MISSOURI DEPARTMENT OF TRANSPORTATION
MAINTENANCE FACILITY SEWER IMPROVEMENTS
VERSAILLES, MISSOURI

SECTION 32 T43N, R17W

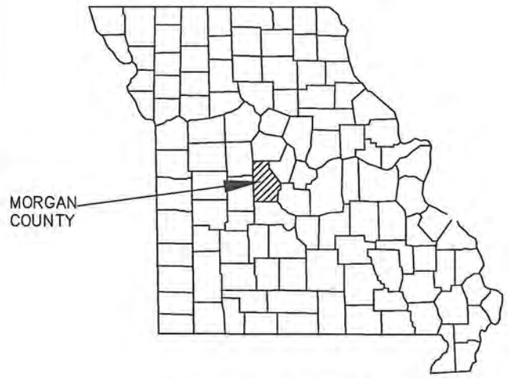
THE CONTRACTOR SHALL ADHERE TO THE PROVISIONS OF THE SENATE BILL NUMBER 583, 78TH GENERAL ASSEMBLY OF THE STATE OF MISSOURI. THE BILL REQUIRES THAT ANY PERSON OR FIRM DOING EXCAVATION ON PUBLIC RIGHT-OF-WAY DO SO ONLY AFTER GIVING NOTICE TO, AND OBTAINING INFORMATION FROM, UTILITY COMPANIES. STATE LAW REQUIRES 48 HOURS ADVANCE NOTICE. THE NAMES AND TELEPHONE NUMBERS OF UTILITY COMPANIES, EVEN IF ONLY REMOTELY INVOLVED WITH THIS PROJECT ARE AS FOLLOWS:

IN KANSAS 1-800-344-7233 DIG-SAFE

IT'S THE LAW!

IN MISSOURI 1-800-344-7483 DIG-RITE

PROJECT LOCATION



PROJECT VICINITY MAP
(NO SCALE)

PROJECT VICINITY MAP
(NO SCALE)

BENCHMARKS

TBM 1:
SET STEPPED 60D NAILS IN EAST SIDE OF POWER POLE AT SOUTHWEST QUADRANT OF JEFFERSON RD AND WILLIAMS ST. ELEV = 1011.55

TBM 2:
SET CHISELED SQUARE ON NE CORNER OF CONCRETE BASE OF FLAG POLE AT EAST SIDE OF MODOT MAINTENANCE OFFICE. ELEV = 1020.52

GENERAL NOTES

1. The engineering information shown on these plans is from studies made in the field and represents the best information available to SHAFER, KLINE AND WARREN, INC.
2. All grassed area disturbed by the contractor shall be fertilized, seeded, and mulched unless otherwise noted on the plans.
3. All utilities and their connections shall be moved or adjusted by the Contractor to fit the new construction unless otherwise noted on the plans.
4. Contractor shall contact utility companies at least three working days, but no more than ten working days, prior to digging by calling DIGRITE at 1-800-344-7483
5. It is the Contractor's responsibility to coordinate the adjustment of the various utilities by the respective companies.
6. There shall be a minimum distance of 18" vertical clearance between the sewer main and water lines. See specifications.
7. All roads, driveways, culverts, fencing, landscape, structures & other improvements damaged during construction shall be repaired or replaced to equal or better condition.
8. Contractor to only remove trees & shrubs as needed for actual construction of utilities. Preserve existing vegetation to the maximum extent practical. Protect all trees not designated for removal. Do not drive or store equipment under dripline.
9. All signs damaged or removed during construction shall be replaced.
10. The locations of utility mains, structures & service connections plotted on these drawings are approximate only and were obtained from records made available to Shafer, Kline & Warren Inc. (SKW). There may be other existing utility mains, structures & service connections not known to SKW and not shown on the drawings. The verification of the existence and the determination of the exact location of utility mains, structures & service connections shall be the responsibility of the construction contractor(s).
11. Site clean up on a daily basis.
12. All open excavations shall be protected.
13. Replace any property monuments removed or destroyed by construction. All monuments shall be set by a surveyor licensed in the State of Missouri.
14. Contractor is to coordinate electrical power installation with electrical utility.

LEGEND

EM	= ELECTRIC METER	MB	= MAILBOX
IB_E	= EXIST IRON BAR	MS	= METAL SIGN
IBPC_E	= EXIST. IRON BAR WITH PLASTIC CAP	PB	= PIPE BOLLARD
IP_E	= EXIST. PIPE	PFB	= POWER AT FACE OF BUILDING
FO	= FIBER OPTIC MARKER	PPED	= POWER PEDESTAL
FH	= FIRE HYDRANT	PP	= POWER POLE
FLP	= FLAG POLE	RW	= R/W MARKER
FUEL FUELTNK	= FUEL TANK	RD	= ROOF DRAIN
G	= GAS MARKER	SSMH	= SANITARY SEWER MANHOLE
GM	= GAS METER	SCO	= SEWER CLEAN OUT
GREG	= GAS REGULATOR	SHRUB	= SHRUB
GV	= GAS VALVE	STNE	= STONE
GVP	= GAS VENT PIPE	TMH	= TELEPHONE MANHOLE
GTPST	= GATE POST	TEP	= TELEPHONE PEDESTAL
GA	= GUY ANCHOR	TR	= TELEPHONE RISER
H&V	= HORIZONTAL & VERTICAL CONTROL POINT		
LP	= LIGHT POLE	TBM	= TEMP BENCHMARK
WM	= WATER METER	TREE	= TREE
WV	= WATER VALVE	WP	= WOOD POST

