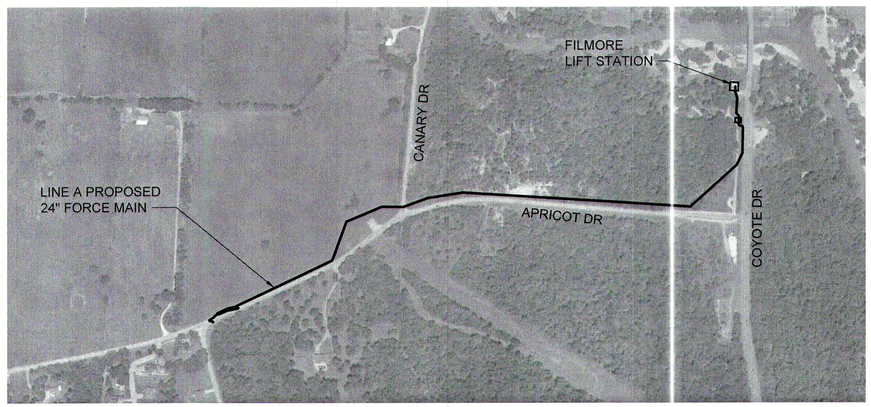
CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN



AUGUST 2019

CIVIL DRAWINGS

DWG. NO.	TITLE
C001	GENERAL NOTES AND LEGEND
C002	CONTROL POINT LAYOUT MAP
C003	PLAN AND PROFILE BOL STA 0+00 TO STA 3+00
C004	PLAN AND PROFILE STA 3+00 TO STA 8+00
C005	PLAN AND PROFILE STA 8+00 TO STA 13+00
C006	PLAN AND PROFILE STA 13+00 TO STA 18+00
C007	PLAN AND PROFILE STA 18+00 TO STA 23+00
C008	PLAN AND PROFILE STA 23+00 TO STA 28+00
C009	PLAN AND PROFILE STA 28+00 TO STA 31+00
C010	PLAN AND PROFILE STA 31+00 TO STA 36+00
C011	PLAN AND PROFILE STA 36+00 TO EOL STA 38+32.23
C012	CIVIL DETAILS I
C013	CIVIL DETAILS II
C014	CIVIL DETAILS III

STRUCTURAL DRAWINGS

DWG. NO.	TITLE
S001	GENERAL NOTES AND LEGEND
S002	CROSSOVER VALVE VAULT
S003	PLAN AND SECTIONS

REFERENCE DRAWINGS

DRAWING TITLE
CIVIL REFERENCE DRAWING SHEET 1 OF 3
CIVIL REFERENCE DRAWING SHEET 2 OF 3
CIVIL REFERENCE DRAWING SHEET 3 OF 3

STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001078
PROFESSIONAL ENGINEER
8/1/19

WILLIAM M. NASH
MECHANICAL
PE 2003001078

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

BURNS McDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

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GENERAL NOTES:

