other related items of work, unless a specific bid item is listed on the bid form.

B. Measurement, if required, will be by the cubic yard (CY).

PAYMENT

A. Payment for all density testing described herein is incidental to the excavation unless a specific bid item is shown on the bid form. Additional excavation, if required, will be incidental to testing costs.

HORIZONTAL EARTH BORING/JACKING AND CASING SECTION

GENERAL

SECTION INCLUDES

A. Description of the work required for the construction of an underground pipe under a highway, railroad or other surface obstruction, as required by boring or jacking and installing steel casing pipe.

B. A description of the materials and equipment necessary to carry out the proposed work.

REFERENCES

A. OSHA Handbook for Excavation Supports.

B. ASTM-D2487 – Classification of Soils for Engineering Purposes.

C. ASTM-A53 Standards for Steel Pipe, Black and Hot Dipped Zinc Coated, Welded and Seamless.

PERFORMANCE REQUIREMENTS

A. The final boring must be straight and uniform. The casing must not show any sign of deflection and must allow easy installation of carrier pipe and centering guides.

SUBMITTALS

A. Address the following items by a submittal to the Engineer:

1. Trench shoring.
2. Steel casing pipe.
3. Guide(s) for centering the carrier pipe within the casing pipe.
4. Dewatering.

B. Show pertinent dimensions, class, weights, size and thicknesses.

C. Particular items of work installed as shown on the plans or defined within the specification do not require submittals but will require a letter of certification from the Contractor stating specifically what items were utilized and were installed on this specific project.

QUALIFICATIONS

A. Contractor must, if requested, provide documentation that he has previously, successfully completed similar work.

B. An experienced supervisor must be in charge and on the site during all construction operations.

REGULATORY REQUIREMENTS

A. Unless otherwise called out within the specifications, Owner will obtain the necessary permit for the described work.

B. Conform to standards described by the Occupational Safety and Health Administration (OSHA) for all trench work and shoring.

ENVIRONMENTAL REQUIREMENTS

A. Minimize surface disturbances by confining the construction activity.

B. Maintain acceptable dust and noise levels during construction.

PRODUCTS

MATERIALS

A. Casing Pipe – Manufactured by US Steel or approved equal having a minimum yield strength of 35,000 psi and the following minimum weights and dimensions:

Casing Inside Diameter (in inches)	Wall Thickness (in inches)
Under 14	.188
14 to 16	.282
18	.312
20	.344
22	.375
24	.406
26	.430
28 to 30	.469
32	.500
34 to 36	.531
38 to 42	.563

B. Carrier Pipe – Manufactured by CertainTeed or Underground Solutions or an approved equal. Pipe must be a restrained joint PVC pipe equal to CertainTeed Certa-Lok VIP Class 150 (AWWA C900 approved), or pipe must be a fused PVC pipe to Underground Solutions DIPS Fusible C-900 or Fusible C-905**.**

C. Carrier Pipe Centering Guides – Equal to Mahoney Pipe Products Corp. or Pipeline Seal and Insulation, Inc.

EXECUTION

EXAMINATION

A. Verify that Owner has the appropriate permit, fully approved.

B. Verify that site and conditions are ready for boring.

PREPARATION

A. Advise the appropriate surface owner of the proposed plans to bore. The appropriate parties are defined as the District Engineer of the Department of Transportation or the County Commission Chairman for a County Highway. In the event of a railroad crossing notify the Roadmaster. Notification required a minimum of 48 hours in advance of beginning construction or as defined on the permit.

B. Provide Engineer with appropriate liability insurance and property damage insurance as required by the Railroad Company, the Department of Transportation, the County or any other surface landowner. Insurance must be in the amount required by the Owner and must be payable to the Owner as defined on the permit.

INSTALLATION

A. Install boring pits so as to properly locate the actual boring as staked by the Engineer.

B. Provide appropriate traffic control as needed or required by the transportation agency.

C. Contractor shall be prepared to dewater the bore pit. Depending on the depth of the bore pits, a high water table may be encountered and that dewatering will be necessary in conjunction with the installation of the bore pit. Costs shall be incidental to the cost of the boring.

D. Bore or jack the casing pipe in the location staked by the Engineer in the field or as defined on the plans or on the permit. The diameter of the casing pipe must be no less than that specified on the bid form.

E. Provide appropriate barricades and safety supports. Contractor shall install trench shoring by means of sheep piling, trench boxes or trench jacks to minimize the construction area. Contractor's operation shall dictate the type of shoring needed. The cost for shoring shall be included in the price bid on the bid form for the installation of the casing.

F. Notify engineer as soon as any unexpected problems arise.

G. Insert carrier pipe using approved guides. The carrier pipe inside diameter must be no less than the underground pipe being connected to. Guides shall center the carrier pipe within the casing.

H. Plug ends of casing around carrier pipe and mark ends of casing with Redwood 2x4 timbers, 6feet long and flush with ground surface. End seals shall be the PSI end seal model "S" or an approved equal.

I. If carrier pipe is to be installed within the casing at a later date, the casing shall be capped and sealed to keep debris out of casing before backfilling.

TOLERANCES

A. The centerline of the casing as installed must be within 0.5 foot horizontally and 0.05 foot vertically of the grade staked by the Engineer in the field.

PROTECTION OF FINISHED WORK

A. Upon the completion of boring operations adequately mark both ends of the casing pipe with Redwood 2x4 timbers, 6feet long and flush with ground surface and plug both ends of carrier pipe.

CLEANUP AND PROJECT CLOSEOUT

A. Make sure the casing ends have been properly marked and/or tied down for future locations.

B. Backfill the boring trench(s) and compact as necessary or required elsewhere herein.

C. Reshape the surface for positive drainage, spread topsoil and seed to return to a condition equal to prior to beginning construction.

PROJECT RECORD DOCUMENTS

A. Provide actual measured dimensions (ties) to permanent fixtures describing the termination points of the casing pipe.

B. Indicate any problems encountered and the appropriate methods of resolution.

MEASUREMENT AND PAYMENT

MEASUREMENT

A. Measurement will be made in a horizontal distance paralleling the casing pipe, end of pipe to end of pipe, to the nearest foot of actual casing installed.

B. Base measurement for carrier pipe cradles or supports upon a minimum of 3 supports for each section of carrier pipe or spaced at 10 foot intervals, whichever is less.

C. Measurement for carrier pipe extending beyond the casing will be by the linear foot.

PAYMENT

A. Boring or jacking a pipe will be as indicated on the proposal for the actual linear feet of casing bored or jacked. Any casing installed in an open trench will be paid at 25 percent of the bid price, if approved and accepted by the Engineer. If no proposal item is listed the boring and jacking will be incidental to other items of work.

B. The carrier pipe and the casing runners, centering guides or cradles, casing pipe and end seals, traffic control signs and flagging required to properly complete the boring or jacking will be included in the price paid for boring and/or jacking. Any carrier pipe extending beyond the casing will be paid as regular underground piping. Any couplings or sleeves will be considered incidental.

TRACER WIRE SECTION

GENERAL

SUMMARY

A. Provide tracer wire (locating wire) and accessories for all non-metallic mains.

B. Related Sections:
1. Trenching, Backfilling and Compaction
2. Sanitary Sewage System
3. Underground PVC Water Distribution Pipe and Fittings

C. Basis of Payment: Incidental.

REFERENCES

A. ASTM D1248 – Polyethylene Plastic extrusion Materials for Wire and Cable

QUALITY ASSURANCE

A. Provide tracer wire designed specifically for the purpose of detecting buried facilities.

PRODUCTS

MANUFACTURERS

A. Tracer Wire:
1. Standard of Quality: Design is based on products of Copperhead Industries <http://www.copperheadwire.com>.
2. Other acceptable Manufacturers: Subject to compliance with specified requirements, acceptable manufacturers and products are:
   a. Manufacturer of comparable products submitted in compliance with Section 010130 - Submittals.

B. Connectors:
1. Standard of Quality: Design is based on DryConn by King Innovation Products <http://www.kinginnovations.com/pro-dryconn.html>.
2. Other Acceptable Manufacturers: Subject to compliance with specified requirements.

C. Tracer Wire access Box
1. Valvco: Part SEWAB
2. Copperhead Lite-Duty Tracer Wire Access Box (LD14*TP) in grass areas at hydrant locations.
3. Copperhead Concrete Driveway Box (CD14*TP) for sidewalks and driveways with light traffic.
4. Copperhead Roadway Box (RB14*TP) for gate valves and manholes in streets and parking lots with heavy traffic.

MATERIALS

A. Open Trench/Boring Installation:
1. Direct burial 12 AWG solid, CCS (Copper Clad Steel), 0.0808 inch diameter.
2. Steel core soft drawn high strength 380 pound average tensile break load.
3. 30 mil high molecular weight, high density polyethylene, complying with ASTM D1248.
4. High flexibility, stretchable to accommodate ground movement.
5. Impact resistant.
6. 30 volt rating
7. Jacket color: Green - "Sewer"; Blue - "Water", Purple - "Reclaimed Water/Irrigation"

8. Physical, permanent, surface legend on insulating jacket, repeated a minimum of every 2 linear feet.

B. Connectors:
1. Waterproof and corrosion proof.
2. Prefilled with non-hardening sealant.
3. Lug:
a. Tin plated high conductivity aluminum with high impact polypropylene housing.
b. Product: DryConn Direct Bury Lug.
4. Connectors:
a. CSA certified as both Pressure Type and Direct Bury.
b. Product: DryConn King Direct Bury.

C. Magnesium Anode
1. Provide 5 pound anode at each:
a. Hydrant
b. Every Other Manhole
c. Connection to existing facilities

EXECUTION

INSTALLATION

A. Approved spliced connection locations: fire hydrant and manhole discharge connections to the main.

B. Except for approved splice connections and repairs, install in continuous manner from discharge manhole to flushing connection, from hydrant to hydrant and manhole to manhole.

C. Install tracer wire parallel with centerline axis of pipe and at "3 o'clock" position.
1. Do not spiral wrap wire to pipe.
2. Do not install under service saddles.
3. Tape tracer wire to pipe.

D. Terminate tracer wires in accordance with Drawings.
1. Terminate in tracer wire access box at each fire hydrant, air release manhole, sanitary manhole, flushing connection and discharge manhole.
2. Provide minimum 3 foot long pigtail at grade termination points within tracer box.
3. Provide 5 pound magnesium anode a maximum of every 1000 feet and at buried pipe ends:
a. Attach to the main tracer wire by solder.
b. Remove anode protective cover.
c. Apply water as directed by manufacturer.

FIELD QUALITY CONTROL

A. System Testing:
1. Test continuity of conduction in the presence of the Engineer.
2. Connect signal generator at wire termini and trace signal throughout the installation.
3. Locate and repair all breaks in conductivity.

TEMPORARY WATER SUPPY SECTION

GENERAL

DESCRIPTION

A. Provide temporary water service to all interrupted service connections associated with all watermain projects. The areas where consumers are affected by the work and require a temporary water supply should be verified with both the Engineer and Owner at least 72 hours (excluding weekends and holidays) prior to the anticipated suspension of water service.

DRAWINGS

A. Project plans provide some existing water utility information. The Contractor may need to perform additional research including from other resources. It shall be the Contractor's responsibility to determine the extent of the water system to be taken out of service to perform the work and the subsequent configuration of the temporary water system to provide service to all affected water customers.

SUBMITTALS

A. Contractor shall submit a shop drawing including all materials proposed to be used for temporary water. Additionally, a temporary water plan shall be submitted prior to starting to layout the temporary water system. This submittal shall include connection points, hydrants and/or valves, layout for connection to each service, and the location of all street crossings as a minimum. These submittals shall be submitted in accordance with Submittals Section of the Special Provisions.

PRODUCTS

TEMPORARY WATER PIPING

A. The water piping of temporary hoses, piping, etc. shall be 160 psi rated, NSF approved hose, flexible polyethylene pipe, or PVC pipe. All pipe used for the temporary water system must have a visible National Sanitation Foundation (NSF) approval stamp by the manufacturer. The temporary system must be maintained leak free. Each residence or business shall be provided with its own temporary water service line off the temporary main.

SHUT OFF VALVE

A. The distribution pipe shall have a manual shut off valve at each service tee. Shut off valves shall be NSF approved ball valves. All ball valves shall have stainless steel ball and constructed of no lead brass.

EXECUTION

GENERAL

A. Following the Engineer's, Owner's and City of Dickinson review and approval of any proposed shutdown request, the Contractor shall be required to give a minimum 24 hour advance notice (excluding weekends and holidays) to all consumers whose service will be temporarily affected, by means of individual notices delivered to each consumer. If the notices are not issued or the service is not ready to be connected to restore service, the City shall be free to exercise their authority in not closing down the existing valves and watermain system.

B. Special arrangements shall be made by the Contractor to provide temporary water service for all commercial services regardless of the length of time the watermain is out of service. The Contractor will not be allowed to take a commercial service out of service except in emergency conditions only. The Contractor shall supply all hoses, fittings, etc. for providing temporary water service at his expense. Copper piping or other "non-taste-inducing" pipe shall be necessary if the commercial consumer serves food or water products as part of his business.

LOCATING CURB STOPS

A. The Contractor shall be solely responsible for all activities of locating, exposing, and operating curb stop valves to the individual properties. Any existing condition that is suspected to indicate a defect of the curb stop valve, box, or service shall be reported immediately to the Engineer. The Owner will not participate in any activity up to this point.

TEMPORARY WATER SYSTEM SIZING

A. All pipe sizes shall be adequate to meet ordinary water supply demands of the consumers.

TEMPORARY WATER SYSTEM DISINFECTION

A. All temporary water systems shall be assembled, flushed, and disinfected in place and approved before being placed into service. The disinfection procedures shall be equal to the procedures required

for the new watermain. This will require minimum 48 hours laboratory time for the Bac-T sample to determine acceptability.

B. Temporary hoses, piping, fittings, etc., to be flushed and disinfected in accordance with Disinfection of Water Systems Section of the Special Provisions, prior to being placed into service.

CONNECTION TO BUILDINGS

A. Once the temporary water system has been assembled, pressure tested and disinfected, the Contractor should expect to find the existing plumbing on some services to be in old condition. The Contractor shall use an ordinary degree of care while working on this condition of service. Also, there may not be any convenient point of temporary connection on some services. In this case, temporary fittings must be provided to achieve the temporary water supply. This will be incidental to the work.

CROSSING ROADS, ALLEYS, AND DRIVEWAYS

A. Pipe protection measures must be supplied at road crossings, alleyways, or residential driveways to maintain the reliability and integrity of the temporary water system.

B. The Contractor will be required to install the temporary water supply at street crossings in a shallow trench or other methods acceptable to the Engineer. Aerial crossings of the temporary water lines at street crossings will not be allowed. Temporary water supply pipes shall not be installed in storm drain pipes or culverts.

C. The trenched asphalt crossings shall be cut straight and vertical, shall have uniform width and shall be cut perpendicular to the centerline of the street. Restoration shall match the existing surface condition and shall have an adequate width to allow compaction with a small mechanical compactor.

D. All associated temporary water supply measures will be removed following permanent water supply completion.

MEASUREMENT AND PAYMENT

GENERAL

A. All costs associated with any of the above work shall be incidental to the installation of the new watermain.

UNDERGROUND VALVES SECTION

GENERAL

SECTION INCLUDES

A. Underground gate valves and cast iron underground valve boxes.

REFERENCES

A. AWWA C509 - Resilient seated gate valves for water and wastewater systems.

B. AWWA C515 – Reduced wall, resilient sealed gate valves for water and wastewater systems.

C. AWWA C550 – Protection Epoxy interior coatings for valves and hydrants.

D. ANSI/NSF – All products (treatment chemicals and materials) that may meet water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriter’s Laboratories, or other organizations accredited by ANSI to test and certify such products.

PERFORMANCE REQUIREMENTS

A. All valves must seal tightly under system pressure with zero leakage or by pass.

SUBMITTALS

A. Prior to shipping any equipment to the project site supply Engineer with two sets of Manufacturer's drawings, literature, and certification of compliance with specifications.

B. Allow 15 working days for Engineer to review and comment on the submittals.

OPERATION AND MAINTENANCE DATA

A. Upon approval of the submittals furnish 3 copies of Manufacturer's instructions to the Engineer.

QUALITY ASSURANCE

A. Follow all manufacturers' instructions on handling, storage and installation.

B. Verify by visual inspection that all valves have appropriate pressure rating and name stamped in housing.

REGULATORY REQUIREMENTS

A. North Dakota State Department of Health, Municipal Facilities Division.

DELIVERY, STORAGE AND HANDLING

A. Deliver valves and boxes free of damage. Any damage including light scratches shall be reported to Engineer prior to installation.

B. Handle valves and boxes in ways approved by the Manufacturer and Engineer.

C. Repair or replace any component as directed by the Engineer.
D. Store all components in a protected area.

ENVIRONMENTAL REQUIREMENTS

A. Do not discharge high concentrations of disinfectant into the environment.

PRODUCTS

MANUFACTURERS

A. Gate Valve: American Flow Control Series 2500, Waterous.

B. Underground Valve Boxes: Tyler Pipe, Trinity Valley, Sigma, Star.

MATERIALS

A. Gate Valves: Gray or ductile iron body, epoxy coated inside and out with resilient seat, stainless steel bolts on the body, bonnet and stuffing box and standard wrench nuts.

B. Underground Valve Boxes:

1. Standard box will be a 3 piece, screw type with appropriate base, 4¼ inch diameter shaft and cover or drop lid marked "water" with stationary rod with centering ring, which extends to within 3 feet of the finished grade. Do not tighten stationary rod to the opening nut of the gate valve.
2. All valve boxes located on a fire/sprinkler system supply line shall be marked "fire" on the lid and as per number 1 above.

C. Bedding: Utilize existing excavated sandy soil that does not contain rocks or hard chunks larger than ½ inch, if available. If material is not available on site, provide sand from an outside source meeting the following gradation:

Sieve Size	Percent Passing
1/2 inch	100
No. 4	60-85
No. 200	0-10

EXECUTION

EXAMINATION

A. Verify that excavated base is ready to receive gate valve and all piping is installed as shown on the drawings.

B. Verify that all accessories and fittings are on site for proper installation of air release valve within existing manholes.

C. Place bedding material at trench bottom, cradling valve and adjoining pipe. Level materials in continuous layers not exceeding 6 inches compacted depth.

VALVE INSTALLATION

A. Install valves, boxes and accessories in accordance with Manufacturer's instructions according to the line and grade shown on the drawings.

B. Install underground valve boxes plumb and vertical in accordance with the detail shown on the drawings and to the finished grade elevation.

TOLERANCES

A. Extend valve box to a point 0.04 feet below the finished grade surface.

B. Install valve box plumb and vertical.

FIELD QUALITY CONTROL

A. Contact Engineer prior to backfilling over any valve or box.
B. Cover all scratches, nicks and chips on the valve protective coating after proper preparation with an approved coating.

CLEANUP AND PROJECT CLOSEOUT

A. Prior to project acceptance by Owner, Contractor shall, along with Owner’s representative, insert a wrench in each valve box installed and check proper wrench fit and operability.

PROTECTION

A. Protect valve and box from settlement by proper blocking.

B. Protect all valves and underground boxes from damage during backfilling and grading.

C. Protect all valve boxes from debris and clean all debris from valve boxes.

D. Provide 3 foot diamond concrete adjustment around gate valve castings as per the gate valve adjustment detail within Section 199 of plans.

PROJECT RECORD DOCUMENTS

A. Furnish all operational data, including Manufacturer's instructions, parts lists, and maintenance data to Engineer prior to final payment.

MEASUREMENT AND PAYMENT

MEASUREMENT

A. Measure gate valve and box by the unit for each (EA) as defined on the bid form.

PAYMENT

A. Payment will be based upon the actual number of valves furnished, installed and accepted by the Engineer. Bedding and support materials will be incidental to the price bid for the valve and box.
B. If no specific bid items are listed in the proposal, payment for valve, box, bedding and support materials shall be incidental to related items of general construction.

SYSTEM PIPING, VALVES, AND RELATED MATERIALS SECTION

GENERAL

DESCRIPTION

A. This section covers piping, fittings, valves, valve operators and miscellaneous components and materials required for proper system operation.

REFERENCES

A. Applicable ASTM, AWWA and ANSI codes and standards.

B. State Building and Plumbing Codes.

C. ANSI/NSF – All products (treatment chemicals and materials) that may meet water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriter's Laboratories, or other organizations accredited by ANSI to test and certify such products.

1.3 SUBMITTALS

A. Submit manufacturer literature, which documents the construction performance and operation of the applicable components.

B. Allow 15 working days for Engineer to review and comment.

QUALITY ASSURANCE

A. All components must be marked, tagged or identified that they meet the performance requirements outlined herein.

DELIVERY STORAGE & HANDLING

A. All equipment and materials shall be handled, stored and installed in accordance with manufacturer recommendations.

PRODUCTS

MANUFACTURER

A. PVC Pipe – Certain Teed Pipe

B. Ductile Iron Pipe – American Cast Iron Pipe Company

C. Ductile Iron Fittings – Harco, Trinity Valley, Tyler Pipe, Star, Sigma

D. Pipe Couplings – Ford, Dresser, Mueller, Hymax pipes over 12 inch diameter, Romac Industries. Inc., - Macro HP – Pipes up to 12 inch diameterPipe Couplings – Ford, Dresser, Mueller, Hymax

E. Gate Valves – American Flow Control Series 2500, Waterous

F. Valve Actuator – Clow or Keystone

G. Post Indicator – Clow or Mueller

MATERIALS

A. PVC Pipe – Schedule 80 or C900 or C905.

B. Ductile Iron – Class 350, cement lined interior and tar coated exterior wrapped in 20-mil polyethylene.

C. Ductile Iron Fittings – Cement lined interior and tar coated exterior wrapped in 20-mil polyethylene.

D. Pipe Couplings – Epoxy coated steel with all stainless steel bolts wrapped in 20-mil polyethylene.

E. Gate Valves – Gray or ductile iron body, fusion bonded, epoxy coated inside and out with resilient seat, stainless steel bolts on the body, bonnet and stuffing box with standard wrench nuts. All gate valves 16" and above have Bevel Gear Actuator.