R R	= PROPERTY LINE
OHP	= OVERHEAD POWER
G G	= GAS LINE
T T	= TELEPHONE LINE
P P	= UNDERGROUND POWER
W W	= WATER LINE
SAN	= SANITARY SEWER
	= SECTION LINE
	= FLOW LINE OF DITCH

INDEX

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STATE OF MISSOURI
PHILIP RYAN WILSON
NUMBER PE-2009019618
PROFESSIONAL ENGINEER
5/21/13

NO.	DATE	REVISIONS	BY	APP'D
1	5-20-13	INDEX	JMR	PW
2				
3				
4				
5				

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MISSOURI CERTIFICATE OF AUTHORITY: F001380850

Designed By: PW
Drawn By: EBM
Checked By: PW
Issue Date:

SHAFER, KLINE & WARREN, INC.
107 Butler Street, Macon, MO 63552-1628
660/385-6441 FAX: 660/385-6614
OFFICE LOCATIONS:
Macon, MO
Columbia, MO
Houston, TX
Iola, KS
Lenexa, KS
Tulsa, OK
North Kansas City, MO
CIVIL ENGINEERS ELECTRICAL ENGINEERS MECHANICAL ENGINEERS STRUCTURAL ENGINEERS LANDSCAPE ARCHITECTS LAND SURVEYORS LAND PLANNERS

MODOT MAINTENANCE FACILITY SEWER
VERSAILLES, MO

COVER SHEET

120617-010

SHEET NO.
1

LAYOUT: LAYOUT1 | BY: JREIGELSBERGER | DATE: 5/21/2013
XREF DWG1: NONE | XREF DWG2: NONE
XREF DWG3: NONE | XREF DWG4: NONE
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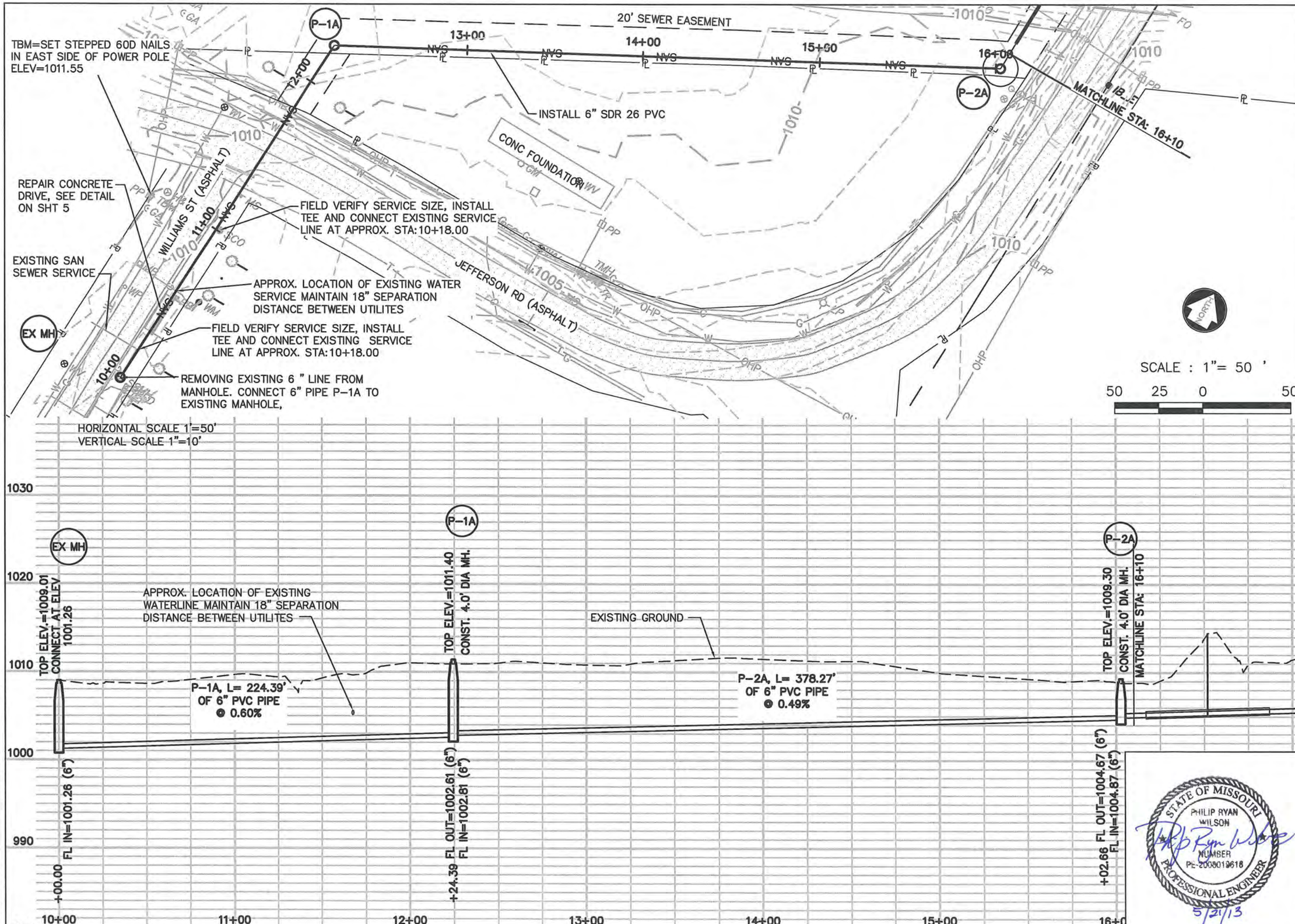

