09SR117

WATER NOTES:

STA 1+16.6 – 0.0' LT	INSTALL 12" MJ PLUG.
STA 1+16.6 – 0.0' LT TO STA 1+19.7 – 0.0' LT	INSTALL 4 LF – 12" PVC WATER MAIN.
STA 1+19.7 – 0.0' LT	INSTALL 12" GATE VALVE.
STA 1+21.9 – 0.0' LT	INSTALL 12" X 12" X 6" TEE.
STA 1+21.9 – 0.0' LT TO STA 1+21.9 – 5.5' RT	INSTALL 6 LF – 6" PVC WATER MAIN.
STA 1+21.9 – 5.5' RT	INSTALL FIRE HYDRANT WITH AUXILARY VALVE.
STA 1+21.9 – 0.0' LT TO STA 1+28.1 – 0.0' LT	INSTALL 7 LF – 12" PVC WATER MAIN.
STA 1+28.1 – 0.0' LT	INSTALL 12" X 12" X 8" TEE.
STA 1+28.1 – 0.0' LT TO STA 1+28.1 – 35.5' RT	INSTALL 36 LF – 8" PVC WATER MAIN.
STA 1+28.1 – 0.0' LT TO STA 1+55.7 – 0.0' LT	INSTALL 28 LF – 12" PVC WATER MAIN.
STA 1+31.1 – 0.0' LT TO STA 1+51.1 – 0.0' LT	ENCASE 21 LF – 12" PVC WATER MAIN.
STA 1+55.7 – 0.0' LT	INSTALL 12" GATE VALVE.
STA 1+55.7 – 0.0' LT TO STA 2+75.4 – 0.0' LT	INSTALL 120 LF – 12" PVC WATER MAIN.
STA 2+75.4 – 0.0' LT	INSTALL 2' VERTICAL DEFLECTION COUPLING.
STA 2+75.4 – 0.0' LT TO STA 3+79.1 – 0.0' LT	INSTALL 104 LF – 12" PVC WATER MAIN.
STA 3+79.1 – 0.0' LT	INSTALL 11.25° BEND.
STA 3+79.1 – 0.0' LT TO STA 4+05.4 – 0.0' LT	INSTALL 27 LF – 12" PVC WATER MAIN.
STA 4+05.4 – 0.0' LT	INSTALL 22.5° BEND.
STA 4+05.4 – 0.0' LT TO STA 4+98.2 – 0.0' LT	INSTALL 100 LF – PVC WATER MAIN.
STA 4+37.2 – 0.0' LT TO STA 4+95.2 – 0.0' LT	BORE 58 LF – 24" STEEL CASING.

WATER NOTES:

STA 4+98.2 – 0.0' LT	INSTALL 12" X 8" REDUCER.
STA 5+00.4 – 0.0' LT	INSTALL 8" GATE VALVE.
STA 5+00.4 – 0.0' LT TO STA 5+04.8 – 0.0' LT	INSTALL 5 LF – 8" PVC WATER MAIN.
STA 5+04.0 – 11.0' LT TO STA 5+04.0 – 11.0' RT	ENCASE 22 LF – 18" RC STORM SEWER.
STA 5+04.8 – 0.0' LT	INSTALL 8" X 8" TAPPING TEE.

SURFACING NOTES:

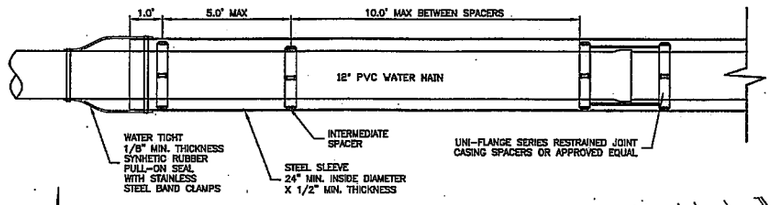
STA 1+13.6 – 1.1' LT TO STA 3+02.0 – 6.0' LT	RESTORE 84 SY – GRAVEL SURFACING.
STA 3+04.8 – 5.9' RT TO STA 4+47.2 – 8.0' LT	REMOVE 184 SY – ASPHALT PAVEMENT INSTALL 52 TONS ASPHALT PAVEMENT INSTALL 83 TONS AGGREGATE BASE COURSE.
STA 4+91.3 – 8.0' LT TO STA 5+01.3 – 6.0' RT	REMOVE 14 SY – ASPHALT PAVEMENT INSTALL 4 TONS ASPHALT PAVEMENT INSTALL 5 TONS AGGREGATE BASE COURSE.
STA 5+04.0 – 6.0' LT TO STA 5+04.0 – 6.0' RT	REMOVE AND REPLACE 12 LF CONCRETE CURB AND GUTTER