1. TOPOGRAPHIC SURVEY DEVELOPED BY ALLGEIER, MARTIN AND ASSOCIATES, INC.
2. ALL ELEVATIONS SHOWN ARE TOP OF FINISHED GRADE UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS ARE IN FEET (FT) UNLESS OTHERWISE INDICATED.
4. PROVIDE UNIFORM SLOPE BETWEEN INDICATED ELEVATIONS SO THAT ALL AREAS SLOPE TO DRAIN AND NO STORMWATER IS PONDED ON SITE BOTH DURING AND AFTER CONSTRUCTION.
5. ALL AREAS DISTURBED BY CONSTRUCTION NOT DESIGNATED TO RECEIVE SURFACING SHALL BE SEEDED OR SODDED. CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO PRE CONSTRUCTION CONDITIONS OR BETTER. SEEDING AND SODDING SHALL CONFORM TO CITY OF JOPLIN STANDARD SPECIFICATIONS, SECTION 5100 - SEEDING AND 5200 - SODDING. CONTRACTOR SHALL RESTORE ALL DISTURBED GREEN SPACES ON THE MICHAEL B. MURRAY PROPERTY USING ZOYSIA SOD. CONTRACTOR SHALL RESTORE ALL DISTURBED EXISTING FENCING TO "AS GOOD OR BETTER" CONDITIONS.
6. EXISTING UNDERGROUND UTILITIES ARE SHOWN ON CONTRACT DRAWINGS USING THE BEST INFORMATION AVAILABLE AT THE TIME OF DRAWING PREPARATION. CONTRACTOR SHALL IDENTIFY, LOCATE AND PROTECT ALL UNDERGROUND UTILITIES WHICH MAY BE AFFECTED BY CONSTRUCTION UNDER THIS CONTRACT BEFORE STARTING EXCAVATION OR OTHER SITE CONSTRUCTION ACTIVITIES WHICH COULD DAMAGE EXISTING UTILITIES. ALL UTILITIES LOCATED SHALL BE INDICATED ON THE RECORD DOCUMENTS.
7. THE CONTRACTOR SHALL NOTIFY THE OWNER UTILITIES OFFICE 72 HOURS PRIOR TO COMMENCING ANY DEMOLITION, EXCAVATION, OR CONSTRUCTION.
8. ALL VALVES, FITTINGS, MANHOLES, ETC. HAVE BEEN LOCATED IN PLAN AND DIMENSIONS SHOWN SHALL BE STRICTLY ADHERED TO UNLESS OTHERWISE DIRECTED BY THE OWNER'S REPRESENTATIVE. PROFILE STATIONING SHALL BE ADJUSTED AS REQUIRED TO CONFORM TO PLAN DIMENSIONS.
9. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING UTILITIES AND TO MAINTAIN UNINTERRUPTED UTILITY SERVICE. ANY DAMAGE INCURRED SHALL BE REPAIRED IMMEDIATELY TO THE SATISFACTION OF THE OWNER AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE A MINIMUM OF 15 DAYS IN ADVANCE OF ANY NECESSARY UTILITY OUTAGES.
10. THE CONTRACTOR SHALL FURNISH, AT NO COST, ANY BENDS OR FITTINGS NECESSARY TO MAKE PROPER HORIZONTAL OR VERTICAL ADJUSTMENTS WHICH CAN NOT BE MADE BY DEFLECTING JOINTS IN CONFORMANCE TO PIPE MANUFACTURER'S RECOMMENDATIONS.
11. THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION ACTIVITIES TO THE PERMANENT AND TEMPORARY EASEMENT AREA SHOWN ON THE DRAWINGS. THE CONTRACTOR MAY SECURE RIGHTS FOR USE OF ADDITIONAL AREA OUTSIDE THE PERMANENT EASEMENT AREA AT THEIR OWN EXPENSE. ALL AGREEMENTS FOR USE OF ADDITIONAL AREAS SHALL BE IN WRITING. CONTRACTOR SHALL FURNISH THE CITY COPIES OF ALL WRITTEN AGREEMENTS.
12. CONTRACTOR SHALL COORDINATE ALL WORK WITH THAT OF THE OWNER AND ANY CONTRACTORS WORKING IN THE AREA.
13. NEW UTILITY STAKEOUT DIMENSIONS ARE TO CENTERLINE OF STRUCTURE AND CENTERLINE OF PIPE, UNLESS INDICATED OTHERWISE.
14. CONTRACTOR SHALL SUBMIT A WORK PLAN FOR REVIEW AND APPROVAL BEFORE BEGINNING ANY WORK THAT INCLUDES PROVISIONS INTENDED TO KEEP WASTEWATER CONVEYANCE IN SERVICE AT ALL TIMES DURING CONSTRUCTION OF IMPROVEMENTS. THE PLAN SHALL SUFFICIENTLY DETAIL THE MEANS AND METHODS INTENDED FOR USE INCLUDING THE USE OF LIVE LINE STOPS, BYPASS PUMPING SYSTEMS, TEMPORARY VALVES, TEMPORARY CONNECTIONS, AND ALL OTHER TEMPORARY MEASURES ANTICIPATED AS WELL AS CRITICAL CONSTRUCTION SEQUENCING. AS-BUILT DRAWINGS ARE AVAILABLE FOR THE EXISTING FORCE MAIN FOR ASSESSMENT OF THE VOLUME OF SEWAGE EXPECTED TO GRAVITY FLOW TO A PENETRATION POINT.
15. CONTRACTOR SHALL FURNISH, INSTALL, CONSTRUCT, AND MAINTAIN TEMPORARY MEASURES TO CONTROL EROSION AND MINIMIZE THE SILTATION OF INTERMITTENT STREAMS AND THE POLLUTION OF PRIVATE PROPERTIES. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED IN SUBSTANTIAL COMPLIANCE WITH LOCAL, STATE, FEDERAL, AND JURISDICTIONAL AGENCY'S REGULATIONS AND CONTRACT DRAWINGS (IF APPLICABLE). TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL COMPLETION OF THE WORK.

SURVEY AND CONTROLS

1. COORDINATES SHOWN HEREON ARE IN FEET AND REFERENCED TO MISSOURI STATE PLAN COORDINATES (NAD83).
2. ELEVATIONS SHOWN HEREON ARE IN FEET AND ARE REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM (NAVD 88).
3. CONTRACTOR SHALL FLAG AND PROTECT ALL SURVEY MARKERS LOCATED WITHIN THE LIMITS OF CONSTRUCTION.

ABBREVIATIONS:

%	-	PERCENT
AL	-	ALUMINUM
APWA	-	AMERICAN PUBLIC WORKS ASSOCIATION
ASTM	-	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AWWA	-	AMERICAN WATER WORKS ASSOCIATION
BF	-	BLIND FLANGE
BOL	-	BEGINNING OF LINE
CIOD	-	CAST IRON OUTSIDE DIAMETER
CL	-	CENTER LINE
D	-	DEFLECTION OR DIAMETER
DIP	-	DUCTILE IRON PIPE
DMJ	-	DISMANTLING JOINT
DR	-	DIMENSION RATIO
DWG	-	DRAWING
Ø OR DIA	-	DIAMETER
E	-	EASTING
EL	-	ELEVATION
EOL	-	END OF LINE
EW	-	EACH WAY
FLG	-	FLANGE
GALV	-	GALVANIZED
INV	-	INVERT
MAX	-	MAXIMUM
MGD	-	MILLION GALLONS PER DAY
MH	-	MANHOLE
MIN	-	MINIMUM
MJ	-	MECHANICAL JOINT
N	-	NORTHING
OC	-	ON CENTER
OD	-	OUTSIDE DIAMETER
PC	-	PRESSURE CLASS
PE	-	PLAIN END
PI	-	POINT OF HORIZONTAL INFLECTION
PS	-	PIPE SUPPORT
PV	-	PLUG VALVE
PVC	-	POLYVINYL CHLORIDE
PVI	-	POINT OF VERTICAL INFLECTION
SDR	-	STANDARD DIMENSION RATIO
SST	-	STAINLESS STEEL
STA	-	STATION
THD	-	THREADED
THK	-	THICK
TOS	-	TOP OF SLAB
TYP	-	TYPICAL
UNK	-	UNKNOWN
WP	-	WALL PIPE
WWF	-	WELDED WIRE FABRIC