STATE OF MISSOURI
PHILIP RYAN WILSON
NUMBER PE-2008019618
PROFESSIONAL ENGINEER
5/21/13

NO.	DATE	REVISIONS	BY	APP'D
5				
4				
3				
2	5-17-13	REDUCED PIPE SIZE TO 6" SDR 26	JMR	PW
1	5-17-13	REPLACED MANHOLES WITH C.O.	JMR	PW

Designed By: PW
Drawn By: BCM
Checked By: PW
Issue Date:

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MODOT MAINTENANCE FACILITY SEWER
VERSAILLES, MO

PLAN AND PROFILE-LINE A

120617-010
SHEET NO.
2

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LAYOUT: PP1 | BY: JREIGELSBERGER | DATE: 5/20/2013
XREF DWG1: NONE | XREF DWG2: NONE
XREF DWG3: NONE | XREF DWG4: NONE

SCALE : 1" = 50 '

50 25 0 50

NORTH

INSTALL APPROX. 14 L.F. OF 6" SERVICE LINE WITH 6X6X6" TEE AND CAP. APPROX LOCATION, CONTRACTOR TO FIELD VERIFY EXACT LOCATION OF SERVICE WITH MODOT. MARK CAP WITH STEEL POST.

PUMP OUT SEPTIC TANK, INSTALL 175 L.F. OF 4" SERVICE LINE THROUGH EXISTING SEPTIC TANK, CONNECT AT EXISTING PIPE LOCATION INTO SEPTIC TANK. CONTRACTOR TO REMOVE EAST WALL OF SEPTIC TANK AND BACK FILL WITH GRAVEL.

FUEL TANKS

JEFFERSON RD

TBM= SET CHISELED SQUARE ON N.E. CORNER OF CONC BASE OF FLAG POLE ELEV=1020.52

INSTALL 70 L.F. OF 10" CASING, SEE DETAIL ON SHEET 5

INSTALL 6" SDR 26 PVC

INSTALL APPROX. 82 L.F. OF 4" SERVICE LINE WITH 6X6X4" TEE. APPROX LOCATION, CONTRACTOR TO FIELD VERIFY EXACT LOCATION OF SERVICE WITH MODOT

INSTALL 4" 11.25 DEGREE FITTING, AND CLEAN OUT

INSTALL 4" 45 AND 11.25 DEGREE FITTINGS, AND CLEAN OUT

MATCHLINE STA:16+10

17+00 20' SEWER EASEMENT 18+00 19+00 20+00 21+00

P-3A

APPROX. C/L RR TRACKS

JEFFERSON RD

CONNECT 4" SERVICE WITH 6X6X4" TEE

EXISTING SEPTIC DISCHARGE

HORIZONTAL SCALE 1'=50'
VERTICAL SCALE 1"=10'

P-2A APPROX. C/L RR TRACKS STA:16+51.87

TOP ELEV.=1009.30 CONST. 4.0' DIA MH.

CONST. DOUBLE CLEAN OUT STA: 17+12

CONST. DOUBLE CLEAN OUT STA: 17+75

CONST. DOUBLE CLEAN OUT STA: 19+25

INSTALL TEE STA: 19+50

EXISTING GROUND

CONST. DOUBLE CLEAN OUT STA: 20+75

INSTALL TEE STA: 21+00

P-3A TOP ELEV.=1017.52 CONST. TYPICAL CLEAN OUT

P-4A, L= 578.46' OF 6" PVC PIPE @ 0.60%

+02.66 FL OUT=1004.67 (6")
FL IN=1004.87 (6")

MATCHLINE STA: 16+10

+83.36 FL= 1008.34 (6")

INSTALL 70 L.F. 10" STEEL CASING UNDER RR TRACKS STA 16+16.87–16+86.87

1030 1020 1010 1000 990 980

16+00 17+00 18+00 19+00 20+00 21+00

STATE OF MISSOURI
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PROFESSIONAL ENGINEER
5/21/13

