

WATER PERMIT NO. 6823-3

Name of Applicant: **TM Rural Water District**

Address: **110 N Main, Parker SD 57053**

Phone: **605 297-3334**

Amount of Water Claimed: **1,680 AF**

Total Acres: **NA**

Source of Water Supply: **groundwater (two wells)**

Water to be used for: **rural water system**

County: **Turner & McCook**

Type of Waste Disposal System:

Location: **located near Dolton**

PRIORITY

Date Received: **3-1-07**

Application/License Fee: **\$575**

Corrected Application Received:

Period of Annual Use: **Jan 1 – Dec 31**

Remarks: **Place to beneficial use water reserved by Future Use Permit No. 6705-3**

Diversion Point: **SW ¼ SW ¼ Sec 20-T100N-**

R55W (Turner County)

SW ¼ SE ¼ Sec 25-T101N-R55W (McCook

County)

Land to be Irrigated: **NA**

Depth of Well: **369 and 302 feet deep**

Well Driller:

Remarks:

Type of Map: **aerial**

Prepared by: **Angeline P Ting, PE**

Reviewed and the Number Assigned on: **3-2-07**

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____

RECEIVED
MAR - 1 2007
WATER RIGHTS
PROGRAM

Mail to: Water Rights Program Joe Foss Building 523 E. Capitol Pierre, SD 57501-3181 (605) 773-3352	No. <u>6823-3</u>	(office use only) Hydrologic Unit <u>10170102</u>
	Basin <u>Vermillion River</u>	
	Newspaper <u>See list</u>	

Application For Permit To Appropriate Water Within The State Of South Dakota

Check use(s) of water:

- | | | | |
|--|---|--|--|
| ☐ Municipal | ☐ Suburban Housing | ☐ Recreational | ☐ Institutional |
| ☒ Rural Water System | ☐ Commercial | ☐ Fish & Wildlife | ☐ Geothermal Heat |
| ☐ Domestic (over 18 gpm) | ☐ Industrial | ☐ Other _____ | |

Type of Application:
(check one)

- ☐ New ☐ Vested Right (Use predates Mar 2, 1955) ☐ Future Use Reservation
☒ Place to Beneficial Use Water Reserved by Future Use Permit No. 6705-3
☐ Amendment/Correction to Permit No. _____

Description of amendment/correction: (i.e. change diversion point(s), add diversion point(s), change use, etc.)

- Name of Applicant TM Rural Water District Phone (605) 297-3334
(check one) ☒ Owner ☐ Tenant/lessee
Mailing Address 110 North Main, Parker State SD 57053
(Street, RR, or Box and City) (Zip Code)
- Amount of water claimed ~~N/A~~ 2.23 *CFS or 1,000 **GPM 90 ***AF
(*Cubic Feet per Second) (**Gallons per Minute) (***)Acre Feet - storage capacity of dam/dugout or annual use if applicable
- Source of water supply UVM Aquifer (aka Basal Aquifer)
- Location of point of diversion (example - 3 wells in SW 1/4 NE 1/4 section 12-T104N-R53W) County Turner & McCook
1 well in SW 1/4 SW 1/4 of Section 20-T100N-R55W (Turner County)
1 well in ~~SE~~ SW 1/4 SE 1/4 of Section 25-T101N-R55W (McCook County)
- County or counties where water will be used Turner, McCook, Minnehaha, Miner, Hutchinson
- Annual period during which water is to be used All year Jan 1 - Dec 31
- Give a description of the project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)
Construction of two new 500 gpm wells and connection to raw water lines to supply water treatment plant located 1/2 mile east of Dolton, SD.

STATE OF SOUTH DAKOTA)
County of Turner SS

Attachments: Attach Form 2A if diversion is from a well or dugout, or if storage of water is proposed. Attach map and any other technical information. (see instructions)

I, TM Rural Water District, the applicant, certify that I have read this application, have examined the attached map and that the matters stated are true and that I intend, and am able to complete the necessary construction.

Applicant's signature Shawn Ryan President

Subscribed and sworn to before me this 26th day of February 20 06

Trudy Lee Konda
Notary Public signature

**SOUTH DAKOTA
WATER PERMIT NO. 6823-3**

Date of first receipt of application March 1, 2007.

The Water Management Board approved Water Permit No. 6823-3 on December 5, 2007 for TM Rural Water District, c/o Ken Pedersen, Manager, 110 N Main, Parker SD 57053 authorizing the construction of the water use system and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 6823-3 places to beneficial use 1,690 acre-feet of water at a maximum diversion rate of 2.23 cubic feet of water per second which was appropriated and reserved by Future Use Permit No. 6705-3. This permit authorizes construction of two wells to be completed into the Upper Vermillion Missouri Aquifer (369 and 302 feet deep) located in the SW ¼ SW ¼ Section 20-T100N-R55W (Turner County) and SW ¼ SE ¼ Section 25-T101N-R55W (McCook County).
2. The water appropriated shall be used for the purpose of supplying the TM Rural Water District which serves users in Turner, McCook, Minnehaha, Miner and Hutchinson counties and may not exceed the amount of water needed for beneficial use.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date from which applicant may claim right is March 13, 2006 (established by Future Use Permit No. 6705-3).
5. One-fifth of the construction is to be completed on or before June 5, 2010.
6. All construction is to be completed on or before December 5, 2012.
7. Water is to be put to beneficial use on or before December 5, 2016.
8. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

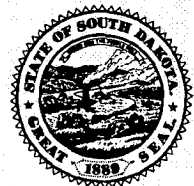
1. The wells approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. The wells authorized by Permit No. 6823-3 shall be constructed by a licensed well driller and construction of the well and installation of the pump shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.
3. Water Permit No. 6823-3 authorizes a maximum annual withdrawal of 1,690 acre feet of water annually from the Upper Vermillion:Missouri Aquifer.
4. TM Rural Water District shall report to the Chief Engineer annually the amount of water withdrawn from the Upper Vermillion:Missouri Aquifer.

WATER MANAGEMENT BOARD

By: Garland Erbele
Garland Erbele, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

FEB 13 2008

date



Well No. 6

(type or print in ink)

1. Well Information - Proposed Construction

- a) Drill Hole Diameter 24" Depth 369'
- b) Casing Type Steel Diameter 12" Thickness 0.3125"
- c) Screen Type Stainless Steel Diameter 12" Thickness
- d) Gravel Pack Silica Length of Gravel Pack Approximately 112'
- e) Depth to Top of Water Bearing Material Approximately 250'
- f) Depth to Water (ground surface to water level) Approximately 100'
- g) Distance to nearest existing domestic well:

On applicants property W ~ 3/4 Mile

On property owned by others E ~ 1/2 Mile

2. Wastewater Disposal System Information

- a) Type of System (i.e. septic tank, drain field)
- b) System Capacity (gallons) Year Constructed
- c) Connected to the City of Sanitary System

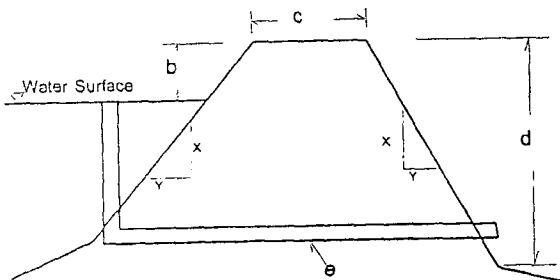
3. Dugout Information

- a) Surface Dimensions Depth
- b) Depth to water (ground surface to water level)

4. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information requested below for each dam. The locations of the dams need to be shown on the map submitted with the application.

- a) If a private engineering firm or government agency was involved in the design of this dam, please give their name and address:



- b) Freeboard
- c) Crest Width
Crest Length
- d) Height
- e) Primary Outlet Capacity
If pipe, diameter
- f) Secondary Spillway Capacity
Spillway Width
- g) X & Y Slope
Upstream
Downstream
- h) Surface Area of Impoundment
- i) Storage Acre Feet
- j) Drainage Area Above Dam Acres

Well No. 7

(type or print in ink)

1. Well Information - Proposed Construction

- a) Drill Hole Diameter 24" Depth 302'
- b) Casing Type Steel Diameter 12" Thickness 0.3125"
- c) Screen Type Stainless Steel Diameter 12" Thickness
- d) Gravel Pack Silica Length of Gravel Pack Approximately 89'
- e) Depth to Top of Water Bearing Material Approximately 210'
- f) Depth to Water (ground surface to water level) Approximately 100'
- g) Distance to nearest existing domestic well:

On applicants property NE ~3 Miles

On property owned by others NW ~1/4 Mile

2. Wastewater Disposal System Information

- a) Type of System (i.e. septic tank, drain field)
- b) System Capacity (gallons) Year Constructed
- c) Connected to the City of Sanitary System

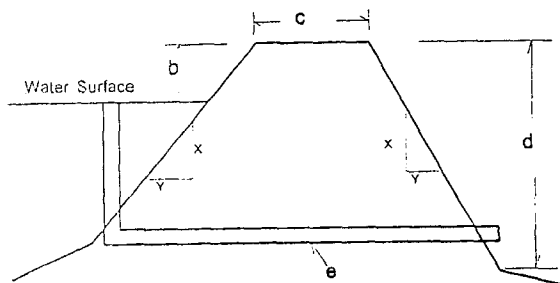
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Spillway Width
- g) X & Y Slope
Upstream
Downstream
- h) Surface Area of Impoundment
- i) Storage Acre Feet
- j) Drainage Area Above Dam Acres

DOLTON TOWNSHIP

267th STREET

EXISTING WELL NO. 4
LANDOWNER: TM RURAL
WATER DISTRICT

HWY 81

SECTION 25

WELL NO. 6
LANDOWNER: TM RURAL
WATER DISTRICT

1500 0 1000 3000

SCALE: 1" = 3000'

268th STREET

CITY OF DOLTON

440th AVENUE

441st AVENUE

442nd AVENUE

269th STREET

EXISTING WTP
LANDOWNER: TM RURAL
WATER DISTRICT

EXISTING WELL NO. 1
LANDOWNER: TM RURAL
WATER DISTRICT

270th STREET

WELL NO. 7
LANDOWNER: TM RURAL
WATER DISTRICT

SECTION 20

271st STREET

F:\2006\01-01\2006\TM Contract 50-Well Improvements.dwg - 2/26/2007 10:30 AM



BANNER
Consulting Engineers & Architects

409 22nd Ave. S. P.O. Box 298
Brookings, South Dakota 57006
605-692-6342
www.bannerassociates.com

Designing Projects, Building Trust

PROJECT TITLE:
**TM RURAL WATER DISTRICT
WATER SYSTEM IMPROVEMENTS-2006
WELL IMPROVEMENTS**

PROJECT LOCATION:
DOLTON,
SOUTH DAKOTA

ADDENDUM NO.:

SHEET TITLE:
**SITE LAYOUT
FOR
WATER RIGHT PERMIT**

DRAWN BY: APT
DESIGNED BY: APT
CHECKED BY: CEB
JOB NO: 200601.01.01
DATE: FEBRUARY, 2007

SCALE: 1" = 3000'

SHEET NO.:
1

RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date 3/1, 20 07

RECEIVED OF TM Rural Water System District

The following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. <u>6823-3</u> to Appropriate Water, to construct and to put water to beneficial use	525	00
Fee for Application for Permit No. _____ to Appropriate Water for Future use		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. <u>6823-3</u>	50	00
Fee for Filing Transfer Form _____		
Fee for _____		
Fee for Issuing New Well Driller's License No. _____ for C.Y. _____		
Fee for Renewal of Well Driller's License No. _____ for C.Y. _____		
Fee for Issuing Well Pump Installer's License No. _____ for C.Y. _____		
Fee for Renewal of Well Pump Installer's License No. _____ for C.Y. _____		
(Any Other Work Provided by Law)	TOTAL	575 00

No.

02975

By Garland Erberle
Chief Engineer 

BANNER ASSOCIATES, INC.
409 22nd Avenue South • P.O. Box 298
Brookings, South Dakota 57006-0298
(605) 692-6342
FAX: (605) 692-6714

February 1, 2007

SD Department of Environment and Natural Resources
Joe Foss Building
523 East Capital
Pierre, SD 57501-3182

RECEIVED
FEB 02 2007
WATER RIGHTS
PROGRAM

Attn. Dave Ryan, NR Engineering Director

Re: Plan Review
TM System Improvements, 06
CONTRACT 5
Well Improvements
BAI Proj. 20601.01.01

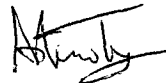
Dear Mr. Ryan:

Please find three copies of the project plans and specifications for the well improvements for TM Rural Water District. TM Rural Water District is currently moving forward with a project that will increase their water system capacity. The enclosed project includes drilling two (2) new wells with pumping capacity of 500 gpm on each well. The plans and specifications for Contract 5 are included with this letter for your review.

The intent of the TM Rural Water District is to construct two new wells prior to August 1, 2007. With your help, we would like to open bids for Contract 5 on February 23, 2007 and award a contract prior to March 1, 2007. At this time, there are no public dollars that will be used for the construction of the project.

Any help that you can provide with your review of the project plans and specifications for Contract 5 would be greatly appreciated. If you have any questions or concerns, please do not hesitate to call me or Chad Bachman at (605) 692.6342.

Sincerely,



Angeline Ting, P.E.

Enclosures: Project Plans & Specifications (3 copies)

Cc: Jim Goodman, SD DENR Water Right Program
Ken Pedersen, TM Rural Water

T M Rural Water District

Box 445, Parker, South Dakota 57053 • Phone (605) 297-3334 • Fax (605) 297-3310

February 27, 2007

DENR
Water Rights Program
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

RECEIVED
MAR - 1 2007
WATER RIGHTS
PROGRAM

Dear Sirs:

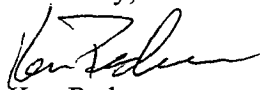
Enclosed is an application to convert some future water rights in the UVM aquifer to beneficial use. The District is in the process of constructing a new 3 million gallon per day treatment plant, which will begin operation by the end of the year. We are anticipating a daily average flow of something over 1.8 million gallons per day at the startup. Additional demand is expected to be on-line shortly afterwards. The current wells do not provide enough capacity for peak demand and additional wells are necessary. Additional water rights will also be needed to meet the expected average daily demands for UVM water.

The District has opened bids for the construction of two wells. Specifically, the two well will be drilled into the UVM aquifer at depths of approximately 302 ft. and 369 ft. in the SW1/4SW1/4 Section 20 T100N-R55W and in the SE1/4SE1/4 Section 25 T101N-R55W, respectively. The specifications call for a 24-inch borehole to be completed with 12-inch casing, and pumps with a 500-gpm capacity.

In order that the construction be allowed to go forward, I would ask that we be allowed to construct the two 12" wells into the UVM aquifer as test wells, to be converted into production wells at the time they are properly licensed.

If you need more information, please contact me.

Sincerely,


Ken Pedersen
Manager

Water Rights Program - File Documentation

NAME: Ken Pedersen, Manage

ADDRESS: TM Rural Water System

DATE: 3-5-07 **COUNTY:** **TELEPHONE:** 605 297-3334

RE: Pending application

COMMENTS:

I called Ken Pedersen to clarify the location of one of the proposed wells. Ken indicated the well in Section 25-T101N-R55W (McCook County) will be located in the SW ¼ SE ¼ as shown on the map. I told him I would change the application accordingly.

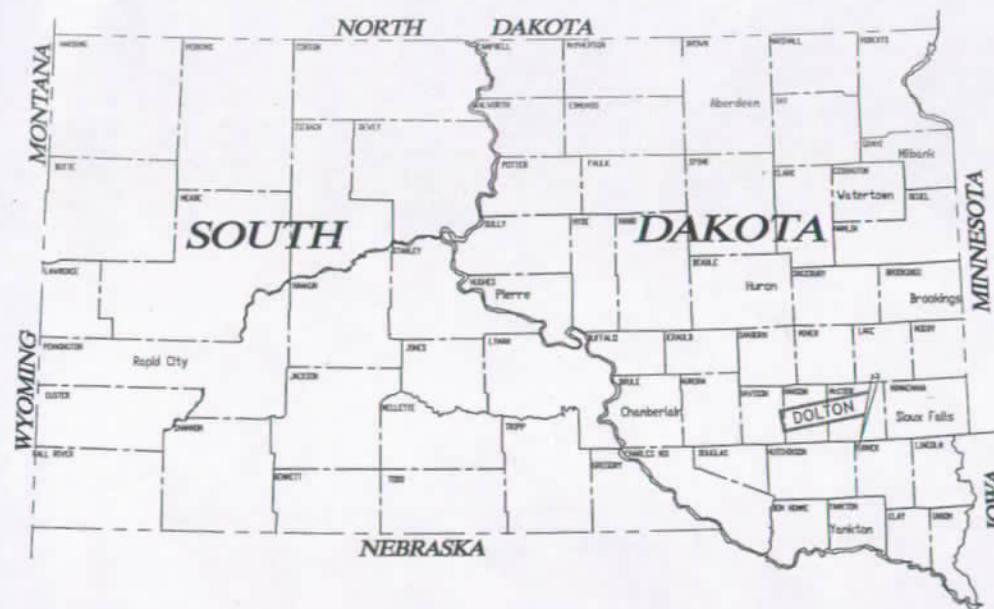


Karen Schlaak
Environmental Scientist

CONSTRUCTION PLANS FOR TM RURAL WATER DISTRICT WATER SYSTEM IMPROVEMENTS - 2006 CONTRACT 5 - WELL IMPROVEMENTS DOLTON, SOUTH DAKOTA

RECEIVED
FEB 02 2007
WATER RIGHTS
PROGRAM

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North
 PROJECT VICINITY MAP
SCALE: NONE

INDEX OF SHEETS	
SHT. NO.	DESCRIPTION
1.	TITLE AND INDEX SHEET
2.	SITE LAYOUT
3.	GENERAL CONSTRUCTION NOTES AND DETAILS
4.	DETAILS
5.	DETAILS
6.	DETAILS
7.	WELL SECTIONS
8.	WELL SITE LOCATIONS
9.	PROCESS PAID SHEET
10.	ELECTRICAL TITLE SHEET
11.	ELECTRICAL SITE PLAN
12.	VAULT ELECTRICAL PLAN
13.	POWER ONE LINE DIAGRAM
14.	ELECTRICAL SCHEDULES AND DETAILS



North
 PROJECT LOCATION MAP
SCALE: NONE

TM RURAL WATER DISTRICT

FEBRUARY, 2007

CONSULTANTS:



PROJECT TITLE:

TM RURAL WATER DISTRICT
WATER SYSTEM
IMPROVEMENTS-2006
CONTRACT 5
WELL IMPROVEMENTS

PROJECT LOCATION:
DOLTON,
SOUTH DAKOTA

REV.	DATE	DESCRIPTION

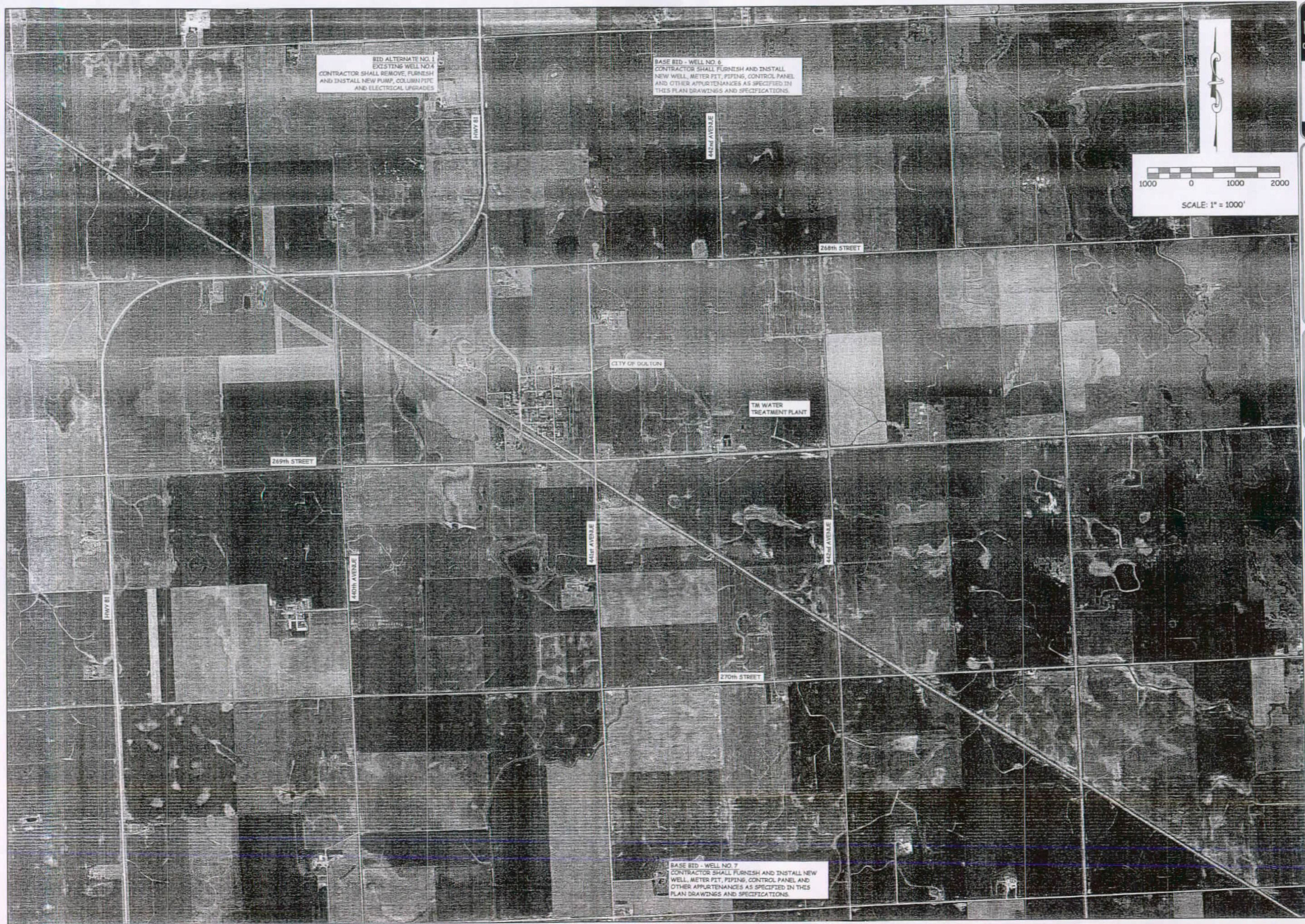
DRAWN BY: R.D.
DESIGNED BY: APT
CHECKED BY: DCO
JOB NO: 20601D101
DATE: FEBRUARY, 2007

SHEET TITLE:

TITLE
AND
INDEX
SHEET

SHEET NO.:

1



BID ALTERNATE NO. 1
EXISTING WELL NO. 4
CONTRACTOR SHALL REMOVE, FURNISH
AND INSTALL NEW PUMP, COLUMN PIPE
AND ELECTRICAL UPGRADES

BASE BID - WELL NO. 6
CONTRACTOR SHALL FURNISH AND INSTALL
NEW WELL, METER PIT, PIPING, CONTROL PANEL
AND OTHER APPURTENANCES AS SPECIFIED IN
THIS PLAN DRAWINGS AND SPECIFICATIONS.

BASE BID - WELL NO. 7
CONTRACTOR SHALL FURNISH AND INSTALL NEW
WELL, METER PIT, PIPING, CONTROL PANEL AND
OTHER APPURTENANCES AS SPECIFIED IN THIS
PLAN DRAWINGS AND SPECIFICATIONS.

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Designing Projects, Building Trust

CONSULTANTS:



PROJECT TITLE:

TM RURAL WATER DISTRICT
WATER SYSTEM
IMPROVEMENTS-2006
WELL IMPROVEMENTS

PROJECT LOCATION:
DOLTON,
SOUTH DAKOTA

REV.	DATE	DESCRIPTION

DRAWN BY: R.D.
DESIGNED BY: APT
CHECKED BY: BCO
JOB NO: 206010101
DATE: FEBRUARY, 2007
SCALE REDUCTION BAR

SHEET TITLE:

SITE
LAYOUT

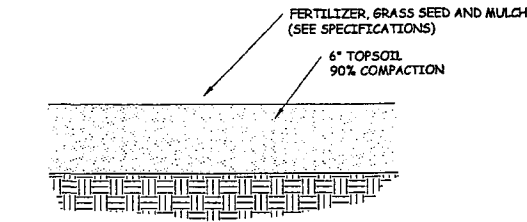
SHEET NO.:

2

GENERAL CONSTRUCTION NOTES:

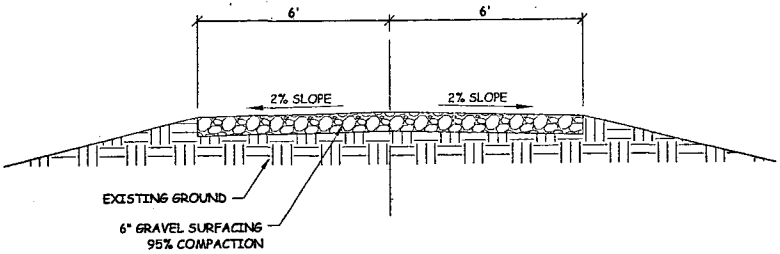
1. LOCATION OF EXISTING UTILITIES SHOWN ON THESE PLANS WAS TAKEN FROM THE BEST AVAILABLE RECORDS AND DOES NOT INCLUDE ALL UNDERGROUND UTILITIES SUCH AS ELECTRICAL, FUEL, UNDERGROUND CABLE TV. PRIOR TO EXCAVATION THE CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION OF ALL UTILITIES WHETHER SHOWN ON THESE PLANS. CONTRACTOR SHALL PROTECT ALL UTILITIES DURING CONSTRUCTION. ANY DISTURBANCE OR REPLACEMENT OF EXISTING UTILITIES SHALL BE INCIDENTAL TO THE PROJECT. ANY LOSS OF TIME DUE TO LOCATING, RELOCATING OR ADJUSTING UTILITIES SHALL BE INCIDENTAL TO THE PROJECT. THE PHONE NUMBER FOR THE ONE CALL IS 1-800-781-7474.
PROJECT LOCATION IS: SECTION 8 T100N-R55W AND SECTION 25 T101N-R55W
2. ALL EXISTING TREES, SHRUBBERY, ETC. SHALL REMAIN UNDISTURBED, UNLESS REMOVAL HAS BEEN AUTHORIZED BY THE ENGINEER. ALL CLEARING, GRUBBING, AND DISPOSAL AS AUTHORIZED BY THE ENGINEER SHALL BE INCIDENTAL TO THE PROJECT.
3. CONTRACTOR SHALL MAINTAIN CONSTRUCTION WORK WITHIN THE LIMITS AS SHOWN ON THE PLANS. ANY DAMAGE OUTSIDE THE CONSTRUCTION LIMITS WILL BE THE CONTRACTOR'S RESPONSIBILITY.
4. ALL DEMOLITION AND REMOVAL OF MATERIAL WITHIN THE CONSTRUCTION LIMITS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE DISPOSED OF AT A SITE PROVIDED BY THE CONTRACTOR.
5. TRENCH SURFACE RESTORATION:
 - (a) GRASS AREAS SHALL HAVE TOPSOIL STRIPPED AND STOCKPILED IN ACCORDANCE WITH THE SPECIFICATIONS AND PLAN DETAILS. REPLACE TOPSOIL AFTER BACKFILL IS COMPLETED. SEED IN ACCORDANCE WITH THE SPECIFICATIONS. CROP AREAS SHALL HAVE TOPSOIL REPLACED AFTER BACKFILL IS COMPLETE.
 - (b) ALL AREAS DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO SAME ELEVATIONS AS PRIOR TO CONSTRUCTION.
 - (c) GRAVEL SURFACED AREAS SHALL BE RESURFACED WITH A 4 INCH DEPTH OF GRAVEL IN ACCORDANCE WITH THE SPECIFICATIONS AND PLAN DETAILS.

NOTE:
SITE GRADING AROUND THE WELL SITES SHALL BE COMPLETED BY WELL CONTRACTOR FROM OFF-SITE. TOP 6" OF BERM, EXCEPT FOR GRAVEL AND CONCRETE SURFACES SHALL BE TOP SOILED AND SEEDED.



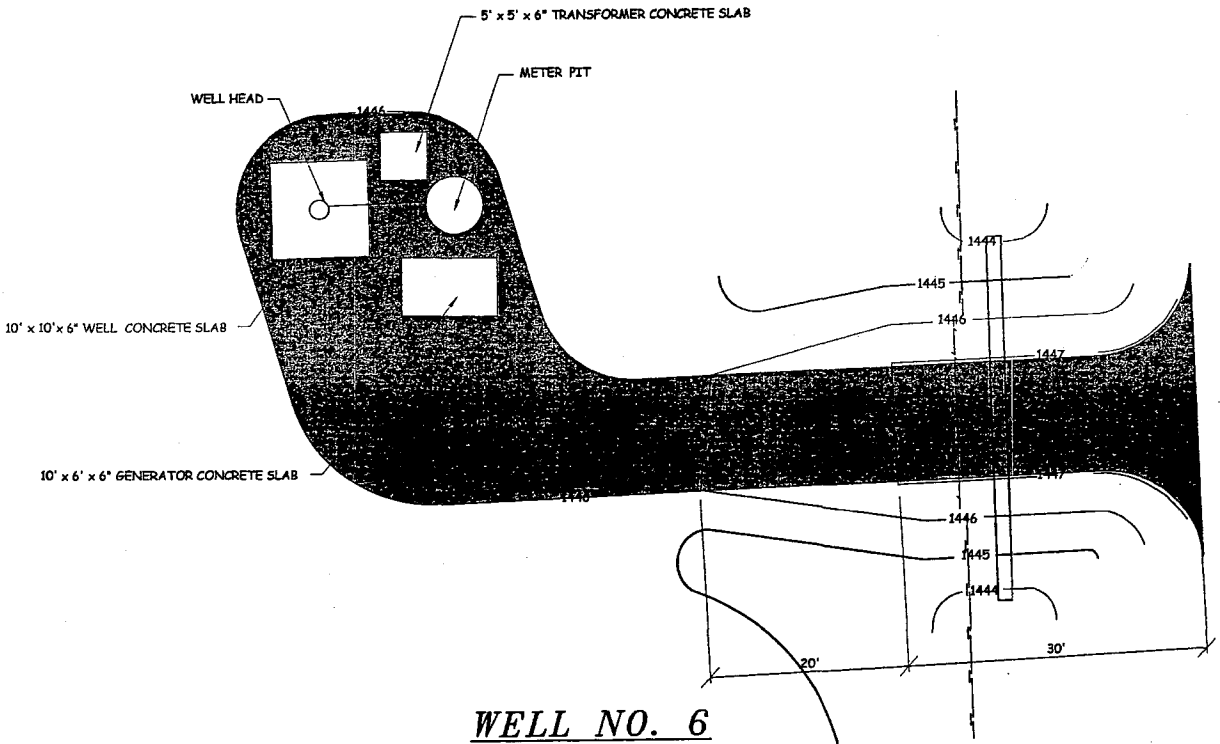
GRASS SURFACE RESTORATION

SCALE: NONE



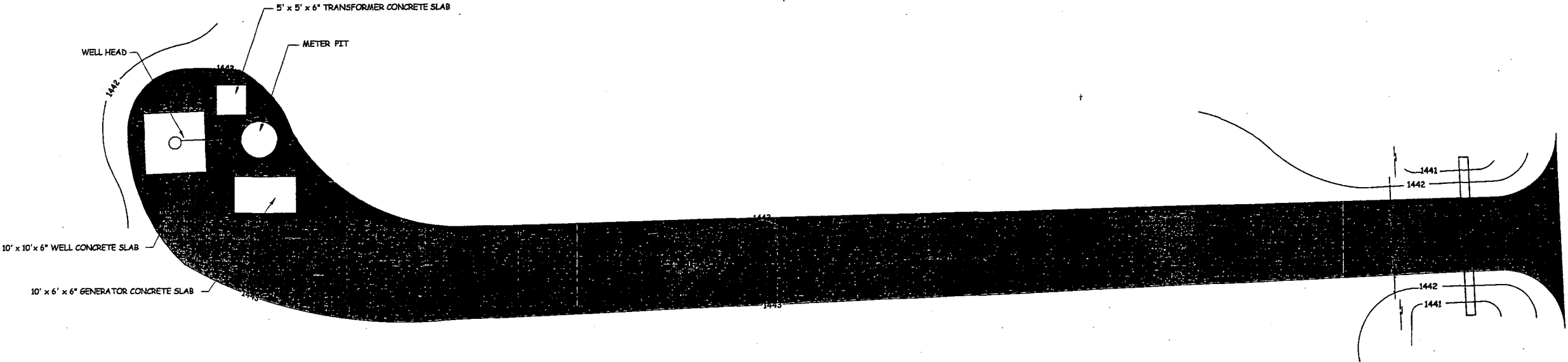
GRAVEL SURFACING RESTORATION

SCALE: NONE



WELL NO. 6

SCALE: NONE



WELL NO. 7

SCALE: NONE

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Designing Projects, Building Trust

CONSULTANTS:



PROJECT TITLE:

TM RURAL WATER DISTRICT
WATER SYSTEM
IMPROVEMMNTS-2006
CONTRACT 5
WELL IMPROVEMMNTS

PROJECT LOCATION:
DOLTON,
SOUTH DAKOTA

REV.	DATE	DESCRIPTION

DRAWN BY: R.D.
DESIGNED BY: APT
CHECKED BY: DCO
JOB NO: 2060101.01
DATE: FEBRUARY, 2007
SCALE REDUCTION BAR

SHEET TITLE:

GENERAL
CONSTRUCTION
NOTES
AND
DETAILS

SHEET NO.:

CONSULTANTS:



PROJECT TITLE :

TM RURAL WATER DISTRICT
WATER SYSTEM
IMPROVEMENTS-2006
CONTRACT 5
WELL IMPROVEMENTS

PROJECT LOCATION:
DOLTON,
SOUTH DAKOTA

[illegible]

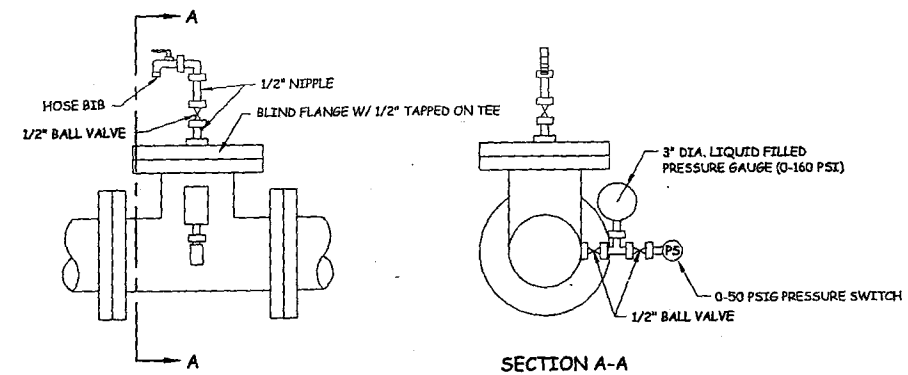
DRAWN BY: R.D.
DESIGNED BY: APT
CHECKED BY: DCO
JOB NO: 20601.01.01
DATE: FEBRUARY, 2007

SHEET TITLE :

DETAILS

SHEET NO. :

4



DETAIL - PRESSURE GAUGE, PRESSURE SWITCH & SAMPLE PORT

SCALE : None

BLOCKING DIMENSIONS																					
PIPE DIA.	TEES						PLUGS			90° BENDS			45° BENDS			22 1/2° BENDS			11 1/4° BENDS		
	A	B	C	D	E	F	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
8"	34	32	21	18	7	6	34	32	18	30	26	21	13	36	18	9	24	18	-	-	-

THRUST BLOCKING NOTES :

1. PLACE DOUBLE LAYER OF PAPER BETWEEN CONCRETE BLOKING AND PLUG.
2. ALL THRUST BLOCKS SHALL BE CAST-IN-PLACE. PRECAST BLOCKS ARE NOT ACCEPTABLE.
3. ALL VALVES AND FITTINGS SHALL BE POLY WRAPPED.
4. COMPRESSIVE STRENGTH FOR THRUST BLOCKS SHALL NOT BE LESS THAN 3000 PSI.

NOTE:

ALL DIMENSIONS ARE IN INCHES.
BLOCKING DESIGN FOR 150 PSI AND 1500 PSI SOIL
BEARING. BLOCKING FOR REDUCED BRANCH TEE
SHALL BE AS LISTED UNDER TEES AND BRANCH
DIAMETER MAINTAIN MINIMUM "F" DIMENSION.

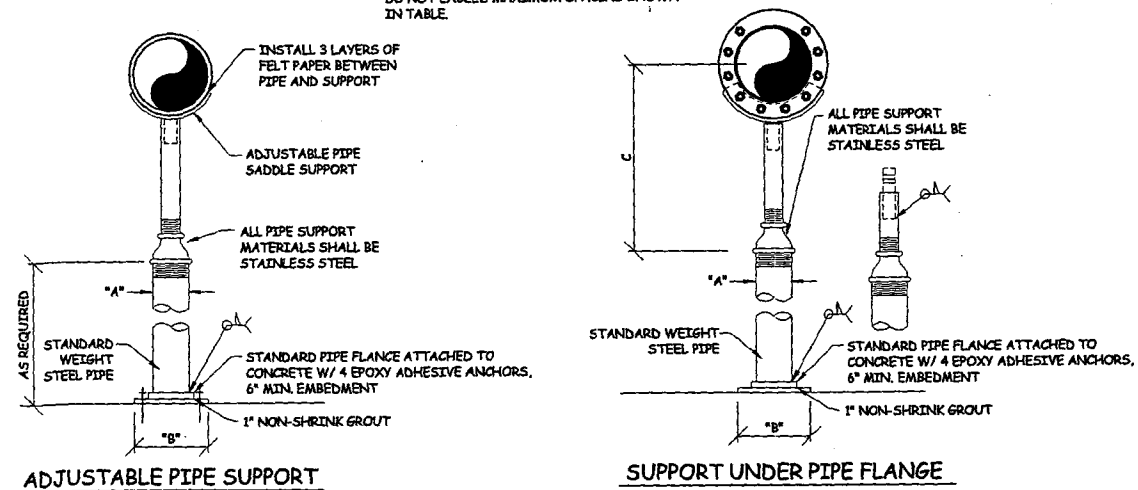
CONCRETE BLOCKING DETAILS

SCALE: None

PIPE SIZE	A (IN.)	B (IN.)	MAX. SUPPORT SPACING (D.I.P.) (FT.)
4	3	9	10
8	3	9	10

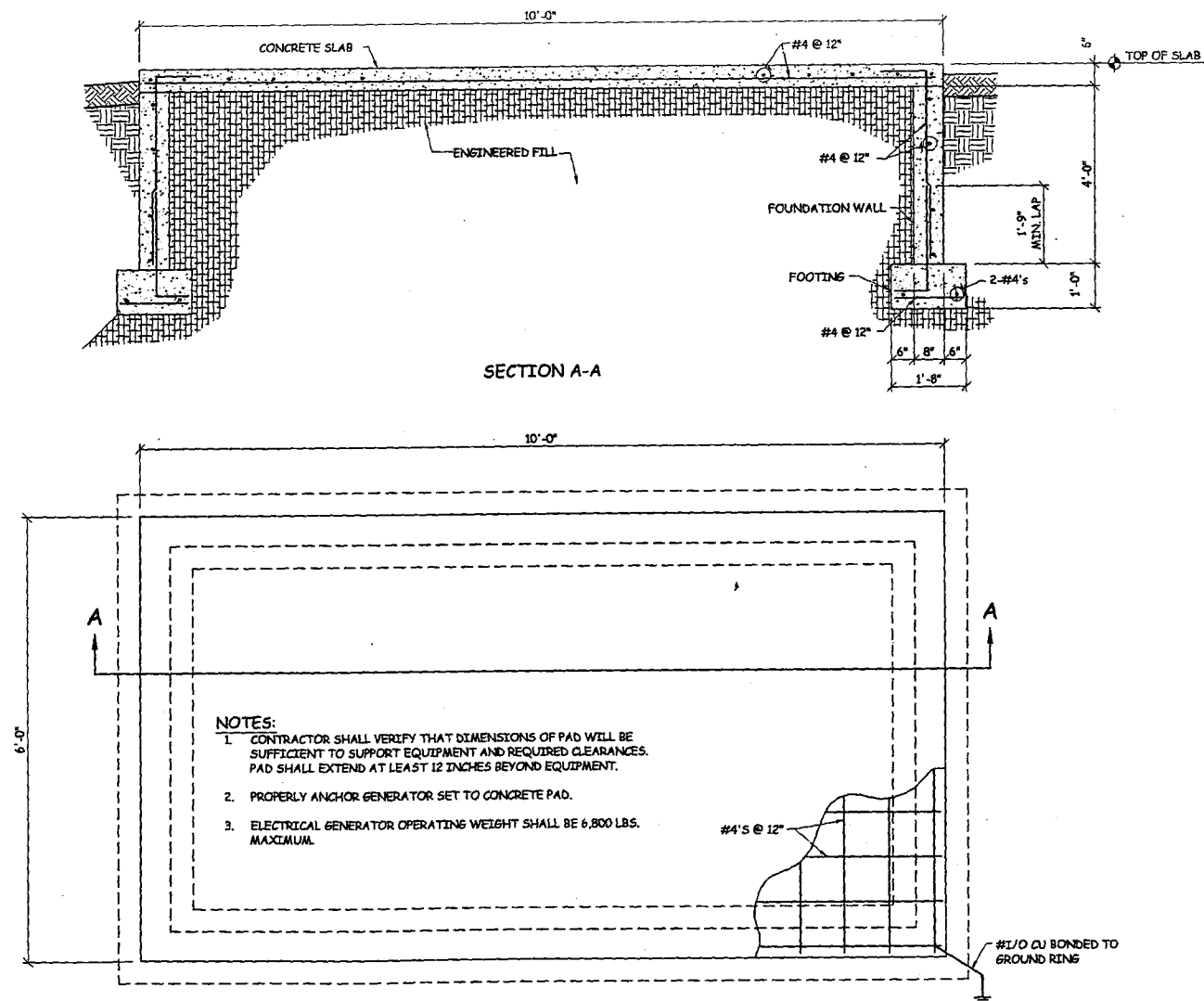
NOTE:

1. SUPPORTS TO BE LOCATED AS SHOWN ON PLANS. IF PRECISE LOCATION IS NOT SHOWN, DO NOT EXCEED MAXIMUM SPACING SHOWN IN TABLE.



DETAILS - ADJUSTABLE PIPE SUPPORTS

SCALE : None

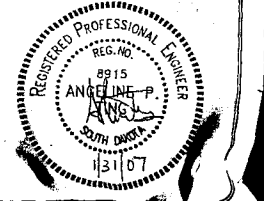


PLAN - ELEC. GENERATOR FOUNDATION DETAILS

SCALE : None

NOTES:

1. CONTRACTOR SHALL VERIFY THAT DIMENSIONS OF PAD WILL BE SUFFICIENT TO SUPPORT EQUIPMENT AND REQUIRED CLEARANCES. PAD SHALL EXTEND AT LEAST 12 INCHES BEYOND EQUIPMENT.
2. PROPERLY ANCHOR GENERATOR SET TO CONCRETE PAD.
3. ELECTRICAL GENERATOR OPERATING WEIGHT SHALL BE 6,800 LBS. MAXIMUM.



PROJECT TITLE:
TM RURAL WATER DISTRICT
WATER SYSTEM
IMPROVEMENTS-2006
CONTRACT 5
WELL IMPROVEMENTS

PROJECT LOCATION:
DOLTON,
SOUTH DAKOTA

REV.	DATE	DESCRIPTION

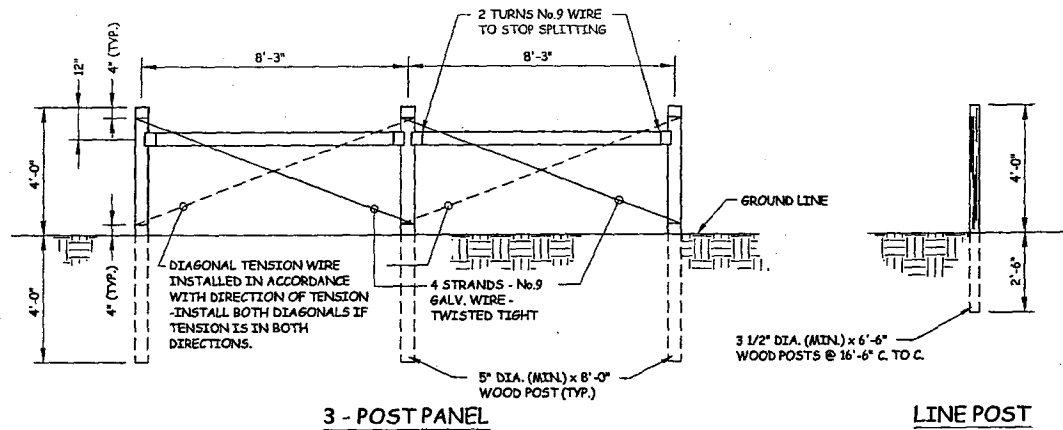
DRAWN BY: R.D.
DESIGNED BY: APT
CHECKED BY: DCO
JOB NO: 20601.01.01
DATE: FEBRUARY, 2007

SHEET TITLE:

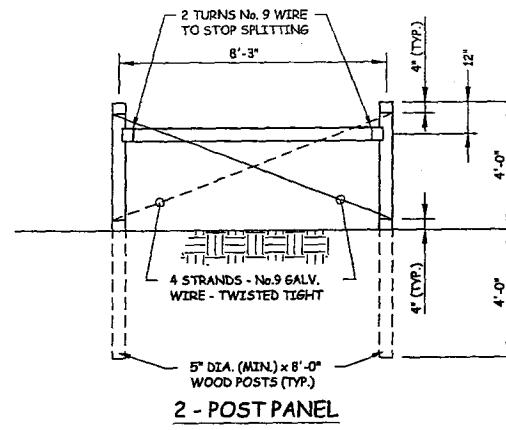
DETAILS

SHEET NO.:

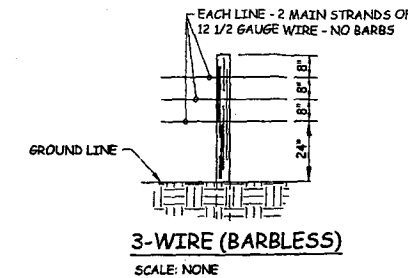
5



FENCING DETAILS
SCALE: NONE



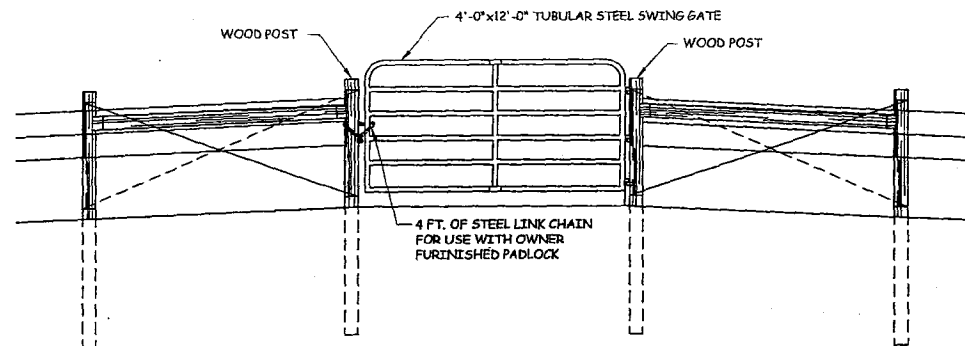
2-POST PANEL



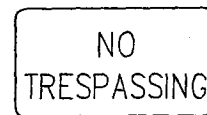
3-WIRE (BARBLESS)
SCALE: NONE

FENCING NOTES:

- HORIZONTAL BRACES SHALL BE 4" DIA. X 8' WOOD POSTS. SHALLOW NOTCHES SHALL BE CUT IN BRACE-PANEL POSTS TO ACCEPT BRACES AND TIED TOGETHER WITH A MINIMUM OF THREE (3) RING SHANK NAILS.
- 3-POST PANEL SHALL BE INSTALLED AT EACH CORNER FOR EACH DIRECTION OF FENCE.
- 2-POST PANEL SHALL BE INSTALLED ON EACH SIDE OF GATE OPENINGS.



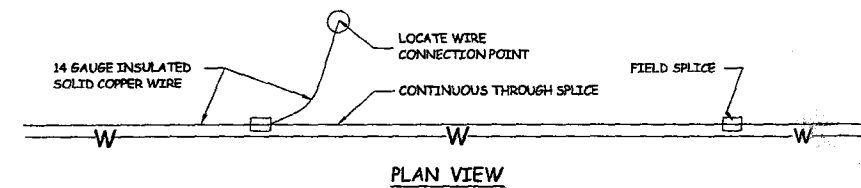
FENCING DETAIL - TUBULAR GATE
SCALE: NONE



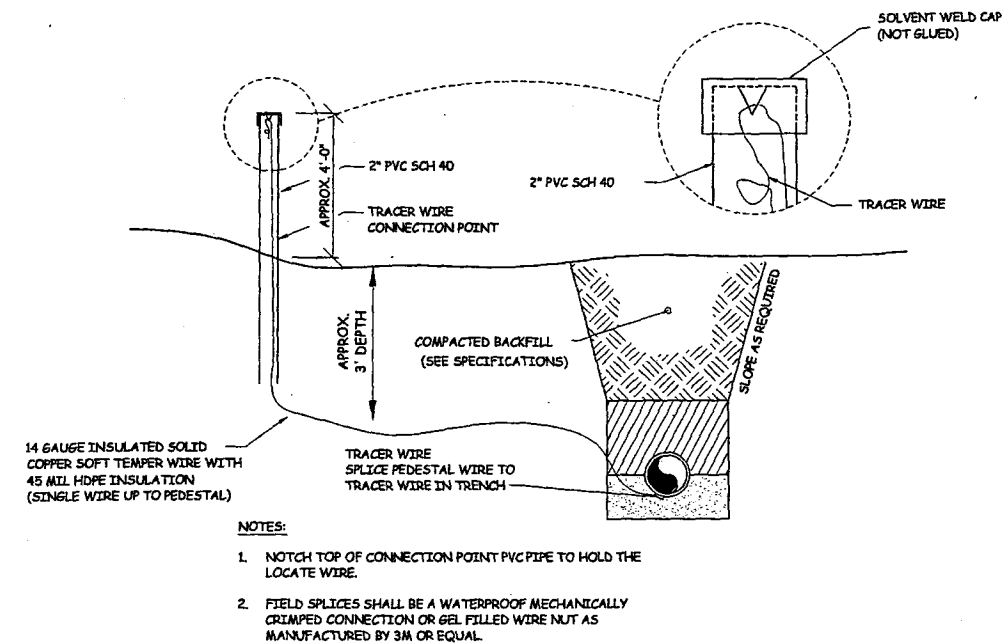
WARNING SIGN DETAIL
SCALE: NONE

SIGN NOTES

- LETTERS SHALL BE A MINIMUM HEIGHT OF 2".
- SIGN SHALL BE A MINIMUM SIZE OF 20" X 12".
- SIGNS SHALL BE PLACED ONE ON EACH SIDE OF THE PROPERTY AND ONE ON THE GATE. 5 TOTAL SIGNS REQUIRED PER WELL SITE.



PLAN VIEW

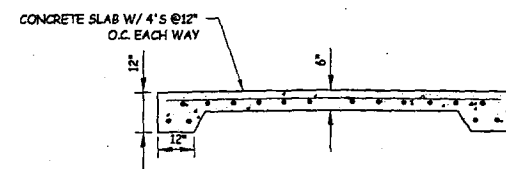


ELEVATION VIEW

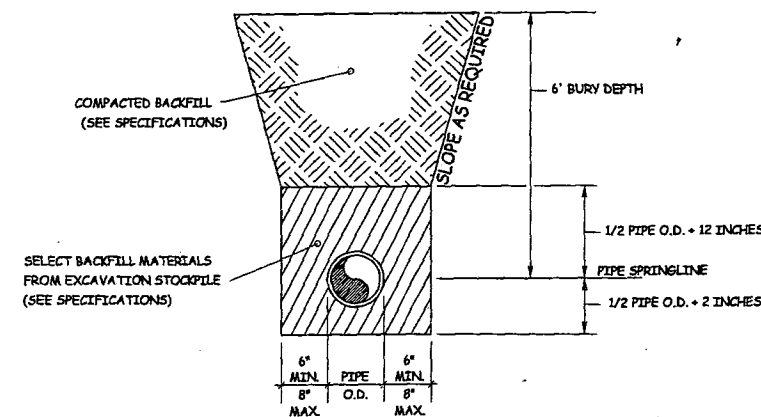
TRACER WIRE DETAIL
SCALE: NONE

NOTES:

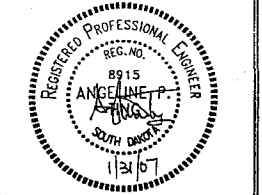
- NOTCH TOP OF CONNECTION POINT PVC PIPE TO HOLD THE LOCATE WIRE.
- FIELD SPLICES SHALL BE A WATERPROOF MECHANICALLY CRIMPED CONNECTION OR GEL FILLED WIRE NUT AS MANUFACTURED BY 3M OR EQUAL.



WELL AND TRANSFORMER CONCRETE SLAB DETAIL
SCALE: NONE



WATERMAIN BEDDING DETAIL
SCALE: NONE



PROJECT TITLE:
TM RURAL WATER DISTRICT
WATER SYSTEM
IMPROVEMENTS-2006
CONTRACT 5
WELL IMPROVEMENTS

PROJECT LOCATION:
DOLTON,
SOUTH DAKOTA

REV.	DATE	DESCRIPTION

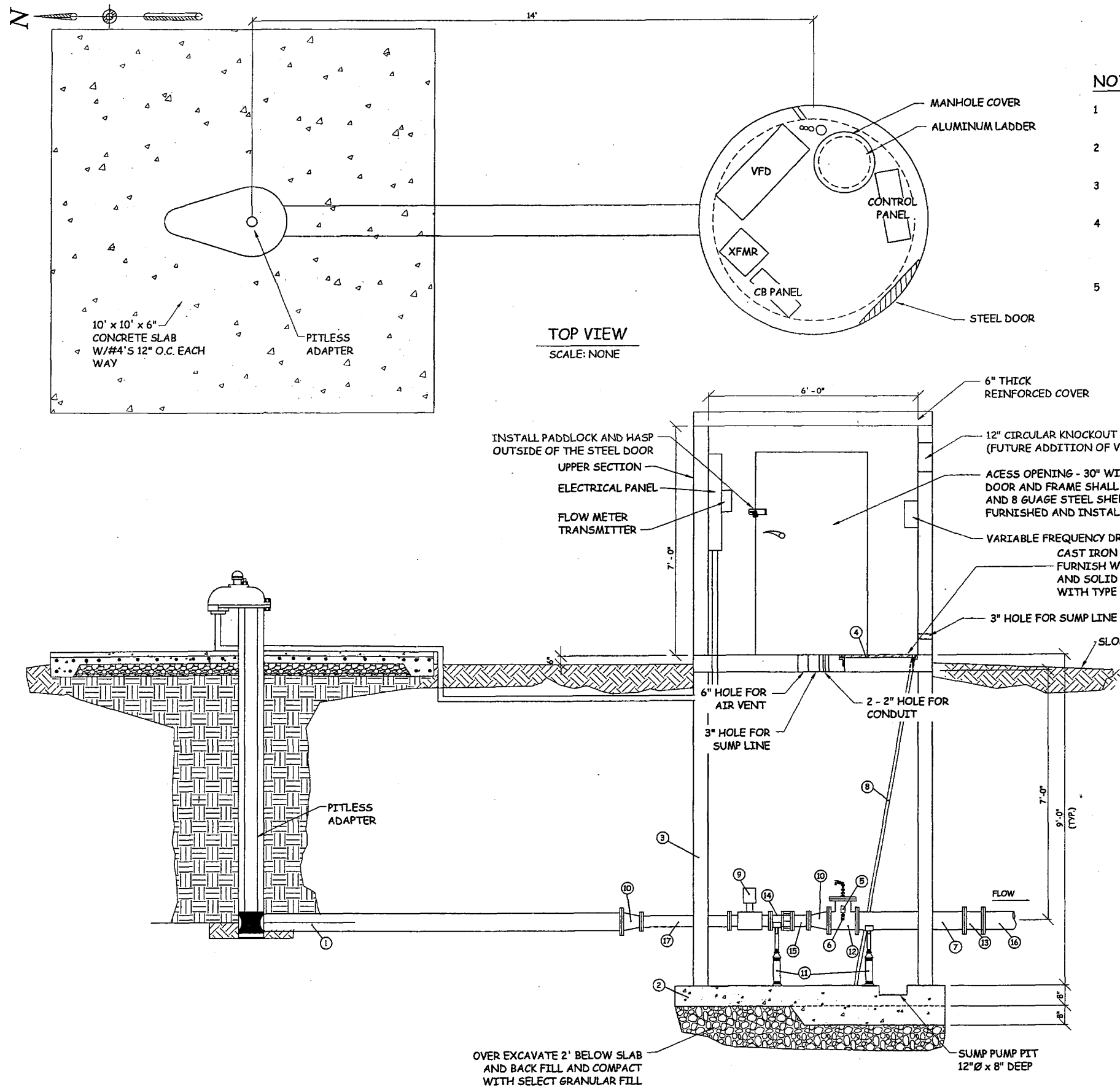
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DESIGNED BY: APT
CHECKED BY: DCO
JOB NO: 206010101
DATE: FEBRUARY, 2007
SCALE REDUCTION BAR

SHEET TITLE:

DETAILS

SHEET NO.:

6



NOTES:

- 1 PIPING TO A POINT OF 5' BEYOND METER PIT SHALL BE FURNISHED AND INSTALLED BY WELL CONTRATOR.
- 2 WELL CONTRACTOR SHALL PROVIDE THE REQUIRED FILL BELOW GRAVEL SURFACING AND FOR WELL EMBANKMENTS.
- 3 USE WATER STOP RX OR EQUAL ON ALL JOINTS OF THE PRECAST MANHOLE AND MAKE ALL PIPE PENETRATING WATER TIGHT.
- 4 WELL CONTRACTOR SHALL COMPACT THE SOIL AROUND THE DIRECT BURIED POWER AND CONTROL CABLES IN ORDER TO PREVENT RODENT DAMAGE TO CABLES. CONTRACTORS SHALL TAKE CARE NOT TO DAMAGE DURING INSTALLATION.
- 5 WELL CONTRACTOR SHALL MAKE FINAL CONNECTION TO THE WATER LINE FURNISHED AND INSTALLED UNDER A SEPARATE CONTRACT.

TOP VIEW

SCALE: NONE

DESCRIPTION:

- 1 8" D.I.P.
- 2 8" THICK x 5'-6" DIA. CONCRETE BASE W/ NO. 4'S EA. WAY
- 3 6' DIA. PRECAST MANHOLE
- 4 MH COVER AND RING, NEENAH R-6350-6 WITH TYPE "C" DROP HANDLE OR EQUAL
- 5 3" DIA. LIQUID FILLED PRESSURE GAUGE (SEE DETAIL ON PAGE 4)
- 6 0-50 PSIG PRESSURE SWITCH
- 7 8" D.I.P. FL. x PE. (TRANSITION TO PVC PIPE 5' BEYOND METER PIT FOR EACH SITE)
- 8 12" x 16" ALUMINUM WITH NON-SLIP RUNGS & BILCO LUI LADDER UP (LADDER TILTED BETWEEN 10° TO 15°)
- 9 4" BADGER MAGNETIC METER
- 10 MJ 8" x 4" REDUCER
- 11 PIPE SUPPORT
- 12 8" x 8" x 8" TEE WITH TAPPED BLIND FLANGE
- 13 8" MJ LONG BODY SLEEVE
- 14 4" DIA. DISMANTLE JOINT
- 15 4" DIA. SPOOL
- 16 8" DIA. PVC WATER MAIN
- 17 4" D.I.P.