REVISION NOTES:

1. HYDRANT SHOWN FOR KNUTSON LANE IS THE HYDRANT REPLACING THE FIRE HYDRANT LOCATED AT STA 16+24.6 – 18.5' LT ON SHEET C2.04.
2. MH 7 INVERT SHALL BE LOWERED TO ELEVATION 3410.08 MODIFICATIONS TO BE MADE TO SHEET C2.04 ARE:
   MH 7
   RIM ELEV = 3419.53
   INV OUT (S) = 3410.08

CONSTRUCTION NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING THE EXACT LOCATION AND DEPTH OF THE EXISTING WATER MAIN BEFORE BORING UNDER STURGIS ROAD.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY RIGHT-TO-WORK PERMITS WITHIN THE SDDOT RIGHT-OF-WAY.
3. CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR A TRAFFIC CONTROL PLAN ACCORDING TO THE MOST CURRENT MUCTD.



BORING DETAIL
N.T.S.

BORING NOTES

STEEL PIPE

STEEL CASING PIPE SHALL BE CARBON STEEL, ASTM A53, GRADE B, SEAMLESS OR WELDED CONSTRUCTION. DIAMETER AND WALL THICKNESS OR SHALL BE AS CALLED OUT IN THE PLANS.

CASING CHOCKS

CASING SPACERS/CHOCKS SHALL BE DESIGNED TO PROVIDE A MINIMUM OF 1.0-INCH CLEARANCE BETWEEN THE CARRIER PIPE'S GREATEST OUTSIDE BELL DIAMETER AND THE CASING PIPE'S INSIDE DIAMETER. CASING SPACERS/CHOCKS SHALL ALSO BE SIZED TO RESTRICT THE CARRIER PIPE'S VERTICAL OR HORIZONTAL MOVEMENT WITHIN THE STEEL CASING TO 1.5-INCHES. THE CASING SPACERS/CHOCKS SHALL SECURELY CLAMP TO THE CARRIER PIPE TO PRECLUDE SLIPPAGE DURING INSTALLATION. SPACERS/CHOCKS SHALL BE CAPABLE OF SUPPORTING THE WEIGHT OF THE CARRIER PIPE, RUNNING FULL. SEE THE CASING/CARRIER DETAIL IN THE PLANS FOR MAXIMUM HORIZONTAL SPACING AND CASING SEAL DETAILS.

CASING END SEALS

FOLLOWING PLACEMENT OF THE CARRIER PIPE, THE ENDS OF THE CASING PIPE SHALL BE SEALED WITH A MINIMUM 1/8" THICK RUBBER PULL-ON SEAL, WITH STAINLESS STEEL CLAMPS AT THE CASING AND AT THE CARRIER PIPE TO PROVIDE A WATERTIGHT SEAL. SEALS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.

CONTRACTOR QUALIFICATIONS

BORING OR JACKING OF PIPE CASINGS SHALL BE ACCOMPLISHED BY AN EXPERIENCED FIRM. IF SUBCONTRACTORS ARE PROPOSED FOR BORED CROSSINGS, THE OWNER RESERVES THE RIGHT TO REVIEW THE PLANT, EQUIPMENT AND QUALIFICATIONS OF THE SUBCONTRACTOR. SUBCONTRACTORS MUST BE APPROVED BY THE OWNER.