NO.	DATE	REVISIONS	BY	APP'D
2	5-17-13	REDUCED PIPE SIZE TO 6" SDR 26	JMR	PW
1	5-17-13	REPLACED MANHOLES WITH C.O.	JMR	PW

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MODOT MAINTENANCE FACILITY SEWER
VERSAILLES, MO

PLAN AND PROFILE-LINE A

120617-010

SHEET NO. 3

LA:\120617-010_CAD\CIVIL\120617-010-PP-01.DWG
LAYOUT: PP2 | BY: JREIGELSBERGER | DATE: 5/20/2013
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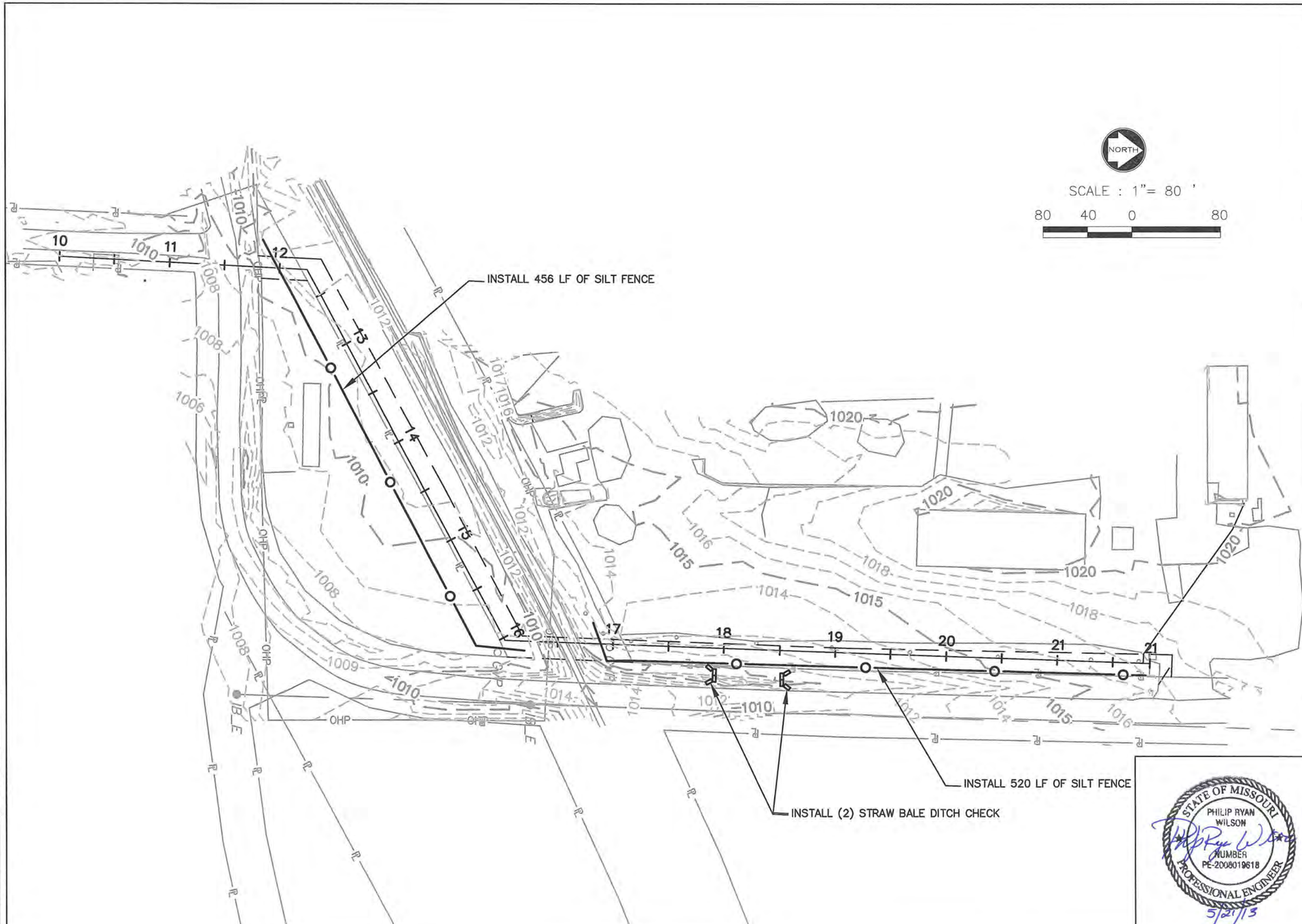
XREF DWG3: NONE | XREF DWG4: NONE



STATE OF MISSOURI
PHILIP RYAN WILSON
NUMBER PE-2008019618
PROFESSIONAL ENGINEER
5/21/13

NO.	DATE	REVISIONS	BY	APP'D
5				
4				
3				
2				
1				

Designed By: PW
Drawn By: BCM
Checked By: PW
Issue Date:

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MODOT MAINTENANCE FACILITY SEWER
VERSAILLES, MO

EROSION CONTROL PLAN

120617-010
SHEET NO.
4

L:\120617-010_CAD\CIVIL\1230617_EROSION CONTROL.DWG
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XREF DWG1: NONE XREF DWG2: NONE
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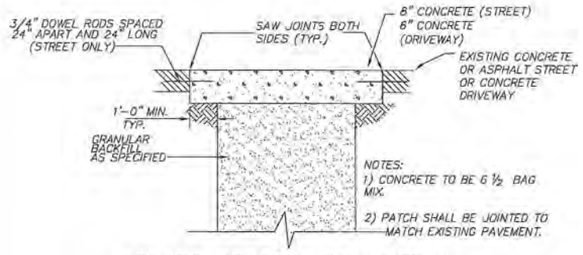
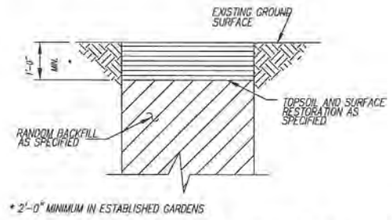