METER PIT AND ELECTRICAL ENCLOSURE DETAIL - WELLS (TYPICAL)

SCALE: NONE



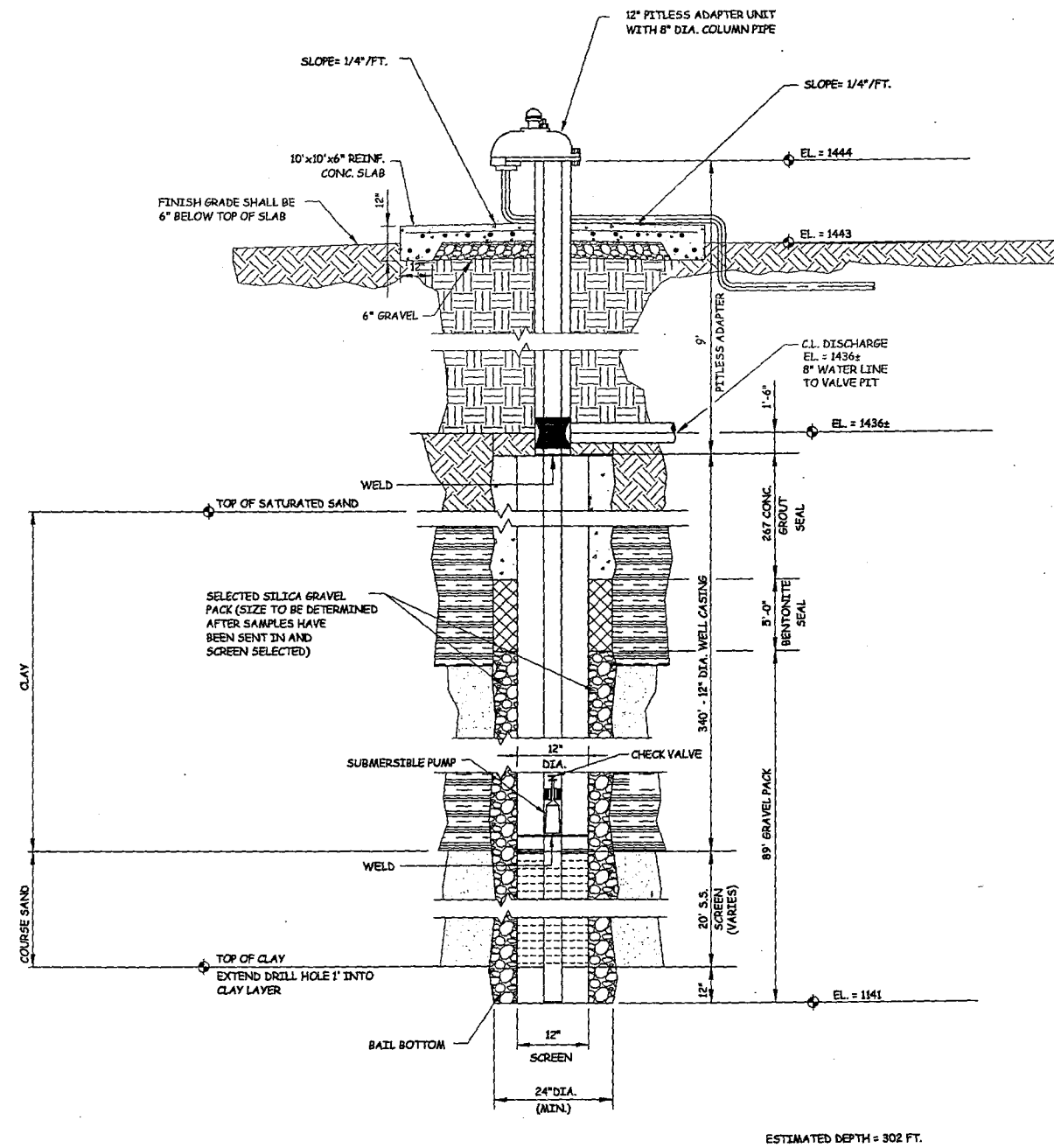
TM RURAL WATER DISTRICT
WATER SYSTEM
IMPROVEMENTS-2006
CONTRACT 5
WELL IMPROVEMENTS

PROJECT LOCATION:
DOLTON,
SOUTH DAKOTA

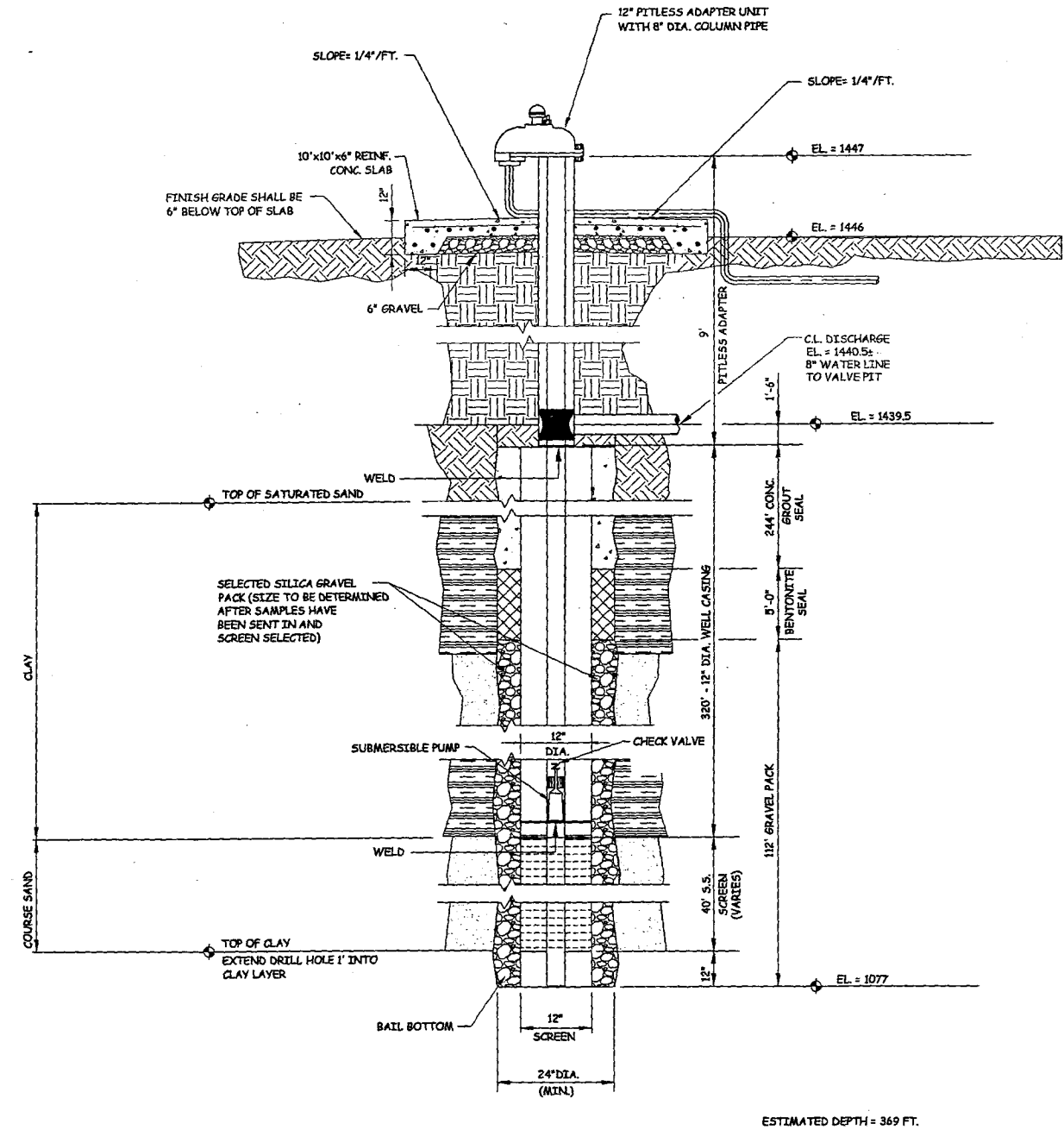
REV.	DATE	DESCRIPTION

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DESIGNED BY: APT
CHECKED BY: DEO
JOB NO: 20601.01.01
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SCALE: REDUCTION BAR

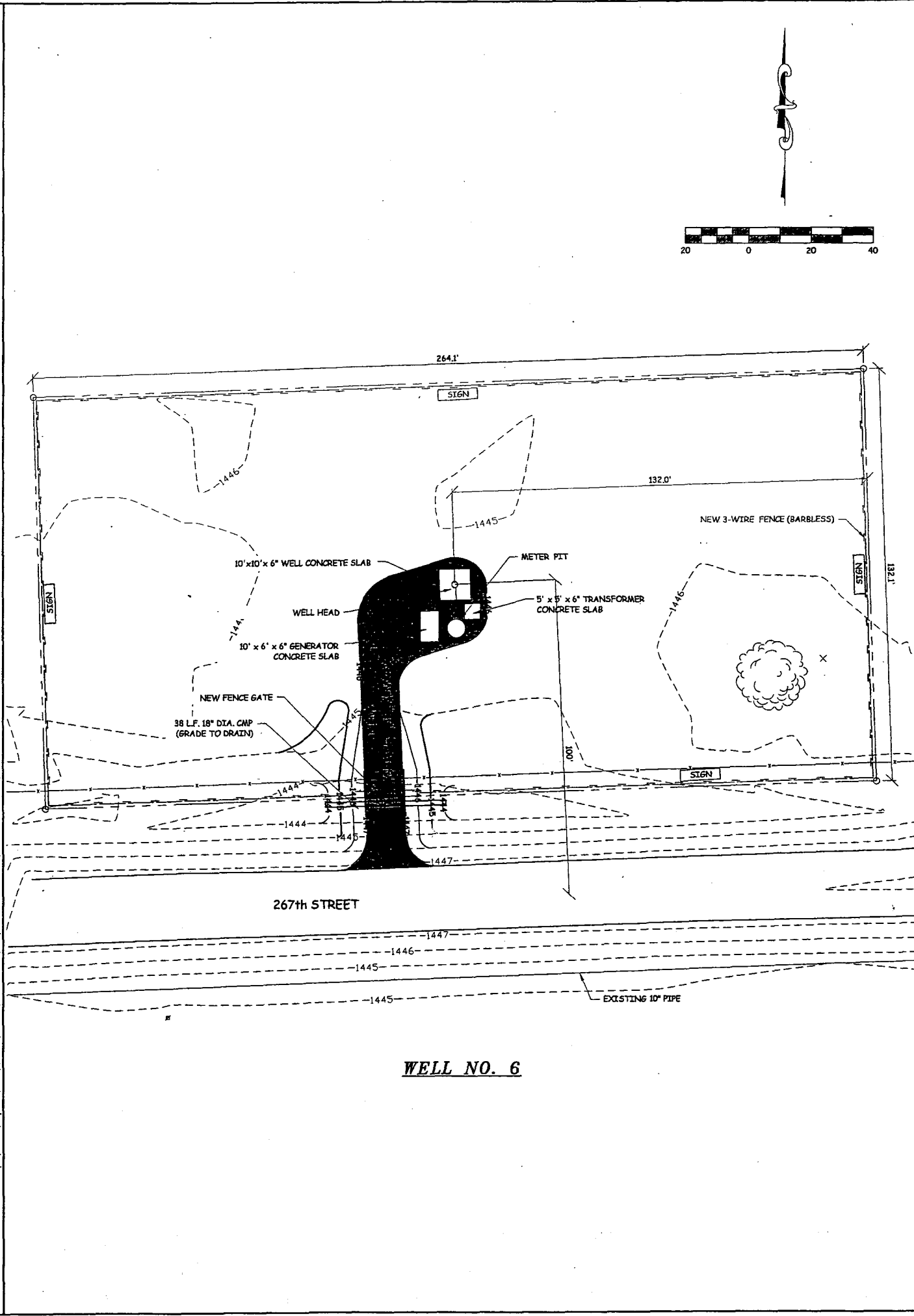
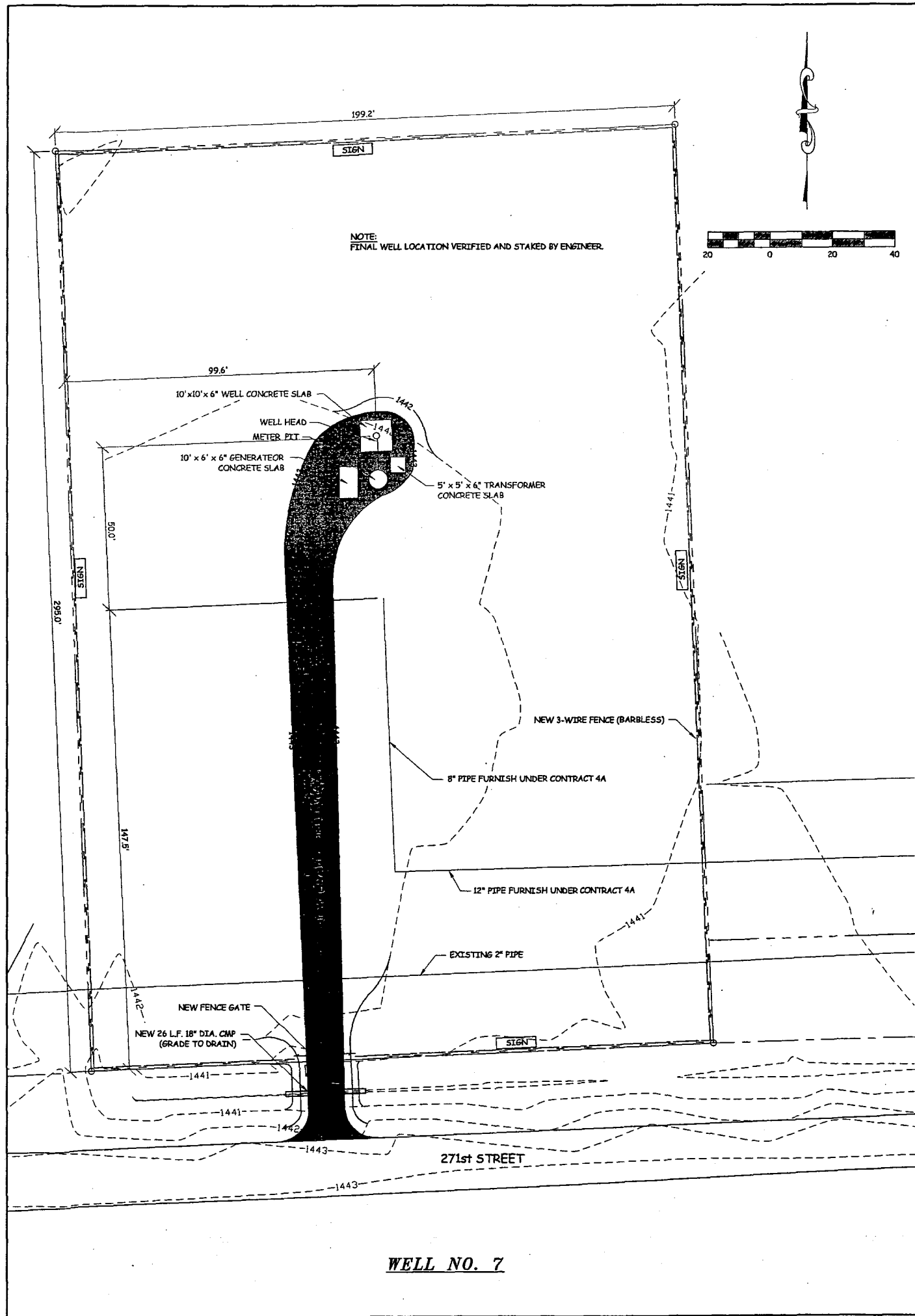
WELL
SECTIONS



WELL CROSS SECTION - WELL NO. 7
SCALE: NONE



WELL CROSS SECTION - WELL NO. 6
SCALE: NONE



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Designing Projects, Building Trust

CONSULTANTS:

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 8915
ANGELINE P. FINCK
SOUTH DAKOTA
1/31/07

PROJECT TITLE:
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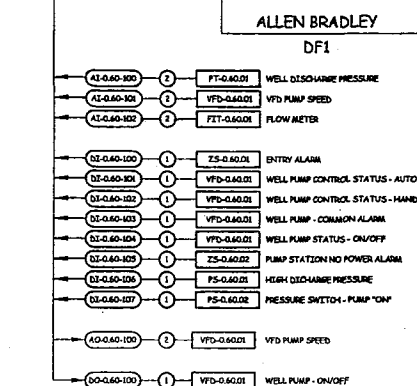
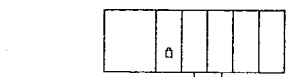
DRAWN BY: R.D.
DESIGNED BY: APT
CHECKED BY: DCO
JOB NO: 20601.0101
DATE: FEBRUARY, 2007
SCALE REDUCTION BAR

SHEET TITLE:
WELL SITE
LOCATIONS

SHEET NO.:
8

PROPOSED WELL PUMP NO.6 RTU-0.60

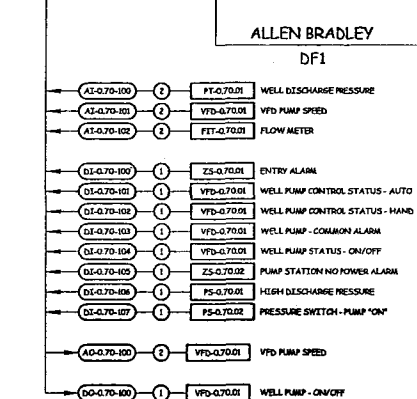
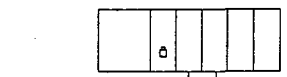
ALLEN BRADLEY
MICRO-LOGIX
(1761-L20 SERIES)



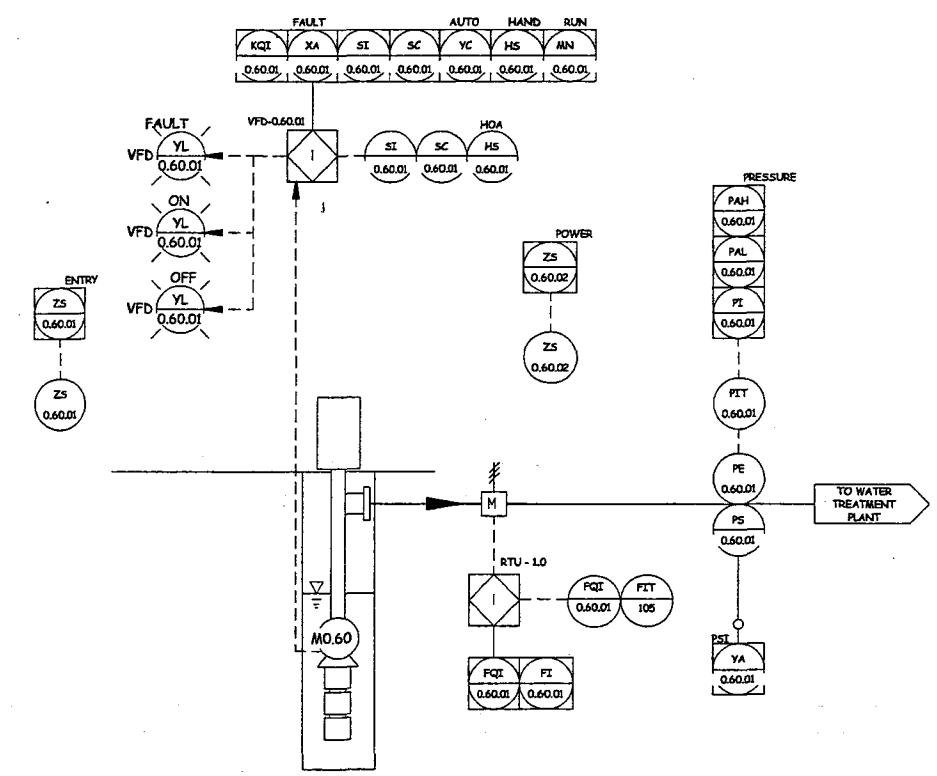
I/O DESCRIPT.	REQUIRED	PROVIDED	SPARE
DISCRETE IN	7	12	5
DISCRETE OUT	1	8	7
ANALOG IN	3	4	1
ANALOG OUT	1	1	0

PROPOSED WELL PUMP NO.7 RTU-0.70

ALLEN BRADLEY
MICRO-LOGIX
(1761-L20 SERIES)

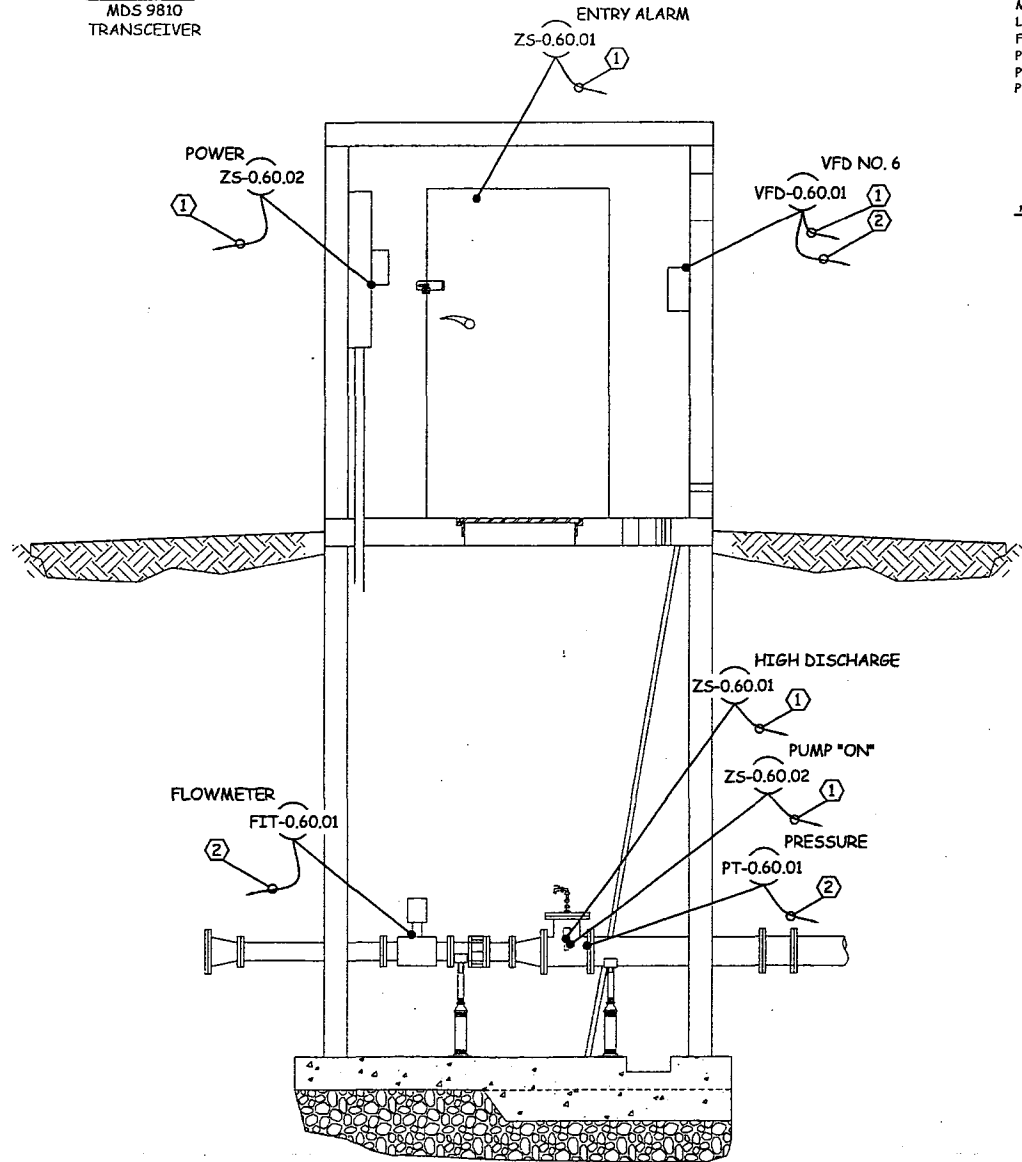
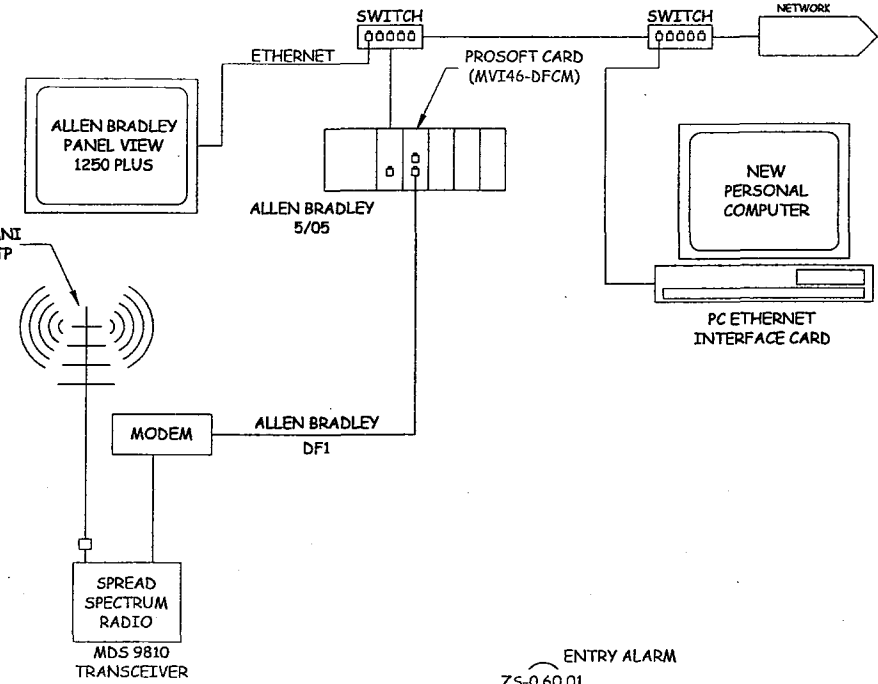


I/O DESCRIPT.	REQUIRED	PROVIDED	SPARE
DISCRETE IN	7	12	5
DISCRETE OUT	1	8	7
ANALOG IN	3	4	1
ANALOG OUT	1	1	0



TYPICAL WELL PUMP P&ID

EXISTING HIGH SERVICE PUMP ROOM RTU-1.0



TYPICAL INSTRUMENT LOCATION

GENERAL NOTES:

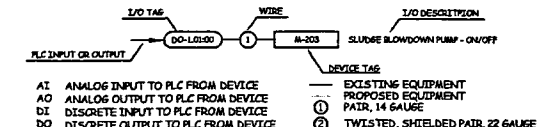
- COORDINATE LOCATION OF SENSORS WITH ENGINEER.
- INSTRUMENTATION WIRING CAN BE COMBINED IN THE SAME CONDUIT WITH OTHER SIMILAR INSTRUMENTATION WIRING TO MINIMIZE THE NUMBER OF CONDUIT CROSSING FROM ONE SIDE OF GATE HOUSE TO THE OTHER.
- DISCRETE AND ANALOG SIGNAL WIRES SHALL NOT BE INSTALLED IN THE SAME CONDUIT. ROUTE SEPARATE CONDUIT FOR DISCRETE AND ANALOG SIGNAL WIRES.
- INSTRUMENTATION CONDUIT TO RUN PERPENDICULAR TO WALLS AND FLOOR.
- ALL CONTROL SYSTEM CONDUIT AND WIRE SHALL COMPLY WITH THE REQUIREMENTS OF DIVISION 16 SPECIFICATIONS.
- ELECTRICIANS TO PROVIDE LABELS FOR ALL INSTRUMENTATION EQUIPMENT USING THE TAG NAMES IDENTIFIED IN I/O LIST.
- CONTRACTOR IS RESPONSIBLE FOR PROVIDING A FULLY FUNCTIONAL SYSTEM COMPLYING WITH THE PROJECT PLANS AND SPECS.

REFERENCE NOTES:

- 3/4" DIA. CONDUIT, TO PLC FOR DISCRETE SIGNAL (24VDC OR 120 VAC).
- 3/4" DIA. CONDUIT, TO PLC FOR ANALOG SIGNAL (4-20 mA OR 0-10V).
- 3/4" DIA. CONDUIT, DEVICE TO PLC FOR COMMUNICATION VIA DEVICENET.
- 3/4" DIA. CONDUIT, TO PLC FOR ETHERNET CONNECTION.

INSTRUMENTATION LEGEND

FCV	FLOW CONTROL VALVE	TT	TEMPERATURE TRANSMITTER
AE	ANALYSIS SENSOR	RTU	REMOTE TERMINAL UNIT
M	MOTOR	FS	FLOW SWITCH
LS	LEVEL TRANSMITTER	PS	PRESSURE SWITCH
FT	FLOW TRANSMITTER	LT	LEVEL TRANSMITTER
PD	PANEL DISPLAY	SV	SOLENOID VALVE
PI	PULSED INPUT	BV	BUTTERFLY VALVE
PV	PNEUMATIC VALVE	CV	CONTROL VALVE
		PS	PRESSURE SENSOR



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CONSULTANTS:



PROJECT TITLE:
**TM RURAL WATER DISTRICT
WATER SYSTEM
IMPROVEMENTS-2006
CONTRACT 5
WELL IMPROVEMENTS**

PROJECT LOCATION:
**DOLTON,
SOUTH DAKOTA**

REV.	DATE	DESCRIPTION

DRAWN BY: CEB
DESIGNED BY: CEB
CHECKED BY: DCO
JOB NO: 20601.01.01
DATE: FEBRUARY, 2007
SCALE: REDUCTION BAR

SHEET TITLE:
**PROCESS
P&ID
SHEET**

SHEET NO.:
9

LIGHTING

	CEILING SURFACE MOUNT FIXTURE (Capital letter indicates fixture type, Small letter indicates switching. Typical for all fixture types)
	WALL MOUNTED FIXTURE
	RECESSED CAN FIXTURE
	SURFACE MOUNT FLUORESCENT FIXTURE
	RECESSED MOUNT FLUORESCENT FIXTURE
	RECESSED MOUNT FLUORESCENT FIXTURE WITH EMERGENCY BALLAST
	WALL MOUNT FLUORESCENT FIXTURE
	EXIT SIGN (Arrow denotes arrow direction)
	EMERGENCY LIGHT WITH BATTERY PACK
	EMERGENCY LIGHT WITH SINGLE REMOTE HEAD
	EMERGENCY LIGHT WITH TWIN REMOTE HEADS
	PHOTOELECTRIC CELL
	LIGHTING CONTACTOR
	CEILING FAN

RECEPTACLES

	SINGLE RECEPTACLE
	DUPLEX RECEPTACLE
	ISOLATED GROUND DUPLEX RECEPTACLE
	SPLIT WIRED DUPLEX RECEPTACLE
	DOUBLE DUPLEX RECEPTACLE
	ISOLATED GROUND DOUBLE DUPLEX RECEPTACLE
	POWER RECEPTACLE (Number denotes amprage of receptacle)
	TWIST LOCK RECEPTACLE
	SPECIAL PURPOSE OUTLET OR CONNECTION
	FLUSH FLOOR RECEPTACLE
	FLUSH FLOOR MULTI-SERVICE OUTLET
	TELE/POWER POLE

"GFI" associated with any of the above receptacles
denotes a Ground Fault Circuit Interrupter Receptacle

"WP" associated with any of the above receptacles
denotes a Weather Proof receptacle

"ac" associated with any of the above receptacles
denotes receptacle mounted ABOVE COUNTER

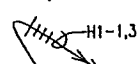
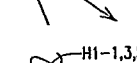
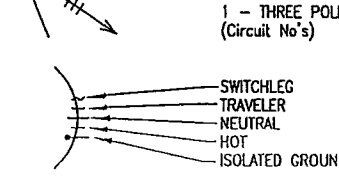
MOTORS

	MOTOR CONNECTION
	DISCONNECT SWITCH
	FUSIBLE DISCONNECT SWITCH
	MAGNETIC STARTER
	COMBINATION STARTER/DISCONNECT
	MANUAL MOTOR STARTER

OTHER

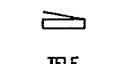
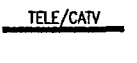
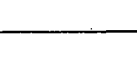
	JUNCTION BOX
	BLANK OUTLET
	WALL MOUNTED PUSH BUTTON
	RELAY
	TRANSFORMER (GROUND PER NEC 250)
	TIMECLOCK
	CIRCUIT BREAKER
	FUSE

HOMERUNS

	1 - SINGLE POLE CIRCUIT (Circuit No's)
	2 - SINGLE POLE CIRCUITS (Circuit No's)
	3 - SINGLE POLE CIRCUITS (Circuit No's)
	1 - TWO POLE CIRCUIT (Circuit No's)
	1 - THREE POLE CIRCUIT (Circuit No's)
	SWITCHLEG TRAVELER NEUTRAL HOT ISOLATED GROUND (CROSS MARK INDICATE NUMBER OF WIRES, NO MARKS INDICATE TWO WIRES)

NOTE:
IF SINGLE POLE CIRCUITS ARE SHOWN, CONTRACTOR MAY COMBINE CIRCUITS.
3 CIRCUITS PER NEUTRAL ON 3 PHASE, AND 2 CIRCUITS PER NEUTRAL
ON SINGLE PHASE.

PANELS AND TERMINATIONS BOARDS

	ELECTRICAL SERVICE ENTRANCE SWITCHGEAR
	POWER DISTRIBUTION PANEL
	PANELBOARD
	SPECIAL EQUIPMENT CABINET - AS NOTED
	TELEPHONE TERMINATION BOARD (4'-0" X 8'-0" Treated Plywood)
	TELEVISION TERMINATION BOARD (4'-0" X 8'-0" Treated Plywood)
	COMBINATION TELEPHONE/TELEVISION BOARD (4'-0" X 8'-0" Treated Plywood)

INDEX OF ELECTRICAL DRAWINGS

10	ELECTRICAL TITLE SHEET
11	ELECTRICAL SITE PLAN
12	VAULT ELECTRICAL PLAN
13	POWER ONELINE DIAGRAM
14	ELECTRICAL SCHEDULES

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CONSULTANTS:

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TM RURAL WATER DISTRICT
WATER SYSTEM
IMPROVEMENTS-2006
CONTRACT 5
WELL IMPROVEMENTS

PROJECT LOCATION:
DOLTON,
SOUTH DAKOTA

REV.	DATE	DESCRIPTION

DRAWN BY: MWJ
DESIGNED BY: MWJ
CHECKED BY: MWJ
JOB NO: 20601.01.01
DATE: JANUARY, 2007

SHEET TITLE:
ELECTRICAL
TITLE SHEET

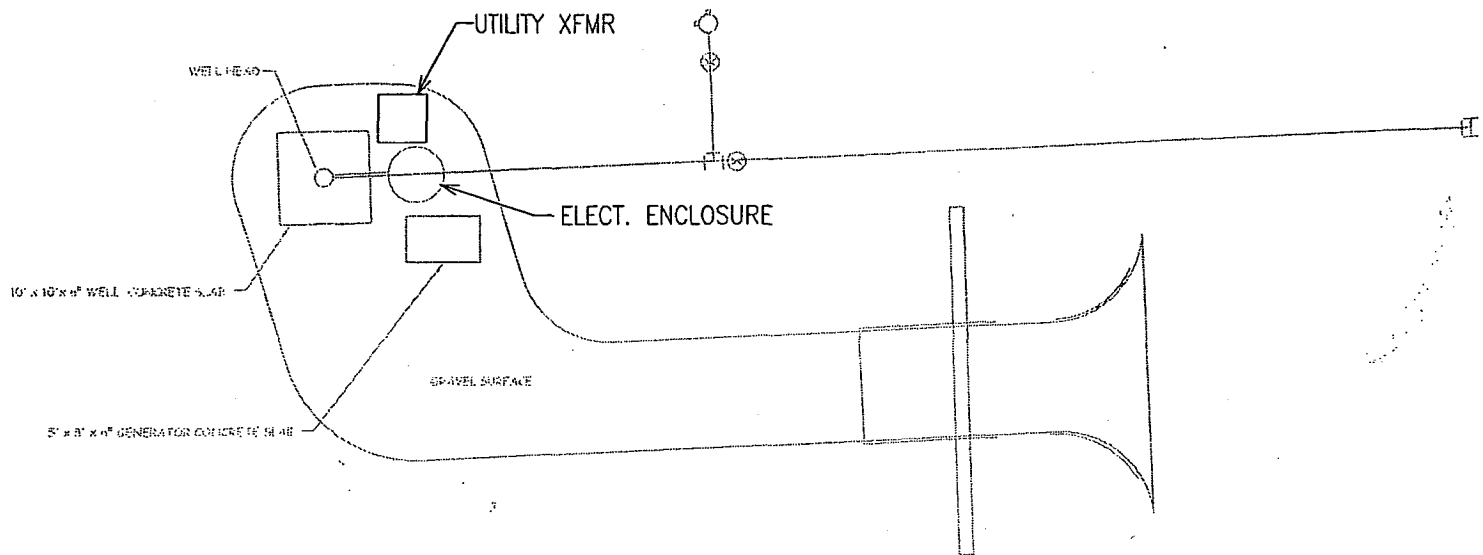
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Sioux City, IA: 401 Douglas Str. • Suite 400 • 51102 • PH: (712) 202-0370 • FAX: (712) 202-0371

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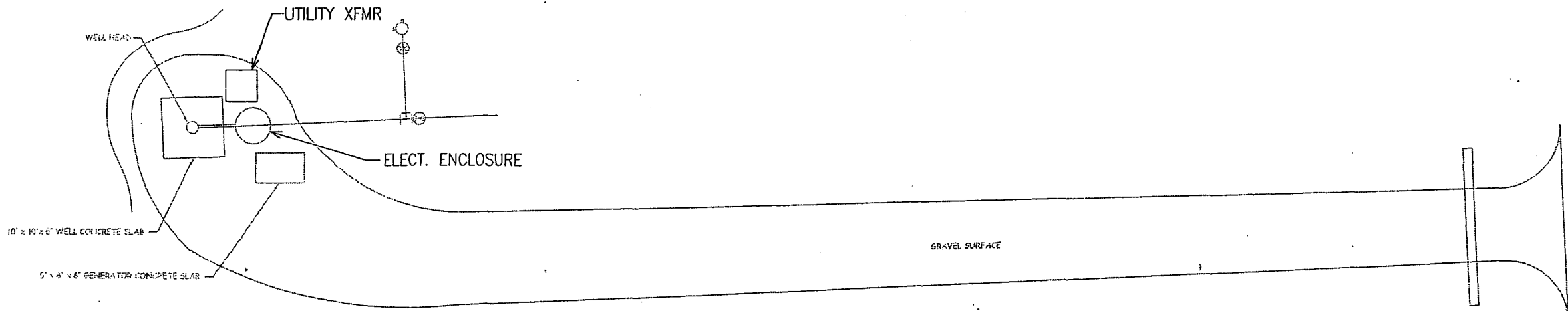
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WELL 6 ELECTRICAL PLAN

SCALE: 1"=20'-0"

(SERVING ELECTRIC UTILITY IS SOUTHEASTER ELECTRIC)



WELL 7 ELECTRICAL PLAN

SCALE: 1"=20'-0"

(SERVING ELECTRIC UTILITY IS SOUTHEASTER ELECTRIC)



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DOLTON,
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REV.	DATE	DESCRIPTION
1	1/1/07	ISSUED FOR PERMIT

DRAWN BY:	MWJ
DESIGNED BY:	MWJ
CHECKED BY:	MWJ
JOB NO:	20601.01.01
DATE:	JANUARY, 2007

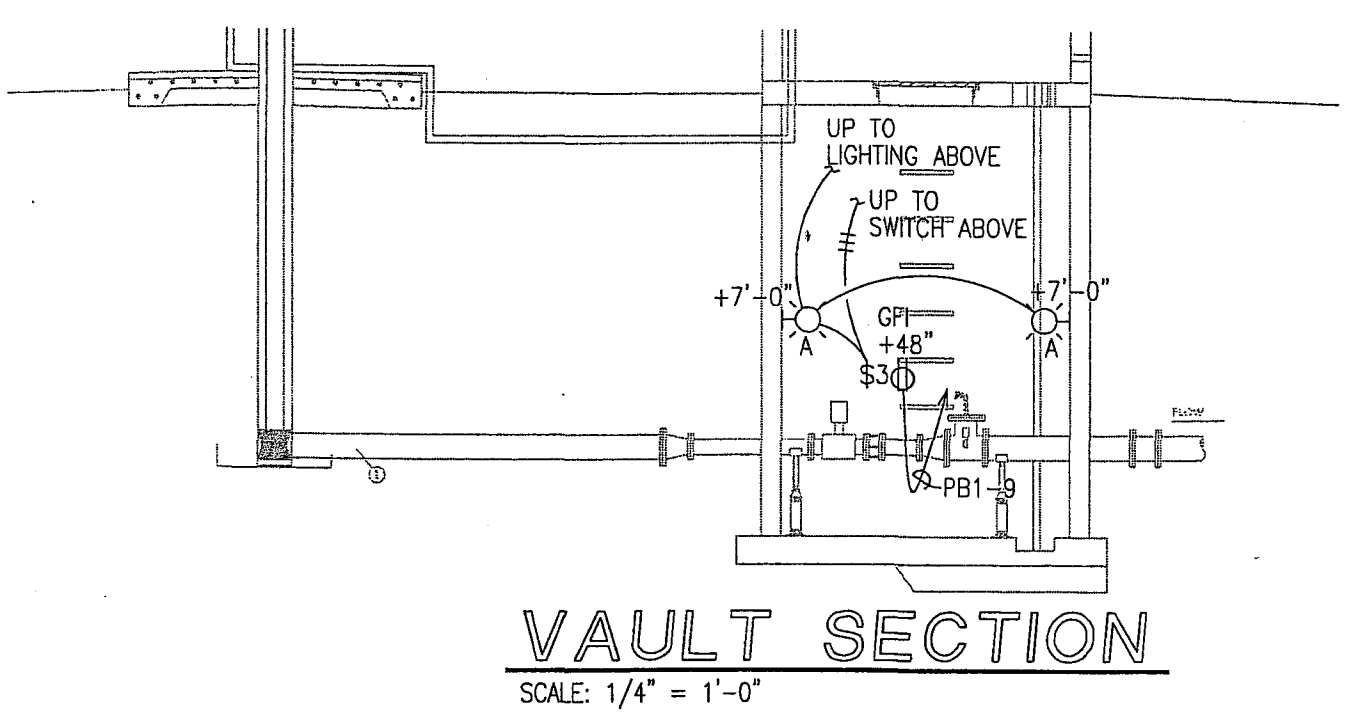
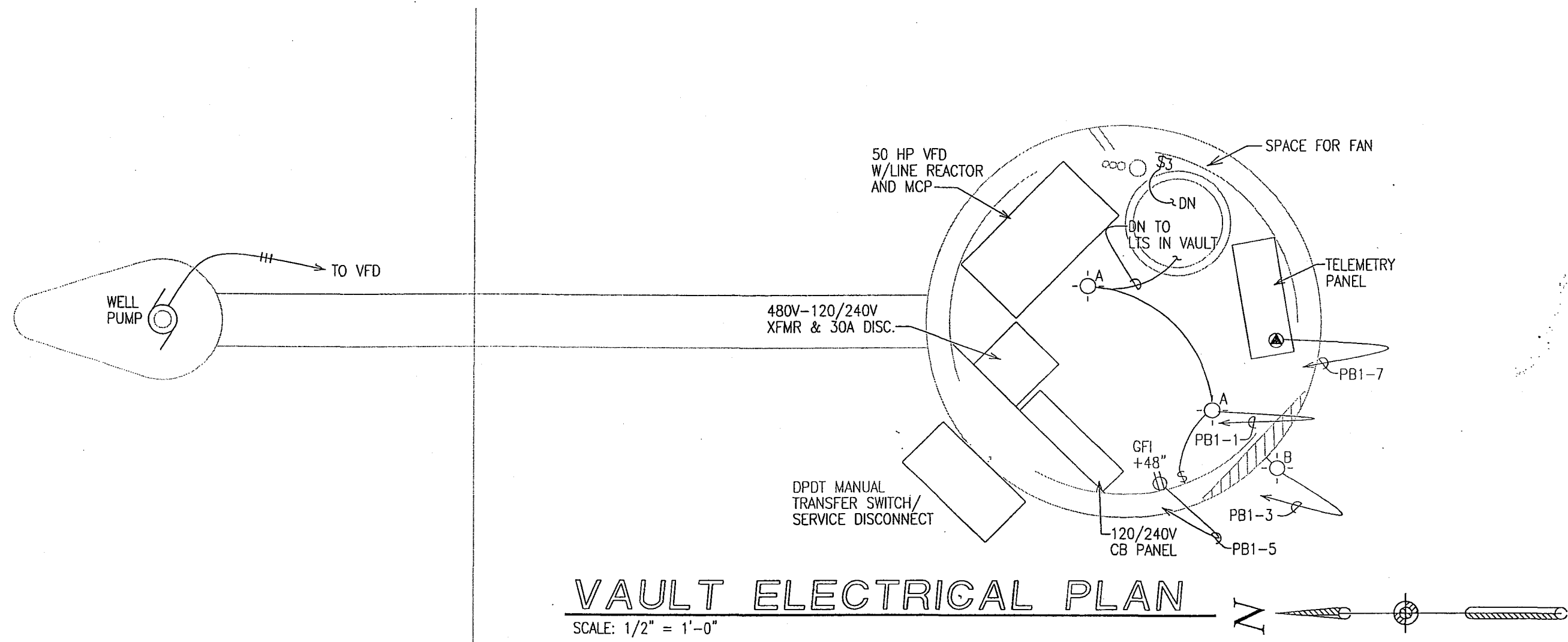
SHEET TITLE:

ELECTRICAL
SITE PLAN

SHEET NO.:

11

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CONSULTANTS:

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SOUTH DAKOTA

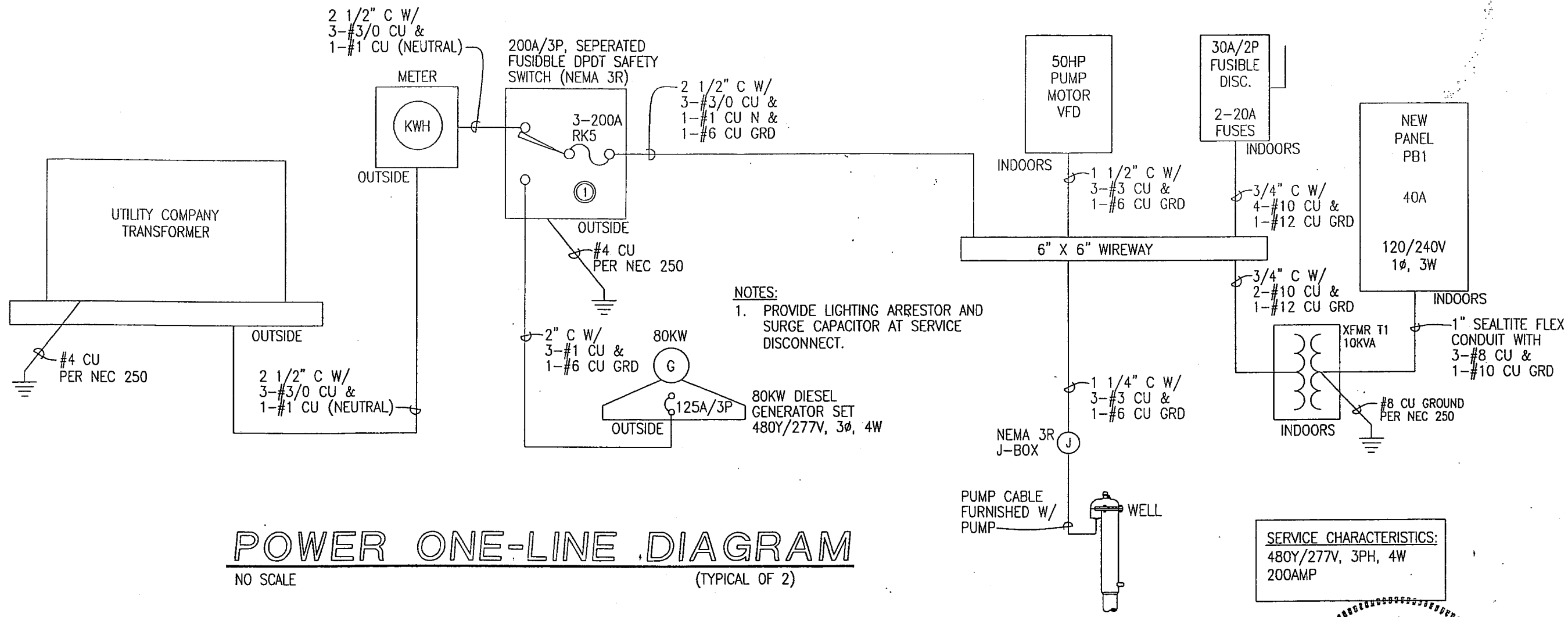
REV.	DATE	DESCRIPTION

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DESIGNED BY: MWJ
CHECKED BY: MWJ
JOB NO: 20601.01.01
DATE: JANUARY 2007
SCALE REDUCTION BAR

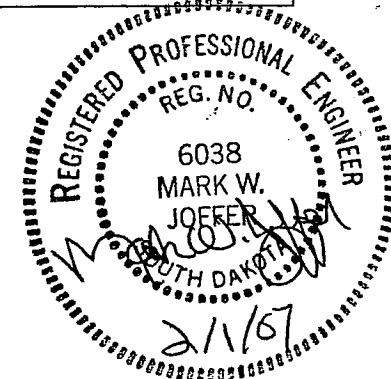
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VAULT
ELECTRICAL
PLAN

SHEET NO.: 12

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POWER ONE-LINE DIAGRAM
NO SCALE (TYPICAL OF 2)



BANNER
Consulting Engineers & Architects
409 22nd Ave. S. P.O. Box 298
Brookings, South Dakota 57006
605-692-6342
www.bannerassociates.com
Designing Projects, Building Trust

CONSULTANTS:

PROJECT TITLE:
TM RURAL WATER DISTRICT
WATER SYSTEM
IMPROVEMENTS-2006
CONTRACT 5
WELL IMPROVEMENTS
PROJECT LOCATION:
DOLTON,
SOUTH DAKOTA

REV.	DATE	DESCRIPTION

DRAWN BY: MWJ
DESIGNED BY: MWJ
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DATE: JANUARY, 2007

SCALE REDUCTION BAR

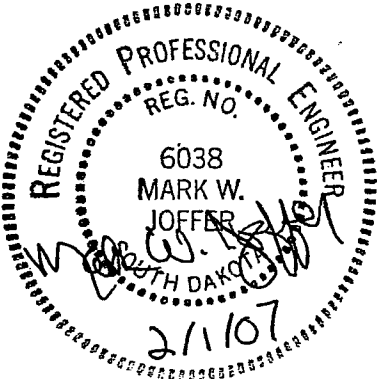
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POWER
ONLINE
DIAGRAM

SHEET NO.: 13

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LIGHTING FIXTURE SCHEDULE											1/31/2007 14:10
FIXT	FIXTURE DATA				LAMP DATA				REMARKS	ADDITIONAL MANUFACTURERS	
TYPE LTR	MANUFACTURER	CATALOG NUMBER	MOUNTING	BALLAST QTY	TYPE	NO	WATTS	CATALOG NUMBER			
A	STONCO	VCXL21GC	Ceil/Surf	—	INC	1	200	20A19	Vapor tight, globe & guard	Killark, GE	
B	LITHONIA	TWA705-120-PE	Wall	1	HPS	1	70	LU70	Mini wall pack, photocell	Cooper	

PANEL "PB1" (Provide TVSS)		VOLTS 120/240 PHASE 1 WIRE 3 MAIN CAPACITY 40 AMPERES												
		MOUNTING		SURFACE		FEEDER SIZE		SEE ONELINE DIAGRAM				MAIN CONNECTION		MCB
CCT NO	ITEM FED	DISTRIBUTION WATTS	WIRE SIZE	CIRCUIT BREAKER			N	CIRCUIT BREAKER			WIRE SIZE	DISTRIBUTION WATTS	ITEM FED	CCT NO
				AMP	POLES	FRAME		FRAME	POLES	AMP				
1	Interior Lights	800	12	20	1	10KAIC	A	10KAIC	1	20	12	1500	Future Fan	2
3	Exterior Light	100	12	20	1	10KAIC	B	10KAIC	1	20	—	0	Spare	4
5	Receptacle	1500	12	20	1	10KAIC	A	10KAIC	1	20	—	0	Spare	6
7	Telemetry Panel	1000	12	20	1	10KAIC	B	10KAIC	1	20	—	0	Spare	8
9	Meter pit Recept	1000	12	20	1	10KAIC	A	10KAIC	1	20	—	0	Spare	10
11	Spare	0	12	20	1	10KAIC	B	10KAIC	1	20	—	0	Spare	12



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CONSULTANTS:

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TM RURAL WATER DISTRICT
WATER SYSTEM
IMPROVEMEMNTS-2006
CONTRACT 5
WELL IMPROVEMEMNTS

PROJECT LOCATION:
DOLTON,
SOUTH DAKOTA

REV.	DATE	DESCRIPTION

DRAWN BY: MWJ
DESIGNED BY: MWJ
CHECKED BY: MWJ
JOB NO: 20601.01.01
DATE: JANUARY, 2007

0 1/2"

SCALE REDUCTION BAR

SHEET TITLE:

ELECTRICAL
SCHEDULES

SHEET NO.:

14

SPECIFICATIONS FOR
TM RURAL WATER DISTRICT
WATER SYSTEM IMPROVEMENTS - 2006
CONTRACT 5
WELL IMPROVEMENTS

Prepared For

THE BOARD OF DIRECTORS

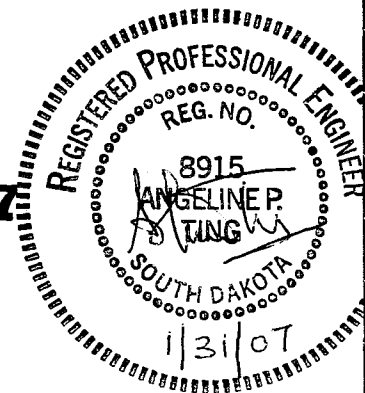
Tom Kramer, President
Greg Nugteren James Davis
Dennis M. Johnson Steven Knutson
Dennis R. Johnson Irvin Dystra
Jim Bones Jim Nelson
Virgil Christensen Greg Wirth
Ken Pedersen, Manager

Prepared By

BANNER ASSOCIATES, INC.

*Consulting Engineers and Architects
Brookings, South Dakota*

FEBRUARY, 2007



#20601.01.01

T-M RURAL WATER DISTRICT
WELL IMPROVEMENTS- 2006
CONTRACT 5: WELL IMPROVEMENTS
DOLTON, SOUTH DAKOTA

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T-M RURAL WATER DISTRICT
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SECTION 00010
ADVERTISEMENT

Notice is hereby given that the TM Rural Water District, Parker South Dakota will receive sealed bids for construction of two (2) production wells. Project scope will include the following:

Base Bid

Drilling of (2) 4" test holes; Furnish and install two (2) 12" diameter supply wells; submersible pumps, stainless steel screens; column pipes and fittings; pitless adapters; meter pits, include building above ground, valves and piping; concrete pad; generator pad; development and test pumping; furnish and install instrumentation control panel; and furnish and install electrical, and all site grading required to provide access to the wellsite, as detailed on the Drawings and specified herein.

Bid Alternate No. 1

Remove, furnish and install new submersible pump, PVC column pipes and electrical upgrades.

The Bids must be prepared on bid forms supplied in the Bidding Documents and filed with TM Rural Water District not later than 1:00 PM, Local Time, February 23, 2007 at which time and place all Bids will be publicly opened and read aloud in the presence of the Bidders and their representatives. No bids will be received after the specified hour and date, and Bids which are not prepared and filed in accordance with "Instructions to Bidders" may be rejected.

Each Bid must be submitted in a sealed envelope. Each sealed envelope containing a Bid must be plainly marked on the outside as Bid for Water System Improvements - 2006 Contract 5: Well Improvements. The envelope should also bear on the outside the name and address of the Bidder. If forwarded by mail or other delivery system, the sealed envelope containing the Bid must be sealed in another envelope, with the notation "Bid Enclosed" on the face thereof, and addressed to the TM Rural Water District, 110 North Main, Parker, SD 57053.

Bidding Documents will be available for distribution on February 5, 2007. Bidding Documents may be examined at the offices of Banner Associates, Inc. in Brookings, SD, or the TM Rural Water District office. A complete set of paper Bidding Documents may be obtained at the office of Banner Associates, Inc., 409 22nd Avenue South, P.O. Box 298, Brookings, SD 57006, (605)692-6342 or may be ordered on-line at www.bannerassociates.com. Copies may be obtained upon **refundable** payment in the sum of \$35.00 including applicable taxes for each set of Bidding Documents. Electronic copies are also available and can be ordered and downloaded from the above website for a \$20.00 **non-refundable fee**, plus applicable taxes.

The Bidder to whom the contract is awarded will be required to furnish a construction performance bond and a construction payment bond to the Owner in the amount of one hundred percent (100%) of the contract award for each bond, in conformance with the requirements of the Contract Documents. The construction performance bond and construction payment bond shall remain in full force until the completion of the Contract as specified in the General Conditions.

All bids must be accompanied by a Bid security. Bid security will take the form of a bid bond in an amount of ten percent (10%) of the Bidder's maximum Bid price or a cashier's or certified check, or bank money order made payable to Owner in an amount of five percent (5%) of the Bidder's maximum Bid price.

The Bid security will be retained by the Owner as liquidated damages if the successful bidder refuses or fails to enter into an Agreement within fifteen (15) days after Notice of Award or fails at time of executing the contract to furnish a construction performance bond and construction payment bond guaranteeing the faithful performance of the work.

Bids may not be withdrawn after the time fixed for opening them. The Owner reserves the right to reject any and all bids, and to waive any irregularities therein.

BY ORDER of TM Rural Water District, Parker SD.

Date January 23, 2007

By Tom Kramer, President
TM Rural Water District

INSTRUCTIONS TO BIDDERS

ARTICLE 1 - DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. Issuing Office: The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation to Bid may be obtained from the Issuing Office.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, within five days of Owner's request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for below.

- A. Documentation of all public contracts and subcontracts under public contracts that your organization has performed within the last five (5) years over \$500,000 involving work similar in character and scope to the work under the Bidding Documents. If the contract or subcontract referenced is not substantially completed, furnish the percent complete for that contract or subcontract.
- B. List of references, minimum of five (5), from the previous stated projects that were performed with the last five (5) years over \$500,000 involving work similar in character and scope to the work under the Bidding Documents.
- C. Parts of the work, besides those disclosed on the List of Subcontractors, that you intend to subcontract.
- D. Schedule of Values.
- E. Non-collusion Affidavit.

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions

A. The Supplementary Conditions identify:

- 1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents.

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2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in Paragraph 4.01.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions has been identified and established in Paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions or information contained in such reports or shown or indicated in such drawings.

4.02 Underground Facilities

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 Hazardous Environmental Condition

A. The Supplementary Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that Engineer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in Paragraph 4.03.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established in Paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates. Owner reserves the right to prohibit access to the site ten (10) days prior to Bid.