THE CONTRACTOR SHALL SUBMIT AT OR PRIOR TO THE PRECONSTRUCTION CONFERENCE DOCUMENTATION RELATED TO THE BORING CONTRACTOR'S EXPERIENCE AND CREDENTIALS. A DETAILED DESCRIPTION OF PROCEDURES TO BE USED AND A PLAN OF OPERATION FOR THE CROSSINGS SHALL ALSO BE SUBMITTED. THE PLAN SHALL DETAIL THE EQUIPMENT AND TECHNIQUES TO BE USED, INCLUDING METHODS TO MAINTAIN GRADE AND ALIGNMENT, AND TRAFFIC CONTROL/PEDESTRIAN SAFETY METHOD. NO WORK WILL BE PERMITTED WITHOUT AN APPROVED PLAN OF OPERATIONS.

INSTALLATION OF STEEL CASING

THE JACKING OR BORING PIT SHALL BE ONLY OF SUFFICIENT LENGTH TO PROVIDE ROOM FOR THE BORING MACHINE, JACKING HEAD, JACKING FRAME, REACTION BLOCKS, JACKS AND ONE PIPE LENGTH. THE PIT SHALL BE OF SUFFICIENT WIDTH TO PERMIT AMPLE WORKING SPACE. THE END OF THE PIT NEAREST TO THE ROADWAY SHALL PRESENT A VERTICAL FACE INTO WHICH THE CASING IS TO BE INSTALLED. SHIELDING OF THE WORKING FACE WITH STEEL PLATE MAY BE NECESSARY TO PREVENT VOIDS OR CAVING.

PITS SHALL BE MAINTAINED IN A DEWATERED CONDITION THROUGHOUT THE CONSTRUCTION PERIOD.

PIT WALLS SHALL CONFORM TO THE RECOMMENDATIONS OF THE GEOTECHNICAL EXPLORATION REPORT.

THE PITS SHALL BE COMPLETELY FENCED WITH AN APPROVED TEMPORARY SAFETY FENCING SYSTEM OR REFLECTORIZED BARRICADES WHEN BORING OR JACKING OPERATIONS ARE NOT IN PROGRESS, AND SHALL BE ILLUMINATED WITH FLASHING WARNING LIGHTS AT NIGHT AT THE EXCAVATION LIMITS CLOSEST TO THE ROADWAY.

THE BORE MAY NOT EXCEED THE OUTSIDE DIAMETER OF THE CASING PIPE.

PIPE CASING ENDS SHALL BE SQUARED BEFORE PLACING INTO THE JACKING STRING AND CONNECTING TO THE PRECEDING SEGMENT.

JOINTS FOR STEEL CASING PIPE SHALL BE OF THE CONTINUOUS SINGLE BUTT WELD TYPE.

HORIZONTAL TOLERANCE OF THE INSTALLED CASING IS PLUS OR MINUS 2.5-FEET FROM PLAN ALIGNMENT.

THE BORE SHALL BE REJECTED IF THE ABOVE REQUIREMENTS ARE NOT MET.

THE ENDS OF THE CASING SHALL BE PERMANENTLY MARKED BY INSTALLING A METAL T-POST 6' BELOW THE FINISHED GRADE DIRECTLY ABOVE THE ENDS OF THE CASING.