F. Post Indicator/Valve Actuator – Cast iron body, painted red above ground and cold tar coated below ground. Unit shall be fixed length with flanged base and gasket, exterior rod, lockable operating handle and target assembly.

EXECUTION

PREPARATION

A. Notify utility companies before digging. Check to make sure all related work is at appropriate stage of completion.

B. Before any city watermain is cut, the contractor shall measure the outside diameter (O.D.) of the pipe with an O.D. tape to make sure contractor has the correct fittings to complete the job. The contractor shall be held responsible for damages caused by not having the correct fittings available.

INSTALLATION

A. Install as shown on the plans.

B. Install per manufacturer’s instructions, unless otherwise directed in writing.

C. Check for leaks before backfilling.

D. Disinfect components to be submersed or which are to come into contact with water prior to installation.

E. Protect all completed work.

CLEAN UP AND PROJECT CLOSEOUT

A. Clean and remove all debris, salvaged materials, etc from site and dispose in proper manner.

B. Provide Engineer with dimensions, which show where underground components are located on an “as constructed drawing".

MEASUREMENT AND PAYMENT

MESUREMENT

A. Unless specific bid items are shown on the bid form for pipe, valves, fittings and related components, payment for all items under this section will be incidental to the other paid items of work.

PAYMENT

A. Payment for defined items will include all equipment, labor and materials required to properly install, construct or connect items and areas of work or shown on the plans.

FIRE HYDRANT SECTION

GENERAL

SECTION INCLUDES

A. Dry Barrel Fire Hydrants

REFERENCES

A. AWWA C502 – Dry Barrel Fire Hydrants

B. AWWA C550 – Protective Coatings for hydrants and valves.

C. ANSI/NSF – All products (treatment chemicals and materials) that may meet water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriter's Laboratories, or other organizations accredited by ANSI to test and certify such products.

PERFORMANCE REQUIREMENTS

A. Hydrant barrel must drain completely whenever hydrant valve is closed.

B. Hydrant shall not leak whenever hydrant valve is fully open.

SUBMITTALS

A. Prior to shipping any equipment to the project site submit Manufacturer's drawings to Engineer for review.

B. Allow 15 working days for Engineer to review and comment.

OPERATION AND MAINTENANCE DATA

A. Upon approval of the submittals furnish Engineer with 3 copies of Manufacturer's drawings and instructions for use in Operation and Maintenance Manual.

QUALITY ASSURANCE

A. Follow all Manufacturer's instructions on handling, storage and installation.

REGULATORY REQUIREMENTS

A. North Dakota State Department of Health, Municipal Facilities Division

B. Occupational Safety and Health Association (OSHA)

DELIVERY, STORAGE AND HANDLING

A. Deliver free of damage.

B. Stored in protected area and handle according to Manufacturer's instructions.

C. Report any damage, including light surface scratches to Engineer prior to installation.

D. Repair or replace any coating or component damage as directed by Engineer.

ENVIRONMENTAL REQUIREMENTS

A. Do not discharge high concentrations of disinfectant into the environment.

PRODUCTS

MANUFACTURERS

A. Fire Hydrants: American Flow Control – Waterous WB 5¼ Pacer approved for 250 psi.

B. Fire Hydrants: American Darling – 5¼ B-62-B approved for 250 psi.

MATERIALS

A. All hydrants furnished and installed shall have breakaway feature with all stainless steel nuts and bolts on the bottom flange. The threads shall be compatible to the equipment of the DICKINSON Fire Department.

B. All hydrants furnished must be rated for 250 psi with two each, 2½ inch diameter hose connections, 4½ inch streamer, break away type traffic flange and minimum 8 foot bury depth.

C. Hydrant thread – hose nozzle #6038. 6 threads per inch, 3.25 inch OD, pumper nozzle #80430, 8 threads per inch, 4 15/16 inch OD (Dickinson Fire Department Thread).

D. Every Hydrant shall have an auxiliary gate valve located on the hydrant lead, 1 foot from the hydrant tee. Valve Box for auxiliary valve shall have stationary rod and lettering marked as “FIRE” on the Lid and as per Underground Valves Section.

EXECUTION

EXAMINATION

A. Verify the exact location of the hydrant and direction of streamer outlet.

B. Verify that pipe has been properly laid and is ready to receive the hydrant.

C. Verify that all accessories and fittings are on site for proper installation of the hydrant.

CONSTRUCTION

A. Install hydrant in accordance with the detail shown on the drawings and to the finished grade elevation.

B. Install appropriate base and blocking as shown on the plans.

C. Follow all Manufacturer’s instructions.

D. Adjust hydrant height in the field so break away traffic flange is properly located. Provide extensions, if necessary, or provide fill material and landscape around hydrant.

E. In the event of high ground water, plug hydrant drain prior to installation. Any hydrant drain plugged, the Contractor shall notify the City of Dickinson Water Utility Maintenance Department.

TOLERANCES

A. Install traffic flange not more than 0.5 feet above the ground surface.

B. Install hydrant plumb and vertical.

C. Install hydrant nozzle height to be 18 inch minimum and 24 inch maximum.

FIELD QUALITY CONTROL

A. Contact Engineer prior to backfilling.

B. Cover all scratches, nicks and chips on the protective coating with an approved coating after proper match preparations.

PROTECTION

A. Protect hydrant from damage during backfilling and grading.

B. Protect aggregate base drain area from becoming contaminated with dust.

C. Install traffic protection posts around hydrants located in open, unprotected areas.

D. The contractor shall cover and protect hydrants from being sprayed with concrete curing compound or hydromulch. Any hydrants sprayed shall be repainted at no cost to the owner.

CLEANUP AND PROJECT CLOSEOUT

A. Prior to project acceptance by Owner, open and close each hydrant valve and observe the barrel drain down in presence of Owner.

B. Verify proper threads by obtaining hose section from Owner and demonstrating the fit to Owner's representative.

PROJECT RECORD DOCUMENTS

A. Furnish all operational data, including manufacturers' instructions, parts lists, and maintenance data to Engineer prior to final payment.

B. In the event hydrant is installed in a high water table area the hydrant drains are to be plugged and the contractor shall provide City Water Maintenance Department with a list of all hydrants plugged and exact location. Also contractor to paint streamer outlet on plugged hydrants yellow in color.

MEASUREMENT AND PAYMENT

MEASUREMENT

A. Basis of measurement for 6IN Hydrant will be by the unit each (EA), as defined on the bid form.

PAYMENT

A. Payment for Fire Hydrants shall be according to the price bid for each hydrant measured and accepted by Engineer. Payment includes all bedding and other support materials required as outlined herein.

FUSIBLE POLYVINYLCHORIDE PIPE FOR INSTALLATION SECTION

GENERAL

DESCRIPTION

A. This section specifies fusible polyvinylchloride pipe, including acceptable fusion technique and practice, safe handling and storage, and installation of the pipe by horizontal directional drilling or directional boring or guided boring.

B. Contractor shall provide a structurally sound, leak proof, monolithic polyvinylchloride pipe for all piping identified for installation by horizontal directional drilling. Individual pipe lengths shall be assembled by butt-fusion unless otherwise specified. Connecting fittings shall be fused or mechanically joined to the piping as specified. Contractor shall also be responsible for all installation processes included drilling, back reaming, management and disposal of all drilling fluid, dewatering flow around his work, and leak testing the fusible polyvinylchloride pipe and fittings in accordance with these specifications.

C. Supplier shall furnish fusible polyvinylchloride pipe conforming to all applicable standards and procedures, and meeting all applicable testing and material properties as described by those standards or within this specification.

QUALITY ASSURANCE

A. References:

1. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of a conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.
2. Unless otherwise specified, references to documents shall mean the documents in effect at the time of construction. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or

otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued.
3. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

References	**Titles**
ANSI/AWWA C110/A21.10	American National Standard for Ductile Iron and Gray Iron Fittings, 3 inch through 48 inch, for Water and Other Liquids
ANSI/AWWA C111/A21.11	American National Standard for Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings
AWWA C605	Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
AWWA C651	Standard for Disinfecting Water Mains
AWWA C900	Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inch through 12 inch, for Water Distribution
AWWA C905	Standard for Polyvinyl Chloride (PVC Pressure Pipe and Fabricated Fittings, 14 inch through 48 inch, for Water Distribution
AWWA M23	AWWA Manual of Supply Practices PVC Pipe - Design and Installation, Second Edition
AWWA M28	AWWA Manual – Rehabilitation of Water Mains
ASTM C495	Standard Test Method for Compressive Strength of Lightweight Insulating Concrete
ASTM C923	Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
ASTM D638	Tensile Properties of Plastics
ASTM D1238	Flow Rates of Thermoplastics by Extrusion Plastomer
ASTM D1505	Standard Test Method for the Density of Plastics by the Density-Gradient Technique
ASTM D1784-02	Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D1785	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D2122	Determining Dimensions of Thermoplastic Pipe and Fittings Test

	Method for Degree of Fusion of Extruded
ASTM D2152	Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion
ASTM D2241	Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)
ASTM D2665	Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM F477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F1057	Standard Practice for Estimating the Quality of Extruded Poly (Vinyl Chloride) (PVC) Pipe by the Heat Reversion Technique
ASTM F1417	Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low Pressure Air
UNI-PUB-6	Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe
UNI-PUB-8	Recommended Practice for the Direct Tapping of Polyvinyl Chloride (PVC) Pressure Water Pipe (Nominal Diameters 6-12 Inch)
NSF-14	Plastics Piping System Components and Related Materials
NSF-61	Drinking Water System Components - Health Effects
PPI TR-2/2006	PVC Range Composition Listing of Qualified Ingredients

MANUFACTURER REQUIREMENTS

A. Fusible polyvinylchloride pipe shall be tested at the extrusion facility for properties required to meet all applicable parameters as outlined in AWWA C900, AWWA C905, and applicable sections of ASTM D2241. Testing priority shall be in conformance with AWWA C900 and AWWA C905.

FUSION TECHNICIAN REQUIREMENTS

A. Fusion Technician shall be fully qualified by the pipe supplier to install fusible polyvinylchloride pipe of the type(s) and size(s) being used. Qualification shall be current as of the actual date of fusion performance on the project.

SPECIFIED PIPE SUPPLIERS

A. Fusible polyvinylchloride pipe shall be used as manufactured under the trade names Fusible C-900®, Fusible C-905®, and FPVC™, for Underground Solutions, Inc., Poway, CA, (858) 679-9551. Fusion process shall be as patented by Underground Solutions, Inc., Poway, CA, Patent No. 6,982,051. Owner and Engineer are aware of no other supplier or fusible polyvinylchloride pipe that is an equal to this specified pipe supplier and product.

WARRANTY

A. A one year warranty for the pipe shall be included, and shall cover the cost of replacement pipe and freight to project site, should the pipe have any defects in material or workmanship.

B. In addition to the standard pipe warranty, the fusing Contractor shall provide in writing a warranty for a period of one year for all the fusion joints, including formation, installation, and pressure testing.

C. Warranty periods shall begin on the date of installation and product acceptance after all applicable testing.

SUBMITTALS

A. The following PRODUCT DATA is required from the pipe supplier and/or fusion provider:

1. Name of the pipe manufacturer and a list of the piping and quantities to be provided by manufacturer.
    a. Product data and pipe supplier data indicating conformance with this specification and applicable standards, including written documentation regarding any intended variance from this specification and applicable standards. This will include experience of pipe supplier by years and number of projects; warranty information; and independent laboratory testing certification.
    b. Material and pipe property testing in conformance with this specification and applicable standards indicating conformance from the pipe extruder per AWWA C900 and AWWA C905:
        1) Dimensional Checks
        2) Pipe Burst
        3) Flattening
        4) Extrusion Quality (Acetone Immersion)

B. Test results will be prepared and made available from the pipe extruder to the Owner or Engineer upon request, for each extrusion run.

C. Fusion joint data and fusion technician data indicating conformance with this specification and applicable standards, including written documentation regarding any intended variance from this specification and applicable standards. This will include fusion joint warranty information and recommended project specific fusion parameters, including criteria logged and recorded by data logger.

D. Material, pipe property, and dimensional data for casing pipe, if used.

E. The following PRODUCT DATA AND INFORMATION is required from the Contractor and/or horizontal directional drilling Contractor:

1. Directional drilling equipment information and certification indicating the applicability of equipment commensurate with the size and scope of the project.
2. Directional drilling operator certification and references, project scope and owners' contact information for the experience commensurate with the size and scope of the project.
3. Shop drawings which will include for each HDD installation any excavation locations, interfering utilities, excavation dimensions, bore dimensions and locations, project specific soil conditions, stress calculations and traffic control schematics.
4. A project safety and contingency plan which shall include but shall not be limited to drilling fluid containment and cleanup procedures, equipment and plan for compromised utility installations including electrical and power lines, water, wastewater and any other subsurface utility.
5. At least two weeks prior to the start of work, the Contractor shall submit his HDD schedule identifying daily work hours and working dates for each installation.
6. Information about the drilling fluid to be used, including product information, material specifications, and handling procedures; material safety data sheet and special precautions required; methods of mixing and application; and disposal plan.

F. The following AS-RECORDED DATA is required from the Contractor and/or fusion provider:

1. Fusion report for each fusion joint performed on the project, including joints that were rejected. Submittals of the Fusion Technician's joint reports are required as requested by the Owner or Engineer. Specific requirements of the Fusion Technician's joint report shall include:
    a. Pipe Size and Dimensions
    b. Machine Size

c. Fusion Technician Identification
d. Job Identification Number
e. Fusion Number
f. Fusion, Heating, and Drag Pressure Settings
g. Heat Plate Temperature
h. Time Stamp
i. Heating and Cool Down Time of Fusion
j. Ambient Temperature

2. As-recorded plan and profile data for the actual alignment of the installed pipeline.
   a. The as-recorded plan will reflect horizontal offset from the baseline and depth of cover, a maximum of every 25 feet and at all changes in direction, whichever is less.
   b. All fittings, valves, or other appurtenances will also be referenced and shown.
   c. This document, along with tracking log sheets, should they be used, shall be provided to the Owner and/or the Engineer. Tracking log sheet data, should it be employed, shall include any and all that apply, including position, roll angle, tilt angle, depth, and hydraulic pull back force measured.
   d. As-recorded plans shall show any deviations from the original plans.

PRODUCTS

FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR POTABLE WATER

A. Fusible polyvinylchloride plastic material for pipe shall conform to AWWA C900 or C905, ASTM D1784, and cell classification 12454. Pipe shall be in accordance with ASTM D2241 for IPS standard dimensions as indicated in these specifications. Compound formulation shall be in accordance with PPI TR-2/2006.

B. Pipe shall be manufactured with 100% virgin resin.

C. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

D. Fusible polyvinylchloride pipe shall be manufactured in a standard 20 foot, 30 foot or 40 foot nominal lengths.

E. Fusible polyvinylchloride pipe shall be blue in color.

F. Pipe shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:
1. Nominal size
2. PVC
3. Dimension Ratio, Standard Dimension Ratio or Schedule
4. AWWA pressure class or rating
5. AWWA Standard designation number
6. NSF-61 mark verifying suitability for potable water service
7. Extrusion production record code
8. Trademark or trade name
9. Cell Classification 12454 and/or PVC material code 1120 may also be included.

G. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.

FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR NON-POTABLE WATER

A. Fusible polyvinylchloride plastic material for pipe shall conform to AWWA C900 or C905, ASTM D1784, and cell classification 12454. Pipe shall be in accordance with ASTM D2241 for IPS standard dimensions as indicated in these specifications. Compound formulation shall be in accordance with PPI TR-2/2006.

B. Pipe shall be manufactured with 100% virgin resin.

C. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

D. Fusible polyvinylchloride pipe shall be manufactured in a standard 20 foot, 30 foot or 40 foot nominal lengths.

E. Fusible polyvinylchloride pipe shall be purple in color.

F. Pipe shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:

1. Nominal size
2. PVC
3. Dimension Ratio, Standard Dimension Ratio or Schedule
4. AWWA pressure class or rating
5. AWWA Standard designation number
6. “Not for Potable Use” designation
7. Extrusion production record code
8. Trademark or trade name
9. Cell Classification 12454 and/or PVC material code 1120 may also be included.

G. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.

FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR WASTEWATER

A. Fusible polyvinylchloride plastic material for pipe shall conform to AWWA C900 or C905, ASTM D1784, and cell classification 12454. Pipe shall be in accordance with ASTM D2241 for IPS standard dimensions as indicated in these specifications. Compound formulation shall be in accordance with PPI TR-2/2006.

B. Pipe shall be manufactured with 100% virgin resin.

C. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

D. Fusible polyvinylchloride pipe shall be manufactured in a standard 20 foot, 30 foot or 40 foot nominal lengths.

E. Fusible polyvinylchloride pipe shall be green in color.

F. Pipe shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:

1. Nominal size
2. PVC
3. Dimension Ratio, Standard Dimension Ratio or Schedule
4. AWWA pressure class or rating
5. AWWA Standard designation number
6. Extrusion production record code
7. Trademark or trade name
8. Cell Classification 12454 and/or PVC material code 1120 may also be included.

G. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.

FUSIBLE POLYVINYLCHLORIDE NON-PRESSURE PIPE FOR WASTEWATER

A. Fusible polyvinylchloride plastic material for pipe shall conform to AWWA C900 or C905, ASTM D1784, and cell classification 12454. Pipe shall be in accordance with ASTM D2241 for IPS standard dimensions as indicated in these specifications.

B. Pipe shall be manufactured with 100% virgin resin.

C. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

D. Fusible polyvinylchloride pipe shall be manufactured in a standard 20 foot, 30 foot or 40 foot nominal lengths.

E. Fusible polyvinylchloride pipe shall be green in color.

F. Pipe shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:

1. Nominal size
2. PVC
3. Dimension Ratio, Standard Dimension Ratio or Schedule
4. AWWA pressure class or rating
5. AWWA Standard designation number
6. Extrusion production record code
7. Trademark or trade name
8. Cell Classification 12454 and/or PVC material code 1120 may also be included.

G. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.

FUSION JOINTS

A. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt fused joints. The Contractor shall follow the pipe supplier's written instructions for this procedure. Joint strength shall be equal to the pipe as demonstrated by testing requirements. All fusion joints shall be completed as described in this specification.

CONNECTIONS AND FITTINGS FOR PRESSURE APPLICATIONS

A. Connections shall be defined in conjunction with the linking of project piping, as well as the tie-ins to other piping systems.

B. DUCTILE IRON MECHANICAL FITTINGS – Acceptable fittings for use with fusible polyvinylchloride pipe shall include standard ductile iron fittings conforming to AWWA/ANSI C110/A21.10 and AWWA/ANSI C111/A21.11.

1. Restrained connections to fusible polyvinylchloride pipe may be made using a restrained retainer gland product for DIPS or IPS sizing, as well as for MJ or flanged fittings. Example manufacturers include:
    a. EBAA Iron – Megalug Series 2000PV, 2000SV, 2100, or Series 2200
    b. Smith-Blair – Cam-Lok, 111/120 series
    c. or approved equal.
2. Bends, tees and other ductile iron fittings shall be restrained with the use of thrust blocking as indicated on the drawings.
3. Ductile iron fittings and retainer glands must be installed per the manufacturer's recommendations.

C. PVC GASKETED, PUSH-ON FITTINGS – Acceptable fittings for use with fusible polyvinylchloride pipe shall include standard PVC pressure fittings conforming to AWWA C900 and AWWA C905.

1. Acceptable fittings for use joining fusible polyvinylchloride pipe other sections of fusible polyvinylchloride pipe or other sections of PVC pipe shall include gasketed PVC, push-on type couplings and fittings, including bends, tees, and couplings as shown in the drawings.
2. Bends, tees and other PVC fittings shall be restrained with the use of thrust blocking as indicated on the drawings.
3. PVC gasketed, push-on fittings and mechanical restraints, if used, must be installed per the manufacturer's recommendations.

D. SLEEVE TYPE COUPLINGS

E. Sleeve type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated on the drawings and in these specifications.

1. Acceptable sleeve-type mechanical pipe couplings shall include for unrestrained coupling:
    a. Smith-Blair Omni-Coupling
    b. Dresser Style 253 or Long Style 253
    c. Hymax Long Body, pipes over 12 inch diameter
    d. Romac Industries, Inc.,- Macro HP, two bolt extended range coupling, pipes up to we inch diameter
    e. or approved equal.

2. Acceptable sleeve type mechanical pipe couplings shall include for restrained coupling EBAA Iron Series 3800 or approved equal.

F. EXPANSION AND FLEXIBLE COUPLINGS

1. Expansion type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated on the drawings and in these specifications.
2. Acceptable expansion type mechanical pipe couplings shall include EBAA Iron EX-TEND 200, Smith-Blair Type-611 or Type-612, or approved equal.
3. Acceptable flexible couplings shall include EBAA Iron FLEX-TEND or approved equal.

G. CONNECTION HARDWARE

1. Bolts and nuts for buried service shall be made of noncorrosive, high strength, low alloy steel having the characteristics specified in ANSI/AWWA C111/A21.11, regardless of any other protective coating.

CONNECTIONS FOR GRAVITY SANITARY SEWER APPLICATIONS

A. The following connections are to be used in conjunction with tie-ins to other gravity sewer piping and structures, and shall be as indicated on the drawings.