4.06 Reference is made to Article 7 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other work.

4.07 It is the responsibility of each Bidder before submitting a Bid to:

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A. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;

B. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;

D. Carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions at the Site which have been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions;

E. Obtain and carefully study (or accept consequences of not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

F. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

G. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;

I. Promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and

J. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 - PRE-BID CONFERENCE

5.01 A Pre-Bid Conference will not be held.

ARTICLE 6 - SITE AND OTHER AREAS

6.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 7 - INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 8 - BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5% of Bidder's maximum Bid Price and in the form of a certified check or bank money order or 10% of Bidder's maximum Bid Price and in the form of a Bid bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.

8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 30 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

8.03 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within thirty (30) days after the Bid opening.

ARTICLE 9 - CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 - LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.

ARTICLE 12 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute. Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.

12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 13 - PREPARATION OF BID

- 13.01 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from Engineer.
- 13.02 All blanks on the Bid Form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each Bid item listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered.
- 13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.
- 13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.
- 13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.
- 13.06 A Bid by an individual shall show the Bidder's name and official address.
- 13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.
- 13.08 All names shall be typed or printed in ink below the signatures.
- 13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.10 The address and telephone number for communications regarding the Bid shall be shown.
- 13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 - BASIS OF BID; COMPARISON OF BIDS

14.01 *Unit Price*

- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.
- B. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.

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C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

14.02 The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as provided in Paragraph 11.02 of the General Conditions.

ARTICLE 15 - SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the following data:

- A. Bid Security
- B. Contractors' Excise Tax License
- C. List of Subcontractors, suppliers
- D. Bidder's Statement of Qualifications

15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque sealed envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to:

TM Rural Water District
110 North Main
PO Box 445
Parker, SD 57054

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

16.02 If within 24 hours after Bids are opened, any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 - OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

19.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.

19.06 If the Contract is to be awarded, Owner will award the Contract to the Bidder whose Bid is in the best interests of the Project.

ARTICLE 20 - CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

ARTICLE 21 - SIGNING OF AGREEMENT

21.01 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number

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of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

END OF SECTION

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DOLTON, SOUTH DAKOTA

BID FORM

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

TM Rural Water District
110 North Main
Parker, SD 57054

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 30 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

Addendum No.

Addendum Date

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in SC-4.02.

E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific

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DOLTON, SOUTH DAKOTA
BID FORM

means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

- F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.
- I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.
- J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- K. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4 – FURTHER REPRESENTATIONS

4.01 Bidder further represents that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

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BID FORM

UNIT PRICE BASE BID SCHEDULE

NOTE: Bidder shall Bid all Items of the Schedule.

Item No.	Spec. Ref. No.	Description of Work and Materials	Quantity and Unit Price (Ink Only)				Total Cost
1.	010200-2.1	Mobilization and Demobilization	1	For the Lump Sum of			\$ _____
2.	310000-4.2	Imported Granular Embedment	110	Ton	@ \$ _____	Ton	\$ _____
3.	310000-4.3	Site Grading	1	For the Lump Sum of			\$ _____
4.	310000-4.5	Compaction- Moisture/ Density Tests	2	EA	@ \$ _____	EA	\$ _____
5.	321100-4.1	Base Course	216	Ton	@ \$ _____	Ton	\$ _____
6.	321100-4.1	Gravel Surfacing	216	Ton	@ \$ _____	Ton	\$ _____
7.	323126-4.2	3-Wire Barbless Fence	1741	LF	@ \$ _____	LF	\$ _____
8.	323126-4.3	Tubular Steel Swing Gate	2	EA	@ \$ _____	EA	\$ _____
9.	329300-4.1	Surface Restoration	1	For the Lump Sum of			\$ _____
10.	331100-4.2	Furnish 8" PVC ASTM, SDR 26 (Class 160) PVC Watermain	50	LF	@ \$ _____	LF	\$ _____
11.	331100-4.3	Install 8" PVC Watermain	50	LF	@ \$ _____	LF	\$ _____
12.	331100-4.4	8"x 4" MJ Reducer w/Joint Restraints	2	EA	@ \$ _____	EA	\$ _____
13.	332100-4.2	Test Holes (2)	680	LF	@ \$ _____	LF	\$ _____
14.	332100-4.3	Drilling Permanent Well Holes	680	LF	@ \$ _____	LF	\$ _____
15.	332100-4.4	12" Well Casing	600	LF	@ \$ _____	LF	\$ _____
16.	332100-4.5	12' Stainless Steel Screen (Including Blind Screen Length)	60	LF	@ \$ _____	LF	\$ _____
17.	332100-4.6	Selected Silica Gravel Pack	201	LF	@ \$ _____	LF	\$ _____
18.	332100-4.7	Bentonite Seal	10	LF	@ \$ _____	LF	\$ _____

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Item No.	Spec. Ref. No.	Description of Work and Materials		Quantity and Unit Price (Ink Only)			Total Cost
19.	332100-4.8	Concrete Grout Seal	511	LF	@ \$ _____	LF	\$ _____
20.	332100-4.9	Development of Well (2 Well with 12" Screen)	24	HRS	@ \$ _____	HRS	\$ _____
21.	332100-4.10	Furnish and Install 12" Pitless Adapter Unit	2	EA	@ \$ _____	EA	\$ _____
22.	332100-4.11	Furnish and Install Submersible Well Pump (50 HP)	2	EA	@ \$ _____	EA	\$ _____
23.	332100-4.12	Furnish and Install 8" PVC Column Pipe and Fittings	600	LF	@ \$ _____	LF	\$ _____
24.	332100-4.14	Test Pumping (2 Wells – 48 Hours)	48	HRS	@ \$ _____	HRS	\$ _____
25.	332100-4.15	Miscellaneous Well Requirements	1	For the Lump Sum of			\$ _____
26.	332100-4.16	Furnish and Install Meter Pit, and Above Ground Building, Piping, Valves and Pressure Gauges	2	EA	@ \$ _____	EA	\$ _____
27.	033000-4.1	Furnish and Install Concrete Pad at Wells	2	EA	@ \$ _____	EA	\$ _____
28.	033000-4.2	Furnish and Install Concrete Pad for Generator	2	EA	@ \$ _____	EA	\$ _____
29.	033000-4.3	Furnish and Install Concrete Pad for Transformer	2	EA	@ \$ _____	EA	\$ _____
30.	400000-3.5	Furnish and Install Instrumentation and Control Panel	2	EA	@ \$ _____	EA	\$ _____
31.	260000	Furnish and Install Electrical	2	EA	@ \$ _____	EA	\$ _____
TOTAL FOR BASE BID UNIT PRICE BID SCHEDULE					\$ _____		

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BID ALTERNATE NO. 1

Item No.	Spec. Ref. No.	Description of Work and Materials	Quantity	Unit Price (Ink Only)	Total Cost
32.	332100-4.11	Furnish and Install Submersible Well Pump (50 HP)	1 EA	@ \$ _____ EA	\$ _____
33.	332100-4.12	Furnish and Install 8" PVC Column Pipe and Fittings	200 LF	@ \$ _____ LF	\$ _____
34.	260000	Furnish and Install Electrical Upgrades	1 EA	@ \$ _____ EA	\$ _____
TOTAL FOR BID ALTERNATE NO. 1 UNIT PRICE BID SCHEDULE				\$ _____	

Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

ARTICLE 6 – TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete on or before July 1, 2007, and will be completed and ready for final payment in accordance with Paragraph 14.07.B of the General Conditions on or before August 1, 2007.
- 6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the Contract Times.

ARTICLE 7 – ATTACHMENTS TO THIS BID

- 7.01 The following documents are attached to and made a condition of this Bid:
- A. Required Bid Security in the amount of five percent (5%) of the Bidder's maximum Bid Price in the form of cashier's, certified check, or bank money order made payable to the Owner or Bid Bond in an amount of ten percent (10%) of the bidder's maximum Bid price made payable to the Owner issued by a surety meeting the requirements of Paragraph 5.01 and 5.02 of the General Conditions.
 - B. Contractor's Excise Tax License
 - C. List of subcontractors, suppliers, (and other) individual and entities required to be identified in the Bid.
 - D. Bidder's Statement of Qualifications with supporting data.

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DOLTON, SOUTH DAKOTA
BID FORM

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

9.01 This Bid submitted by:

If BIDDER is:

An Individual:

Name (typed or printed): _____

By: _____ (SEAL)
(Individual's Signature)

Doing business as: _____

Business address: _____

Phone No.: _____ Fax No.: _____

A Corporation:

Corporation Name: _____ (SEAL)

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Attest: _____

(Signature of Corporate Secretary)

Business address: _____

Phone No.: _____ Fax No.: _____

Date of Authorization to do business in State of South Dakota is: _____

A Partnership:

Partnership Name: _____ (SEAL)

By: _____
(Signature of general partner – attach evidence of authority to sign)

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BID FORM

Name (typed or printed): _____

Business address: _____

Phone No.: _____ Fax No.: _____

A Joint Venture:

Name of Joint Venture: _____ (SEAL)

First Joint Venturer Name: _____ (SEAL)

By: _____

(Signature of joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

Phone No.: _____ Fax No.: _____

Second Joint Venturer Name: _____ (SEAL)

By: _____

(Signature of joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

Phone No.: _____ Fax No.: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership and corporation that is party to the joint venture shall be in the manner indicated above.)

SUBMITTED ON _____, 20__.

State Contractor License No. _____. (If applicable)

END OF SECTION

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BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER:

TM Rural Water District
110 North Main
Parker, SD 57056

BID

Bid Due Date:

Project (Brief Description Including Location):

BOND

Bond Number:

Date (Not later than Bid due date):

Penal sum

(Words)

(Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

SURETY

(Seal
)

(Seal)

Bidder's Name and Corporate Seal

Surety's Name and Corporate Seal

By: _____
Signature and Title

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title

Attest: _____
Signature and Title

Note: Above addresses are to be used for giving required notice.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

- 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
- 3.2. All Bids are rejected by Owner, or
- 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

**PART J—
CONTRACTORS' EXCISE TAX LICENSE**

No public corporation may award any contract for the construction of any public improvement unless the contractor has a South Dakota Contractors' Excise Tax License.

PLEASE COMPLETE THE FOLLOWING:

1. Owner Name: _____
2. Business Name: _____
3. South Dakota Tax Permit Number: _____
1. If you applied for a Contractors' Excise Tax License but have not received the license, please list your federal identification number and date license applies for:

EIN _____ Application Date _____

I certify that to the best of my knowledge, the above information is accurate and complete.

Contractor Signature

Date

* *If the contractor indicates a license has been applied for but not received, please call the South Dakota Department of Revenue at 1-800-829-9288 to verify the status of the application.*

* *An application for a Contractors' Excise Tax License may be obtained from the South Dakota Department of Revenue's website www.state.sd.us/revenue or by calling 1800-829-9188.*

THIS FORM MUST BE SUBMITTED WITH THE CONTRACTORS' BID

T-M RURAL WATER DISTRICT
WELL IMPROVEMENTS- 2006
CONTRACT 5: WELL IMPROVEMENTS
DOLTON, SOUTH DAKOTA

BIDDER'S STATEMENT OF QUALIFICATIONS

BIDDER hereby certifies under oath the truth and correctness of all statements and of all answers to questions made hereinafter. ENGINEER and OWNER reserve the right to request and receive other such information as may be required to enable an evaluation of the BIDDER's qualifications to perform the Work under this project.

SUBMITTED TO:

T-M Rural Water
110 North Main
P.O. Box 445
Parker, SD 57054

PROJECT IDENTIFICATION:

T-M Rural Water District
Water System Improvements- 2006
Contract 5: Well Improvements

Submitted By: _____

Bidder's Legal Name: _____

Address: _____

Main Office: _____

1. How many years has your organization been in business as a general contractor? _____

2. How many years has your organization been in business under its present business name? _____

3. If a corporation answer the following:

a. Date of incorporation: _____

b. State of incorporation: _____

c. President's name: _____

d. Vice-President's name(s): _____

e. Secretary's name: _____

f. Treasurer's name: _____

4. If individual or partnership answer the following:

a. Date of organization: _____

b. Name and address of all partners. (State whether general or limited partnership): _____

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DOLTON, SOUTH DAKOTA
BIDDER'S STATEMENT OF QUALIFICATIONS

5. If other than corporation or partnership, describe organization and name principals:

6. We normally perform ____ % of the work with our own forces. The work we perform with our own forces, listed by trades, includes the following:

(Attach additional sheets if necessary).

7. Have you ever failed to complete any work awarded to you? If so, note when, where, and why:

8. Has any officer or partner of your organization ever been an officer or partner of another organization that failed to complete a construction contract? If so, state circumstances:

9. Has/is your firm or organization been involved in any litigation? If so, state circumstances:

10. List name of project, owner, architect/engineer, contract amount, percent complete, and scheduled completion of the major projects your organization has in progress on this date:

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BIDDER'S STATEMENT OF QUALIFICATIONS

11. State at least three successfully completed projects your organization has completed in the past 10 years which involved similar scope and magnitude to the Work covered by these Contract Documents. For these three projects, list the name of project, owner, architect/engineer, contract amount, date of completion, and percent of work with own forces.

List the experience of the principal individuals of your organization, including the person you expect to assign as Project Manager or Project Superintendent:

12. Industry References:

13. Bank References:

14. Name of bonding company and name and address of agent:

15. Upon request only after bid opening -- Provide statement of financial conditions, including latest regular dated financial statement or balance sheet prepared in accordance with generally accepted accounting principles.

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DOLTON, SOUTH DAKOTA
BIDDER'S STATEMENT OF QUALIFICATIONS

16. Dated at _____ this _____ day of _____, 20____.

Legal Name of Organization: _____

By: _____
(Signature)

(Name)

(Title)

(Corporate Seal if a Corporation) _____ being duly sworn, deposes and
says that he/she is the _____ of _____

(Bidder's organization or Firm) and that the answers to the foregoing questions and all statements therein contained are true and correct.

Subscribed and sworn before me this _____ day of _____, 20____.

Notary Public: _____

My Commission Expires: _____ day of _____, 20____.

END OF SECTION

T-M RURAL WATER DISTRICT
WELL IMPROVEMENTS- 2006
CONTRACT 5: WELL IMPROVEMENTS
DOLTON, SOUTH DAKOTA

LIST OF SUBCONTRACTORS AND SUPPLIERS

PROJECT: _____

BIDDER: _____

List all Subcontractors and Suppliers to be employed on the above Project. This list shall be submitted as required in Article 12 of the Instructions to Bidders and Article 7 of the Bid Form with such additional information as is required therein.

Work	Firm	Dollar Amount

END OF SECTION

Notice of Award

Dated _____

Project: Water System Improvements -2006 Owner: TM Rural Water District Owner's Contract No.:

Contract: Contract 5: Well Improvements Engineer's Project No.: # 20601.01.01

Bidder:

Bidder's Address: (send Certified Mail, Return Receipt Requested)

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for _____

(Indicate total Work, alternates or sections or Work awarded.)

The Contract Price of your Contract is _____ Dollars (\$_____).

(Insert appropriate data if Unit Prices are used. Change language for Cost-Plus contracts.)

_____ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

_____ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

1. Deliver to the Owner [_____] fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), [and] General Conditions (Paragraph 5.01) [and Supplementary Conditions (Paragraph SC-5.01).]
3. Other conditions precedent:

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

T-M Rural Water District

Owner

By:

Authorized Signature

Title

Copy to Engineer

T-M RURAL WATER DISTRICT
WELL IMPROVEMENTS- 2006
CONTRACT 5: WELL IMPROVEMENTS
DOLTON, SOUTH DAKOTA

EJCDC
AGREEMENT
BETWEEN OWNER AND CONTRACTOR FOR
CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between TM Rural Water District

(Owner) and _____

(Contractor).

Owner and Contractor, in consideration of the mutual covenants set forth herein, agree as follows:

ARTICLE 1 - WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

All labor, materials, equipment, utilities and all other items necessary for the construction of TM Rural Water District Well Improvements 2006/07.

ARTICLE 2 - THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Project plans and specifications labeled:
T-M Rural Water District
Water System Improvements-2006
Contract 5: Well Improvements
Dolton, South Dakota

ARTICLE 3 - ENGINEER

3.01 The Project has been designed by Banner Associates, Inc. (Engineer), who is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIMES

4.01 Time of the Essence

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Dates for Substantial Completion and Final Payment

A. The Work will be substantially completed on or before July 1, 2007, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before August 1, 2007.

4.03 Liquidated Damages

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A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner \$500.00 for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner \$250.00 for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 - CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A below:

- A. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this paragraph 5.01.A:

As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions. Unit prices have been computed as provided in Paragraph 11.03 of the General Conditions.

Total of all estimated prices: _____
(\$ _____) (words)
(numbers)

- C. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.
- #### ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 Progress Payments; Retainage

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 15TH day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

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1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:

a. 90 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, Owner, on recommendation of Engineer, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no additional retainage; and

b. 90 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less 100 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

ARTICLE 7 - INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate equal to the maximum legal rate allowed.

ARTICLE 8 - CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions.

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E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 - CONTRACT DOCUMENTS

9.01 Contents

A. The Contract Documents consist of the following:

1. This Agreement (pages 00520-1 to 00520-6, inclusive).
2. Performance bond (pages 00610-1 to 00610-2, inclusive).
3. Payment bond (pages 00615-1 to 00615-2, inclusive).
4. General Conditions (pages 00700-1 to 00700-42, inclusive).
5. Supplementary Conditions (pages 00800-1 to 00800-4, inclusive).
6. Specifications as listed in the table of contents of the Project Manual.
7. Drawings consisting of 7 sheets with each sheet bearing the following general title: TM Rural Water District, Water System Improvements - 2006, Contract 5: Well Improvements.
8. Addenda (numbers _____ to _____, inclusive).
9. Exhibits to this Agreement (enumerated as follows):

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- a. Contractor's Bid (pages 00410-1 to 00410-6, inclusive).
- b. Documentation submitted by Contractor prior to Notice of Award (pages ____ to ____, inclusive).
- c. Notice of Award C-510.

10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

- a. Notice to Proceed (page C-550-1).
- b. Work Change Directives.
- c. Change Order(s).
- d. Field Order(s)

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 - MISCELLANEOUS

10.01 Terms

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

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10.04 Severability

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 Other Provisions

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in duplicate. One counterpart each has been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____, _____ (which is the Effective Date of the Agreement).

OWNER:

CONTRACTOR:

By: _____

By: _____

Title: _____

Title: _____

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest: _____

Attest: _____

Title: _____

Title: _____

Address for giving notices:

Address for giving notices:

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Owner-Contractor Agreement.)

License No.: _____
(Where applicable)

Agent for service or process: _____

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

Notice to Proceed

Dated _____

Project: Water System Improvements -2006	Owner: TM Rural Water District	Owner's Contract No.:
Contract: Contract 5: Well Improvements		Engineer's Project No.: # 20601.01.01
Contractor:		

Contractor's Address: [send Certified Mail, Return Receipt Requested]

You are notified that the Contract Times under the above contract will commence to run on _____. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is July 1, 2007, and the date of readiness for final payment is August 1, 2007.

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must [add other requirements]:

T-M Rural Water District

	Owner
Given by:	
	Authorized Signature
	Title
	Date

Copy to Engineer

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER:

TM Rural Water District
110 North Main
Parker, SD 57054

CONTRACT

Date:
Amount:
Description (Name and Location):

BOND

Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

(Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title

SURETY

(Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

Contractors of America, and the American Institute of Architects.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.

3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:

3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and

3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and

3.3. Owner has agreed to pay the Balance of the Contract Price to:

1. Surety in accordance with the terms of the Contract;
2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.

4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:

4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or

4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
2. Deny liability in whole or in part and notify Owner citing reasons therefor.

5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3. Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone

Surety Agency or Broker

Owner's Representative (engineer or other party)

PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER:

TM Rural Water District
110 North Main Street
Parker, SD 57054

CONTRACT

Date:
Amount:
Description (Name and Location):

BOND

Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

Surety's Name and Corporate Seal (Seal)

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title

SURETY

Surety's Name and Corporate Seal (Seal)

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:

6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone

Surety Agency or Broker:

Owner's Representative (engineer or other party):

Certificate of Substantial Completion

Project: Water System Improvements 2006	Owner: TM Rural Water District	Owner's Contract No.:
Contract: Contract 5: Well Improvements		Date of Contract:
Contractor:		Engineer's Project No.: # 20601.01.01

This [tentative] [definitive] Certificate of Substantial Completion applies to:

- ☐ All Work under the Contract Documents:
 ☐ The following specified portions:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [revised tentative] [definitive] list of items to be completed or corrected, is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

- ☐ Amended Responsibilities
 ☐ Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer

Date

Accepted by Contractor

Date

Accepted by Owner

Date

To (Owner): TM Rural Water District	Application Period:	Application Date:
Project: Water System Improvements -2006	From (Contractor):	Via (Engineer)
Owner's Contract No.:	Contract: Contract 5: Well Improvements 2006/07	
	Contractor's Project No.:	Engineer's Project No.:

Change Order Summary

1. ORIGINAL CONTRACT PRICE	\$
2. Net change by Change Orders	\$
3. CURRENT CONTRACT PRICE (Line 1 ± 2).....	\$
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	\$
5. RETAINAGE:	
a. _____ % x \$ _____ Work Completed	\$
b. _____ % x \$ _____ Stored Material	\$
c. Total Retainage (Line 5a + Line 5b)	\$
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)	\$
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	\$
8. AMOUNT DUE THIS APPLICATION	\$
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)	\$

The undersigned Contractor certifies that: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

\$ _____
(Line 8 or other - attach explanation of other amount)

(Engineer)

6 (Line 8 or other - attach explanation of other amount)

(Owner)

Funding Agency (if applicable)

(Date)

Contractor's Application

EJCDC No. C-620 (2002 Edition)
Prepared by the Engineers' Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.
#20601.01.01

Contractor's Application

[illegible]

Change Order

No. _____

Date of Issuance: _____ Effective Date: _____

Project: Water System Improvements -2006	Owner: TM Rural Water District	Owner's Contract No.:
Contract: Contract 5: Well Improvements		Date of Contract:
Contractor:		Engineer's Project No.: 20601.01.01

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments: (List documents supporting change):

CHANGE IN CONTRACT PRICE:

Original Contract Price:

\$ _____

[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____:

\$ _____

Contract Price prior to this Change Order:

\$ _____

[Increase] [Decrease] of this Change Order:

\$ _____

Contract Price incorporating this Change Order:

\$ _____

CHANGE IN CONTRACT TIMES:

Original Contract Times: ☐ Working days ☐ Calendar days

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____:

Substantial completion (days): _____

Ready for final payment (days): _____

Contract Times prior to this Change Order:

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

[Increase] [Decrease] of this Change Order:

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

Contract Times with all approved Change Orders:

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

RECOMMENDED:

By: _____
Engineer (Authorized Signature)

Date: _____

Approved by Funding Agency (if applicable): _____

ACCEPTED:

By: _____
Owner (Authorized Signature)

Date: _____

ACCEPTED:

By: _____
Contractor (Authorized Signature)

Date: _____

Date: _____

T-M RURAL WATER DISTRICT
WELL IMPROVEMENTS- 2006
CONTRACT 5: WELL IMPROVEMENTS
DOLTON, SOUTH DAKOTA

COVER PAGE
For Attachment to Submittals

Submittal No. _____ Description _____

Specification Section _____ Date _____

To facilitate the assumption of responsibility by the Contractor under the General Requirements, each submittal by the Contractor shall contain as a cover page thereto, the following legend. This cover page shall be signed or initialed by a representative of the Contractor previously designated by the Contractor to the Engineer and Owner, in writing, for such purpose.

- a. This submittal is made under the provision of the General Requirements. Contractor makes an express warranty to the Owner, by express affirmation, that if installed into the project, the work which forms the basis of this submittal will conform to the design requirements of the Agreement, as that design has been contractually agreed to and which is the basis of the bargain between the parties thereto.
- b. It is the purpose of this submittal to describe the goods proposed for use by the Contractor and to demonstrate conformance of that description to the Agreement requirement.
- c. To the extent necessary, the Contractor by making this submittal, warrants that the whole of the goods shall conform to the submittal.
- d. At the time of this submission, the Contractor acknowledges that he is aware that the purpose of this submission is to induce the Engineer and Owner to authorize the use of this work for purposes of contract compliance by the Contractor, and further that the Engineer and Owner, in doing so, relies upon the skill, judgement, and integrity of the Contractor as to the compliance of this submitted work to the requirements of the Agreement. Contractor hereby acknowledges that he has by his own resources found and selected the work submitted herewith and that is suitable for the purpose of being fit and suitable for use in the final construction under this Agreement.

The Contractor hereby notifies the Engineer and Owner that:

1. _____
2. _____
3. _____

The above referenced features are not in conformance with the requirements of the Agreement and Contractor nevertheless asks approval thereof.

Contractor's Representative



DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

NOTICE OF INTENT &
CERTIFICATE OF APPLICANT FORM
TO RECEIVE COVERAGE UNDER THE
GENERAL PERMIT FOR TEMPORARY DISCHARGES
AND A TEMPORARY WATER USE PERMIT

This form is provided by the Secretary of the South Dakota Department of Environment and Natural Resources in accordance with §74:52:02:09 of the Administrative Rules of South Dakota. No South Dakota Surface Water Discharge Permit will be issued except under completion and submittal of this form to the following addresses:

original to: South Dakota Department of Environment and Natural Resources
Surface Water Quality Program
Joe Foss Building
523 East Capitol Avenue
Pierre, South Dakota 57501-3181
Telephone: (605) 773-3351 FAX: (605) 773-4068

PLEASE PRINT OR TYPE

I. Primary Contact Information

☐ Owner ☐ Operator ☐ Contractor

Name _____ Phone _____

Responsible Contact Person _____

Street _____

City _____ State SD County _____ Zip Code _____

II. Secondary Contact Information (If different from above)

☐ Owner ☐ Operator ☐ Contractor

Name _____ Phone _____

Responsible Contact Person _____

Street _____

City _____ State SD County _____ Zip Code _____

III Facility/Site Location

Name _____ Phone _____

Responsible Contact Person _____

Street _____

City _____ State SD County _____ Zip Code _____

Is this facility located in Indian Country? ☐ Yes ☐ No

Section _____ Quarter _____ Township _____ Range _____

Latitude _____ Longitude _____

IV. Standard Industrial Classification (SIC) Code of facility: _____

FOR SDDENR USE ONLY

Permit Number: _____ Date Received: _____
Date Permitted: _____ PCS: _____

- V. Please list all the activities which require the applicant to obtain a discharge permit. (Attach additional sheets if necessary.)

VI. Discharge Information

- A. Estimate the following:

Date water withdrawal will commence: _____

Date for commencement of discharge: _____

Termination date of withdrawal: _____

Termination date of discharge: _____

Total volume of withdrawal: _____

Total volume of discharge: _____

Average flow rate of withdrawal: _____

Average flow rate of discharge: _____

- B. Source of water which is to be discharged: _____

- C. Name of Receiving Waters: _____

- D. Brief description of water treatment processes employed, if any:

- E. Describe the discharge and the type of wastewater from each outfall. Include all overflows, bypasses, or discharges from holding ponds, trenches, excavations, vessels, pipelines, etc.:

Outfall 001 _____

Outfall 002 _____

Outfall 003 _____

Attach additional sheets if necessary.

NOTE: Please place points of withdrawal and discharge on a topographic map, or other map if a topographic map is unavailable. This map should extend to one (1) square mile beyond the property boundaries of the facility and each of its discharge facilities, and those wells, springs, and other surface water bodies, drinking water wells, and surface water intake structures listed in public records, or otherwise known to the applicant in the map area.

- F. Is there any reason to believe that the discharge may contain any pollutant other than those limited in the permit (i.e. TSS, pH, Chlorine, BTEX, Benzene, and TPH)? ☐ Yes ☐ No
If yes, list any pollutants that may be present: _____

NOTE: Attach any analytical data which indicate levels of pollutants present in water to be discharged.

VII. Pollution Prevention Plan

- A. Has the facility written a pollution prevention plan in lieu of sampling for TSS and pH?

☐ Yes ☐ No

- B. Brief description of best management practices being used in lieu of sampling:

VIII. Hydrostatic Testing

- A. Type of vessel being tested: _____
- B. Material from which vessel is constructed: _____
- C. Check appropriate box: ☐ Vessel has been previously used ☐ Vessel is virgin material
- D. Description of fluid material normally contained/transported through the vessel:

IX. List other information which you feel should be brought to the attention of the SDDENR regarding coverage under this general permit.

Attach additional sheets if necessary.

X. Certification – authorized representative should initial the check box.

I certify under penalty of law that this document and all attachments were prepared under my direction (*initial*) or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including revocation of the permit and the possibility of fine and imprisonment for knowing violations.

NOTE: Application must be signed by the authorized chief elective or executive officer of the applicant, or by the applicant, if an individual.

I declare and affirm under the penalties of perjury that this claim (petition, application, information) has been examined by me, and to the best of my knowledge and belief, is in all things true and correct.

Name _____ Title _____

Date _____

Signature _____

Surface Water Quality Program
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181
Telephone: (605) 773-3351

STATE OF SOUTH DAKOTA

BEFORE THE SECRETARY OF

THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

IN THE MATTER OF THE)
APPLICATION OF _____)
_____) **CERTIFICATION OF**
_____)
APPLICANT
_____) **(FACILITY NAME)**
STATE OF SD _____)
COUNTY OF _____) SS

I, _____, the applicant in the above matter after being duly sworn upon oath hereby certify the following information in regard to this application:

South Dakota Codified Laws Section 1-40-27 provides:

"The secretary may reject an application for any permit filed pursuant to Titles 34A or 45, including any application by any concentrated swine feeding operation for authorization to operate under a general permit, upon making a specific finding that:

(1) *The applicant is unsuited or unqualified to perform the obligations of a permit holder based upon a finding that the applicant, any officer, director, partner or resident general manager of the facility for which application has been made:*

- (a) *Has intentionally misrepresented a material fact in applying for a permit;*
- (b) *Has been convicted of a felony or other crime involving moral turpitude;*
- (c) *Has habitually and intentionally violated environmental laws of any state or the United States which have caused significant and material environmental damage;*
- (d) *Has had any permit revoked under the environmental laws of any state or the United States; or*
- (e) *Has otherwise demonstrated through clear and convincing evidence of previous actions that the applicant lacks the necessary good character and competency to reliably carry out the obligations imposed by law upon the permit holder; or*

(2) *The application substantially duplicates an application by the same applicant denied within the past five years which denial has not been reversed by a court of competent jurisdiction. Nothing in this subdivision may be construed to prohibit an applicant from submitting a new application for a permit previously denied, if the new application represents a good faith attempt by the applicant to correct the deficiencies that served as the basis for the denial in the original application.*

All applications filed pursuant to Titles 34A and 45 shall include a certification, sworn to under oath and signed by the applicant, that he is not disqualified by reason of this section from obtaining a permit. In the absence of evidence to the contrary, that certification shall constitute a prima facie showing of the suitability and qualification of the applicant. If at any point in the application review, recommendation or hearing process, the secretary finds the applicant has intentionally made any material misrepresentation of fact in regard to this certification, consideration of the application may be suspended and the application may be rejected as provided for under this section.

Applications rejected pursuant to this section constitute final agency action upon that application and may be appealed to circuit court as provided for under chapter 1-26."

Pursuant to SDCL 1-40-27, I certify that I have read the forgoing provision of state law, and that I am not disqualified by reason of that provision from obtaining the permit for which application has been made.

I declare and affirm under the penalties of perjury that this claim (petition, application, information) has been examined by me, and to the best of my knowledge and belief, is in all things true and correct.

NOTE: Notice of Intent/Certificate of Applicant form must be signed by the authorized chief elective or executive officer of the applicant, or by the applicant, if an individual.

Dated this ____ day of _____, 20__.

Applicant Signature

Applicant Name (print)

**PLEASE ATTACH SHEET DISCLOSING ALL FACTS PERTAINING TO
SDCL 1-40-27 (1) (a) THROUGH (e).
ALL VIOLATIONS MUST BE DISCLOSED, BUT WILL NOT
AUTOMATICALLY RESULT IN THE REJECTION OF AN APPLICATION.**



DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

NOTICE OF TERMINATION
OF COVERAGE UNDER THE
GENERAL PERMIT FOR TEMPORARY DISCHARGES

This form is required to be submitted when a discharge permit is no longer required or necessary. Submission of this form shall in no way relieve the permittee of permit obligations required prior to submission of this form. Please submit this form to the following addresses:

original to: South Dakota Department of Environment
and Natural Resources
Surface Water Quality Program
Joe Foss Building
523 East Capitol Avenue
Pierre, South Dakota 57501-3181
Telephone: (605) 773-3351 FAX: (605) 773-5286

PLEASE PRINT OR TYPE

I. Permittee Information

Name _____ Phone _____
Responsible Contact Person _____
Street _____
City _____ State SD County _____ Zip Code _____

II. Mailing Address of Facility/Site Location

Name _____ Phone _____
Responsible Contact Person _____
Street _____
City _____ State SD County _____ Zip Code _____

III. Permit Number: _____

IV. Check the reason for termination of permit coverage:

- ☐ Temporary discharge is no longer occurring ☐ You are no longer the operator of the facility
☐ Other reason(s): _____

NOTE: Attach any Discharge Monitoring Reports (DMRs) which indicate pollutants in exceedance of permit limits.

I certify under penalty of law that all temporary discharge activities from the identified facility that are authorized by a SWD general permit have been eliminated or that I am no longer the operator of the facility. I understand that by submitting the Notice of Termination, I am no longer authorized to discharge from temporary discharge activities under this general permit, and that discharging pollutants from temporary discharge activities is unlawful under the South Dakota Water Pollution Control Act where the discharge is not authorized by a SWD permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the South Dakota Water Pollution Control Act. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

NOTE: NOT must be signed by the authorized chief elective or executive officer of the applicant, or by the applicant, if an individual.

Name (print) _____ Title _____
Signature _____ Date _____

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the Controlling Law.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By



PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
a practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN COUNCIL OF ENGINEERING COMPANIES

AMERICAN SOCIETY OF CIVIL ENGINEERS

This document has been approved and endorsed by



The Associated General Contractors of America



Knowledge for Creating
and Sustaining
the Built Environment

Construction Specifications Institute

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National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314

American Council of Engineering Companies
1015 15th Street, N.W., Washington, DC 20005

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Nos. C-520 or C-525 (2002 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC Construction Documents, General and Instructions (No. C-001) (2002 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. C-800) (2002 Edition).

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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*--The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*--The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder*--The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*--A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*-- Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*--The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*--The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*--See Paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer*--The individual or entity named as such in the Agreement.

20. *Field Order*--A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

23. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*--The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*--A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*--The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*--Polychlorinated biphenyls.

31. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*--A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Related Entity* -- An officer, director, partner, employee, agent, consultant, or subcontractor.

37. *Resident Project Representative*--The authorized representative of Engineer who may be assigned to the Site or any part thereof.

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Schedule of Submittals*--A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. *Schedule of Values*--A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

41. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

42. *Site*--Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

43. *Specifications*--That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain

administrative requirements and procedural matters applicable thereto.

44. *Subcontractor*--An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

45. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

46. *Successful Bidder*--The Bidder submitting a responsive Bid to whom Owner makes an award.

47. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

48. *Supplier*--A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.

49. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

50. *Unit Price Work*--Work to be paid for on the basis of unit prices.

51. *Work*--The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

52. *Work Change Directive*--A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times

but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B. Intent of Certain Terms or Adjectives

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered", "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. Day

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. Defective

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents, or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. Furnish, Install, Perform, Provide

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 Copies of Documents

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 Commencement of Contract Times; Notice to Proceed

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement

or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 Starting the Work

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 Before Starting Construction

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule; indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 Preconstruction Conference

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 Initial Acceptance of Schedules

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or

responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of, their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. Reporting Discrepancies

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. Resolving Discrepancies

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work

(unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or

2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaption by Engineer.

B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's

sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party..

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. Possible Price and Times Adjustments

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. Not Shown or Indicated

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will

promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. Reports and Drawings: Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

B. Limited Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to

entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06. G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified

in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

5.04 *Contractor's Liability Insurance*

A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection

from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, (other than caused by flood) and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any

deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract

Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or

received from the superintendent shall be binding on Contractor.

6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,

3) it has a proven record of performance and availability of responsive service; and

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times, and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items*

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified, and

b) available engineering, sales, maintenance, repair, and replacement services;

4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

B. Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. Engineer's Evaluation: Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. Special Guarantee: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. Engineer's Cost Reimbursement: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract

Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. Contractor's Expense: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 Concerning Subcontractors, Suppliers, and Others

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor

2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual

or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 Taxes

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 Use of Site and Other Areas

A. Limitation on Use of Site and Other Areas

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. Removal of Debris During Performance of the Work: During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. Cleaning: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. Loading Structures: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 Record Documents

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 Safety and Protection

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Draw-

ings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. Shop Drawings

a. Submit number of copies specified in the General Requirements.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples*: Contractor shall also submit Samples to Engineer for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals , any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. Submittal Procedures

1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents

with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. Engineer's Review

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. Resubmittal Procedures

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 Continuing the Work

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or

disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 Contractor's General Warranty and Guarantee

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 Indemnification

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or

arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal

shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 - OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and

properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 *Insurance*

A. Owner's responsibilities, if any, in respect of purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep

Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show

partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to, the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall

promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim, shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and

Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have

resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expresses, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. Costs Excluded: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

C. Contractor's Fee: When all the Work is performed on the basis of cost-plus, Contractor's fee shall

be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. Cash Allowances

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. Contingency Allowance

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an

allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

- a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

- b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

- c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

- d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

- e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

- f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted

by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 Delays

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 Access to Work

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 Tests and Inspections

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to

be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
2. correct such defective Work; or
3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress

payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent

inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
- d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

- a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
- b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
- c. there are other items entitling Owner to a set-off against the amount recommended; or
- d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 Contractor's Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 Substantial Completion

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, , Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial

Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals

that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

- a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;
- b. consent of the surety, if any, to final payment;
- c. a list of all Claims against Owner that Contractor believes are unsettled; and
- d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations

under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and, will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance

with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be

governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or

2. agrees with the other party to submit the Claim to another dispute resolution process, or

3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 - MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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SECTION 00800
SUPPLEMENTARY CONDITIONS

1. GENERAL -

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (EJCDC C-700, 2002 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions which are defined in the Standard General Conditions of the Construction Contract have the meanings assigned to them in the General Conditions.

SC-2.03.A. -

Delete Paragraph 2.03.A. in its entirety and insert the following in its place:

A. The Contract Times will commence to run on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement.

SC-3.03.A.1 -

Add a new paragraph immediately after paragraph 3.03.A.1 of the General Conditions which is to read as follows:

In resolving such conflicts, errors, and discrepancies, the documents shall be given precedence in the following order: Agreement, Bid Form (including Bid Schedule, Bid Item Descriptions and other attachments, if included), Modifications, Addenda, Supplementary Conditions, Instructions to Bidders, General Conditions, Specifications, and Drawings. Figure dimensions on Drawings shall govern over scale dimensions, and detailed Drawings shall govern over general Drawings. Any Work that may reasonably be inferred from the Specifications or Drawings as being required to produce the intended result shall be supplied whether or not it is specifically called for. Work, materials, or equipment described in words which so applied have a well-known technical or trade meaning shall be deemed to refer to such recognized standards.

SC-4.02.

Add the following paragraph 4.02.C:

C. Test hole log prepared by Sargent Drilling Industrial Engineering is available, dated March 29 to 30 and May 23 of 2006, in the vicinity area of the project locations. The report was used by ENGINEER in preparation of the Contract Documents in Drawings on the physical conditions relating to the test hole log.

SC-4.06.A. - Add the following new sentence immediately following paragraph 4.06.A of the General Conditions which is to read as follows:

No reports or drawings related to Hazardous Environmental Conditions are known to Engineer.

SC-4.06.B. - Delete paragraph 4.06.B of the General Conditions in its entirety and add the following:

B. Not used.

SC-5.03 - Add the following new paragraph immediately following paragraph 5.03.A of the General Conditions.

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B. By requiring such insurance and insurance limits herein, Owner does not represent that coverage will necessarily be adequate to protect Contractor, and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

SC-5.04 -

Add the following new paragraphs immediately following paragraph 5.04.B of the General Conditions:

C. The limits of liability for the insurance required by paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations.

1. Worker's Compensation and related coverages under paragraphs 5.04.A.1 and 5.04.A.2 of the General Conditions:

- (a) State: Statutory
- (b) Applicable Federal (e.g. Longshoreman's): Statutory
- (c) Employer's Liability: \$500,000

In case any class of employees engaged in hazardous work under this Contract is not protected under the Workmen's Compensation Statute, the Contractor shall provide, and shall cause each Subcontractor to provide, adequate Employer's Liability Insurance for the protection of his employees not otherwise protected.

2. Comprehensive General Liability under paragraphs 5.04.A.3 through 5.04.A.6, and Contractual Liability under paragraph 5.04.B.4 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

- (a) Bodily Injury (including completed operations and products liability):
 - \$1,000,000 Each Occurrence
 - \$2,000,000 Annual Aggregate
- (b) Property Damage (including explosion, collapse and underground);
 - \$1,000,000 Each Occurrence
 - \$2,000,000 Annual Aggregate
- (c) Personal Injury, with employment exclusion deleted:
 - \$1,000,000 Annual Aggregate
- (d) Excess or Umbrella Liability
 - 1) General Aggregate \$4,000,000
 - 2) Each Occurrence \$4,000,000

3. Automobile Liability under 5.04.A.6 of the General Conditions:

Bodily Injury:

- \$500,000 Each Person
- \$1,000,000 Each Occurrence

Property Damage:

- \$250,000 Each Occurrence

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or combined single limit of..... \$1,000,000

4. The Contractual Liability coverage required by Paragraph 5.04.B.4. of the General Conditions shall be provided by the Contractor as part of the Contractor's General Liability coverage.
5. Contractor shall provide Owner with Certificate verifying the policy coverages but the certificate should only show coverages that are on the actual policy.

SC-5.04.B.1

Add the following as primary additional insured parties on the general liability policy and all certificates of insurance:

Owner	-	T-M Rural Water District
Engineer	-	Banner Associates, Inc.

The primary additional insured shall also include completed operations.

SC-5.06.A.

Contractor shall provide "all-risk" insurance in accordance with paragraph 5.06.A. of the General Conditions.

SC-6.02.A -

Add a new paragraph immediately after paragraph 6.02.A of the General Conditions which is to read as follows:

The Contractor shall be responsible for providing competent, suitably qualified personnel to perform the Work. If during the performance of the Work, the Owner determines that the Contractor has provided incompetent, unsuitably qualified personnel, the Owner shall notify the Contractor in writing and the Contractor shall replace said personnel immediately with competent, suitably qualified personnel.

SC-6.06

Add the following paragraph immediately following paragraph 6.06.G of the General Conditions:

H. Owner or Engineer may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by a particular Subcontractor or Supplier.

SC-6.17.D.3 -

Add the following sentence immediately after paragraph 6.17.D.3 of the General Conditions which is to read as follows:

Each Shop Drawing or sample submitted shall be accompanied with a Cover Page (refer to Project Form, Form Shop-1). Shop Drawing review process and description is detailed in the General Requirements.

SC-6.17.E.1 -

Add the following sentence immediately after paragraph 6.17.E.1 of the General Conditions which is to read as follows:

Shop Drawing review process and description is detailed in the General Requirements.

SC-12.01.B -

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Add the following language at the end of paragraph 12.01.B of the General Conditions:

The Owner shall have the right to conduct an audit of the Contractor's financial records to substantiate any and all costs claimed by the Contractor.

SC-12.03.A -

Delete the first sentence of paragraph 12.03.A of the General Conditions and insert the following in its place:

The Owner shall determine if an extension of time is warranted and the amount of time allowed for extension due to delays beyond the control of Contractor if a claim is made therefor as provided in paragraph 12.02.A.

SC-14.02.A.1 -

Delete the first sentence of paragraph 14.02.A.1 of the General Conditions as written and substitute the following sentence:

On or before the 15th day of the month, but not more than once a month, Contractor shall submit Application for Payment to the Engineer for the work accomplished during the preceding calendar month for which progress payment is sought.

SC-16.01.A -

Add the following paragraphs at the end of paragraph 16.01.A of the General Conditions:

16.02 Resolution of Claims And Disputes

A. *Decision of Engineer.* Claims, including those alleging an error or omission by the Engineer, shall be referred initially to the Engineer for decision. An initial decision by the Engineer shall be required as a condition precedent to mediation, arbitration or litigation of all Claims between the Contractor and Owner arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Engineer with no decision having been rendered by the Engineer. The Engineer will not decide disputes between the Contractor and persons or entities other than the Owner.

B. The Engineer will approve or reject Claims by written decision, which shall state the reasons therefor and which shall notify the parties of any change in the Contract Price or Contract Times (or Milestones) or both. The approval or rejection of a Claim by the Engineer shall be final and binding on the parties but subject to mediation and arbitration.

C. When a written decision of the Engineer states that (1) the decision is final but subject to mediation and arbitration and (2) a demand for arbitration of a Claim covered by such decision must be made within 30 days after the date on which the party making the demand receives the final written decision, then failure to demand arbitration within said 30-day period shall result in the Engineer's decision becoming final and binding upon the Owner and Contractor. If the Engineer renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence, but shall not supersede arbitration proceedings unless the decision is acceptable to all parties concerned.

END OF SECTION

SECTION 00810 - EXHIBIT 1
(TO SUPPLEMENTARY CONDITIONS)

**A LISTING OF THE DUTIES, RESPONSIBILITIES AND
LIMITATIONS OF AUTHORITY OF THE RESIDENT PROJECT REPRESENTATIVE**

Engineer shall furnish a Resident Project Representative (RPR), assistants and other field staff to assist Engineer in observing performance of the Work of the Contractor.

Through more extensive on-site observations of the Work in progress and field checks of materials and equipment by the RPR and assistants, Engineer shall endeavor to provide further protection for Owner against defects and deficiencies in the work; but, the furnishing of such services will not make Engineer responsible for or give Engineer control over construction means, methods, techniques, sequences or procedures or for safety precautions or programs, or responsibility for Contractor's failure to perform the Work in accordance with the Contract Documents.

The duties and responsibilities of the RPR are limited to those of Engineer in Engineer's agreement with the Owner and in the construction Contract Documents, and are further limited and described as follows:

A. General

RPR is Engineer's agent at the site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions. RPR's dealing in matters pertaining to the on-site work shall in general be with Engineer and Contractor keeping Owner advised as necessary. RPR's dealings with subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner with the knowledge of and under the direction of Engineer.

B. Duties and Responsibilities of RPR

1. Schedules: Review the progress schedule, schedule of Shop Drawing submittals and schedule of values prepared by Contractor and consult with Engineer concerning acceptability.
2. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.
3. Liaison:
 - a. Serve as Engineer's liaison with Contractor, working principally through Contractor's superintendent and assist in understanding the intent of the Contract Documents; and assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-site operations.
 - b. Assist in obtaining from Owner details or information, when required for proper execution of the Work.
4. Shop Drawings and Samples:
 - a. Record date of receipt of Shop Drawings and samples.
 - b. Receive samples which are furnished at the site by Contractor, and notify Engineer of availability of samples for examination.
 - c. Advise Engineer and Contractor of the commencement of any Work requiring a Shop Drawing or sample if the submittal has not been approved by Engineer.

5. Review of Work, Rejection of Defective Work, Inspections, and Tests:
 - a. Conduct on-site observations of the Work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
 - b. Report to Engineer and Owner whenever RPR believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of Work that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
 - c. Verify that tests, equipment and systems startups and operating and maintenance training are conducted in the presence of appropriate personnel, and that Contractor maintains adequate records thereof; and observe, record and report to Engineer appropriate details relative to the test procedures and startups.
 - d. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections and report to Engineer.
6. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.
7. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report with RPR's recommendations to Engineer. Transmit to Contractor decisions as issued by Engineer.
8. Records:
 - a. Maintain at the Engineer's Office orderly files for correspondence, reports of job conferences, Shop Drawings and samples, reproductions of original Contract Documents including all Work Directive Orders, Addenda, Change Orders, Field Orders, additional Drawings issued subsequent to the execution of the Contract, Engineer's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.
 - b. Keep a diary or log book, recording Contractor hours on the job site, weather conditions, data relative to questions of Work Directive Orders, Change Orders or changed conditions, list of job site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.
 - c. Record names, addresses and telephone numbers of all Contractor's, subcontractors and major suppliers of materials and equipment.
9. Reports:
 - a. Furnish Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the progress schedule and schedule of Shop Drawing and sample submittals.
 - b. Consult with Engineer in advance of scheduled major tests, inspections or start of important phases of the Work.

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- c. Recommend to Engineer and draft proposed Field Orders, Work Directive Orders and Change Orders, obtaining backup material from Contractor.
 - d. Report immediately to Engineer and Owner upon the occurrence of any accident.
 - 10. Payment Requests: Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to the Engineer, noting particularly the relationship of the payment requested to the schedule of values, Work completed and materials and equipment delivered at the site but not incorporated in the Work.
 - 11. Certificates, Maintenance and Operation Manuals: During the course of the Work, verify that certificates, maintenance and operation manuals and other data required to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to Engineer for review and forwarding to Owner prior to final payment for the Work.
 - 12. Completion:
 - a. Before Engineer issues a Certificate of Substantial Completion, submit to Contractor a list of observed items requiring completion or correction.
 - b. Conduct a final inspection in the company of Engineer, Owner, and Contractor and prepare a final list of items to be completed or corrected.
 - c. Observe that all items on final list of items have been completed or corrected and make recommendations to Engineer concerning acceptance.
- C. Limitations of Authority for Resident Project Representative:
- 1. Shall not authorize any deviation from the Contract Documents or substitution of materials or equipment, unless authorized by Engineer.
 - 2. Shall not exceed limitations of Engineer's authority as set forth in the Contract Documents.
 - 3. Shall not undertake any of the responsibilities of Contractor, subcontractors or Contractor's superintendent.
 - 4. Shall not advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction unless such advice or directions are specifically required by the Contract Documents.
 - 5. Shall not advise on, issue directions regarding or assume control over safety precautions and programs in connection with the Work.
 - 6. Shall not accept Shop Drawing or sample submittals from anyone other than Contractor.
 - 7. Shall not authorize Owner to occupy the Project in whole or in part.
 - 8. Shall not participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by Engineer.

END OF EXHIBIT 1

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SECTION 010000 - GENERAL REQUIREMENTS

PART 1 - SUMMARY OF WORK

1.1 WORK UNDER THIS CONTRACT

- A. The work to be performed under this Contract consists of the construction of: (Bidder should be aware of the location site before bidding.)

Base Bid

Drilling of (2) 4" test holes; Furnish and install two (2) 12" diameter supply wells; submersible pumps, stainless steel screens; column pipes and fittings; pitless adapters; meter pits, include building above ground, valves and piping; concrete pad; generator pad; development and test pumping; furnish and install instrumentation control panel; and furnish and install electrical, and all site grading required to provide access to the wellsite, as detailed on the Drawings and specified herein.

Bid Alternate No. 1

Remove, furnish and install new submersible pump, PVC column pipes and electrical upgrades.

1.2 CHARACTER OF WORK

- A. It is intended that the Contract Documents include all items requisite and necessary to finish the entire work properly, even though every item necessarily involved may not be particularly mentioned. All work when finished shall be turned over to the Owner in complete and undamaged state. The work shall be executed in the best and most workmanlike manner by qualified and efficient mechanics, in strict accordance with the Contract Documents.
- B. It is intended that the Contractor perform all work in accordance with the applicable and current Federal, State and Local; Acts, Standards, Guidelines and Safety manuals including but not limited to the following:
1. TM Rural Water District Employee Health and Safety Manual.
 2. Occupational Safety and Health Administration (OSHA).
 3. Environmental Protection Agency (EPA).
 4. South Dakota Department of Environment and Natural Resources (SDDENR).
 5. Recommended Standards for Water Works – Great Lakes Upper Mississippi River board of State Public Health and Environmental Manager's; also known as the Ten State Standards.
 6. American Water Works Association (AWWA).
- C. If there is any conflict between the Standards, Guidelines and Safety manuals the more stringent requirement shall govern.

1.3 USE OF SITE

- A. The Contractor shall confine operations to those areas indicated in the Contract Documents and permitted by law, ordinances and permits. He shall not unreasonably encumber the site with any materials or equipment. Allow for Owner occupancy and use by the public. Keep driveways and entrances clear and available to the Owner, Owner's employees, and emergency vehicles at all times.

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1.4 USE OF COMPLETED PORTIONS - OWNER OCCUPANCY

- A. The Owner shall have the right to take possession of and use any completed or partially completed portions of the work. Such taking possession and use shall not be deemed as acceptance of any work not completed in accordance with the Contract Documents. If such prior use increases the cost of or delays to the work, the Contractor shall be entitled to such extra compensation, or extension of time, or both, as the Engineer may determine.

1.5 DRAWINGS

- A. The Drawings, consisting of sheets dated February, 2007, are a part and parcel hereof, and wherever the word Contract appears herein, the same shall be held to include the Drawings.

1.6 SURVEYS

- A. The Contractor shall provide competent engineering personnel to execute the work in accordance with the Contract requirements. He shall verify the figures shown on the survey and approved drawings before undertaking any construction work and shall be responsible for the accuracy of the finished work.
- B. The Engineer shall establish such reference points as will in his judgment enable the Contractor to proceed with the work. If the Contractor finds that any previously established reference points have been destroyed or displaced he shall promptly notify the Engineer.
- C. The Contractor shall protect and preserve the established bench marks and monuments and shall make no changes in locations without approval of the Engineer.

1.7 MECHANICAL AND ELECTRICAL RESPONSIBILITY

- A. The Contractor shall be responsible for making all changes in mechanical and electrical connections to the equipment he selects to be installed if said connections are different than shown on the mechanical and electrical plans.

PART 2 - PROGRESS AND PAYMENT

2.1 SCHEDULE OF PAYMENT

- A. The unit price Bid Form shall serve as the Schedule for Payment when a unit price bid form is used. If a lump sum bid form is used, the Contractor shall submit to the Engineer a schedule itemizing the various portions of the work aggregating the total Contract price. The schedule will constitute the format for the request for payment and shall provide sufficient detail for the Engineer to check and approve the Contractor's request for payment. As a minimum, the schedule shall have breakdowns for each area as delineated on the Plans and/or as detailed in the Specification Divisions and Sections.

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2.2 PROGRESS PAYMENTS

- A. On or about the first day of each month the Contractor shall submit to the Engineer a request for payment for the work performed during the previous month. The request shall indicate the value of the work done including materials delivered for and stored on the site of the work. The Engineer shall check the request and recommend the amount of the payment to be made. Progress payments and retention from the progress payments shall be made according to conditions outlined in the General Conditions which form a part of these Specifications.

PART 3 - SUBMITTALS

3.1 SUBCONTRACTORS AND SUPPLIERS

- A. Within ten days after receipt of the Notice to Proceed, the Contractor shall submit to the Engineer a list, including names and addresses, of the subcontractors he proposes to use on the project and the suppliers of major equipment or material items.

3.2 CONSTRUCTION SCHEDULES

- A. Within ten days after receipt of the Notice to Proceed, the Contractor shall submit to the Engineer a schedule showing the proposed progress of the construction. The schedule shall show the proposed starting and completion dates for the various stages of the construction and shall be prepared such that it can be used to plot actual progress against proposed progress. No progress payments will be made until the construction schedule is received.

3.3 EQUIVALENT PRODUCTS

- A. Whenever in the Drawings or Specifications any material or process is indicated or specified by patent or proprietary name and/or by name of manufacturer, such Specifications shall be deemed to be used for the purpose of facilitating description of the material and/or process desired and shall be deemed to be followed by the words "or equivalent", and the Contractor may offer any material or process which shall be equal in every respect to that so indicated or specified; provided, however, that if the material, process, or article offered by the Contractor is not, in the opinion of the Engineer, equal in every respect, then the Contractor must furnish the material, process or article specified or one that, in the opinion of the Engineer, is equal thereof in every respect.
- B. Prior Approval: The items of materials and/or equipment listed in the appendix attached to this Section must receive approval prior to bidding if it is intended to furnish products other than those specifically named in the Specifications. The requirements for obtaining such approval is specified in the Information for Bidders. Submittals for prior approval shall include shop drawings and/or samples as required by these Specifications. The shop drawings shall be complete, including drawings, diagrams, illustrations, performance charts, brochures or other data necessary to demonstrate compliance of the item with the requirements of the Specifications. Samples shall represent the actual material or item to be furnished and shall include such necessary certification or documentation as to fully demonstrate compliance with the Specifications. Approval for equivalent products for items not listed herein will be given after the time of award of the Contract.

3.4 SHOP DRAWINGS AND SAMPLES

- A. The Contractor shall submit shop drawings and/or samples as required by these Specifications prior to incorporating the items contained into the work. The shop drawings shall be complete, including drawings, diagrams, illustration, performance charts, brochures or other data necessary to demonstrate compliance of the item with the requirements of the Specifications. Samples shall represent the actual material or item to be furnished and shall include such necessary certification or documentation as to fully demonstrate compliance with the Specifications. Approval of the shop drawings and/or samples by the Engineer will constitute approval only for the design concept of the project and will in no way relieve the Contractor of his responsibility for compliance with the requirements of the Specifications. Submittals for shop drawings and samples shall be as specified under the appropriate section for the item. Submittals shall be made for the items specified elsewhere which are listed in the Appendix attached to this Section. Six copies shall be submitted.
- B. Engineer's Review:
1. Engineer's review action stamp, appropriately completed, will appear on all shop drawings of Contractor when returned by Engineer.
 2. Checking is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Any action shown is subject to the requirements of the Drawings and Specifications. Contractor is responsible for: Dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades and the satisfactory performance of his work.
 3. Review status designations listed on Engineer's action stamp are defined as follows:
 - a. "No Exception Taken": Signifies equipment or material represented by the submittal conforms with the design concept and complies with the intent of the Contract Documents and can be incorporated into the Work. Contractor is to proceed with fabrication or procurement of the items and with related Work.
 - b. "Make Corrections Noted": Signifies equipment or materials represented by the submittal conforms with the design concept and complies with the intent of the Contract Documents and can be incorporated into the Work in accordance with Engineer's notations. Contractor is to proceed with the Work in accordance with Engineer's notations and is to submit a revised submittal responsive to notations marked on the returned submittal or written in the letter of transmittal.
 - c. "Revise and Resubmit": Signifies equipment or material represented by the submittal does not conform with the design concept or comply with the intent of the Contract Documents and cannot be incorporated into the Work. Contractor is to submit compliance submittals responsive to the Contract Documents.
 - d. "Submit Specified Item": Signifies submittals of such preliminary nature that a determination of conformance with the design concept or compliance with the intent of the Contract Documents must be deferred until additional information is furnished. Contractor is to submit such additional information to permit layout and related activities to proceed.
 - e. "For Reference Only": Signifies submittals which are for supplementary information only; pamphlets, general information sheets, catalog cuts, standard sheets, bulletins, and similar data, all of which are useful to Engineer and Owner in design, operation, or maintenance, but which by their nature do not constitute a basis for determining that items represented thereby conform with the design concept or comply with the intent of the Contract Documents. Engineer reviews such submittals for general content but not for substance.
 - f. "Distribution Copy": Signifies submittals which have been previously reviewed and are being distributed to Contractor, Owner, Resident Project Representative, and others for coordination and construction purposes.