STREET RESTORATION DETAIL
NO SCALE



GRASSED AREA TRENCH BACKFILL DETAIL
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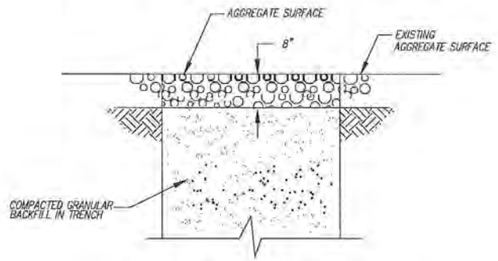
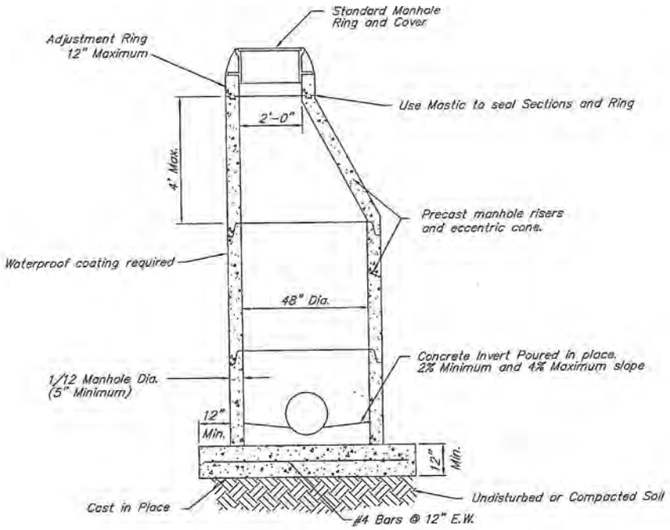
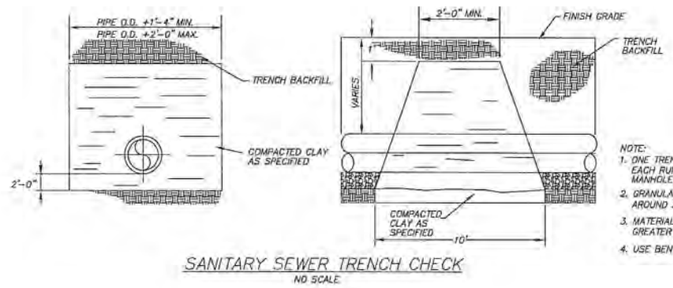


AGGREGATE SURFACED AREA
NO SCALE

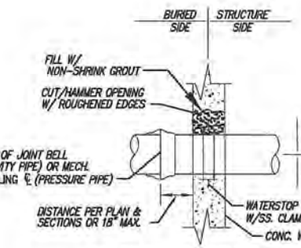


STANDARD ECCENTRIC MANHOLE DETAIL



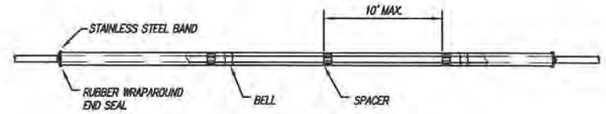
SANITARY SEWER TRENCH CHECK
NO SCALE

NOTE:
1. ONE TRENCH CHECK REQUIRED EACH RUN OF PIPE BETWEEN MANHOLES.
2. GRANULAR EMBEDMENT WILL NOT BE USED AROUND SANITARY SEWER PIPE.
3. MATERIAL SHALL BE FREE OF ANY STONES GREATER THAN 3\4", BRICKS, CONCRETE, ETC.
4. USE BENTONITE CLAY AROUND PIPE.



NOTE: THIS DETAIL APPLIES TO ALL PIPES GROUTED INTO NEW AND EXISTING STRUCTURES.

GROUT RING
NO SCALE



PLAN

DIAMETER

CARRIER PIPE	2"	3"	4"	6"	8"
STEEL NOMINAL CASING DIAMETER	6"	6"	8"	10"	14"
STEEL WALL CASING THICKNESS	.188"	.188"	.188"	.188"	.188"
PVC – SDR35 NOMINAL CASING DIAMETER	6"	6"	8"	10"	15"
POLYETHYLENE	6"	6"	8"	10"	15"

NOTES: CASING, CASING SPACERS, AND END SEAL DETAIL

1) CASING SPACER AND END SEALS SHALL BE USED ON ALL ENCASED CROSSINGS.