B. PVC GASKETED, PUSH-ON COUPLINGS

1. Acceptable couplings for joining fusible polyvinylchloride pipe to other sections of fusible polyvinylchloride pipe or other sections of PVC pipe shall include gasketed PVC, push-on type couplings as shown in the drawings.
2. PVC gasketed, push-on fittings and/or retainer glands must be installed per the manufacturer's recommendations.

C. SLEEVE TYPE COUPLINGS:

1. Sleeve type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated on the drawings and in these specifications.
2. Acceptable sleeve type mechanical pipe couplings shall include for unrestrained coupling Smith-Blair Omni-Coupling, Dresser Style 253 or Long Style 253, Hymax Long Body - pipes over 12 inch diameter, Romac industries, Inc., Macro HP – two bolt extended range couplings, pipes up to 12 inch diameter; or approved equal.
3. Acceptable sleeve type mechanical pipe couplings shall include for restrained coupling, EBAA Iron Series 3800 or approved equal.

D. EXPANSION AND FLEXIBLE COUPLINGS

1. Expansion type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated on the drawings and in these specifications.
2. Acceptable expansion type mechanical pipe couplings shall include EBAA Iron EX-TEND 200, Smith-Blair Type-611 or Type-612, or approved equal.
3. Acceptable flexible couplings shall include EBAA Iron FLEX-TEND or approved equal.

E. CONNECTION HARDWARE

1. Bolts and nuts for buried service shall be made of non-corrosive high strength, low alloy steel having the characteristics specified in ANSI/AWWA C111/A21, regardless of any other protective coating.

F. CONNECTION TO SANITARY SEWER MANHOLES AND STRUCTURES

1. Fusible polyvinylchloride pipe shall be connected to manholes and other structures to provide a leak free, properly graded flow into or out of the manhole or structure.
2. Connections to existing manholes and structures shall be as specified and shown on the drawings.
    a. For a cored or drilled opening provide a flexible, watertight connection that meets and/or exceeds ASTM C923.

b. For a knock out opening, provide a watertight connection (waterstop or other method) meeting the material requirements of ASTM C923 that is securely attached to the pipe with stainless steel bands or other means.

c. Grout opening in manhole wall with non-shrink grout. Pour concrete collar around pipe and outside manhole opening. Provide flexible pipe joint or flexible connector within 2 feet of collar.

3. Connections to a new manhole or structure shall be as specified and shown on the drawings.

a. A flexible, watertight gasket per ASTM C 923 shall be cast integrally with riser section(s) for all precast manhole and structures.

b. Drop connections shall be required where shown on drawings.

c. Grout internal joint space with non-shrink grout.

DRILLING SYSTEM EQUIPMENT

A. GENERAL

1. The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore(s) and pullback of the pipe(s), a drilling fluid mixing and delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide boring operations, and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project. All required equipment shall be included per the emergency and contingency plan as submitted per these specifications.

B. DRILLING RIG

1. The directional drilling machine shall consist of a hydraulically powered system to rotate, push and pull drill pipe while delivering a pressurized fluid mixture to a steerable drill head. The machine shall be anchored to withstand the pulling, pushing and rotating forces required to complete the project.

2. The drilling rig hydraulic system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks.

3. The drilling rig shall have a system to monitor and record maximum pull back hydraulic pressure during pull back operations.

C. DRILL HEAD

1. The horizontal directional drilling equipment shall produce a stable fluid lined tunnel with the use of a steerable drill head.

2. The system must be able to control the depth and direction of the pipe.

3. Drill head shall contain all necessary cutters and fluid jets for the operation, and shall be of the appropriate design for the medium being drilled.

D. DRILLING FLUID SYSTEM

1. DRILLING FLUID (MUD)

a. Drilling fluid shall be composed of clean water and the appropriate additive(s) for the fluid to be used. Water shall be from a clean source and shall meet the mixing requirements of the manufacturer.

b. The water and additives shall be mixed thoroughly to assure the absence of any clumps or clods. No hazardous additives may be used.

c. Drilling fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of bore wall(s).

d. Drilling fluid shall be disposed of offsite in accordance with local, state and federal requirements and/or permit conditions.

e. No additional chemicals or polymer surfactants shall be allowed to be added to the drilling fluid as submitted for this project without written consent of the Owner and/or Engineer.

2. MIXING SYSTEM

a. A self-contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid for the project.

b. The mixing system shall be able to ensure thorough mixing of the drilling fluid. The drilling fluid reservoir tank shall be sized for adequate storage of the fluid.

c. The mixing system shall continually agitate the drilling fluid during drilling operations.

3. DRILLING FLUID DELIVERY AND RECOVERY SYSTEM

a. The drilling fluid pumping system shall have a minimum capacity to supply drilling fluid in accordance with the drilling equipment pull back rating at a constant required pressure.

b. The delivery system shall have filters or other appropriate in-line equipment to prevent solids from being pumped into the drill pipe.

c. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and properly disposed of. The use of spill containment measures shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system (if used) to prevent spills into the surrounding environment. Pumps, vacuum truck(s), and/or storage of sufficient size shall be in place to contain excess drilling fluid.

d. A closed loop drilling fluid system and a drilling fluid cleaning system should be used to whatever extent practical, depending upon project size and conditions. Under no circumstances shall drilling fluid that has escaped containment be reused in the drilling system.

E. PIPE PULL HEADS

1. Pipe pulls heads shall be utilized that employ a positive through bolt design assuring a smooth wall against the pipe cross section at all times.

2. Pipe pull heads shall be specifically designed for use with fusible polyvinylchloride pipe, and shall be as recommended by the pipe supplier.

F. DRILLING CONTROL SYSTEM

1. Calibration of the electronic detection and control system shall be verified prior to the start of the bore.

2. The drilling head shall be remotely steerable by means of an electronic or magnetic detection system. The drilling head location shall be monitored in three dimensions:

a. Offset from the baseline

b. Distance along the baseline

c. Depth of cover

3. Point of rotation of the head shall also be monitored.

4. For gravity application and on grade drilling, sonde/beacon or approved equipment applicable for grade increments of 1/10th of one percent shall be used.

EXECUTION

DELIVERY AND OFF LOADING

A. All pipes shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the Owner or Engineer.

B. Each pipe shipment should be inspected prior to unloading to see if the load has shifted or otherwise been damaged. Notify Owner or Engineer immediately if more than immaterial damage is found.

C. Each pipe shipment should be checked for quantity and proper pipe size, color and type.

D. Pipe should be loaded, off loaded, and otherwise handled in accordance with AWWA M23.

E. A forklift with chisel forks shall be used to off load the pipe. The fork chisel should be checked to be sure it is not thicker than the gap between the units of pipe strapped together for shipping and handling purposes. Extend forks to remove each top unit from the truck. When unloading 20 foot lengths, remove back units first. Do not run forks too far under the units, as fork ends striking adjacent units may cause damage. Insure that the forks are fully engaged. The 30 foot and 40 foot lengths are shipped in single length units. Because these are longer, the packages will flex or bend more than the 20 foot length units. If left bundled in units, unloading can be done with a single forklift so long as it is of sufficient capacity to handle the load. If sag

exceeds recommendation (see the table below as to allowable sag), then each piece of pipe should be unloaded individually. The forks should be placed as far apart as possible to provide support to the unit. When unloading individual pieces of pipe, the pipe should be supported at approximately the 1/3 point measured from each end of the pipe.

Sag in Pipe Lengths during Unloading and Moving	**Height (SAG)**	
Segment		
Nom. Pipe Size (DIPS)	30 foot Length (inches)	40 foot Length (inches)
4	13	23 1/2
6	9	16 1/2
8	7	12 1/2
10	5 1/2	10
12	4 1/2	8 1/2
14	4	7 1/2
16	3 1/2	6 1/2
18	3	5 1/2
20	2 1/2	5
24	2 1/2	4
30	2	3 1/2
36	1 1/2	3
42	1	2 1/2
48	1	2
Segment	**Height (SAG)**	
Nom. Pipe Size (IPS)	30 foot Length (inches)	40 foot Length (inches)
3	18	32 1/2
4	14	25 1/2
6	9 1/2	17
8	7 1/2	13
10	6	10 1/2
12	5	9
14	4 1/2	8
16	4	7
18	3 1/2	6
20	3	5 1/2
24	2 1/2	4 1/2
30	2	3 1/2
36	1 1/2	3
42	1 1/2	2 1/2
48	1	2

F. Sag is the measurement of the pipe ends relative to the pipe center. With a pipe raised on the forklift, a string line can be pulled from the bottom of one end of the pipe to the bottom of the other end of the pipe. The distance in the center from the string to the bottom of the pipe is the sag.

G. If a forklift is not available, a spreader bar with fabric straps capable of handling the load should be used. Recommended lift points when using fabric slings are at the point approximately 1/3 of the length measured from each end of the unit.

H. Off-loading devices such as chains, wire rope, chokers, or other pipe handling implements that may scratch, nick, cut, or gouge the pipe are strictly prohibited.

I. During removal and handling, be sure that the pipe does not strike anything. Significant impact could cause damage, particularly during cold weather.

J. If appropriate unloading equipment is not available, pipe may be unloaded by removing individual pieces. Care should be taken to insure that pipe is not dropped or damaged.

K. Pipe should be carefully lowered, not dropped, from trucks.

L. In preparation for pipe installation, placement of pipe should be as close to the fusion area as practical.

HANDLING AND STORAGE

A. Any length of pipe showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. Damaged areas, or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by the Owner or Engineer.

B. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the Owner or Engineer.

C. Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter.

D. Pipe shall be handled and supported with the use of woven fiber pipe slings or approved equal. Care shall be exercised when handling the pipe to not cut, gouge, scratch or otherwise abrade the piping in any way. Use of hooks, chains, wire rope or any other handling device which creates the opportunity to damage the surface of the pipe is strictly prohibited.

E. After delivery to the project site, fusible polyvinylchloride pipe shall be stored at ambient temperature and protected from ultraviolet light degradation. If pipe is to be stored for periods of 6 months or longer, the pipe must be shaded or otherwise shielded from direct sunlight. Covering of the pipe which allows for temperature buildup is strictly prohibited. Pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excess heat accumulation.

F. Racks or dunnage to prevent damage to the bottom of the pipe during storage should support the pipe lengths. Supports should be spaced to prevent pipe bending and deformation. The pipe shall be stored in stacks no higher than that given in the following table:

Pipe Diameter (inches)	Max. No. of Rows Stacked
8 or less	5
12 to 21	4
24 to 30	3
33 to 48	2

FUSION PROCESS

A. GENERAL

1. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's recommendations.
2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier. Training records for qualified fusion technicians shall be available to Owner or Engineer upon request.
3. Each joint fusion shall be recorded and logged by an electronic monitoring device (data logger) affixed to the fusion machine. Joint data shall be submitted as part of the As-Recorded information, in accordance with this specification.

4. The fusible polyvinylchloride pipe will be installed in a manner so as not to exceed the recommended bending radius.
5. Where fusible polyvinylchloride pipe is installed by pulling in tension, the recommended Safe Pulling Force, according to the pipe supplier, will not be exceeded.
6. Only appropriately sized, and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. Fusion machines must incorporate the following properties, including the following elements:

a. HEAT PLATE – Heat plates shall be in good condition with no deep gouges or scratches within the pipe circle being fused. Plates shall be clean and free of any contamination. Heater controls shall properly function, and cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier's recommendations.
b. CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.
c. GENERAL MACHINE – Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.
d. DATALOGGER – The current version of the pipe supplier's recommended and compatible software shall be used. Protective case shall be utilized for the hand held wireless portion of the unit. Datalogger operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.

7. Other equipment specifically required for the fusion process shall include the following:

a. Pipe rollers shall be used for support of pipe to either side of the machine.
b. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement and/or windy weather.
c. Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.
d. Facing blades specifically designed for cutting fusible polyvinylchloride pipe.

B. JOINT RECORDING

1. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the butt-fusion of thermoplastic pipe. The software shall register and/or record the parameters required by the manufacturer and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician's joint report.

DRILLING OPERATIONS

A. GENERAL

1. Grades, radii, and alignment of the proposed HDD installation are presented in the drawings for reference and intended bore path. The path of the bore may be modified based on field and equipment conditions. Entry and exit locations and control point elevations shall be maintained as shown on the drawings and specified, unless otherwise approved by the Owner or Engineer.
2. Bend radii shown on the drawings are minimum allowable radii and shall not be reduced. Control point elevations shown on the drawings are minimum allowable cover and/or separation and shall not be reduced.

B. LOCATION AND PROTECTION OF UNDERGROUND UTILITIES

1. Correct location of all underground utilities that may impact the HDD installation is the responsibility of the Contractor, regardless of any locations shown on the drawings or previous survey completed by the Engineer and/or Owner.
2. Utility location and notification services shall be contacted by the Contractor prior to the start of construction.
3. All existing lines and underground utilities shall be positively identified, including exposing those facilities that are located within an envelope of possible impact of HDD installation as

determined for the project specific site conditions. It is the Contractor and HDD system operator's responsibility to determine this envelope of safe offset from existing utilities. This will include, but is not limited to, soil conditions and layering, utility proximity and material, HDD system and equipment, and foreign subsurface material.

4. The Contractor shall pot hole and locate all existing lines and underground utilities. The Contractor shall fill and compact all pot holes and return the surface to its original grade and surface material. All pot holes in pavement areas will be patched with High Early Concrete with the concrete to be 8 inches in depth, minimum. This work shall be incidental to the Horizontal Directional Drilling installation.

C. SITE LOCATION PREPARATION

1. Work site as indicated on drawings shall be graded or filled to provide a level working area. No alterations beyond what is required for operations are to be made.
2. Contractor shall confine all activities to designated work areas.

D. DRILLING LAYOUT AND TOLERANCES

1. The drill path shall be accurately surveyed with entry and exit areas placed in the appropriate locations within the areas indicated on drawings. If using a magnetic guidance system, drill path will be surveyed for any surface geomagnetic variations or anomalies.
2. Instrumentation shall be provided and maintained at all times that accurately locates the pilot hole, measures drill string axial and torsional loads and measures drilling fluid discharge rate and pressure.
3. Entry and exit areas shall be drilled so as not to exceed the bending limitations of the pipe as recommended by the manufacturer.

E. PILOT HOLE BORE

1. Pilot hole shall be drilled along bore path. In the event that the pilot bore does deviate from the bore path, Contractor shall notify Owner and Engineer and the Owner and/or Engineer may require Contractor to pull back and redrill from the location along bore path before the deviation.
2. The Contractor shall limit curvature in any direction to reduce force on the pipe during pullback. Ideally, the directional bore should lie in a vertical plane. The minimum radius of curvature shall be no less than that specified by the pipe manufacturer and as indicated on the drawings.
3. In the event that a drilling fluid fracture, inadvertent returns or returns loss occurs during pilot hole drilling operations, Contractor shall cease drilling and contact the Owner and Engineer.
4. Owner and/or Engineer shall approve the pilot hole bore alignment prior to back reaming phase and pipe installation.

F. REAMING

1. After successfully completing the pilot hole, the bore hole shall be reamed to a diameter which meets all local jurisdictional standards and the following table as a minimum:

Nominal Pipe Diameter	**Bore Hole Diameter**
< 8 inches	Pipe Dia. + 4 inches
8 inches to 24 inches	Pipe Dia. x 1.5
> 24 inches	Pipe Dia. + 12 inches

2. Multiple reaming passes shall be used at the discretion of the Contractor and shall conform to these specifications.
3. A swivel shall be used between the reaming head and the fusible polyvinylchloride pipe to minimize torsion stress on the assembly.
4. In the event of a drilling fluid fracture, returns loss or other loss of drilling fluid, the Contractor shall be responsible for restoring any damaged property to original condition and cleaning up the area in the vicinity of the damage or loss. Contractor shall immediately inform the Owner and Engineer.

PIPE PULL BACK AND INSERTION

A. Pipe shall be fused prior to insertion, if the site and conditions allow, into one continuous length.

B. Contractor shall handle the pipe in a manner that will not over stress the pipe prior to insertion. Vertical and horizontal curves shall be limited so that the pipe does not over deflect, buckle, or otherwise become damaged. Damaged portions of the pipe shall be removed and replaced.

C. The pipe entry area shall be graded as needed to provide support for the pipe and to allow free movement into the bore hole.
1. The pipe shall be guided into the bore hole to avoid deformation of, or damage to, the pipe.
2. The fusible polyvinylchloride pipe may be continuously or partially supported on rollers or other Owner and Engineer approved friction decreasing implement during joining and insertion, as long as the pipe is not over stressed or critically abraded prior to, or during installation.

D. Buoyancy modification shall be at the sole discretion of the Contractor, and shall not exceed the pipe supplier's recommendations. Damage caused by buoyancy modifications shall be the responsibility of the Contractor.

E. Once pullback operations have commenced, the operation shall continue without interruption until the pipe is completely pulled through the bore hole. Except for drill rod removal, pull back operation shall not cease until the pipe has been completely installed to final position. During the pull back operations, excessive pull back force shall be reported to Owner and Engineer.

F. The pipe shall be installed in a manner that does not cause upheaval, settlement, cracking, or movement and distortion of surface features. Any damages caused by the Contractor's operations shall be corrected by the Contractor at no cost to the Owner.

G. The Contractor shall provide vent holes along the boring route. The number of vents will depend upon the Contractor's construction operation. The Contractor shall fill and compact all vent holes and return the surface to its original grade and surface material. All vent holes in pavement areas will be patched with High Early Concrete with the concrete to be 8 inches in depth, minimum. This work shall be incidental to the Horizontal Directional Drilling installation.

H. See Tracer Wire Section for Tracer Wire Requirements.

PREPARATION PRIOR TO MAKING CONNECTIONS INTO EXISTING PIPING SYSTEMS

A. Approximate locations for existing piping systems are shown on the drawings or detailed in the specifications. Prior to making connections into existing piping systems, the Contractor shall:

1. Field verify location, size, piping material and piping system of the existing pipe.
2. Obtain all required existing piping manufacturer(s) approved fittings (i.e., saddles, sleeve type couplings, flanges, tees, etc., as shown).
3. Have installed all temporary pumps and/or pipes in accordance with established connection plans.
4. Have on hand necessary pipe stoppers, pancake flanges or other items which may be necessary should an existing valve or appurtenance fail to seal properly.

B. Unless otherwise approved by the Engineer, new piping systems shall be completely assembled and successfully tested prior to making connections into existing pipe systems.

PIPE SYSTEM CONNECTIONS

A. Pipe connections shall be installed per applicable standards and regulations, as well as per the connection manufacturer's recommendations and as indicated on the drawings. Pipe connections to structures shall be installed per applicable standards and regulations, as well as per the connection manufacturer's recommendations.

TAPPING FOR POTABLE AND NON-POTABLE WATER APPLICATIONS

A. Tapping shall be performed using standard tapping saddles designed for use on PVC piping in accordance with AWWA C605. Tapping shall be performed only with use of tap saddles or sleeves. NO DIRECT TAPPING WILL BE PERMITTED. Tapping shall be performed in accordance with the applicable sections for Saddle Tapping per Uni-Pub-8.

B. Tapping sizes shall be limited to the following maximum diameters for the nominal pipe diameters as indicated below:

1. Nominal pipe diameters14 inch and under in size shall be limited to a maximum tapping diameter of 1 inch.
2. Nominal pipe diameters 16 inch - 18 inch in size shall be limited to a maximum tapping diameter of 2 inch.
3. Nominal pipe diameters 20 inch- 24 inch in size shall be limited to a maximum tapping diameter of 4 inch.
4. Nominal pipe diameters 30 inch and larger in size shall be limited to a maximum tapping diameter of 6 inch.

C. All other connections requiring a larger diameter shall be made with a pipe connection as specified and indicated on the drawings.

D. Equipment used for tapping shall be made specifically for tapping PVC pipe:

1. Tapping bits shall be slotted “shell” style cutters, specifically made for PVC pipe. ‘Hole saws’ made for cutting wood, steel, ductile iron, or other materials are strictly prohibited.
2. Manually operated or power operated drilling machines may be used.

E. Taps may be performed while the pipeline is filled with water and under pressure (‘wet’ tap), or when the pipeline is not filled with water and not under pressure (‘dry’ tap).

INSTALLATION ACCEPTANCE AND CLEANUP

A. If the final grade of the finished installation is not satisfactory to the Owner, Engineer or other jurisdictional entity, the pipe shall be abandoned, full pressure grouted in place in accordance with the jurisdictional authority, and an alternate installation shall be made. The abandoned pipe shall be properly shown on as recorded drawings to be submitted following conclusion of the construction work.

B. The Engineer shall inspect the installed pipe ends for roundness and/or damage. Evidence of significant surface scratching shall be brought to the attention of the Engineer. Gouges or excessive surface damage of more than 10 percent of the wall thickness may be grounds to abandon the bore and have the Contractor re-drill another line at no additional cost to the Owner.

C. Following the installation, the project site shall be returned to a condition equal to or better than the preconstruction condition of the site. All excavations will be backfilled and compacted to 95% maximum density. All pavement and hardscape shall be repaired per applicable jurisdictional standards, excess materials shall be removed from the site, and disturbed areas shall be re-landscaped. All drilling fluid shall be properly disposed of.