LEGEND

EXISTING		NEW
	CONTROL POINT	6
	ELECTRIC METER	
	FIRE HYDRANT	
	IRON PIN	
	LIGHT POLE	
M	MANHOLE	
	POST	
	UTILITY POLE	
	SIGN	
	UTILTIY RISER	
	BUSH	
	TREE	
	WATER METER	
	WATER VALVE	
–R/W–	RIGHT-OF-WAY	
–OHD–	OVERHEAD UTILITY	
–UGW–	UNDERGROUND WATER	
–UGT–	UNDERGROUND TELEPHONE	
–UGP–	UNDERGROUND POWER	
–X–	FENCE	
–UE–	UNDERGROUND ELECTRICAL	
–GAS–	UNDERGROUND GAS	
–OHE–	OVERHEAD ELECTRIC	
–W–	WATER	
–TEL–	TELECOM	
–SS–	SANITARY SEWER	
–S–	STORM	
	TEMPORARY CONSTRUCTION EASEMENT	TCE
	PERMANENT EASEMENT	P/E

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001076
PROFESSIONAL ENGINEER
8/1/19

WILLIAM M. NASH
MECHANICAL
PE 2003001078

BURNS McDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JUNE 29, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN
GENERAL NOTES AND LEGEND

project	contract
105643	

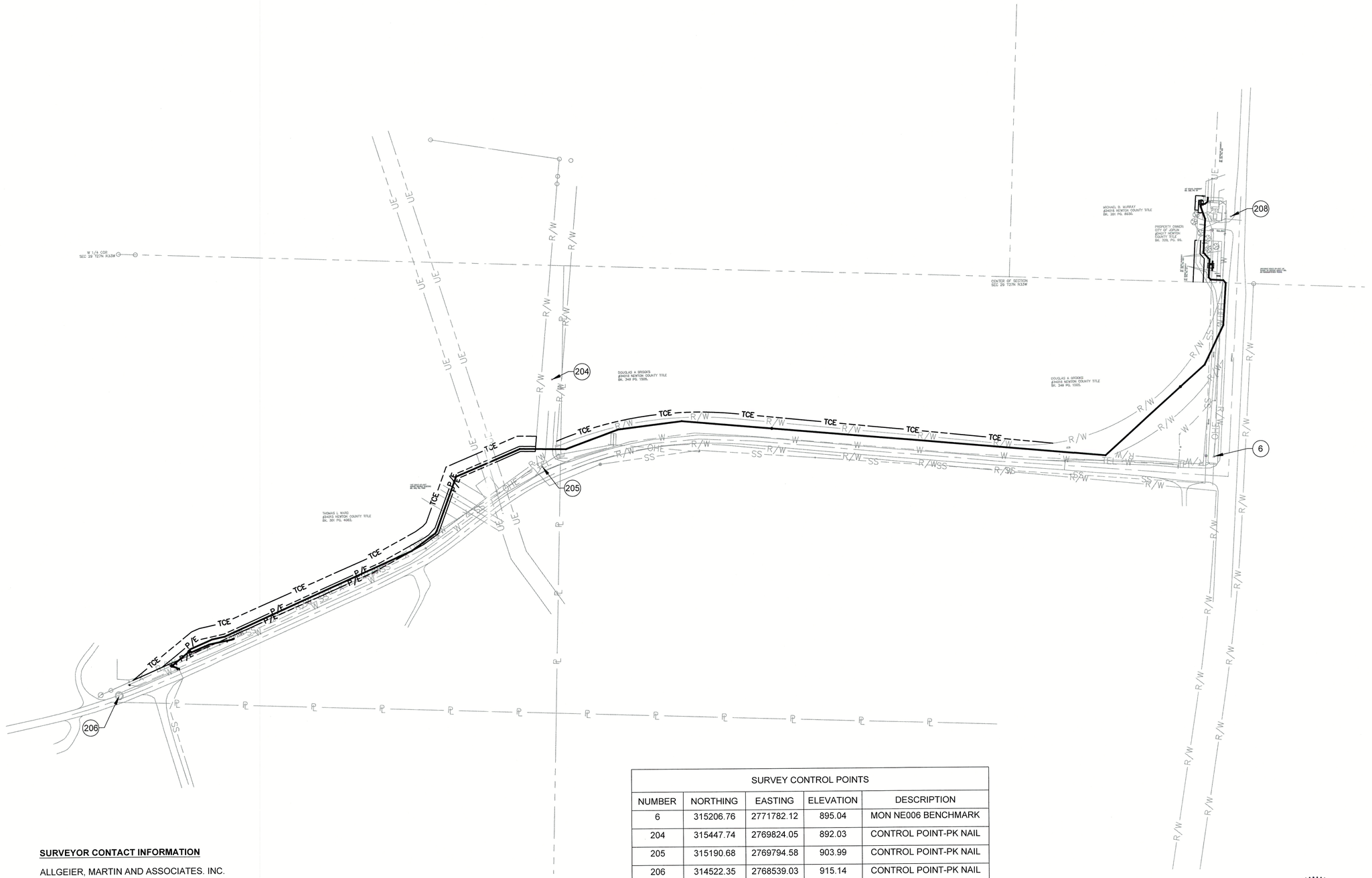
drawing **C001** – rev. **0**

sheet of sheets

file 105643_C001-GENERAL NOTES.DWG

Millimeters
Scale For Microfilming
Inches

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SURVEY CONTROL POINTS				
NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
6	315206.76	2771782.12	895.04	MON NE006 BENCHMARK
204	315447.74	2769824.05	892.03	CONTROL POINT-PK NAIL
205	315190.68	2769794.58	903.99	CONTROL POINT-PK NAIL
206	314522.35	2768539.03	915.14	CONTROL POINT-PK NAIL
208	315914.84	2771834.40	879.70	CONTROL POINT-60D NAIL