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PART 4 - TESTING LABORATORY SERVICES

4.1 TESTING

- A. The services of an approved independent testing laboratory shall be secured by the Contractor, at his own expense, to provide the following tests which are specified elsewhere:

310000 Compaction – Moisture/Density Tests
331100 Water Bacteriological Test
332100 Water Samples from new production wells

PART 5 - TEMPORARY FACILITIES AND TRAFFIC CONTROLS

5.1 CONSTRUCTION AREA

- A. The Contractor shall limit his construction operations to the areas indicated. Confine operations to areas within construction limits indicated. This shall include the operation and storage of equipment and the storage of materials for use on the project. The construction areas shall be maintained in a neat and orderly condition at all times.

5.2 SECURITY

- A. The Contractor shall provide security as required at the site. It shall be the Contractor's responsibility to provide such additional security as may be required to protect the construction and any materials and/or equipment stored on the site.

5.3 ACCESS ROADS

- A. Access roads within the project area shall be kept open and maintained in a passable condition at all times.

5.4 BARRICADES AND WARNING SIGNS

- A. The Contractor shall provide, erect, and maintain necessary barricades, suitable and sufficient lights, danger signals, signs and traffic control devices. The Contractor shall take all necessary precautions for the protection of the work and safety of the public. Highways and streets closed to traffic shall be protected by barricades. Obstructions shall be illuminated during hours of darkness. Warning signs shall be provided to control and direct traffic.
- B. The Contractor shall erect warning signs in advance of the project where operations may interfere with the use of the road by traffic.
- C. All traffic control devices and methods shall conform with the Manual on Uniform Traffic Control Devices for Streets and Highways issued by the United States Department of Transportation and adopted by the South Dakota Department of Transportation.

- D. Payment for this item will be made at the Contract lump sum price for "Traffic Control", which price and payment shall be full compensation for costs necessary to complete this item.

PART 6 - MATERIAL AND EQUIPMENT

6.1 STORAGE AND PROTECTION

- A. The Contractor shall, at all times, carefully and properly protect all materials and equipment, both before and after being used on the job, and all work performed by him, and provide any special protection from weather deemed necessary without additional cost to the Owner. The Contractor shall coordinate with the Engineer for designating storage areas and for the requirements for storage and protection. Storage of materials and equipment shall be within the area designated on the Drawings as the Construction Area.

6.2 MATERIALS SOURCES

- A. It shall be the responsibility of the Contractor to locate sources for all materials specified herein and for any other material or item required to produce or complete the materials and/or work specified. The Contractor shall bear all costs in connection with acquisition, transportation, preparation, fabrication and/or installation of the material or item in the final work.

PART 7 - CONSTRUCTION SEQUENCE

7.1 General

- A. During the construction of the TM Well Improvements, the contractor shall schedule operations to maintain the operation of the existing system. Any scheduled interruptions in water service shall be coordinated with and approved by the OWNER prior to interrupting water service. Any water service interruptions shall be kept within a maximum duration of two hours. Service interruptions necessary for the installation of valves and fittings in existing water lines shall be scheduled to occur during minimum demand periods.
- B. The construction sequence for the various aspects of the project must be scheduled and coordinated to minimize service interruptions. The sequence of construction shall generally be as follows:
 - 1. Contractor shall maintain access to the site for the operating staff of TM Rural Water District at all times.
 - 2. All excess material that is not used in construction shall be removed and disposed of by the Contractor.
 - 3. Refer to General Notes pages of the Drawings for additional requirements.

PART 8 - PROJECT CLOSEOUT

8.1 CLEAN-UP

- A. Upon completion of the work, the Contractor shall clean up the construction site and all of the facilities constructed thereon in such a manner that the site and facilities will be acceptable to the Owner for placing the work in service. The clean-up shall include the removal of all debris and matter not intended to be left on the site

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or in or around the site facilities. All areas and facilities shall be thoroughly cleaned and all work specified shall be completed prior to final acceptance of the project.

8.2 ACCEPTANCE OF THE WORK

- A. After the Contractor shall have completed the clean-up and testing of the completed job, a final inspection shall be conducted by the Engineer and the Contractor to ascertain that all items of the work are complete and in conformance with the requirements of the Contract Documents in all respects. In the event any discrepancies are found in the work, these discrepancies shall be rectified prior to acceptance of the work. At such time as all items of the work, including clean-up and testing of the work, are acceptable to the Engineer and the Owner, the Contractor shall be so notified in writing and final payment shall be authorized.

8.3 COMPLETION OF THE WORK

- A. The Contractor shall begin and complete the work within the times stated in the Contract. The capacity of the Contractor's construction plant and the forces employed shall be such as to insure the completion of the work within the specified period of time. The damages that may result from any delay in completion of the work by the time agreed upon will be difficult to ascertain. If the work, or any part of it, is not completed on or before the date fixed for its completion by terms of the Contract, the Contractor shall pay the Owner liquidated damages in the amount as determined by the terms of the Contract.

8.4 GUARANTEE AND COMPLETION OF THE CONTRACT

- A. All work under this Contract will have a normal one year warranty after the date of final acceptance by the Owner.
- B. During the warranty period, the Contractor shall be responsible for all repairs arising out of defective workmanship or materials, or both, which in the judgment of the Owner, shall become necessary during such period. If, within ten days after the mailing of a notice in writing to the Contractor or his agent, the said Contractor shall neglect to make, or undertake with due diligence, to make the aforesaid repairs, the Owner is hereby authorized to make such repairs at the Contractor's expense; providing however, that in case of an emergency where, in the judgment of the Owner, delay would cause serious loss or damage, repairs may be made without notice being sent to the Contractor and the Contractor shall pay the cost thereof. The terms of the Contract shall not be deemed to be completed until such time that the warranty period has ended and any remedial action required by the warranty has been performed by the Contractor. The Contractor's performance and payment bond shall remain in full force until such completion of the Contract.

8.5 PROJECT RECORD DRAWINGS

- A. The Contractor shall keep one set of Plans and Specifications on the job, in good order, which shall be labeled "Record Copy". This set of Plans and Specifications shall be filed separately, kept clean and readable, and protected. Whenever changes and/or deviations from the original Contract Documents are made, the Contractor shall record such changes and deviations on the Record Copy and upon completion of the work shall certify and forward the Record Copy to the Engineer as "As-Constructed Documents".

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8.6 OPERATION AND MAINTENANCE DATA

- A. The Contractor shall submit to the Engineer complete and detailed operation and maintenance data for the required items of equipment incorporated in the work. The data shall provide sufficient information for the Owner to properly and correctly operate and maintain the facilities with a minimum of expense and down time. Operation and maintenance data shall be submitted for the items which are specified elsewhere and which are listed in the Appendix attached to this Section. Six copies shall be submitted.

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APPENDIX A

ITEMS REQUIRING PRIOR APPROVAL

- Section 332100 - Well Screen, Pitless Adapter Unit, Method of Drilling, Well Pumps
- Section 400000 - Process Integration
- Section 409100 - Primary Process Measurement Devices

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APPENDIX B

ITEMS REQUIRING SHOP DRAWING SUBMITTALS

- Section 332100 - Well Screen, Pitless Adapter Unit, Well Pumps, Pressure Gauges, Pressure Switches, Flow Meters, Column Pipe, Gate Valves.
- Section 400000 - Process Integration
- Section 409100 - Primary Process Measurement Devices

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APPENDIX C

ITEMS REQUIRING OPERATION AND MAINTENANCE DATA SUBMITTALS

Section 332100	-	Well Pumps, Pitless Adapter Unit
Section 409100	-	Primary Process Measurement Devices

END OF SECTION 010000

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SECTION 010200 - MOBILIZATION

PART 1 - SUMMARY

1.1 DESCRIPTION

- A. This item shall consist of preparatory work and operations, including, but not limited to the necessary movement of personnel, equipment, and incidentals to the project site; for the establishment of offices, buildings and other facilities necessary for work on the project; and for work and operations which must be performed, and for cost incurred before starting work on the various contract items on the project site.

PART 2 - MEASUREMENT AND PAYMENT

2.1 MOBILIZATION AND DEMOBILIZATION

- A. Payment shall be made at the Contract lump sum price for "Mobilization and Demobilization", as stipulated in the Bid, which price and payment shall be full compensation for all mobilization and/or re-mobilization costs. Partial payments for mobilization shall be made in accordance with SDDOT Standard Specifications for Roads and Bridges, 2004 Edition, Section 9.10 – Mobilization. No separate payment will be made for demobilization.

END OF SECTION 010200

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SECTION 033000 - CONCRETE WORK

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section of the Specifications includes the concrete work and all work incidental thereto, as shown on the Drawings and specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. The following items of related work are specified and included in other sections of these Specifications:

SECTION 310000 Earthwork for Site Grading, Trenching, and Backfilling.

1.3 COMPLIANCE WITH STANDARD AND INDUSTRY SPECIFICATIONS

- A. Any material or operation specified by reference to the published specifications of a manufacturer, The American Society for Testing and Materials (ASTM), The American Concrete Institute (ACI), The Portland Cement Association, The Concrete Reinforcing Steel Institute, the local Building Code, or other published standard, shall comply with the requirements of the current specification or standard listed.

1.4 SHOP DRAWINGS

- A. Submit copies of shop drawings in accordance with "GENERAL REQUIREMENTS" for reinforcing steel which shall indicate bending diagrams; assembly diagrams; splicing and laps of rods; shapes; dimension and details of bar reinforcing and accessories. Drawings shall be prepared in accordance with the "Manual of Standard Practice for Detailing Reinforced Concrete Structures," ACI 315-80. Scaled dimensions from structural drawings shall not be used in determining the lengths of reinforcing rods.

1.5 TESTS

- A. All tests of cement, aggregates and concrete shall be made by an independent testing laboratory, approved by the Engineer, and at the expense of the Contractor. The Contractor shall furnish reports of all concrete tests from the testing laboratory. Two (2) copies of such reports shall be sent as promptly as possible to the Engineer. No concrete shall be placed for payment prior to the Engineer approving the P.C.C. mix design. It shall be the Contractor's responsibility to cause all specimens and tests to be made in accordance with these Specifications under the direct supervision of the Engineer and at no additional cost to the Owner.

1. Field Concrete Tests:

- a. Making and Curing Compression Test Specimens:

- 1) During the progress of the work compression test specimens shall be made and cured in accordance with the "Standard Method of Making and Curing Concrete Test Specimens in the Field" (ASTM C 31). Each test shall consist of at least four (4) specimens. Not less than one test shall be made for each strength of concrete placed on any one day and at least one test for each pour of 100 cubic yards of concrete or fraction thereof placed. The Contractor shall have the testing laboratory make additional sets of tests as directed by the Engineer at no cost to the Owner.

- a) All field cylinders shall be made and cured by an independent testing laboratory, approved by the Engineer, and at the expense of the Contractor.
- b. Test for Compression Strength:
 - 1) Specimens shall be tested in accordance with the "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens" (ASTM C 39). For each test, one specimen shall be tested at the age of 7 days and two specimens shall be tested at the age of 28 days. Tests shall be made by an approved independent Testing Laboratory. Two copies of the test reports shall be submitted to the Engineer.
- c. Tests for Slump:
 - 1) Slump tests shall be made according to "Standard Test Method for Slump of Portland Cement Concrete" (ASTM C 143).
 - a) A minimum of one (1) slump test shall be taken for each daily concrete pour less than 100 cubic yards. If more than 100 cubic yards is placed per day, then one test shall be taken for each 100 cubic yards or fraction thereof placed. The Contractor shall have the testing laboratory make additional sets of tests as directed by the Engineer at no cost to the Owner. The slump test(s) shall be made by an independent testing laboratory, approved by the Engineer, and at the expense of the Contractor. Two (2) copies of the Report shall be submitted to the Engineer.
- d. Tests for Air Content: Air content of concrete shall be tested according to either "Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method" (ASTM C231) or "Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method". (ASTM C 173).
 - 1) A minimum of one (1) air content shall be taken for each daily concrete pour less than 100 cubic yards. If more than 100 cubic yards is placed per day, then one test shall be taken for each 100 cubic yards or fraction thereof placed. The Contractor shall have the testing laboratory make additional sets of tests as directed by the Engineer at no cost to the Owner. The air content test(s) shall be made by an independent testing laboratory, approved by the Engineer, and at the expense of the Contractor. Two (2) copies of the Report shall be submitted to the Engineer.

1.6 STORAGE OF MATERIALS

- A. Cement: All cement shall be stored in suitable, dry weather-proof buildings, on floors raised above the ground, or in weather-tight, moisture- and damp-proof bins. No cement shall be used which has become caked or lumpy.
- B. Aggregates: Concrete aggregates shall be so stored that the inclusion of foreign materials is prevented. They shall be so stored and piled that coning and segregation cannot occur.
- C. Reinforcement Steel shall be stored on platforms or other supports which will prevent contact of the steel with the ground or surface water.

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PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete: The concrete specified in this section and furnished for the work shall meet the requirements of Section 462 of the SDDOT Standard specifications for Roads and Bridges 2004 Edition for class M6 concrete.
- B. Metal Reinforcement: Unless noted on the Drawings, or otherwise specified in these Specifications, reinforcing bars shall be Grade 60, conforming to the requirements of the "Standard Specification for Deformed Billet - Steel Bars for Concrete Reinforcement" (ASTM A 615).
- C. Preformed Expansion Joint Filler: Unless otherwise shown on the Drawings or specified in these Specifications, expansion joint filler shall be asphalt impregnated strips, 1/2-inch in thickness, conforming to "Standard Specification for Preformed Expansion Joint Filler for Concrete" (ASTM D 994). Filler shall extend for the full depth of concrete slabs and finish.
- D. Admixtures: Air-entraining admixtures shall conform to "Standard Specification for Air-Entraining Admixtures for Concrete" (ASTM C 260). Other admixtures, approved for use, shall conform to appropriate ASTM Standards. Admixtures containing chloride ions will not be allowed.
- E. Curing Compounds: Lindseed Oil Base Emulsion Compound, see Section 821 of the Standard Specifications. Unless otherwise specified or approved, Type I curing compound shall be used.
- F. Form Release Agents: Form coating or releasing agent shall be a non-oil base compound completely compatible with the membrane curing compound used and which does not stain concrete.

2.2 CONCRETE QUALITY AND PROPORTION

- A. General: The allowable stresses for the design of the structure are based on the specified compressive strength of the concrete cylinder at 28 days or at the earliest age at which the concrete may be expected to receive its full load. Unless otherwise shown on the Drawings or specified in these Specifications, concrete used shall conform to the requirements of Section 462.3 of the SDDOT Standard Specifications for Roads and Bridges, 2004 Edition for Class M6 concrete.

2.3 MIXING AND PLACING CONCRETE

- A. Preparation of Equipment and Place of Deposit:
 - 1. Before placement, all equipment for mixing and transporting the concrete shall be cleaned, and all debris and ice shall be removed from the places to be occupied by the concrete. Forms shall be thoroughly wetted (except in freezing weather) or coated with a releasing agent and masonry filler units that will be in contact with concrete shall be well drenched (except in freezing weather). The reinforcement shall be thoroughly cleaned of ice, dirt, loose rust and mill scale, or other coatings.
 - 2. Water shall be removed from place of deposit before concrete is placed unless otherwise permitted by the Engineer. All laitance and other unsound material shall be removed from hardened concrete before additional concrete is added.

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B. Mixing:

1. Ready Mixed Concrete:

- a. Ready mixed concrete shall be mixed and delivered in accordance with "Standard Specification for Ready-Mixed Concrete" (ASTM C 94).
- b. The Engineer shall have free access to the mixing plant at all times.
- c. The Subcontractor furnishing ready-mix concrete shall have sufficient plant and transportation facilities to assure continuous delivery of concrete to the project site at the required rate.

C. Conveying:

1. Concrete shall be conveyed from the mixer to the place of final deposit by methods which will prevent the separation or loss of materials.
2. Equipment for chuting, pumping, and pneumatically conveying concrete shall be of such size and design as to insure a practically continuous flow of concrete at the delivery end without separation of materials.

D. Placing:

1. Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. Concrete shall be placed at such a rate that it is at all times plastic and flows readily between bars. No concrete that has partially hardened or been contaminated by foreign material shall be deposited on the work, nor shall retempered concrete be used.
2. When placing is once started, it shall be carried on as a continuous operation until the placement of the panel or section is completed. the top surface shall be generally level. When construction joints are necessary, they shall be made in accordance with Paragraph 3.01F.
3. All concrete shall be thoroughly compacted by suitable means during the operation of placing, and shall be thoroughly worked around reinforcement, embedded fixtures and into the corners of the forms. Vibrators may be used to aid in the placement of concrete provided they are used under experienced supervision and the forms designed to properly withstand this action.
4. Surfaces to be finished shall be brought to proper grade, struck off, and finished in a workmanlike manner. No honeycombing, rough spots, or protruding stones shall be left exposed. Floors shall be smooth with uniform grade and the thickness full depth at all locations as shown on the plans.
5. The Contractor's Superintendent in charge of concrete work shall mark in ink on the Drawings the time and the date of the placing of concrete in the different members. Such Drawings shall be kept on file at the job until the completion of the structure and shall be subject to the inspection of the Engineer at all times.

PART 3 - EXECUTION

3.1 FORMS AND DETAILS OF CONSTRUCTION

A. Design and Removal of Forms:

1. Forms shall conform to the shape, lines and dimensions of the members as called for on the Drawings, and shall be substantial and sufficiently tight to prevent leakage of mortar. They shall be properly braced or tied together so as to maintain position and shape.
2. No construction loads exceeding the structural design loads shall be supported upon any unshored portion of the structure under construction. No construction load shall be supported upon, nor any

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shoring removed from any part of the structure under construction until that portion of the structure has attained sufficient strength to support safely its weight and the loads placed thereon. This strength may be demonstrated by job-cured test specimens and by a structural analysis considering the proposed loads in relation to these test strengths. Such analyses and test data shall be furnished by the Contractor to the Engineer.

3. Forms shall be removed in such a manner as to insure the complete safety of the structure. Where the structure as a whole is supported on shores, the removable floor forms, beams and girder sides, column and similar vertical forms may be removed after 24 hours, providing the concrete is sufficiently strong not to be injured thereby.
- B. Cleaning and Bending Reinforcement: At the time concrete is placed, metal reinforcement shall be free from loose, thick rust, mill scale, or other coatings that will destroy or reduce the bond. All bars shall be bent cold, unless otherwise permitted by the Engineer. No bars partially embedded in concrete shall be field-bent except as shown on plans or as specifically permitted by the Engineer.
- C. Placing Reinforcement: Metal reinforcement shall be accurately placed according to the Drawings and adequately secured in position by concrete, metal, or other approved chairs, spacers, or ties.
- D. Concrete Protection for Reinforcement:
1. The metal reinforcement shall be protected by the thickness of concrete indicated on the Drawings. Where not otherwise shown, the thickness of concrete over the reinforcement shall be as follows:
 - a. Where concrete is deposited against ground without the use of forms, not less than 3 inches.
 - b. Where concrete is exposed to the weather, or exposed to the ground, but placed in forms, not less than 2 inches.
- E. Construction Joints:
1. Joints not indicated on the Drawings shall be so made and located as to least impair the strength of the structure. All construction joints shall be keyed, have water stops where required, and have reinforcing steel extended through the joints except where otherwise required by the Engineer. Directly after concrete placement is completed, reinforcing steel projecting beyond the concrete shall be thoroughly cleaned. Where a joint is to be made, the surface of the concrete shall be thoroughly cleaned and all laitance removed. Before the placing of new concrete, vertical joints shall be thoroughly wetted and slushed with a coat of neat cement grout.
 2. A delay, at least until the concrete in columns and walls is no longer plastic must occur before casting or erecting beams, girders, or slabs supported thereon. Beams, girders, brackets, column capitals and haunches shall be considered as part of the floor system and shall be placed monolithically therewith.
- F. Surface Finish:
1. Exterior Slabs, Curbs and Gutters, Walks and Stairs: Broom finish shall be given to exterior surfaces. The concrete shall be screeded and floated to the required finish level with no coarse aggregate visible. After the surface moisture has disappeared and laitance has been removed, surfaces shall be steel troweled to an even smooth finish. The troweled surfaces shall be broomed with a fiber-bristle brush to create a non-skid finish.

3.2 CURING

- A. Provisions shall be made for maintaining concrete in a moist condition for at least 5 days after the placement of the concrete, except that for high-early strength concretes, moist curing shall be provided for at least the first 3 days.
- B. Curing shall commence as soon as free water has disappeared from the surface after finishing. Curing of formed soffits of beams, girders, floor slabs and similar surfaces shall be accomplished by moist curing with forms in place for the full curing period. Curing may be accomplished by any of the following methods:
 - 1. Moist Curing: Surfaces shall be kept continually wet by covering with burlap, mats or sand, thoroughly saturated with water and covering kept wet by spraying or hosing. Place materials to provide complete coverage and lap all joints a minimum of 3 inches.
 - 2. Impervious - Sheeting Curing: Surfaces shall be thoroughly wetted with a fine spray of water and then covered with waterproof paper, polyethylene sheeting or polyethylene-coated waterproof paper. Edges and ends of sheeting shall be overlapped not less than 4 inches and securely cemented or taped to form a continuous cover.
- C. Membrane Curing: Apply curing compound to freshly placed concrete surfaces as soon as initial set is reached and after surface is free of excess water in accordance with Manufacturer's printed instructions. Do not use membrane curing on surfaces required to receive additional concrete or concrete fill, on cement finish coats that are to receive hardening and dustproofing treatment unless compatible, nor on vertical surfaces after removal of forms.

3.3 WEATHER REQUIREMENTS

- A. Cold Weather Requirements:
 - 1. Adequate equipment shall be provided for heating the concrete materials and protecting the concrete during freezing or near-freezing weather. No frozen materials or materials containing ice shall be used.
 - 2. All concrete materials and all reinforcement, forms, fillers, and ground with which the concrete is to come in contact shall be free from frost. Whenever the temperature of the surrounding air is below 40°F., all concrete placed in the forms shall have a temperature of between 50°F. and 70°F., and adequate means shall be provided for maintaining a temperature of not less than 70°F. for 3 days or 50°F. for five days. When high-early-strength concrete is used, the temperature shall be maintained at not less than 70°F. for two days or 50°F. for three days. In either case, additional time necessary to insure proper curing of the concrete shall be provided as directed by the Engineer. The housing, covering or other protection used in connection with curing shall remain in place and intact at least 24 hours after the artificial heating is discontinued. No dependence shall be placed on salt or other chemicals for the prevention of freezing.
 - 3. Whenever heated enclosures are used, care must be taken to assure that the concrete is kept moist during the curing period. Space heaters that will create carbon dioxide shall be properly vented to the outside.
- B. Hot Weather Requirements:
 - 1. In hot weather, suitable precautions shall be taken to avoid drying of the concrete prior to finishing operations. Use of windbreaks, sunshades, fog sprays, or other devices shall be provided as directed by the Engineer.

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2. Concrete deposited in hot weather shall not have a placing temperature that will cause difficulty from loss of slump, flash set, or cold joints. Concrete temperature shall be less than 90°F. unless higher temperatures are permitted by the Engineer.

PART 4 - MEASUREMENT AND PAYMENT

4.1 CONCRETE PAD AT WELL

- A. The concrete pad to be installed at each well site shall be measured by the number of each pad actually installed. Payment for the concrete pad shall be at the contract Unit Price for "Furnish and Install Concrete Pad at Well" or stipulated in the proposal which price and payment shall include all transportation, materials, form work, labor, tools, supplies and equipment necessary to satisfactorily construct the concrete pad at the location and to the dimensions and elevations indicated on the Drawings.

4.2 CONCRETE PAD FOR GENERATOR

- A. The concrete pad for generator to be installed at each well site shall be measured by the number of each pad actually installed. Payment for the concrete pad shall be at the contract Unit Price for "Furnish and Install Concrete Pad for generator" or stipulated in the proposal which price and payment shall include all transportation, materials, form work, labor, tools, supplies and equipment necessary to satisfactorily construct the concrete pad at the location and to the dimensions and elevations indicated on the Drawings.

4.3 CONCRETE PAD FOR TRANSFORMER

- A. The concrete pad for transformer to be installed at each well site shall be measured by the number of each pad actually installed. Payment for the concrete pad shall be at the contract Unit Price for "Furnish and Install Concrete Pad for transformer" or stipulated in the proposal which price and payment shall include all transportation, materials, form work, labor, tools, supplies and equipment necessary to satisfactorily construct the concrete pad at the location and to the dimensions and elevations indicated on the Drawings.

END OF SECTION 033000

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SECTION 260000 - SUMMARY OF WORK

1.1 GENERAL

1.2 RELATED DOCUMENTS

The following specification sections are included as part of this specification package.

1. Section 260000, Summary of Work
 2. Section 260100, Basic Procedural Methods
 3. Section 260500, Basic Electrical Materials and Methods
 4. Section 260600, Grounding and Bonding
 5. Section 260750, Electrical Identification
 6. Section 261200, Conductors and Cables
 7. Section 261300, Raceways and Boxes.
 8. Section 261400, Wiring devices
 9. Section 262890, TVSS
 10. Section 264200, Enclosed Motor Controllers
 11. Section 264420, Panel boards
 12. Section 264610, Dry Type Transformers (600 V and less)
- A. The Project consists of; providing all necessary electric materials and other items as required for the successful installation of a new water wells as shown on the construction documents.
1. Project Location: Dolton, SD
 2. Owner: TM Rural Water
- B. Contract Documents, were prepared for the Project by PREMIER Engineering, Inc, 225 North Main, PO Box 567, Parker, SD 57053-0567.
- C. Use of the Site: Limit use of premises to areas indicated. Do not disturb portions of the site beyond the areas indicated.
1. Allow for Owner occupancy and use by the public.
 2. Keep driveways and entrances clear. Do not use these areas for parking or material storage. Schedule deliveries to minimize on-site storage of materials and equipment.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SCOPE OF WORK

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1. Provide all electrical material and labor necessary for the installation of three new water wells. This shall include, but not be limited to, the following:
 - a. Furnish and install new electric service, electric gear, conduit systems, wiring, etc. as required.
2. Coordinate electric service work with local electric utility, owner, and other contractors to minimize disruption and downtime. ANY AND ALL CHARGES ASSESSED BY THE ELECTRIC UTILITY TO ACCOMMODATE THE REQUIREMENTS OF THIS PROJECT ARE THE SOLE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. VERIFY ALL CHARGES WITH UTILITY BEFORE SUBMITTING BID.

PART 4 – SPECIAL INFORMATION/REQUIREMENT

4.1 RESOLUTION OF DISCREPANCIES

1. If discrepancies are found to exist between the project drawings and project specifications, the more restrictive and obligatory document shall prevail as the project requirement.
2. If discrepancies are found to exist between the requirements of the; Electrical Specifications (Division 26), the Mechanical Specifications (Division 25), the Architectural Specifications (Division 1 through Division 14 inclusive), and/or the Specification Front End Documents (Bidding Requirements-Agreement, Bonds, and Closeout Documents-Project Forms-Conditions of the Contract), the more restrictive and obligatory document/section(s) shall prevail as the project requirement.

END OF SECTION 260000

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SECTION 260100 – BASIC PROCEDURAL METHODS

This Section of Specification contains several subsections. These subsections are listed below:

- I. REQUEST FOR PRIOR APPROVAL
- II. SHOP DRAWINGS AND PRODUCT DATA
- III. REFERENCE STANDARDS AND DEFINITIONS
- IV. PROJECT RECORD DOCUMENTS
- V. OPERATION AND MAINTENANCE DATA
- VI. WARRANTIES

I. REQUEST FOR PRIOR APPROVAL

PART I - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. The only products and manufacturers allowed to be used under this contract are those that are specified, those listed as approved equals in the contract documents or those given "prior approval" during the bidding stage of this project.
- B. This Section includes administrative and procedural requirements pertaining to requests for prior approval to bid and utilize products that are not specifically specified or listed as an equal in the original construction documents.

1.3 SUBMITTAL PROCEDURES

- A. Manufacturers whose product is not specified or specifically listed on the plans or in the specifications are allowed to submit information on a product that they would like to be considered as an equal to those specified or listed. By submitting this information for consideration, the product representative is indicating that the product being presented for consideration equals or exceeds the specified product in quality, performance and operating parameters. The procedure for this submittal is listed below.
 - 1. Submit literature on product that is to be considered for prior approval. This literature shall include catalog cuts with all pertinent technical specifications, dimensions and pictures for the product.
 - 2. Literature shall be submitted so that engineer receives it no later than 8 days prior to bid date.
 - 3. All approvals will be in the form of an addendum issued to all plan holders.

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4. If product is not listed as approved in an addendum prior to opening of the bid, the contractor shall provide the product(s) specified or listed as equals in the original contract drawings or specifications.

II. SHOP DRAWINGS, AND PRODUCT DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the submittal of shop drawings.

- B. Shop Drawings include, but are not limited to, the following:

1. Fabrication drawings.
2. Installation drawings.
3. Setting diagrams.
4. Shopwork manufacturing instructions.
5. Templates and patterns.
6. Schedules.
7. Wiring Diagrams

- C. Standard generic information prepared without specific reference to the project is not shop drawings.

- D. Product Data include, but are not limited to, the following:

1. Manufacturer's product specifications.
2. Manufacturer's installation instructions.
3. Standard color charts.
4. Catalog cuts.
5. Roughing-in diagrams and templates.
6. Standard wiring diagrams.
7. Printed performance curves.
8. Operational range diagrams.
9. Mill reports.
10. Standard product operating and maintenance manuals.
11. Field samples.

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1.3 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal to the Engineer sufficiently in advance of scheduled performance of related construction activities to avoid delay.
1. Coordinate each submittal with other submittals and related activities that require sequential activity including:
 - a. Testing.
 - b. Purchasing.
 - c. Fabrication.
 - d. Delivery.
 2. Coordinate transmittal of different types of submittals for the same element of the Work and different elements of related parts of the Work to avoid delay in processing because of the Architect's need to review submittals concurrently for coordination.
 - a. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are forthcoming.
 3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
 - a. Allow 2 weeks for the Engineer's initial review of each submittal. Allow additional time if the Engineer must delay processing to permit coordination with subsequent submittals. The Engineer will advise the Contractor when a submittal being processed must be delayed for coordination.
 - b. Where necessary to provide an intermediate submittal, process the intermediate submittal in the same manner as the initial submittal.
 - c. Allow 2 weeks for reprocessing each submittal.
 - d. The Engineer will not authorize an extension of time because of the Contractor's failure to transmit submittals to the Engineer sufficiently in advance of the Work to permit processing.
- B. Submittal Preparation: Place a permanent label or title block on each submittal for identification.
1. Indicate name of the firm or entity that prepared each submittal on the label or title block.
 2. Provide a space approximately 4 by 5 inches (100 by 125 mm) on the label or beside the title block to record the Contractor's review and approval markings and the action taken by the Engineer.
 3. Include the following information on the label for processing and recording action taken.
 - a. Project name.
 - b. Date.
 - c. Name and address of the Engineer.
 - d. Name and address of the Contractor.
 - e. Name and address of the subcontractor.
 - f. Name and address of the supplier.
 - g. Name of the manufacturer.
 - h. Number and title of appropriate Specification Section.
 - i. Drawing number and detail references, as appropriate.
 - j. Similar definitive information as necessary.

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- C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal by use of a transmittal form. The Engineer will return submittals received from sources other than the Electrical Contractor.
 - 1. Record relevant information and requests for data on the transmittal form. On the form, or an attached separate sheet, record deviations from requirements of the Contract Documents, including minor variations and limitations.
 - 2. Include the Contractor's certification stating that information submitted complies with requirements of the Contract Documents.

1.4 SHOP DRAWINGS

- A. Submit newly prepared information, drawn accurately to scale. Do not reproduce Contract Documents or copy standard printed information as the basis of Shop Drawings.
 - 1. Include the following information on Shop Drawings:
 - a. Dimensions.
 - b. Identification of products and materials included.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - 2. Submit Coordination Drawings where required for integration of different construction elements. Show construction sequences and relationships of separate components where necessary to avoid conflicts in utilization of the space available.
 - 3. Do not allow Shop Drawing copies that do not contain an appropriate final stamp or other marking indicating the action taken by the Engineer to be used in construction.
 - 4. Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).
 - 5. Submittal: Submit 10 black-line prints for the Engineer's review.
 - a. The Contractor shall mark up and retain one of the prints returned as a "Record Document."

1.5 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction or system. Mark each copy to show which choices and options are applicable to the Project.
 - 1. Where Product Data includes information on several similar products, some of which are not required for use on the Project, mark copies clearly to indicate which products are applicable.
 - 2. Where Product Data must be specially prepared for required products, materials, or systems because standard printed data are not suitable for use, submit as Shop Drawings not Product Data.
 - 3. Include the following information in Product Data:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with recognized trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.

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4. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

1.6 ENGINEER'S ACTION

- A. Except for submittals for the record or for information, where action and return of submittals is required, the Engineer will review each submittal, mark to indicate the action taken, and return.
 1. Compliance with specified characteristics is the Contractor's responsibility and not considered part of the Engineer's review and indication of action taken.
- B. Action Stamp: The Engineer will stamp each submittal with a uniform, action stamp. The Engineer will mark the stamp appropriately to indicate the action taken, as follows:
 1. Final Unrestricted Release: Where submittals are marked "No Exceptions Noted," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final acceptance will depend on that compliance.
 2. Final-but-Restricted Release: When submittals are marked "See Attached Comments," the Work covered by the submittal may proceed provided it complies with both the Engineer's notations or corrections on the submittal and requirements of the Contract Documents. Final acceptance will depend on that compliance.
 3. Returned for Resubmittal: When submittal is marked "Rejected," do not proceed with the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the Engineer's notations. Resubmit without delay. Repeat if necessary to obtain a different action mark.
 - a. Do not permit submittals marked "Rejected" to be used at the Project Site or elsewhere where construction is in progress.

III. REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic contract definitions are included in the Conditions of the Contract.
- B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.

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- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Engineer, requested by the Engineer, and similar phrases.
- D. "Approved": The term "approved," when used in conjunction with the Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - 1. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- J. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the 16-division format and CSI/CSC's "MasterFormat" numbering system.
- B. Specification Content: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

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2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.
- C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different but apparently equal to the Architect for a decision before proceeding.
 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Engineer for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.
- F. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following abbreviations and acronyms, as referenced in the Contract Documents, mean the associated names. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.

AIA The American Institute of Architects
 1735 New York Ave., NW
 Washington, DC 20006-5292

(202) 626-7300

ANSI American National Standards Institute

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	11 West 42nd St., 13th Floor New York, NY 10036-8002	(212) 642-4900
ETL	ETL Testing Laboratories, Inc. c/o ITS/Warnock Hersey P.O. Box 2040 3933 U.S. Route 11, Industrial Park Cortland, NY 13045	(800) 345-3851 (607) 753-6711
ICEA	Insulated Cable Engineers Association, Inc. P.O. Box 440 South Yarmouth, MA 02664	(508) 394-4424
IEC	International Electrotechnical Commission (Available from ANSI) 11 West 42nd St., 13th Floor New York, NY 10036-8002	(212) 642-4900
IEEE	Institute of Electrical and Electronic Engineers 345 E. 47th St. New York, NY 10017-2394	(212) 705-7900
IESNA	Illuminating Engineering Society of North America 120 Wall St., 17th Floor New York, NY 10005-4001	(212) 248-5000
NECA	National Electrical Contractors Association 3 Bethesda Metro Center, Suite 1100 Bethesda, MD 20814-5372	(301) 657-3110
NEI	National Elevator Industry 185 Bridge Plaza North, Suite 310 Fort Lee, NJ 07024	(201) 944-3211
NEMA	National Electrical Manufacturers Association 2101 L St., NW, Suite 300 Washington, DC 20037	(202) 457-8400
NETA	InterNational Electrical Testing Association P.O. Box 687 Morrison, CO 80465-1526	(303) 697-8441
NFPA	National Fire Protection Association One Batterymarch Park P.O. Box 9101 Quincy, MA 02269-9101	(800) 344-3555 (617) 770-3000
FAA	Federal Aviation Administration (U.S. Department of Transportation) 800 Independence Ave., SW	

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Washington, DC 20591

(202) 366-4000

FCC	Federal Communications Commission 1919 M St., NW Washington, DC 20554	(202) 418-0126
FDA	Food and Drug Administration 5600 Fishers Lane Rockville, MD 20857	(301) 443-1544
GSA	General Services Administration F St. and 18th St., NW Washington, DC 20405	(202) 708-5082
NIST	National Institute of Standards and Technology (U.S. Department of Commerce) Building 101, #A1134 Rte. I-270 and Quince Orchard Rd. Gaithersburg, MD 20899	(301) 975-2000
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor) 200 Constitution Ave., NW Washington, DC 20210	(202) 219-8148

1.5 GOVERNING REGULATIONS AND AUTHORITIES

- A. Copies of Regulations: Obtain copies of the following regulations and retain at the Project site to be available for reference by parties who have a reasonable need:

1.6 SUBMITTALS

- A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

IV. PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

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1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents.
- B. Project Record Documents required include the following:
 - 1. Marked-up copies of Contract Drawings.
 - 2. Marked-up copies of Shop Drawings.
 - 3. Newly prepared drawings.
 - 4. Marked-up copies of Specifications, addenda, and Change Orders.
 - 5. Marked-up Product Data submittals.
 - 6. Field records for variable and concealed conditions.
 - 7. Record information on Work that is recorded only schematically.

1.3 RECORD DRAWINGS

- A. Markup Procedure: During construction, maintain a set of blue- or black-line white prints of Contract Drawings and Shop Drawings for Project Record Document purposes.
 - 1. Mark these Drawings to show the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to, the following:
 - a. Revisions to details shown on the Drawings.
 - b. Locations and depths of underground utilities.
 - c. Revisions to routing of piping and conduits.
 - d. Revisions to electrical circuitry.
 - e. Actual equipment locations.
 - f. Locations of concealed internal utilities.
 - g. Changes made by change order or Construction Change Directive.
 - h. Changes made following the Architect/Engineer's written orders.
 - i. Details not on original Contract Drawings.
 - 2. Mark record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.
 - 3. Mark record sets with red erasable colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 - 4. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 5. Note Construction Change Directive numbers, alternate numbers, change-order numbers, and similar identification.
- B. Responsibility for Markup: The individual or entity who obtained record data, whether the individual or entity is the Installer, subcontractor, or similar entity, shall prepare the markup on record drawings.
 - 1. Accurately record information in an understandable drawing technique.

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2. Record data as soon as possible after obtaining it. Record and check the markup prior to enclosing concealed installations.
3. At time of Substantial Completion, submit record drawings to the Architect for the Owner's records. Organize into sets and bind and label sets for the Owner's continued use.

1.4 RECORD SPECIFICATIONS

- A. During the construction period, maintain 3 copies of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.
1. Mark the Specifications to indicate the actual installation where the installation varies from that indicated in Specifications and modifications issued. Note related project record drawing information, where applicable. Give particular attention to substitutions, selection of product options, and information on concealed installations that would be difficult to identify or measure and record later.
 - a. In each Specification Section where products, materials, or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.
 - b. Record the name of the manufacturer, supplier, installer, and other information necessary to provide a record of selections made and to document coordination with record Product Data submittals and maintenance manuals.
 - c. Note related record Product Data, where applicable. For each principal product specified, indicate whether record Product Data has been submitted in maintenance manual instead of submitted as record Product Data.
 2. Upon completion of markup, submit record Specifications to the Architect for the Owner's records.
 3. Each prime contractor is responsible for marking up Sections that contain its own Work.
 - a. The Contractor for General Construction is responsible for collecting marked-up record Sections from each of the other prime contractors. The Contractor for General Construction is also responsible for collating these Sections in proper numeric order with its own Sections to form a complete set of record Specifications.
 - b. The Contractor for General Construction is responsible for submitting the complete set of record Specifications as specified.

1.5 RECORD PRODUCT DATA

- A. During the construction period, maintain one copy of each Product Data submittal for Project Record Document purposes.
1. Mark Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Product Data submitted. Include significant changes in the product delivered to the site and changes in manufacturer's instructions and recommendations for installation.
 2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 3. Note related Change Orders and markup of record Drawings, where applicable.
 4. Upon completion of markup, submit a complete set of record Product Data to the Architect for the Owner's records.
 5. Where record Product Data is required as part of maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as record Product Data.

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PART 3 - EXECUTION

3.1 RECORDING

- A. Post changes and modifications to the Documents as they occur. Do not wait until the end of the Project.

V. OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for operation and maintenance manuals, including the following:
 - 1. Preparing and submitting operation and maintenance manuals for building operating systems and equipment.
 - 2. Preparing and submitting instruction manuals covering the care, preservation, and maintenance of architectural products and finishes.
 - 3. Instruction of the Owner's operating personnel in the operation and maintenance of building systems and equipment.

1.3 QUALITY ASSURANCE

- A. Maintenance Manual Preparation: In preparation of maintenance manuals, use personnel thoroughly trained and experienced in operation and maintenance of equipment or system involved.
 - 1. Where maintenance manuals require written instructions, use personnel skilled in technical writing where necessary for communication of essential data.
 - 2. Where maintenance manuals require drawings or diagrams, use draftsmen capable of preparing drawings clearly in an understandable format.

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- B. Instructions for the Owner's Personnel: Use experienced instructors thoroughly trained and experienced in operation and maintenance of equipment or system involved to instruct the Owner's operation and maintenance personnel.

1.4 SUBMITTALS

- A. Submittal Schedule: Comply with the following schedule for submitting operation and maintenance manuals:

2. Submit 1 copy of data in final form at least 15 days before final inspection. The Engineer will return this copy after final inspection, with comments.
3. After final inspection, make corrections or modifications to comply with the Engineer's comments. Submit the specified number of copies of each approved manual within 15 days of receipt of the Engineer's comments.

- B. Form of Submittal: Prepare operation and maintenance manuals in the form of an instructional manual for use by the Owner's operating personnel. Organize into suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder.

1. Binders: For each manual, provide heavy-duty, commercial-quality, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to receive 8-1/2-by-11-inch (115-by-280-mm) paper. Provide a clear plastic sleeve on the spine to hold labels describing contents. Provide pockets in the covers to receive folded sheets.
 - a. Where 2 or more binders are necessary to accommodate data, correlate data in each binder into related groupings according to the Project Manual table of contents. Cross-reference other binders where necessary to provide essential information for proper operation or maintenance of the piece of equipment or system.
 - b. Identify each binder on front and spine, with the printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, date, and subject matter covered. Indicate volume number for multiple volume sets of manuals.
2. Dividers: Provide heavy paper dividers with celluloid-covered tabs for each separate Section. Mark each tab to indicate contents. Provide a typed description of the product and major parts of equipment included in the Section on each divider.
3. Protective Plastic Jackets: Provide protective, transparent, plastic jackets designed to enclose diagnostic software for computerized electronic equipment.
4. Text Material: Where maintenance manuals require written material, use the manufacturer's standard printed material. If manufacturer's standard printed material is not available, provide specially prepared data, neatly typewritten, on 8-1/2-by-11-inch (115-by-280-mm), 20-lb/sq. ft. (75-g/sq. m) white bond paper.
5. Drawings: Where maintenance manuals require drawings or diagrams, provide reinforced, punched binder tabs on drawings and bind in with text.
 - a. Where oversize drawings are necessary, fold drawings to the same size as text pages and use as a foldout.
 - b. If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in front or rear pocket of binder. Insert a typewritten page indicating drawing title, description of contents, and drawing location at the appropriate location in the manual.

1.5 MANUAL CONTENT

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- A. In each manual include information specified in the individual Specification Section and the following information for each major component of building equipment and its controls:
1. General system or equipment description.
 2. Design factors and assumptions.
 3. Copies of applicable Shop Drawings and Product Data.
 4. System or equipment identification, including:
 - a. Name of manufacturer.
 - b. Model number.
 - c. Serial number of each component.
 5. Operating instructions.
 6. Emergency instructions.
 7. Wiring diagrams.
 8. Inspection and test procedures.
 9. Maintenance procedures and schedules.
 10. Precautions against improper use and maintenance.
 11. Copies of warranties.
 12. Repair instructions including spare parts listing.
 13. Sources of required maintenance materials and related services.
 14. Manual index.
- B. Organize each manual into separate Sections for each piece of related equipment. As a minimum, each manual shall contain a title page; a table of contents; copies of Product Data, supplemented by Drawings and written text; and copies of each warranty, bond, and service contract issued.
1. Title Page: Provide a title page in a transparent, plastic envelope as the first sheet of each manual. Provide the following information:
 - a. Subject matter covered by the manual.
 - b. Name and address of the Project.
 - c. Date of submittal.
 - d. Name, address, and telephone number of the Contractor.
 - e. Name and address of the Architect.
 - f. Cross-reference to related systems in other operation and maintenance manuals.
 2. Table of Contents: After title page, include a typewritten table of contents for each volume, arranged systematically according to the Project Manual format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume.
 - a. Where a system requires more than one volume to accommodate data, provide a comprehensive table of contents for all volumes in each volume of the set.
 3. General Information: Provide a general information Section immediately following table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the subcontractor or Installer and the maintenance contractor. Clearly delineate the extent of responsibility of each of these entities. Include a local source for replacement parts and equipment.
 4. Product Data: Where the manuals include manufacturer's standard printed data, include only sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where the Project includes more than one item in a tabular

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- format, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation, and delete references to information that is not applicable.
5. Written Text: Prepare written text to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper operation and maintenance of equipment or systems. Prepare written text where it is necessary to provide additional information or to supplement data included in the manual. Organize text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure.
 6. Drawings: Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. Coordinate these drawings with information contained in project record drawings to assure correct illustration of the completed installation.
 7. Warranties, Bonds, and Service Contracts: Provide a copy of each warranty, bond, or service contract in the appropriate manual for the information of the Owner's operating personnel. Provide written data outlining procedures to follow in the event of product failure. List circumstances and conditions that would affect validity of warranty or bond.

1.8 INSTRUCTIONS FOR THE OWNER'S PERSONNEL

- A. Prior to final inspection, instruct the Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Provide instruction at mutually agreed upon times.
 1. For equipment that requires seasonal operation, provide similar instruction during other seasons.
 2. Use operation and maintenance manuals for each piece of equipment or system as the basis of instruction. Review contents in detail to explain all aspects of operation and maintenance.

VI. WARRANTIES

PART I - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties.
 1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.

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- C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3 DEFINITIONS

- A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.4 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.5 SUBMITTALS

- D. Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

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- E. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (115-by-280-mm) paper.
 - 1. Provide copies of each required warranty, as necessary, for inclusion in each required O&M manual.

END OF SECTION 260100

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SECTION 260500 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Raceways.
2. Wire and connectors.
3. Supporting devices for electrical components.
4. Electrical identification.
5. Utility company electricity-metering components.
6. Concrete equipment bases.
7. Cutting and patching for electrical construction.

1.2 SUBMITTALS

- A. Product Data: For utility company electricity-metering components.
- B. Shop Drawings: Dimensioned plans and sections or elevation layouts and single-line diagram of electricity-metering component assemblies specific to this Project.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Devices for Utility Company Electricity Metering: Comply with utility company published standards.
- C. Comply with NFPA 70.

1.4 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings for electrical supports, raceways, and cable with general construction work.
- B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment that requires positioning before closing in the building.
- C. Coordinate electrical service connections to components furnished by utility companies.

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1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for service entrances and electricity-metering components.
 2. Contractor shall include any and all costs assessed by the electric utility in his/her bid.
- D. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.

PART 2 - PRODUCTS

2.1 RACEWAYS

- A. IMC: Intermediate metal conduit; ANSI C80.6, zinc-coated steel, with threaded fittings.
- B. LFMC: Liquidtight flexible metal conduit; zinc-coated steel with sunlight-resistant and mineral-oil-resistant plastic jacket.
- C. RMC: Rigid metal conduit; galvanized rigid steel; ANSI C80.1.
- D. RNC: Rigid nonmetallic conduit; NEMA TC 2, Schedule 40 PVC, with NEMA TC3 fittings.
- E. Raceway Fittings: Specifically designed for raceway type with which used.

2.2 WIRES, CABLES, AND CONNECTIONS

- A. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.
- B. Conductors, Larger Than No. 10 AWG: Stranded copper.
- C. Insulation: Thermoplastic, rated 600 V, 75 deg C minimum, Type THW, THHN-THWN, or USE depending on application..
- D. Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

2.3 SUPPORTING DEVICES

- A. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.
- B. Slotted-Steel Channel: Flange edges turned toward web, and 9/16-inch- (14-mm-) diameter slotted holes at a maximum of 2 inches (50 mm) o.c., in webs. Strength rating to suit structural loading.
- C. Slotted Channel Fittings and Accessories: Recommended by the manufacturer for use with the type and size of channel with which used.

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1. Materials: Same as channels and angles, except metal items may be stainless steel.
- D. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.
- E. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.
- F. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable-iron casting with hot-dip galvanized finish.
- G. Expansion Anchors: Carbon-steel wedge or sleeve type.
- H. Toggle Bolts: All-steel springhead type.
- I. Powder-Driven Threaded Studs: Heat-treated steel.

2.4 ELECTRICAL IDENTIFICATION

- A. Identification Device Colors: Use those prescribed by ANSI A13.1, NFPA 70, and these Specifications.
- B. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape, not less than 1 inch wide by 3 mils thick (25 mm wide by 0.08 mm thick).
- C. Tape Markers for Conductors: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- D. Color-Coding Cable Ties: Type 6/6 nylon, self-locking type. Colors to suit coding scheme.
- E. Underground Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape compounded for permanent direct-burial service, and with the following features:
 1. Not less than 6 inches wide by 4 mils thick (150 mm wide by 0.102 mm thick).
 2. Embedded continuous metallic strip or core.
 3. Printed legend that indicates type of underground line.
- F. Engraved-Plastic Labels, Signs, and Instruction Plates: Engraving stock, melamine plastic laminate punched or drilled for mechanical fasteners 1/16-inch (1.6-mm) minimum thickness for signs up to 20 sq. in. (129 sq. cm) and 1/8-inch (3.2-mm) minimum thickness for larger sizes. Engraved legend in black letters on white background.
- G. Warning and Caution Signs: Preprinted; comply with 29 CFR 1910.145, Chapter XVII. Colors, legend, and size appropriate to each application.
 1. Interior Units: Aluminum, baked-enamel-finish, punched or drilled for mechanical fasteners.

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2. Exterior Units: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate with 0.0396-inch (1-mm), galvanized-steel backing. 1/4-inch (6-mm) grommets in corners for mounting.

- H. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

2.5 EQUIPMENT FOR UTILITY COMPANY'S ELECTRICITY METERING

- A. Comply with requirements of electrical power utility company for meter sockets.

2.6 CONCRETE BASES

- A. Concrete: 3000-psi (20.7-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

- A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom.
- B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.
- D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 RACEWAY APPLICATION

- A. Installations:
 1. Exposed: IMC or RMC.
 2. Underground: RNC.
 3. Connection to Vibrating Equipment: LFMC.
 4. Boxes and Enclosures: NEMA Type 12, 3R or Type 4, or as indicated.

3.3 RACEWAY AND CABLE INSTALLATION

- A. Keep legs of raceway bends in the same plane and keep straight legs of offsets parallel.
- B. Use RMC elbows where RNC turns out of slab/ground.

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- C. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or woven polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wires.
- D. Connect motors and equipment subject to vibration, noise transmission, or movement with a maximum of 72-inches (1830-mm) flexible conduit. Install LFMC in wet or damp locations. Install separate ground conductor across flexible connections.

3.4 WIRING METHODS FOR POWER, LIGHTING, AND CONTROL CIRCUITS

- A. Application: Use wiring methods specified below to the extent permitted by applicable codes as interpreted by authorities having jurisdiction.
- B. Feeders and branch circuits: Insulated single conductors in raceway.
- C. Remote-Control Signaling and Power-Limited Circuits, Classes 1, 2, and 3: Insulated conductors in raceway unless otherwise indicated.

3.5 WIRING INSTALLATION

- A. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

3.6 ELECTRICAL SUPPORTING DEVICE APPLICATION

- A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, slotted channel system components.
- B. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four with, 200-lb (90-kg) minimum design load for each support element.

3.7 SUPPORT INSTALLATION

- A. Support individual horizontal single raceways with separate, *metal straps*.
- B. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves during erection of concrete.
- C. Seal around sleeves with /sealant material on both sides of opening. Mortar may be used.
- D. Secure electrical items and their supports to structure, using the following methods unless other fastening methods are indicated:
 - 1. Wood: Wood screws or screw-type nails.
 - 2. New Concrete: Concrete inserts with machine screws and bolts.

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3. Structural Steel: Welded threaded studs, Spring-tension clamps, or threaded studs driven by powder charge and provided with lock washers.
 - a. Comply with AWS D1.1 for field welding.
4. Fasteners for Damp, Wet, or Weather-Exposed Locations: Stainless steel.
5. Light Steel: Sheet-metal screws.
6. Fasteners: Select so load applied to each fastener does not exceed 25 percent of its proof-test load.

3.8 IDENTIFICATION MATERIALS AND DEVICES

- A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.
- C. Self-Adhesive Identification Products: Clean surfaces before applying.
- D. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.
- E. Install continuous underground plastic markers during trench backfilling, for exterior underground power, control, signal, and communication lines located directly above power and communication lines. Locate 6 to 8 inches (150 to 200 mm) below finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches (400 mm), overall, use a single line marker.
- F. Install warning, caution, and instruction signs where required to comply with 29 CFR 1910.145, Chapter XVII, and where needed to ensure safe operation and maintenance of electrical systems and of items to which they connect. Indoors install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
- G. Install engraved-laminated emergency-operating signs with white letters on red background with minimum 3/8-inch- (9-mm-) high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.
- H. For Panelboards, provide framed, typed circuit schedules with explicit description and identification of items controlled by each breaker.

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3.9 ELECTRICITY-METERING EQUIPMENT

- A. Install utility company metering equipment according to utility company's written requirements. Provide grounding and empty conduits as required by utility company.

3.10 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger, in both directions, than supported unit. Follow supported equipment manufacturer's anchorage recommendations and setting templates for anchor-bolt and tie locations, unless otherwise indicated.

3.11 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair, refinish and touch up disturbed finish materials and other surfaces to match adjacent undisturbed surfaces.

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SECTION 260600 -- GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes grounding of electrical systems and equipment. Requirements specified in this Section may be supplemented by requirements of other Sections.

1.2 SUBMITTALS

- A. Product Data: For ground rods.
- B. Field quality-control test reports.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled under UL 467 as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Apache Grounding/Erico Inc.
 - 2. Boggs, Inc.
 - 3. Chance/Hubbell.
 - 4. Copperweld Corp.
 - 5. Dossert Corp.
 - 6. Erico Inc.; Electrical Products Group.
 - 7. Framatome Connectors/Burndy Electrical.
 - 8. Galvan Industries, Inc.
 - 9. Hastings Fiber Glass Products, Inc.
 - 10. Ideal Industries, Inc.
 - 11. ILSCO.
 - 12. Kearney/Cooper Power Systems.
 - 13. Korns, C. C. Co.; Division of Robroy Industries.
 - 14. Lyncole XIT Grounding.
 - 15. O-Z/Gedney Co.; a business of the EGS Electrical Group.

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16. Raco, Inc.; Division of Hubbell.
17. Salisbury, W. H. & Co.
18. Superior Grounding Systems, Inc.
19. Thomas & Betts, Electrical.

2.2 GROUNDING CONDUCTORS

- A. For insulated conductors, comply with Division 26 Section "Conductors and Cables."
- B. Conductor Material: Copper only.
- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Grounding Electrode Conductors: Stranded cable.
- E. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.
- F. Bare, Solid-Copper Conductors: ASTM B 3.
- G. Assembly of Bare, Stranded-Copper Conductors: ASTM B 8.
- H. Bare, Tinned-Copper Conductors: ASTM B 33.
- I. Copper Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
- J. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulated spacer.
- K. Connectors: Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items. Exothermic-welded type, in kit form, selected per manufacturer's written instructions.

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel.
 1. Size: [3/4 by 120 inches (19 by 3000 mm)] in diameter.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- B. In all raceways, use insulated equipment grounding conductors.

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- C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections.
- D. Equipment Grounding Conductors: Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
 - 1. Install insulated equipment grounding conductors in feeders and branch circuits.
 - 2. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.
- E. Ground Rods: Install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.
 - 1. Drive ground rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.
 - 2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except as otherwise indicated. Make connections without exposing steel or damaging copper coating.
- F. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- G. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers or supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
- H. Connections: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
 - 6. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
 - 7. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

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8. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
9. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486.
10. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.2 FIELD QUALITY CONTROL

- A. Testing: Perform the following field quality-control testing:
 1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
 2. Test completed grounding system at each location where a maximum ground-resistance level is indicated and at service disconnect enclosure grounding terminal. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests, by the fall-of-potential method according to IEEE 81.

END OF SECTION 260600

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SECTION 260750 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes electrical identification materials and devices required to comply with ANSI C2, NFPA 70, OSHA standards, and authorities having jurisdiction.

1.3 QUALITY ASSURANCE

- A. Comply with ANSI C2.
- B. Comply with NFPA 70.
- C. Comply with ANSI A13.1 and NFPA 70 for color-coding.

PART 2 - PRODUCTS

2.1 RACEWAY AND CABLE LABELS

- A. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide (0.08 mm thick by 25 to 51 mm wide).
- B. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape.
 - 1. Not less than 6 inches wide by 4 mils thick (152 mm wide by 0.102 mm thick).
 - 2. Compounded for permanent direct-burial service.
 - 3. Embedded continuous metallic strip or core.
 - 4. Printed legend indicating type of underground line.
- C. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

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2.2 NAMEPLATES AND SIGNS

- A. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.
- B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. in. (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.
 - 1. Engraved legend with black letters on white face.
 - 2. Punched or drilled for mechanical fasteners.
- C. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for the application. 1/4-inch (6.4-mm) grommets in corners for mounting.
- D. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for the application. 1/4-inch (6.4-mm) grommets in corners for mounting.
- E. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers, or strong adhesive specifically made for the application.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.
- C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before applying.
- E. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Where width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches (400 mm) overall, use a single line marker. [Limit use of line markers to direct-buried cables] [Install line marker for underground wiring, both direct-buried cables and cables in raceway].

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F. Color-Coding of Secondary Phase Conductors: Use the following colors for service, feeder, and branch-circuit phase conductors:

1. 240/120-V Conductors:
 - a. Phase A: Black.
 - b. Phase B: Red.
2. 480/277-V Conductors:
 - a. Phase A: Yellow.
 - b. Phase B: Brown.
 - c. Phase C: Orange.
3. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:
 - a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 1-inch- (25-mm-) wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.
 - b. Colored cable ties applied in groups of three ties of specified color to each wire at each terminal or splice point starting 3 inches (76 mm) from the terminal and spaced 3 inches (76 mm) apart. Apply with a special tool or pliers, tighten to a snug fit, and cut off excess length.

G. Apply identification to conductors as follows:

1. Conductors to Be Extended in the Future: Indicate source and circuit numbers.
2. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor with source, voltage, circuit number, and phase. Use color-coding to identify circuits' voltage and phase.
3. Multiple Control and Communication Circuits in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding, or cable marking tape.

H. Apply warning, caution, and instruction signs as follows:

1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
2. Emergency Operation: Install engraved laminated signs with white legend on red background with minimum 3/8-inch- (9-mm-) high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

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- I. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high lettering on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:
1. Panelboards, electrical cabinets, and enclosures.
 2. Access doors and panels for concealed electrical items.
 3. Emergency system boxes and enclosures.
 4. Disconnect switches.
 5. Enclosed circuit breakers.
 6. Motor starters.
 7. Power transfer equipment.
 8. Control devices.
 9. Transformers.
- J. Panelboard Identification: For panelboards, provide framed, typed circuit schedules with explicit description and identification of items controlled by each individual breaker.