TESTING

A. Testing shall comply with all local building codes, statutes, standards, local jurisdiction, and laws.

B. HYDROSTATIC TESTING AND LEAKAGE TESTING FOR PRESSURE PIPING

1. Hydrostatic and leakage testing shall comply with AWWA C605.
2. Hydrostatically test all pressure pipe in the presence of Engineer at a minimum pressure of 150 psi for a period of no less than 3 hours, with pipe section being tested to maintain pressure within 5 PSI of the specified hydrostatic test pressure. Determine allowable leakage per hour by the following equation:

$Q = \frac{LD\sqrt{P}}{148{,}000}$

Where:

Q= quantity of makeup water, in gallons per hour
L= length of pipe section being tested, in feet
D= nominal diameter f the pipe, in inches
P= average test pressure during the hydrostatic test in pounds per square inch (gauge)

3. If hydrostatic testing and leakage testing are performed at separate times, follow procedures as outlined in AWWA C605.
4. In preparation for pressure testing the following parameters must be followed:

a. All air must be vented from the pipeline prior to pressurization. This may be accomplished with the use of the air relief valves or corporation stop valves, vent piping in the testing hardware or end caps, or any other method which adequately allows air to escape the pipeline at all high points. Venting may also be accomplished by 'flushing' the pipeline in accordance with the parameters and procedures as described in AWWA C605.

b. The pipeline must be fully restrained prior to pressurization. This includes complete installation of all mechanical restraints per the manufacturer's instructions and recommendations, whether permanent or temporary to the final installation. This also includes the installation and curing of any and all required thrust blocking. All appurtenances included in the pressure test, including valves, blow offs, and air relief valves shall be checked for proper installation and restraint prior to the beginning of the test.

c. Temporary pipeline alignments that are being tested, such as those that are partially installed in their permanent location shall be configured to minimize the amount of potentially trapped air in the pipeline.

5. Obtain Engineer's approval of testing equipment. Equipment, as a minimum must consist of a volumetrically calibrated water tank with cover, oil filled pressure gage graduated in feet of water or psi, flexible hoses, leak free valves and gas driven pump with capability to develop 200 psi of discharge pressure.

6. If leakage is greater than allowable, take immediate action to correct the problem(s) and retest the section until leakage limits are met.

7. If a new section of pipe is connected to an existing main or to a service connection, take appropriate action to prevent damage to the existing main. This may include temporary capping and blocking and leaving trench open for visual leakage inspection by Engineer.

C. LEAKAGE TESTING FOR NON-PRESSURE PIPING

1. Gravity sanitary sewers shall be tested for excessive leakage. This may include appropriate water or low pressure air testing. The leakage outward or inward (exfiltration or infiltration) shall not exceed 25 gallons per inch of pipe diameter per mile per day for any section of the system. An exfiltration or infiltration test shall be performed with a minimum positive head of 2 feet. The air test, if used, shall be conducted in accordance with one of the following Standards:

a. ASTM F1417

b. UNI-B-6

2. The testing method selected shall properly consider the existing groundwater elevations during the test. If the test section fails the test for excessive leakage, the Contractor shall repair or replace all defective materials and/or workmanship at no additional cost to the Owner.

D. DEFLECTION TESTING FOR NON-PRESSURE PIPING

1. After completion of the backfill, the Engineer or Owner may require that a deflection test be performed. If the test section fails the test for excessive deflection, the Contractor shall repair or replace all defective materials and/or workmanship at no additional cost to the Owner.

2. Deflection tests should be conducted using a go/no-go mandrel. The mandrel's outside dimension shall be sized to permit no more than 5 percent deflection. The percent deflection shall be established from the base inside diameter of the pipe. If the internal beading of the joints for the pipe is not required to be removed, the mandrel shall account for this clearance as well. The mandrel shall be approved by the Owner or Engineer prior to use. Lines that permit safe entry may allow other deflection test options, such as direct measurements with extension rulers.

E. DISINFECTION OF THE PIPELINE FOR POTABLE WATER PIPING

1. Refer to Section Disinfection of Water System of the Special Provisions.

F. PARTIAL TESTING

1. Segments of the pipe may be tested separately in accordance with standard testing procedure, as approved by the Owner and Engineer.

MEASUREMENT AND PAYMENT

MEASUREMENT

A. Measure fusible polyvinylchloride pipe by the linear foot (LF) of pipe as required, installed and accepted by the Engineer. Extend measurement along the center line of the pipe.

B. The fusion of the pipe, the fusion of equipment, preparation, handling and storage shall all be incidental to the fusible polyvinylchloride pipe.

C. Measure fittings by the pound, using standard, manufacturer listed weights for the actual size and type of fitting installed and accepted by the Engineer. Flanged and mechanical joint fittings will include all bolts, gaskets and accessories.

D. Bedding, thrust blocking, lubricant, trimming and any other miscellaneous items or special requirements shall be incidental to the pipe or fittings and will not be measured.

PAYMENT

A. Payment for fusible polyvinylchloride pipe installed by trenching shall be paid as per the item of work listed on the bid form for trenching for the actual length approved by the Engineer. Payment includes all trenching excavation, fusing of pipe, fusion equipment, installation of pipe in trench, bedding materials, backfilling, compacting, water for compacting and the additional items listed herein.

B. Payment for fusible polyvinylchloride pipe installed by horizontal directional drill (HDD) shall be paid as per the item of work listed on the bid form for HDD and the actual length approved by the Engineer. Payment includes excavating of bore holes, fusing of the pipe, fusion equipment, boring equipment, installation of the pipe, water and lubricant, backfilling and compacting of bore pits, removal of drilling fluid, clean up and the additional items listed herein.

C. Payment for hydrostatic testing, disinfection, testing and flushing shall be incidental to the pipe installed.

D. If specific items of required work are not as listed on the bid form, consider payment incidental to other, related, items of work.

WATER SERVICE LINES SECTION

GENERAL

SECTION INCLUDES

A. Water Service Connection, pipe and fittings for domestic water service line, curb stop and box.

REFERENCES

A. ASTM D-2239 – Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.

B. North Dakota State Plumbing Code.

C. North Dakota State Department of Health Rules and Regulations (Ten State Standards).

D. ANSI/NSF – All products (treatment chemicals and materials) that may meet water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriter's Laboratories, or other organizations accredited by ANSI to test and certify such products.

E. Section Disinfection of Water System of the Special Provisions.

SYSTEM DESCRIPTION

A. Pipe, fittings and appurtenant items are specifically manufactured and constructed to connect to a water distribution system and to convey water to an independent service connection such as a residence or business. A service is defined as less than 4 inches in diameter.

PERFORMANCE REQUIREMENTS

A. Pipe and fittings have no leaks and are able to withstand intermittent surges at least 2 times the rated pressure of the pipe.

SUBMITTALS

A. Provide manufacturers data on all pipe materials, fittings, valves and accessories to Engineer prior to shipping to site.

B. Allow 15 working days for Engineer to review submittals and respond appropriately.

QUALITY ASSURANCE

A. Identify all pipe on the exterior with applicable ASTM Standards, manufacturer's name and pressure rating with permanent marking.

B. Identify other components with manufacturer's name and pressure rating marked visibly on exterior surface or have a certified tag accompanying the appropriate items stating they meet the specification.

The city Public Safety Building will be provided with water service in the vicinity of STA. XX+XX. The service saddle will be Ford Stainless Steel FS333 or Romac 305 All Stainless Steel Service Saddle or equal. The corporation stop will be ball type, no lead, AWWA/CC x Compression by Ford Meter Box Company, Inc. [FB1001-7-IDR7-NL] or equal. The service line will be 2 inch Polyethylene Class 160. The curb stop will be ball type, no lead, compression joint both sides, Minneapolis pattern by Ford Meter Box Company, Inc. [B66-777M-IDR7-NL] or equal.

REGULATORY REQUIREMENTS

A. North Dakota State Plumbing Board.

B. Municipal Facilities Division of the North Dakota State Department of Health.

DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products in accordance with manufacturer's recommendations. Keep all openings capped or wrapped until ready to use.

B. Deliver and store valves and other fittings in shipping containers with labeling in place.

C. Store in a protected area.

ENVIRONMENTAL REQUIREMENTS

A. Do not flush high concentrations of disinfectant into the open environment.

B. Do not bury or dispose of solid waste in pipe trench. Use proper disposal methods.

PRODUCTS

MANUFACTURERS

A. Pipe: Granse, Eagle Plastic or Yardley for polyethylene and Halstad or Reading for copper tubing.

B. Service Connection:
1. Romac – Saddle Style 306 SS
2. Ford – Service Saddle, Style FS 303
3. Ford – Ball Corporation Stop, Style FB-1001.
4. McDonald – Ball Style Corporation Stop – 4704B-33.

C. Ball Curb Stop and Box:
1. Ford – Curb stop and box – Style FB 66444M for IPS PE pipes and FB 22444M for copper tubing.
2. McDonald – Ball Style Curb Stop - 6104-33, Curb Box – 5614

MATERIALS

A. Pipe: Polyethylene Pipe: Class 200 (IPS) SDR-7 P.E. 3408, High Density ASTM D-2239.

B. Copper Tubing: Type K meeting ASTM B-88.

C. Service Connection: Double bolt, stainless steel.

D. Curb Stop and Box: The length of the curb box extended shall be 7 foot 6 inches. Each box shall be equipped with lid and plug. Curb boxes shall be Minneapolis Pattern (thread type). A wood stud shall be placed by the curb box. The curb box shall be brought up to finished grade.

E. Bedding: Utilize existing excavated sandy soil that does not contain rocks or hard chunks larger than ½ inch, if available. If material is not available on site, provide sand from an outside source meeting the following graduation:

Sieve Size	Percent Passing
1/2 inch	100
No. 4	60-85
No. 200	0-10

F. All fittings shall be red brass (no lead brass).

G. All corporations and curb stops shall be ball style valves.

H. All fittings for copper lines shall be compression.

I. Service lines sizes in 1 ¼ inch or 3 inch will not be allowed.

J. Wrap on saddle sleeve shall be Romac 55-306 with AWWA tapered thread or equal, width shall be a minimum of 3 ½ inch. Wrap on saddles shall be used on 6 inch PVC and smaller PVC mains. Full circle clamps shall be used on taps over 1 inch on all types of watermains and any watermain 8 inch or larger except C-900 PVC. Full circle clamps shall be Rockwell Full Circle Clamp 55-256 or equal, width shall be a minimum of 8 inch exception C-900, then wrap on sleeve may be used as above.

K. A solid brick or concrete block shall be placed under all curb stops. Curb stops to remain off until new main and services have been pressure tested, flushed and disinfected.

L. All corporations and curb stops shall be brass pack joints.

EXECUTION

EXAMINATION

A. Verify existing conditions as shown on the plans or described herein.

B. Verify that building service connection and municipal utility watermain size, location and invert are as indicated or proposed.

C. Hand trim excavations to required elevations. Provide proper pipe bedding for pipe and bell configuration.

D. Remove clay lumps, large stones or other hard matter that could damage pipe or impede consistent backfilling or compaction.

E. Place bedding material at trench bottom, cradling valves and pipe. Level materials in continuous layers not exceeding 6 inches in compacted depth.

CONSTRUCTION

A. Ream pipe and tube ends and remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Assemble as much as possible before lowering into trench.

D. Prepare pipe connections according to manufacturer's recommendations and industry standards.

E. Maintain separation of water lines from sewer piping as follows:

1. Parallel Installation:

    a. Watermains shall be laid at least 10 feet horizontally from any existing or proposed gravity sanitary or storm sewer, septic tank, or subsoil treatment system. The distance shall be measured edge to edge.

b. In cases where it is not practical to maintain a 10 foot separation, the reviewing authority may allow deviation on a case-by-case basis, if supported by data from the Design Engineer.

2. Crossings:

a. Watermains crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the watermain and the outside of the sewer. This shall be the case where the watermain is either above or below the sewer with preference to the watermain located above the sewer.

b. At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. Special structural support for the water and sewer pipes may be required.

3. Exception: When it is impossible to obtain the minimum specified distance, the reviewing authority must specifically approve any variance. Where sewers are being installed the following methods of installation may be used:

a. Such deviation may allow installation of the watermain closer to a sewer, provided that the watermain is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the watermain is at least 18 inches above the top of the gravity sewer.

b. The sewer materials shall be water works grade 150 psi (1.0 Mpa) pressure rated pipe meeting AWWA standards or pipe approved by the reviewing authority and shall be pressure tested to ensure water tightness.

4. Force mains: There shall be at least a 10 foot horizontal separation between watermains and sanitary sewer force mains. There shall be an 18 inch vertical separation at crossings as required in item 2 - Crossings.

5. Sewer Manholes: No water pipe shall pass through or come in contact with any part of a sewer manhole. Watermain should be located at least 10 feet from sewer manholes.

6. Separation of Watermains from Other Sources of Contamination: Design Engineers should exercise caution when locating watermains at or near certain sites such as sewage treatment plants or industrial complexes. On site waste disposal facility, including absorption field must be located and avoided. The Engineer must contact the reviewing authority to establish specific design requirements for locating watermains near any source of contamination.

F. Install pipe bedding and hand tamp. Hand trim trench as necessary.

G. Install pipe in straight line or in straight segments.

H. Establish elevations of buried piping to ensure not less than 7½ feet of cover.

I. Maintain a temporary plug in each section of pipe until the adjoining section is installed.

J. Protect pipe and bedding until backfilling operations are completed.

K. Only local Water Utility Maintenance employees shall operate existing fire hydrants and valves, Contractor shall call City to coordinate for operation of existing utilities.

HYDROSTATIC TESTING

A. Hydrostatically test all pipe, components and accessories in the presence of Engineer at a minimum pressure of 150 PSI for a period of no less than 3 hours. Test methods and equipment must be approved by Engineer prior to beginning test. If any leakage is found, take appropriate action to correct problem and then retest as described herein.

FLUSHING AND DISINFECTION

A. Coordinate with Water Utility Maintenance Department for flushing of new main and operation of existing utilities.

B. Flush and disinfect in the presence of Engineer to the approval of Engineer immediately after completion of pressure test.

C. Always flush away from existing mains or services, if possible.

D. Whenever a service is connected to an existing main, flush the service through a yard spigot.

E. Provide temporary piping and valving if necessary.

FIELD QUALITY CONTROL

A. Contact Engineer prior to placing any fill over pipe.

B. Double check all pipe, fittings and connections to make sure they are clean, leak free and correctly assembled.

CLEANUP AND PROJECT CLOSEOUT

A. Verify all curb boxes and pipe ends are properly marked for future relocation.

B. Verify with Owner's representative whether curb stops should be open or closed.

C. Review project with Owner's representative to make certain all curb stops are accessible and operable.

PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of piping, valves, connections, and invert elevations where applicable on "as constructed" plans.

B. Identify and describe the discovery of uncharted utilities.

C. Provide Engineer with a complete set of "as constructed" plans showing ties to all connections and termination points of all piping and appurtenances prior to final payment.

MEASUREMENT AND PAYMENT

MEASUREMENT

A. Measure water service line by the linear foot (LF) as installed and accepted by the Engineer. Extend measurement from the centerline of the watermain to the curb stop.

B. Measure water service connections by the complete unit (EA) as installed and accepted by the Engineer. Each unit includes the tapping of the main, saddle and corporation.

PAYMENT

A. Payment for all items of work listed on the bid form will be for the actual number of units approved by the Engineer. Payment includes excavation, hand trimming of trench, bedding, materials, equipment and backfilling.

B. If specific items of required work are not listed on the Bid Form, payment will be considered incidental to other related items of work.

DISINFECTION OF WATER SYSTEM

GENERAL

SECTION INCLUDES

A. Disinfection of potable water distribution and/or transmission system.

B. Testing and reporting results.

REFERENCES

A. AWWA B300 - Hypochlorites; American Water Works Association; 2011 (ANSI/AWWA B300).

B. AWWA B301 - Liquid Chlorine; American Water Works Association; 2010 (ANSI/AWWA B301).

C. AWWA B302 - Ammonium Sulfate; American Water Works Association; 2010 (ANSI/AWWA B302).

D. AWWA B303 - Sodium Chlorite; American Water Works Association; 2010.

E. AWWA C651 - Disinfecting Water Mains; American Water Works Association; 2005 (ANSI/AWWA C651).

SUBMITTALS

A. Submit Safety and Data Sheets (SDS) to Engineer for each type of disinfectant to be used prior to beginning the disinfection process.

B. Follow requirements Submittals Section of the Special Provisions.

QUALITY ASSURANCE

A. Submit bacteriologist's signature and authority associated with testing.

B. Test all samples at a laboratory approved by the State Department of Health.

REGULATORY REQUIREMENTS

A. North Dakota State Department of Health, Municipal Facilities Division.

B. Where possible do not allow any water to be taken from system until after all bacterial results have been confirmed as passing standards.

C. Monitor free residual on an hourly basis for the first 6 hours. Document all test results.

D. Do not allow any water to be taken from system for human consumption until certain it is free of harmful bacteria.

DELIVERY, STORAGE AND HANDLING

A. Follow all instructions on the Safety and Data Sheet (SDS) on the proper handling and storage of the disinfectant being used.

ENVIRONMENTAL REQUIREMENTS

A. Do not dispose disinfection chemicals or water with concentrations of more than 2 mg/l of disinfectant into the environment. Dilute any concentrations greater than 2 mg/l prior to discharge.

B. Properly dispose of all chemical containers.

PRODUCTS

MANUFACTURERS

A. Hawkins Chemical or approved equal.

MATERIALS

A. Certify all disinfectant products as meeting applicable AWWA Standards.

B. Hypochlorite’s, Liquid Chlorine and Chlorine gas, are approved for use in disinfection.

EXECUTION

EXAMINATION

A. Verify that water system has been cleaned, flushed, inspected, and pressure tested.

B. Verify that all services are turned off.

C. Perform scheduling and disinfecting activity with start-up, testing, adjusting and balancing, demonstration procedures, including coordination with related systems and services.

EXECUTION

A. The option to be used can be determined in the field with advance approval by the Engineer.

B. Option 1 – Tablet Method

1. During construction, place the following number of calcium hypochlorite tablets in each 20 foot long section of pipe, both mainline and branch lines.

Pipe Diameter	No. of 5-G Tablets
4	1
6	1
8	2
10	3
12	4

2. Attach the tablets to the inside top of pipe by a food grade adhesive. Attach an equal number of tablets to each section of pipe.
3. When installation is complete, fill the main with water at a rate that maintains a velocity no greater than 1 foot/second.
4. Maintain water in pipe for at least 24 hours. Operate all valves and hydrants during the 24 hour period.
5. At the end of the 24 hour period, residual shall be greater than 2 mg/l of free chlorine.
6. If free residuals are acceptable, flush the main and two (2) sets of bacteriological tests shall be taken for each 1200 LF maximum, of new watermain installed with tests taken at least 24 hours apart.
7. If free residuals are less than the 2 mg/l, the engineer shall determine the appropriate action.

C. Option 2 - Continuous Feed Method

1. Flush all components to remove particulate matter and air. Flushing should be done at a rate, which maintains a velocity of 2.5 feet/second and continues until water is clear as determined by Engineer.
2. Connect chlorine feed equipment (gas or liquid) at a point not more than 10 feet downstream from beginning of new main.
3. Chlorine shall be fed by solution at a rate, which will provide a free chlorine residual within the main of not less than 25 mg/l. At the end of a 24 hour period, this residual shall not be less than 10 mg/l.
4. The following Table can be used as a guide to determine amounts of chlorine needed:

Approximate Amount of Chloring Needed for 50 mg/l Chloring Solution

Volume of Reservoir or Pipeline (Gallons)	**Liquid laundry Bleach (5.25% Chlorine)**	**Calcium Hydrochlorite (70% Chlorine)**
1,000	1 gallons	0.6 Pounds
5,000	5 gallons	3.0 Pounds
10,000	10 gallons	6.0 Pounds
25,000	25 gallons	15.0 Pounds
50,000	50 gallons	30.0 Pounds
75,000	75 gallons	45.0 Pounds
100,000	100 gallons	60.0 Pounds
500,000	500 gallons	300.0 Pounds

5. Flush main slowly while chlorine is being injected at the upstream end. Regular testing at the discharge point will determine when the entire main has been chlorinated.
6. Maintain chlorinated water in main for 24 hours during which time all valves shall be operated.
7. After the 24 hour period, take two random sample for each 1200 feet maximum, of main being tested.
8. If the free chlorine residual is greater than 10 mg/l at all points tested, flush the main. Take bacteriological tests for each 1200 LF maximum, of new watermain installed with tests taken at least 24 hours apart.
9. If residuals are less than 2 mg/l the Engineer will determine the appropriate course of action.

D. Option 3 - Slug Method

1. Process is identical to Option 2 except that the water is dosed with chlorine to a concentration of 100 mg/l for a period of three hours.
2. At the end of the 3 hour period, a free chlorine residual not less than 50 mg/l.
3. If the free residual is less than 50 mg/l at any random point tested, as determined by the Engineer, the Engineer will decide an appropriate course of action.
4. If all samples have more than 50 mg/l of free residual, flush the main. Take two (2) sets of bacteriological tests for each 1200 LF maximum, of new watermain installed with tests taken at least 24 hours apart.
5. If residuals are less than 2 mg/l the Engineer will determine the appropriate course of action.

TOLERANCES

A. A plate count of "zero" is required on the bacteriological test.

B. The feed or application rates stated herein are for general guidance only. Refer to AWWA C651 for exact limits.

FIELD QUALITY CONTROL

A. After final flushing each 1,200 foot segment and branches greater than 50 LF, and before the new water main is connected to the distribution system, two consecutive sets of acceptable samples, per 1,200 foot main or 50 foot branch shall be collected from the new main and taken at least 24 hours apart.

B. Exact number of free residual tests will vary with the size of system but in no case take fewer than two sets of tests with three (3) random samples, at least 24 hours apart.

C. Copies of all bacteriological tests shall be sent to the Field Engineer and the City Water Utility Maintenance Department.

CLEANUP AND PROJECT CLOSEOUT

A. Clean up and properly dispose of all chemicals and containers.

B. Drain any standing water from flushing.

PROJECT RECORD DOCUMENTS

A. Disinfection report:
1. Type and form of disinfectant used.
2. Date and time of disinfectant injection start and time of completion.
3. Test locations.
4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested (two tests, 24 hours apart).
5. Date and time of flushing start and completion.
6. Disinfectant residual after flushing in ppm for each outlet tested.