SURVEYOR CONTACT INFORMATION

ALLGEIER, MARTIN AND ASSOCIATES. INC.
P.O. BOX 2627
JOPLIN MO., 64803-2627
PHONE: 417-680-7200

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

HOR. SCALE 1"=20'
VERT. SCALE 1"=10'

0 10' 20' 40'
SCALE IN FEET

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
NOVEMBER 11, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN
CONTROL POINT LAYOUT MAP

project	contract
105643	

drawing **C002** rev. **0**

sheet of sheets

file 105643_FORCE MAIN.DWG

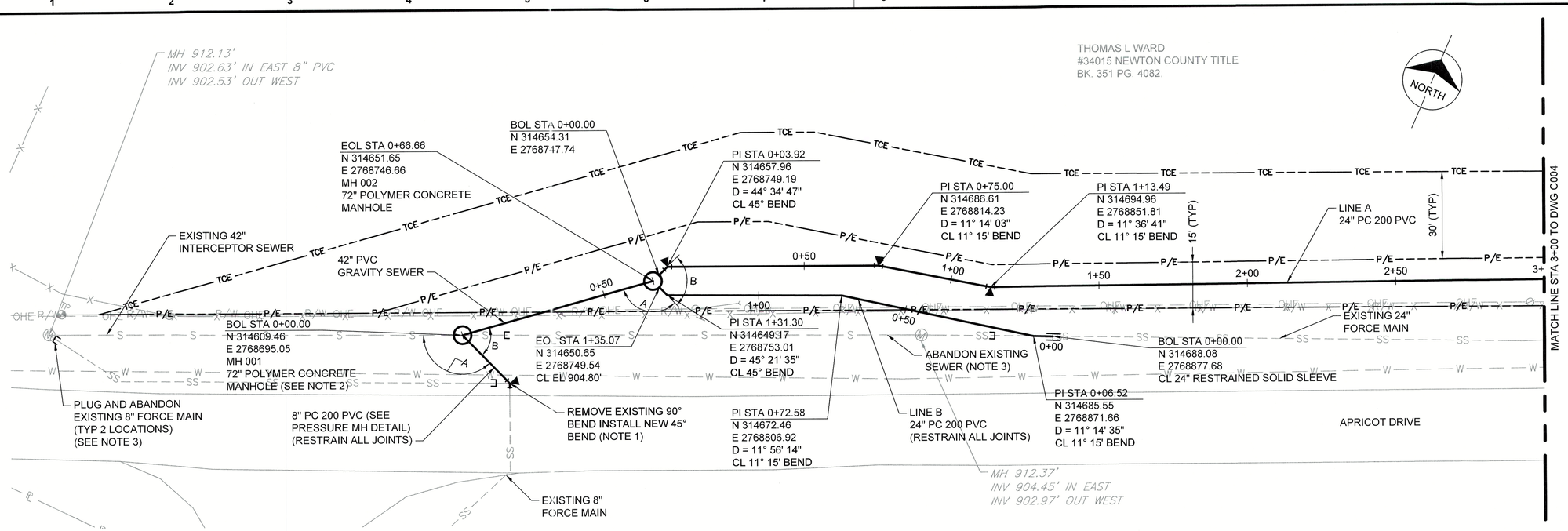
STATE OF MISSOURI
WILLIAM
NUMBER
PE-2003001078
PROFESSIONAL ENGINEER
8/1/19

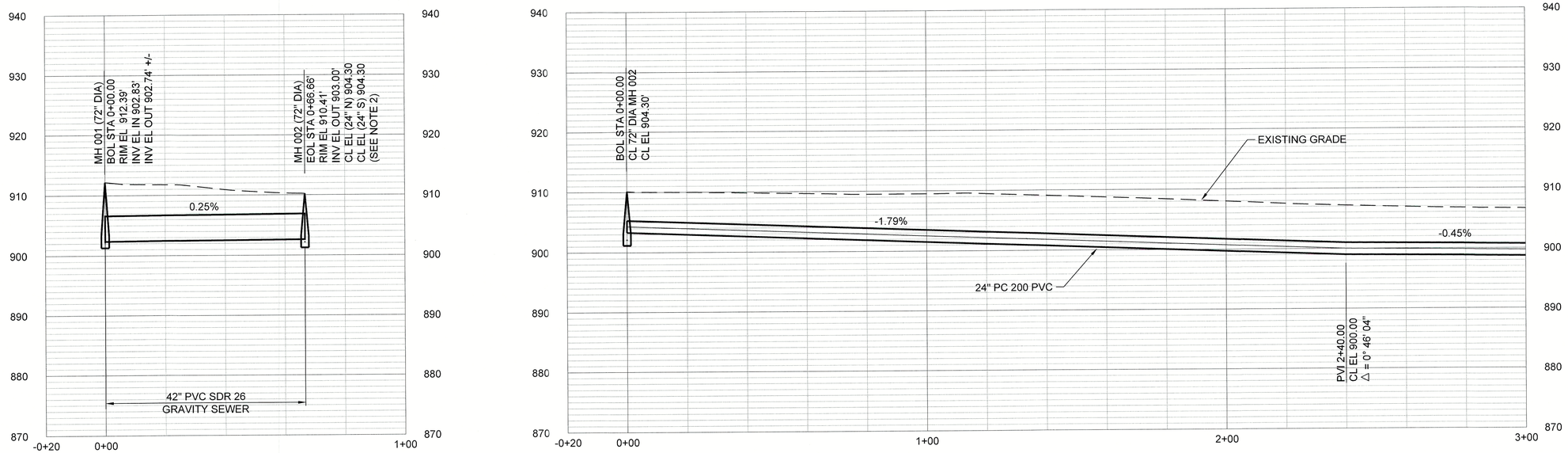
WILLIAM M. NASH
MECHANICAL
PE 2003001078