END OF SECTION 260750

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SECTION 261200 - CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.2 REQUIREMENTS

- A. All wiring associated with this project shall be installed in raceway. No open cabling will be allowed, except as specifically noted and appliance cords.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 CONDUCTORS AND CABLES

- A. Manufacturers:
 - 1. American Insulated Wire Corp.; a Leviton Company.
 - 2. General Cable Corporation.
 - 3. Senator Wire & Cable Company.
 - 4. Southwire Company.
- B. Refer to Part 3 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.

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- C. Conductor Material: Copper only, unless aluminum is specifically noted on the project documents. Conductors shall be, solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.
- D. Conductor Insulation Types: Type THW, THHN-THWN, XHHW complying with NEMA WC.

2.3 CONNECTORS AND SPLICES

- A. Manufacturers:
 - 1. AFC Cable Systems, Inc.
 - 2. AMP Incorporated/Tyco International.
 - 3. Hubbell/Anderson.
 - 4. O-Z/Gedney; EGS Electrical Group LLC.
 - 5. 3M Company; Electrical Products Division.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR AND INSULATION APPLICATIONS

- A. Service Entrance conductors, feeders, and branch circuits: Type THHN-THWN, single conductors in raceway.

3.2 INSTALLATION

- A. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- B. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- C. Identify and color-code conductors and cables according to Division 26 Section "Basic Electrical Materials and Methods" & "Electrical Identification".
- D. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
- E. Wiring at Outlets: Install conductor at each outlet, with at least [6 inches (150 mm)] of slack.

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SECTION 261200 – CONDUCTORS AND CABLES
3.3 FIELD QUALITY CONTROL

- A. Testing: Provide meggar testing on all service conductors, switchgear feeders, and 3- phase motor circuits. Tests shall measure resistance from conductor to raceway, conductor to ground, and conductor to conductor.
- B. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION 261200

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SECTION 261300 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. See Division 26 Section "Basic Electrical Materials and Methods" for supports, anchors, and identification products.
- C. See Division 26 Section "Wiring Devices" for devices installed in boxes and for floor-box service fittings.

1.2 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets indicated.
- B. Shop Drawings: Show fabrication and installation details of components for raceways, fittings, boxes, enclosures, and cabinets.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 METAL CONDUIT AND TUBING

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A. Manufacturers:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Anamet Electrical, Inc.; Anaconda Metal Hose.
4. Electri-Flex Co.
5. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
6. LTV Steel Tubular Products Company.
7. Manhattan/CDT/Cole-Flex.
8. O-Z Gedney; Unit of General Signal.
9. Wheatland Tube Co.

B. Rigid Steel Conduit: ANSI C80.1.

C. IMC: ANSI C80.6.

D. LFMC: Flexible steel conduit with PVC jacket.

E. Fittings: NEMA FB 1; compatible with conduit and tubing materials.

2.3 NONMETALLIC CONDUIT AND TUBING

A. Manufacturers:

1. American International.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corp.
4. Cantex Inc.
5. Certainteed Corp.; Pipe & Plastics Group.
6. Condux International.
7. ElecSYS, Inc.
8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.
11. RACO; Division of Hubbell, Inc.
12. Spiraldut, Inc./AFC Cable Systems, Inc.
13. Thomas & Betts Corporation.

B. RNC: NEMA TC 2, Schedule 40 PVC.

C. RNC Fittings: NEMA TC 3; match to conduit or tubing type and material.

2.4 METAL WIREWAYS

A. Manufacturers:

1. Hoffman.

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SECTION 261300 - RACEWAYS AND BOXES

2. Square D.

- B. Material and Construction: Sheet metal sized and shaped as indicated, NEMA 12/3R.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.
- E. Wireway Covers: Flanged-and-gasketed type.
- F. Finish: Manufacturer's standard enamel finish.

2.5 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers:

- 1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
 - 2. Emerson/General Signal; Appleton Electric Company.
 - 3. Erickson Electrical Equipment Co.
 - 4. Hoffman.
 - 5. Hubbell, Inc.; Killark Electric Manufacturing Co.
 - 6. O-Z/Gedney; Unit of General Signal.
 - 7. RACO; Division of Hubbell, Inc.
 - 8. Robroy Industries, Inc.; Enclosure Division.
 - 9. Scott Fetzer Co.; Adalet-PLM Division.
 - 10. Spring City Electrical Manufacturing Co.
 - 11. Thomas & Betts Corporation.
 - 12. Walker Systems, Inc.; Wiremold Company (The).
 - 13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
- B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover.
 - C. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
 - D. Small Sheet Metal Pull and Junction Boxes: NEMA 12.
 - E. Hinged-Cover Enclosures: NEMA 250, Type 12, with continuous hinge cover and flush latch.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

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2.6 FACTORY FINISHES

- A. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard prime-coat finish ready for field painting.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Application:
 - 1. Exposed: Rigid steel or IMC.
 - 2. Underground: RNC.
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 4. Boxes and Enclosures: NEMA 250, Type 12, 3R, and 4X.
- B. Minimum Raceway Size: Home runs = **3/4-inch trade size (DN 21)**, all others = **1/2-inch trade size (DN 16)**.
- C. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

- A. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- B. Complete raceway installation before starting conductor installation.
- C. Support raceways as specified in Division 16 Section "Basic Electrical Materials and Methods."
- D. Install temporary closures to prevent foreign matter from entering raceways.
- E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above finished slab.
- F. Make bends and offsets so ID is not reduced. Keep legs of bends in same plane and keep straight legs of offsets parallel, unless otherwise indicated.
- G. Raceways Embedded in Slabs: Install in middle 1/3 of slab thickness where practical and leave at least 2 inches (50 mm) of concrete cover.
 - 1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.

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2. Space raceways laterally to prevent voids in concrete.
 3. Run conduit larger than 1-inch trade size (DN 27) parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 4. Change from non-metallic conduit to rigid steel conduit, or IMC before rising above slab.
- H. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
1. Run parallel or banked raceways together on common supports.
 2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- I. Join raceways with fittings designed and approved for that purpose and make joints tight.
1. Use insulating bushings in all conduits to protect conductors.
- J. Tighten set screws of threadless fittings with suitable tools.
- K. Terminations:
1. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.
- L. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.
- M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Where otherwise required by NFPA 70.
- N. Stub-up Connections: Extend conduits through concrete floor slab connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; LFMC may be used 6 inches (150 mm) above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.
- O. Flexible Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in damp or wet locations. Install separate ground conductor across flexible connections.

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- P. Surface Raceways: Install a separate, green, ground conductor in all raceways containing AC/DC power conductors.
- Q. Set floor boxes level. Trim after installation to fit flush with finished floor surface.
- R. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

3.3 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF SECTION 261300

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SECTION 261400 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Single and duplex receptacles, ground-fault circuit interrupters, and integral surge suppression units.
2. Single- and double-pole snap switches and dimmer switches.
3. Device wall plates.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.
- C. Receptacles shall have Federal Specification grade rating.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Wiring Devices:
 - a. Bryant Electric, Inc./Hubbell Subsidiary.
 - b. Eagle Electric Manufacturing Co., Inc.
 - c. Hubbell Incorporated; Wiring Device-Kellems.
 - d. Leviton Mfg. Company Inc.
 - e. Pass & Seymour/Legrand; Wiring Devices Div.

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SECTION 261400 – WIRING DEVICES

2.2 RECEPTACLES

- A. Straight-Blade-Type Receptacles: Comply with NEMA WD 1, NEMA WD 6, DSCC W-C-596G, and UL 498.
- B. Straight-Blade and Locking Receptacles: Federal Specification-Duty grade.
- C. GFCI Receptacles: Straight blade, feed-through type, Federal Specification grade, with integral NEMA WD 6, Configuration 5-20R duplex receptacle; complying with UL 498 and UL 943. Design units for installation in a 2-3/4-inch- (70-mm-) deep outlet box without an adapter.

2.3 SWITCHES

- A. Single- and Double-Pole Switches: Comply with DSCC W-C-896F and UL 20.
- B. Snap Switches: Federal Commercial Specification grade, quiet type.

2.4 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
 - 1. Material for Wet Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."

2.5 FINISHES

- A. Color:
 - 1. Wiring Devices Connected to Normal Power System: Gray , unless otherwise indicated or required by NFPA 70.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install devices and assemblies level, plumb, and square.
- B. Remove wall plates and protect devices and assemblies during painting.

3.2 CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding."
- B. Connect wiring according to Division 26 Section "Conductors and Cables."

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- C. Utilize pigtails to connect devices to circuit. Circuit shall not rely on device to maintain circuit continuity.

3.3 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements.
 - 2. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.
- B. Remove malfunctioning units, replace with new units, and retest as specified above.

END OF SECTION 261400

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SECTION 262890 - TVSS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes transient voltage surge suppressors for low-voltage power, control, and communication equipment.
- B. Related Sections include the following:
 - 1. Division 26 Section "Panelboards" for factory-installed transient voltage surge suppressors.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.
- B. Product Certificates: Signed by manufacturers of transient voltage suppression devices, certifying that products furnished comply with the following testing and labeling requirements:
 - 1. UL 1283 certification.
 - 2. UL 1449 listing and classification.
- C. Field Test Reports: Written reports of tests specified in Part 3 of this Section. Include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Failed test results and corrective action taken to achieve requirements.
- D. Maintenance Data: For transient voltage suppression devices to include in maintenance manuals specified in Division 1.
- E. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain suppression devices and accessories through one source from a single manufacturer.

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- B. Product Options: Drawings indicate size, dimensional requirements, and electrical performance of suppressors and are based on the specific system indicated. Other manufacturers' products complying with requirements may be considered. Refer to Division 1 Section "Substitutions."
 - C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - D. IEEE Compliance: Comply with IEEE C62.41, "IEEE Guide for Surge Voltages in Low Voltage AC Power Circuits," and test devices according to IEEE C62.45, "IEEE Guide for Surge Suppressor Testing."
 - E. NEMA Compliance: Comply with NEMA LS 1, "Low Voltage Surge Protective Devices."
 - F. UL Compliance: Comply with UL 1283, "Electromagnetic Interference Filters," and UL 1449, "Transient Voltage Surge Suppressors."
- 1.5 PROJECT CONDITIONS
- A. Placing into Service: Do not energize or connect panelboards to their sources until the surge protective devices are installed and connected.
 - B. Service Conditions: Rate surge protective devices for continuous operation under the following conditions, unless otherwise indicated: **Note special environmental conditions.**
 - 1. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage.
 - 2. Operating Temperature: -30 to 120 deg F.
 - 3. Humidity: 0 to 100 percent, noncondensing.
 - 4. Altitude: Less than 10,000 feet (6000 m) above sea level.
- 1.6 COORDINATION
- A. Coordinate location of field-mounted surge suppressors to allow adequate clearances for maintenance.
- 1.7 WARRANTY
- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Manufacturers of a Broad Line of Suppressors:
 - a. Advanced Protection Technologies, Inc.
 - b. Current Technology, Inc.
 - c. Cutler-Hammer, Inc.
 - d. General Electric
 - e. Siemens Energy & Automation.
 - f. Square D Co.

2.2 PANELBOARD SUPPRESSORS

- A. Surge Protective Device Description:
1. Fuses, rated at 200-kA interrupting capacity.
 2. Fabrication using bolted compression lugs for internal wiring.
 3. Integral disconnect switch.
 4. Redundant suppression circuits.
 5. Arrangement with wire connections to phase buses, neutral bus, and ground bus.
 6. Red and green LED indicator lights for power and protection status.
 7. Audible alarm, with silencing switch, to indicate when protection has failed.
 8. One set of dry contacts rated at 5 A, 250-V, ac, for remote monitoring of protection status. Coordinate with building power monitoring and control system.
 9. Surge-event operations counter.
- B. Peak Single-Impulse Surge Current Rating: 80 kA per phase.
- C. Protection modes and UL 1449 clamping voltage for 240/120 V, single-phase, 3-wire circuits, shall be as follows:
1. Line to Neutral: 400 V.
 2. Line to Ground: 400 V.
 3. Neutral to Ground: 400 V.

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PART 3 - EXECUTION

3.1 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.2 FIELD QUALITY CONTROL

- A. Testing: Perform the following field quality-control testing:
 - 1. After installing surge protective devices, but before electrical circuitry has been energized, test for compliance with requirements.
 - 2. Complete startup checks according to manufacturer's written instructions.
 - 3. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.19. Certify compliance with test parameters.
- B. Repair or replace malfunctioning units. Retest after repairs or replacements are made.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections. Report results in writing.
 - 1. Verify that electrical wiring installation complies with manufacturer's installation requirements.

3.3 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain surge protective devices.
 - 1. Train Owner's maintenance personnel on procedures and schedules for maintaining suppressors.
 - 2. Schedule training with Owner, through Architect, with at least seven days' advance notice.

END OF SECTION 262890

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SECTION 264200 - ENCLOSED MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes ac general-purpose controllers rated 600 V and less that are supplied as enclosed units.

1.2 SUBMITTALS

- A. Product Data: For each type of enclosed controller indicated.
- B. Shop Drawings: Power, signal, and control wiring.
- C. Field quality-control test reports.
- D. Operation and maintenance data. In addition to requirements specified in Division 1 Section "Closeout Procedures," include the following:
 - 1. Load-Current and Overload-Relay Heater List: Compile after motors have been installed and arrange to demonstrate that selection of heaters suits actual motor nameplate full-load currents.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain enclosed controllers of a single type through one source from a single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.
- D. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed controllers, including clearances between enclosed controllers, and for adjacent surfaces and other items. Comply with indicated maximum dimensions.

1.4 COORDINATION

- A. Coordinate features of enclosed controllers and accessory devices with pilot devices and control circuits to which they connect.

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- B. Coordinate features, accessories, and functions of each enclosed controller with ratings and characteristics of supply circuit, motor, required control sequence, and duty cycle of motor and load.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Corp.; Cutler-Hammer Products.
 - 2. General Electrical Distribution & Control.
 - 3. Rockwell Automation Allen-Bradley Co.; Industrial Control Group.
 - 4. Siemens/Furnas Controls.
 - 5. Square D Co.

2.2 MANUAL ENCLOSED CONTROLLERS

- A. Description: NEMA ICS 2, general purpose, Class A, with toggle action and overload element.

2.3 MAGNETIC ENCLOSED CONTROLLERS

- A. Description: NEMA ICS 2, Class A, combination, full voltage, non-reversing, across the line, unless otherwise indicated. NEMA Size 1 minimum size.
- B. Control Circuit: 120 V; obtained from integral control power transformer with a control power transformer] of sufficient capacity to operate connected pilot, indicating and control devices, plus 100 percent spare capacity.
- C. Combination Controller: Factory-assembled combination controller and disconnect switch.
 - 1. Circuit-Breaker Disconnecting Means: NEMA AB 1, motor-circuit protector with field-adjustable, short-circuit trip coordinated with motor locked-rotor amperes.
- D. Adjustable Overload Relay: Dip switch selectable for motor running overload protection with NEMA ICS 2, Class 10 tripping characteristic, and selected to protect motor against voltage and current unbalance and single phasing. Provide relay with Class II ground-fault protection, with start and run delays to prevent nuisance trip on starting.

2.4 ENCLOSURES

Description: Mount inside of control panel as indicated in that portion of the specifications.

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SECTION 264200 - ENCLOSED MOTOR CONTROLLERS
2.5 ACCESSORIES

- A. Devices shall be factory installed in controller enclosure, unless otherwise indicated.
- B. Control Relays: Auxiliary and adjustable time-delay relays.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Select features of each enclosed controller to coordinate with ratings and characteristics of supply circuit and motor; required control sequence; duty cycle of motor, drive, and load; and configuration of pilot device and control circuit affecting controller functions.
- B. Select horsepower rating of controllers to suit motor controlled. Minimum size controller shall be NEMA Size 1.

3.2 IDENTIFICATION

- A. Identify enclosed controller components and control wiring according to Division 26 Section "Basic Electrical Materials and Methods and Section Electrical Identification."

3.3 CONTROL WIRING INSTALLATION

- A. Install wiring between enclosed controllers according to Division 16 Section "Conductors and Cables."
- B. Bundle, train, and support wiring in enclosures.
- C. Connect hand-off-automatic switch and other automatic-control devices where applicable.
 - 1. Connect selector switches to bypass only manual- and automatic-control devices that have no safety functions when switch is in hand position.
 - 2. Connect selector switches with enclosed controller circuit in both hand and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

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SECTION 264200 – ENCLOSED MOTOR CONTROLLERS
3.4 FIELD QUALITY CONTROL

- A. Testing: After installing motor controllers and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
 - 1. Procedures: Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Sections 7.5, 7.6, and 7.16. Certify compliance with test parameters.
 - 2. Remove and replace malfunctioning units with new units, and retest.
- B. Report test results in writing.

END OF SECTION 264200

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SECTION 264420 -- PANEL BOARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes distribution and branch-circuit panelboards.

1.2 SUBMITTALS

- A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard, including the following:
1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following data:
 - a. Enclosure types and details for types other than NEMA 250, Type 1.
 - b. Bus configuration, and current, and voltage ratings.
 - c. Short-circuit current rating of panelboards and overcurrent protective devices.
 - d. Listing for series rating of installed devices.
 - e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices.
 2. Wiring Diagrams: Power, signal, and control wiring.
- C. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.
- D. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NEMA PB 1.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

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SECTION 264420 - PANEL BOARDS
2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton Corp.; Cutler-Hammer Products.
 2. General Electric Co.; Electrical Distribution & Control Div.
 3. Siemens Energy & Automation, Inc.
 4. Square D Co.

2.2 FABRICATION AND FEATURES

- A. Enclosures: Surface-mounted cabinets. NEMA PB 1, Type 12/3R, suitable for environmental conditions at installed location.
- B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions.
- C. Finish: Manufacturer's enamel finish over corrosion-resistant treatment or primer coat. Paint shall be rated to withstand continuous exposure to the elements.
- D. Directory Card: With transparent protective cover, mounted in metal frame, inside panelboard door.
- E. Bussing: Hard-drawn copper, 98 percent conductivity.
- F. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.
- G. Panelboard Short-Circuit Rating:
1. Fully rated to interrupt symmetrical short-circuit current available at terminals.
- H. Panels with Main Service Disconnect: Listed for use as service equipment.
- I. Spaces for Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.
- J. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard.

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- B. Doors: Front mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

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- C. Panels shall be equivalent to a General Electric AQ series.

2.4 OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 2. GFCI Circuit Breakers: Single- and two-pole configurations with 5-mA trip sensitivity.
 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install panelboards and accessories according to NEMA PB 1.1.
1. Install flush unless otherwise indicated.
- B. Mounting Heights: Top of trim 74 inches (1880 mm) above finished floor, unless otherwise indicated.
- C. Mounting: Plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.
- D. Install filler plates in unused protective device spaces.
- E. Wiring in Panelboard Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.

3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 16 Section "Basic Electrical Materials and Methods".
- B. Panelboard Nameplates: Label each panelboard laminated-plastic nameplate mounted with corrosion-resistant screws. This name plate shall contain the following information: Panel name, voltage rating, amp rating, # of phases, # of wires (ex. 3 phase, 4 wire), and source that panel is fed from (ex.. "Fed from MDP1").
- C. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create

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directory; handwritten directories are not acceptable. Do NOT use plan numbers for directory. Get proper room names and numbers from owner before creating directory.

3.3 FIELD QUALITY CONTROL

- A. Testing and Inspection: After installing panelboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
1. Procedures: Perform each electrical test and visual and mechanical inspection indicated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers.
 2. Test insulation resistance of panelboard bus with a megohmmeter, and ground continuity of cabinet and ground bus. Reject buses with insulation resistance less than 2 megohms.
 3. Correct defective and malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

END OF SECTION 264420

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SECTION 264420 - PANEL BOARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes distribution and branch-circuit panelboards.

1.2 SUBMITTALS

- A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard, including the following:
 - 1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following data:
 - a. Enclosure types and details for types other than NEMA 250, Type 1.
 - b. Bus configuration, and current, and voltage ratings.
 - c. Short-circuit current rating of panelboards and overcurrent protective devices.
 - d. Listing for series rating of installed devices.
 - e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices.
 - 2. Wiring Diagrams: Power, signal, and control wiring.
- C. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.
- D. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NEMA PB 1.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

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2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Corp.; Cutler-Hammer Products.
 - 2. General Electric Co.; Electrical Distribution & Control Div.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D Co.

2.2 FABRICATION AND FEATURES

- A. Enclosures: Surface-mounted cabinets. NEMA PB 1, Type 12/3R, suitable for environmental conditions at installed location.
- B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions.
- C. Finish: Manufacturer's enamel finish over corrosion-resistant treatment or primer coat. Paint shall be rated to withstand continuous exposure to the elements.
- D. Directory Card: With transparent protective cover, mounted in metal frame, inside panelboard door.
- E. Bussing: Hard-drawn copper, 98 percent conductivity.
- F. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.
- G. Panelboard Short-Circuit Rating:
 - 1. Fully rated to interrupt symmetrical short-circuit current available at terminals.
- H. Panels with Main Service Disconnect: Listed for use as service equipment.
- I. Spaces for Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.
- J. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard.

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- B. Doors: Front mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

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- C. Panels shall be equivalent to a General Electric AQ series.

2.4 OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 2. GFCI Circuit Breakers: Single- and two-pole configurations with 5-mA trip sensitivity.
 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install panelboards and accessories according to NEMA PB 1.1.
1. Install flush unless otherwise indicated.
- B. Mounting Heights: Top of trim 74 inches (1880 mm) above finished floor, unless otherwise indicated.
- C. Mounting: Plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.
- D. Install filler plates in unused protective device spaces.
- E. Wiring in Panelboard Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.

3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 16 Section "Basic Electrical Materials and Methods".
- B. Panelboard Nameplates: Label each panelboard laminated-plastic nameplate mounted with corrosion-resistant screws. This name plate shall contain the following information: Panel name, voltage rating, amp rating, # of phases, # of wires (ex. 3 phase, 4 wire), and source that panel is fed from (ex.. "Fed from MDP1").
- C. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create

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directory; handwritten directories are not acceptable. Do NOT use plan numbers for directory. Get proper room names and numbers from owner before creating directory.

3.3 FIELD QUALITY CONTROL

- A. Testing and Inspection: After installing panelboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
1. Procedures: Perform each electrical test and visual and mechanical inspection indicated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers.
 2. Test insulation resistance of panelboard bus with a megohmmeter, and ground continuity of cabinet and ground bus. Reject buses with insulation resistance less than 2 megohms.
 3. Correct defective and malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

END OF SECTION 264420

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SECTION 264610 - DRY TYPE TRANSFORMERS (600 V AND LESS)

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA:
 - 1. Distribution transformers.
 - 2. Control and signal transformers.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Wiring and connection diagrams.
- C. Output Settings Reports: Record of tap adjustments specified in Part 3.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with IEEE C 57.12.91.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cutler-Hammer.

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2. GE Electrical Distribution & Control.
3. Siemens Energy & Automation, Inc.
4. Sola/Hevi-Duty Electric.
5. Square D/Groupe Schneider NA.

2.2 MATERIALS

- A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.
- B. Cores: Grain-oriented, non-aging silicon steel.
- C. Coils: Continuous windings without splices, except for taps.
 1. Internal Coil Connections: Brazed or pressure type.
 2. Coil Material: Copper.

2.3 DISTRIBUTION TRANSFORMERS

- A. Comply with NEMA ST 20, and list and label as complying with UL 1561.
- B. Cores: One leg per phase.
- C. Enclosure: Totally enclosed, nonventilated, NEMA 250, type suitable for outdoor use.
 1. Core and coil shall be encapsulated within resin compound, sealing out moisture and air.
 2. Finish: Comply with NEMA 250 for "Outdoor Corrosion Protection."
 3. Finish Color: Gray.
- D. Insulation Class: 220 deg C, UL-component-recognized insulation system with a maximum of 150 deg C rise above 40 deg C ambient temperature.
- E. Taps for Transformers Smaller Than 3 kVA: None
- F. Taps for Transformers 7.5 to 24 kVA: One 5 percent tap above and one 5 percent tap below normal full capacity.
- G. Wall Brackets: Manufacturer's standard brackets.

2.4 CONTROL AND SIGNAL TRANSFORMERS

- A. Description: Self-cooled, two-winding dry type, rated for continuous duty, complying with NEMA ST 1, and listed and labeled as complying with UL 506.
- B. Ratings: Continuous duty. If rating is not indicated, provide at least 50 percent spare capacity above connected peak load.

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SECTION 264610 - DRY TYPE TRANSFORMERS (600 V AND LESS)
2.5 SOURCE QUALITY CONTROL

- A. Test and inspect transformers according to IEEE C57.12.91.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.

3.2 CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding."
- B. Connect wiring according to Division 26 Section "Conductors and Cables."

3.3 ADJUSTING

- A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 5 percent. Submit recording and tap settings as test results.
- B. Output Settings Report: Prepare a written report recording output voltages and tap settings.

END OF SECTION 264610

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SECTION 310000 – EARTHWORK FOR SITE GRADING, TRENCHING, AND BACKFILLING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section of the Specifications includes all earthwork for site grading, roadways, structures, trenching for water lines and utilities and all work incidental thereto, as shown on the Drawings and as specified herein.

1.2 JOB CONDITIONS

- A. The Contractor shall operate his equipment only in those areas designated on the Drawings, or by the Engineer as construction areas. Indiscriminate operation of equipment outside of designated construction areas will not be permitted.

1.3 TESTING AND INSPECTION SERVICE

- A. It shall be the responsibility of the Contractor to employ a qualified independent geotechnical engineering testing agency to classify proposed on-site and borrow soils to verify that soils comply with specified requirements and to perform required field and laboratory testing.

1.4 GUARANTEE

- A. During a period of one year from and after the date of final acceptance by the Owner of the work embraced by this Contract, the Contractor shall make all needed repairs or replace as necessary any damage caused by settlement, at no additional cost to the Owner.

1.5 DEWATERING PERMIT

- A. Prior to dewatering, the Contractor shall obtain a "Notice of Intent" permit for temporary dewatering. Upon completion, the Contractor shall furnish a "Notice of Termination" for temporary dewatering. The permits and termination notices are provided in the project forms or can be obtained from the Department of Environment and Natural Resources, Surface Water Quality Program at (605) 773-3351 Pierre, South Dakota. The Contractor shall be responsible for obtaining the permit and any costs relating thereto.

1.6 CONTROL OF EROSION AND SEDIMENT

- A. Control of erosion and sediment shall be in conformance with SDDENR guide for Best Management Practices for sediment and erosion control on wastewater management treatment sites in South Dakota. The Contractor shall be responsible for furnishing, constructing and maintaining erosion and sediment control, and for any costs relating thereto.

PART 2 - MATERIALS

2.1 IMPORTED GRANULAR EMBEDMENT

- A. Crushed rock or pea gravel in the general size range from ¼" to 1-1 ½" as defined in ASTM D2321.

2.2 SELECT BACKFILL

- A. Material from excavation or imported material consisting of earth free from large stones, frozen material, vegetation, cinders, ashes and other organic material. Select material shall be sufficiently pulverized to permit proper compaction.

2.3 BACKFILL MATERIALS

- A. The material obtained from the project excavations may be used as backfill unless otherwise shown on the Drawings or specified in these Specifications, provided that all organic material, rubbish, debris, rocks greater than six (6) inches in any dimension, and other objectionable materials are first removed. Broken portland cement concrete and bituminous type pavements obtained from the project excavations will not be permitted in the backfill.

2.4 FILL CONCRETE

- A. Minimum 28 day compressive strength shall be 2500 psi.

2.5 SELECT ENGINEERED FILL

- A. Sub base or base material. The physical characteristics and the materials shall conform to the S.D. Department of Transportation requirements granular backfill as follows:

- 1. This material shall be free from dirt, vegetable matter, or other foreign substance. The material shall meet the following gradation requirements by dry weight:

Percent Passing a 1 ½ inch (37.5 mm) sieve.....	100
Percent Passing a 1 inch (25.0 mm) sieve.....	95-100
Percent Passing ½ inch (12.5 mm) sieve.....	25-80
Percent Passing a No. 4 (4.74 mm) sieve.....	0-20
Percent Passing a No. 8 (2.36 mm) sieve.....	0-5

- 2. Abrasion loss shall not exceed 40 percent.

2.6 TOPSOIL

- A. Friable clay loam surface soil free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.

2.7 GRAVEL SURFACING

- A. Gravel surfacing material for drives, and at locations shown on the Drawings shall conform to the requirements of the South Dakota Department of Transportation, Division of Highways, Standard Specification for Gravel surfacing, and Aggregate Base Course unless otherwise shown on the Drawing or approved by the Engineer.

PART 3 - EXECUTION

3.1 SITE PREPARATION

- A. The Engineer will establish construction lines and designate all trees, shrubs, plants and other items to remain. All surface objects and all trees, stumps, roots and other obstructions not designated to remain shall be cleared and properly disposed of.
- B. All temporary openings in fences and necessary repairs to replace the existing fence in its original location and condition shall be performed by the Contractor.
- C. The Contractor shall be responsible for the proper removal, care and resetting of all culverts, drainage pipe and other minor structures authorized by the Engineer for temporary relocation from the alignment of the work.
- D. Removal of surface improvements where not indicated to be removed on the plans such as street paving, curbs, gutters and sidewalks shall be held to a minimum. When it is necessary to excavated through existing asphalt or concrete paving, sidewalks, or curb and gutter; before excavating, the cut shall be first made with a concrete saw for the full depth of the existing surface. All material removed and the method employed to replace the surface improvement to its original grade, depth and alignment shall be first authorized and approved by the Engineer. All material removed shall be disposed of by the Contractor as directed by the Engineer at a site provided by the Contractor.

3.2 TOPSOIL

- A. Topsoil in excavation areas shall be stripped from the site and stored in stockpiles. Topsoil (no less than 6") including vegetation in site grading areas to receive embankment shall be stripped and stockpiled.

3.3 REMOVAL OF WATER

- A. Permits:
 - 1. The Contractor shall obtain all State and Federal permits for dewatering. The Contractor shall be responsible for obtaining the permits and any costs relating there to.
- B. Drainage: The Contractor shall at all times during the construction of the work provide and maintain ample equipment to remove and dispose of all water entering the excavation or other parts of the work. The excavation shall be kept dry until all work therein has been completed and backfilling commenced. All grading in the vicinity of the excavation shall be performed in such a manner as to provide positive surface drainage away from the site and to prevent surface water from flowing into the excavation.
 - 1. No reinforcing steel shall be placed in water, and no water shall be allowed to rise over any reinforcing steel before the concrete has been placed. No water will be allowed to come in contact with any concrete

within twenty-four (24) hours after placement unless shown on the Drawings or authorized by the Engineer.

C. Dewatering:

1. Trench Dewatering: During trenching operations for installation of utilities, when groundwater is encountered in sufficient quantities to require continuous pumping with well points or other special handling in order to maintain a satisfactory dry trench condition, it shall be considered wet trench. In such case, the Contractor shall submit to the Engineer for approval, his proposed method of disposing of the water prior to initiating the dewatering procedure. The Contractor shall be responsible for any damage occurring from disposal of water. Trenches for utilities shall be dewatered to an elevation of at least one (1) foot below the pipe invert elevation.
2. Structure Excavation Dewatering: During excavation for structures other than utility trenches, the Contractor shall provide suitable equipment including, if necessary, pumping with well points or other special handling to keep the excavation dry as required by paragraph 3.3 A. The Contractor shall be responsible for any damage occurring from disposal of water. Excavation for structures shall be dewatered to an elevation of at least two (2) feet below the bottom of the excavation

3.4 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES

- A. This section of the specification includes excavation, trenching, and backfilling for underground utility lines and miscellaneous utility structures such as valve vaults and thrust blocks.

1. Excavation and Trenching:

- a. General: The Contractor shall perform all excavation of every description and of whatever substances encountered, to the depths indicated on the Drawings or as otherwise specified. Excavated materials shall be piled a sufficient distance from the banks of the excavation to avoid overloading and to prevent slides or cave-ins.
- b. All excavated materials not required for fill or backfill shall be removed and disposed of as indicated or as directed by the Engineer. Topsoil shall be removed and stockpiled in an area designated to be seeded.
- c. All excavation shall be made by open cut method unless otherwise shown on the Plans. The banks of trenches shall be kept as nearly vertical as practicable to a point 6" above the pipe diameter, above that point, the trench shall be either cut back or properly sheathed and braced for trench cave-in protection.
- d. Trenches shall be not less than 12 inches wider nor more than 16 inches wider than the outside diameter of the pipe laid therein, and shall be excavated true to line, so that clear space of not less than 6 inches nor more than 8 inches in width is provided on each side of the pipe. The maximum width of trench specified applies to the width at and below the level of the top of the pipe. The width of trench above that level may be as wide as necessary for sheathing and bracing, and the proper installation of the work.
- e. The bottom of trenches shall be accurately graded to provide uniform bearing and support for each section of pipe on stable soil at every point along its entire length, except for portions of the pipe sections where it is necessary to excavate for bell holes. Bell holes shall be dug after the trench bottom has been graded. Bell holes shall be excavated only to an extent sufficient to permit accurate work in the making of the joints and to insure that the pipe, for a maximum of its length, will rest upon the prepared bottom of the trench. The bottoms of all trenches shall be rounded so that at least one-fourth of the circumference of the pipe shall rest firmly on undisturbed or compacted soil.

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- f. Under no circumstances will it be permissible to leave a pipeline excavation unprotected or unguarded when work is not actually in progress on the pipeline. If it becomes necessary for the Contractor to leave the pipeline excavation for any reason, it shall be the Contractor's responsibility to leave one of his employees at the site to watch the site so unauthorized personnel do not enter the excavation.
- g. Unless otherwise required, the pipeline excavation shall be completely backfilled at the end of each days operation, and reopened when work resumes on this portion of the line. The Contractor shall be responsible to mark the end of the pipe in such a manner that it may be easily found when the ditch is reopened.
- h. Excavation for structures and accessories shall be of sufficient size so as to leave at least twelve (12) inches of clear space between the outer surface of the structure and the embankment or sheathing and bracing which may be used to hold and protect them. Unless otherwise shown on the Drawings or authorized by the Engineer, the bottom of the excavation shall not be undercut below the grades established.
- i. Where soft, spongy, unstable or other similar material is encountered upon which the bedding material, structure or pipe is to be placed, this unsuitable material shall be removed to a depth ordered by the Engineer and replaced with subgrade stabilization pipe foundation material as directed by the Engineer. Foundation material required to replace unauthorized excavated materials shall be furnished and installed by the Contractor at his own expense. No additional payment will be made for undercutting.

2. Protection of Excavation:

- a. The Contractor shall provide suitable sheeting, shoring and bracing to protect all excavations to provide safe working conditions, and in strict conformance with safety regulations. Damage or injury resulting from settlement, slides, cave-ins, water pressure or other causes shall be the responsibility of the Contractor and damage shall be repaired at his own expense.
- b. The Contractor shall provide adequate signs, barricades, flashing lights and watchmen and take all necessary precautions for the protection of the work and the safety of the public. All barricades and obstructions shall be protected at night by flashing signal lights which shall be kept burning from sunset to sunrise. Barricades shall be of substantial construction and shall be painted white or whitewashed to increase their visibility at night. Suitable signs shall be so placed as to show in advance where construction, barricades or detours exist.
- c. The Contractor shall at all times so conduct his work as to insure the least possible obstruction to traffic and inconvenience to the general public and shall at all times maintain access to existing public and private property.

3. Protection of Existing Utilities:

- a. Existing utilities shall be protected from damage during the excavation and backfilling operations, and if damaged, shall be repaired by the Contractor, at his expense. It shall be the Contractor's responsibility to arrange with each utility company known to maintain utilities in the area of work to have all underground facilities located and staked by the utility company prior to excavation.
- b. It is understood and agreed that the Contractor has considered in the bid the permanent and temporary utility appurtenances in their present or relocated positions as shown on the plans. Additional compensation will not be allowed for delays, inconvenience or damage sustained due to interference from the utility appurtenances or the operation of moving them.

4. Grading and Stockpiling:

- a. During excavation, unless otherwise shown on the Drawings or specified herein, material suitable for bedding and backfill shall be placed in stockpiles in approved locations, so selected as not to

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- interfere with the work being performed under this contract or in the normal operation of other unrelated functions.
 - b. Stockpiles shall be placed a sufficient distance back from the edges of the excavation to avoid overloading and to prevent slides or cave-ins.
 - c. Stockpiles shall be kept in a neat, well-drained workable condition at all times.
 - 5. Disposal of Excess Material: Material in excess of that required for the permanent work and/or any material unsuitable for backfill shall be disposed of by the Contractor as directed by the Engineer. All costs of disposal shall be the contractors responsibility.
 - 6. It shall be the responsibility of the Contractor to provide all materials, including earth cover and topsoil.
- B. Granular Embedment Material:
- 1. General:
 - a. Bedding shall be defined as that material supporting, surrounding and extending to one (1) foot above the top of the pipe or conduit. Where it becomes necessary to undercut the bottom of the utility trench to remove rock or other interfering objects at subgrade for bedding, any void below such subgrade shall be filled with compacted bedding material as shown on the Drawings or approved by the Engineer.
 - b. Where it is necessary to remove soft, spongy, unstable or other similar material which is incapable of properly supporting the structure or pipe, any void below the bottom of the structure or pipe shall be filled with compacted granular embedment material or fill concrete as directed by the Engineer.
 - c. Where it is necessary for any reason to undercut below the bottom of concrete poured in place structures, the void below the bottom of the structure shall be filled with concrete at the same time and of the same quality as that of the structure itself, unless otherwise shown on the Drawing or approved by the Engineer. If the necessity for such additional bedding material has been caused by an act or failure to act on the part of the Contractor, the Contractor shall bear the expense of the additional excavation and bedding.
 - d. Bedding material shall be first placed so that the pipe is uniformly supported for the full length of the barrel with full bearing on the bottom segment of the pipe equal to a minimum of one-fourth the circumference of the pipe. The remainder of the bedding shall then be placed around and over the pipe in uniform layers approximately four (4) inches in depth. Each layer shall be properly hand compacted.
 - 2. Bedding Material:
 - a. Bedding material shall be selected material from the excavation stockpile, granular embedment material or concrete as shown on the Drawings or directed by the Engineer.
 - b. Selected bedding material shall be, where possible, free-draining granular material. When approved by the Engineer, excavated earth free from large stones, hard dry lumps, frozen lumps, debris or organic matter may be used. Select material shall be sufficiently pulverized to permit proper compaction.
 - c. If native materials are not suitable for use as bedding material, embedment material must be hauled in from an alternate site.
- C. Backfilling:
- 1. General:

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- a. Backfill shall be considered as starting one (1) foot above the top of the pipe or conduit. All material below this point shall be considered as bedding.
- b. Backfill, or fill, as the case may be, for precast or cast-in-place valve vaults shall start at the subgrade for the structure.
- c. Except where the pipe must remain exposed for leakage and exfiltration tests and subject to the provisions herein, the Contractor shall proceed as soon as possible with backfilling operations. Care shall be exercised so that the structure or pipe will not be damaged or displaced. If the pipe is supported by concrete cradle placed between the trench wall and the pipe, backfill above the concrete bedding shall not be placed nor sheeting pulled for at least 24 hours after placement of the concrete.
- d. Unless otherwise specified or authorized by the Engineer, backfill against or over the top of any cast-in-place structure shall not be placed prior to seven (7) days after completion of concrete placement.
- e. Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, the voids remaining shall be backfilled with suitable material and compacted as approved by the Engineer.
- f. Voids left by the removal of sheeting, piles and similar sheeting supports shall be immediately backfilled with clean sand which shall be jetted into place to assure dense and complete filling of the voids.
- g. Backfill shall be placed and mechanically compacted in accordance with the applicable requirements of paragraph 3.4D, herein.
- h. Any backfill improperly placed or where settlement occurs, shall be removed to the depth required for proper compaction, then replaced and compacted as required to finished grade.

2. Top Soil:

- a. The Contractor shall remove available top soil from surface embankments and excavation backfills of trenches and around structures on the site of the work at the locations requiring top soil. This top soil shall be stock-piled separately and placed on the embankments and backfill after all construction across, over or above such embankments and backfill has been completed. The minimum total depth of top soil shall be 6 inches or of greater depth as may be specified or indicated on the plans.

D. Compaction of Backfill:

1. General:

- a. Backfill shall be mechanically compacted by means of tamping rollers, sheepfoot rollers, pneumatic tire rollers, vibrating rollers, or other mechanical tampers. All such equipment shall be of a size and type approved by the Engineer.
- b. Permission to use specific compaction equipment shall not be construed as guaranteeing or implying that the use of such equipment will not result in damage to adjacent ground, existing improvements, or improvements installed under the contract. The Contractor shall make his own determination in this regard.
- c. Material for mechanically compacted backfill shall be placed in lifts which, prior to compaction, shall not exceed the thickness specified below for the various types of equipment:
 - 1) Impact, free-fall, or "stomping" equipment - maximum lift thickness of three (3) feet.
 - 2) Vibratory equipment, including vibratory plates, vibratory smooth-wheel rollers, and vibratory pneumatic-tired roller - maximum lift thickness of two (2) feet.
 - 3) Rolling equipment including sheepfoot (both vibratory and non-vibratory), grid, smooth-wheel (non-vibratory), pneumatic-tired (non-vibratory), and segmented wheels - maximum lift thickness of one (1) foot.

- 4) Hand-directed mechanical tampers - maximum lift thickness of four (4) inches.
 - d. A minimum of three (3) feet of backfill material shall be placed over the top of a pipe before operating vibratory, sheepsfoot, impact, free-fall or "stomping" type compaction equipment.
 - e. Mechanically compacted backfill shall be placed in horizontal layers of thickness (not exceeding those specified above) compatible to the material being placed and the type of equipment being used. Each layer shall be evenly spread, moistened (or dried, if necessary), and then tamped or rolled until the specified relative compaction has been attained.
 - f. Compaction adjacent to all manholes, catch basins, valve boxes, curb boxes, and similar structures shall be performed by the use of hand-directed mechanical tampers with lifts not exceeding that specified above.
2. Backfill in Unimproved Areas:
 - a. Backfill in areas not containing surface improvements shall be compacted as specified in paragraph 3.4 D1, to a density at least equal to that of the surrounding soil.
 3. Backfill in Areas Containing Surface Improvements or Future Surface Improvements:
 - a. Backfill in areas containing surface improvements or designated for future surfacing shall be compacted as specified in paragraph 3.4 D1, except that backfill material shall be placed in lifts not to exceed six (6) inches in loose depth. Each layer shall be uniformly compacted to a minimum of 95% of maximum dry density, as defined by ASTM D698, before successive lifts are placed. The backfill material shall be compacted at a moisture content of no less than four (4) percentage points below the optimum moisture content.
 4. Moisture Control
 - a. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice. Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density. Stockpile or spread and dry removed wet unsatisfactory soil material.
 5. Compaction
 - a. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers. Place backfill and fill evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.
 - b. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to ASTM D698 (Standard Proctor):
 - 1) Compact backfill or fill layers in unimproved areas to a density at least equal to that of the surrounding soil.
 - 2) Compact backfill or fill layers in areas containing surface improvements or future surface improvements at 95 percent maximum dry density.
 - 3) Compact backfill or fill layers in seeded or sodded areas at 90 percent maximum dry density.
 6. Field Quality Control:

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- a. Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
 - b. Perform field in-place density tests according to ASTM D1556 (sand cone method), ASTM D 2167 (rubber ballon method), or ASTM D 2937 (drive cylinder method), as applicable. Field in-place density tests may also be performed by the nuclear method according to ASTM D 2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. With each density calibration check, refer to the calibration curves furnished with the moisture gauges according to ASTM D 3017. A schedule of density tests may be submitted to the Engineer for approval.
 - c. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact and retest until required density is obtained.
 - d. All costs for removal, replacement, recompaction and retesting of the material shall be paid for by the Contractor.
7. Site Cleanup:
- a. Before final acceptance of the work, the Contractor shall clear the entire worksite of equipment, unused materials, and rubbish so as to present a satisfactory clean and neat appearance. Agricultural areas shall be scarified with spring tooth harrows and finely raked to a smooth surface free of rocks and debris.

3.5 ROADWAY AND EMBANKMENT GRADING

- A. The access roadway and the embankments at the well shall be constructed to the lines and grades shown on the Drawings or designated by the Engineer. This section of the Specifications covers the earthwork required for roadway and embankment grading.
1. Excavation shall be unclassified and shall consist of removal and stockpiling of topsoil, removal and disposal of unsuitable substances for roadway and embankment construction, and excavation of fill materials needed for embankment construction.
 2. The subgrade below the roadway and embankment excavations shall be scarified to a depth of 6 inches prior to placement of fill materials. The scarified area shall be compacted to 95% of standard proctor density.
 3. Excavations, roadways, and embankments shall be finished to provide a smooth, uniform surface. Excavations shall be blended to the natural surfaces by rounding the top of the cuts. Slopes shall be trimmed and dressed to provide a surface acceptable to the Engineer.
 4. Topsoil shall be placed on the well embankments and side slopes of the roadway grading to a depth of approximately 6".
 5. It shall be the responsibility of the Contractor to provide all materials for roadway and well embankment grading including fill materials, gravel surfacing, and top soil. Top soil and fill materials shall be obtained from designated borrow areas on site.

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3.6 CLEAN UP

- A. The Contractor shall maintain the work area in a clean and presentable condition during his work operation and shall clear the area of surplus construction materials, debris and rubbish resulting from his operations. The site shall be left in a satisfactory clean and neat appearance.

3.7 PROTECTION OF WORK

- A. All structures and piping shall be carefully protected from damage in a suitable manner until completion of the project.

PART 4 - MEASUREMENT AND PAYMENT

4.1 EXCAVATION, BEDDING, BACKFILLING AND INCIDENTALS

- A. All excavation of every description; site preparing; sheeting and shoring; dewatering; on-site bedding; backfilling; compacting; watering for compaction; removing shrubs and trees; moving and resetting fences, portable culverts, and minor structures; grading; shaping; salvaging, stockpiling, and placing topsoil; site cleanup and other "incidentals" required to complete the work shall not be measured for payment separately, but shall be considered as a subsidiary obligation of the Contractor in the installation of pipe, structures, specials, and other items of measurement; and the entire cost thereof shall be included in the Contract unit price bid for furnishing and installing pipe, structures, specials, or other items for which payment is established.

4.2 IMPORTED GRANULAR EMBEDMENT

- A. If native material is not suitable for use as bedding material, material will need to be hauled in from an alternate location. Imported granular embedment material furnished and placed as authorized bedding material shall be measured in tons. Payment shall be made at the contract unit price per ton for "Imported Granular Embedment" as stipulated in the Bid, which price and payment shall be full compensation for furnishing granular materials and all tools, labor and equipment required to haul and install the bedding in accordance with the Specifications. Granular embedment material required to replace unauthorized excavated material, or for the control of water shall be furnished and installed by the Contractor at his cost without further compensation.

4.3 SITE GRADING

- A. Site grading for the access road and well embankment shall be completed to the lines and grades indicated on the drawings. Payment shall be made at the Contract Lump Sum price for "Site Grading" which price and payment shall be full compensation for all labor, materials, equipment, tools, and miscellaneous items necessary for completion of the site grading to the lines and grades indicated on the drawings.

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4.4 COMPACTION - MOISTURE/DENSITY TESTS

- A. Compaction - Moisture/Density Tests shall be measured by the number satisfactorily performed. Payment shall be made at the Contract unit price for "Compaction - Moisture/Density Tests" as stipulated in the Bid, which price and payment shall be full compensation for all labor, tools, and equipment for performing tests and providing certified test results in a satisfactory manner.

END OF SECTION 310000

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SECTION 321100 - BASE COURSES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section of the specifications includes the construction of all base course and gravel surfacing, geotextile fabric, select granular backfill, and all work incidental thereto, as shown on the Drawings and as specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. The following items of related work are specified and included in other sections of these specifications:

Section 312000	Earthwork for Site Grading, Trenching, and Backfilling
Section 331100	Water Utility Distribution Piping

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Base Course: Aggregate Base Course shall be crushed aggregate conforming to SDDOT Standard Specifications, Section 882.
- B. Gravel Surfacing: Aggregate for Gravel Surfacing shall be crushed aggregate conforming to SDDOT Standard Specifications, Section 882.

PART 3 - EXECUTION

3.1 BASE COURSE AND GRAVEL SURFACING WORK

- A. Gravel surfacing on drives, and at other locations shown on the Drawings will be installed to the thickness and widths shown on the Drawing. The thickness of installation shall be compacted thickness. In no case shall the compacted thickness be less than 6 inches unless specifically called out on the Drawings.
- B. Base course materials may be processed by either road mix methods or plant mix methods.
- C. When blending of ingredients is accomplished by road mix methods, granular additives shall be incorporated by means of an approved spreader box or other suitable device. Base course which is dumped on the project shall be satisfactorily windrowed prior to incorporating additives.
- D. When blending of ingredients is accomplished by means of a central plant, the component materials (including water) shall be fed uniformly into the mixer of the plant at a predetermined rate of each material. The plant shall be equipped with control gates or devices to assure positive proportioning of separately piled or produced materials and the mixer shall thoroughly mix the materials.

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- E. When base course is laid by means of an approved spreader, it shall have been previously processed by means of a central plant.
- F. When base course is laid by means other than an approved spreader, the quantity of material in the windrow will be limited to that necessary to construct a compacted layer with a four (4) inch thickness.
- G. Each layer shall be satisfactorily compacted before the next lift is placed thereon.
- H. The moisture content for compaction of base course shall be approximately optimum moisture of the material.
- I. The required density of the constructed base course shall be ninety-five percent (95%) of the maximum dry density in accordance with ASTM D 698. Field density shall be measured in accordance with ASTM D 1556 or ASTM D 2922.
- J. Final rolling of the top surface of the base course shall be accomplished in such a manner as will embed as many of the loose stones as possible. The finished surface shall be smooth and free from waves and the Contractor shall finish the surfacing to within +/- 0.5 percent of the typical section cross slope.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 BASE COURSE, AND GRAVEL SURFACING INSTALLATION

- A. Base Course and Gravel Surfacing Installation will be measured to the nearest one-tenth (1/10) ton. Payment shall be made at the Contract unit price per ton for Gravel Base Course or Gravel Surfacing as indicated in the Bid, which price and payment shall be full compensation for all labor, tools, and equipment for spreading, grading, and compacting the base course and gravel surfacing according to the Specifications.

END OF SECTION 321100

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SECTION 323126 – WIRE FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Wire Fencing
 - 2. Tubular Gates

1.3 SUBMITTALS

- A. Product Data: Provide for each component specified.
- B. Shop Drawings: Include plans, gate locations, elevations, sections, installation details, and attachment details.
- C. Samples: Submit samples for each type of fencing component required.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS

- A. Line Posts: 3 ½" diameter (minimum) x 6'-6" preservative-treated (for ground contact) timber
- B. Brace Posts: 5" diameter (minimum) x 8'-0" preservative-treated (for ground contact) timber.
- C. Horizontal Braces: 4" diameter x 8'-0" preservative-treated (for ground contact) timber.

2.2 WIRE FENCING PRODUCTS

- A. Main Line Wires: Two strands of 12 ½ gauge galvanized wire.
- B. Smooth Wire: Smooth wire used for brace posts shall be No. 9-galvanized wire.

2.3 GATES

- A. Tubular Steel Gates: Gates shall consist of 19 gauge (minimum), 1-3/4" (minimum) tubular steel, powder coated, blue in color.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Indicate locations of utilities, property lines and markers. Stake locations of fence lines, gate locations, corner posts and end posts. Approve final layout with Architect / Engineer.
- B. At gate locations, grade soil to provide a surface as flat and level as practical between hinged and latched posts and within the swing area of the gate.

3.2 INSTALLATION, GENERAL

- A. Set fencing to required levels and lines, with all members plumb, true to line, cut, and fitted.
- B. Do not use materials with defects that impair quality of fencing.
- C. Install staples diagonal to wood grain. Staples shall be installed to allow free movement of the wire.

3.3 INSTALLATION, PASTURE GATES

- A. Install gates in accordance to manufacture's instructions utilizing recommended mounting hardware. Install gates level, plumb and secure for full opening without interference.
- B. Adjust gate to operate smoothly, easily, and free of binding, excessive deflection, or distortion. Confirm that latches and locks engage accurately and securely.

3.4 CLEANING

- A. Clean up and remove all debris and any stray nails or staples from around fencing areas.

PART 4 - MEASUREMENT AND PAYMENT

4.1 WIRE FENCES AND GATES INCIDENTALS

- A. The furnishing and installing of specific items and/or the performance of work shall not be individually measured and paid. The costs shall be included in the unit price bid for the associated bid item of work. Such items shall be considered a subsidiary obligation of the Contractor and will not be individually measured and paid. Items considered incidental include but are not limited to:
 - 1. Site preparation.
 - 2. All work and material associated with 2 post panels and 3 post panels.
 - 3. Gate accessories including but not limited to: hinges, hardware, chain, and get anchor.

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SECTION 323126 – WIRE FENCES AND GATES

4.2 3-WIRE BARBLESS FENCE

- A. 3-Wire Barbless Fence shall be measured and paid by the LINEAR FOOT (LF) at the unit price bid. Measurement shall be by the length of fence installed, not including gates. The amount bid shall include all work and material for construction.

4.3 TUBULAR STEEL GATES

- A. Tubular Steel Gates shall be measured and paid per EACH (EA). Measurement shall be by each gate installed. The amount bid shall include all work and material necessary for construction.

END OF SECTION 323126

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SECTION 329300 - SURFACE RESTORATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section of the Specifications includes all seeding, landscaping, fertilizing, erosion control and all work incidental thereto, as shown on the Drawings and as specified herein. The areas to be seeded include all areas not receiving surfacing that are disturbed as a result of construction operations. This shall include but not be limited to all excavation, embankments, borrow areas, and waste disposal areas. Any areas disturbed as a result of the construction of the facilities shall be reseeded according to these Specifications.

1.2 RELATED WORK ELSEWHERE

- A. The following items of related work are specified and included in other sections of these Specifications.

Section 310000: Earthwork for site grading trenching and backfilling.

1.3 COORDINATION AND SCHEDULING

- A. Planting Season: Sow lawn seed during normal planting seasons for type of lawn work required. Correlate planting with specified maintenance periods to provide required maintenance from date of Substantial Completion. No seeding shall be done when ground is frozen and between June 1 and August 1 without written consent of the Engineer.
- B. Weather Limitations: Proceed with planting only when existing and forecast weather conditions are suitable for work.

PART 2 - PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with U.S. Department of Agriculture Rules and Regulations and with the Association of Official Seed Analysts' "Rules for Testing Seeds" for purity and germination tolerances. Labels shall indicate compliance with applicable rules, regulations and Federal Acts.
 - 1. Seed Mixture: Provide seed of grass species and varieties, proportions by weight, and minimum percentages of purity, germination, and maximum percentage of weed seed as indicated on Schedules at the end of this Section.

2.2 TOPSOIL

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, 4 percent organic material minimum, free of stones 1 inch (25 mm) or larger in any dimension, and other extraneous materials harmful to plant growth.
 - 1. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when

quantities are insufficient. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

2.3 FERTILIZER

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea-form, phosphorous, and potassium in the following composition:
 - 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

2.4 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Fiber Mulch: Biodegradable dyed-wood cellulose-fiber mulch, nontoxic, free of plant growth- or germination-inhibitors, with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

2.5 EROSION-CONTROL MATERIALS

- A. Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long.
- B. Fiber Mesh: Biodegradable twisted jute or spun-coir mesh, 0.92 lb per sq. yd. (0.5 kg per sq. m) minimum, with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive lawns and grass for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect adjacent and adjoining areas from hydroseed overspraying.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 PLANTING SOIL PREPARATION

- A. Limit subgrade preparation to areas that will be planted in the immediate future.
- B. Loosen subgrade to a minimum depth of 4 inches (100 mm). Remove stones larger than 1-1/2 inches (38 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter.
- C. Mix fertilizers with topsoil at rates indicated. Delay mixing fertilizer if planting does not follow placing of planting soil within a few days. Either mix soil before spreading or apply soil amendments on surface of spread topsoil and mix thoroughly into top 4 inches (100 mm) of topsoil before planting.
- D. Spread planting soil mixture to depth required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen.
 - 1. Place approximately 1/2 the thickness of planting soil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture.
- E. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than 1-1/2 inches (38 mm) in any dimension, and other objects that may interfere with planting or maintenance operations.
- F. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- G. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

3.4 RECONDITIONING LAWNS

- A. Recondition existing lawn areas damaged by Contractor's operations, including storage of materials or equipment and movement of vehicles. Also recondition lawn areas where settlement or washouts occur or where minor regrading is required.
- B. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.
- C. Where substantial lawn remains, mow, dethatch, core aerate, and rake. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.
- D. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of it off the Owner's property.
- E. Till stripped, bare, and compacted areas thoroughly to a depth of 6 inches (150 mm).
- F. Apply required soil amendments and initial fertilizers and mix thoroughly into top 4 inches (100 mm) of soil. Provide new planting soil as required to fill low spots and meet new finish grades.
- G. Apply seed and protect with straw mulch as required for new lawns.
- H. Water newly planted areas and keep moist until new grass is established.

3.5 SATISFACTORY LAWN

- A. Seeded lawns will be satisfactory provided requirements, including maintenance, have been met and a healthy, uniform, close stand of grass is established, free of weeds, bare spots exceeding 5 by 5 inches (125 by 125 mm), and surface irregularities.
- B. Replant lawns that do not meet requirements and continue maintenance until lawns are satisfactory.

3.6 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto surface of roads, walks, or other paved areas.
- B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period until lawn is established.

3.7 MAINTENANCE

- A. Begin maintenance of lawns immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:
 - 1. Seeded Lawns: 60 days after date of Substantial Completion.
 - a. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established at that time, continue maintenance during next planting season.
- B. Maintain and establish lawns by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn.
 - 1. Replant bare areas with same materials specified for lawns.
 - 2. Add new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose. Anchor as required to prevent displacement.

3.8 SEED MIXTURES SCHEDULE

- A. Seed Mixture For disturbed Areas Within Public Right-of-Way and Easements other than Farmed Ground: Provide certified grass-seed blends or mixes, proportioned by weight, as follows:

<u>Name</u>	<u>PLS. lbs. / Acre</u>
Western Wheat Grass	1.5
Green Needle Grass	0.9
Big Bluestem	2.5
Little Bluestem	2.0

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Indian Grass	1.5
Side Oats Gramma	0.8
Switch Grass	0.6

Total pounds of pure live seed per acre:
9.8 pounds (per acre)

PART 4 - MEASUREMENT AND PAYMENT

4.1 SURFACE RESTORATION

- A. All Surface Restoration, landscaping, seeding, fertilizing, mulching, site preparation, topsoiling, watering, removal of trees and shrubs, shaping, topdressing, site cleanup and various other "incidentals" shall be measured as a single unit. Payment for Surface Restoration shall be at the Contract Lump Sum price for "Surface Restoration" as stipulated in the Bid Schedule which price and payment shall be full compensation for all labor, tools, equipment and materials for Surface Restoration including site preparation, soil testing, topsoiling, topdressing, site cleanup, seeding, fertilizing, mulching, watering, fence repair, maintenance and other incidentals to restore the area disturbed by construction in accordance with the Plans and Specifications.

END OF SECTION 329000

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SECTION 331100 – WATER UTILITY DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section of the Specification includes all raw water lines, valves, fittings, appurtenant equipment and facilities, and all work incidental thereto, as shown on the Drawings and as specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. The following items of related work are specified and included in other sections of these Specifications:

Section 310000: Earthwork for site grading, trenching and backfilling.