B. Bacteriological report:

1. Date issued, project name, and testing laboratory name, address, and telephone number.
2. Time and date of water sample collection.
3. Name of person collecting samples.
4. Test locations.
5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested (two tests, 24 hours apart).
6. Coliform bacteria test results for each outlet tested.

MEASUREMENT AND PAYMENT

MEASUREMENT

A. Payment for disinfection of a water system and/or components thereof will be incidental to other related items of work unless a specific proposal item is shown for disinfection.

UNDERGROUND PVC WATER DISTRIBUTION PIPE & FITTINGS SECTION

GENERAL

SECTION INCLUDES

A. Watermain piping, fittings, accessories, and bedding.

REFERENCES

A. Handbook of PVC Pipe – Design and Construction.

B. ASTM F-1483 – Standard Specifications for Oriented Poly (Vinyl Chloride), PVCO, Pressure Pipe.

C. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2012.

D. ASTM D-2152 – Test Method for degree of fusion of extruded poly (Vinyl Chloride) (PVC) Pipe.

E. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2009.

F. ASTM D-2672 – Bell-End Poly (Vinyl Chloride) (PVC) Pipe.

G. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals; 1998 (Reapproved 2011).

H. ASTM F477 – Rubber Gaskets for PVC pipe.

I. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; American Water Works Association; 2010 (ANSI/AWWA C105/A21.5).

J. ANSI/AWWA C110/A21.1 – Ductile Iron and Gray Iron Fittings.

K. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; American Water Works Association; 2012 (ANSI/AWWA C111/A21.11).

L. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast; American Water Works Association; 2009 (ANSI/AWWA C151/A21.51).

M. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances; American Water Works Association; 2010 (ANSI/AWWA C600).

N. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution; American Water Works Association; 2007 (ANSI/AWWA C900/C900a).

O. North Dakota State Plumbing Code.

P. North Dakota State Department of Health Rules and Regulations (10 State Standards).

Q. ANSI/NSF – All products (treatment chemicals and materials) that may meet water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriter's Laboratories, or other organizations accredited by ANSI to test and certify such products.

SYSTEM DESCRIPTION

A. Pipe, fittings and accessories are specifically manufactured and constructed to make a water distribution system used to convey potable water from the source to individual points of use. Distribution piping includes all piping 4 inches in diameter and larger.

PERFORMANCE REQUIREMENTS

A. Pipe and fittings must be able to withstand intermittent surges at least 2 times the rated pressure of the pipe without any leaks.

SUBMITTALS

A. Prior to shipping any materials to the site, submit manufacturer's specifications and literature to Engineer for approval.

B. Follow requirements Submittals Section of the Special Provisions.

QUALITY ASSURANCE

A. Identify all pipe on the exterior with applicable ASTM Standards, name of manufacturer and pressure rating with permanent marking.

B. Stamp the name of the Manufacturer and the pressure rating on the exterior of all fittings and accessories.

C. Tag or otherwise certify that any component that is not stamped or marked meets the specifications.

REGULATORY REQUIREMENTS

A. North Dakota State Department of Health, Municipal Facilities Division.

B. North Dakota State Plumbing Code.

C. ND State Department of Health Rules and Regulations (10 State Standards)

DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle all pipe, fittings and accessories in accordance with manufacturer's specifications and with all labels in place.

B. Store all materials in a protected area.

ENVIRONMENTAL REQUIREMENTS

A. Do not flush high concentrations of disinfectant into the environment.

B. Properly dispose of all containers for such things as pipe joint lubricants.

C. Do not bury disposable solid waste in pipe trench.

PRODUCTS

MANUFACTURERS

A. Pipe: Northern Pipe Products, Certainteed Corporation, Extrusion Technologies, Inc. or approved equal.

B. Fittings: Harco, Tyler, Trinity Valley or approved equal.

C. Sleeves: Rockwell, Cascade or approved equal.

MATERIALS

A. Pipe: the type of pipe will be identified in the bid form.

1. Polyvinylchloride (PVC) specified shall be gasketed bell and spigot of a quality equal to that manufactured by CertainTeed vinyl iron pipe or approved equal. The PVC pipe shall meet the requirements of AWWA C900 “standard for polyvinyl chloride (PVC) pressure pipe”, 4 inch through 12 inch and AWWA C905 for 14 inch and 16 inch for water. The pipe shall be furnished in cast iron pipe equivalent outside diameters with rubber gasketed joints.
2. Molecular Oriented Poly (Vinyl) Chloride – PVC (MO) must have a pressure rating of 200 psi and a design safety factor of 2 to 1.
3. AWWA C900 PVC Pipe must have a DR 18 rating unless otherwise specified and be approved by the National Sanitation Foundation (NSF) for potable water service under criteria C-14. Pipe must also be listed by Underwriters Laboratory Inc. (U/L) and be Factory Mutual (FM) approved unless otherwise specified.

4. Restrained joint PVC shall be manufactured from Type 1, Grade 1, 200-psi hydrostatic design stress high impact material. All couplings and fittings shall be specifically manufactured for restrained joint connections. Pipe must have a DR 18 rating unless otherwise specified.

B. Fittings: Cast or ductile iron with a pressure rating of no less than 350 psi when tested in accordance with AWWA standards. All fittings used shall be specifically designed for the outside diameter (OD) of the pipe. Fittings with interchangeable gaskets will not be allowed. Interior: All fittings for watermain shall be cement lined ductile iron class 350 as manufactured by Tyler Pipe or Trinity Valley and shall conform to the listed revision of ANSI/AWWA C153/A21.53 and ANSI/AWWA C104/A21.4. Exterior: All iron fittings shall be completely coated with Koppers Bitumastic No. 300-M, or an approved equal.

C. Sleeves: Specifically manufactured for the type, class and diameter of pipe on which it will be used. Utilize PVC, stainless steel or metal sleeves coated with a protective coating approved for use on potable water systems.

D. Bolts, nuts and washers: stainless steel, approved grade.

E. Bedding material: Utilize existing, excavated sandy material that does not contain any rocks or chunks of earth larger than ½ inch. If material is not available on site, provide sand from an outside source, meeting the following gradation:

Sieve Size	Percent Passing
1/2 inch	100
No. 4	60-85
No. 200	0-10

F. Service line sizes in 1 1/4 inch or 3 inch will not be allowed.

EXECUTION

EXAMINATION

A. Verify that excavated base is ready to receive work and all excavations, dimensions and elevations are as indicated on the drawings or required to properly install pipe or fittings.

B. Hand trim excavations to required elevations. Provide proper pipe bedding for pipe and bell configuration.

C. Remove clay lumps, large stones or other hard matter that could damage pipe or impede consistent backfilling or compaction.

D. Place bedding material at trench bottom, cradling pipe and bell joint.

E. Level material in continuous layers not exceeding 6 inches compacted depth.

PIPE INSTALLATION

A. Install pipe, fittings and accessories in accordance with Manufacturer's instructions and according to the line and grade shown on the drawings or established by the Engineer in the field.

B. Clean and inspect each section of pipe and gasket before installation.

C. Hand compact backfill up both sides of pipe to 12 inches (compacted depth) above top of pipe.

D. If contractor cuts a section of pipe, ream the cut to a smooth surface before using elsewhere.

E. Prepare pipe connections according to Manufacturer’s recommendations and industry standards.

F. Maintain separation of water lines from sewer systems and piping as listed in the 10 States Standards, latest edition.

1. Parallel installation

a. Water mains shall be laid at least 10 feet horizontally from any existing or proposed gravity sanitary or storm sewer, septic tank, or subsoil treatment system. The distance shall be measured edge to edge.

b. In cases where it is not practical to maintain a 10 foot separation, the reviewing authority may allow deviation on a case-by-case basis, if supported by data from the design engineer.

2. Crossings

a. Water mains crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer with preference to the water main located above the sewer.

G. Bury water piping with a full 7½ feet of earth cover over the pipe.

HYDROSTATIC TESTING

A. Hydrostatically test all pressure pipe in the presence of Engineer at a minimum pressure of 150 psi for a period of no less than 2 hours as required by AWWA Section C605-05, Section 7, with pipe section being tested to maintain pressure within 5 PSI of the specified hydrostatic test pressure. Determine allowable leakage per hour by the following equation:

$Q = LD\sqrt{P}$
148,000
Where:
Q= quantity of makeup water, in gallons per hour
L= length of pipe section being tested, in feet
D= nominal diameter f the pipe, in inches
P= average test pressure during the hydrostatic test in pounds per square inch (gauge)

B. Remove all air prior to beginning of test.

C. Obtain Engineer's approval of testing equipment. Equipment, as a minimum must consist of a volumetrically calibrated water tank with cover, oil filled pressure gage graduated in feet of water or psi, flexible hoses, leak free valves and gas driven pump with capability to develop 200 psi of discharge pressure.

D. If leakage is greater than allowable, take immediate action to correct the problem(s) and retest the section until leakage limits are met.

E. If a new section of pipe is connected to an existing main or to a service connection, take appropriate action to prevent damage to the existing main. This may include temporary capping and blocking and leaving trench open for visual leakage inspection by Engineer.

FLUSHING

A. Flush in the presence of Engineer to the approval of Engineer immediately after completion of pressure test.

B. Flush away from existing mains or services.
C. Water for flushing furnished by the Owner.

D. Provide temporary piping if required.

TOLERANCES

A. Lay pipe to the following tolerances in reference to the line and grade staked in the field:

1. Vertical Tolerance: Plus or minus 0.1 feet
2. Horizontal Tolerance: Plus or minus 0.5 feet
3. Separation Tolerance: Minimum of 10 feet outside diameter between mains

B. If line and grade is not staked in the field, lay pipe straight and have no more than a 1 degree deflection at any joint

FIELD QUALITY CONTROL

A. Contact the Engineer prior to placing any fill material over the pipe.

B. Double check all pipe, fittings and connections prior to backfilling to make sure they are clean, leak free, and correctly assembled.

PROTECTION

A. Protect all pipe installed by maintaining a temporary plug in the end of each section until next section is installed.

B. Protect pipe and sand bedding from damage or displacement until initial backfilling operation has been completed.

CLEANUP AND PROJECT CLOSEOUT

A. Review project with Owner's representative to make certain all areas have been cleaned up satisfactorily.

B. Adequately mark the end of a buried main with a redwood 2x4 timber, extending from invert to 2 feet above ground surface and painted blue.

C. Verify that main and related components have been pressure tested, disinfected and flushed.

PROJECT RECORD DOCUMENTS

A. Accurately record location of pipe runs, connections, and termination points on "as constructed" plans.

B. Identify and describe and show approximate location of uncharted utilities discovered during excavation.

C. Provide disinfection and bacteriological reports as required herein.

MEASUREMENT AND PAYMENT

MEASUREMENT

A. Measure watermain by the linear foot (LF) of pipe as required installed and accepted by the Engineer. Extend measurement along the centerline of the pipe and include hydrant leads.

B. Measure fittings by the pound (LB), using standard, manufacturer listed weights for the actual size and type of fitting installed and accepted by the Engineer. Flanged and mechanical joint fittings will include all bolts, gaskets and accessories.

C. Bedding, thrust blocking and other miscellaneous items such as gaskets, lubricant and other special requirements are incidental to pipe and fittings and will not be measured.

PAYMENT

A. Payment for all items of work listed on the bid form will be for the actual number of units approved by the Engineer. Payment includes all excavation, hand trimming of trench, bedding, materials, backfilling, hydrostatic testing, disinfection, testing and flushing as defined herein.

B. If specific items of required work are not listed on the bid form, consider payment will be incidental to other, related, items of work.

MANHOLES, CLEANOUTS AND COVERS SECTION

GENERAL

SECTION INCLUDES

A. Standard, and Drop Manholes

B. Manholes with Monolithic Bases

C. Cleanouts

D. Frames, Lids, Covers and Accessories

E. Chimney Seals

REFERENCES

A. ASTM C478 - Precast reinforced concrete manhole sections.

B. ASTM C923 - Flexible resilient connectors between reinforced concrete manhole structures and pipes.

C. ASTM A48 - Gray iron castings.

D. Federal Specification SS-S-00210(CSA-FSS): Extruded rubber sealant.

E. ASTM C94 - Ready Mix Concrete.

F. ASTM C150 - Portland Cement Type 1.

G. ASTM C144 - Mortar sand.

H. ASTM C207 - Hydrated lime.

I. ASTM C5 - Quicklime.

J. ASTM C91 - Masonry Cement, Type M.

K. ASTM C387 - Packaged, dry, combined materials, for mortar and concrete.

L. ASTM A240 Type 304 Chromium – Nickel Stainless Steel.

SYSTEM DESCRIPTION

A. Manhole (i.e.: frame, cover, adjusting rings, chimney seal, barrel, cone section, base, and boots) must all fit together securely and allow access to an underground pipe.

B. Cleanout components (i.e.: frame, cover, riser, bends and/or wye) must all fit together securely and provide for a smooth connection to an underground pipe for purposes of cleaning.

PERFORMANCE REQUIREMENTS

A. All connections and joints are watertight and leak free.

B. Provide smooth and accessible inverts on manholes.

C. Provide smooth and gradual bends on cleanouts.

SUBMITTALS

A. Prior to shipping any components to the project submit shop drawings to Engineer for review.

B. Allow 15 working days for Engineer to review and comment.

C. Note size, location (angle) and other relevant information.

D. If project involves the handling or bypassing of sanitary sewage, submit a written plan to Engineer explaining how this will be done.

QUALITY ASSURANCE

A. Manufacturers must certify in writing, if requested by Engineer, that all manholes, cleanouts and appurtenances be constructed within the guidelines of the appropriate ASTM specifications.

B. Company specializing in manufacturing products must have a minimum of five years, documented experience.

C. Precast sections must be legibly stamped with the date cast.

DELIVERY, STORAGE AND HANDLING

A. Manufacturer is responsible for providing specific instructions for the proper delivery, storage and handling.

B. Install manholes, cleanouts and, components without damage. Immediately remove any damaged components from the project site.

ENVIRONMENTAL REQUIREMENTS

A. Never discharge any raw, untreated wastewater or debris into the environment.
B. Properly dispose

PRODUCTS

MANUFACTURERS

A. North Dakota Concrete Products (Cretex) - Precast manholes, precast adjusting rings

B. Neenah Foundry Co. - Manhole frames and lids, lamphole frames and lids.

C. Press Seal Gasket Corporation - Rubber sealant; flexible gasket connectors.

D. CRETEX Specialty Products – Manhole chimney seals.

MATERIALS

A. Standard and Drop Manholes: Tongue and groove joints, monolithic bases, pre-cast influent and effluent openings, cast-in-place concrete inverts and an eccentric cone section transition to lid with PVC influent drop apparatus.

B. Manhole Frames and Covers: Equal to R-1733 with self-sealing solid type "C" lid as manufactured by Neenah.

C. Meter manhole and Pressure Reducing Valve Manhole: The 36 inch diameter manhole casting shall be a Neenah R-1739-A with a vented lid or approved equal.

> Insulated Cover - 4 inch rigid insulation cover ½ inch marine plywood each side with galvanized steel handle and eight stainless steel nuts and bolts. A 2 inch hole shall be drilled through the cover. A 1 ½ inch x 1 ½ inch x 1/8 inch aluminum angel frame around the opening circumference anchored with eight equally paced stainless steel fasteners.

D. Manhole Chimney Seals: Equal to product manufactured by CRETEX.

E. Cleanout Frames and Lids: Equal to R-1975 with solid lid as manufactured by Neenah.

F. Connectors: Flexible gasket connectors equal to "PSX" as manufactured by Press-Seal Gasket Corporation.

G. Manhole Adjusting Rings: Modular reinforced precast concrete rings, or HDPE adjusting rings as manufactured by Lad Tech, Inc., as per manufacturer's written instructions.

H. Sealant: Extruded rubber, 1"x1" in roll form on paper, equal to "E-Z Stick" as manufactured by Press-Seal Gasket Company.

I. Mortar: (By volume), Type M: 1 part Portland Cement or masonry cement, ¼ part hydrated lime and 2¾ to 3¾ parts sand.

J. Manhole Invert: Portland cement concrete made from a 6-bag mix and have a 28 day compressive strength of 3000 psi. All inverts shall have smooth finish.

K. Manhole sections shall have built-in lifting devises provided by the manhole manufacturer.

L. All drop manholes shall have piping on the outside of manhole only. No drops are allowed inside of manhole.

EXECUTION

PREPARATION

A. Verify line and grade locations.

B. Verify cast in or built in items are in proper location and elevation.

C. Verify number of sections for correct height. Allow for a maximum of 2 adjusting rings.

D. Coordinate the placement of influent and effluent pipe openings as required for installing flexible gasket connectors and a smooth transition.

CONSTRUCTION

A. Place monolithic bottom on stable subgrade. Make sure it is level.

B. Place manhole sections plumb and level.

C. Install joint sealant between all manhole sections.

D. Backfill and compact uniformly around manhole or cleanout to required density.

E. Set adjusting rings, frame and cover to correct elevation. Allow for grout between rings. Coordinate with other adjacent work as necessary.

F. Lay adjusting rings in full bed of mortar, uniformly jointed with the manhole section. Adjust and level to meet finished grade.

G. Install Chimney Seals as recommended by manufacturer. External chimney seals are to be on all sanitary manholes within grass areas. Internal chimney seals are to be on all sanitary manholes within pavement areas.

H. Form inverts with cast-in-place concrete, carefully finishing and troweling to true shape of the lower half of the sewer pipe and sloping up of the manhole, providing positive drainage to the flow line and effluent. Flow line of invert shall be smooth finish.

I. Plug all lift holes with mortar.

TOLERANCES

A. Final elevations for inverts and rim shall be within plus or minus 0.03 feet of the specified or staked elevation.

B. Finished manhole elevations shall always be ¼ inch lower than finished street grade on an existing street.

FIELD QUALITY CONTROL

A. Provide proper compaction around manholes and cleanouts.

B. Check for proper invert flow.

C. Check for infiltration and exfiltration and correct if necessary.

D. Regularly check temporary sewage handling equipment and piping (if in use) to avoid spills or backup.

E. Provide 5 foot diamond concrete adjustments around manhole casting as per the manhole adjustment detail within the Dickinson Standard Drawings.

CLEANUP AND PROJECT CLOSEOUT

A. Clean all debris from manholes and cleanouts. Individually remove cover and check each one.

B. Properly adjust all frames to the proposed grade. Wood shims not allowed for adjustment.

PROJECT RECORD DOCUMENTS

A. Provide Engineer with a complete set of shop drawings showing all changes and what was actually constructed.

MEASUREMENT AND PAYMENT

MEASUREMENT

A. Measure Manhole 48IN Drop, Manhole 48IN and Manhole Special by the unit (each) as defined on the bid form.

PAYMENT

A. Payment for each unit shall include excavating, backfilling, grading, subgrade stabilization, manhole section, influent and effluent openings, cast-in-place inverts, two adjusting rings, frame, lid and/or cover and all related accessories. Chimney Seals (if required) will be considered incidental to the price bid for manholes.

B. If no specific bid item is shown on the proposal, payment will be considered incidental to other related items.

MANHOLE INTERNAL CHIMNEY SEAL SECTION

GENERAL

SCOPE

A. This specification includes the materials and procedures required for the internal sealing of the entire chimney area of all new sanitary manholes, new storm sewer manholes, adjust sanitary manholes, and adjust storm sewer manholes, as shown on the attached drawings.

WORK REQUIRED

A. An internal flexible rubber frame seal and where necessary, an interlocking extension or extensions, meeting the requirements of this section, shall be used to seal the entire chimney of all manholes included in this project. The seal and extension or extensions shall extend from the frame casting down to the top of the manhole cone.

DEFINITIONS

A. Chimney - The cylindrical variable height portion of the manhole structure used to support and adjust the finished grade of the manhole frame. The chimney extends from the top of the cone to the base of the manhole frame.

B. Cone - That portion of the manhole structure which slopes upward and inward from the barrel of the manhole to the required chimney or frame diameter.

SYSTEM DESCRIPTION

A. Design Requirements - The manhole frame seal shall be designed to prevent leakage of water through the above described portions of the manhole throughout a 50 year design life. The seal shall also be designed so that it can be installed in manholes where the diameters of the frame and chimney differ by up to 20%.

B. Performance Requirements – The frame seal shall be capable of repeated vertical movement of not less than 2 inches and/or repeated horizontal movement of not less than ½ inch after installation and throughout its design life.

SUBMITTALS

A. Test Report - A test report from an approved testing agency, showing that the seal meets the performance requirements of System Description B in the above section, shall be provided by each frame seal manufacturer or supplier. The report shall include the results of the following test performed on a test unit on which the frame seal is attached. The test unit shall consist of a watertight base unit, at least 1

unsealed grade ring or brick course and a differentially moveable, unsealed, manhole frame. The Engineer reserves the right to observe the testing.

1. The manhole frame shall be raised 2 inches and moved laterally 1/2 inch. The frame shall be held in this position for a minimum of 100 hours, after which it is returned to its normal position.
2. The same test unit is then placed in a water tank filled to just below the top of the frame. The frame shall then be raised 2 inches and lowered back down through a minimum 30 cycles. The frame is then raised 2 inches and held in that position while the frame is moved laterally 1/2 inch. The frame is then returned to its normal position to complete the test.

The seal shall remain in place and watertight throughout the duration of the test. Any displacement, dislodgement or leakage of the seal shall be cause for failure. Any seal that fails the test may be reworked and retested.

B. Certification (Affidavit of Compliance) - The manufacturers of all manhole frame seals shall submit a notarized certification to the Engineer stating that their product meets the design life requirements of System Description B in the above section, and the applicable material requirements of the Frame Seal Section A & B of the below section.

QUALITY ASSURANCE

A. Acceptance Testing - Manhole frame seals shall be visually inspected after installation to insure that the seal is properly positioned, tight against the manhole and frame surfaces, that no voids or leakage points exist and that the bands are securely locked in place. Any seals failing this test shall be reworked as necessary and retested at no additional cost to the owner. Any seals not passing this visual inspection may, at the Contractor's option, be tested for leakage using a method approved by the Engineer.