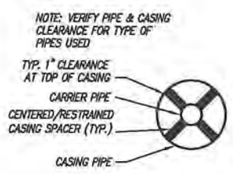
2) CASING SPACERS SHALL BE SPACED A MAXIMUM OF 10' APART ON 10" AND SMALLER CARRIER PIPE, AND 5' APART ON 12" AND LARGER CARRIER PIPE. INSTALL A SPACER AT EACH BELL OF THE CARRIER PIPE AND AT EACH END OF THE CASING PIPE.

3) END SEALS SHALL BE PLACED AT EACH END OF THE CASING PIPE.

4) CASING SPACERS TO BE PSI RANGER SERIES A2, 62K HIGH DENSITY POLYETHYLENE FOR PVC, AND POLYETHYLENE CASING AND SBS-2 304 STAINLESS STEEL FOR STEEL CASING; OR APPROVED EQUAL. CASING SPACERS TO BE CENTERED/RESTRAINED WITH POLYETHYLENE RUNNERS.

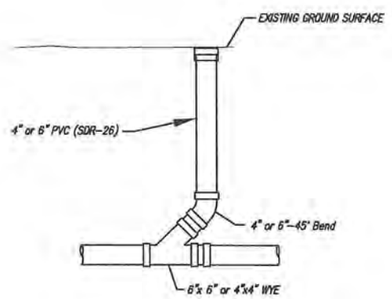
5) END SEAL TO BE PSI MODEL W WITH STAINLESS STEEL BANDS OR APPROVED EQUAL. END SEALS TO BE RUBBER WRAPAROUND TYPE.

NOTE: VERIFY PIPE & CASING CLEARANCE FOR TYPE OF PIPES USED

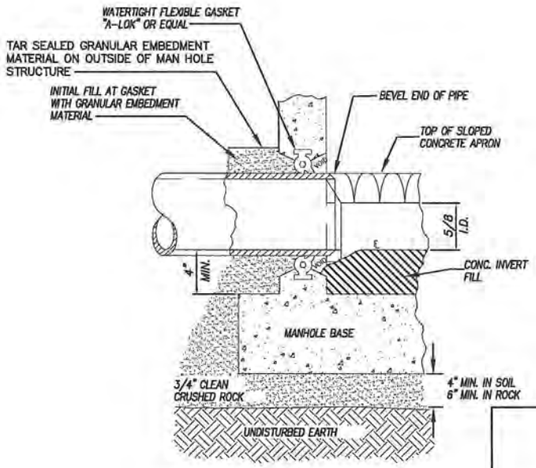


SECTION

CASING, CASING SPACERS, AND END SEALS
NO SCALE

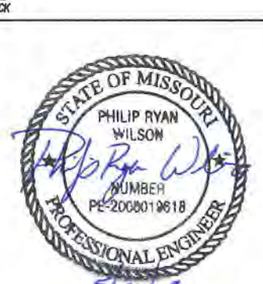


TYPICAL CLEAN OUT DETAIL
(GRAVITY SEWER)
NO SCALE



NOTE:
1. BITUMINOUS COATING ON EXTERIOR SURFACE OF MANHOLE SHALL NOT COME IN CONTACT WITH PIPE GASKET.
2. FOR CAST-IN-PLACE CONCRETE MANHOLES OR PRE-CAST WITH BOX-OUTS, THE PIPE GASKET SHALL BE A RUBBER LABYRINTH WATERSTOP WITH STAINLESS STEEL CLAMPING BANDS LOCATED AT CENTER OF WALL AND THE SPACE BETWEEN PIPE & WALL COMPLETELY GROUTED WITH NONSHRINKING MORTAR.
3. PIPE MAY PROJECT 1" MAXIMUM PAST INSIDE WALL OF MANHOLE. BUT NO CONTACT BETWEEN PIPE & INVERT.

MANHOLE GASKET DETAIL



NO.	DATE	REVISIONS	BY	APP'D
1	5-17-13	REMOVED STEPS IN MANHOLE DETAIL	JWR	PW
2	5-20-13	LOWERED TOP OF CLEAN OUT	JWR	PW
3				
4				
5				

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Designed By: PW
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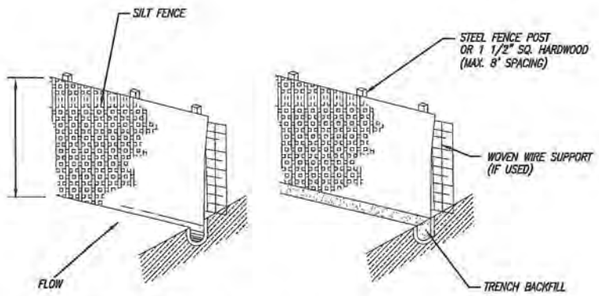
MODOT MAINTENANCE FACILITY SEWER
VERSAILLES, MO