1.3 SHOP DRAWINGS

- A. Shop drawings shall be submitted in accordance with "General Requirements" for the following items:
1. Piping and fittings with dimensions, details, materials of construction, and load tables for the class of pipe furnished.
 2. All valves, and accessories with dimensions, details and materials of construction.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Pipe furnished for installation on this project shall be of the size and type shown on the Drawings. The pipe shall be manufactured from one of the materials designated for the specified line and application as described in the following subsections. Pipe materials permitted for each of the specified lines are as follows:

<u>Pipe Designation</u>	<u>Allowable Pipe Materials</u>
Raw Water Piping	ASTM PVC – Class 160, SDR-26 8" Ductile Iron Pipe- Class 300

1. AWWA, C900 PVC Pipe: Polyvinyl chloride pressure pipe and fittings shall conform to the requirements of AWWA C-900 "Poly Vinyl Chloride (PVC) Pressure Pipe". Outside pipe diameter shall be the same as that of cast iron pipe of similar nominal size. Pipe materials shall conform to "Standard Specification for Rigid Poly (Vinyl Chloride) Compounds and Chlorinated Poly (Vinyl Chloride) Compounds" (ASTM D-1784). The pipe shall bear the National Sanitation Seal for potable water pipe. Provisions must be made for expansion and contraction at each joint with an elastomeric ring. The bell shall consist of an integral wall section with a solid cross-section elastomeric ring which meets the requirements of ASTM 1869 and E-477. The bell section shall be designed to be at least as strong as the pipe wall. Each length of pipe, including integral bell, shall be pressure tested to four times the class pressure of the pipe for a minimum of five (5) seconds. Pipe and fittings must be assembled with a non-toxic lubricant. Standard lengths

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shall be 20 feet for all sizes. At least 85% of the total footage of pipe of any class and size shall be furnished in standard lengths, the remaining 15% in random lengths. Random lengths shall not be less than 10 feet long. Pipe may be furnished with separate couplings in lieu of integral bell in order to achieve high deflection. Separate couplings shall pass a hydrostatic integrity test at the factory at four times the pressure class of the coupling for five seconds. All bolts used shall be stainless steel or ceramic coated bolts similar to "Cor-Blue" as manufactured by NSS Industries. Sacrificial zinc anode caps shall be provided on every other bolt at each mechanical joint. The anode caps shall be similar to "Trumball" anode caps as manufactured by Trumball Industries, Inc. C-900 pipe shall be as manufactured by Certanteed, J-M, Northern, or Engineer approved equal.

2. ASTM D2241 Pressure Rated Water Pipe.
 - a. General: Unless otherwise shown on the drawings, or specified, all pressure rated PVC pipe shall comply with the provisions of the American Society for Testing and Materials Standard Specification for Poly Vinyl Chloride (PVC) Pressure Rated Pipe (SDR Series) ASTM D2241.
 - b. PVC pipe shall be Type I Grade 1, 12454. with a hydrostatic design basis of 4,000 psi, per ASTM 2837 and with a service factor of 0.5 for hydrostatic design stress of 2,000 psi. Pipe shall be designated as PVC 1120 conforming to the requirements of ASTM 1784, Rigid Poly Vinyl Chloride (PVC) compounds and Chlorinated Poly Vinyl Chloride (CPVC) compounds. Pipe shall bear the National Sanitation Foundation (NSF) seal of approval.
 - c. PVC pipe shall be precision extruded from new polyvinylchloride material and shall be homogenous throughout, free from visible cracks, holes, foreign inclusions, or other defects. The pipe shall be as uniform as commercially practical in color, opacity, density and other physical properties. Material shall be manufactured with all virgin materials. Re-ground or re-worked material regardless of source shall not be used.
 - d. PVC pipe shall be of the size designated on the Drawings. The pipe class shall be Class 160, SDR 26.
 - e. Pipe joints shall be push-on joints using locked in Reiber style gaskets. Couplings shall be a twin gasket coupling with a positive stop in the middle that will position the pipe ends within the coupling.
 - f. PVC pipe shall be as manufactured by Certanteed, J-M, Northern, Vinyl-Plex with Reiber Style gasket or Engineer approved equal.
 3. Ductile Iron Pipe: Ductile iron pipe shall conform to the requirements of ANSI A21.50 (AWWA C150) and ANSI A21.51 (AWWA C151). All buried or encased piping shall be push on joint type or mechanical joint pipe conforming to the requirements of ANSI A21.11 (AWWA C111). Push on joint or mechanical joint ductile iron pipe shall be a minimum pressure class 300. Pipe shall be bituminous coated. Mechanical joint fittings for use on ductile iron pipe shall be rated for 150 psi working pressure. Pipe shall be mortar lined. Certification of inspection and testing shall be provided by the manufacturer. Bolts for flanged and mechanical joints wherever used shall be Cor-Blue with zinc anode caps on every other bolt. All ductile iron pipe shall be wrapped with polyethylene encasement conforming to the requirements of AWWA Standard 105.
- B. Water Pipe Fittings:
1. All fittings for water pipe piping shall be ductile iron compact fittings conforming to the requirements of AWWA C-153 and ANSI Standards A21.53. All fittings shall be cement mortar lined conforming to AWWA C-104 and ANSI A21.4.
 - a. Mechanical joint pipe fittings shall be furnished with a single rubber gasket conforming to AWWA C111 and ANSI A21.11. (Bolts for mechanical joint fittings shall be Cor-Blue with zinc anode caps on every other bolt.)

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- b. Direct buried fittings shall be wrapped with polyethylene encasement conforming to the requirements of AWWA C105.
- c. Solid x Swivel Adapter Coupling fittings are "plain end" mechanical joint fittings with an integral follower gland. The protruding plain end, when fitted with gasket, is inserted into a standardized mechanical joint bell and bolted tight. The solid x swivel adaptor and anchor coupling are positive restraints as manufactured by Tyler, Clow, or approved equal.

C. MECHANICAL JOINT RESTRAINTS:

- 1. Mechanical joint restraints shall be incorporated in the design of the follower gland. The restraint mechanism shall consist of a plurality of individually actuated gripping surfaces to maximize restraint capability. Glands shall be manufactured of ductile-iron conforming to ASTM A536-80. The gland shall be such that it can replace the standardized mechanical joint gland and can be used with the standardized mechanical joint bell conforming to ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of latest revision. Twist-off nuts, sized the same as tee head bolts, shall be used to ensure proper actuating of restraining devices. Bolts shall be Cor-Blue with zinc anode caps on every other bolt. The restraining glands shall have a pressure rating equal to that of the pipe on which it is used and shall be EBAA Iron, Inc., Romac, or Engineer approved equivalent.

D. DISMANTLING JOINTS

- 1. Dismantling joints shall be a self-contained restraint joint fitting and furnished as a complete unit, consisting of a spigot piece, flange adaptor, tie rods, and gasket. The dismantling joint shall be designed so no parts extend outside the flange diameter and the internal bore shall match that of the pipe system.
 - a. The dismantling joint shall be installed with a fusion-bonded Epoxy or Rilsan nylon coating. The spigot piece and flange adaptor shall be of ASTM A283 Grade C steel and the tie bars shall be ASTM A193 Grade B7 threaded rod with rolled thread. The gasket shall be EPDM Grade E. The design pressure rating shall be equal to or larger than the mating flanges. The gasket seal and compression stud and nut arrangement shall be independent of the tie rod restraint system.
 - b. The tie rod diameter shall be compatible with the corresponding bolt diameter of the mating flange. The tie rod restraint system shall be capable of withstanding the full pressure thrust that the pipe system can develop at no more than 50 percent of the yield strength of the tie rod material.
 - c. The dismantling joint shall be manufactured by Viking Johnson, ROMAC DJ400, or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

- A. The contractor shall cut and remove surface improvements, excavate and trench, remove water, bed, backfill, and restore surface improvements in accordance with the requirements outlined in Section 312000 of these Specifications and details shown on the Drawings.
 - 1. At all times when work is not in progress all open ends of pipe and fittings shall be securely closed so that no trench water, earth or other substance will enter the pipe.

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2. If the maximum width of the trench at the top of the pipe specified in Section 312000 is exceeded for any reason other than by direction of the Engineer, the Contractor shall, at his own cost, install such concrete encasement or granular embedment material as may be required to satisfactorily support the added backfill load.

3.2 LAYING PIPE

- A. The installation of water distribution pipe shall conform to the applicable sections of the "Underground installation of Polyvinyl Chloride (PVC) Pressure Pipe and fittings for water" (AWWA C605-05), "AWWA Standard for Installation of Cast-Iron Water Mains" (AWWA C600), and manufacturer's recommendations except as otherwise directed by the Engineer or noted herein. Bedding for PVC pipe shall be Class I granular material (ASTM D2321) installed and compacted in accordance with the manufacturer's recommendations.
 1. Pipe shall be carefully inspected in the field before and after laying. If any cause for rejection is discovered in a pipe after it is laid, it shall be repaired or replaced by the Contractor. Any corrective work shall be approved by the Engineer and shall be at the expense of the Contractor without additional cost to the Owner.
 2. The Engineer shall be given the opportunity to inspect existing pipe before connection to new pipe is made. Pipe shall be laid upgrade. Each pipe shall be laid true to line and grade and in such a manner as to form a close concentric joint with the adjoining pipe. As the work progresses, the interior of the pipe shall be cleaned of all dirt and superfluous materials of every description. Where sewers are installed parallel to existing water lines, a minimum horizontal separation of 10 feet shall be maintained between the two pipes unless directed by the Engineer.
 3. Tracer wire shall be installed with all buried pipe, including but not limited to hydrant legs, service lines, air release piping, mainline.

3.3 JOINTING

- A. The type of joint used shall conform to the requirements for the applicable type of pipe. Jointing operations shall be carried out in strict adherence to the manufacturer's recommendations. When joining PVC pipe to cast iron fittings, the bevel on the PVC shall be made the same as the bevel required for the cast iron fitting (normally shorter and steeper than factory pipe bevel).
- B. Cutting of pipe will be done in a neat and workman like manner without damage to the pipe. Cutting shall be done by means of an approved type of mechanical cutter.

3.4 WATER AND SEWER MAIN SEPARATION

- A. Horizontal Separation: Whenever possible, watermain should be laid at least 10 feet, horizontally, from any existing or proposed sewer. Should local conditions prevent a lateral separation of 10 feet, a watermain may be laid closer than 10 feet to a sewer if:
 1. It is laid in a separate trench; or
 2. It is laid in the same trench with the water main located at one side on a bench of undisturbed earth;
 3. In either case, the elevation of the crown of the sewer is at least 18 inches below the bottom of the water main.

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- B. Vertical Separation: Whenever sewers must cross under watermain, the watermain shall be laid at such an elevation that the top of the sewer is at least 18 inches below the bottom of the water main. If the sewer line is less than 18 inches below the watermain, or is above the watermain, either the sewer pipe or watermain shall be fully encased for a distance of ten (10) feet each side of the crossing. The encasement shall consist of PVC encasement pipe closed at the ends with flexible reducing couplings. Concrete shall be used around all fittings which need to be encased, otherwise, the PVC encasements shall be used. The minimum thickness of the concrete shall be six (6) inches.

3.5 CONCRETE CRADLES

- A. The pipe shall be supported on concrete cradles where directed by the Engineer. The concrete shall meet as a minimum the requirements of 4000 psi concrete.

3.6 CONNECTIONS

- A. The Contractor shall make all connections to existing piping and structures from which water is to be received or discharged.
- B. All MJ long body sleeves 8-inch and larger shall be installed with an internal spacer the internal spacer shall be cut from pipe material similar to the adjoining pipe.

3.7 THRUST BLOCKS

- A. Fittings at bends in all buried lines shall be firmly wedged against undisturbed earth with cast-in-place concrete thrust blocking. Provide blocking as detailed on the drawings or as directed by the Engineer. The concrete shall meet, as a minimum, the requirements of 4000 psi concrete.

3.8 WATERMAIN CONNECTIONS

- A. Connect to existing watermain with size and in locations as indicated according to requirements of water utility. Use restrained joints and fittings and pipe at point of connection.

3.9 RAISING OR LOWERING OF WATER LINES

- A. Water lines will be raised or lowered by the Contractor in those locations shown on the Plans, or where directed by the Engineer to avoid interference with new or existing utilities. Water line adjustments shall be constructed to provide a minimum of six (6) feet of cover over the adjusted water line. Water line adjustments shall not be made until the Utility which owns the water line has authorized such work. The adjusting of water lines shall be considered incidental.

3.10 CLEANING AND DISINFECTION

- A. Each unit of completed water line shall be disinfected with chlorine and tested for bacteriological quality before acceptance for domestic operation.

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1. Cleaning: The newly installed watermain shall be cleaned by passing an appropriately sized polyurethane foam swab through the pipe. The swab shall be inserted into the new watermain at temporary testing/flushing connections. The expulsion of the swab shall be at the terminal end of the flushing connection. Contractor shall make every effort to prevent backwater from re-entering the pipe by temporary installation of mechanical joint pipe bends and pipe joints to provide a riser out of the trench. After passage of the swab, the watermain shall be adequately flushed of all backwater. Contractor shall make necessary provisions for the discharge of the water used for cleaning and flushing from the watermain. Any damage caused by the discharged water shall be the sole responsibility of the Contractor. When flushing the line, the water used for disinfecting the waterline must not reach a stream river or other waterway if chlorine is detected in the water. Contact South Dakota Department of Environment and Natural Resources, Surface Water Quality Program at (605) 773-3351 for more information.
 - a. Clarification: Information pertaining to the requirements needed to discharge the cleaning water shall be directed to South Dakota Department of Environment and Natural Resources (SD DENR), Surface Water Quality Program at (605) 773-3351.
2. Disinfection:
 - a. Use the purging and disinfecting procedure in accordance with ANSI/AWWA C651 and as described below:
 - 1) Comply with NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
 - 2) Fill system or part of system with water/chlorine solution containing at least 50 parts per million of chlorine. Isolate (valve off) system or part thereof and allow to stand for 24 hours.
 - 3) Filling and Contact: When installation has been completed, the main shall be filled with water at a rate such that water within the main will flow at a velocity no greater than 1 foot per second. This water shall remain in the pipe for at least 24 hours. If the water temperature is less than 41°F, the water shall remain in the pipe for at least 48 hours. Valves shall be positioned so that the strong chlorine solution in the treated main will not flow into watermains in active service.
3. Final Flushing:
 - a. Clearing the Main of Heavily Chlorinated Water: After the applicable retention period, heavily chlorinated water should not remain in prolonged contact with pipe. In order to prevent damage to the pipe lining or corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the system or is acceptable for domestic use.
 - b. Disposing of Heavily Chlorinated Water: The environment to which the chlorinated water is to be discharged (including point of storm sewer discharge) shall be inspected. If there is any question that the chlorinated discharge will cause damage to the environment, including creeks, streams, ponds, or lakes that support aquatic life, then a reducing agent shall be applied to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water.
4. Bacteriological Tests:

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- a. After disinfection, the waterlines must be flushed and the disinfected line must be sampled. Two consecutive samples of water from the end of the disinfected line must be collected at least 24 hours apart. These samples must be submitted to the State Health Laboratory in Pierre, or other laboratory acceptable to the department. The samples must be free of coliform bacteria before the system is placed into service. When flushing the line, the water used for disinfecting the water line must not reach a stream, river, or other waterway if chlorine is detected in the water. Contact the Surface Water Quality Program at (605) 773-3351 for more information.
 - 1) Information pertaining to the requirements needed to discharge the flushing water shall be directed to South Dakota Department of Environment and Natural Resources (SD DENR), Surface Water Quality Program at (605) 773-3351.
5. Redisinfection:
- a. If the initial disinfection fails to produce satisfactory bacteriological samples, the main may be reflushed and shall be resampled. If check samples show the presence of coliform organisms, then the main shall be rechlorinated by the Continuous Feed Method or Slug Method in accordance with AWWA.
6. Alternate Methods:
- a. The Contractor may, at his option, use either the Continuous Feed or Slug Method in lieu of the specified Method. The procedures for the alternate methods are described in AWWA C651 Sections 5.2 and 5.3.
- 3.11 HYDROSTATIC TESTING FOR WATER LINES
- A. General: It is the intent of this Specification that all joints in piping be watertight and that all joints which are found either by observation or any specified test to leak shall be made watertight by the Contractor. The watermain shall be tested in accordance with AWWA C-600 or as specified herein.
 - B. Pressure Test: After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 1.5 times the working pressure at the point of testing.
 1. Test Pressure Restrictions: Test pressures shall
 - a. Not be less than 110 psi for class 160 ASTM pipe and not less than 135 psi for class 200 ASTM pipe.
 - b. Not exceed pipe or thrust restraint design pressures.
 - c. Be of at least two- hour duration.
 - d. Not vary by more than five (5) psi.
 - e. Not exceed twice the rated pressure of the valves or hydrants when the pressure boundary of the test section includes closed gate valves or hydrants.
 - f. Not exceed the rated pressure of the valves if resilient-seated butterfly valves are used (150 psi).
 2. Pressurization: Each valved section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gage, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer.

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3. Air Removal: Before applying the specified test pressure, air shall be expelled completely from the pipe and valves. If permanent air vents are not located at all high points, the Contractor shall install corporation stops at such points so that air can be expelled as the line is filled with water. After all the air has been expelled, the corporation stops shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation stops shall be left in-place.
4. Examination: All exposed pipe, fittings, valves, and joints shall be examined carefully during the test. Any damage or defective pipe, fittings, valves, or joints that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory to the Engineer.

C. Leakage Test:

1. General: A leakage test shall be conducted concurrently with the pressure test.
 - a. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within five (5) psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.
2. Allowable Leakage: No pipe installation will be accepted if the leakage is greater than that determined by the following formula(s):

For ductile iron pipe:
$$L = \frac{SD(p)^{1/2}}{133,200}$$

Where

L	=	The allowable leakage in gallons per hours.
S	=	The length of pipe tested in feet.
D	=	The nominal pipe diameter in inches.
p	=	The average test pressure during the leakage test in psi gauge.

For PVC pipe:
$$L = \frac{ND\sqrt{P}}{7400}$$

Where

L	=	The allowable leakage in gallons per hours.
N	=	The number of joints in the length of pipeline tested
D	=	The nominal pipe diameter in inches.
p	=	The average test pressure during the leakage test in psi gauge.

- 1) When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gallon per hour per inch of nominal valve size shall be allowed.
 - 2) When hydrants are in the test section, the test shall be made against the closed hydrant.
3. Acceptance of Installation: Acceptance shall be determined on the basis of allowable leakage. If any test of pipe disclosed leakage greater than that specified in paragraph 3.18.C2. "Allowable Leakage", above, the Contractor shall, at his expense, locate and repair the defective material until the leakage is within the specified allowance.

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- a. All visible leaks are to be repaired regardless of the amount of leakage.

3.12 MAINTAINING WATER SERVICE

- A. During the replacement of existing watermain and installation of new watermain, the water service shall be maintained during construction, except for brief shutdowns to connect into existing watermain. The shutdowns for "cut-in" shall be during low demand periods and adequate notice shall be given to the affected water consumers. During the replacement of an existing watermain, the Contractor shall supply water to the consumers by a temporary above ground piping system. The necessary pipe, fitting, valves, etc. required for the temporary water services shall be considered incidental to the Watermain Pipe and Pipe Fittings and will not be measured for payment separately.

3.13 CLEAN-UP

- A. Upon completion of the work, the Contractor shall remove all surplus construction materials and debris resulting from the work and all areas of work shall be left in an orderly manner.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. All measurements and payments will be based on completed work performed in strict accordance with the Drawings and Specifications and the respective prices and payment shall constitute full compensation for all work completed, including incidentals. No separate payment will be made for excavation, trenching, dewatering, backfilling, and utility identification, for items of work covered under this section of the Specifications and all such costs pertinent to these items shall be included in the applicable unit prices therefore.

4.2 FURNISH WATERMAIN

- A. Watermain pipe shall be measured in lineal feet along the centerline of the pipe with out deducting for fittings or valves for the various sizes of watermain furnished for the work. Payment shall be made at the Contract unit price per lineal foot for "Furnish Watermain", as stipulated in the Bid for the various sizes and types as shown, which price and payment shall be full compensation for all labor, materials, tools and equipment for furnishing the pipe, including pipe materials, transporting, handling, unloading, storing and incidentals in accordance with the Drawings and Specifications.

4.3 INSTALL WATERMAIN

- A. Watermain trench shall be measured along the centerline of the pipe without deducting for fittings or valves for single and parallel (dual) pipe applications. Payment shall be made at the Contract unit price per lineal foot for "Install Single Watermain" and "Install Parallel Watermain in Common Trench", as stipulated in the Bid for the various sizes and types as shown, which price and payment shall be full compensation for all labor, tools, materials, and equipment for installing single or parallel watermain, including handling, excavation, removal or plugging of existing watermain, laying, jointing, dewatering, backfilling, compaction, removal and replacement of fences and culverts, protection and adjustment of

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utilities and landscaping which may be encountered by the work, disinfection, cleaning the pipe interior, disposal of excess materials, clean-up, and testing of the finished pipeline in accordance with the Drawings and Specifications.

4.4 TRANSITION SLEEVES AND FITTINGS

- A. Transition sleeves, specials, and fittings shall be measured by the number of each kind and size actually installed. Payment for this item shall be made at the Contract unit price each for sleeves, specials, and fittings of the various kind and size as stipulated in the Bid Proposal, which price and payment shall be full compensation for all labor, tools, equipment, and materials for furnishing and installing the items, including handling, excavating, jointing, dewatering, blocking, backfilling, testing and disinfecting, all in accordance with the Plans and Specifications. Concrete required for thrust blocks shall be included as incidental to this item.

END OF SECTION 331100

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PART 1 - GENERAL

1.1 SCOPE

- A. This specification is intended to provide the information necessary for all parties concerned with the contract to know the nature and amount of equipment, materials and work required to successfully complete two (2) production wells in accordance with the South Dakota Well Construction Standards (ARSD 74:02:04).
- B. These Specifications are in accordance with the American Water Works Association Standard for Deep Wells (AWWA A100). These Specifications are intended to supplement or modify the standards to fit the needs or expected conditions. Also, for more detailed description of the work to be performed, reference is made to a particular section of the AWWA Standard.

1.2 LOCATION

- A. The proposed water supply wells to be constructed under these Specifications are located approximately 1.8 miles north and 0.75 miles east for well identified as No. 6 and 2.2 miles south and 0.5 east for well identified as No. 7 of Dolton, South Dakota. The locations are shown in the Drawings included with these Specifications. The wells will serve as Raw Water Supply Wells No. 6 and Well No. 7

1.3 LOCATION CONDITIONS

- A. The Contractor shall satisfy himself regarding all local conditions affecting his work by personal investigation. Neither the site information contained in these Specifications nor that derived from maps or plans or from the Owner or his agents or employees shall act to relieve the Contractor from any responsibility hereunder from fulfilling any and all of the terms and requirements of his contract.
- B. The Contractor shall make his own arrangements for water required for drilling of the well. The contractor has the option of installing a temporary well and pump for a water supply for drilling. A temporary water right may be necessary if a well is used for the water supply. Water used for drilling, if other than from well itself, shall be chlorinated clear water containing a free chlorine residual at the time of use. The temporary well shall be removed upon completion of construction of the production well. The Contractor shall contact the Department of Environment and Natural Resources, Water Right program for more information concerning a temporary water right.

1.4 SHOP DRAWINGS

- A. Shop drawings shall be submitted in accordance with the General Requirements for the following items:
 - 1. Well screen with dimensions, collapse strength, percent open area, inlet open area/ft., transmitting capacity/ft., details and materials of construction.
 - 2. Casing pipe with dimensions, collapse strength, details and materials of construction.
 - 3. Pitless adapter unit with dimensions, details and materials of construction.
 - 4. Well pump with dimensions, details, materials of construction, motor data, certified pump curves, analysis of critical speed, operating requirements, and manufacturers description of pump characteristics.
 - 5. Column pipe with dimensions, details and materials of construction.

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6. Pump control/electrical system with dimensions, details, materials of construction and electrical diagrams.

1.5 PRIOR APPROVAL

- A. The following items of equipment shall receive approval prior to bidding if it is intended to furnish products other than those named in these Specifications:
 1. Well screen
 2. Pitless Adapter Unit
 3. Method of Drilling
 4. Well Pump
- B. Instructions for obtaining such approval are included in the Instructions to Bidders and the General Requirements.

1.6 PERSONNEL AND DRILLING EQUIPMENT

- A. The Contractor shall supply capable and experienced personnel and suitable drilling equipment to perform this work. Each bidder shall supply a list along with his bid which shows:
- B. Experience record of Contractor on wells of similar depth and capacity.
- C. Name and experience record of person or persons likely to serve as construction superintendent.
- D. Manufacturer's name and model number of drilling machine or machines to be used.
- E. The Contractor shall submit documentation indicating he is a licensed driller in accordance with SDCL 46-6-9.
 1. Adequate safety equipment, i.e., hard hats, hard toed shoes, and gloves shall be used by the drilling crew while on the job site.
 2. Drilling method used shall be one of the following; forward or reverse circulation rotary. If special drilling mud is used in the drilling operation, it shall be removed by well development in order to prevent invasion of the formation.

1.7 PERMITS

- A. After the award has been made, the Contractor shall apply for and acquire permits from authorized agencies, as required. No field operation shall commence until these necessary approvals have been obtained.

1.8 MOBILIZATION AND DEMOBILIZATION

- A. The lump sum bid for mobilization and demobilization includes moving onto and off the site all the materials and equipment for constructing and developing the well. It also includes cleaning up the site upon completion of the contract.

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PART 2 - PRODUCTS

2.1 WELL CASINGS

- A. All well casings shall be new. They shall be steel and shall conform to AWWA-A100. The well casing may not be mill reject. The casing shall be joined by welding in accordance with the Standards of the American Welding Society.
- B. Production Casing – The casings shall have the nominal dimensions as follows:

Well #	Diameter	Wall Thickness	Weight Per Foot
No. 6	12"	0.3125"	50 lbs.
No. 7	12"	0.3125"	50 lbs.

- C. The Contractor shall deliver two copies of the mill certificate to the Engineer for approval before delivering the casing to the job site.

2.2 CEMENT GROUT

- A. A mixture of high sulfate resistant portland cement (ASTM C150) and not more than 6 gallons water per bag (one cubic foot or 94 lbs.) of cement. The water used shall be fresh, clear and potable.

2.3 BENTONITE CLAY PLUG

- A. The bentonite plug shall be a bentonite grout pumped into the annular space through a tremie pipe. Bentonite grout shall be a mixture of water and a minimum of 20% solids by weight and have a minimum slurry density of 9.4 lbs. per gallon. Bentonite used for grout must be either natural-mined montmorillonite clay without additives or be a bentonite meeting NSF Standard 60. The use of bentonite pellets or chips or prohibited.

2.4 WELL SCREEN

- A. Material and aperture opening. The well screen and its fittings shall be manufactured entirely of Type 304 stainless steel. The well screen aperture opening shall be determined by the well screen manufacturer. It shall have sufficient open area to transmit the desired yield of 500 gpm at an aperture entrance velocity equal or less than 0.10 feet per second.
- B. The well screen shall be of the continuous slot, wire wound type. The well screens shall be constructed of v-shaped trapezoidal wire continuously wrapped around an array of equally spaced support rods of the same material. It shall have a nominal inside diameter of 12 inches. Intermediate screen sections shall be joined by welded connections. The welding rod shall be of material suitable for joining stainless steel in order not to reduce the corrosion resistance. The rod selected must be approved by the Engineer.
- C. The bottom of the screen shall be fitted with a closed bail bottom of the same connecting material as the screen. Bail depth below screen area shall be not less than 12". Top of screen section shall be fitted with a 12" well casing nipple.

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- D. Well screen shall be similar and equal to Johnson Well Screen Watermark, a Weatherford Company at Houston, or prior approved equal.

2.5 GRAVEL PACK MATERIAL

- A. The gravel to be used for the gravel wall around the screen and casing shall be well-rounded particles containing not less than 95% siliceous material with not more than 5% calcareous materials. The gravel shall be washed and screened to required sizes for maximum aquifer development. Gravel shall be as produced by Northern Sand and Gravel of Muscatine, Iowa, or Eau Claire Sand and Gravel of Eau Claire, Wisconsin. The gravel size and samples shall be submitted to the Engineer along with certified tests prior to installation. Additional samples shall be selected by the Engineer during installation of the gravel wall. All gravel shall be furnished in bags properly labeled.
- B. The grading of the gravel pack shall be selected by the screen manufacturer.
- C. The gravel pack material shall be delivered to the job site in clearly labeled bags and shall remain in the bags until time of installation in the well.

2.6 PITLESS ADAPTER UNIT AND DROP TUBE

- A. The pitless adapter unit shall be of the size as shown on Drawings by 9 foot bury and of the positive self-sealing industrial heavy duty type. It shall have the capability for a minimum full diameter thru-seal area for well maintenance purposes.
- B. Positive pressure "O" ring seals shall be used throughout both for internal well sealing and external surface water sealing. Positive threaded well vent, cable entrance, and extra openings shall be provided and capped. A mechanical joint discharge connection one foot from the end of the pitless unit shall be provided. A 1-inch drop tube attached to port in cover of the pitless unit shall be provided for drawdown measuring. Drop tube shall be polyethylene 160 psi tested pipe.
- C. The pitless adapter unit shall be a Baker Monitor Division or prior approved equal.

Well Number	NO. 6	NO. 7
Pitless Adapter O.D.	12"	12"
Discharge Size	8"	8"
Column Pipe Size	8"	8"

2.7 WELL PUMP

- A. Scope: The work to be done under this section of the Specifications includes all transportation, labor, tools, supplies, plant, and equipment for furnishing and installation of submersible electric motor driven turbine pump for the TM Rural Water District, Parker, South Dakota.
- B. Pump Construction: The pump to be furnished under these Specifications is to be a standard well-known make by a manufacturer with a past record of building reliable well pumps. The pump must comply in all respects with the applicable regulations of the South Dakota Department of Environment and Natural Resources and AWWA Standard E100 Part B.

1. Pumping Conditions:

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Well Number	NO. 4	NO. 6	NO. 7
Well I.D.	12"	12"	12"
Depth of Well*		369'	302'
Static Water Level Elev.**			
Elevation of Top Well Screen**		1162	1118
Pumping Level Elevation**			
Bottom of Well Pump Elev.		1163	1119
Static Discharge Elev.			
Total Dynamic Head (T.D.H.) @ Design Flow	225'	225'	225'
Design Flow	650gpm	500gpm	500gpm
Minimum Motor Size	50 HP	50 HP	50 HP
Column Pipe Size	8"	8"	8"

* Variable, measured from existing grade, shall be verified by pilot boring.

** Variable.

- a. Total dynamic head does not include losses in pumping unit.
 - b. The pump capacity shown above shall be the capacity, exclusive of all losses in the pumping unit, at an operating speed of not to exceed 3600 RPM. The impeller efficiency at the design condition shall not be less than the efficiency shown and the design capacity shall be slightly less than capacity at peak efficiency to avoid cavitation. The Contractor must supply efficiency and operating curves for approval. The entire pump assembly must be capable of passing through the diameter opening of the pitless adapter specified for each respective well. Pump curve points listed are those of a Goulds Model submersible pump. Pump housing shall be constructed of 316 stainless steel.
2. Bowl Assembly: The bowls shall be constructed of stainless steel close-grained cast iron, bronze, or Meehanite, and shall be free of blow holes or sand holes and other defects. Each bowl shall be fitted with a bronze sleeve type or stainless steel/NBR bearing.
- a. The impellers shall be of stainless steel and the closed type. They shall be accurately fitted, smoothly finished and suitably balanced to give smooth, efficient operation. The impeller unit is to be furnished with a sufficient number of stages to efficiently meet the conditions outlined above.
 - b. Epoxy used to coat cast iron bowl assembly shall conform to AWWA Standards for use in a Potable Water System. Epoxy coating system shall be Tnemec series 20 or FC20 and shall be applied at the manufacturer recommended Dry Film Thickness (DFT) and recommended number of coats.
 - c. The shaft shall be of 431 stainless steel and be of adequate diameter to safely transmit all loads placed upon it.
 - d. The bowl assembly shall be equipped with a suitable, stainless steel strainer at the suction intake.
3. Discharge Column: The column pipe shall be PVC with stainless steel threaded nipples and spline type couplings incorporated with set screws to provide resistance against torque by the pump motor during start up. The column pipe furnished shall be the nominal diameter size as shown in section 2.2 of these Specifications. Casing centralizers shall be furnished with the column pipe to prevent column pipe from vibrating. Column pipe shall be Certa-Lok Drop Pipe for Submersible

from top of the lower bowl assembly to the top of the column pipe where it is attached to the pitless adapter shall be determined from field measurements after construction of the well.

4. Column Pipe Adapters: The column pipe adapter between the pump and column pipe shall be a stainless steel male threaded by grooved or spline adapter.
 5. Submersible Motor: The motor shall be of the completely enclosed type for continuous underwater operation on 460 volts, 60 cycle, 3 phase, A.C. current. The motor shaft shall be stainless steel. The motor shall be filled with high dielectric strength mineral oil and the oil shall be circulated throughout the motor for cooling the rotor, stator windings, and bearings. An approved type of mechanical seal shall isolate the well water from the oil. Motor may be water-filled design for cooling the rotor, stator windings and bearings. Motor housing shall be of 316 stainless steel. Motor horsepower shall be 40 HP for all wells.
 - a. A stainless steel/NBR bearing shall be provided at each end of the rotor and a heavy thrust bearing shall carry the weight of all rotating parts and the hydraulic thrust of the pump. The oil pressure within the pump shall be hydrostatically balanced with the water outside the pump.
 - b. During motor start-up the current shall not exceed the normal running current by more than 500%. The motor manufacturer must provide a suitable means of accomplishing this.
 6. Power Cable: The power cable to the motor shall be impervious to moisture in addition to having high abrasion resistance. The cable shall be protected with a stainless steel guard where it passes by the bowl assembly to prevent damage from contact with the well casing. Stainless steel cable clamps shall be provided to support the cable along the column pipe. The cable size shall be not less than No. 10 copper. The cable shall be of adequate length so that there is no splice in the cable between the pump and the J Box at the pitless adapter unit.
 7. Drawdown Gauge: A plastic tubing shall be furnished and installed with the pump as a means of determining water level. End the tubing slightly above the bowl. A drawdown gauge shall be furnished and attached to the pitless adaptor. Minimum diameter of the drawdown tube shall be 1" to allow insertion of well level probe.
 8. Check Valve: The submersible pump shall be fitted with a check valve constructed of stainless steel or materials similar to those used in the construction of the pump to prevent dissimilar metals corrosion at the connections to the pump and column pipe. Check valves constructed of stainless steel shall have stainless steel housings, seats, and check valve internals. The valve shall be furnished with the pump as an integral part of the pump assembly.
- C. Pump Approval: Well pumps bid for the submersible pump installation shall be Goulds, or prior approved equal. Pump suppliers, other than those named herein, must have approval from the Engineer on the type and model number of pump they intend to supply to meet the Specifications prior to bid opening. Final pump selection should be made upon completion of well development and test pumping.
- 2.8 WATER FOR DRILLING AND WELL DEVELOPMENT
- A. Water used for drilling and well development other than water from the well itself shall be chlorinated clear water containing a free chlorine residual at the time of use. Free chlorine residual concentration shall be not less than 0.5 mg/l.

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2.9 METER PIT, PRESSURE GAUGES, AND MISCELLANEOUS

- A. Each well shall be equipped with a gate valve, an air release and vacuum valve, pressure gauge, pressure switch, flowmeter and 120 volt duplex outlet located in a valve pit adjacent to the well as detailed on the Drawings.
- B. Pressure Gauges: Pressure gauges shall be a corrosion-resistant stainless steel gauge with a rotary movement. Gauges shall be equipped with a diaphragm isolation and a ball valve to isolate the gauge from the line. Gauges shall be connected to the water main with threaded bronze connections and copper pipe. The gauge specifications are as follows:
- | | |
|----------------|--|
| Dial Size: | 3" or larger. |
| Case and Ring: | Stainless steel case and ring. BUNA-N multi-function plug with removable nipple for venting and pressure relief. |
| Window: | Shatter-resistant, high temperature acrylic, sealed to case with BUNA-N gasket and secured with a bayonet ring. |
| Dial: | White aluminum with black markings. |
| Pointer: | Adjustable, black-coated stainless steel. |
| Movement: | Stainless steel, rotary type. |
| Bourdon Tube: | Stainless steel. |
| Restrictor: | Stainless steel, threaded. |
| Range: | 0 to 100 psi. |
| Accuracy: | ± 1% of span. |
- C. Meter pit and upper electrical enclosure shall be precast concrete manholes with an inside diameter of 72" and a wall thickness of 5". The top of the meter pits shall be a precast concrete manhole top similar to the Type II manhole top fabricated by Cretex Concrete Products. The manhole cover and ring shall be similar and equal to the Neenah Model R-6350-G with Type "C" drop handle.
- D. The manhole ring shall be set in bitumastic seal similar to Ram-Nek. The meter pits shall have 3 inches of crushed rock placed uniformly over the floor area to serve as a working surface.
- E. The manholes shall be similar to those manufactured by South Dakota Concrete Products.
- F. Corporation stops for use with the pressure gage in the meter pit shall be ball valves similar and equal to Ford Ballcorp FB 500 or A.Y. McDonald. Valves shall be 3/4" and 1" and furnished with 1/4 turn lever actuator and open by turning counterclockwise. Valve manufacturer shall provide certification that valve meets AWWA C800-01.
- G. Saddles shall be Power Seal Model for taps in the meter pit. Manufacturer shall provide certification to the Engineer that saddles and corporation stops are designed for at least 200 psi working pressure. Corporation stops shall be ball valves similar and equal to A.Y. McDonald or Ford Ballcorp FB 500.

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PART 3 - EXECUTION

3.1 TEST HOLES AND OBTAINING SAMPLES

- A. Two test holes shall be drilled at locations selected by the Owner and Engineer in the area of the proposed wells to determine the thickest aquifer formation. Test holes shall be no smaller than six (6) inches diameter. Four (4) inch diameter test holes may be used if an electronic logger is used during the test drilling process. They shall be drilled through the water bearing formation. Inorganic mud may be used as the drilling fluid.
- B. An accurate driller's log of materials penetrated shall be recorded by the driller who must have the skills to determine the depths and thicknesses of the various underlying strata encountered.
- C. Split Spoon Formation Samples from the pilot holes shall be collected and handled in accordance with Bulletin 638-S, "Instructions for Taking Formation Samples", published by UOP-Johnson Division.
- D. After the formation testing has been completed, the pilot holes shall be plugged in accordance with ARSD 74:02:04. The site shall be obliterated and restored to original contour. If the production well is centered over the test hole, the plugging is not required.

3.2 OBTAINING WATER SAMPLES

- A. Water samples shall be collected from each completed production well. Sample shall be collected near the end of the pump test.
- B. Water samples shall be collected as outlined in "Standard Methods for the Examination of Water and Wastewater (20th Edition, 1998), published jointly by the APHA, AWWA, and WEF.

3.3 TESTING OF FORMATION AND WATER SAMPLES

- A. All samples will be sent to an approved laboratory whereby the following tests will be conducted at the Contractors expense. Contractor shall submit the name of the laboratory to be used for formation analysis. Approved laboratories for water analysis include:

State Health Lab
Pierre, South Dakota

Water Purification Plant
Sioux Falls, South Dakota

- 1. Formation Samples
 - a. Sieve analysis using five or more standard sieves.
 - b. Determination of effective size, uniformity coefficient and model size.
 - c. Percent clay.
 - d. Permeability.
- 2. Water Samples

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- a. Percent sand (as ppm after 15 minutes of pumping at a designated rate).
- b. Chemical analysis including:
 - 1) Total dissolved solids
 - 2) Total hardness and Calcium hardness
 - 3) Total iron
 - 4) Total manganese
 - 5) Chlorides
 - 6) Nitrates
 - 7) Total alkalinity
 - 8) Conductivity
 - 9) pH (To be determined on site)
 - 10) Langelier stability index
 - 11) Sulfate
 - 12) Ammonia - Nitrogen
- c. Temperature and pH of water when pumped shall be measured by the driller and recorded on sample.

3.4 CONSTRUCTION OF THE WELL

- A. General: The Contractor shall drill the well at the locations designated by the Engineer. The Contractor shall drill the hole and install the materials previously described in order that the finished well shall conform to the design illustrated in the Drawings and any applicable standards established by local, state or federal regulatory agencies. The mud pit for the test drilling shall be positioned at least 10 feet from the proposed production well.
 - 1. The Contractor shall dispose of cuttings and discharged water in a manner prescribed by the Engineer so as not to create damage to public or private property. During the test pumping, however, the water discharged shall be piped to a point of overland drainage.
- B. Drilling - Casing Hole: The Contractor shall drill a 24-inch diameter hole to accommodate the 12" well screen to the depths shown on the Drawings. If the depths are adjusted because of underground conditions at the site, payment will be on the basis of unit price per lineal foot of the hole drilled.
- C. Setting Steel Casing and Screen: The full diameter well screens shall be fastened to the casing by welding procedures conforming to the practice of the American Welding Society. Connection between the carbon steel casing and the stainless steel well screen shall be made using type 309 Stainless Steel welding rod. The top of the steel casing shall terminate approximately natural ground level where a pitless adaptor unit shall be welded to well casing.
 - 1. The well screen shall be centered in the hole such that a minimum of 3 inches exists between the face of the hole and the well screen. Centering guides shall be so spaced around and along the casing pipe to insure adequate clearance for the gravel pack and cementing operation. A minimum of two centering guides shall be used. One centering guide shall be immediately above the connection to the well screen.
 - a. After the casing and screen have been lowered into position and before gravel pack operations begin, the casing and screen shall be tested for plumbness and alignment. This test shall be made in accordance with Sec. 8, "Testing for Plumbness and Alignment", of the AWWA Standard A100. Should the casing fail to meet the requirements and interfere

with the installation and/or operation of the pumping equipment. The plumbness and/or alignment shall be corrected by the Contractor at his own expense.

- D. Gravel Packing: The gravel pack shall be introduced in such a manner that it is readily known (with 10% accuracy) how much volume of gravel is in the hole. It shall be placed in a manner uniform and continuous such that hydraulic segregation and bridging are minimized or eliminated.
1. The gravel shall be placed via gravity through two tremie pipes. These tremie pipes shall be located 180° apart in the annular space around the screen and inner casing. They shall terminate no more than 5 feet above the bottom of the hole or level of the gravel pack already placed in the hole. They shall be gradually lifted and sections removed as the level of gravel placed in the hole rises. Funnel fittings at the tops of the tremie pipes shall be used to facilitate the placing of the gravel into the tremie. Clean water shall be used to lubricate the downward movement of the gravel in the tremie pipes - usually from 1 to 3 gpm. Care shall be taken to avoid contamination of the gravel pack materials.
 2. Five pounds of calcium hypochlorite (70% available chlorine) or an equivalent amount of liquid sodium hypochlorite per cubic yard will be mixed in with and placed with the gravel. The rest of the annular space will be sealed with cement grout and bentonite.
- E. Grouting: Grouting of the steel casing shall be accomplished in the presence of the Engineer. It shall be grouted in one continuous operation, filling the annular space between the drilled hole and the casing to the land surface. A 5-foot sodium bentonite plug or seal shall be placed on top of the gravel pack at the indicated level prior to placing the cement grout. The clay plug seal shall not extend more than four (4) feet above the top of the aquifer.
1. The grout shall be placed in the annular space between the drilled hole and casing by use of a grout pipe outside the casing. (AWWA Standard Section 7). The pipe shall extend to the bottom of the annular space initially and should remain submerged in grout during the entire time that grout is being placed.
 2. The pipe may be left in place, or it may be gradually removed. In the event of interruption of the grouting operations, the bottom of the pipe shall be raised above the grout level and should not be resubmerged until all air and water have been displaced from the grout pipe. The grout may be pumped into the pipe or applied continuously by gravity. The grout returning to the surface shall be wasted until the Engineer determines that the grouting has been satisfactory.
 - a. No further work shall be done on the well until the grout has firmly set. (A minimum of 72 hours for neat cement and 24 hours for quick-setting cement).

3.5 DEVELOPING THE WELL

- A. The development process shall be accomplished by simultaneous high velocity, horizontal-jetting and pumping. The O.D. of the jetting tool shall be one inch less in diameter than the screen I.D. The minimum exit velocity of the jetting fluid at the jet nozzle shall be 150 ft/sec. The tool shall be rotated at a speed less than 1 rpm. It shall be positioned at one horizon for not less than two minutes and then shall be moved to the next horizon which shall be no more than 6 inches vertically from the previous jetting horizon. The jetting shall proceed from the bottom of the screen to the top. Pumping from the well shall be at a rate from 5% to 15% more than that introduced through the jetting tool. Water to be used for jetting must be free of sand, turbidity and coliform bacteria. The Contractor has the option of using a surge block method for well development. Pumping rates and duration shall be as specified in Paragraph C. Minimum Development Time.

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1. Means shall be provided for removal of sand jetted into the screen and which settles to the bottom and which is not being removed by the installed pumping equipment.
- B. In conjunction with high velocity, horizontal-jetting and pumping the well shall be surged using a test pump capable of pumping 150% of the design yield. The surging action shall consist of alternately lifting a column of water to ground level and letting the water fall back in the well. The above process is known as raw-hiding the well. Any sand damage to the pump is the responsibility of the Contractor.
- C. The minimum development time shall be twelve (12) hours. If the surge block method is used for development of the well, pumping rates shall be 150 gpm for three hours, 300 gpm for three hours, 500 gpm for three hours, and 650 gpm for three hours. Development shall continue until the Engineer decides further development is unnecessary.

3.6 TESTING THE WELLS

- A. Test Pump and Accessory Equipment: The Contractor shall furnish and install a test pump for pump testing the well. The test pump shall be a vertical turbine with sufficient column and shaft to allow for testing the well to 100 percent drawdown if requested. The test pump shall be operated from a diesel engine or electric unit with variable speed drives and of sufficient size to vary pumping rate from 100 gpm to 650 gpm. When the final test is initiated, it shall be conducted continuously without stoppage. The discharge from the pump shall be equipped with sufficient effluent pipe to carry the water away from the test area (minimum length of 500 feet) and shall be equipped with an orifice meter or other acceptable measuring device to observe the rate of discharge from the pump accurately. Contractor shall be responsible for obtaining the temporary water use permit required for test pumping the well.
 1. A drawdown measuring tube of metal or plastic shall extend from the base of the pump discharge head to a depth no greater than 2 feet above the pump bowls. This tube shall permit the entry and use of a water level measuring device such as an electric sounder or a steel tape.
- B. Pump Test: Each well shall be test pumped for a period of 24 hours or until the water level stabilizes over a 3 hour period at a constant rate of 500 gpm. The discharge of the test pump shall be measured via a circular orifice meter and the water level measured with a suitable measuring device to the nearest 1/4 inch. Measurements of the yield and water level shall be made every minute for the first 10 minutes of the test, every 5 minutes for the next 90 minutes and then every 15 minutes until 3 hours have passed. Measurements between 3 and 5 hours should be made 30 minutes apart and then after 5 hours and until the end of the test they can be made hourly. A one-gallon water sample shall be obtained within 20 minutes after starting the pump and then about 5 minutes before shutting the pump down. After the pump is shut down, recovery measurements of the water level should be made for a period equal to at least one-half of the pumping period or until the water level has reached the original static level. The schedule of the recovery measurements shall be made at the same time intervals that the measurements were made during the pumping portion of the test.
 1. Water level measurements shall be taken throughout the pump test and the recovery period specified. The Contractor shall furnish either a minimum of two individuals to the site for recording well level readings during the pump test or a means for simultaneous electronic recording of water levels at each locations. If an electronic means for recording drawdown levels is provided, the data gathered shall be printed in a report which includes calculated values for transmissivity and yield.
- C. Minimum Well Screen Efficiency. The pump test data will be used to calculate the efficiency of the well screen and gravel pack. If the calculation indicates the efficiency is less than 75%, the well shall be redeveloped at the unit price for development.

3.7 INSTALLATION OF PITLESS ADAPTER UNITS

- A. After each well has been developed and the pump test completed, the Contractor will excavate and cut off the casing at the elevation required to install the 9-foot bury pitless adapter unit. The pitless adapter unit shall be connected to the steel well casing by use of an adaptor (12 x 18") or by using a ½" steel plate welded to the 12" and 18" casing and the bottom of the pitless adaptor.

3.8 DISINFECTING THE WELL

- A. The well shall be disinfected before removing the test pump from the well and before collecting any samples for determining microbiological quality. Disinfection of wells shall be done in strict accordance with ANSI/AWWA C654. This shall be done by introducing a chlorine solution into the well such that a concentration of at least 50 ppm of available chlorine exists in all parts of the well at static conditions. The chlorine solution should be introduced into the well in such a manner that the well surfaces above the static level will be completely flushed with the solution. A minimum of 2 hours contact time should be provided before pumping the well to waste. No separate payment shall be made for this work. Disinfection of the well shall be considered subsidiary to this section of the Specifications. At all times the Contractor shall use all reasonable measures to prevent either tampering with the well or the entrance of foreign matter into it. The Contractor shall be responsible for any objectionable material that may fall into the well and its consequences until the completion and acceptance of the work by the Engineer.

3.9 RECORDS

- A. Two copies of the driller's log for each well, signed and dated by the well driller shall be given to the Engineer. The logs will record the materials penetrated to the nearest foot. In addition to the two copies of the driller's log that are furnished to the engineer, one signed and dated copy of the driller's log shall be mailed to:

South Dakota Department of Environment and Natural Resources
Water Rights Program
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181

- 1. The well construction records shall be filed by the driller pursuant to ARSD 74:02:04:65.
- B. All static water level measurements will be recorded. This record along with the times that the measurements were made, will be given to the Engineer.
- C. A complete casing and screen location record shall be made by the driller and given to the Engineer. This will show the individual length of sections of casing and screen and the location of packers, plugs and seals.
- D. Pumping test data will be supplied to the Engineer from all pumping tests conducted on the well. These will show dates, water levels, discharge rates and times of stopping and starting the pump.

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3.10 PLACING PUMPS IN SERVICE

- A. The Contractor shall be responsible for having an experienced person on the site to supervise the installation of the pump and accessories.
 - 1. The pitless adapter unit for the submersible pump shall be furnished by the well Contractor. The Contractor shall remove the pitless adapter, set the pump in place, screw the column pipe to the adapter and set the entire unit into place sealing the adapter.
 - 2. All electrical connections between pump and electrical conductors shall be made at the Well to the starter and control panel.
 - 3. Prior to installation of the permanent pump in the well, the pump motor, column pipe, pump bowls, tubing, probes, electrical cable and all other components to be placed in the well shall be thoroughly swabbed in a chlorine solution of not less than 50 ppm concentration for disinfection purposes.

3.11 SITE RESTORATION AND FINISH GRADING

- A. Portland cement concrete used in constructing the well slab shall be in full accordance with SECTION 033000 - CONCRETE of these Specifications. Concrete shall have a minimum 28-day compressive strength of 4000 psi.
 - 1. All areas disturbed in the construction of the well shall be graded to provide proper drainage and a neat appearance. The top six inches of all disturbed areas shall be topsoiled and reseeded as directed by the Engineer, which work shall not be a pay item but shall be considered as subsidiary to this section of the Specifications. The Contractor shall provide fill material as necessary, properly graded and compacted to 95% of maximum density and finished to final established elevations as shown on the Drawings. Grading shall conform with Section 310000 of these Specifications. The gravel surfacing shall be placed to a depth of approximately 4 inches.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 DRILLING TEST HOLES

- A. The drilling of test holes shall be up to discretion of owner.
- B. The drilling of test holes shall be measured by the number of lineal feet of test holes actually drilled to designated bottoms. No other measurement for payment shall be authorized under this item.
- C. The drilling of test holes shall be paid for at the contract unit price per linear foot for "Test Holes" as stipulated in the Bid, which price and payment shall be full compensation for all transportation, furnishing all labor, tools, equipment, materials, supplies, plant and other necessary items required to drill the test holes, logging and sampling of each strata of the formation, filling abandoned test holes, clean-up and other appurtenances required to complete the work under this section.

4.2 DRILLING PERMANENT WELL

- A. The drilling of the well shall be measured in lineal feet of depth which shall be the total depth of the permanent casing plus screen. Payment for drilling shall be made at the Contract unit cost per lineal foot

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for "Drilling Permanent Well Hole" for well screens of various diameters, as stipulated in the Bid which price and payment shall be full compensation for all transportation, labor, tools, supplies, materials and equipment required to construct the well hole for both the permanent casing and the screen, sampling of the formation if requested, and all other pertinent work required to complete the hole.

4.3 PERMANENT CASING

- A. The permanent casing installed in the wells shall be measured by the actual length in feet of casing furnished and installed. Payment for casing shall be made at the Contract unit price per lineal foot for "Well Casing", for the well casings of various sizes, as stipulated in the Bid, which price and payment shall be full compensation for all transportation, labor, tools, material, supplies and equipment required to furnish and install the casing in its final location.

4.4 STAINLESS STEEL WELL SCREEN

- A. The well screen installed in the well shall be measured by the actual length in feet of screen furnished and installed, measured from and including the bail bottom to the top of the connection to the casing. Payment for well screen shall be made at the Contract unit price per lineal foot for "18" Stainless Steel Well Screen" as stipulated in the Bid, which price and payment shall include all transportation, labor, tools, material, supplies and equipment required to satisfactorily install the well screen to its final location.

4.5 SELECTED SILICA GRAVEL PACK

- A. The selected silica gravel used for the gravel wall around the well screen and casing shall be measured in linear feet of gravel pack material installed in the annular space of the wells. Payment shall be made at the Contract unit price per lineal foot for "Selected Silica Gravel Pack", as stipulated in the Bid, which price and payment shall be full compensation for all transportation, labor, tools, material and equipment required to construct the selected silica gravel pack in a satisfactory manner. Measurement will be made to the nearest foot.

4.6 BENTONITE SEAL

- A. The bentonite material used for the bentonite seal around the well casing shall be measured in linear feet of annular space for the total length of the bentonite hole plug seal. Payment shall be made at the Contract unit price per linear foot for "Bentonite Seal", as stipulated in the Bid, which price and payment shall be full compensation for all transportation, labor, tools, material and equipment required to construct the bentonite seal in a satisfactory manner.

4.7 CONCRETE GROUT SEAL

- A. The concrete grout used for seal around the well casing shall be measured in lineal feet of depth of seal. Payment shall be made at the Contract unit price per lineal foot for "Concrete Grout Seal", as stipulated in the Bid, which price and payment shall be full compensation for all transportation, labor, tools, materials and equipment required to construct the concrete grout seal in a satisfactory manner.

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4.8 DEVELOPMENT OF PERMANENT WELL

- A. Complete development of the well shall be measured by the complete item to produce a clear and sand-free effluent from the well. Payment shall be made at the Contract unit price for "Development of Permanent Well", based on actual pump operation time, as stipulated in the Bid, which price and payment shall be full compensation for all transportation, labor, tools, materials and equipment required to develop the well in a satisfactory manner, including surging, backwashing, installation and removal of test pump, disinfecting the well, clean-up and other appurtenances required to complete the work. The period of development shall be not less than 6 hours per well under this item.

4.9 FURNISH AND INSTALL PITLESS ADAPTER UNIT

- A. The pitless adapter unit installed in the well shall be measured as a single unit of work furnished and installed. Payment for Pitless Adapter Unit shall be made at the Contract unit price for "Furnish and Install Pitless Adapter Unit" for various sizes, as stipulated in the Bid, which price and payment shall include all transportation, labor, tools, material, supplies and equipment required to satisfactorily install the pitless adapter units in their final location.

4.10 FURNISH AND INSTALL SUBMERSIBLE WELL PUMP

- A. The submersible well pump with integral check valve installed in the well shall be measured as a single unit of work furnished and installed. Payment for Submersible Well Pump shall be made at the Contract unit price for "Furnish and Install Submersible Well Pump" for various sizes as stipulated in the Bid, which price and payment shall include all transportation, labor, tools, material, supplies and equipment required to satisfactorily install the submersible well pumps in their final location.

4.11 FURNISH AND INSTALL PVC COLUMN PIPE AND FITTINGS

- A. The PVC column pipe installed in the well shall be measured by the actual length in feet for the various sizes of column pipe furnished and installed. Payment for pipe shall be made at the Contract unit price per lineal foot for "Furnish and Install PVC Column Pipe and Fittings", for the column pipe of various sizes shown, as stipulated in the Bid, which price and payment shall be full compensation for all transportation, labor, tools, material, supplies and equipment required to furnish and install the column pipe in its final location.

4.12 FURNISH AND INSTALL COLUMN PIPE ADAPTER

- A. The adapter for column pipe installed between the pump and column pipe shall be considered incidental to the installation of the column pipe.

4.13 FURNISH AND INSTALL CHECK VALVE

- A. The check valves of various sizes installed in the wells will be an integral part of the submersible well pump. Furnishing and installing the check valve will be considered incidental to the installation of the pump.

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4.14 TEST PUMPING

- A. Test pumping of the well shall be measured on the basis of the number of hours of actual pumping. The services to be provided as a part of the test pumping shall include staff to operate the test pump, staff to read and record water level measurements in the pumped well and an adjacent test well during both the test pumping period and a recovery period of not less than 12 hours, and staff to read and record the rate of flow from the test pump during the test period. Payment shall be made at the Contract Unit price for "Test Pumping" based on actual pump operating time as stipulated in the Bid, which price and payment shall be full compensation for all transportation, labor, tools, materials and equipment required for the test pumping period and recovery period. The period of test pumping shall be twelve (12) hours unless modified by the Engineer.

4.15 MISCELLANEOUS WELL REQUIREMENTS

- A. Under this item, the CONTRACTOR shall be paid the lump sum price shown on the Bid Schedule as full compensation for the following work: disinfecting production wells; collect, ship and analyze samples for bacteriological parameters; deliverables including daily driller's reports, driller's logs, geophysical logging, well test pumping results and recommendations, "As Constructed" drawings; and completed State of South Dakota Well Completion Report.

4.16 FURNISH AND INSTALL METER PIT, ABOVE GROUND BUILDING, PIPING, VALVES, AND PRESSURE GAUGES

- A. The meter pit, above ground building and the pressure gauge installed at the wells shall be measured by the number of units actually furnished and installed. Furnishing and installing the 8" and 4" D.I.P. shall be considered incidental to the installation of the meter pit. Payment for the meter pit, piping, valves, pressure switch and pressure gauge shall be made at the Contract unit price each for "Furnish and Install Meter Pit, Above Ground Building, Piping, Valves, and Pressure Gauges" as stipulated in the Bid, which price and payment shall include all transportation, labor, tools, materials, supplies and equipment required to satisfactorily install the meter pit, above ground building, piping, valves, and pressure gauges in their final location and as detailed in the Drawings.

END OF SECTION 332100

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PART 1 - GENERAL

1.1 DESCRIPTION

- A. This work shall consist of performing all labor and furnishing all material to provide a complete and workable control system for the TM Rural Water, proposed wells no. 6 and no. 7. This Section includes specifications for the control panels, appurtenances and associated materials and equipment. This section also defines responsibilities and requirements for coordination of the work, shop drawing submittals, operator training, system checkout, spare parts, and warranty.

1.2 EXISTING CONDITIONS AND INTEGRATOR'S RESPONSIBILITY

- A. The control system supplier shall be responsible for coordination of all aspects of control system work including: interfacing of control system with motor control centers, interfacing of controls with instruments and equipment, testing of control systems, coordination with the Owner, operator training, system checkout and repair during the warranty period, and complete system documentation. The control system installation shall be coordinated with the Engineer and Operating Staff to minimize disruptions of operation of the treatment plant during the connection of additional equipment and the modification of existing equipment connected to the control system. The control system integrator shall provide drawings showing the interconnecting wiring requirements to connect the control panels to the process equipment and to the motor control centers. This information shall include wire counts for specific control and instrument systems. The Contractor will furnish copies of the process equipment submittal information to the control system integrator for coordination and completion of the control submittal drawings. It is expected that this coordination will require on-site coordination and such coordination shall be included as a part of the bid for the control system integration. For purposes of coordination, it is recommended, but not required, that the Control Integrator serve as a subcontractor to the Electrical Contractor.