PRODUCTS

FRAME SEAL

Frame seals shall consist of a flexible internal rubber sleeve, extensions and stainless steel expansion bands, all conforming to the following requirements:

A. Rubber Sleeve and Extension - The flexible rubber sleeve and extensions shall be extruded or molded from a high grade rubber compound conforming to the applicable material requirements of ASTM C-923, with a minimum 1500 psi tensile strength, maximum 18% compression set and a hardness (durometer) of 48±5.

The rubber sleeve shall be double, triple or quadruple pleated with a minimum unexpanded vertical height of 8 inches, 10 inches or 13 inches respectively and a minimum thickness of 3/16 inches. The top and bottom section of the sleeve that compresses against the manhole frame casting and the chimney/cone shall have an integrally formed expansion band recess and a series of sealing fins to facilitate a watertight seal. These sealing fins shall have teardrop holes or air pockets to allow the sealing area to conform to minor surface irregularities that may be encountered.

The top section of the extension shall have a minimum thickness of 3/32 inches and shall be shaped to fit into the bottom band recess of the sleeve under the bottom chimney seal band and the remainder of the extension shall have a minimum thickness of 3/16 inches. The bottom section of the extension shall contain an integrally formed expansion band recess and multiple sealing fins matching that of the rubber sleeve.

Any splice used to fabricate the sleeve and extension shall be hot vulcanized and have a strength such that the sleeve shall withstand a 180 degree bend with no visible separation.

B. Expansion Bands - The expansion bands used to compress the sleeve against the manhole shall be integrally formed from 16 gauge stainless steel conforming to the applicable material requirements of ASTM A-240 Type 304, with no welded attachments and shall have a minimum width of 1 3/4 inches.

The bands shall have a minimum adjustment range of 2 1/2 diameter inches and the mechanism used to expand the band shall have the capacity to develop the pressures necessary to make a watertight seal. The band shall be permanently held in place with a positive locking mechanism which secures the band in its expanded position after tightening.

C. Acceptable Manufacturers

1. Cretex Specialty Products

EQUIPMENT

A. The contractor shall have a manufacturer's recommended expansion tool and all other equipment/tools necessary to prepare the surfaces of the manhole and install the frame seals.

CEMENTITIOUS GROUT

A. Cementitious grout shall be a premixed, non-metallic, high strength, non-shrink grout which meets the requirements of ASTM C-191 and C-827 as well as CRD-C-588 and C-621. When mixed to a mortar or "plastic" consistency, it shall have minimum one day and 28 day compressive strength of 6,000 and 9,000 psi, respectively.

EXECUTION

FIELD MEASUREMENTS

A. The Contractor shall field measure the manholes to determine the information required on the manufacturer's "Sizing and Ordering" procedure. This information is needed to obtain the proper size of bands, the size, shape and width of the rubber sleeve and the need for and size of any extensions.

SURFACE PREPARATION

A. All sealing surfaces shall be reasonably smooth, clean and free of any form offsets or excessive honeycomb. The top internal portion of the manhole cone shall have a minimum 3 inch high vertical surface. The preparation of this vertical surface when none exists shall be in accordance with the frame seal manufacturer's instructions.

INSTALLATION OF FRAME SEAL

A. The internal frame seals and extensions shall be installed in accordance with the manufacturer's instructions.

PART 4 MEASUREMENT AND PAYMENT

MANHOLE FRAME SEAL

A. All costs for furnishing and installing an internal frame seal and where necessary, an extension or extensions shall be included within the unit price bid for sanitary manholes.

B. All costs for furnishing and installing an internal frame seal and where necessary, an extension or an extensions, shall be included within the unit price bid for Storm Sewer manholes.

C. All costs for furnishing and installing an internal frame seal and where necessary, an extension or extensions, shall be included within the unit price bid for Adjust Sanitary Manhole.

D. All costs for furnishing and installing an internal frame seal and where necessary, an extension or extensions, shall be included within the unit price bid for Adjust Storm Sewer Manhole.

MANHOLE EXTERNAL CHIMNEY SEAL SECTION

GENERAL

SCOPE

A. This specification includes the materials and procedures required for the external sealing of the entire chimney area of all new sanitary manholes, as shown on the attached drawings.

WORK REQUIRED

A. An external flexible rubber frame seal and where necessary, an interlocking extension or extensions, meeting the requirements of this section, shall be used to seal the entire chimney of all sanitary manholes

included in this project. The seal and extension or extensions shall extend from the lower base flange of the frame down to the top of the cone.

DEFINITIONS

A. Chimney -The cylindrical variable height portion of the manhole structure used to support and adjust the finished grade of the manhole frame. The chimney extends from the top of the cone to the base of the manhole frame casting.

B. Cone -That portion of the manhole structure which slopes upward and inward from the barrel of the manhole to the required chimney or frame diameter.

SYSTEM DESCRIPTION

A. Design Requirements -The manhole frame seal shall be designed to prevent leakage of water through the above described portions of the manhole throughout a 50 year design life. The seal shall also be designed so that it can be installed on a manhole where the outside diameter of the frame's base flange and the chimney or cone differ by up to 4 inches.

B. Performance Requirements -The frame seal shall be capable of repeated vertical movement of the frame of not less than 2 inches and/or repeated horizontal movement of not less than 1/2 inch after installation and throughout its design life.

SUBMITTALS

A. Test Report - A test report from an approved testing agency showing that the seal meets the performance requirements System Description B in the above section, shall be provided by each frame seal manufacturer or supplier. The report shall include the results of the following test performed on a test unit on which the frame seal is attached. The test unit shall consist of a watertight base unit, at least 1 unsealed grade ring or brick course and a differentially moveable, unsealed, manhole frame. The Engineer reserves the right to observe the testing.

1. The manhole frame shall be raised 2 inches and moved laterally 1/2 inch. The frame shall be held in this position for a minimum of 100 hours, after which it is returned to its normal position.
2. The same test unit is then placed in a water tank filled to just below the top of the frame. The frame shall then be raised 2 inches and lowered back down through a minimum 30 cycles. The frame is then raised 2 inches and held in that position while the frame is moved laterally ½ inch. The frame is then returned to its normal position to complete the test.

The seal shall remain in place and watertight throughout the duration of the test. Any displacement, dislodgement or leakage of the seal shall be cause for failure. Any seal that fails the test may be reworked and retested.

B. Certification (Affidavit of Compliance) -The manufacturers of all manhole frame seals shall submit a notarized certification to the Engineer stating that their product meets the design life requirements System Description B in the above section, and the applicable material requirements of the Frame Seal Section A & B of the below section.

QUALITY ASSURANCE

A. Acceptance Testing - Manhole frame seals shall be visually inspected after installation to insure that the seal is properly positioned right against the manhole and frame surfaces, that no voids or leakage points exist and that the bands are securely locked in place. Any seals failing this test shall be reworked as necessary and retested at no additional cost to the owner. Any seals not passing this visual inspection may, at the contractor’s option, be tested for leakage using a method approved by the Engineer.

PRODUCTS

FRAME SEAL

Frame seals shall consist of a flexible external rubber sleeve and extension and stainless steel compression bands, all conforming to the following requirements:

A. Rubber Sleeve and Extension - The flexible rubber sleeve and extension shall be extruded or molded from a high grade rubber compound conforming to the applicable material requirements of ASTM C-923, with a minimum 1500 psi tensile strength, maximum 18% compression set and a hardness (durometer) of 48+5.

The rubber sleeve shall be corrugated, with a minimum thickness of 3/16 inches and shall be available in unexpanded vertical heights of 6 and 9 inches. The top section of the sleeve shall contain multiple sealing tins and be designed to extend both over and under the manhole frame's base flange, thereby allowing it to be mechanically locked to the frame. The bottom section of the sleeve shall contain an integrally formed compression band recess and a series of sealing fins to facilitate a watertight seal.

The extension shall have a minimum thickness of 3/16 inches. The top portion of the extension shall be shaped to fit into the bottom band recess of the sleeve and have its own integrally formed band recess, which is located such that when assembled this recess is centered over that of the sleeve. The bottom section of the extension shall contain an integrally formed compression band recess and multiple sealing fins matching that of the rubber sleeve.

Any splice used to fabricate the sleeve and extension shall be hot vulcanized and have a strength such that the sleeve shall withstand a 180 degree bend with no visible separation.

B. Compression Bands -The bands used to compress the sleeve against the manhole shall be integrally formed from 16 gauge stainless steel conforming to the applicable material requirements of ASTM C-923, Type 304, with no welded attachments and shall have a minimum width of 1 inch. The top compression band shall have a shape and width sufficient to, when tightened, will mechanically lock the sleeve to the manhole frame's base flange. The lower compression band shall be a flat strip to allow placement into the lower band recess of the seal and or extension. The tightening mechanism on both bands shall have the capacity to develop the pressures necessary to make a watertight seal and shall have a minimum adjustment range of 2 diameter inches. Screws, bolts and nuts used on the bands shall be stainless steel conforming to ASTM F-593 and 594, Type 304.

C. Acceptable Manufacturers

1. Cretex Specialty Products

EQUIPMENT

A. The contractor shall have a manufacturer's recommended compression tool and all other equipment/tools necessary to prepare the surfaces of the manhole and install the frame seals.

CEMENTITIOUS GROUT

A. Cementitious grout shall be a premixed, non-metallic, high strength, non-shrink grout which meets the requirements of ASTM C-191 and C-827 as well as CRDC-588 and C-621.When mixed to a mortar or "plastic" consistency it shall have minimum one day and 28 day compressive strength of 6,000 and 9,000 psi, respectively.

EXECUTION

FIELD MEASUREMENTS

A. The Contractor shall measure the manhole to determine the information required on the manufacturer's “Sizing and Ordering" procedure. This information is needed to obtain the proper size of bands, the size and width of the rubber sleeve and the need for and size of any extensions.

SURFACE PREPARATION

A. All sealing surfaces shall be reasonably smooth, clean and free of any form offsets or excessive honeycomb. The top external portions of the cone shall have a minimum 3 inch high vertical surface. The preparation of this vertical surface when none exists shall be in accordance with the frame seal manufacturer’s instructions. The manhole frame shall be set to the required grade while sitting on 3 3/4 inch steel spacers which have been totally embedded in a course of cementitious grout conforming to the requirements of Section 2.3.

INSTALLATION OF FRAME SEAL

A. The external frame seals and extensions shall be installed in accordance with the manufacturer's instructions.

MEASUREMENT AND PAYMENT

MEASURE AND PAYMENT

A. All costs for furnishing and installing an external frame seal and where necessary an extension or extensions, shall be included in the unit price bid for the Manhole 48IN Drop, Manhole 48, and Manhole Special.

SANITARY SEWAGE SYSTEM SECTION

GENERAL

SECTION INCLUDES

A. Sanitary sewer main and service line piping, fittings, accessories and bedding.

REFERENCES

A. ASTM D1784 – Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

B. ASTM D3034 – Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

C. ASTM D2672 – Bell-End Poly (Vinyl Chloride) (PVC) Pipe.

D. ASTM D2321 – Recommended practice for underground installation of flexible thermoplastic sewer pipe.

E. ASTM D2729 – Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

F. ASTM F477 – O-ring rubber gaskets for PVC sewer pipe joints.

G. Handbook of PVC Pipe – Design and Construction.

H. North Dakota State Plumbing Code.

I. North Dakota State Department of Health Rules and Regulations (10 State Standards).

SYSTEM DESCRIPTION

A. Sanitary Sewage System consists of pipe and other components that are manufactured, assembled and constructed to efficiently collect and convey sanitary sewage from a service connection such as a residence or business to a treatment facility.

SUBMITTALS

A. Prior to shipping any materials to the site submit manufacturer's specifications and literature on pipe, fittings, accessories and bedding to Engineer for approval.

B. If project involves the handling or bypassing of sanitary sewage, submit a written plan to Engineer explaining how this will be done.

C. Allow 15 working days for Engineer to review submittals and respond appropriately.

QUALITY ASSURANCE

A. Identify all pipe and fittings on the exterior with applicable ASTM Standards, name of manufacturer, size and SDR with permanent markings.

B. Tag or otherwise certify that any item not marked or stamped meets the specifications.

REGULATORY REQUIREMENTS

A. North Dakota State Department of Health, Municipal Facilities Division.

B. North Dakota State Plumbing Code.

C. North Dakota State Department of Health Rules and Regulations (10 State Standards).

DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle all pipe, fittings and accessories according to manufacturer’s written instructions.

B. Store all materials in a protected area.

ENVIRONMENTAL REQUIREMENTS

A. Properly dispose of all containers for such things as pipe joint lubricants.

B. Do not bury disposable solid waste in pipe trench.

C. Never discharge raw, untreated wastewater or debris into the environment.

PRODUCTS

MANUFACTURERS

A. Certainteed - PVC sewer piping, wyes and bends.

B. Northern Pipe Products - PVC sewer piping, wyes and bends.

MATERIALS

A. Polyvinylchloride (PVC) pipe and fittings: SDR-35, gasketed bell and spigot.

B. Utilize pipe-bedding materials from existing excavated sandy soil, which does not contain rocks or hard chunks larger than 1/2 inch, if available. If material is not available on site, provide sand from an outside source meeting the following gradation:

Sieve Size	Percent Passing
1/2 inch	100
No.4	60-85
No. 200	0-10

EXECUTION

EXAMINATION

A. Verify that excavated base is ready to receive work and all excavations, dimensions and elevations are as indicated on the drawings.

B. Hand trim excavations to required elevations. Provide proper pipe bedding for pipe and bell configuration.

C. Remove clay lumps, large stones or other hard matter that could damage pipe or impede consistent backfilling or compaction.

D. Place bedding material at trench bottom, cradling pipe and bell joint.

E. Level bedding materials in continuous layers not exceeding 6 inches compacted depth up on both sides of pipe to pipe centerline.

F. Maintain optimum moisture content of backfill material to obtain required compaction density.

G. If temporary sewage bypass is required verify that all pumps, plugs and piping is in place and fully operational.

H. The City of Dickinson Waste Water Maintenance Department shall be notified of all manhole covers removed so they may reseal them.

PIPE INSTALLATION

A. Install pipe, fittings and accessories in accordance with manufacturer's instructions and according to the line and grade shown on the drawings or established by Engineer in the field.

B. Maintain separation of water lines from sewer piping as follows:

1. Parallel Installation:
    a. Watermains shall be laid at least 10 feet horizontally from any existing or proposed gravity sanitary or storm sewer, septic tank, or subsoil treatment system. The distance shall be measured edge to edge.
    b. In cases where it is not practical to maintain a 10 foot separation, the reviewing authority may allow deviation on a case-by-case basis, if supported by data from the Design Engineer.
2. Crossings:
    a. Watermains crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the watermain and the outside of the sewer. This shall be the case where the watermain is either above or below the sewer with preference to the watermain located above the sewer.
    b. At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. Special structural support for the water and sewer pipes may be required.
3. Exception: When it is impossible to obtain the minimum specified distance, the reviewing authority must specifically approve any variance. Where sewers are being installed the following methods of installation may be used:
    a. Such deviation may allow installation of the watermain closer to a sewer, provided that the watermain is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the watermain is at least 18 inches above the top of the gravity sewer.
    b. The sewer materials shall be water works grade 150 psi (1.0 Mpa) pressure rated pipe meeting AWWA standards or pipe approved by the reviewing authority and shall be pressure tested to ensure water tightness.
4. Force mains: There shall be at least a 10 foot horizontal separation between watermains and sanitary sewer force mains. There shall be an 18 inch vertical separation at crossings as required in item 2 - Crossings.
5. Sewer Manholes: No water pipe shall pass through or come in contact with any part of a sewer manhole. Watermain should be located at least 10 feet from sewer manholes.
6. Separation of Watermains from Other Sources of Contamination: Design Engineers should exercise caution when locating watermains at or near certain sites such as sewage treatment plants or industrial complexes. On site waste disposal facility including absorption field must be located and avoided. The Engineer must contact the reviewing authority to establish specific design requirements for locating watermains near any source of contamination.

C. Maintain separation of water lines from sewer piping as follows:

1. Where both water and sewer are of new construction:
   a. No additional protection needed if watermain crosses at least 5 feet above the sewer.
   b. If the watermain crosses within 1.5 feet above the sewer, center a full length of watermain over the sewer.
   c. If the watermain crosses within 1.5 feet above the sewer, center a full length of watermain over the sewer. Sewer joints located within 10 feet of the crossing will withstand 25 psi internal pressure.
2. Where watermain crosses over an existing sewer:
   a. No additional protection needed if watermain is at least 1.5 feet above the sewer (intervening dirt must be left undisturbed).
   b. If crossing is within 1.5 feet above sewer, center a full length of watermain over the sewer main.
3. Where watermain crosses under the sewer:
   a. In all cases, provide additional protection by centering a full length of watermain under the sewer main. Sewer joints located within 10 feet of the crossing will withstand 25 psi internal pressure.

D. Clean and inspect each section of pipe and gasket before installation.

E. Backfill and hand compact up both sides of pipe to 12 inches (compacted depth) above top of pipe.

F. When pipe of different materials are to be jointed, an approved compression type coupling shall be used.

G. Flush pipe when laying operations have been completed.

TOLERANCES

A. Installed gravity sewer pipe to the following tolerances:

1. Vertical: Plus or minus 0.03 feet
2. Horizontal: Plus or minus 0.05 feet
3. Separation tolerance: minimum of 10 feet outside diameter between mains

FIELD QUALITY CONTROL

A. Contact the Engineer prior to placing any backfill over the pipe.

B. Lamp each section of pipe after installation.

C. See Pipeline Cleaning Section of the Special Provisions.

D. Testing

E. 1. See Pipeline Televising Section for requirements

1. Sewer lines may be hydrostatically tested to ensure integrity, test in the presence of the Engineer in the following manner:
   a. Plug the downstream end of pipe in manhole.
   b. Plug all newly constructed service lines.
   c. Fill pipe with water to a point where the upstream manhole has 24 inches of water above the invert measured at the center of the manhole.
   d. Allow to stand for 3 hours.
   e. If water level drops determine why, repair if needed, and repeat test until water level remains constant.
2. Deflection Testing: Testing may be required for flexible pipe types (PVC, HDPE, CCG). Deflection tests shall be performed not sooner than 30 days after completion of the placement and compaction of the backfill. The pipe shall be clean and inspected for offsets and obstructions prior to testing to finish grade. Testing shall be done in the presence of the Engineer. Deflections shall be determined by use of a mandrel.

a. Mandrel shall have a minimum diameter equal to 95 percent of the Average Internal Diameter of the pipe. The 5 percent deflection shall include deflection from burial and manufacturing process.
b. The mandrel shall be rigid steel, be nonadjustable, and have an odd number of legs (9 legs minimum) and have an effective length not less than its nominal diameter. It shall have a minimum diameter, at any point along the fill length. The mandrel shall be fabricated of steel and shall have pull rings at either end. The mandrel shall be stamped or engraved indicating the pipe material specification, nominal size and mandrel outside diameter. The maximum average inside diameter of the pipe shall be measured and calculated in the field prior to installation.
c. The mandrel shall be pulled through the pipe by hand to ensure that maximum allowable deflections have not been exceeded. Prior to use, the mandrel shall be certified and submitted to the Engineer. If the mandrel fails to pass through the pipe, it will be deemed to be over deflected.
d. Unless otherwise permitted by the Engineer, any over deflected pipe shall be uncovered and, if not damaged, removed and reinstalled. Damaged pipe shall be removed from the work site and replaced with new pipe.
e. Owner reserves the right to measure the deflection at any time during the warranty period. Deflections greater than 5 percent shall be considered failure and the Contractor may be required to re-excavate, replace the pipe if necessary, re-compact the backfill and restore the surface with no additional costs to the Owner for such work.
f. All costs incurred by the Contractor attributable to mandrel and deflection testing, including any delays and reinstallation of deflected pipe, shall be considered incidental to other bid items.

PROTECTION

A. Protect all pipe installed by maintaining a temporary plug in the end of each section until next section is installed.

B. Protect pipe and sand bedding from damage or displacement until backfilling operation has been completed.

CLEANUP AND PROJECT CLOSEOUT

A. Flush pipe, manholes and cleanouts.

B. Remove all debris flushed from line and dispose as necessary.

C. After flushing and cleaning of sewer mains, remove all covers from manholes and assist the Engineer in lamping each individual reach (manhole to manhole) of sewer main.

D. Review project with Owners representative to verify cleanup is acceptable.

E. Adequately mark all buried pipe ends and service lines with redwood 2x4 timbers, 6 feet long and flush with ground surface.

PROJECT RECORD DOCUMENTS

A. Accurately record location of pipe runs, wyes, service connections, and termination points on "as constructed" plans.

B. Identify, describe and show approximate location of variations in subsoil conditions or the discovery of uncharted utilities.

C. Provide Engineer with “as constructed” plans.

D. If required by plan note, special provision or identified on the bid form, televise all gravity sewer mains using a conventional process by running a video camera through the newly laid pipes. Provide two copies of standard VHS videotapes and video logs identifying all services and any irregularities to the Engineer.

MEASUREMENT AND PAYMENT

MEASUREMENT

A. Measure sanitary sewer mains and service line piping by the linear foot (LF) as installed and accepted by Engineer. Extend measurement from center of manhole/cleanout to center of manhole/cleanout.

B. Measure service lines by the linear foot (LF) as installed and accepted by Engineer. Extend measurements from the centerline of main to the end of newly installed service line.

C. Measure service line connections by the unit (EA) as installed and accepted by the Engineer. Measurement will include wye and riser (if required).

D. Pipe lubricant, gaskets, joint cement, or any other materials needed to complete the installation, as well as testing and flushing are considered incidental and will not be measured.