INSTALLATION OF CARRIER PIPE

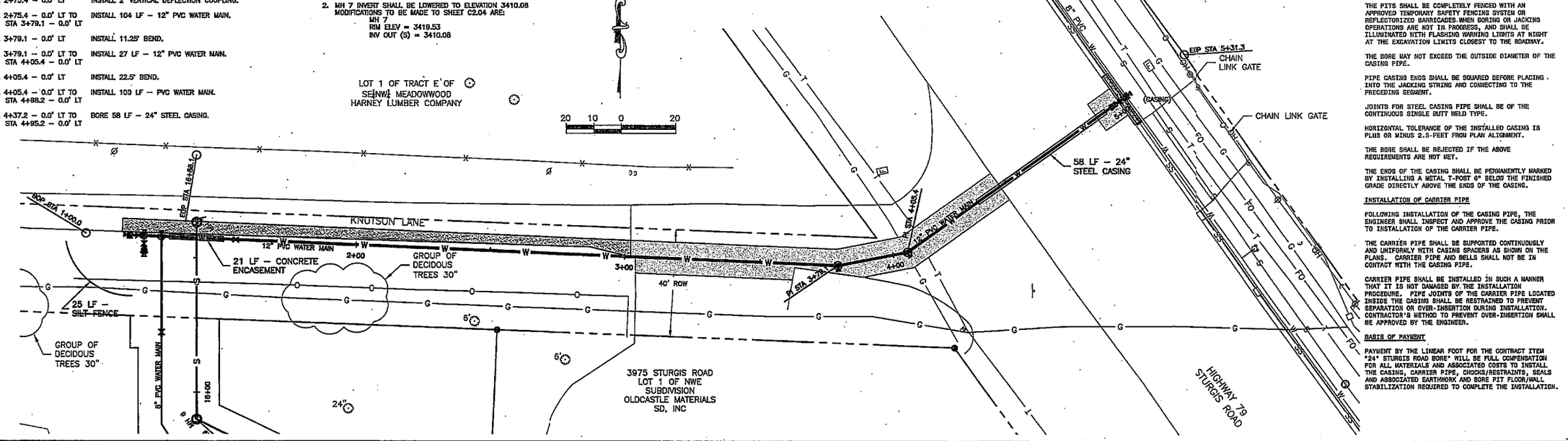
FOLLOWING INSTALLATION OF THE CASING PIPE, THE ENGINEER SHALL INSPECT AND APPROVE THE CASING PRIOR TO INSTALLATION OF THE CARRIER PIPE.

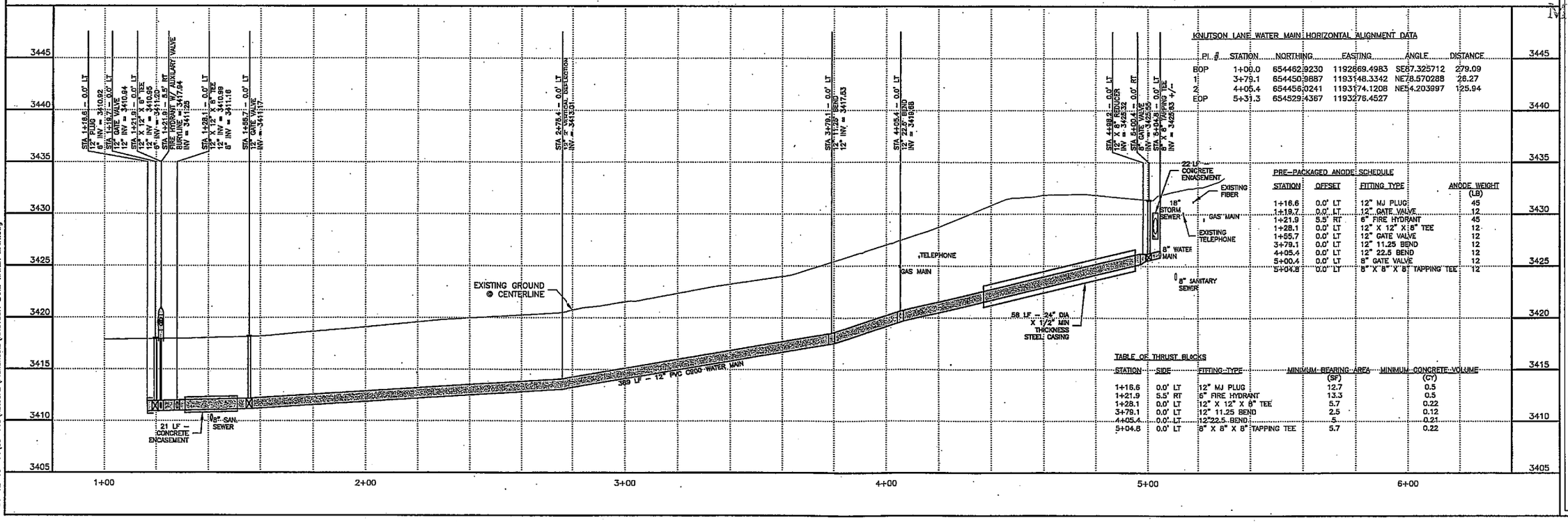
THE CARRIER PIPE SHALL BE SUPPORTED CONTINUOUSLY AND UNIFORMLY WITH CASING SPACERS AS SHOWN ON THE PLANS. CARRIER PIPE AND BELLS SHALL NOT BE IN CONTACT WITH THE CASING PIPE.