Scale For Microfilming
Millimeters
Inches

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NOTES:

1. CONTRACTOR SHALL POTHOLE EXISTING 8" FORCE MAIN 90° BEND AND NEARBY EXISTING WATER MAIN TO DETERMINE ELEVATIONS BEFORE BEGINNING CONSTRUCTION WORK IN THIS AREA. CONTRACTOR SHALL PROVIDE ALL NECESSARY FITTINGS TO ROUTE 8" FORCE MAIN UNDER WATER MAIN AS PART OF THIS WORK.
2. CONTRACTOR SHALL POTHOLE EXISTING 42" GRAVITY SEWER AT PROPOSED TIE IN LOCATION TO DETERMINE REQUIRED MANHOLE DEPTH BEFORE ORDERING NEW MANHOLE. CONTRACTOR SHALL INSTALL AND OPERATE A BYPASS PUMPING SYSTEM CAPABLE OF PUMPING A MINIMUM OF 13 MGD TO PUMP ALL FLOW AROUND THE LOCATION OF MH001 BEFORE BEGINNING INSTALLATION WORK ON MH001.
3. CONTRACTOR SHALL SEQUENCE ALL WORK SUCH THAT SANITARY CONVEYANCE ALWAYS REMAINS IN SERVICE. EXISTING FORCE MAIN TIE IN SHOULD BE MADE ONCE NEW FORCE MAIN IS INSTALLED, TESTED AND OPERATIONAL. ABANDON EXISTING FORCE MAIN AND INTERCEPTOR SEWER SEGMENTS AS SHOWN ONCE EXISTING FORCE MAIN TIE IN TO NEW MANHOLE IS COMPLETE. INSTALL CONCRETE PLUGS IN THE LINE AT EACH END OF THE ABANDONED SEGMENT. ABANDON EXISTING MANHOLE BY REMOVING A MINIMUM OF THE TOP THREE VERTICAL FEET OF RISER, INSTALLING CONCRETE PLUGS IN THE INCOMING AND OUTGOING LINES, AND FILLING MANHOLE WITH BACKFILL TO GRADE.

MANHOLE SUMMARY TABLE			
MH	DIA	A	B
001	72"	135° 20'	60° 30'
002	72"	118° 44' 17"	90° 20' 30"

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

HOR. SCALE 1"=20'
VERT. SCALE 1"=10'
SCALE IN FEET

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JUNE 15, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI
JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN
PLAN AND PROFILE
BOL STA 0+00 TO STA 3+00