E. Pipe bedding will be incidental to the price bid for sanitary sewer piping unless a bid item is shown on the bid form.

PAYMENT

A. Payment for all items of work listed on the bid form will be for the actual number of units approved by the Engineer and includes all materials, labor and equipment.

B. If required, all pumps, piping, plugs, labor and miscellaneous equipment necessary for temporary sewage handling or bypass shall be paid for as identified on the bid form. If no specific bid items are listed on the bid form, temporary sewage handling or bypass will be considered incidental to the price bid for sanitary sewer main or sewer line piping.

C. If video work is required it will be paid as bid or if no specific bid item is shown it will be considered incidental to the price bid for new sewer main.

PIPELINE CLEANING SECTION

GENERAL

SECTION INCLUDES

A. High pressure water jetting, rodding, bucketing, brushing and flushing of pipes and manholes.

PERFORMANCE REQUIREMENTS

A. Provide necessary qualified personnel and equipment to clean the specified pipes and manholes.

SUBMITTALS

A. Submit to Engineer prior to or at the preconstruction meeting a schedule of work.

B. Submit to Engineer prior to or at the preconstruction meeting a written plan for traffic control, including detour routes and signage (if applicable).

QUALIFICATIONS

A. Perform cleaning with personnel trained in use of all equipment to adequately clean the sewer of all debris.

ENVIRONMENTAL REQUIREMENTS

A. Dispose of all waste materials in an approved location.

EXECUTION

PUBLIC NOTIFICATION

A. Publish an article in local newspaper not more than 1 week prior to commencement stating the following information:

1. Dates of project implementation.
2. Reason for cleaning.
3. If resident encounters odor problems, pour water down basement traps.
4. Local phone number for Contractor.

PREPARATION

A. Ensure traffic control devices including the necessary signage are on the project site.

PROCEDURE

A. Equipment:

1. Equipment used for sewer cleaning shall be capable of removing all dirt, grease, rocks, roots and other materials.
2. Equipment shall be selected by the Contractor to prevent damage to the pipe.
3. Cleaning equipment capable of cleaning lengths up to 1000 feet shall be provided. (Does not apply to bucket machines).

B. Light Cleaning:

1. Required where it has been determined through a visual inspection that only small deposits of debris exist within the sewer line.
2. Cleaning would require not more than three (3) slow passes through the line with high pressure, high volume jetting equipment.

C. Heavy Cleaning:

1. If line is not clean after three (3) passes through the line with high pressure water jetting equipment, then heavy equipment may be used to facilitate the removal of such deposits.
2. Bucket machines, scrapers, augers and jetting equipment may be utilized in this heavy duty cleaning.
3. Where bucket machines and buckets are to be used, caution should be taken that proper sized flexible cable be used so that breakage will not occur. Contractor is responsible for all damage caused by bucketing lines.

D. Waste Material:

1. Pipe shall be completely clear of any debris, roots, sand, deposits, grease, etc.
2. Determine the extent and methods required to adequately clean the sewer.
3. All sludge, dirt, sand, rocks, grease, roots and other solid or semisolid material resulting from the cleaning operation shall be removed at the downstream structure of the section being cleaned.
4. Passing material past accessible structures, which can cause line stoppages, accumulations of sand in wet wells or damage to pumping equipment, shall not be permitted.
5. Use of a vacuum truck in conjunction with cleaning operations may be required.
6. All dirt, debris, roots and other material removed from the sewers shall be hauled away by the Contractor to a dumpsite approved by the Owner.
7. Follow all regulations of the Environmental Protection Agency and all other regulating agencies.
8. Cleaning shall be of the entire reach between structures.
9. If cleaning of an entire section cannot be successfully performed from one structure, the equipment shall be set up on the other structure and cleaning again attempted without additional compensation.
10. Removal and disposal of debris and clean-up related to this work shall also be incidental to this bid item.

SCHEDULING AND COORDINATION

A. Contractor shall schedule and coordinate all cleaning activities with Owner and Engineer.

CLEANING AND RESTORATION

A. Remove all debris from manhole and surrounding area at conclusion of job.

B. Return manhole lids to proper location.

PROJECT RECORD DOCUMENTS

A. Note all severely deteriorated or damaged manholes, connections and associated appurtenances discovered during cleaning operation and report these to the Engineer.

B. Maintain a diary recording these discoveries and any other information that may be helpful to the owner in assessing system conditions.

C. Provide Engineer a typed diary or work log of all observations or discoveries identifying location of deteriorated or damaged manholes, connections and associated appurtenances.

MEASUREMENT AND PAYMENT

MEASUREMENT

A. Measure cleaning of pipes by the linear foot (LF) as accepted by the Engineer.

B. Extend measurement from center of manhole/cleanout to center of manhole/cleanout.

C. Manhole cleaning shall be incidental to the pipeline cleaning bid item.

PAYMENT

A. Payment for light cleaning shall be per linear foot (LF), paid when completed and diaries received.

B. Payment for heavy cleaning shall be paid as shown on the bid form.

C. If heavy cleaning is not on the bid form it will be considered incidental to the cleaning bid item.

D. If no bid item is provided for cleaning, payment will be incidental to other bid items.

PIPELINE TELEVISING SECTION

GENERAL

SECTION INCLUDES

A. Requirements for televising and reporting underground pipelines.

PERFORMANCE REQUIREMENTS

A. Assure a complete examination of the internal condition of the pipeline utilizing a closed circuit color camera.

B. Performance Requirements: All sanitary sewer mains installed or repaired under this project shall be televised by the Contractor. The Contractor shall be allowed to televise with the following requirement: A City of Dickinson representative and/or Engineer shall be on site to view the televising. Then Contractor shall assure that the lines are free of debris prior to televising, i.e. no dirt, stone, gravel, or other foreign materials, other than joint lubricants, shall be present. Distance measurements shall be provided with the televising so that deficient locations and all wye locations may be found adequately. DVD's shall be produced, during televising showing, clean pipe walls, water flow (if any), joints, wyes, and distance, in tenths, from centerline of starting manhole to centerline of ending manhole of each televising run. Any portion of the system found not to be in compliance with these specifications shall be reconstructed in accordance with these specifications and re-televised at the Contractor's expense. The Contractor shall provide two copies of the televised tape to the Engineer along with two copies of an accurate log showing distances along the televised run to any distresses and all wye locations. The Contractor shall allow adequate time for televising of the sanitary sewer lines prior to any undertaking of subgrade preparation over said sewer lines. Contractor to coordinate with the Engineer and the City.

All deficiencies outside of allowed tolerance, within the plans and specifications, shall be repaired by the Contractor and all repair costs shall be born by the Contractor. Timeliness of repair, with respect to other work, shall be the responsibility of the Contractor. The Contractor shall ensure timeliness of televising and shall review subsequent tape to check for any deficiencies so they may be repaired in a timely manner with respect to construction operations. All repairs shall be agreed upon by the Engineer, City and Contractor. Any cost to repair, including any street reconstruction, waterline repair, etc. shall be born by the Contractor.

SUBMITTALS

A. Submit to Engineer a schedule of work prior to or at the pre-construction meeting.

B. Submit to Engineer, prior to commencement of work, a written plan for traffic control including detour routes and signage (if applicable).

C. Submit to Engineer 2 copies of all DVD's and logs at project completion.

QUALITY ASSURANCE

A. DVD's label will indicate location, start and stop points and date.

B. Any service connection, joint connection or defect discovered during video taping shall be viewed from all possible angles and directions to show any damage or repair required.

C. Videos obscured by steam, water or other obstructions that do not allow Engineer to observe the condition of the pipe shall be rejected and redone at Contractor's expense.

QUALIFICATIONS

A. Televising of pipeline shall be performed by trained personnel to assure the best quality televising possible.

B. A minimum of 2 years active experience televising pipelines shall be required of any Contractor bidding on this project.

C. Pre-qualification to all perspective bidders shall include a listing of similar projects including type of project, date and contact.

PRODUCTS

MATERIALS

A. The Contractor shall utilize a software package system that is PACP compliant Version 4.2 in a digital format compatible with the City of Dickinson's equipment and technology.

EXECUTION

PREPARATION

A. Notify Engineer in writing of any changes made in the traffic control plan.
B. Notify Engineer in writing of any changes in the schedule of work plan.

PROCEDURE

A. Equipment

1. Contractor shall furnish all labor, equipment and materials to perform the closed circuit television inspection of the pipelines.
2. Operation of the equipment is to be controlled from above ground with a skilled technician at the control panel in the television studio, controlling the movement of the camera through the pipeline in either direction.
3. Televising equipment shall include the camera, television monitor, cables, power source, lights and other equipment necessary to the televising operation.
4. The importance of accurate distance measurements is emphasized. Accuracy of the measurement meter shall be checked daily by use of a walking meter, roll-a-tape, or other suitable device. Footage measurements shall begin at the centerline of the upstream manhole and end at the centerline of the downstream manhole. Footage shall be shown on the video data view and recorded at all times.

B. Roots, Mineral Deposits, and Protruding Taps

1. Where obstruction within the pipeline prevent the passage of televising equipment, Contractor shall reset his equipment to pass through the pipeline section from the other end and thereby complete the inspection.

2. Contractor will be required to remove any obstruction to complete televising of pipeline as directed by Engineer.

C. Camera

1. Camera and lighting quality shall be suitable to provide a clear, continuously in focus picture of the entire inside periphery of the pipeline for all conditions encountered during the work.
2. Camera shall be able to operate efficiently in 100% humidity conditions.
3. The minimum resolution of the video system shall be 650 lines of resolution color video picture.
4. The color camera shall be one specifically designed and constructed for the purpose of televising pipelines.
5. Color camera shall have a high resolution lens, rated at a minimum of 1.4 LUX, capable of spanning 360 degrees circumference and 270 degrees on horizontal axis to televise pipelines 6 inch diameter or larger.
6. Focal distance shall be adjustable through a range of 1 inch to infinity.
7. Contractor shall have available a self-propelled crawler transporter on which to mount the color camera so as to be able to inspect the pipeline as required.
8. The video camera shall not be pulled at a speed greater than 30 feet per minute.
9. Whenever non-remote powered and controlled winches are used to pull the television camera through the line, telephones, radios, or other suitable means of communication shall be setup between the two manholes of the section being inspected to insure good communication between the members of the crew.

D. DVD's

1. The entire pipeline inspection shall be recorded on a narrated videotape that includes all findings.
2. DVD's shall be high quality color and recorded in either a digital format compatible with the City of Dickinson's equipment and technology.
3. Any out of focus video recordings, or portions thereof, shall be cause for rejection of the video recording and will necessitate retelevising at Contractor's expense.
4. Televising shall be completed in a systematic fashion as approved by Engineer.
5. Provide on screen digital display, indicate distance travel down the pipe from beginning of run. Reset counter to zero at beginning.
6. Visual (On screen in corner):
    a. Report number.
    b. Date of television inspection.
    c. Sewer section and number.
    d. Current distance along reach (tape counter footage).
    e. Printed labels on DVD container and DVD with location information, date, format information, and other descriptive information.
7. Audio:
    a. Date and time of television inspection, operator name, name of overlying or adjacent street, and manhole numbers.
    b. Verbal confirmation of sewer section and television direction in relation to direction of flow.
    c. Verbal description of pipe size, type and pipe joint length.
8. Verbal description and location of each service connection and pipe defect.
    a. Type of weather during inspection.

E. During the course of the inspection and as required by the Engineer, actual video information will be transmitted from the television monitor to a video image printer to produce color still image photographs of faults.

F. Video Logs

1. A report will be generated by an onboard computer and printer, and will provide commentary on photographs and fault areas if required by the Engineer.
2. The video log reports shall be typed or computer generated.
3. Include the following information in the report:

a. Nearest street and cross street at starting point.
b. Starting manhole number, depth, and type.
c. Ending manhole number, depth and type.
d. Size and type of line being televised.
e. Footage of each defect or service found in the line.
f. Total length of the line measured from manhole to manhole.
g. Physical location of line.
h. Surface type above the line.
i. Location on the video tape.
j. Date, time, city, street, basin, sewer section, reference manhole number, name of operator, inspector, and weather conditions.
k. Pipe diameter, pipe material, section length, depth of pipe, length between joints, and corresponding videotape identification.
l. Location of each point of leakage.
m. Location of each service connection.
n. Location of any damaged sections, nature of damage, and location with respect to pipe axis.
o. Deflection in alignment of grade and pipe.

4. Television Inspection Logs: The logs shall be typed or computer printed and acceptable to the City of Dickinson. Printed location records shall be kept by the Contractor and will clearly show the location, in relation to adjacent manholes, of each infiltration point discovered by the television camera. An estimate of the flow rate of observed infiltration points shall be made and recorded. In addition, other points of significance such as locations of building sewer laterals, joints, unusual conditions, roots, storm sewer connections, collapsed sections, presence of scale and corrosion, and other discernible features will be recorded and two (2) copies of such records shall be supplied to the Owner.
5. DVD Recordings: The purpose of DVD recording shall be to supply a visual and audio record of the condition of the lines that may be replayed both daily and at future presentations. DVD recording playback shall be at the same speed that it was recorded. Upon completion of the work, all DVD's recorded during the television inspection shall become the property of the City of Dickinson. Cost of DVD's shall be included in the unit price bid. A complete recording shall be made of each line televised. A voice recording on DVD's shall make brief and informative comments on the sewer conditions.
6. The Contractor shall provide 2 professionally bound to the City of Dickinson. A summary shall be included and will include the television inspection log specified in Section 1 of these Specifications. A one page summary sheet shall also be provided which stated the sewer section, length, size, date completed, and totals.
7. If the Contractor notices during the televising of a sewer main that a segment will need to be repaired, the Contractor shall notify the Engineer and Owner immediately.

SCHEDULING AND COORDINATION

A. Schedule and coordinate all televising activities with Owner and Engineer.

CLEANING AND RESTORATION

A. Return manhole lids to proper location.

PROJECT RECORD DOCUMENTS

A. Provide Engineer 2 copies of videos and video logs.

MEASUREMENT AND PAYMENT

MEASUREMENT

A. Measure televising by the linear foot (LF) as accepted by the Engineer.

B. Measure from center of manhole to center of manhole.

C. If only one manhole, measurement shall be taken from the footage on the video.

D. Measure removal of obstruction as each (EA) as approved by the Engineer.

PAYMENT

A. Payment for all items of work listed on the bid form will be for the actual number of units approved by the Engineer and includes all materials, labor and equipment.

B. Payment for televising shall be per linear foot paid when complete. Allow one month after Engineer receives the videos for viewing and acceptance of the work. The final 10% of the televising bid item will be paid after the acceptance of the work.

C. Payment for removal of obstruction shall be each paid when removed and approved by the Engineer.

D. If no specific item is shown, televising and removal of obstruction will be considered incidental to other bid items.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

CONCRETE FORM LINER

SOIA-SAP-CPU-5-983(050)050 – PCN 20038

1.0 DESCRIPTION

This work consists of constructing Ashlar Stone textured surfaces on areas of the piers and MSE walls designated in the Plans. The work shall be performed in accordance with the Plans and the following.

2.0 FORMED TEXTURED SURFACES

The concrete surface shall be formed using a form lining system made of high-strength urethane elastomer capable of withstanding anticipated concrete pour pressures without leakage or causing physical defects. Form liners shall attach easily to forms and be removable without causing concrete surface damage. The liners shall be designed to form surfaces conforming to the design intent including the shape, lines, and dimensions described herein and in the plans. Match pattern features at form liner joints to minimize visible pattern repeats and make the formed concrete surface appear uniform and continuous without visible seams and form marks. When joints are unavoidable, make joints along main features of the pattern.

Form liners shall produce the textured effect of a highly realistic, random cut stone masonry surface. Simulated stones should exhibit the rough, natural (split) finish of real stone laid in place with hand tooled mortar joints. Surfaces having a smooth, slick or shiny surface will be rejected. Maximum pattern relief shall be 1-1/4 inches in depth. Form liner molds shall be cast from natural stones to provide a realistic natural stone pattern. Individual stones shall be formed with crisp, sharp edges and a rough (split), natural relief to the shape and dimensions described herein and shown on approved shop drawings.

Subject to compliance with requirements, provide form liner materials with an Ashlar Stone pattern from the following manufacturers:

1. Greenstreak (Pattern No. 330)
2. Scott System, Inc. (Pattern No. 167C)

3. Custom Rock Formliner (Pattern No. 2000)
4. Other approved manufacturers

Form ties shall be made of non-corrosive materials when the portion permanently embedded in the concrete is less than 1-1/2 inches from the finished surface.

Form release agents shall be fully compatible with the form liner material and the special surface finish to be applied to the textured surfaces.

3.0 SUBMITTALS

Within 60 calendar days of execution of the Contract, submit the following to the Engineer for approval:

A. Product data including manufacturer's technical information and use instructions for form liner placement and release.

B. Actual samples of form ties that will be permanently embedded in the concrete.

C. Qualification data for firms and person specified below under Quality Assurance to demonstrate their capabilities and experience. Include a list of completed projects with project names, addresses, names of architects, engineers and owners, plus any other pertinent information.

D. Work drawings indicating form liner layout and termination details. Indicate backup, rustication, reveal and chamfer strip locations. Include jointing, form tie location, pattern placement, pattern match details, and end, edge and other special conditions. Indicate tolerances and procedures of installation and separation.

4.0 QUALIFICATIONS

A. Manufacturer's Qualifications: The form liner manufacturer must have five years minimum experience making liners used to create formed concrete surfaces matching the pattern designated in the plans.

B. Installer Qualifications: The form liner installer shall have had a minimum of five consecutive years of experience in textured formed concrete construction.

C. Test Panels: Construct test panels of textured formed surfaces of the approved Concrete Form Liner for quality control comparison of surface texture and pattern

characteristics between the approved sample and the actual work as it is installed. The test panels shall be constructed using Class AE-3 concrete. Materials used in the construction of the concrete test panels shall comply with the applicable requirements of 602.04 B and C for formwork and concrete. The form liners used for the concrete test panels shall produce the same pattern that is intended for use on the structures. Cast unreinforced panels vertically simulating as many phases of the actual construction as possible. Additional concrete test panels will be required if results of the initial test panel do not meet the requirements of these special provisions.

The test panels may also be used as a finished surface for mock-ups of the color of the Special Surface Finish and the Anti-Graffiti Coating as specified in SP 146(14). The test panels shall be a minimum of 3 inches thick, 5 feet wide and 3 feet high.

Test panels shall be held until released by the Engineer. Once they are released, remove and dispose of the test panels in accordance with 107.17.

Test panels shall be considered incidental to the work and no direct compensation will be made therefore.

5.0 CONSTRUCTION REQUIREMENTS

Match pattern features at form liner joints to make the formed concrete surface appear uniform and continuous without grout leakage at the joints. When concrete vertical construction joints are required, place form liner joints in the valley of the grooves, or as approved by the Engineer. Following removal of forms, finish minor defects to blend with the balance of the pattern surface texture. Filling of “bug holes” or other similar deformities in the texture surface that are 1/2 inch or less in diameter or depth is not required. No visible vertical and horizontal seams or conspicuous form marks created by butt-joining form liners will be allowed. Where it is not possible to locate a vertical groove at a construction joint, the concrete surface shall be finished to reduce visibility of the construction joints.

Strip formwork in accordance with the form liner manufacturer’s recommendations to avoid concrete surface deterioration or weakness planes in the substrate. Finish form tie holes in accordance with 602.04 I.1 using approved patching materials.

Surface Preparation: All conventionally formed concrete surfaces receiving Concrete Form Liner texture shall be water blasted to break the surface film and to remove all laitance detrimental to the finish coating system performance. Sandblasting will not be allowed for cleaning concrete surfaces. Pressure washing with water at a pressure of 3000 psi at a rate of

3 to 4 gallons per minute using a fan nozzle held perpendicular to the surface at a distance of one to two feet shall be used.

Clean and repair surfaces of form liners to be reused. Split, frayed, delaminated or otherwise damaged form liner material will not be acceptable for exposed surfaces. Do not use "patched" forms for exposed concrete surfaces.

6.0 METHOD OF MEASUREMENT

Measurement will be by area in square feet of the finished surface area constructed to the limits shown and noted in the Plans.

7.0 BASIS OF PAYMENT

Payment will be made at the Contract Unit Price for the following:

Item No.	Pay Item	Pay Unit
980-0565	Concrete Form Liner	Square Foot

This payment shall be full compensation for all costs of constructing the textured surfaces including the concrete test panels, and the additional concrete required to achieve the specified texture relief.

This document was originally issued and sealed by Todd A. Lang, Registration Number PE-5295 on 03/27/15 and the original document is stored at the North Dakota Department of Transportation.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

INDUSTRY TRACK WORK

SOIA-SAP-CPU-5-983(050)050 – PCN 20038

1.0 DESCRIPTION

This work consists of furnishing and installing railroad track and track related items for the Dickinson Ready Mix spur track as designated in the Plans and as specified.

This work also includes removal of existing track, furnishing and installing new track, shifting of track, aligning track, relocation of an existing derail and ballasting and surfacing of track as described in the Contract Plans.

All work shall comply with BNSF Railway Company Design Guidelines for Industry Track Projects ***May 2011 – Revised Dec 2011*** at a minimum.
http://www.bnsf.com/customers/pdf/indytrkstds.pdf

2.0 QUALIFICATIONS

Contractor that will supervise and perform track work must be able to demonstrate experience in construction of railroad track in accordance with both AREMA and BNSF standards. Foreman shall have a minimum of 5 years of experience.