CARRIER PIPE SHALL BE INSTALLED IN SUCH A MANNER THAT IT IS NOT DAMAGED BY THE INSTALLATION PROCEDURE. PIPE JOINTS OF THE CARRIER PIPE LOCATED INSIDE THE CASING SHALL BE RESTRAINED TO PREVENT SEPARATION OR OVER-INSERTION DURING INSTALLATION. CONTRACTOR'S METHOD TO PREVENT OVER-INSERTION SHALL BE APPROVED BY THE ENGINEER.

BASIS OF PAYMENT

PAYMENT BY THE LINEAR FOOT FOR THE CONTRACT ITEM "24" STURGIS ROAD BORE" WILL BE FULL COMPENSATION FOR ALL MATERIALS AND ASSOCIATED COSTS TO INSTALL THE CASING, CARRIER PIPE, CHOCKS/RESTRAINTS, SEALS AND ASSOCIATED EARTHWORK AND BORE PIT FLOOR/WALL STABILIZATION REQUIRED TO COMPLETE THE INSTALLATION.





KNUTSON LANE WATER MAIN HORIZONTAL ALIGNMENT DATA

PI. #	STATION	NORTHING	EASTING	ANGLE	DISTANCE
BOP	1+00.0	654462.9230	1192869.4983	SE87.325712	279.09
1	3+79.1	654450.9887	1193148.3342	NE78.570288	26.27
2	4+05.4	654456.0241	1193174.1208	NE54.203997	125.94
EOP	5+31.3	654529.4367	1193276.4527		

PRE-PACKAGED ANODE SCHEDULE

STATION	OFFSET	FITTING TYPE	ANODE WEIGHT (LB)
1+16.6	0.0' LT	12" MJ PLUG	45
1+19.7	0.0' LT	12" GATE VALVE	12
1+21.9	5.5' RT	6" FIRE HYDRANT	45
1+28.1	0.0' LT	12" X 12" X 8" TEE	12
1+55.7	0.0' LT	12" GATE VALVE	12
3+79.1	0.0' LT	12" 11.25 BEND	12
4+05.4	0.0' LT	12" 22.5 BEND	12
5+00.4	0.0' LT	8" GATE VALVE	12
5+04.8	0.0' LT	8" X 8" X 8" TAPPING TEE	12

TABLE OF THRUST BLOCKS

STATION	SIDE	FITTING TYPE	MINIMUM BEARING AREA (SF)	MINIMUM CONCRETE VOLUME (CY)
1+16.6	0.0' LT	12" MJ PLUG	12.7	0.5
1+21.9	5.5' RT	6" FIRE HYDRANT	13.3	0.5
1+28.1	0.0' LT	12" X 12" X 8" TEE	5.7	0.22
3+79.1	0.0' LT	12" 11.25 BEND	2.5	0.12
4+05.4	0.0' LT	12" 22.5 BEND	5	0.21
5+04.8	0.0' LT	8" X 8" X 8" TAPPING TEE	5.7	0.22

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Rapid City, South Dakota 57701
phone: 605.348.2266 fx: 605.348.6506
Landscape Architecture • Land Planning & Golf Course Architecture
CONTACT: MATT FRIDELL

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Rapid City Growth Management Department

DATE: JANUARY 12, 2010
PROJECT MANAGER: JAMES LUSHBOUGH
PROJECT NUMBER: 2005-017

REGISTERED PROFESSIONAL ENGINEER SEAL NO. 6060 DAVID M. MUCK SOUTH DAKOTA 1-12-10

OUTDOOR CAMPUS South Dakota Game, Fish & Parks
RAPID CITY, SOUTH DAKOTA

KNUTSON LANE WATER MAIN

C2.07

01-12-10 P:\09-110\AutoCAD\PlanSheets\KNUTSON LANE WATER MAIN.dwg

09SR117

SANITARY SEWER NOTES:

STA 6+25.4 – 0.0' LT	INSTALL MH 2. (48")
STA 6+25.4 – 0.0' LT TO STA 9+22.7 – 0.0' LT	INSTALL 297 LF – 8" PVC SANITARY SEWER MAIN.
STA 8+67.2 – 0.0' LT	INSTALL 4" PVC GRAVITY SERVICE AT 3.5% SLOPE
STA 9+22.7 – 0.0' LT	INSTALL MH 3. (48")
STA 9+22.7 – 0.0' LT TO STA 11+01.6 – 0.0' LT	INSTALL 179 LF – 8" PVC SANITARY SEWER MAIN.
STA 11+01.6 – 0.0' LT	INSTALL MH 4. (48")
STA 11+01.6 – 0.0' LT TO STA 14+55.9 – 0.0' LT	INSTALL 354 LF – 8" PVC SANITARY SEWER MAIN.

WATER NOTES:

STA 6+00.1 – 5.5' LT	INSTALL 8" 11.25° BEND WITH THRUST BLOCK.
STA 6+00.1 – 5.5' LT TO STA 6+50.8 – 5.5' LT	INSTALL 51 LF – 8" PVC WATER MAIN.
STA 6+50.8 – 5.5' LT	INSTALL 8" 11.25° BEND WITH THRUST BLOCK.
STA 6+50.8 – 5.5' LT TO STA 6+88.5 – 13.0' LT	INSTALL 39 LF – 8" PVC WATER MAIN.
STA 6+88.5 – 13.0' LT	INSTALL 8" 11.25° BEND WITH THRUST BLOCK.

WATER NOTES:

STA 6+88.5 – 13.0' LT TO STA 9+05.3 – 13.0' LT	INSTALL 217 LF – 8" PVC WATER MAIN.
STA 8+79.8 – 13.0' LT	INSTALL 8"X8"X4" TEE AND 4" GATE VALVE FOR SERVICE.
STA 8+79.8 – 21.0' LT TO STA 8+78.8 – 44.0' LT	ENCASE 23 LF – 4" PVC SERVICE
STA 9+05.3 – 13.0' LT	INSTALL 8" 45° BEND WITH THRUST BLOCK.
STA 9+05.3 – 13.0' LT TO STA 9+40.1 – 13.0' LT	INSTALL 10 LF – 8" PVC WATER MAIN.
STA 9+40.1 – 13.0' LT	INSTALL 8" 45° BEND WITH THRUST BLOCK.

WATER NOTES:

STA 9+40.1 – 13.0' LT TO STA 9+52.0 – 13.0' LT	INSTALL 12 LF – 8" PVC WATER MAIN.
STA 9+52.0 – 13.0' LT	INSTALL 8" X 8" X 6" TEE WITH THRUST BLOCK.
STA 9+52.0 – 13.0' LT TO STA 9+52.0 – 19.2' RT	INSTALL 32 LF – 6" PVC WATER MAIN.
STA 9+52.0 – 19.2' RT	INSTALL FIRE HYDRANT WITH AUXILARY VALVE AND THRUST BLOCK.
STA 9+54.1 – 13.0' LT	INSTALL 8" GATE VALVE.
STA 9+54.1 – 13.0' LT TO STA 10+92.0 – 13.0' LT	INSTALL 138 LF – 8" PVC WATER MAIN.

WATER NOTES:

STA 10+92.0 – 13.0' LT	INSTALL 8" 11.25° BEND WITH THRUST BLOCK.
STA 10+92.0 – 13.0' LT TO STA 11+08.9 – 13.0' LT	INSTALL 8 LF – 8" PVC WATER MAIN.
STA 1'+08.9 – 13.0' LT	INSTALL 8" 22.5° BEND WITH THRUST BLOCK.
STA 1'+08.9 – 13.0' LT TO STA 12+74.1 – 13.0' LT	INSTALL 165 LF – 8" PVC WATER MAIN.
STA 1'+39.0 – 13.0' LT TO STA 11+51 – 13.0' LT	ENCASE 22 LF – 8" PVC WATER MAIN.