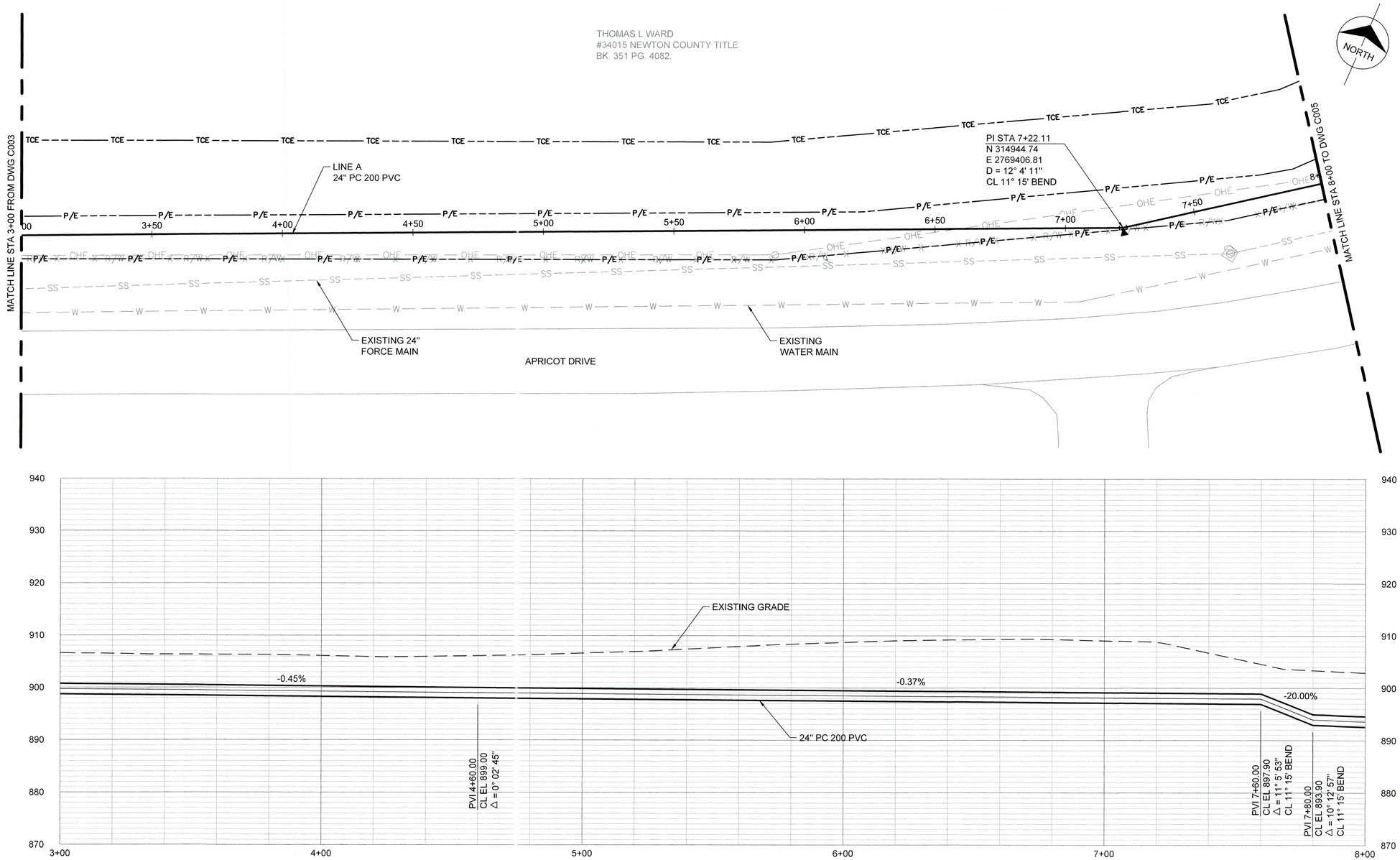
project	contract
105643	

drawing C003 – rev. 0
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file 105643_FORCE MAIN.DWG

STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001078
PROFESSIONAL ENGINEER
8/1/19
WILLIAM M. NASH
MECHANICAL
PE 2003001078

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no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

HOR. SCALE 1"=20'
VERT. SCALE 1"=10'

SCALE IN FEET

BURNS McDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JUNE 15, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN

PLAN AND PROFILE

STA 3+00 TO STA 8+00

project	contract
105643	

drawing **C004** rev. **0**

sheet of sheets

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STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001078
PROFESSIONAL ENGINEER