1. A proposed Allen Bradley 5/05 PLC is used to control the proposed water treatment plant. This PLC will control the new softening plant, the operation of the high service pumps and the master control for the polling the remote sites. Two radios are used to poll the remote locations. One polls the distributions system sites and the second radio polls the wells. The second radio is an MDS 9810 spread spectrum radio. This radio will poll the four existing well sites as well as the two proposed wells. All communications between the Master and the slave distribution system and well field PLCs communicate through a PROSOFT card (MVI46-DFCM) using the Allen Bradley DF protocol.
2. Due to the complexity and type of installation, a planned sequence of operations is required to install the system while keeping the existing treatment facility in operation. It shall be the responsibility of the control system supplier to closely schedule his work so that his work will be installed at the proper time and without delaying the completion of the entire project. The plan for the sequence of operations shall be reviewed with the Owner and Engineer prior to starting installation of the equipment.
3. The existing water treatment plant for the TM Rural Water must remain in service during installation and checkout of the various control systems. The control system contractor shall coordinate his activities with the Owner, Engineer, and General Contractor to minimize service disruptions.
4. It is the responsibility of the General Contractor and all his Subcontractors to install all equipment in strict accordance with manufacturer's recommendations, with adequate on-site supervision being provided by the manufacturer of the equipment or his authorized representative.

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5. The authorized representative of the manufacturers supplying equipment shall notify the Consulting Engineer that the equipment has been satisfactorily installed and is ready for operation. No form of energy shall be turned on to any part of the control and monitoring system prior to receipt by the Consulting Engineer of a statement of approval of the installation from the Contractor containing his supplier's authorization for turning on energy to the system.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. The following items of related work are specified and included in other sections of these Specifications:
 1. Division 16 - Electrical, Power, and Lighting
 2. Division 40 – Primary Process Measurement Devices
- B. The materials specifications for wire, appurtenances, and equipment apply to the materials required for the control system. The treatment process equipment specifications detail requirements for new and relocated process equipment. The control contractor shall coordinate control and monitoring system wiring requirements. Programmable Controllers furnished with process equipment shall be connected to the PLC network.

1.4 PRIOR APPROVAL

- A. The following items of materials and or equipment must receive approval prior to bidding if it is intended to furnish products other than those specifically named in the Specifications:
 1. Programmable Logic Controllers
 2. Control Integrator

Control Integrator for this project shall be qualified to modify the existing system and shall provide warranty for the modifications made.

- B. The requirements for obtaining such approval are specified herein and in the General Requirements. In addition to and not exclusive of the requirements set forth in the General Requirements, any equipment manufacturer who wishes to be considered shall submit to the Engineer a detailed proposal describing the system.
- C. A proposal for the control system including the control panels shall include the following:
 1. Specifications for controllers proposed for the various control loops including software system proposed.
 2. Description of the operation of the programmable logic controllers proposed.
 3. Specifications and description of the personal computer equipment and software packages proposed including HMI software package proposed.
 4. A project implementation plan, including information on project management, engineering, installation, startup, and maintenance service. The project implementation plan shall state how many people will be assigned to the project and the qualifications of the people who will be on site. The Engineer designing the control system shall be a registered professional engineer.
 5. A list of installations of similar projects which include similar configurations of programmable controllers, operator interface devices, personal computers, and software systems. The installation list shall include the name, address, and phone number of the operator or utility superintendent and the consulting engineer.

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6. A complete description of exceptions taken to these Specifications including detailed explanations of any proposed alternatives.
- D. If the required materials are not included in the pre-qualification proposal, the proposal will be considered incomplete and non-responsive and may be rejected by the Owner and the Engineer.

1.5 SHOP DRAWINGS AND BIDDING REQUIREMENTS

- A. Submit copies of shop drawings in accordance with DIVISION 1 - SUBMITTALS for all hardware items listed under "Products". Shop drawings shall include all catalog cuts, descriptive data, and drawings for the entire control system. If catalog cuts are furnished, the specific model number, color, and all requirements shall be indicated on each copy of the shop drawings.
- B. Submit copies of the proposed method of control system expansion including a listing of additional hardware required, additional software required, and implementation requirements. The data acquisition and monitoring system supplier shall also submit a detailed explanation of the procedure for integrating the water treatment process controls into the new radio telemetry system.
- C. Submit system documentation as described in paragraphs 3.01 and 3.02 of this Specification.

PART 2 - PRODUCTS

2.1 PROCESS CONTROL FUNCTIONS – PROPOSED WELLS

- A. General: The scope of work under this contract includes the addition of the new equipment furnished under this contract to the control system, reconnecting and reconfiguring equipment that is replaced under this contract, and modification of the appropriate displays, reports, and logs to record the information generated by the new equipment and instruments. All wiring and appurtenances required for a complete and functional system addition shall be provided under this contract. The monitoring and control functions are described in the functional description of the control system. The control equipment and material specifications are described in the Specifications for control system hardware and materials.
 1. PLC-0.60 and PLC-0.70 are the proposed controller for the operation of each respective well site. Each PLC shall communicate with the master at the water treatment plant. The operator shall be able to start and stop pumps based on the water level in the clearwell and set the desired pumping rate from each of the wells.
 2. A new antenna shall be provided with each of the proposed plc at each respective well site. The integrator shall provide and install a new omni antenna at the water treatment plant for communications with the entire remote well sites. Well site no.6 is located approximately one half mile to the east of the existing well no. 4 well site and Well site no. 7 is located approximately 2 miles south and one half mile to the west.
 3. The main HMI system at the water treatment plant shall be modified to monitor and control the operation of the two proposed wells.
- B. The Input/Output lists are provided in the Plans. The information provided identifies the signals to be connected and the panel at which they will be connected.
- C. Control Loops for Treatment Process Control (PID Control)

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1. Analog Inputs

<u>Description</u>	<u>Signal Range</u>
Well No. 6 Flow Rate (FIT-0.60.01)	0-1,000 GPM
Well No. 7 Flow Rate (FIT-0.70.01)	0-1,000 GPM

2. Analog Outputs for Treatment Process Control Loops (Excludes Outputs to Recorders, Displays, etc...)

<u>Description</u>	<u>Output To</u>
Well No. 6 Flow Meter	VFD pump speed (VFD-0.60.01)
Well No. 7 Flow Meter	VFD pump speed (VFD-0.70.01)

D. Operational Description - Control Functions:

1. General: An existing personal computer system in the existing water treatment plant provides a system for monitoring the treatment process and equipment in the well field, treatment plant and distributions system.

a. General Requirements: The control and monitoring system shall incorporate a Programmable Logic Controller based system sized to handle all analog and contact closure signals necessary for the monitoring and control functions specified in this contract. Two modes of control shall be available to the operator.

- 1) Operator Setpoint Control: In this mode the operator shall set desired flow, level, and time interval setpoints as required by the various control loops. Adjustment of a setpoint shall not hinder the operation of other control loops. The control loop shall operate the system within the setpoint limits if the controlled equipment is in the automatic mode. Dead bands, signal averaging, and signal damping will be necessary to prevent unnecessary and too frequent control adjustments. Signal averaging shall be operator adjustable over a span of 0 to 10 minutes. The operator shall be able to override the automatic control from the control panel by using the Hand control or Open/Close controls for valves.
- 2) Manual Control: In this mode the operator shall be able to take direct control of any device connected to a Hand-Off-Auto switch on the MCC or control panel or Open-Close-Auto switch on the control panel. The manual mode of control shall be completely independent of the programmable controller and failure of the programmable controller shall in no way limit manual control functions. Each pump and chemical feed system having a motor starter in the MCC will also have a lockable Hand-Off switch at the unit. The off position of this switch will override all other controls. The Hand position will permit control of the unit operation from either the switch on the MCC or the process control panel.
- 3) Status and Alarm Monitoring: Equipment alarms shall be designed to inform the operator of any un-commanded change of status. Equipment

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failure alarm logic shall include adjustable time delays to prevent nuisance alarms due to time delays in the starting controls. The motor starter controls for process equipment generally include time delay relays to sequence restart after power failure. The time delays for the alarms shall be set longer than the time delay for start to prevent nuisance alarms.

- a) Analog input alarms shall be annunciated when a setpoint limit is violated or a signal is lost. Zero flow signals on flow meters will not necessarily be an alarm condition; setpoints for low flow must be adjustable to prevent nuisance alarms at zero flow. Operator shall enter alarm limits using the keyboard for the process control interface.
 - b) Status and alarm engraving is shown on the Plans. The engraving schedules and arrangements shown are intended as a guide for control panel layouts. Variations to plan shown arrangements will be reviewed at the time of shop drawing submittal.
2. Functional Description of Process Controls: The following is narrative of the normal operating procedures for each major piece of equipment in at each of the proposed well sites. The parameters in brackets are initial setpoints for operator selected variables. All operator selected setpoints shall allow the operator to change or modify variables in the control of the equipment.
- a. Panel Locations: The process monitoring and control panels shall be located in each of the remote locations as generally shown on the Plans. Coordinate location of proposed panels with engineer prior to installing panel and associated conduit. The following narrative is intended for both proposed well site. The nomenclature is based on the operation of Well No. 6. Both well sites should operate in the following manner.
 - b. Well Pump Discharge Flow Meter: A new raw water flow meter (FIT-0.60.01) & transmitter shall be connected to PLC-0.60, as furnished under this Contract. The flow meter measure raw water being pumped from the aquifer to the water treatment plant. The plc shall monitor and report the flow rate to the PLC-1.0, and control the speed of the pump. The minimum flow required to report to the control system shall be an operator entered setpoint [20 gpm]. If the flowrate is less than the operator selected parameter, the flow shall read 0 gpm.
 - 1) The transmitter for each meter shall be mounted on the wall in the above ground structure. Flow totals shall be displayed by a six digit non-resetting flow totalizer within the control system software package. The raw water flow signal shall be connected to the programmable logic controller for display of flow rate and total flows on operator interface screens.
 - 2) Flow signals used to pace the well pump speed shall be handled as described in the following sub sections.
 - c. Well Pump: A submersible well pump shall be furnished and installed under this contract. Well pump no. 6 (M-0.60) will be used to lift water from the aquifer and deliver to the water treatment plant. The pump will be controlled by a VFD (VFD-0.60). The well pump will be called to start and stop based on the water level in the clearwell as monitored by one of two level transducers (LT-101 or LT-102). The operator shall be able to select which transducer controls the operation of the well pumps.

1) Normal Mode of Operation:

The well pumps will be called “on” based on an operator selected setpoint in the clearwell (LT-101) [12.0 feet]. When the water in the clearwell reaches an operator selected setpoint [20.0 feet] the well will be called “off”. All wells will be setup to operate in a lead, lag, lag-lag method of operation. The control logic shall not use an alternate to balance the run hours on each of the well pumps. The operator shall also be capable of automatically turning more than one pump on or off based on a clearwell water level.

2) Control of Pump Speed:

- a) Pump Speed Control Option 1 – Maintain rate of flow to match an operator-entered flow setpoint [500 gpm]. In this operating mode, the operator will enter a setpoint for the total rate of flow to be delivered to the water treatment plant as measured by water meter (FM-0.60.01). Pump speed for the operating pumps shall be automatically adjusted to maintain the desired flow rate.
- b) Pump Speed Control Option 2 – Maintain preset discharge pressures (PT-0.60.01) [30 psi] in the discharge piping. In this operating mode, the pump speed shall be adjusted to provide a desired pressure to the water treatment plant. If the level drops below the setpoint, the pump speed shall be automatically increased to provide sufficient flow to bring the pressure to the desired level. Once the pressure is at the desired level, the pump speed shall automatically be adjusted to maintain that level.

3) Pump Protection and Emergency Shut Down:

- a) The control logic in PLC-0.60 shall include alarms and overrides to shut down the well pumps pumping to the water treatment plant in the event of a low flow (FT-0.60.01) [50 gpm], a high flow (FT-0.60.01) [800 gpm], or a high discharge pressure (PT-0.60.01) [50 psi] in the well discharge piping.
 - b) Each pump will have a pressure switch (PS-0.60.01) mounted on the well discharge piping. This pressure switch shall include two relay contacts that close when during a high pressure event [60 psi]. One control wire shall be pulled and landed on the pumps associated VFD and the other shall be pulled and landed on PLC-0.60. The pressure switch wired directly to the VFD shall be programmed to shut the pump down when in the Auto or hand operation.
 - c) A second pressure switch shall be used to indicate positive flow in the discharge piping. The signal generated by this pressure switch (PS-0.60.02) shall be used to indicate that the well pump is operating [20 psi].
 - d) All emergency shut down setpoints shall be operator selected.
- d. Pressure Transmitter: A pressure transmitter shall be furnished and installed on each of the well discharge piping (PT-0.60.01 and PT-0.70.01) as shown in the P& ID drawings. High pressure [50 psi] alarms shall shut down the well pump and be annunciated on the Ethernet LAN when pressures rises above an operator selected setpoint.
 - e. Entry Alarm: Each well building will be equipped with intrusion alarm systems to indicate unauthorized entry by using limit switches (ZS-0.60.01) mounted on the exterior door. An alarm conditions shall be generated and annunciated on the Ethernet LAN if and when an unauthorized entry is recorded.
 - f. “No Power” Alarm: Each well building will be equipped with a relay (ZS-0.60.02) that will monitor the presence of line power. The relay shall be located in the control panel

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and wired to the PLC-0.60. An alarm conditions shall be generated and annunciated on the Ethernet LAN if and when a power failure is recorded.

2.2 MONITORING AND CONTROL SYSTEM HARDWARE AND MATERIALS

- A. General: The monitoring and control system shall consist of the following major units: Process control panel, conduit with cable only for future purpose to connect a personal computer in the control room, connections to the various motor starters and process instrumentation as shown on the plans. The treatment process control panel shall include automatic control and manual backup capabilities for monitoring and manipulating certain aspects of the processes as defined herein. The control panel shall also contain the power supplies necessary to power the field transmitters requiring 12 and 24 VDC power. Terminals blocks shall be supplied for all input and output signals, in addition to the signals necessary to support the control system. Electrical circuits for chemical feed pumps and instrumentation shall be separate from the electrical circuit for the process control and telemetry system even if they are located within the process control panel.
- B. All analog input and output signals shall be fused independently using fused terminal blocks with LED indicator lights to signal a blown fuse.
- C. Control switches and push buttons shall be furnished and installed as necessary to accomplish the specified control functions. All switches and pushbuttons shall be labeled with appropriate nameplates. Switches and pushbuttons shall be suitable for installation in a high humidity corrosive environment.
- D. Relays, timers, and other control panel mounted control devices shall be plug-in design for convenient maintenance. All relays and timers for similar use shall be identical and interchangeable.
- E. The panels shall be completely pre-wired. Main groups of wire shall be routed in plastic nonflammable wiring duct. Smaller groups of wires shall be secured with nylon cable clamps and ties or plastic spiral wraps. Terminal blocks shall be used for all external wiring connections. Field wiring to terminal strips shall be routed through non-flammable wiring duct.
- F. Equipment connections shall be made with spade lugs except where devices specified are available only with solder type terminals. Connections shall be made as recommended by the manufacturer.
- G. The circuit breaker panel board shall be mounted inside the control panel at a readily accessible location.
- H. Interior illumination shall be installed inside the control panel with a single pole switch mounted at a convenient location.
- I. A duplex receptacle shall be mounted inside the panels in the operator station and inside each of the control subpanels.
- J. The complete installation shall be done such that all relays, control devices, and panel instruments are completely accessible without major dismantling of panel equipment.
- K. Enclosures: The control panel in the treatment plant shall be a totally enclosed panels of the size and shape indicated on the Drawings. Framework shall be 2"x 1-1/4"x 1/4" (minimum) steel angle with bracing and stiffeners added, as required, to form a rigid structure.

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- L. The panels shall be fabricated with front access doors. Each door shall be equipped with a three-point latching mechanism and non-locking handle. Doors shall be constructed of 10-gauge structural steel (minimum). Rear access to the panel is not available. A chrome trim strip shall be provided to cover any shipping splits.
- M. A warning sign shall be installed inside each enclosure indicating the presence of separate externally derived sources for voltage in the panel. The signs shall be a minimum of 3 inches by 6 inches in size or sized to fit the available space. The signs shall be red and white or similar color scheme acceptable to the Engineer.
- N. Interior brackets, hinged equipment racks, and mounting pans shall be provided for mounting panel equipment. Temporary equipment bracing shall be provided to allow the panel sections to be turned on their side for moving into the control room.
- O. All interior and exterior surfaces shall be sandblasted prior to painting. Interior and exterior surfaces shall be primed with lacquer metal primer 3/4 to 1 mil dry. Interior finish coat shall be white low-gloss industrial lacquer 1 mil dry with a smooth texture. Exterior finish coat shall be low-gloss industrial lacquer 1 mil dry of a color to be selected by the Owner.
- P. Control panel enclosure shall be as manufactured by Hoffman Engineering Company, EQUIPTO Enclosures, or an Engineer approved equal.
- Q. Nameplates and Signs: Nameplates and signs shall be engraved as shown on the Plans. Nameplates for the control panel front shall be made of a phenolic laminate with satin black surface and white core. Engraving shall be done in a manner which exposes the white core. The edges of nameplates shall be beveled to expose the color of the core. The nameplates shall be 0.040 inch thick.
- R. Lettering on nameplates shall be a minimum of 3/8" in height for capital letters. Engraving schedules shall be approved by the Engineer prior to engraving the nameplates.
- S. Nameplates shall be attached to the panel by adhesive and a mechanical fastener. Screws or rivets shall be brass, stainless steel or chromium plated steel.
- T. Control and Wiring Devices and Appurtenances:
 - 1. Conductors: Conductors for receptacles, interior lighting, and other similar loads shall be AWG No. 14, 41 strand, copper (minimum). Conductors for low power loads of 120 volts or lower voltages shall be AWG No. 18, 16 strand, copper (minimum). All conductors shall be identified at both ends with wire tags. Conductors for 4-20 mA low level signals shall be AWG No. 18 twisted shielded pair, with thermo-plastic insulation. Conductors for the data transmission system within the treatment plant shall be a Cat 5 cable as specified in section 16758.
 - 2. Terminal Blocks: Terminal blocks for all external connections shall be rated at 600 volts. Terminal blocks for internal panel connections of AWG No. 14 conductor and smaller shall be rated at 300 volts. White terminal marking strips indicating point identification and diode or capacitor polarity shall be installed on each terminal block. Terminal blocks shall include disconnect switch terminal block sections suitable for interrupting control voltages where a control voltage source enters the enclosure from a remote location.
 - 3. Receptacles: Duplex receptacles shall be of the 20 ampere, 125 volt, 2 pole, 3 wire, grounding type complete with box.

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4. Interior Illumination: Control panel interior lighting fixtures shall be complete with ballast, wiring, and fluorescent lamps. Fixtures shall be controlled by a single pole, box mounted switch.
- U. Circuit Breaker Protection: Circuit breakers shall be quick-make, quick-break, thermal-magnetic, trip indicating and have common trip on all multiple breakers. Provisions for additional breakers shall be such that field addition of connectors or mounting hardware will not be required to add breakers to the panel boards. All instrumentation systems, annunciator panels, lighting circuits, or similar major devices requiring 120 volt AC power shall have an individual circuit breaker. Circuit breaker trip ratings shall be as recommended by the manufacturer of the equipment being protected. Each control panel shall have space provided for a minimum of two additional circuit breakers. Control circuits including flow pacing signals to each chemical feeder shall be independent and independently fused so that a circuit problem with one feeder does not interrupt operation of other feeders.
- V. Power Supplies: Constant voltage transformers shall be used to supply power to all equipment requiring a constant voltage supply which does not have self-contained voltage regulation equipment. AC and DC power supplies shall be furnished for control circuits and indicating lights where not supplied from power supplies furnished as a part of major equipment items.
 1. Constant Voltage Transformers: Constant voltage transformers shall be rated as follows:
 - a. Input Voltage: 95-125 Volts AC.
 - b. Output Voltage: 115 Volts AC.
 - c. Regulation: +/- 1 percent.
 - d. Size: As Required.
 - 1) Constant voltage transformers shall be as manufactured by Allen Bradley, General Electric, Square D, Sola Electric Company or an "Engineer approved equal". Constant voltage transformers shall be equipped with surge protection to protect control circuits from voltage spikes.
 2. AC Power Supplies: AC power supplies shall be rated as follows:
 - a. Primary Voltage: 120 Volts AC.
 - b. Secondary Voltage: 24 Volts AC.
 - c. Size: As required.
 - 1) AC power supplies shall be as manufactured by General Electric, Square D, Allen Bradley, SOLA, or an "Engineer approved equal".
 3. DC Power Supplies: DC power supplies shall be rated as follows:
 - a. Input Voltage: 105-125 Volts AC.
 - b. Output Voltage: 12-32 Volts DC adjustable.
 - c. Line Regulation: 50 mV for +/- 10V Line Change.
 - d. Load Regulation: 100 mV for Full Load Current Change.
 - e. Ripple: 35 mV RMS.
 - f. Transient Response Time: From 5 to 50 ms; Typical Overshoot between 0.5 and 1.15 volts.

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- 1) DC power supplies shall be as manufactured by Honeywell, Allen Bradley, Square D, General Electric, Acopian or an "Engineer approved equal".
4. Uninterruptible Power Supplies: Uninterruptible power supplies shall be furnished and installed in the new PLC panel. Provide a double conversion (AC-DC-AC) on-line UPS that will continue to operate flawlessly in the event of a power failure and when the standby generator comes on line. UPS shall produce a pure sine wave output and provide 20 minutes of operation w/o utility power. UPS shall be manufacturer be SG Series UPS Plus as manufactured by Falcon Electric or approved equal.
- W. Control Relays: Control relays shall be plug in relays. Relay contacts on 110 VAC circuits shall be rated for 300 volts and up to 10 amps of load. Coil voltage and contact configuration shall be as required to implement the control and instrumentation loops indicated.
 1. Control relays shall be GE, Allen Bradley, Square D, IDEC RR series, Potter Brumfield, or an Engineer approved equal.
- X. Timing Relays: In general timer control functions may be provided in the control logic furnished for the programmable logic controller. Where timing relays are necessary, the relays shall be of the "ON-DELAY" or "OFF-DELAY" type which begins the time delay upon energizing the coil and reset automatically when de-energized. The timing relays shall contain contacts of the voltage and current ratings required to implement the control functions indicated.
 1. Timing relays for periods greater than 200 seconds shall utilize solid state electronics. Timers shall have 11 pin base which matches other timers used. Timers shall be ATC 328 Series or an Engineer approved equal.
 2. Timing relays for periods of 200 seconds and less shall be solid state with adjustable timing ranges of 10-180 sec., suitable for interior panel mounting. Timers shall have an 11 pin base which matches the other timers used. Timers shall be as manufactured by Allen Bradley, General Electric, Square D, AGASTAT Series 7000, IDEC RTY series, or an Engineer approved equal.
 3. Alarm Annunciators: Alarms shall be annunciated using an external contact closure signal connected to the telephone and intercom system. The contact closure shall initiate a distinctive alarm tone to be sounded.
- Y. Switches and Pushbutton Controls: Sequence selector switches shall be multiple deck, rotary type detent switches with silver finish phosphor-bronze moveable, wiping contacts. The number of decks shall be as required to implement the switching action indicated on the Drawings and/or in the functional description of the controls.
 1. Manual-Auto selector switches shall be heavy-duty, oil-tight type switches with maintained contacts as manufactured by General Electric Series CR2940, Allen Bradley, Square D, or an Engineer approved equal.
 2. Pushbutton switches shall be heavy-duty, oil-tight switches with momentary contacts as manufactured by General Electric Series CR2940, Allen Bradley, Square D, or an Engineer approved equal.
- Z. Fuse Holders: Fuse holders for AC and DC instrument systems shall be Buss Snap-Lock Type HLD fuse holders or an Engineer approved equal.
 1. Each power supply, process instrument, and motor control circuit operating within the panel shall be individually fused using terminal block fuse connectors installed per the manufacturer's recommendations.

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2. Provide spare fuses for each AC and DC circuit. Spare fuses shall be stored in a spare fuse cabinet located inside the panel enclosure near the fuse holder mounting brackets.
- AA. Process Controllers: The treatment process control shall be provided by a programmable logic controller. The PLC's shall be used for the process control at the master control panel and the new remote panel furnished under this contract. The programmable control system may be used for driving;
1. Control loops
 2. Sequential controls
 3. Status and alarm lights and horns
 4. Digital displays of analog signals
 5. Non-resetting flow totalizers
- a. Manual control for the pumps, valves, and process equipment shall be independent of the programmable control system and wired so that a failure of the programmable control system will not limit the ability of the operator to control the process.
 - 1) Programmable Logic Controllers (PLC's): The PLC's furnished shall be designed for ladder logic control sequence programming using an open architecture software system. The PLC's shall be equipped with input/output boards and terminal strips necessary for the control functions specified. The PLC's shall be compatible with the telemetry system. The number of inputs and outputs shall be determined by the control system contractor and will be governed by the control functions required and the configuration of signals within the panel. The system shall be configured with a spares of each type of input and output as shown on plans.
 - a) The PLC's shall be rack mounted within the control panel. The controller and I/O boards shall include LED's for status indication and diagnostics. The PLC shall include multiple communication ports. One port shall be for communication with the input/output racks for the master control panel, one port shall be provided for connection of a personal computer system interface, and one port shall be provided for connection of the operator interface.
 - b) The PLC's furnished shall be fully documented, commercially available PLC's equal to the Allen-Bradley Micro-Logix (1761-L20 series), no equals.
 - 2) Programmable Control System: The programmable control system shall be a programmable logic controller based system to provide process control. The system also serves as the master telemetry unit for the telemetry system. The telemetry system provides water level information from the remote water towers for the purpose of controlling the high service pumps, clearwell level information for the purpose of controlling the wells, and flow and level information from the process monitoring and control panel for water system monitoring from a remote location.
 - a) Control loops for the various processes in the treatment plant shall be configurable from both a PLC program loading device and a personal computer. The control loop parameters shall be defined by preprogrammed control function blocks of a field proven design demonstrated to have been used successfully on systems of equal or greater complexity. Entry of

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configuration data for control blocks shall be through operator interface screens similar to spreadsheets and shall use descriptive text.

BB. Operator Interface: Work under this contract includes provision of new Panel View 300 micro in the well building as shown on the plans.

- 1) The new Operator interface shall be a Panel View 300 display computer and shall be mounted on the panel fronts as shown on the process instrumentation plans.

CC. Spare Parts: The control system supplier shall furnish the following spare parts with the control panels.

- | | | |
|----|-----------------------------------|-------------------------------------|
| 1. | PLC Parts | |
| a. | Power Supply | One (1) |
| 2. | 24 VDC Power Supply | One (1) |
| 3. | Indicating Lamps for Panel Lights | Ten (10) for each type (lamps only) |
| 4. | Hand Switches | Two (2) of each type |
| 5. | Relays – Complete Units | Four (4) of each type |

All required spare parts shall be delivered to the Owner prior to final acceptance of the work. The spare parts shall not be used as replacement parts during the warranty period.

2.3 TELEMETRY SYSTEM

- A. Description: This work shall consist of performing all labor and furnishing all material to install the new RTU and radio telemetry systems for the pump meter building. This Section includes descriptions of radios and telemetry system hardware as well as performance specifications for the operation of the system. All antennas, mounting brackets, licenses, and other appurtenances and services necessary to furnish and install a complete and operable system in accordance with the plans and specifications shall be furnished as a part of this Contract.
- B. General: It is intended that the master panel in the operator station at the water treatment plant provide a system for monitoring the remote well sites. Four (4) well sites are presently connected to the telemetry panel in the existing water plant. The new process monitoring and control panel shall provide means for displaying the well information and a means for adjusting the setpoints for control of the various pumps and valves. The control and monitoring requirements for the equipment connected to the system are listed in the functional descriptions of the controls.
- C. Radio Telemetry Equipment - Scope of Work: Furnish and install a complete telemetry system including remote radios, modems, antennas, antenna lead cables, antenna mounting systems, lightning protection systems, and communications links necessary to connect the remote sites to the process monitoring and control system for the water treatment plant. The system radios shall provide a bi-directional, solid-state, microprocessor-based system to digitally transmit status and data signals over 900MHz spread spectrum channels. Data shall be transmitted in serial digital format with error checking.
1. General Requirements: The existing master radio operates on a licensed radio frequency in the 900MHz spread spectrum in full-duplex, half-duplex, or simplex mode. Minimum data transmission baud rate shall be 9600 bps. The radio systems shall be rack mounted in such a way that a transmitter, receiver, or power supply module can be replaced
 2. Technical Requirements – Remote Stations and Replacement Radios

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- a. General: The radio transceiver shall be a new current model suitable for transmitting and receiving spread spectrum at a user selected rate of 9600 bps, 8 bit, no parity, 1 stop bit. Units shall operate from power furnished by the remote PLC or Master PLC Unit. Units shall have built in locally accessible, via serial port, diagnostics allowing on line viewing of power output, temperature, voltage, signal strength, antenna/feedline condition, and data decode performance. Radio transceivers shall have an operating temperature range of at least -40 Deg F to + 140 Deg F without signal degradation.
 - b. The radio shall operate in the half-duplex mode. Transmitter keying shall be provided by the associated Remote Terminal Unit. Radios shall provide for serial digital transmission and reception of data from the master telemetry panel via the repeater radio system, if a repeater station is necessary. The radios shall be operated as license free radios and synthesized to operate in the range of frequencies available for use in spread spectrum communications. Programming shall be via personal computer or handheld terminal without changing internal components. All remote radios shall be furnished with a Remote Maintenance Module which will provide the ability to monitor its internal operation and diagnostic parameters via a handheld terminal or personal computer plugged into the remote radio. Frequency, transmit power, and deviation must be adjustable from the repeater radio and from the master radio using a handheld terminal or personal computer. Specific requirements for each site are summarized in the following paragraphs.
 - c. Radios shall be MDS 9810, no approved equal.
3. Technical Requirements – Radio Antenna Systems
- a. General: Radio antenna systems shall be furnished complete with antenna elements, mounting hardware, connecting cable, weather heads, poles, and/or masts where required. The antennas shall be tuned for the licensed frequency.
 - b. The radio telemetry system supplier shall provide the antenna for each site as required to achieve the overall communications requirements of the system. Antennas shall be directional or omni directional as required and suitable for outdoor environments. They shall be of all aluminum construction and rated to withstand at least 100 MPH winds with 1/2 inch radial ice.
 - c. Adequate lengths of RG 8U coaxial cable shall be provided for connection of the antenna to the radio transceiver at each site. The transmission line shall be terminated only in connectors rated for the required service. A lightning arrestor shall be placed between the transceiver and coaxial cable.
 - d. Unless specifically stated, the antennas shall be attached to existing structures, such as tanks or buildings. Particular attention shall be given to the correct installation of the antennas to give adequate protection from nearby lightning strikes by providing a low resistance DC path to ground. Instructions for installing these antennas shall be given to the Contractor so as to ensure reliable operation.
 - e. Contractor shall furnish all mounting masts or poles as required to support the antennas at the elevations and orientations required. Masts and poles shall be suitable for outdoor environmental conditions, provide adequate support and protection for transmission lines and be provided complete with all necessary mounting accessories. The Masts and/ or pole shall be a minimum of 2-inch diameter pipe to adequately support the antenna. Minimum acceptable technical and physical specifications of the antenna shall be as follows:

Directional Antenna

Type ----- 4 element Yagi, with a forward gain of at least 7 dB

Front to back ratio ----- 20 dB

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Lightning protection ----- Direct ground

Feed point method ----- Weatherproof gamma match for coaxial feed line

Omni-Directional Antenna

Type ----- 2/ 4 dipole array adjustable for omni bi-directional pattern

Gain ----- At least 3dB omni, 6dB offset

Lightning protection ----- Direct ground

Feed point method ----- DC ground through metal support pipe

- f. Schedule of Manufacturers: Radio antennas at the remote site shall be MDS Clearwave 97-3194-A14. Antenna lead shall be Andrews or Engineer approved equal. Radio antennas at remote sites shall be Yagi directional antennas with 3/8" Andrews SuperFlex cable. Antenna vector shall be pointed to the master antenna at the water treatment plant. Antennas shall be mounted on mast or pole as specified in the specific application requirements listed previously. Antennas shall be as manufactured by Antenna Specialists, Cellwave or approved equal.

2.4 QUALIFICATIONS OF CONTROL SYSTEM CONTRACTORS

- A. Control system contractors proposing to bid the work specified herein shall be approved by the Owner and the Engineer. In addition to the system specifications, the following minimum requirements shall be met by the Contractor; (1) At least five years of experience in design and installation of control systems for water treatment plants. (2) Demonstrated ability to serve as control contractor. (3) List of names and qualifications of individuals to be assigned to the job. Including the professional registration number of the design engineer.
- B. The following control system integrators are prior approved for this contract:
1. Micro-Comm
- C. If it is intended to use a control system contractor other than those listed above, prior approval is required. Refer to Subsection 1.04 of this Specification for Prior Approval requirements.

PART 3 - EXECUTION

3.1 CONTROL SYSTEM

- A. General: In addition to the shop drawings and descriptive literature required by the General Requirements, the control contractor shall provide complete system documentation necessary for installation, operation and maintenance. The documentation shall be provided prior to shipment of hardware. The documentation shall include but not necessarily be limited to the following:
1. General description of equipment.

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2. Panel front drawings.
3. Panel mounted equipment location map.
4. Software licenses and documentation identifying TM Rural Water District as the holder of the software license. Licenses shall be developer's licenses which permit the Owner to make additions and modifications to the system.
5. Wiring diagrams for panels and telemetry system.
 - a. Control system documentation listing the control system address for each and every analog and contact closure input and output in the system. Documentation must include an English language descriptor for each input and output and the scale for the analog inputs and outputs.
 - b. Control schematics including field wiring requirements and identification of terminal numbers for both the control panels and the field terminations.
6. Listing and description of routine maintenance requirements and equipment necessary to perform required maintenance. (Include in O&M Manual only).
7. Specifications and descriptions of panel mounted hardware including lights, switches, annunciators, controllers, displays, and power supplies, etc.
8. List of spare parts provided.
 - a. Programmable Logic Controller and RTU system documentation shall include six copies of descriptions for all loops and the operator's manual describing procedures for routine adjustments to process control and communications loops. Description of control loops shall be copies of printout of the ladder logic diagram used for control with explanatory annotation.
 - b. A total of six copies of the entire documentation package shall be provided. One of the copies shall be provided for use by the system operator. This copy shall be in loose leaf form bound in ring binders to facilitate modifications and additions. The manual shall detail steps required for operator interface with the process control system.
9. System Test: Control panels shall be tested prior to delivery to the site. Testing procedures shall be developed by the equipment supplier and approved by the Engineer. The testing shall include but not necessarily be limited to the following:
 10. 48-hour "burn-in" of all panel mounted hardware with no failures.
 11. Testing of all analog and digital inputs using a signal generator.
 12. Testing of analog and digital outputs using indicating devices to show output.
 13. Testing of controllers; input and output, operator interface, and accuracy of control loop.
 - a. Testing shall be open to observation by the Owner and Engineer upon request.
14. Installation and Startup: Control panels shall be installed by the controls contractor. Installation shall include but not necessarily be limited to setting equipment in place and connection of power and signal wiring. Power wiring shall consist of connecting 115 VAC circuits from distribution panels supplied by the electrical contractor. Connections shall be made to screw type terminals. The control system contractor shall provide terminal to terminal interconnection drawings for all terminations between cabinets of the chemical feeders and filter controls and local control panels and between motor control cabinets and local control panels. The electrical contractor will install wiring between the process control panels and motor control centers and shall make wiring terminations in the motor control cabinets. The control contractor will supervise and approve terminations in the process control and monitoring panels.
15. The control panels shall be installed at the locations shown on the Drawings. All panels shall be set plumb and level. After all field connections have been completed, close all openings to prevent debris from entering the panels. Seal all conduits with duct seal. Field connections of power and control wiring shall be made through terminal blocks.

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16. The control contractor shall provide at least five (5) days system start-up assistance by a team of factory based engineering and programming personnel. During this start-up period, the personnel are to thoroughly check all equipment and repeat the factory acceptance test specified earlier.
17. Operational Training: Operator training for operation and maintenance of the process control panels shall be provided. The training shall include all instruction necessary to provide operating personnel the ability to perform all control functions, routine periodic maintenance, and light emergency maintenance on the system.
18. Operator training for operation, maintenance and troubleshooting shall be provided. The training shall be conducted at the job site. At least two individuals representing the Owner shall receive the training. The training sessions shall be a minimum of one eight-hour day and shall include "hands-on" training on the system furnished under this contract. The Owner reserves the right to videotape the training sessions for future reference.
19. Maintenance and Spare Parts: The local control panel supplier shall provide maintenance for a period of one (1) year from acceptance of the work (Substantial Completion). Maintenance shall include a program of visits once every three months by a representative of the integrator to perform periodic preventive maintenance work. Demand maintenance as required by the system shall be included and shall be provided within 24 hours or request on a five-day week, eight hours per day basis.
20. Spare terminals for the local control panel shall be provided proportionate to their use. A minimum of 10% spares of each type of point shall be provided. Other spare parts requirements are listed in II. PRODUCTS.
21. After successful completion of the control and telemetry system, but prior to final acceptance of the work, the integrator must submit to Owner and Engineer complete documentation of the ladder logic for each of the PLC in the system. Integrator is to submit three (3) copies prior to final completion.

3.2 SYSTEMS ACCEPTANCE

- A. System acceptance shall be defined as that point in time when the complete system has passed the mutually defined field acceptance test and has performed as a functioning unit for 30 consecutive days without the loss of process control functions or process management functions. Loss of process control functions shall be defined as follows:
 1. Loss of a process loop controller.
 2. Loss of the alarm annunciator subsystem.
 3. Loss of process variable display and recording functions.
 4. Loss of communication with SCADA system without automatic restart.
 5. One year warranty on the equipment begins upon successful completion of the field acceptance test.

3.3 GRAPHIC SCREEN STANDARDS

- A. It is the intent of these specifications to provide the end user with state-of-the-art SCADA functionality. The following standards for SCADA graphical displays are intended to establish expectations for quality and performance functionality for all graphical screen development. The SCADA supplier is responsible for coordinating with the Engineer and end user to define screen requirements and develop graphical screens to these standards as a minimum.
 1. Graphic screens developed for this project are required to depict the actual process equipment configuration as accurately as possible.
 2. Graphic screens are required to incorporate 3D images accurately depicting pumps, tanks, piping and process equipment representative of being controlled and or monitored by the SCADA Software.

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3. All overview and site-specific screens will incorporate a “navigational header bar” similar in function and appearance to *Microsoft Internet Explorer*. The intention of this specification is to provide a familiar, user-friendly navigation throughout the SCADA graphical displays.
4. Standard Alarm Screen functionality will be provided to ensure flexibility and quick access to live alarms, alarm history and alarm grouping parameters. The following features and functionality will be included as a minimum:
 - a. An Alarm Screen header bar will head all alarm pages and reside below the Navigation Bar.
 - b. Buttons will be provided to dynamically switch between Alarm Summary and Alarm History.
 - c. A menu will be provided to allow user to select and open historical alarm archives. A time-date stamp file structure shall be used.
 - d. A pull-down menu bar will be provided to select operator configured alarm groups.
 - e. A user selectable field will allow both sorting of alarms by priority and the ability to define priority for all system alarms.
5. Standard Trending Screen functionality will be provided to ensure flexibility and easy access to real time and historical trend information for any variable TAG defined within the SCADA application. The following features and functionality will be provided as a minimum:
 - a. The Trending Screen will allow the user to define trend scenarios. A button will be provided to open a dialog window to select multiple variable TAGS and save them as a trend scenario for future use.
 - b. A pull-down menu will be provided to allow the user to open saved trend scenarios.
 - c. A button will be provided to allow the user to select real-time or historical trends.
 - d. A button will be provided for to save displayed trend info to a file in CSV data format for export to external software applications (such as Microsoft Excel).
 - e. A Print Trend button will be provided to allow user to print current trend. The print format will be a full page in landscape and include only the trend graph and axis scaling (print screen dumps are not acceptable).
6. Dragging the mouse over designated process areas in the above overview allows the operator to select predetermined processes or equipment and drill down to site-specific detail screens.
7. Critical “overview” information such as tank levels, flows and pressures will be indicated through data fields or animation effects such as level fills or color change.
8. All monitored and or controlled process equipment will be animated or color-highlighted to indicate status changes. For example, a pump “running” condition will be signified by the pump color changing to bright green. A pump “required” condition will turn the pump graphic to turn bright yellow and flashing red will indicate a pump “fail” condition.
9. Tank and vessel levels will be indicated with a tabular data field and by graphic “fill” simulating a rising or falling level within the tank or vessel.
10. The ability to “drill down” to detail screens or graphics will be provided for designated process control equipment. Clicking on a device or process area will generate a detail graphic or pop-up window to access specific data or control functions. For example, clicking on Filter No. 1 would pull up a detail graphic for that individual filter.
11. Pop-up screens will be provided for device control and or status monitoring. For example, clicking on a pump graphic will open a Hand-Off-Auto control allow access to change control setpoints or view detail status or maintenance information.

B. Graphic Display Submittals.

1. Pre-submittal graphics meeting. The SCADA supplier will coordinate a meeting with the Engineer and end user to define general display configuration, navigation and functionality.
2. The SCADA supplier will submit sample graphics as defined in the pre-submittal graphics meeting, to the Engineer for final approval.

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3.4 DEPLOYMENT OF OI DISPLAYS

- A. Integrator is to develop operator interface graphics for the Panel View Plus operator interfaces and the personal computer HMI using the RSView Studio development software. The intent is to program all interfaces the same so that all data can be viewed from any of the Panel View Plus locations, the new control personal computer and the existing personal computer. The system shall be created so that the Owner can create graphics from the main control personal computer and push the compiled application out to the remote operator interfaces. Navigation through the screens shall be the same regardless of location. Alarm conditions shall be generated locally and acknowledged from any of the operator interfaces. The diagnosis check for each developed application must be disabled to allow each operator interface to continue monitoring regardless if communication is lost with one of the locations on the Ethernet LAN. Data shall be displayed as blanks or “#####” if communications are lost.

3.5 INSTALLATION OF INSTRUMENTATION CONDUIT AND CABLES

- A. Furnishing and installation of all conduits needed for instrumentation and control signals or any other instrumentation or control conduit shall be the responsibility of the electrical or instrumentation contractor. Furnishing and installation of the instrumentation or control wiring shown on the Plans shall be the responsibility of the electrical system or instrumentation contractor. Control system supplier shall supervise and authorize wiring connections in the process control and monitoring panels.

END OF SECTION 400000

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PART 1 - GENERAL

1.1 DESCRIPTION

- A. This work shall consist of furnishing and installing all material to provide a complete and workable system at each of the proposed wells. This Section includes specifications for the process instrumentation, and associated materials and equipment. This section also defines responsibilities and requirements for coordination of the work, shop drawing submittals, operator training, system checkout, spare parts, and warranty.

1.2 CONDITIONS AND SYSTEMS RESPONSIBILITY

- A. The instrumentation equipment supplier shall be responsible for operator training, system checkout and repair during the warranty period, and documentation including submittal drawings and installation operation and maintenance manuals.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. The following items of related work are specified and included in other sections of these Specifications:
1. Division 01 – Submittal Procedures
 2. Division 01 – Demonstration and Training
 3. Division 16 – Electrical, Power, and Lighting
 4. Division 40 – Process Integration
 5. Division 44 – Interior Piping and Valves
- B. The materials specifications for wire, appurtenances, and equipment apply to the materials required for the control system. The treatment process equipment specifications detail requirements for new and relocated process equipment. The control contractor shall coordinate control and monitoring system wiring requirements.

1.4 PRIOR APPROVAL

- A. The following items of materials and or equipment must receive approval prior to bidding if it is intended to furnish products other than those specifically named in the Specifications. 2. The requirements for obtaining such approval are specified herein and in the "General Requirements". :
1. Flow meter,
 2. Pressure transmitters,
- B. The requirements for obtaining such approval are specified herein and in the "General Requirements".
- C. Contractors must submit to the Engineer within seven calendar days before the scheduled bid opening date, design information including drawings they wish to have considered as an approved alternate. The design pre-submittal shall be complete and shall include as a minimum the following:
1. Drawings, specifications, and product literature with adequate detail to determine that what is proposed will meet the requirements of the plans and specifications.
 2. A list of installations of similar type presently in service.

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3. A complete listing of changes that will be required in the contract plans and specifications to accommodate the alternate equipment.
- D. Alternate bidders shall guarantee, in writing that the equipment offered will provide comparable or superior features, performance quality, and materials of construction as the equipment specified. Prior approval of the alternate equipment shall not constitute final approval of specific equipment, but rather constitutes only approval of the respective equipment manufacturers to provide price quotations based on equipment meeting the specifications. Alternate equipment manufacturers shall modify their standard products as necessary to meet all provisions of the specifications without exception.
- E. The cost of any changes incidental to installation of the alternate equipment such as electrical wiring, relocation of piping, engineering supervision, as-built drawings, etc., shall be borne by the Contractor with no additional expense to the Owner.
- F. If after installation the alternate equipment does not perform in accordance with the specifications or other deficiencies are noted, the Owner will require the modification or replacement of such equipment to meet the specifications at no additional expense.

1.5 SHOP DRAWINGS AND BIDDING REQUIREMENTS

- A. Submit copies of shop drawings in accordance with "General Requirements" for all hardware items and software products listed under "Products". Shop drawings shall include all catalog cuts, descriptive data, and drawings for the entire control system. If catalog cuts are furnished, the specific model number, color, and all requirements shall be indicated on each copy of the shop drawings.
- B. Submit copies of the proposed instrumentation including a listing of additional hardware required, software required, and implementation requirements.
- C. Submit instrumentation documentation as described in paragraphs 3.01 and 3.02 of this Specification.

PART 2 - PRODUCTS

- A. Electro-Magnetic Flow Meters: Furnish and install electro-magnetic flowmeters for the measurement point listed herein and at the location as generally indicated on the Drawings.
 1. General. The magnetic flowmeters shall be designed for measurement of velocity and flow of liquids containing solids in a meter body constructed of ductile iron, stainless steel, or epoxy coated steel.
 2. Performance requirements for each transducer and transmitter are as follows:

Output Signal:	4-20 mA DC linear with flow
Accuracy:	+/- 0.1% of span
Repeatability:	+/- 0.1% of point
Calibration:	Factory calibrated for application, field adjustable
Transmitter Enclosure:	NEMA 4X enclosure Transmitter shall be mounted separately from the metering tube
Display on Transmitter:	Digital
Power Supply:	24 VDC – Powered from the Control Panel

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Zero and Span Adjustments:

Continuously adjustable, non interactive
Suitable for accidental submergence

Submergence:

Materials of Construction:

Metering tube:

304 Stainless Steel with Soft Rubber Liner

Electrodes:

Alloy C or 316 SS

Gaskets:

Viton or equal

Connections:

ANSI Class 125 lb Flanges w/ SS Ground
Rings

3. Specific Application Requirements.

Installation Identification	ID Code	Range	Size and Installation Notes
Well No. 6 Flow Meter	FIT-0.60.01	0-1,000 gpm	4" meter required
Well No. 7 Flow Meter	FIT-0.70.01	0-1,000 gpm	4" meter required

4. Schedule of Manufacturers: Magnetic meters shall be Badger Magnetoflow, or engineer approved equal. Contractor is to provide ductile iron spool piece with equivalent laying length for each meter size.

B. Pressure Switches: Furnish and install pressure switches for each of the applications listed herein at of the locations generally indicated on the plans.

1. General Requirements: The pressure switches shall sense water pressure at the location listed and shall generate a SPST dry contact closure signal compatible with the SCADA system. The status and alarm indications shall be activated by pressure either dropping below the low pressure setpoint or rising above the high pressure setpoint on the switch. Switches shall be NSF certified for contact with potable water. Switches shall be designed for use on water systems with pressures up to 100 psi. Setpoint activation shall be adjustable over the entire range of the switch. For applications where either a high and low pressure alarm or status input is required, a single switch with multiple SPST outputs may be used as long as they are independently adjustable and non-interactive with each other.

2. Specific Application Requirements.

Installation Identification	ID Code	Range	Size and Installation Notes
Well No. 6 Switch – High Discharge	PS-0.60.01	0-100 psi	Wire to PLC-0.06 & VFD-0.06.01
Well No. 6 Switch – Pump Running	PS-0.60.02	0-100 psi	Wire to PLC-0.06
Well No. 7 Switch – High Discharge	PS-0.70.01	0-100 psi	Wire to PLC-0.07 & VFD-0.07.01
Well No. 7 Switch – Pump Running	PS-0.70.02	0-100 psi	Wire to PLC-0.07

3. Approved Manufacturers: Pressure switches shall be Series 400 switches as manufactured by United Electric or Engineer approved equal.

C. Pressure Transmitter: Furnish and install pressure transmitter with external indication.

1. General Requirement: Transmitter shall produce a 4-20 mA output proportional to a liquid pressure. Provide transmitter completely solid state and of modular design to facilitate field repair. Provide a 2-inch diameter with digital display that is visible without removing an end cover. Pressure transmitters shall be Model L5A as manufactured by Micro-Comm, Model IGP20 as manufactured by Foxboro or approved equal.

2.

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Output Signal 4-20 mA DC
Type Strain Gage and Diaphragm

Pressure Element
Type Strain Gage
Diaphragm & Body Material 316 SS
Connection Size & Rating ½" NPT

Transmitter
Mounting Floor Stand with Corp Stop
Local Display Yes
Power Supply 24 VDC

3. Specific Application Requirements.

<u>Installation Identification</u>	<u>ID Code</u>	<u>Range</u>	<u>Size and Installation Notes</u>
Well No. 6 Discharge Pressure	PIT-0.60.01	0-100 psi	
Well No. 7 Discharge Pressure	PIT-0.70.01	0-100 psi	

D. Intrusion Alarms: Furnish and install limit switches in each of the locations indicated on the plans.

- General Requirements: The intruder alarms shall sense unauthorized entry into the building and initiate an alarm. Alarms shall cause a contact closure signal to be transmitted to the central control unit via the telemetry system. Provide heavy-duty industrial switches that convert mechanical motion into electrical inputs. Provide switches capable of mounting in any position. Provide watertight switches NEMA 4. Entry limit switches shall be Type 802 as manufactured by Allen-Bradley or approved equal.

2. Specific Application Requirements.

<u>Installation Identification</u>	<u>ID Code</u>	<u>Size and Installation Notes</u>
Well No. 6 Entry Alarm	ZS-0.60.01	
Well No. 7 Entry Alarm	ZS-0.70.01	

PART 3 - EXECUTION

3.1 GENERAL

- General: In addition to the shop drawings and descriptive literature required by the General Requirements, the supplier shall provide complete system documentation necessary for installation, operation and maintenance. The documentation shall be provided prior to shipment of hardware. The documentation shall include but not necessarily be limited to the following:

- General description of equipment.
- Dimension drawings.
- Wiring diagrams for connection to process control system.
- Listing and description of routine maintenance requirements and equipment necessary to perform required maintenance. (Include in O&M Manual only).

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5. Installation and Startup: Process Instrumentation installation shall be inspected by a qualified representative of the manufacturer. Installation shall include but not necessarily be limited to setting equipment in place and connection of power and signal wiring. Power wiring shall consist of connecting 115 VAC circuits from distribution panels supplied by the electrical contractor. Connections shall be made to screw type terminals. The control system integrator will provide terminal to terminal interconnection drawings for all terminations between control panels and field mounted instruments. The electrical contractor will install wiring between the process control panels and instruments and shall make wiring terminations. The control integrator shall verify terminations in the process control and monitoring panels.
- B. Equipment shall be delivered to the site in undamaged condition. Equipment shall be stored above ground and protected from the weather. Equipment shall be installed in strict accordance with manufacturer's recommendations, the Plans and Specifications. Contractor shall supply all materials, labor, and appurtenances, etc. to provide functional Process Instrumentation.
- C. The Contractor and Manufacturer shall be responsible for coordinating with the System Integrator to supply all the necessary equipment.

3.2 PRODUCT HANDLING

- A. Comply with the pertinent provisions of the delivery schedule.
- B. Fabricated parts when delivered to the site shall be stored off the ground and protected from weather and damage. Control and electrical devices shall be stored indoors.

3.3 INSTALLATION OF EQUIPMENT

- A. The contractor shall erect and install equipment in strict conformance with the printed manuals provided by the equipment manufacturer.
- B. All anchor bolts and miscellaneous hardware shall be stainless steel. All bolted connections shall be provided with lock washer.
- C. The contractor shall adjust equipment for proper alignment, both horizontal and vertical in strict conformance with the printed manuals provided by the equipment manufacturer.

3.4 ACCEPTANCE

- A. The contractor shall field test instruments after erection in the presence of the engineer and equipment manufacturer to verify operation, uniformity, and compliance with the requirements specified by the manufacturer.
- B. The contractor shall provide all labor, materials, and test apparatus necessary to conduct testing at no additional cost to the Owner.

3.5 INSTALLATION OF INSTRUMENTATION CONDUIT AND CABLES

- A. Furnishing and installation of all conduits needed for instrumentation and or any other instrumentation or control conduit shall be the responsibility of the electrical contractor.

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Furnishing and installation of the instrumentation or control wiring shown on the Plans shall be the responsibility of the electrical system contractor. Control system supplier shall supervise wiring connections in the process control and monitoring panels.

3.6 INSTALLATION, OPERATION AND MAINTENANCE MANUALS

- A. The contractor shall furnish Operation and Maintenance Manuals for each instrument provided in accordance with Division 1 – Submittal Procedures.

END OF SECTION 409100



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

March 9, 2007

Ken Pedersen
Manager
TM Rural Water District
Box 445
Parker, SD 57053

Dear Mr. Hamm:

As requested, pursuant to South Dakota Well Construction Standard 74:02:04:21, TM Rural Water District is authorized to construct two test wells prior to approval of a water permit. The test wells are to be completed into the Missouri management unit of the Upper Vermillion aquifer (UVM) in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 20, T100N-R55W and in the SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 25, T101N-R55W, respectively. The test wells must be constructed in accordance with the SD Well Construction Standards. Any test holes that are abandoned must be plugged pursuant to the SD Well Construction Standards.

A SD Water Permit must be obtained before water from this well can be used. Approval of this test well does not assure issuance of a water permit. Following review of a Water Permit Application; and assessing the availability of water, the potential impacts to existing users, the beneficial use, and the public interest of a permit, the Chief Engineer will make a recommendation to the Water Management Board regarding the application. The recommendation to approve, deny, or defer the application will be publicly noticed and an opportunity afforded for the public to intervene. A public hearing may be required to consider the water permit.

Very truly yours,

JAMES A. GOODMAN, P.E.
Natural Resources Engineer
for GARLAND ERBELE, Chief Engineer
Water Rights Program
(605) 773-3352



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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May 21, 2007

Louis Atsma
26951 441th Avenue
Dolton SD 57319

Dear Mr. Atsma:

Please find enclosed the report, recommendation and public notice for a water right permit application filed by TM Rural Water District. The notice is to be published in newspapers in the five counties served by the rural water system. A petition to intervene must be submitted by June 18, 2007. Filing a petition will cause a hearing to be scheduled before the Water Management Board.

This information is being sent based on our prior conversation and you requested notification when TM Rural Water District files an application.

Sincerely,

Eric Gronlund
Water Rights Program, DENR
605 773-3352
eric.gronlund@state.sd.us

enclosure



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**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 6823-3, TM Rural Water District**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit Application No. 6823-3, TM Rural Water District, 110 North Main, Parker SD 57053

The Chief Engineer is recommending APPROVAL of Application No. 6823-3 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) it is in the public interest with the following qualifications:

1. The wells approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. The wells authorized by Permit No. 6823-3 shall be constructed by a licensed well driller and construction of the well and installation of the pump shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.
3. Water Permit No. 6823-3 authorizes a maximum annual withdrawal of 1,690 acre feet of water annually from the Upper Vermillion:Missouri Aquifer.
3. TM Rural Water District shall report to the Chief Engineer annually the amount of water withdrawn from the Upper Vermillion:Missouri Aquifer.

See report on application for additional information.

Garland Erbele, Chief Engineer
May 15, 2007

WATER PERMIT APPLICATION NO. 6823-3
TM RURAL WATER DISTRICT
MAY 3, 2007

Water Permit Application No. 6823-3 proposes to place to beneficial use 1,690 acre-feet of water annually at a maximum diversion rate of 2.23 cubic feet per second. The water has been appropriated and reserved by Future Use Permit No. 6705-3. Approval of this application will authorize construction of two wells approximately 369 and 302 feet deep respectively, that are to be completed into the Upper Vermillion-Missouri aquifer. The wells are to be located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 20, T100N-R55W in Turner County and the SW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 25, T101N-R55W in McCook County.

AQUIFER: Upper Vermillion-Missouri (UVM)

Aquifer Characteristics:

The Upper Vermillion-Missouri aquifer is a glacial outwash deposit composed of fine sand to cobble gravel. The aquifer is a basal aquifer underlaid by the Carlile Shale, the Niobrara Formation or the Sioux Quartzite. The Upper Vermillion-Missouri aquifer underlies approximately 207 square miles of Hutchinson and Turner Counties, obtains a maximum thickness of 170 feet, has an average thickness of 68 feet and contains an estimated 1,802,000 acre-feet of water in storage in the two counties (Lindgren and Hansen, 1990). In this area the Upper Vermillion-Missouri lies on a northwest-southeast trending preglacial bedrock channel (Lindgren and Hansen, 1990). The aquifer extends into McCook County but the areal extent has not been delineated (see figure 1).

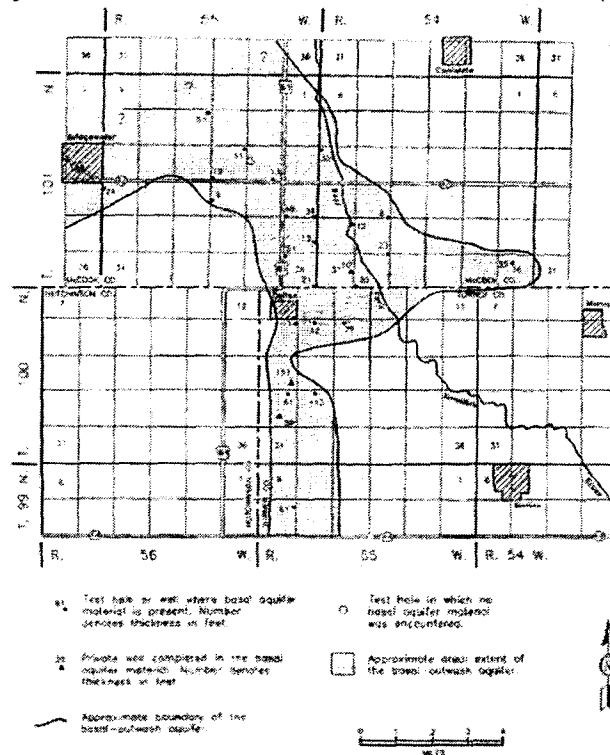


Figure 1. Approximate areal extent and thickness of the Upper Vermillion-Missouri aquifer in this area, modified from (Schulz, L., 1991).