MISC DETAILS

120617-010

SHEET NO.
5

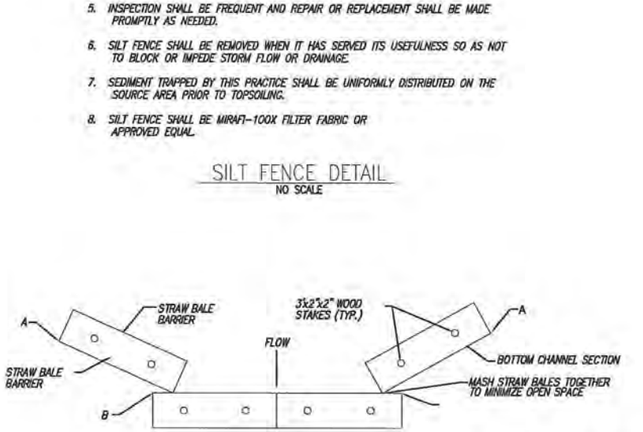
L:\120617-010_CAD\CIVIL\120617_DET.DWG
LAYOUT: MISC DETAILS | BY: JREIGEL.SBERGER | DATE: 5/20/2013
XREF DWG1: NONE | XREF DWG2: NONE
XREF DWG3: NONE | XREF DWG4: NONE



CONSTRUCTION SPECIFICATIONS:

1. POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE AND SPACED AT A MAX. 8' APART OR TO SILT FENCE MANUFACTURER SPECIFICATIONS, WHICHEVER IS STRICTER.
2. SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW.
3. THE TRENCH SHOULD BE A MINIMUM OF 6" DEEP 3-4" WIDE TO ALLOW FOR THE SILT FENCE TO BE LAID IN THE GROUND AND BACKFILLED.
4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH SUPPORT POST OR TO WOVEN WIRE WHICH IS IN TURN ATTACHED TO THE FENCE POSTS.
5. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
6. SILT FENCE SHALL BE REMOVED WHEN IT HAS SERVED ITS USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
7. SEDIMENT TRAPPED BY THIS PRACTICE SHALL BE UNIFORMLY DISTRIBUTED ON THE SOURCE AREA PRIOR TO TOPSOILING.
8. SILT FENCE SHALL BE MIRAFI-100X FILTER FABRIC OR APPROVED EQUAL.

SILT FENCE DETAIL
NO SCALE

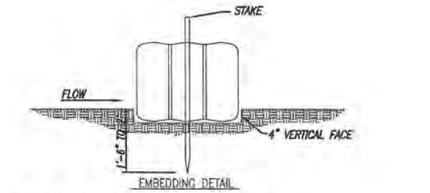


POINTS "A" SHOULD BE HIGHER THAN POINTS "B" TO INSURE FLOW THROUGH OR OVER BARRIER, NOT AROUND IT.

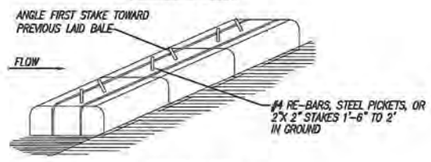
TOP VIEW DITCH APPLICATION DETAILS

DITCH CHECK SPACING			
DITCH ℄ SLOPE %	SPACING (FT)	DITCH ℄ SLOPE %	SPACING (FT)
.05	400	5.5	38
1.0	200	6.0	35
1.5	133	6.5	30
2.0	100	7.0	28
2.5	80	7.5	26
3.0	66	8.0	25
3.5	57	8.5	23
4.0	50	9.0	22
4.5	44	9.5	21
5.0	40	10.0	20

TEMPORARY STRAW BALE DITCH CHECK
NO SCALE



EMBEDDING DETAIL

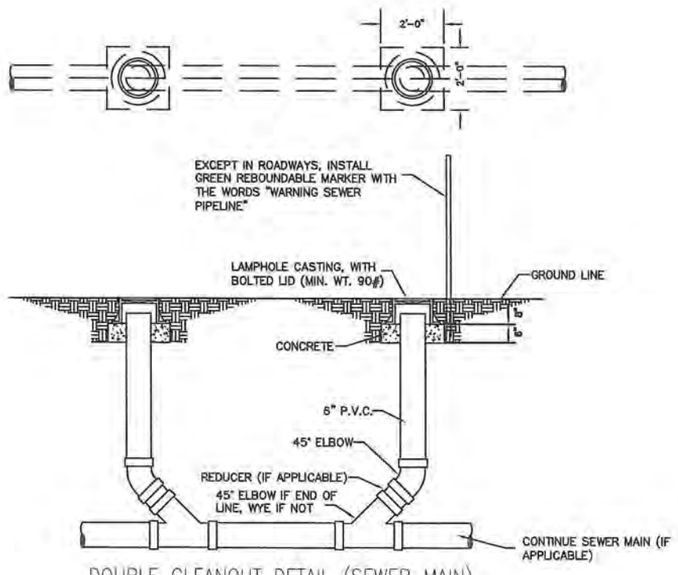


ANCHORING DETAIL

NOTES:

1. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 4".
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
4. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE BY THE OWNER.

STRAW BALE DIKE DETAIL
NO SCALE

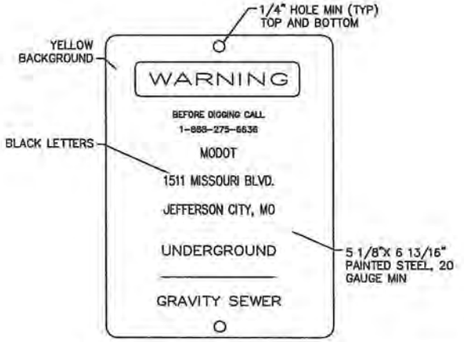


DOUBLE CLEANOUT DETAIL (SEWER MAIN)
NO SCALE

NOTES:
1. PROVIDE FITTINGS, AS NECESSARY FOR LINE DEFLECTION AT CLEANOUT.
2. DOUBLE CLEANOUT PAID AS TWO CLEANOUTS.