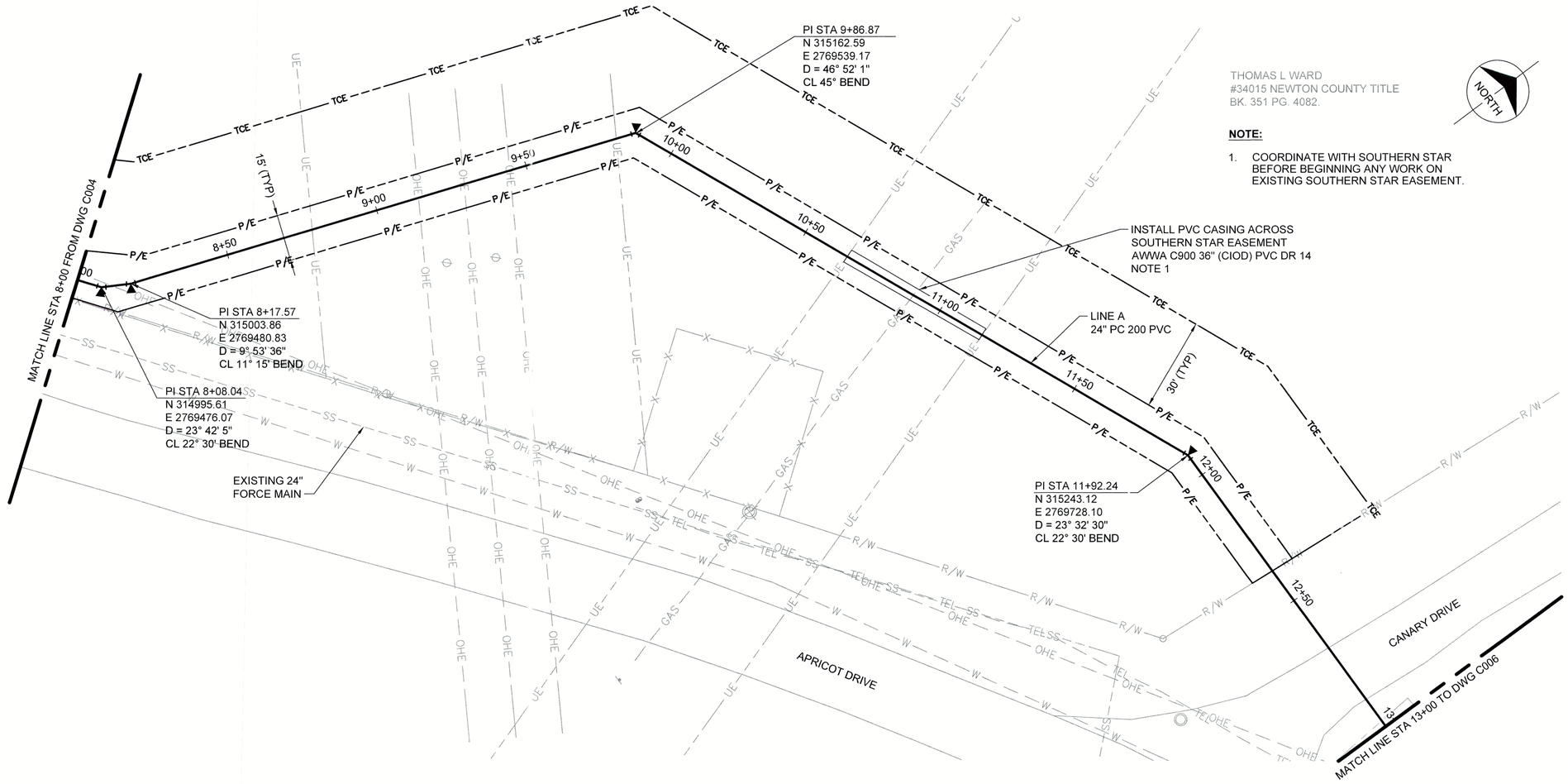
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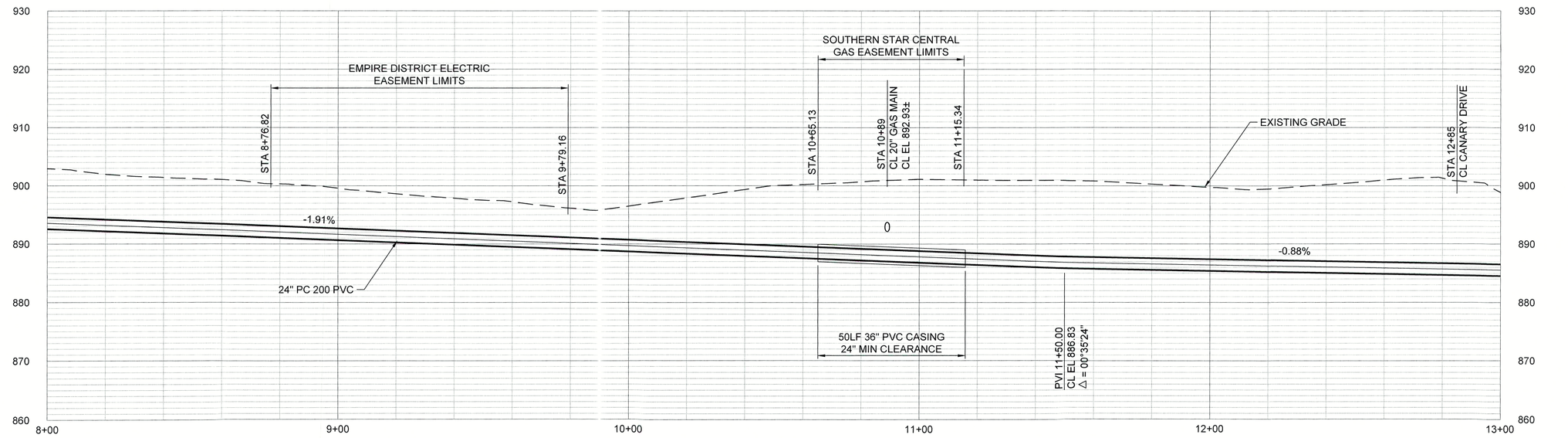
WILLIAM M. NASH
MECHANICAL
PE 2003001078

Scale For Microfilming
Millimeters
Inches

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no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001078
PROFESSIONAL ENGINEER
8/1/19

WILLIAM M. NASH
MECHANICAL
PE 2003001078

HOR. SCALE 1"=20'
VERT. SCALE 1"=10'
SCALE IN FEET
SCALE IN FEET

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JUNE 15, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN
PLAN AND PROFILE
STA 8+00 TO STA 13+00

project	contract
105643	

drawing **C005** – rev. **0**

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DOUGLAS A BROOKS
#34018 NEWTON COUNTY TITLE
BK. 349 PG. 1505

NORTH

MATCH LINE STA 13+00 FROM DWG C005

MATCH LINE STA 18+00 TO DWG C007

TCE

15' TYP

R/W

PI STA 13+28.48
N 315241.91
E 2769864.33
D = 21° 20' 17"
CL 22° 30' BEND

PI STA 14+93.59
N 315298.67
E 2770019.38
D = 12° 32' 59"
CL 11° 15' BEND

LINE A
24" PC 200 PVC

PI STA 16+82.96
N 315321.83
E 2770207.33
D = 12° 40' 16"
CL 11° 15' BEND

EXISTING
WATER MAIN

APRICOT DRIVE

OHE

TEL

W

SS

TP

EXISTING GRADE

-0.88%

+0.75%

+2.75%

+4.29%

+4.14%

+2.63%

24" PC 200 PVC

PVI 16+20.00
CL EL 882.70
△ = 0° 56' 02"

PVI 16+60.00
CL EL 883.00
△ = 1° 08' 44"

PVI 17+00.00
CL EL 884.10
△ = 0° 52' 52"

PVI 17+35.00
CL EL 885.60
△ = 0° 05' 09"

PVI 17+70.00
CL EL 887.05
△ = 0° 51' 51"

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001078
PROFESSIONAL ENGINEER
8/1/19

WILLIAM M. NASH
MECHANICAL
PE 2003001078

HOR. SCALE 1"=20'
VERT. SCALE 1"=10'