Recharge to the Upper Vermillion-Missouri aquifer is from subsurface inflow from the Niobrara and the Sioux Quartzite aquifers and from direct infiltration of precipitation where the aquifer is at or near the ground surface. Recharge to the aquifer has not been quantified.

The Water Rights Program monitors 28 observation wells completed into the Upper Vermillion-Missouri aquifer. Five of these observation wells are in the immediate vicinity of the well sites proposed by this application. Hydrographs for the wells are shown in figures 2-6.

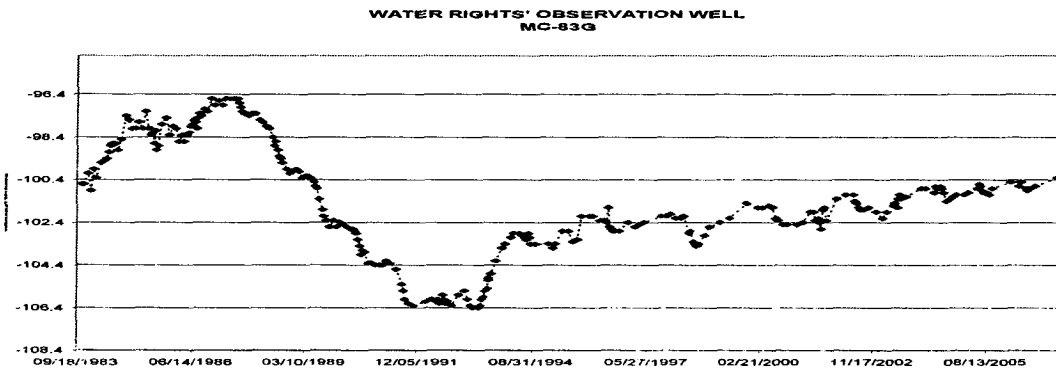


Figure 2. Hydrograph of Water Rights Observation well near proposed well sites.

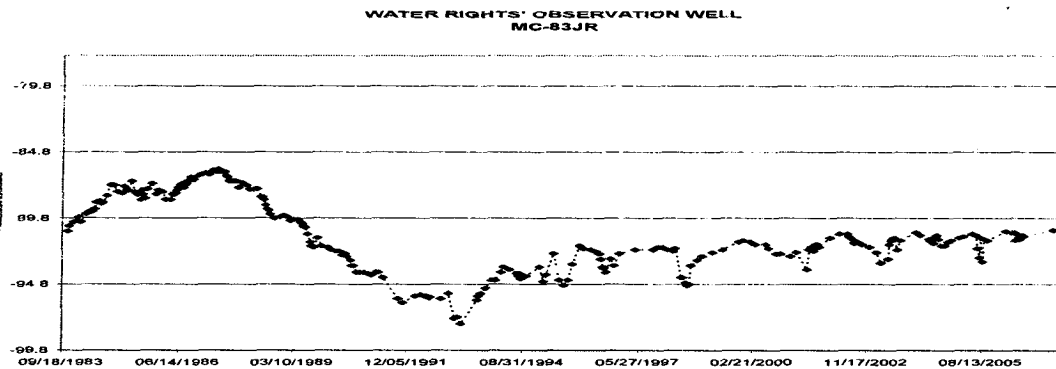


Figure 3. Hydrograph of Water Rights Observation well near proposed well sites.

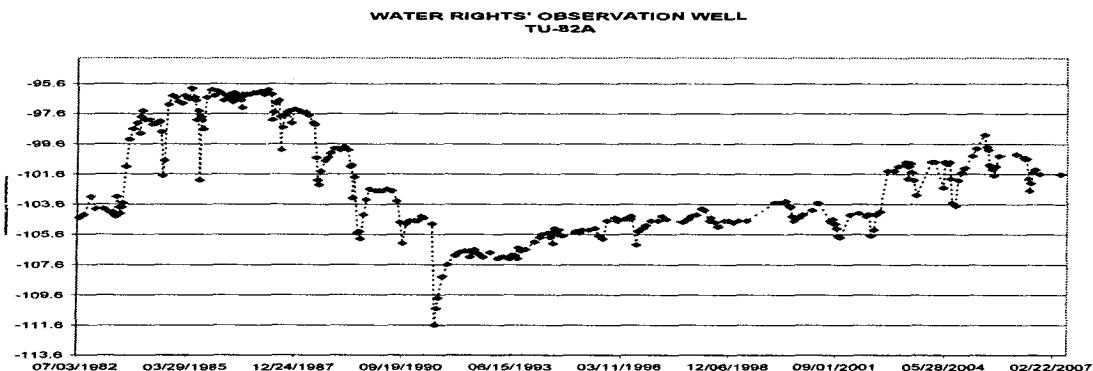


Figure 4. Hydrograph of Water Rights Observation well near proposed well sites.

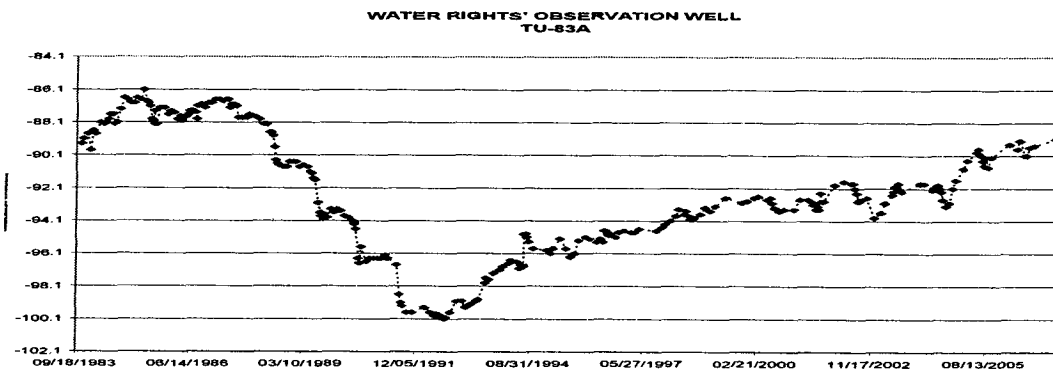


Figure 5. Hydrograph of Water Rights Observation well near proposed well sites.

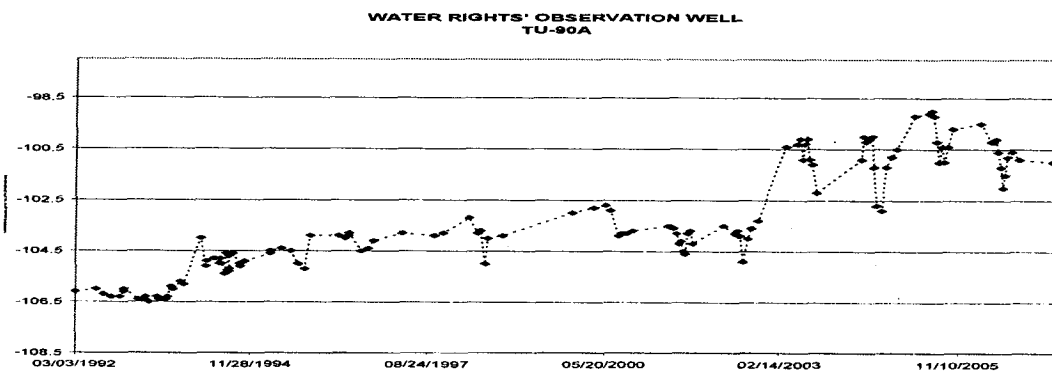


Figure 6. Hydrograph of Water Rights Observation well near proposed well sites.

The water level data obtained from these wells document the long term trends of the aquifer relative to recharge and withdrawals from the aquifer. The hydrographs indicate that withdrawals have not exceeded recharge over the period of record.

Existing Water Rights

The seven Water Rights appropriating groundwater within approximately eight miles of the well sites proposed by this application are shown in Table 1.

PERMIT NO	NAME	AQUIFER	USE	CFS	ACRES
767-3	CITY OF BRIDGEWATER	UVM*	MUN	0.96	NA
4704A-3	STEVEN G FREISEN	UVM	IRR	0.89	96.00
5359-3	HAY LOFT CAFE	PS	COM	0.07	NA
4752-3	TODD M & MERLYN HOFER	UVM	IRR	1.78	186.00
4771A-3	CITY OF MARION	PS	MUN	0.45	NA
4771B-3	CITY OF MARION	PS	MUN	0.40	NA
4747-3A	BRIAN W SCHMIDT	UVM	IRR	0.89	110.00

* Possibly completed into the UVM aquifer

Table 1. Groundwater appropriations belonging to others within approximately eight miles of the wells proposed by Application No. 6823-3

The nearest well, supplying Water Right No.4752-3, is located about 0.85 miles southwest of the south well site that is proposed by this application. The Upper Vermillion Missouri aquifer is under confined/artesian and drawdown may extend some distance from a pumped well. Well interference from the wells proposed by this application should not be significant to exiting users due to the distance between wells.

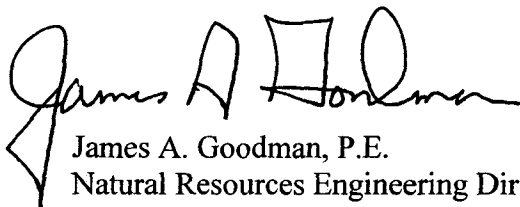
Conclusions:

1. This application proposes to place to beneficial use 1,690 acre-feet of water annually water which was appropriated and reserved by Future Use Permit No. 6705-3.
2. The Water Rights Program monitors a number of observation wells in the Upper Vermillion-Missouri aquifer in this area.
3. The appropriation proposed by this application should not impact existing users.



Ken Buhler
Natural Resources Engineering Specialist

approved by



James A. Goodman, P.E.
Natural Resources Engineering Director

References:

- Lindgren, R.J. and Hansen, D.S., 1990, Water Resources of Hutchinson and Turner Counties, South Dakota, U.S. Geological Survey Water-Resources Investigation Report 01-4219, 100 p.
- Schulz, L.D., 1991, Investigation of the Basal Outwash in the Dolton Vicinity, DENR-Geological Survey Open File Report UR-64, 33 p.
- Water Rights Program, 2007, "Water Right/Permit Files" DENR-Water Rights Program, Joe Foss Building, Pierre, SD 57501
- Water Rights Program, 2007, "Observation Well Files" DENR-Water Rights Program, Joe Foss Building, Pierre, SD 57501

Affidavit of Publication

STATE OF SOUTH DAKOTA } :SS
COUNTY OF TURNER }

I, **Donna Rumbaugh** City of Parker, County of Turner, State of South Dakota, being first duly sworn on oath, deposes and says:

The New Era is a weekly legal newspaper of general circulation, printed and published in the City of Parker, in said County of Turner, by The New Era, Lyon Sioux Press, publishers, and has been such legal newspaper during the times hereinafter mentioned; that the said newspaper has been in existence as such legal newspaper for more than one year prior to the publication of the notice hereunto attached, and has during all of said publication of the notice hereunto attached, and has during all of said time had, and now has, more than 200 bona fide subscribers; that the undersigned, The affiant, is the **Office Manager** of the said newspaper, in charge of the advertisement department thereof and has personal knowledge of all the facts stated in this affidavit and the advertisement headed:

#TM Rural Water # 4260 App to appropriate water

printed copy of hereto attached, is printed and published in the said newspaper for two successive weeks, once each week and on the same day of the week, on the following dates, to-wit:

On Thursday, the 31 day of May, 2007

On Thursday, the 7 day of June, 2007

On Thursday, the day of , 200

On Thursday, the day of , 200

On Thursday, the day of , 200

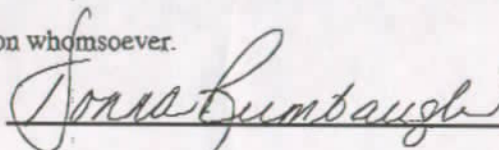
That \$54.70 being the full amount of the fees for publication

of the attached notice insures solely for the benefits of the publishers of the

said newspaper, that no arrangement or understanding for a division thereof

has been made with any other person and that no part thereof has been agreed

to be paid to any other person whomsoever.



Subscribed and sworn to before me this 5th

Day of June, 2007

My Commission
Expires:

20__

Notary Public, Turner County, South Dakota

Notice of application no. 6823-3 to Develop Reserved Water

Notice is given that TM Rural Water District 110 North-Mam, Parker SD 57053 has filed an application for a water permit to place to beneficial use 1,690 acre-feet of water at a maximum diversion rate of 2.23 cubic feet of water per second which was appropriated and reserved by Future User Permit No. 6705-3. This application will authorize construction of two wells to be completed into the Upper Vermillion Missouri Aquifer (369 and 302 feet deep) located in the SW 1/4 SW 1/4 Section 20-T100N-R55W (Turner County) and SW 1/4 SE 1/4 Section 25-T100N-R55W (McCook County). The water will be used to supply the TM Rural Water District which serves users in Turner, McCook, Minnehaha, Miner, and Hutchinson counties.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6823-3 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on these applications as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendations must file a written petition with BOTH the applicant and Chief Engineer at the same time. The petition must contain the Chief Engineer's recommendation. The Chief Engineer's address is: Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605/773-3832) and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by June 18, 2007.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Steven M. Butler, Secretary, Department of Environment and Natural Resources.

(#4260, 5/30/07, 6/6/07, The New Era)

RECEIVED

JUN 11 2007

WATER RIGHTS
PROGRAM

Form 8

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)

County of McCook) SS

I, Troy Schwans

certify that the attached printed Notice was
taken

from the Salem Special

printed and published in Salem

County of McCook and

state of South Dakota. The notice was
published

in the newspaper on the following two dates:

May 31, 2007

June 7, 2007

Cost of Printing \$49.90

Troy Schwans
(Signature)

Owner
(Title)

7/6/06
(Date Signed)

Public Notice

NOTICE OF APPLICATION

NO. 6823-3 to Develop
Reserved Water

Notice is given that TM Rural Water District, 110 North Main, Parker, SD 57053 has filed an application for a water permit to place to beneficial use 1,690 acre-feet of water at a maximum diversion rate of 2.23 cubic feet of water per second which was appropriated and reserved by Future User Permit No. 6705-3. This application will authorize construction of two wells to be completed into the Upper Vermillion Missouri Aquifer (369 and 302 feet deep) located in the SW 1/4 SW 1/4 Section 20-T100N-R55W (Turner County) and SW 1/4 SE 1/4 Section 25-T101N-R55W (McCook County). The water will be used to supply the TM Rural Water District which serves users in Turner, McCook, Minnehaha, Miner, and Hutchinson counties.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6823-3 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on these applications, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendations must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E. Capitol, Pierre, SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by June 18, 2007.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Steven M. Pirner, Secretary, Department of Environment and Natural Resources.

5/31,6/7c

AFFIDAVIT OF PUBLICATION-

Customer Number: 078340
Invoice Number: 1031887

SD Dept Of Environment & Natural Resources

Argus Leader **AFFIDAVIT OF PUBLICATION**

STATE OF SOUTH DAKOTA

COUNTY OF MINNEHAHA } ss

Linda Schulte being duly sworn, says: That The Argus Leader is, and during all the times hereinafter mentioned was, a daily legal newspaper as defined by SDCL 17-2-21, as amended published at Sioux Falls, Minnehaha County, South Dakota; that affiant is and during all of said times, was an employee of the publisher of such newspaper and has personal knowledge of the facts stated in this affidavit; that the notice, order or advertisement, a printed copy of which is hereto attached, was published in said newspaper upon

Wednesday, the 30 day of May 2007,

Wednesday, the 6 day of June 2007,

_____, the _____ day of _____ 2007,

_____, the _____ day of _____ 2007,

_____, the _____ day of _____ 2007,

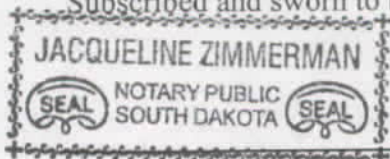
_____, the _____ day of _____ 2007,

_____, the _____ day of _____ 2007,

and that \$116.85 was charged for publishing the same

Linda Schulte

Subscribed and sworn to before me 6/6/2007.



J. Zimmerman

Notary Public, South Dakota

My Commission expires December 22, 2009

NOTICE OF APPLICATION
NO. 6823-3 to Develop
Reserved Water

Notice is given that TM Rural Water District, 110 North Main, Parker SD 57053 has filed an application for a water permit to place to beneficial use 1,680 acre-feet of water at a maximum diversion rate of 2.23 cubic feet of water per second which was appropriated and reserved by Future User Permit No. 6705-3. This application will authorize construction of two wells to be completed into the Upper Vermillion Missouri Aquifer (369 and 302 feet deep) located in the SW 1/4 SW 1/4 Section 20-T100N-R55W (Turner County) and SW 1/4 SE 1/4 Section 25-T101N-R55W (McCook County). The water will be used to supply the TM Rural Water District which serves users in Turner, McCook, Minnehaha, Minot and Hutchinson counties.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6823-3 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on these applications, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

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June 18, 2007

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Steven M. Pinner, Secretary, Department of Environment and Natural Resources.

May 30 &
1031887 June 6, 2007

AFFIDAVIT OF PUBLICATION

County of Hutchinson)
) ss.
State of South Dakota)

RECEIVED

JUN - 8 2007

WATER RIGHTS
PROGRAM

Tim L. Waltner, of said county and state, being duly sworn, on his oath, deposes and says: That Courier is a weekly newspaper of general circulation and a legal newspaper as required by law, published in the town of Freeman in said county and state by Tim L. Waltner, and has been such during the time hereinafter mentioned: That Waltner, the undersigned, am publisher of said newspaper in charge of the advertising department thereof, and have personal knowledge of all stated in this affidavit, and that the advertisement headed **Water Application**

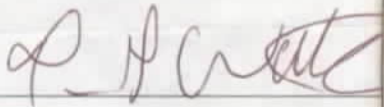
a printed copy of which is hereto attached, and published in the said newspaper for two issues to-wit:

The first publication on:
May 30, 2007

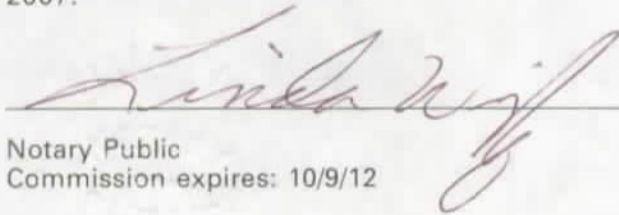
the second publication on:
June 6, 2007

and the third publication on:

That the full amount of the fees charged for the same to-wit: The sum of **\$21.44** insures benefit of the publisher of the Freeman Courier agreement or understanding for any division has been made with any other person who the amount of **\$21.44** is the rate for publication notices.



Subscribed and sworn to before me this 6th day of June 2007.


Notary Public
Commission expires: 10/9/12

Publication fee: **\$21.44**
Notary fee:
Total: **\$21.44**

NOTICE OF APPLICATION NO. 6823-3 to Develop Reserved Water

Notice is given that TM Rural Water District, 110 North Main, Parker SD 57053 has filed an application for a water permit to place to beneficial use 1,690 acre-foot of water at a maximum diversion rate of 2.23 cubic feet of water per second which was appropriated and reserved by Future User Permit No. 6705-3. This application will authorize construction of two wells to be completed into the Upper Vermillion Missouri Aquifer (369 and 302 feet deep) located in the SW 1/4 Sw 1/4 Section 20-T100N-R55W (Turner County) and SW 1/4 SE 1/4 Section 25-T101N-R55W (McCook County). The water will be used to supply the TM Rural Water District which serves users in Turner, McCook, Minnehaha, Miner and Hutchinson counties.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6823-3 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on these applications, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the application or con-

testing the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendations must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E. Capitol, Pierre, SD 57501 (605)773-3352" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by June 18, 2007.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Steven M. Pirner, Secretary, Department of Environment and Natural Resources.

**NOTICE OF APPLICATION
NO. 6823-3 to Develop
Reserved Water**

Notice is given that TM Rural Water District, 110 North Main, Parker SD 57053 has filed an application for a water permit to place to beneficial use 1,690 acre-feet of water at a maximum diversion rate of 2.23 cubic feet of water per second which was appropriated and reserved by Future User Permit No. 6705-3. This application will authorize construction of two wells to be completed into the Upper Vermillion Missouri Aquifer (369 and 302 feet deep) located in the SW 1/4 SW 1/4 Section 20-T100N-R55W (Turner County) and SW 1/4 SE 1/4 Section 25-T101N-R55W (McCook County). The water will be used to supply the TM Rural Water District which serves users in Turner, McCook, Minnehaha, Miner and Hutchinson counties.

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Any person interested in opposing or supporting this application or recommendations must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by July 9, 2007.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA, County of Miner: ss.

Danny Schwans of said County and State, being duly sworn, on his oath says: That the Miner County Pioneer is a legal newspaper of general circulation, printed and published in Howard, said County and State, by Danny Schwans, and has been such newspaper during the time hereinafter mentioned; and that I, Danny Schwans, the undersigned, am publisher of said newspaper, in charge of the advertising department thereof, and have personal knowledge of all the facts stated in this affidavit, and that the advertisement or notice

headed Notice of Application No 6823-3
to Develop Reserved Water

a printed copy of which is hereunto attached, was printed and publishing in the regular and entire issue of said newspaper and not in a supplement, once each week for 2

successive weeks, the first publication being made on the 21st day of June, 2007

and the last publication on the 28th day of June, 2007

The first publication being made on the day of.....20.....

The second publication being made on the.....day of.....20.....

The third publication being made on the day of.....20.....

The fourth publication being made on the.....day of.....20.....

The fifth publication being made on the..... day of.....20.....

That said newspaper is a legal newspaper, and has a bona fide circulation of more than two hundred copies weekly, and has been published within the County of Miner, for more than fifty-two successive weeks next prior to the first publication of said notice, and is printed in an office maintained in Howard, South Dakota, the place of publication of said newspaper. That the full amount of fees for publication of the annexed notice is \$46.01 and inures solely to the benefit of said publisher; that no agreement or understanding for a division thereof has been made with any person and that no part thereof has been agreed to be paid to any person whomever.

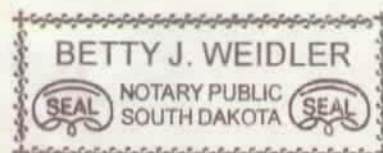
Danny Schwans
4th
Subscribed and swore to me this 28th day of June, 2007

Betty J. Weidler

My Commission expires the 29th day of April, 2010

Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application.

Steven M. Pirner, Secretary,
Department of Environment
and Natural Resources.
(June 21 & 28)



Water Rights Program - File Documentation

NAME: TM RWD

ADDRESS: Parker

DATE: 6-12-07 **COUNTY:** TU **TELEPHONE:** 605 297-3334

RE: Publication Notice

COMMENTS:

I called the Miner Co. Pioneer regarding publication of the notice on May 31 and June 6. Betty with the paper informed me that it was not published. She did indicate she remembered getting verification from the TM to publish, it just didn't happen.

I email the paper with the revised notice to be published on June 20 and 27 (letter mailed 6-12-07)

I called TM RWD and informed them of the situation. I told them I was resending the info to the paper today and the petition date was now July 9, 2007. Re-publication in the other 4 papers was not required.



Karen Schlaak
Environmental Scientist



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

June 12, 2007

Ken Pederson
Tm Rural Water System
110 N Main
Parker SD 57053

Dear Mr. Pederson:

The Miner County Pioneer was contacted today regarding the Notice of Application for Water Permit No. 6823-3. Betty with the paper informed me that it was not published. We have sent another Notice for them to publish on June 20 and 27, 2007. It will not be necessary to republish in all of the papers again. The date for petitions to be submitted will now be July 9, 2007.

My suggestion would be to call the paper (605 997-3725) and authorize publication again, even though it shouldn't be necessary.

Sincerely,

Karen Schlaak
Water Rights Program
605 773-3352

enclosures



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

May 21, 2007

The New Era
PO Box 579
Parker SD 57053-0579

ATTENTION: Legal Public Notice

Enclosed is a Notice on Application No. 6823-3 to Appropriate Water to be published twice. Please publish the first notice on May 31, 2007 with the second publication 7 days later. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

The applicant must verify to you that the notice is to be published, before you make the first publication. **Please BILL the APPLICANT for the cost of publication.** The APPLICANT is TM Rural Water District, 110 N Main, Parker SD 57053 (Ph # 605-297-3334).

Please send the Water Rights Program the first publication immediately. The publication is checked for accuracy so any corrections can be made in the second publication. You may use the form below or fax a copy of the first publication. Any fax should be sent to the attention of Karen Schlaak at (605) 773-4068. Publication errors can invalidate the public notice.

After the second publication, **please send us an affidavit or use the enclosed Proof of Publication form.** The applicant pays the cost of publication, but the Water Rights Program records require an affidavit or Proof of Publication. Delays in receiving the affidavit can be costly to the applicant.

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

-----CUT HERE-----

No. 6823-3

TO: Eric Gronlund
Water Rights Program
Joe Foss Building
Pierre SD 57501-3181

Date _____

We are in receipt of your letter of May 21, 2007 enclosing Notice to Appropriate Water by Application No. 6823-3 which was first published in our issue of _____. **ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.**

Name

Newspaper



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

May 21, 2007

Salem Special
PO Box 220
Salem SD 57058-0220

ATTENTION: Legal Public Notice

Enclosed is a Notice on Application No. 6823-3 to Appropriate Water to be published twice. Please publish the first notice on May 31, 2007 with the second publication 7 days later. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

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Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

-----CUT HERE-----

No. 6823-3

TO: Eric Gronlund
Water Rights Program
Joe Foss Building
Pierre SD 57501-3181

Date _____

We are in receipt of your letter of May 21, 2007 enclosing Notice to Appropriate Water by Application No. 6823-3 which was first published in our issue of _____. **ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.**

Name

Newspaper



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

May 21, 2007

The Argus Leader
PO Box 5034
Sioux Falls SD 57117-5034

ATTENTION: Legal Public Notice

Enclosed is a Notice on Application No. 6823-3 to Appropriate Water to be published twice. Please publish the first notice on May 30, 2007 with the second publication 7 days later. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

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Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

-----CUT HERE-----

No. 6823-3

TO: Eric Gronlund
Water Rights Program
Joe Foss Building
Pierre SD 57501-3181

Date _____

We are in receipt of your letter of May 21, 2007 enclosing Notice to Appropriate Water by Application No. 6823-3 which was first published in our issue of _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

Name

Newspaper



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

May 21, 2007

Miner County Pioneer
PO Box 220
Howard SD 57349-0220

ATTENTION: Legal Public Notice

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Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

-----CUT HERE-----

No. 6823-3

TO: Eric Gronlund
Water Rights Program
Joe Foss Building
Pierre SD 57501-3181

Date _____

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Name

Newspaper



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

May 21, 2007

Freeman Courier
PO Box 950
Freeman SD 57029-0950

ATTENTION: Legal Public Notice

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The applicant must verify to you that the notice is to be published, before you make the first publication. **Please BILL the APPLICANT for the cost of publication.** The APPLICANT is TM Rural Water District, 110 N Main, Parker SD 57053 (Ph # 605-297-3334).

Please send the Water Rights Program the first publication immediately. The publication is checked for accuracy so any corrections can be made in the second publication. You may use the form below or fax a copy of the first publication. Any fax should be sent to the attention of Karen Schlaak at (605) 773-4068. Publication errors can invalidate the public notice.

After the second publication, **please send us an affidavit or use the enclosed Proof of Publication form.** The applicant pays the cost of publication, but the Water Rights Program records require an affidavit or Proof of Publication. Delays in receiving the affidavit can be costly to the applicant.

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

-----CUT HERE-----

No. 6823-3

TO: Eric Gronlund
Water Rights Program
Joe Foss Building
Pierre SD 57501-3181

Date _____

We are in receipt of your letter of May 21, 2007 enclosing Notice to Appropriate Water by Application No. 6823-3 which was first published in our issue of _____. **ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.**

Name

Newspaper



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

NOTE: TO BE SURE OF PUBLICATION ON
THE CORRECT DATES, CONTACT
THE NEWSPAPERS RIGHT AWAY.

May 21, 2007

KEN PEDERSEN
TM RURAL WATER DISTRICT
110 N MAIN
PARKER SD 57053

Dear Mr. Pedersen:

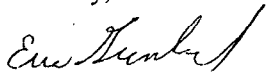
Water Permit Application No. 6823-3 for rural water system use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Publisher of the following papers:

The New Era, Parker SD	605-297-4419
Salem Special, Salem SD	605-425-2361
Argus Leader, Sioux Falls SD	605-331-2200
Miner County Pioneer, Howard SD	605-772-5644
Freeman Courier, Freeman SD	605-925-7033

You will need to contact the newspapers and authorize publication of this notice. For your information, a copy of the notice, the recommendation of the Chief Engineer and report on the applications is enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspapers to authorize publication of your Notice and to arrange for payment. Early contact with the papers can eliminate delays. Upon receiving authorization, the publishers have been instructed to publish your notice once each week for two consecutive weeks. The newspapers have also been instructed to send us the Proof of Publication. We must receive Proof of Publication before action can be taken on the applications.

Sincerely,


Eric Gronlund
Natural Resources Engineer
(605) 773-3352

enclosures

NOTE: If you plan to contest any part of the Chief Engineer's recommendation, you must file a petition pursuant to the procedures outlined in the attached notice of hearing. The Water Management Board will then consider your concerns during a hearing on the application.

Instruction to Newspaper - Publish first Notice on June 20, 2007 with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 6823-3 to Develop Reserved Water

Notice is given that TM Rural Water District, 110 North Main, Parker SD 57053 has filed an application for a water permit to place to beneficial use 1,690 acre-feet of water at a maximum diversion rate of 2.23 cubic feet of water per second which was appropriated and reserved by Future User Permit No. 6705-3. This application will authorize construction of two wells to be completed into the Upper Vermillion Missouri Aquifer (369 and 302 feet deep) located in the SW 1/4 SW 1/4 Section 20-T100N-R55W (Turner County) and SW 1/4 SE 1/4 Section 25-T101N-R55W (McCook County). The water will be used to supply the TM Rural Water District which serves users in Turner, McCook, Minnehaha, Miner and Hutchinson counties.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6823-3 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on these applications, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendations must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by July 9, 2007.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Steven M. Pirner, Secretary, Department of Environment and Natural Resources.

RECEIVED

JUN 18 2007

WATER RIGHTS
PROGRAM

June 15, 2007

Regarding Permit 6823-3

Dear DENR:

We are a concern group of owners having domestic wells in the TM Rural Water District. We would like to come to the permit hearing and ask questions and state problems that we are having with are own domestic wells. Our agenda will mainly focus on water quality, amount of water available to us, are basic water rights, and miscellaneous questions.

Thank you.

Louis ATSM A 26951 441st AVE Dolton, SD Fairbairn
Penni's Turkovich 44005 269th St Dolton, SD Dan Janki
Priscilla Turkone 44005 269th St Dolton SD 57319 Priscilla Turkone
Cindy Walther 26963 440th Ave Dolton SD 57319 Cindy Walther
Ted Walther 26963 440th Ave Dolton SD 57319
Dale Hernandez 44028 267 St Dolton SD 57319
Charles Dechert 26729 US Hwy. 81 Dolton, SD 57319
Elden Wiens 26918 441st Avenue Dolton, S.Dak. 573

RECEIVED

JUN 18

WATER RIGHTS
PROGRAM

RECEIVED

JUN 18 2007

WATER RIGHTS
PROGRAM

June 15, 2007

Regarding Permit 6823-3

Dear DENR:

We are a concern group of owners having domestic wells in the TM Rural Water District. We would like to come to the permit hearing and ask questions and state problems that we are having with are own domestic wells. Our agenda will mainly focus on water quality, amount of water available to us, are basic water rights, and miscellaneous questions.

Thank you.

Marc Dock

Marc Dock 44212 267th St
Bridgewater 57319

Kevin Hoffman

Kevin Hoffman 26674 US Hwy 81 Dutton SD 57318

Jim Hoffman

Jim Hoffman 26340 440th Ave Bridgewater 57319

Dan Koehn

Dan Koehn 27133 443rd Ave Marion SD 57043

Dell Thomas

Dell Thomas 27226 441 Ave Marion SD 57043



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

June 25, 2007

NOTICE

TO: Ken Pedersen, Manager
TM Rural Water District
Box 445
Parker SD 57053
and Parties of Record (see attached list)

FROM: Garland Erbele, Chief Engineer
Water Rights Program

SUBJECT: Notice of Hearing on Water Permit Application No. 6823-3, TM Rural Water District

A petition to intervene has been filed by a concerned group of domestic well owner in response to the public notice of Water Permit Application No. 6823-3, TM Rural Water District. A copy of the petition is enclosed to the applicant. The petition was filed in response to the Notice of Application to appropriate water published in five counties served by the District. This notice schedules a hearing before the Water Management Board to consider Application No. 6823-3.

As specified in the publication notice, Application No. 6823-3 proposes to place to beneficial use 1,690 acre-feet of water at a maximum diversion rate of 2.23 cubic feet of water per second which was appropriated and reserved by Future Use Permit No. 6705-3. This application will authorize construction of two wells to be completed into the Upper Vermillion Missouri Aquifer (369 and 302 feet deep) located in the SW 1/4 SW 1/4 Section 20-T100N-R55W (Turner County) and SW 1/4 SE 1/4 Section 25-T101N-R55W (McCook County). The water will be used to supply the TM Rural Water District which serves users in Turner, McCook, Minnehaha, Miner and Hutchinson counties.

The Water Management Board will conduct a hearing to consider Application No. 6823-3 at 10:30 AM on October 3, 2007 in the Floyd Matthew Training Center, Joe Foss Building, 523 E. Capitol Avenue, Pierre SD. Pursuant to SDCL 46-2-9, 46-2-11, and 46-2A-23, the Board has legal authority and jurisdiction to conduct this hearing. The hearing time is an estimate and may be delayed due to prior agenda items. Notice will be provided to all parties of record of any change in the hearing time or date.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6823-3 because 1) the proposed diversion can be developed without unlawful impairment of existing rights, 2) the proposed use is a beneficial use and 3) it is in the public interest. The Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve, 2)

approve with qualifications, 3) defer, or 4) deny this application based on the evidence presented at the public hearing.

The October 3, 2007, hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any party who timely filed a petition opposing the application. The request for an automatic delay must be filed by September 21, 2007.

This hearing may be an adversarial proceeding. Any party of record and/or the applicant have the right to be represented by a lawyer and may present evidence or cross-examine witnesses according to SDCL 1-26. These and other due process rights will be forfeited if not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

Notice is further given to individual with disabilities that this hearing is being held in a physically accessible facility. Please notify Eric Gronlund at (605) 773-3352 by September 21, 2007, if you have any questions about the hearing process or have special needs for which the department will make arrangements.

This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-16; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15, 46-2A-23; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4 and Board Rules ARSD 74:02:01:01 thru 74:02:01:15.

c: Diane Best, Assistant Attorney General

enclosure (to the applicant)

NOTE: The publication notice in the Miner County Pioneer did not occur at the same time as the other four newspapers. Because of this issue the date to intervene is now extended until July 9, 2007.

Since this matter does not involve a monetary controversy in excess of \$2,500.00 or termination of a property right in accordance with SDCL 1-26-18.3, the Chief Engineer has determined this contested case need not be referred to the Office of Hearing Examiners. If any party disagrees with this determination, the Chief Engineer shall be notified by July 23, 2007.

CERTIFICATION

I hereby certify that on June 25, 2007, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated June 25, 2007, regarding scheduling of hearing for Water Right Permit Application No. 6823-3, TM Rural Water District, as addressed below and on the attached parties of record.

Ken Pedersen, Manager
TM Rural Water District
Box 445
Parker SD 57053

A copy of the above described Notice was sent Inter-office to:

Diane Best, Assistant Attorney General, 1302 E. Hwy 14, Suite 1, Pierre SD 57501-8501



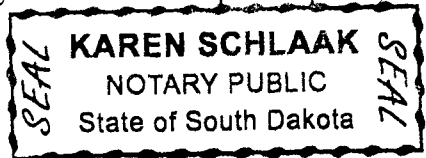
Gail Jacobson, Secretary
Water Rights Program, DENR

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 25th day of June, 2007.



Karen Schlaak
Notary Public
My Commission expires April 1, 2013



PARTIES of RECORD
Water Permit Application No. 6823-3, TM Rural Water District

APPLICANT

Ken Pedersen, Manager
TM Rural Water District
Box 445
Parker SD 57053

PETITIONERS

LOUIS ATSMA
26951 441ST AVE
DOLTON SD 57319

DENNIS JURKOVICH
44005 269TH ST
DOLTON SD 57319

PRISCILLA JURKOVICH
44005 269TH ST
DOLTON SD 57319

CINDY WALTNER
26963 440TH AVE
DOLTON SD 57319

TED WALTNER
26963 440TH AVE
DOLTON SD 57319

DALE HEEMSTRA
44028 267TH ST
DOLTON SD 57319

CHARLES DECHERT
26729 US HWY 81
DOLTON SD 57319

ELDON WIENS
26918 441ST AVE
DOLTON SD 57319

MARC DECK
44212 267TH ST
BRIDGEWATER SD 57319

KEVIN HOFFMAN
26674 US HWY 81
DOLTON SD 57319

JIM HOFFMAN
26340 440TH AVE
BRIDGEWATER SD 57319

DAN KOEHN
27133 443RD AVE
MARION SD 57043

DELL THOMAS
27226 441ST AVE
MARION SD 57043



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

September 13, 2007

NOTICE

TO: Ken Pedersen, Manager
TM Rural Water District
Box 445
Parker SD 57053
and Parties of Record (see attached list)

FROM: Garland Erbele, Chief Engineer
Water Rights Program

SUBJECT: Hearing on Water Permit Application No. 6823-3, TM Rural Water District

The Water Management Board will consider Application No. 6823-3 filed by TM Rural Water District on October 3, 2007, at 10:30 AM (CDT), in the Floyd Matthew Training Center, Joe Foss Building, 523 E. Capitol Avenue, Pierre SD. Notice will be provided to parties if there is a change in the hearing time.

Applicable provisions of the public notice published June 21 and 28, 2007 in the Miner County Pioneer and the notice dated June 25, 2007 will still apply. This hearing may be an adversarial proceeding. Any party of record has the right to be present and to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

I am enclosing a copy of the report, recommendation and petition in the matter of Water Permit Application No. 6823-3. State law directs the Chief Engineer to provide Water Management Board members with a copy of all pleadings including petitions for each proceeding. The enclosed material is the same information being sent to the Board members in advance of the hearing.

Please contact Eric Gronlund, Water Rights Program at (605) 773-3352, if you have any questions.

enclosure

C: Diane Best, Assistant Attorney General

PARTIES of RECORD
Water Permit Application No. 6823-3, TM Rural Water District

APPLICANT

KEN PEDERSEN, MANAGER
TM RURAL WATER DISTRICT
BOX 445
PARKER SD 57053

PETITIONERS

LOUIS AT SMA
26951 441ST AVE
DOLTON SD 57319

DENNIS JURKOVICH
44005 269TH ST
DOLTON SD 57319

PRISCILLA JURKOVICH
44005 269TH ST
DOLTON SD 57319

CINDY WALTNER
26963 440TH AVE
DOLTON SD 57319

TED WALTNER
26963 440TH AVE
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44028 267TH ST
DOLTON SD 57319

CHARLES DECHERT
26729 US HWY 81
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DOLTON SD 57319

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26340 440TH AVE
BRIDGEWATER SD 57319

DAN KOEHN
27133 443RD AVE
MARION SD 57043

DELL THOMAS
27226 441ST AVE
MARION SD 57043

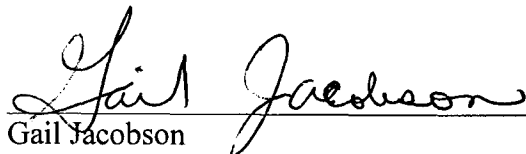
CERTIFICATION

I hereby certify that on September 13, 2007, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated September 13, 2007, regarding scheduling of hearing for Water Right Permit Application No. 6823-3, TM Rural Water District, addressed as stated below and on the attached parties of record :

Ken Pedersen, Manager
TM Rural Water District
Box 445
Parker SD 57053

A copy of the above described Notice was sent Inter-office to:

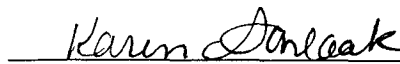
Diane Best, Assistant Attorney General, 1302 E. Hwy 14, Suite 1, Pierre SD 57501-8501



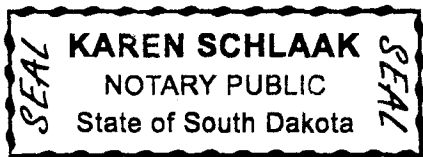
Gail Jacobson
Water Right Program, DENR

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 13th day of September, 2007.



Karen Schlaak
Notary Public
My Commission expires April 1, 2013





**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

November 6, 2007

NOTICE

TO: Ken Pedersen, Manager
TM Rural Water District
Box 445
Parker SD 57053
and Parties of Record (see attached list)

FROM: Garland Erbele, Chief Engineer
Water Rights Program

SUBJECT: Hearing on Water Permit Application No. 6823-3, TM Rural Water District

The October 3rd hearing before the Water Management Board on Water Permit Application No. 6823-3 filed by TM Rural Water District has been rescheduled for December 5, 2007, at 1:00 PM, in the Floyd Matthew Training Center, Joe Foss Building, 523 E. Capitol Avenue, Pierre SD. The agenda time is an estimate and may be delayed due to prior agenda items. Notice will be provided to parties if there is a change in the hearing time.

Applicable provisions of the public notice published in Turner, McCook, Minnehaha, Miner and Hutchinson Counties and the notice dated June 25, 2007 will still apply. This hearing may be an adversarial proceeding. Any party of record has the right to be present and to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

A copy of the report, recommendation and petition in the matter of Water Permit Application No. 6823-3 was previously sent to parties of record. State law directs the Chief Engineer to provide Water Management Board members with a copy of all pleadings including petitions for each proceeding. This information will be sent to the Board members in advance of the hearing. Please contact Eric Gronlund at (605) 773-3352 if you need another copy of this information sent to you.

C: Diane Best, Assistant Attorney General
Curt Mortenson, Attorney, PO Box 190, Fort Pierre SD 57532

PARTIES of RECORD
Water Permit Application No. 6823-3, TM Rural Water District

APPLICANT

Ken Pedersen, Manager
TM Rural Water District
Box 445
Parker SD 57053

PETITIONERS

LOUIS ATSMA
26951 441ST AVE
DOLTON SD 57319

DENNIS JURKOVICH
44005 269TH ST
DOLTON SD 57319

PRISCILLA JURKOVICH
44005 269TH ST
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27226 441ST AVE
MARION SD 57043

CERTIFICATION

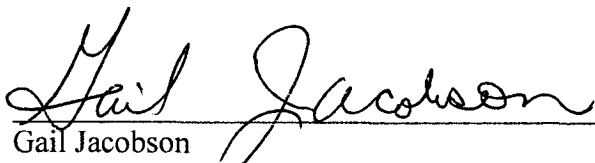
I hereby certify that on September November 6, 2007, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated November 6, 2007, regarding scheduling of hearing for Water Right Permit Application No. 6823-3, TM Rural Water District, addressed as stated below and on the attached parties of record :

Ken Pedersen, Manager
TM Rural Water District
Box 445
Parker SD 57053

Curt Mortenson, Attorney
PO Box 190
Fort Pierre SD 57532

A copy of the above described Notice was sent Inter-office to:

Diane Best, Assistant Attorney General, 1302 E. Hwy 14, Suite 1, Pierre SD 57501-8501



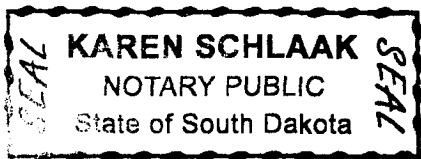
Gail Jacobson
Water Right Program, DENR

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 6th day of November, 2007.



Karen Schlaak
Notary Public
My Commission expires April 1, 2013





**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

December 10, 2007

Louis Atsma
26951 441st Ave
Dolton SD 57319

Dennis Jurkovich
44005 269th St
Dolton SD 57319

Ted Waltner
26963 440th Ave
Dolton SD 57319

Marc Dick
44212 267th St
Dolton SD 57319

Gentleman:

Enclosed are five DENR exhibits presented at the Water Management Board hearing on TM Rural Water District's water permit application. You requested a copy of these exhibits be sent to you. Some of these exhibits have been reduced in size.

Please let me know if I have omitted an exhibit that is of interest to you.

Sincerely,

Eric Gronlund
Water Rights Program, DENR
605 773-3352

enclosure

6823-3

Water Rights Program - DENR
Conversation File Documentation

NAME OF PERSON OR FILE: Water Permit No. 6823-3, TM Rural Water District

ADDRESS: 110 N Main, Parker SD COUNTY: Turner and McCook County

DATE: February 13, 2008 TELEPHONE:

RE: Water Permit No. 6823-3

COMMENTS:

Water Permit Application No. 6823-3 requests to place to beneficial use water reserved by Future Use Permit No. 6705-3 from the Upper Vermillion Missouri Aquifer. Normally the Water Rights Program requires the reserved water to come out of the future use permit with the earliest priority date until none remains. In this case, the future use permit with the earliest priority date is No. 5358-3. However, Permit No. 6823-3 to construct and place water to beneficial use was taken out of No. 6705-3.

The amount of water requested under Permit No. 6823-3 is 1,690 acre feet of water at a diversion rate of 2.23 cubic feet of water per second. A diversion rate of 2.23 cfs equates to only 1,614.5 acre feet of water. The permit is issued for 1,690 acre feet of water. At licensing the quantity of water will need to be corrected and the portion not developed will revert back to the Future Use Permit No. 6705-3.

Once they find a good well he will contact me to get any permitting issues addressed with the location of the well.

NAME: Eric Trunkley



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

FEB 13 2008

TM Rural Water District
Ken Peterson Manager
110 N Main
Parker SD 57053

Dear Mr. Peterson:

Enclosed is Water Permit No. 6823-3 authorizing construction of your water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

Form 10, *Notice of Completion of Works and Application of Water to Beneficial Use*, is enclosed. Please return this completed form after you have finished the system and have put the water to beneficial use. An investigation can then be scheduled so the water license may be issued, thus completing the acquisition of a water right.

An informational sheet ? *Common Water Right Questions?* is also enclosed. This sheet is intended to answer some of the questions associated with obtaining and keeping a water right.

Sincerely,

Garland Erbele, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

RECEIVED

FEB 25 2008

WATER RIGHTS
PROGRAM

NOTICE OF COMPLETION OF WORKS AND
APPLICATION OF WATER TO BENEFICIAL USE

Date 2-19-08

TO: Water Rights Program, DENR
523 E. Capitol
Pierre, SD 57501-3181

FROM: TM RURAL WATER DISTRICT
(name)
PO BOX 445
(address)
PARKER, SD 57053 605-297-3334
(city, state, zip) (phone)

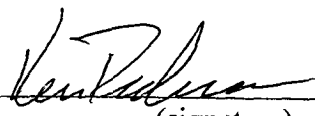
I have completed the construction of the water use system and I have put the water to beneficial use to the maximum extent it is going to be used.

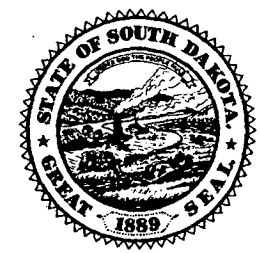
Water Permit No. 6823-3 states that the water use system is to be constructed by 12-5-2012, and water is to be put to beneficial use by 12-5-2016.
(date) (date)

The water use system was completed on 2-15-2008.
(date)

Applying the water to beneficial use was completed on 2-15-08.
(date)

You may schedule an investigation so that the water license may be issued.


(signature)



Sargent Drilling

INDUSTRIAL ENGINEERING
COMPLETE MUNICIPAL AND INDUSTRIAL
WELL AND PUMP SERVICE

PO Box 367
846 South 13th St.
Geneva, NE 68361-0367

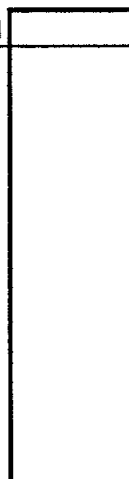
Phone: (402) 759-3902
Toll Free: (888) 496-3902
Fax: (402) 759-4960

Driller's Log

SW 1/4 SW 1/4 Sec 20 - T100N - R55W

Customer: TM Rural Water District		Legal: Well #7	
Date Construction Started: 7/22/2007		GPS Reading: 43° 27' 33.3"	
Well Depth: 392'		Bore Hole: 24"	
Type of Plain Casing: .375" wall steel		Casing Dia.: 12"	
From: 0'	To: 292'		
Type of Perf. Casing: Stainless v-wire		Casing Dia.: 12"	
Slot size: .060"	From: 292'	To: 392'	
Sump From:		Type of Bottom: Stainless steel	
Gravel From: Northern		Grade Size: A pack	
Yards of Gravel: 9 super sacks	Bags of Chunks: 1 super sack		
Bags of Powder: 48	Yards of Concrete: 16 concrete grout		
Stabilizers: 5	Well Development Time:		
Test Pump Results:		SWL:	
GPM from			
GPM from			
GPM from			
GPM from			

Ground Level



0' - 240' Concrete grout

240' - 250' Bentonite

250' - 392' Chorinated gravel

Sargent Drilling

**INDUSTRIAL ENGINEERING
COMPLETE MUNICIPAL AND INDUSTRIAL
WELL AND PUMP SERVICE**

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1-888-496-3902

TEST HOLE LOG

CUSTOMER: TM RWD 2006-7	
WELL ID: #7	
LOCATION:	
LATITUDE:	
LONGITUDE:	
FOOTAGES:	
DATE: 4-26-07	DRILLED BY: Derek Schweitzer

SWL: 100'

PWL:

<u>from feet</u>	<u>- to feet</u>	
0	20	Topsoil and clay
20	40	Clay and blue clay with cobbles
40	60	Blue clay with cobbles
60	100	Blue clay and sandy blue clay with cobbles
100	120	Blue clay and sandy blue clay with trace medium and coarse sand streaks and cobbles
120	140	Blue clay and sandy blue clay with cobbles and thin hard streaks
140	148	Blue clay and sandy blue clay with cobbles
148	160	Medium and coarse blue sand and trace fine gravel with cobbles
160	178	Medium and coarse sand and fine gravel
178	179	Hard
179	180	Clay
180	192	Blue clay
192	195	Fine, medium and coarse gravel and coarse sand (loose)
195	215	Blue clay
215	217	Hard
217	220	Blue clay with hard layers
220	240	Blue clay with hard edges and thin gravel streaks
240	245	Blue clay
245	247	Hard
247	260	Fine gravel and medium and coarse sand
260	265	Clay
265	280	Fine gravel and medium and coarse sand
280	300	Fine gravel with medium and coarse sand and hard layers
300	320	Fine and medium gravel and medium and coarse sand and hard streaks
320	396	Fine to medium gravel and medium and coarse sand with hard streaks and thin clay streaks
396	397	Sioux quartite

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Driller's Log

SW 1/4 SE 1/4 Sec 25 - T10N - R55W

Customer: TM Rural Water		Legal: Well #6B	
Date Construction Started: 6/12/2007		GPS Reading: 43° 30' 52.4"	
Well Depth: 341'		Bore Hole: 24"	
Type of Plain Casing: .375" wall		Casing Dia.: 12"	
From: 0'	To: 271'		
Type of Perf. Casing: Stainless V-wire		Casing Dia.: 12"	
Slot size: .060"	From: 271'	To: 341'	
Sump From:		Type of Bottom: Steel	
Gravel From: Northern		Grade Size: A-pack	
Yards of Gravel: 8 super sacks	Bags of Chunks: 1 super sack		
Bags of Powder: 72	Yards of Concrete: 16 grout		
Stabilizers: 5	Well Development Time:		
Test Pump Results:		SWL:	
GPM from			
GPM from			
GPM from			
GPM from			

Ground Level

	0' - 240' Concrete grout
	240' - 250' Bentonite
	250' - 341' Chlorinated gravel

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TEST HOLE LOG

CUSTOMER: TM RWD 2006-1	
WELL ID: 6B	
LOCATION:	
LATITUDE: 43° 30' 52.8"	
LONGITUDE: 097° 22' 23.7"	
FOOTAGES:	
DATE: 4-30-07	DRILLED BY: Derek Schweitzer

SWL: 100'

PWL:

<u>from feet</u>	<u>- to feet</u>	
0	20	Topsoil and clay with cobbles
20	33	Clay
33	40	Blue clay with cobbles
40	100	Blue clay and sandy blue clay with cobbles
100	140	Blue clay and sandy blue clay with cobbles and trace medium to coarse sand
140	156	Blue clay and sandy blue clay with medium and coarse sand and cobbles
156	160	Fine gravel and medium and coarse sand
160	180	Medium and coarse sand and fine gravel
180	200	Fine, medium and coarse sand and fine gravel with thin clay streaks
200	205	Medium to coarse sand
205	216	Coarse sand and clay layers
216	220	Coarse sand and trace fine gravel
220	224	Medium to coarse sand and fine gravel
224	228	Clay
228	240	Medium and coarse sand and clay layers
240	256	Blue clay with medium to coarse sand streaks
256	267	Medium to coarse sand and fine gravel
267	269	Hard
269	277	Clay with sand streaks
277	280	Fine to medium gravel and medium and coarse sand with hard edges
280	300	Fine to medium gravel and coarse sand with clay layers and cobbles
300	317	Clay
317	320	Coarse sand
320	340	Coarse sand and fine gravel with limestone layers and clay layers
340	369	Shale
369	370	Sioux quartite

dh

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4-HOUR CONSTANT RATE TEST LOG

CUSTOMER: TM Rural Water	
WELL ID:	WELL TYPE:
TEST START DATE: 06-25-07	TEST END DATE: 06-25-07
READINGS TAKEN BY:	
STATIC WATER LEVELS: PRODUCTION WELL: 103'	TEST WELL: OBSERVATION WELL: 76'
ACTUAL START TIME (am/pm): 11:15am	
REFERENCE POINT:	DISTANCE FROM REFERENCE POINT TO GROUND:

Time After Start	Actual Time (am/pm)	Production Well		Test Well Water Level (ft. in.)	Observation Well Water Level (ft. in.)
		Pumping Water Level (ft. in.)	Pump Rate (gpm)		
0 min	11:15am				
1 min	11:16am	111' 9"	948		
2 min	11:17am	112' 3"	948		
3 min	11:18am	113' 3"	960		
4 min	11:19am	113' 8"	980		
5 min	11:20am	114' 3"	1023		
6 min	11:21am	114' 3"	1023		
7 min	11:22am	114' 7"	1023		
8 min	11:23am	114' 10"	1023		
9 min	11:24am	114' 10"	1023		
10 min	11:25am	115'	1023		
15 min	11:30am	113' 10"	1034		
20 min	11:35am	113' 10"	1034		
25 min	11:40am	115'	1034		
30 min	11:45am	115' 2"	1000		
35 min	11:50am	115' 6"	1000		
40 min	11:55am	115' 3"	1000		
45 min	12:00pm	115' 3"	1000		
50 min	12:05pm	115' 6"	1000		
55 min	12:10pm	115' 3"	1000		
1 hr	12:15pm	115' 6"	1000		
1 hr 5 min	12:20pm	115' 6"	1000		
1 hr 10 min	12:25pm	115' 6"	1000		

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4-HOUR CONSTANT RATE TEST LOG

CUSTOMER: TM Rural Water	
WELL ID:	WELL TYPE:
TEST START DATE: 06-25-07	TEST END DATE: 06-25-07
READINGS TAKEN BY:	
STATIC WATER LEVELS: PRODUCTION WELL: 103' TEST WELL: OBSERVATION WELL: 76'	
ACTUAL START TIME (am/pm): 11:15am	
REFERENCE POINT:	DISTANCE FROM REFERENCE POINT TO GROUND:

Time After Start	Actual Time (am/pm)	Production Well		Test Well Water Level (ft. in.)	Observation Well Water Level (ft. in.)
		Pumping Water Level (ft. in.)	Pump Rate (gpm)		
1 hr 15 min	12:30pm	115' 6"	1000		
1 hr 20 min	12:35pm	115' 6"	1000		
1 hr 25 min	12:40pm	115' 6"	1000		
1 hr 30 min	12:45pm	115' 6"	1000		
1 hr 35 min	12:50pm	115' 6"	1000		
1 hr 40 min	12:55pm	115' 6"	1000		
1 hr 45 min	1:00pm	115' 6"	1000		
2 hr	1:15pm	115' 7"	1000		
2 hr 15 min	1:30pm	115' 7"	1000		
2 hr 30 min	1:45pm	115' 8"	1000		
2 hr 45 min	2:00pm	115' 9"	1000		
3 hr	2:15pm	115' 9"	1000		
3 hr 30 min	2:45pm	115' 9"	996		
3 hr 39 min	2:54pm	115' 9"	996		

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CONSTANT RATE RECOVERY LOG

CUSTOMER: TM Rural Water	
WELL ID:	WELL TYPE:
TEST START DATE: 6-25-07	TEST END DATE: 6-26-07
READINGS TAKEN BY:	
STATIC WATER LEVELS: PRODUCTION WELL: 103' TEST WELL: OBSERVATION WELL: 76'	
ACTUAL START TIME (am/pm): 2:54pm	
REFERENCE POINT:	DISTANCE FROM REFERENCE POINT TO GROUND:

Time After Start	Actual Time (am/pm)	Production Well		Test Well Water Level (ft. in.)	Observation Well Water Level (ft. in.)
		Pumping Water Level (ft. in.)	Pump Rate (gpm)		
0 min	2:54pm				
1 min	2:55pm	105'			
2 min	2:56pm	104' 11"			
3 min	2:57pm	104' 10"			
4 min	2:58pm	104' 9"			
5 min	2:59pm	104' 9"			
6 min	3:00pm	104' 7"			
7 min	3:01pm	104' 7"			
8 min	3:02pm	104' 6"			
9 min	3:03pm	104' 6"			
10 min	3:04pm	104' 5"			
11 min	3:05pm	104' 4"			
16 min	3:10pm	104' 3"			
21 min	3:15pm	104' 2"			
26 min	3:20pm	104' 1"			
31 min	3:25pm	104' 1"			
36 min	3:30pm	104' 1"			
41 min	3:35pm	104'			
46 min	3:40pm	104'			
51 min	3:45pm	104'			
56 min	3:50pm	104'			
1 hr 1 min	3:55pm	104'			
1 hr 6 min	4:00pm	104'			

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CONSTANT RATE RECOVERY LOG

CUSTOMER: TM Rural Water	
WELL ID:	WELL TYPE:
TEST START DATE: 6-25-07	TEST END DATE: 6-26-07
READINGS TAKEN BY:	
STATIC WATER LEVELS: PRODUCTION WELL: 103' TEST WELL: OBSERVATION WELL: 76'	
ACTUAL START TIME (am/pm): 2:54pm	
REFERENCE POINT:	DISTANCE FROM REFERENCE POINT TO GROUND:

Time After Start	Actual Time (am/pm)	Production Well		Test Well Water Level (ft. in.)	Observation Well Water Level (ft. in.)
		Pumping Water Level (ft. in.)	Pump Rate (gpm)		
1 hr 11 min	4:05pm	104'			
1 hr 16 min	4:10pm	104'			
1 hr 21 min	4:15pm	104'			
1 hr 26 min	4:20pm	104'			
1 hr 31 min	4:25pm	104'			
1 hr 36 min	4:30pm	104'			
1 hr 41 min	4:35pm	103' 11"			
1 hr 56 min	4:50pm	103' 11'			
2 hr 11 min	5:05pm	103' 11"			
2 hr 26 min	5:20pm	103' 11"			
2 hr 41 min	5:35pm	103' 11'			
2 hr 56 min	5:50pm	103' 11"			
17hr 10 min	7:04am	103' 9"			