3.0 MATERIALS

A. Subbgrade shall be constructed in accordance with NDDOT Specifications and compacted to not less than 95% of the maximum standard laboratory density, and not more than 4% below the optimum moisture content and not more than 4% above the optimum moisture content.
B. Provide sub-ballast that meets the requirements of Section 816 Class 5 with the following modification. Percent passing the No. 200 sieve changed to 0-6%.
C. Ballast material shall be AREMA Class 2 (1” – 3/8”) and in accordance with AREMA and BNSF Specifications. Minimum depth of ballast material beneath ties and cross sectional area as shown in the plans.
D. Ties shall be timber AREMA number 4 or number 5 cross ties, 8 foot six inches

long and placed on 21.5 inch centers.

E. Rail shall be at a minimum 112 pound section, new or AREMA number 1 relay rail, and shall be compatible with BNSF's standard rail sections.
F. Anchors shall be new with a minimum of 16 anchors per 39 foot long panel.
G. Joint bars shall be new or best quality second hand and be of proper size and design for the rail.
H. Offset joint bars will be required if proposed rail is not of the same weight and section as track at the connection to the existing rail at each end. Offset joint bars shall be new and of the proper hand, material and dimensions.
I. Bolts, nuts, and washers shall be new.
J. Acceptance of Material: The Contractor shall furnish the Engineer a Certificate(s) of Compliance certifying the above materials comply with the applicable contract specifications. A copy of all test results performed by the Contractor necessary to assure contract compliance shall be furnished to the Engineer.

Acceptance shall be based on the Certificate(s) of Compliance, accompanying test reports, visual inspection, and/or any additional testing information requested by the Engineer. The Engineer retains the right to order or perform independent tests to verify information.

4.0 EQUIPMENT

Equipment shall be in good working condition, appropriate for the work and designed for the intended use.

5.0 CONSTRUCTION REQUIREMENTS

General Requirements: All work shall be in accordance with the contract documents and BNSF standards.

6.0 METHOD OF MEASUREMENT

A. Track removals will be measured on a lineal basis per foot of track removed (two lineal feet of rail per lineal foot of track). Track removal will include removal of rail and ties.
B. Installation of crossing panels for the temporary bypass road at the Dickinson Ready Mix spur track will be included in the cost of Railroad Track per lineal foot.
C. Construction of track, including ballast and surfacing and cutover connections and shifts, shall be on a lineal basis per foot of track complete and in place (two lineal feet of rail per lineal foot of track). Shifting of ends and resurfacing of existing

track shall be incidental to the construction of the track.

7.0 BASIS OF PAYMENT

Payment will be made at the Contract Unit Price for the following:

Item No.	Pay Item	Pay Unit
202-0329	Removal of Railroad Rail	Lineal Foot
980-0500	Railroad Ballast	Ton
980-0510	Railroad Sub-Ballast	Ton
980-0560	Railroad Track	Lineal Foot

This payment will be full compensation for all labor, equipment, and materials necessary to complete the work.

This document was originally issued and sealed by Todd A. Lang, Registration number PE-5295 on 3/20/15 and the original document is stored at the North Dakota Department of Transportation.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

ANTI-GRAFFITI COATING

SOIA-SAP-CPU-5-983(050)050 – PCN 20038

1.0 DESCRIPTION

This work consists of applying an anti-graffiti coating to all areas designated in the Plans. The work shall be performed in accordance with the Plans and the following:

2.0 MATERIALS

Anti-graffiti coatings shall be a clear system designed as a non-sacrificial, non-destructive coating system for exterior architectural aesthetics. Product shall be compatible with any surface sealer and/or special surface finish that may have been previously applied to the concrete surfaces. It shall be non-yellowing, non-chalking and UV-resistant, available in a semi-gloss finish and shall not require re-application after graffiti removal. Coating shall not contain paraffin (wax) or elastomeric silicones. Acceptable products shall demonstrate protection from graffiti defacement, chemical staining, ghosting, shadowing and normal environmental effects without yellowing, color change, increased dirt pick-up or damage to the coating or substrate for a minimum ten-year period.

Acceptable anti-graffiti coating products are as follows:

1. Graffiti Gard IV Low Luster as manufactured by TEX•COTE
2. Pro Industrial Anti-Graffiti Coating as manufactured by The Sherwin-Williams Company
3. PERMACLEAN as manufactured by TK Products
4. Other products submitted and approved by the Engineer

All products applied under this Project shall be supplied by the same manufacturer.

Graffiti removal agents required to be used with the proposed anti-graffiti coating shall be non-toxic, non-flammable, biodegradable and have a pH of 7 - 8.5. After graffiti removal, no evidence of graffiti shall be present. The product(s) shall not cause a change in the appearance to the treated surface, including shadowing, ghosting or staining of the coating or substrate.

3.0 SUBMITTALS

Submittals shall be made at the time of the pre-construction conference.

The Contractor shall submit the following items to the Engineer:

A. Manufacturer's product data sheets indicating technical information, label analysis and application instructions for the proposed anti-graffiti coating.

B. Provide a list of manufacturer-approved products for cleaning of the surface of the proposed anti-graffiti coating product(s).

C. Certified test reports indicating compliance with requirements.

   A one-quart sample of each anti-graffiti coating product and a compatible graffiti removal agent for verification purposes. Test panel in accordance with the requirements of SP 144(14).

D. Applicator qualifications demonstrating experience in coating applications. Include a list of recently completed graffiti-resistant coating projects. Supply name and location of project, name and telephone number of owner, and a description of products used, substrates, applicable local environmental regulations and application procedures.

4.0 QUALITY ASSURANCE

The approved coating manufacturer shall conduct a training seminar for the purpose of training the applicators on anti-graffiti product technology, substrates and application methods. A manufacturer's representative shall be present during the application to the test panel(s), during the first application to bridge and during the first application to the retaining walls.

5.0 APPLICATION

Prior to full application of the anti-graffiti coating to the designated surfaces, the applicator shall apply the anti-graffiti coating to the test panel containing the Concrete Form Liner texture and Special Surface Finish as described in SP 144(14) to confirm compatibility, coverage and possible color change. Any problems or damage to the color system as a direct result of the anti-graffiti products or surface preparation methods shall be corrected to the

satisfaction of the Engineer and at the Contractor's expense.

Apply the anti-graffiti coatings according to the manufacturer's directions to the areas indicated in the plans.

6.0 METHOD OF MEASUREMENT

Measurement for the Anti-graffiti Coating applied to the designated areas will be by area based on the Plan dimensions of the finished colored plane surface area in square feet.

7.0 BASIS OF PAYMENT

Payment will be made at the Contract Unit Price for the following:

Item No.	Pay Item	Pay Unit
930-9930	Anti-Graffiti Coating	Square Foot

This payment will be full compensation for all costs of surface preparation, furnishing, applying, and curing of the anti-graffiti coating as described above.

The cost of application of the anti-graffiti coating to the test panels for quality assurance purposes shall be included in the cost of Anti-Graffiti Coating and no direct compensation will be made therefore.

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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

PAINTING OVER GALVANIZED STEEL

5-983(050)050 – PCN 20038

GENERAL
This work consists of the surface preparation and painting of galvanized steel.

MATERIALS
Use a two coat paint system consisting of a polyamide epoxy primer and an aliphatic polyurethane finish coat. Provide the system from a single manufacturer. Provide components that are recommended for use as part of a two-coat system.

Use a paint system formulated by the manufacturer for use over galvanized steel.

A. Epoxy Primer.
Use a chemically-curing polyamide epoxy primer that is a two component and chemically-curing.

Use primer capable of being spray applied to the manufacturer's recommended Dry Film Thickness (DFT) in on coat without sagging or mud cracking. After mixing the primer shall be smooth, uniform, and free of lumps or coarse particles.

Formulate the color of the primer to produce a distinct contrast with the galvanized surface and the finish coat.

Provide an epoxy primer that meets the material properties shown in Table 1.

Table 1
Paint Properties

Total Solids, percent by volume	54% min
Pot life at 77°F	4 hours min
VOX content	3.5 lbs/gal max
Curing Time for Recoating[1]	24 hours max
[1]When applied at the manufactures' recommended thickness at 77°F and 50% relative humidity.	

B. Finish Coat.
Use a compatible two-component, aliphatic polyurethane finish coat with a weather resistant finish and the gloss and color as specified in the plans.

Use paint with a finish coat that meets the material properties shown in Table 1.

C. Certification and Acceptance
Before the use of the paint system, provide a Certificate of Compliance as specified in Section 106.01 C, "Certificate of Compliance" and the following:

1. Manufacturer Contact Information

2. Product Data Sheets
3. Manufacturer's Application Instructions
4. Material Safety Data Sheets or Globally Harmonized System

D. Packaging and Labeling

Provide a label on each container that contains:

- The name of manufacturer;
- The brand name;
- The lot number of the paint;
- Complete instructions for the use of the paint;
- The shelf life of the components; and
- The post life of the mixture.

CONSTRUCTION REQUIREMENTS

A. Surface Preparation

Prepare the surface according to ASTM D 6386. Do not quench the surface if the galvanized coating will be applied within 48 hours.

Do not use chromate conversion coatings.

B. Coating Application

Apply paint when environmental conditions, such as temperature, humidity, and dew point, are within the manufacturer's recommended range.

Apply coating in a uniform, even coat and worked into all corners and crevices. Use a brush on surfaces inaccessible to spray applications.

The DFT of the coating system will be in accordance with the manufacturer's recommendations. Remove surface coating from areas outside the manufacturer's specified range in a manner that protects the underlying galvanized coating and also prepares the surface for recoating.

BASIS OF PAYMENT

Include the cost of work described in this Special Provision in the contract unit price for "Pedestrian Railing".

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

TEMPORARY BYPASS REQUIREMENTS

SOIA-SAP-CPU-5-983(050)050 – PCN 20038

DESCRIPTION

The following are schedule and maintenance requirements for the Temporary Bypass that will maintain State Avenue traffic during the bridge construction for this project.

SCHEDULE REQUIREMENTS

The grading for the Temporary Bypass from Station 208+90 to Station 211+00 shall be complete to the bottom of the aggregate base course elevations by August 1, 2015. BNSF will set crossing panels at approximate Stations 209+30, 210+16, 210+32 and 210+47 after August 1, 2015. Paving from Station 208+90 to Station 211+00 will not be able to be completed until these four crossing panels have been set by BNSF. The paving for the entire Temporary Bypass shall be complete and the Contractor shall be prepared to move traffic from the existing State Avenue to the bypass by September 1, 2015. The actual traffic shift shall be coordinated with BNSF construction in the project area.

To be considered ready for traffic, the Temporary Bypass shall meet the following requirements:

(1) Paved from Station 201+00 to Station 216+00
(2) Traffic control signs for Phase 3 are complete and in place.
(3) BNSF has installed crossing panels and signals for their four tracks
(4) Contractor installed crossing panels for the existing and proposed Dickinson Ready Mix spur are complete and in place.

If these schedule requirements are not met, liquidated damages of $5,000/calendar day will be charged for each day that the schedule is not met.

MAINTENANCE REQUIREMENTS

The Contractor shall be responsible for all road maintenance, including the temporary bypass except for snow removal. Snow removal will be conducted by the City of Dickinson. If

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maintenance or restoration work becomes necessary, the Engineer will notify the Contractor and the Contractor shall respond as follows:

(1) The Contractor shall begin the maintenance and restoration work within 24 hours of the Engineer's notification and stay onsite until the maintenance and restoration work is complete. If the Contractor fails to begin the maintenance and restoration work within 24 hours of the Engineer's notification, the Department may do one or both of the following:

(a) Apply a contract price reduction of $4,000 per each additional day, or part of a day, beyond the initial 24-hour notice.

(b) Complete the maintenance and restoration work by other means, and deduct the cost of the maintenance and restoration work from monies due or to become due the Contractor.

(2) If the maintenance or restoration work affects public safety the Contractor will begin the maintenance and restoration work immediately. If the Contractor fails to begin the maintenance and restoration work immediately, the Department will have the authority to have the maintenance and restoration work completed and will deduct the cost of the maintenance and restoration work from monies due or to become due the Contractor.

Beginning maintenance or restoration work means having the proper equipment and personnel on site to complete the maintenance or restoration work.

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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION

FUEL COST ADJUSTMENT CLAUSE

Revision Date: 9/8/2006

Introduction

This Special Provision provides for price adjustments to the Contract when significant changes in the cost of motor fuels and burner fuels occur while completing the Contract work. Participation in fuel cost adjustment program is not mandatory. A Contractor is not required to notify the Department at the time of submitting bids whether the Contractor will or will not participate in the fuel cost adjustment provision.

The North Dakota Department of Transportation (NDDOT) will send the low responsible bidder a "Fuel Cost Adjustment Affidavit" (SFN 58393) with the proposed Contract. The Contractor shall return a completed Fuel Adjustment Affidavit with the signed Contract as specified in Standard Specification Section 103.06, Execution and Approval of the Contract. The affidavit shall be returned on all Contracts with this provision even if the Contractor elects not to participate in the provision.

Compensation adjustments for motor fuels and burner fuels consumed in prosecuting the Contract shall be determined by the Engineer in accordance with the provisions set forth herein. Compensation adjustments will be assessed monthly for the cost of the motor fuels and burner fuels whenever the Current Fuel Index (CFI) is outside the given threshold of the Base Fuel Index (BFI) for the Contract.

If the Contractor has a fixed price for fuel for motor or burner fuels to complete the work, no fuel cost adjustments will be made for that fuel type. If there is no fixed fuel price for motor or burner fuels, participation in the Fuel Adjustment provision is the decision of the prime Contractor.

If the prime Contractor decides not to participate, no fuel cost adjustments will be made to the Contract for the Contractor or any subcontractors. If the prime Contractor elects to participate in the fuel cost adjustment provision, the prime Contractor shall include the anticipated fuel cost of subcontractors who wish to participate. If fuel cost adjustments are made to the Contract, the prime Contractor shall ensure that participating subcontractors including second and lower tier, are included in the adjustments in proportion to the percentage of work and anticipated fuel cost by that subcontractor.

Fuel Indexes

Each month, NDDOT will record the average wholesale price for No. 2 diesel fuel and the average wholesale price for unleaded gasoline (87 octane). The monthly average will be the average of the daily rack prices for the month as reported by DTN Energy for Fargo ND.

The burner fuel index will be the No. 2 diesel fuel index regardless of the type of burner fuel actually used.

The Base Fuel Index (BFI) price for motor fuels and burner fuel to be used in the Contract will be the average wholesale price for the month prior to the bid opening.

The Current Fuel Index (CFI) price for motor fuels and burner fuel to be used for each monthly adjustment will be the average wholesale price for the month prior to the adjustment month.

Fuel Ratio

For motor fuels diesel and unleaded gas, the fuel ratio of the Contract will be determined by dividing the Contractor's affidavit costs for each motor fuel by the original Contract amount.

For burner fuels, the fuel ratio of the contract will be determined by dividing the Contractor's affidavit cost for burner fuels by the original Contract amount of plant-mixed hot bituminous pavement paid by the ton. Asphalt cement, binders and other miscellaneous bituminous items shall not be included.

The fuel ratio of the contract for motor and burner fuels will remain the same throughout the length of the contract. The sum of the affidavit fuel costs shall not exceed 15% of the original Contract amount.

The fuel ratio for the three fuel types will be determined by the following equation:

$$\textbf{Fuel Ratio}_{(x, y, z)} = \textbf{Affidavit Cost}_{(x, y, z)} / \textbf{Original Contract Amount}_{(x, y, z)}$$

(x)	=	Motor Fuel (Diesel)
(y)	=	Motor Fuel (Unleaded)
(z)	=	Burner Fuel
Fuel Ratio$_{(x, y, z)}$	=	Fuel ratio of the contract for each respective fuel type
Affidavit Cost$_{(x, y, z)}$	=	Fuel costs from Fuel Adjustment Affidavit (SFN 58393)
Original Contract Amount$_{(x, y)}$	=	Total of the original contract amount excluding lane rental, and Part B of the bid (when A+B bidding is used), if applicable.
Original Contract Amount$_{(z)}$	=	Total original contract amount for all hot bituminous pavement bid items combined, excluding bid items for asphalt cement, sawing and sealing joints, coring, etc. Only hot bituminous pavement bid items measured by the Ton will be included in the calculation.

Cost Change

The monthly change in fuel costs will be determined by the following equation:

$$\textbf{Cost Change}_{(x, y, z)} = (\textbf{CFI}_{(x, y, z)} - \textbf{BFI}_{(x, y, z)}) / \textbf{BFI}_{(x, y, z)}$$

(x)	=	Motor Fuel (Diesel)
(y)	=	Motor Fuel (Unleaded)
(z)	=	Burner Fuel (use diesel prices)
Cost Change$_{(x, y, z)}$	=	The relative change in the current CFI and the BFI for each fuel type
CFI$_{(x, y, z)}$	=	Current Fuel Index for each fuel type
BFI$_{(x, y, z)}$	=	Base Fuel Index for each fuel type

Contract Adjustments

Contract adjustments will be made for the cost of motor and burner fuels whenever the cost change exceeds a ±0.10 threshold. No fuel cost adjustment will be made for work done under liquidated damages. Adjustments will be determined for Motor Fuel (diesel), Motor Fuel (unleaded), and Burner Fuel (burner) separately and shall be computed on a monthly basis.

When the cost change is greater than 0.10, the rebate to the Contractor for each fuel type shall be computed according to the following formulas:

$$\mathbf{FCA_{(x,\,y,\,z)} = Fuel\ Ratio_{(x,\,y,\,z)} \times Estimate_{(x,\,y,\,z)} \times (\ Cost\ Change_{(x,\,y,\,z)} - 0.10\ )}$$

(x)	=	Motor Fuel (Diesel)
(y)	=	Motor Fuel (Unleaded)
(z)	=	Burner Fuel
$FCA_{(x,\,y,\,z)}$	=	Fuel Cost Adjustment for each of the fuel types
$Fuel\ Ratio_{(x,\,y,\,z)}$	=	Fuel Ratio for each of the fuel types
$Estimate_{(x,\,y)}$	=	The monthly total of work done on estimates issued in the current month excluding incentive or disincentive payments, pay factor adjustments and any work completed under liquidated damages.
$Estimate_{(z)}$	=	The monthly total of hot bituminous pavement work done on estimates issued in the current month, excluding bid items for asphalt cement, sawing and sealing joints, coring, etc. Only hot bituminous pavement bid items measured by the Ton will be included in the calculation. Hot bituminous pavement work completed under liquidated damages will not be included.
$Cost\ Change_{(x,\,y,\,z)}$	=	The monthly change in fuel costs for each of the fuel types

When the cost change is less than -0.10, the credit to the Department for each fuel type shall be computed according to the following formulas:

$$\mathbf{FCA_{(x,\,y,\,z)} = Fuel\ Ratio_{(x,\,y,\,z)} \times Estimate_{(x,\,y,\,z)} \times (\ Cost\ Change_{(x,\,y,\,z)} + 0.10\ )}$$

(x)	=	Motor Fuel (Diesel)
(y)	=	Motor Fuel (Unleaded)
(z)	=	Burner Fuel
$FCA_{(x,\,y,\,z)}$	=	Fuel Cost Adjustment for each of the fuel types
$Fuel\ Ratio_{(x,\,y,\,z)}$	=	Fuel Ratio for each of the fuel types
$Estimate_{(x,\,y)}$	=	The monthly total of work done on estimates issued in the current month excluding any incentive or disincentive payments, pay factor adjustments and any work completed under liquidated damages.
$Estimate_{(z)}$	=	The monthly total of hot bituminous pavement work done on estimates issued in the current month, excluding bid items for asphalt cement, sawing and sealing joints, coring, etc. Only hot bituminous pavement bid items measured by the Ton will be included in the calculation. Hot bituminous pavement work completed under liquidated damages will not be included.
$Cost\ Change_{(x,\,y,\,z)}$	=	The monthly change in fuel costs for each of the fuel types

Payments

Adjustments will be determined by the Engineer monthly. Adjustments will be made under the following spec and code for each fuel type:

109 0100	Motor Fuels (Diesel)
109 0200	Motor Fuels (Unleaded)
109 0300	Burner Fuel

When significant payment adjustments are made on final estimates to account for final in-place measured quantities, the Engineer may prorate the adjustments back to the months when the work was done.

Attachments

For informational purposes, a ‘Fuel Cost Adjustment Affidavit’ (SFN 58393) is included as Attachment A.

FUEL COST ADJUSTMENT AFFIDAVIT

North Dakota Department of Transportation, Construction Services
SFN 58393 (08-2006)

Attachment A

Project Number

The Contractor is not required to notify the Department at the time of submitting bids whether he will or will not participate in the fuel cost adjustment program. The Contractor shall return the affidavit on all Contracts with this Provision even if the Contractor elects not to participate.

Check the box for each fuel type that has a fixed price.
No adjustments in fuel price will be made for the boxes that are checked.

☐ Diesel ☐ Unleaded ☐ Burner Fuel

Does your company elect to participate in a fuel adjustment for this contract for the fuels that do not have a fixed price?
No adjustments in fuel prices will be made if **No** is checked.

☐ Yes ☐ No

If yes, provide the total dollars for each of the applicable fuels.

Diesel (x)	$		
Unleaded (y)	$		
Burner Fuel (z)	$		
Sum (x+y+z)	$	% of Original Contract Amount	%*

*The sum of the x, y, and z may not exceed 15% of the original contract amount.

Under the penalty of law for perjury of falsification, the undersigned,

_____, _____
Name Title

of _____, here by certifies that the documentation is submitted in good
Contractor

faith, that the information provided is accurate and complete to the best of their knowledge and belief, and that the monetary amount identified accurately reflects the cost for fuel, and that they are duly authorized to certify the above documentation on behalf of the company.

I hereby agree that the Department or its authorized representative shall have the right to examine and copy all Contractor records, documents, work sheets, bid sheets and other data pertinent to the justification of the fuel costs shown above.

_____ **X** _____
Date Signed

State of _____

County of _____

Subscribed and sworn to before me this _____ day of _____, _____.

(Seal) **X** _____
Signature of Notary Public

My Commission Expires _____