NOTES:

1. THE EROSION CONTROL FEATURES AND NOTES SHOWN ON THIS SHEET REPRESENT THE MINIMUM REQUIREMENTS ACCEPTABLE. LOCATIONS ARE TYPICAL AND MAY VARY ACCORDING TO CONTRACTORS STAGING AND LIMITS OF CONSTRUCTION.
2. IT SHALL BE EACH CONTRACTOR'S RESPONSIBILITY TO CONTROL EROSION AND PREVENT POLLUTION FOR ALL WORK WHICH THEY ARE DIRECTLY INVOLVED.
3. IT SHALL BE EACH CONTRACTORS RESPONSIBILITY TO PLACE ADDITIONAL CONTROL DEVICES AS REQUIRED DURING CONSTRUCTION TO PREVENT SOIL LOSS FROM THE SITE. IT SHALL ALSO BE EACH CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THEIR EROSION CONTROL FEATURES IN PROPER WORKING CONDITION UNTIL THE SITE IS STABILIZED BY PAVEMENT, VEGETATION OR OTHER MEANS.
4. WHEN POSSIBLE, WITHOUT ADVERSELY AFFECTING CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL: MINIMIZE THE AMOUNT OF SURFACE AREA WHICH IS EXPOSED AT ONE TIME, LEAVE GRADED AREAS WITH A ROUGH TEXTURE, CONSTRUCT TEMPORARY TERRACES DURING GRADING OPERATIONS, AND LIMIT UNNECESSARY VEHICLE TRAFFIC IN GRADED AREAS.
5. THE SPILLAGE OF DEBRIS, INCLUDING THE TRACKING OF SOIL, OUTSIDE OF THE CONSTRUCTION LIMITS SHALL BE AVOIDED.
6. STRAW BALE DIKES OR SILT FENCES SHALL BE PLACED ON A CONTOUR ELEVATION ALONG THE DOWNHILL SIDE AND FOR THE FULL EXTENT OF THE DISTURBED AREAS WITHIN THE CONSTRUCTION LIMITS. THE LAST FIVE FEET ON EACH END OF RUN OF SILT FENCE/STRAW BALE DIKE SHALL BE PLACED FACING UPHILL AT 90 DEGREES TO THE CONTOUR LINE.
7. THE CONTRACTOR SHALL PREVENT SILT AND SEDIMENT FROM ENTERING THE STORM SEWER SYSTEM. STRAW BALE DIKES SHALL BE PLACED AROUND ALL STORM SEWER INLETS EXCEPT DURING CONSTRUCTION OPERATIONS WHICH REQUIRE THEIR REMOVAL.
8. CONTRACTOR SHALL INSPECT THEIR EROSION CONTROL DEVICES AFTER ALL RAINFALL EVENTS TO INSURE THEY ARE WORKING PROPERLY. THE CONTRACTOR SHALL ALSO INSPECT THE SITE AFTER ALL RAINFALL EVENTS AND ON A PERIODIC BASIS TO ASSESS THE NEED AND IF PRUDENT, INSTALL ADDITIONAL EROSION CONTROL DEVICES AS REQUIRED.
9. ALL AREAS UPON REACHING FINAL GRADE SHALL BE BROUGHT TO FINAL PLAN CONDITION (PAVED, MULCHED AND SEEDED, SODDED, OR OTHER) AS SOON AS POSSIBLE.



NOTES: NAME PLATES AND SEWER LINE MARKERS
1) NAME PLATES SHALL BE PLACED AT MANHOLES AND AS REQUIRED BY OWNER.
2) 48" MINUMIM CLEARANCE BETWEEN BOTTOM OF SIGN AND EXISTING GROUND LEVEL.

NAME PLATE DETAIL
NO SCALE

STATE OF MISSOURI
PHILIP RYAN WILSON
NUMBER PE-2008019618
PROFESSIONAL ENGINEER
5/21/13

NO.	DATE:	REVISIONS	BY	APP'D
1	5-17-13	ADDED DOUBLE C.O. DETAIL	JMR	PW
2	5-17-13	ADDED NAME PLATE DETAIL	JMR	PW
3				
4				
5				

Designed By: PW
Drawn By: BCM
Checked By: PW
Issue Date:

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CIVIL ENGINEERS ELECTRICAL ENGINEERS MECHANICAL ENGINEERS SURVEYORS LAND PLANNERS LANDSCAPE ARCHITECTS

MODOT MAINTENANCE FACILITY SEWER
VERSAILLES, MO

MISC DETAILS

120617-010

SHEET NO. 6

LAYOUT: EC DETAILS | BY: JARENDSIBERGER | DATE: 5/20/2013
XREF DWG1: NONE | XREF DWG2: NONE
XREF DWG3: NONE | XREF DWG4: NONE
L:\120617-010\CAD\CIVIL\120617_DET.DWG