PRE-PACKAGED ANODE SCHEDULE

STATION	OFFSET	FITTING TYPE	ANODE WEIGHT (LB)
6+00.1	5.5' LT	8" 11.25 BEND	12
6+50.8	5.5' LT	8" 11.25 BEND	12
6+88.5	13.0' LT	8" 11.25 BEND	12
9+05.3	13.0' LT	8" 45.0 BEND	12
9+40.1	13.0' LT	8" 45.0 BEND	12
9+52.0	13.0' LT	8"x8"x6" TEE	12
9+52.0	19.2' RT	6" FIRE HYDRANT	45
9+54.1	13.0' LT	8" GATE VALVE	15
10+92.0	13.0' LT	8" 11.25 BEND	12
11+08.9	13.0' LT	8" 22.5 BEND	12

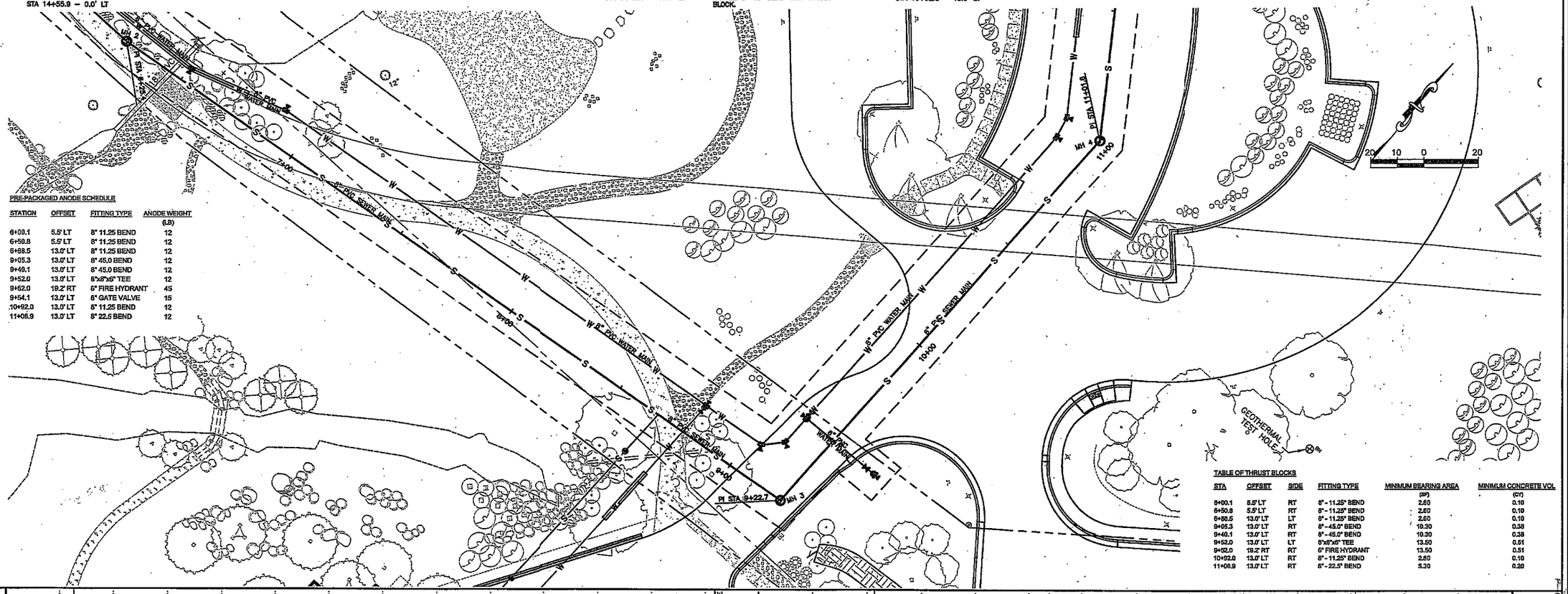
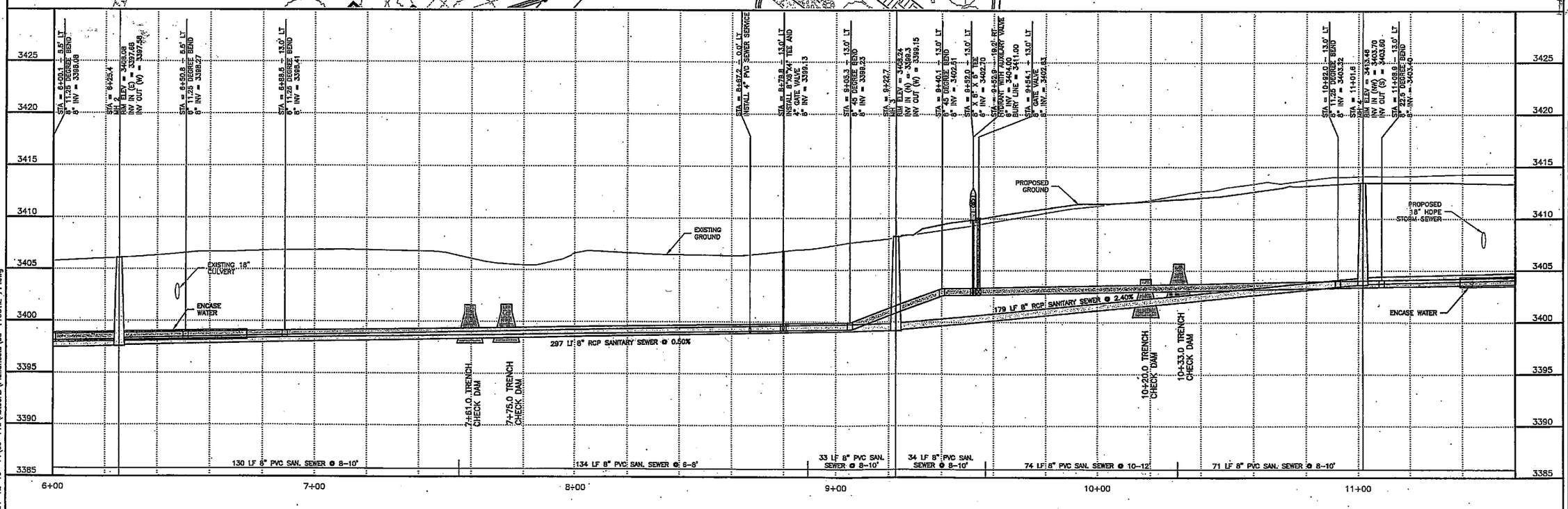


TABLE OF THRUST BLOCKS

STA	OFFSET	SIDE	FITTING TYPE	MINIMUM BEARING AREA (SF)	MINIMUM CONCRETE VOL (CY)
6+00.1	5.5' LT	RT	8" - 11.25° BEND	2.60	0.10
6+50.8	5.5' LT	RT	8" - 11.25° BEND	2.60	0.10
6+88.5	13.0' LT	LT	8" - 11.25° BEND	2.60	0.10
9+05.3	13.0' LT	RT	8" - 45.0° BEND	10.30	0.38
9+40.1	13.0' LT	RT	8" - 45.0° BEND	10.30	0.38
9+52.0	13.0' LT	LT	8"x8"x6" TEE	13.50	0.51
9+52.0	19.2' RT	RT	6" FIRE HYDRANT	13.50	0.51
10+92.0	13.0' LT	RT	8" - 11.25° BEND	2.60	0.10
11+08.9	13.0' LT	RT	8" - 22.5° BEND	5.30	0.20



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DATE: JANUARY 12, 2010

PROJECT MANAGER: JAMES LUSHBOUGH

PROJECT NUMBER: 2005-017

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DAVID L. MUCK
SOUTH DAKOTA
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