SCALE IN FEET

BURNS McDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JUNE 15, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN
PLAN AND PROFILE

STA 13+00 TO STA 18+00

project	contract
105643	

drawing C006 – rev. 0

sheet of sheets

file 105643_FORCE MAIN.DWG

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Scale For Microfilming
Millimeters
Inches

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DOUGLAS A BROOKS
#34018 NEWTON COUNTY TITLE
BK. 349 PG. 1505

NORTH

MATCH LINE STA 18+00 FROM DWG C006

MATCH LINE STA 23+00 TO DWG C008

TCE — R/W — W — SS

15' TYP

18+50 19+00 20+00 20+50 21+00 21+50 22+00 22+50 23

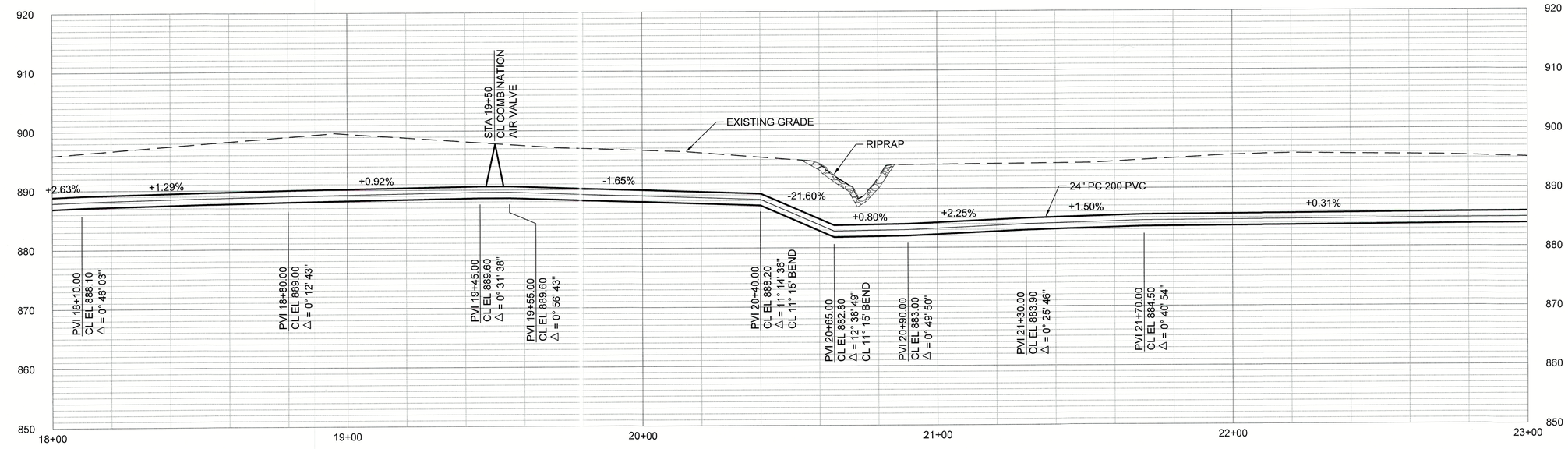
STA 19+50.00
N 315298.64
E 2770473.36
CL COMBINATION
AIR VALVE

LINE A
24" PC 200 PVC

EXISTING
WATER MAIN

APRICOT DRIVE

INSTALL 32 SY MODOT TYPE 3 ROCK DITCH LINER RIPRAP AT MAXIMUM 2:1 SIDE SLOPE, BEGINNING AT 36" RCP CULVERT OUTLET TO 5' BEYOND FORCE MAIN, SEE DETAIL 5 ON C014



no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001078
PROFESSIONAL ENGINEER
8/1/19

WILLIAM M. NASH
MECHANICAL
PE 2003001078

HOR. SCALE 1"=20'
VERT. SCALE 1"=10'

0 10' 20' 40'
SCALE IN FEET

BURNS McDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JUNE 15, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN
PLAN AND PROFILE

STA 18+00 TO STA 23+00

project	contract
105643	

drawing **C007** rev. **0**

sheet of sheets

file 105643_FORCE MAIN.DWG

Millimeters
Inches
Scale For Microfilming

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DOUGLAS A BROOKS
#34018 NEWTON COUNTY TITLE
BK. 349 PG. 1505

NORTH

MATCH LINE STA 23+00 FROM DWG C007

MATCH LINE STA 28+00 TO DWG C009

TCE

15' TYP

R/W

LINE A
24" PC 200 PVC

23+00 23+50 24+00 24+50 25+00 25+50 26+00 26+50 27+00 27+50 28+00

W

EXISTING
WATER MAIN

APRICOT DRIVE

EXISTING 24"
FORCE MAIN

SS

EXISTING GRADE

+0.31%

+1.22%

24" PC 200 PVC

PVI 27+20.00
CL EL 886.20
△ = 0° 31' 17"

920 910 900 890 880 870 860 850

23+00 24+00 25+00 26+00 27+00 28+00

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001078
PROFESSIONAL ENGINEER
8/1/19

WILLIAM M. NASH
MECHANICAL
PE 2003001078

HOR. SCALE 1"=20'
VERT. SCALE 1"=10'

0 10' 20' 40'
SCALE IN FEET

0 10' 20'
SCALE IN FEET

BURNS McDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JUNE 15, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN
PLAN AND PROFILE

STA 23+00 TO STA 28+00

project	contract
105643	

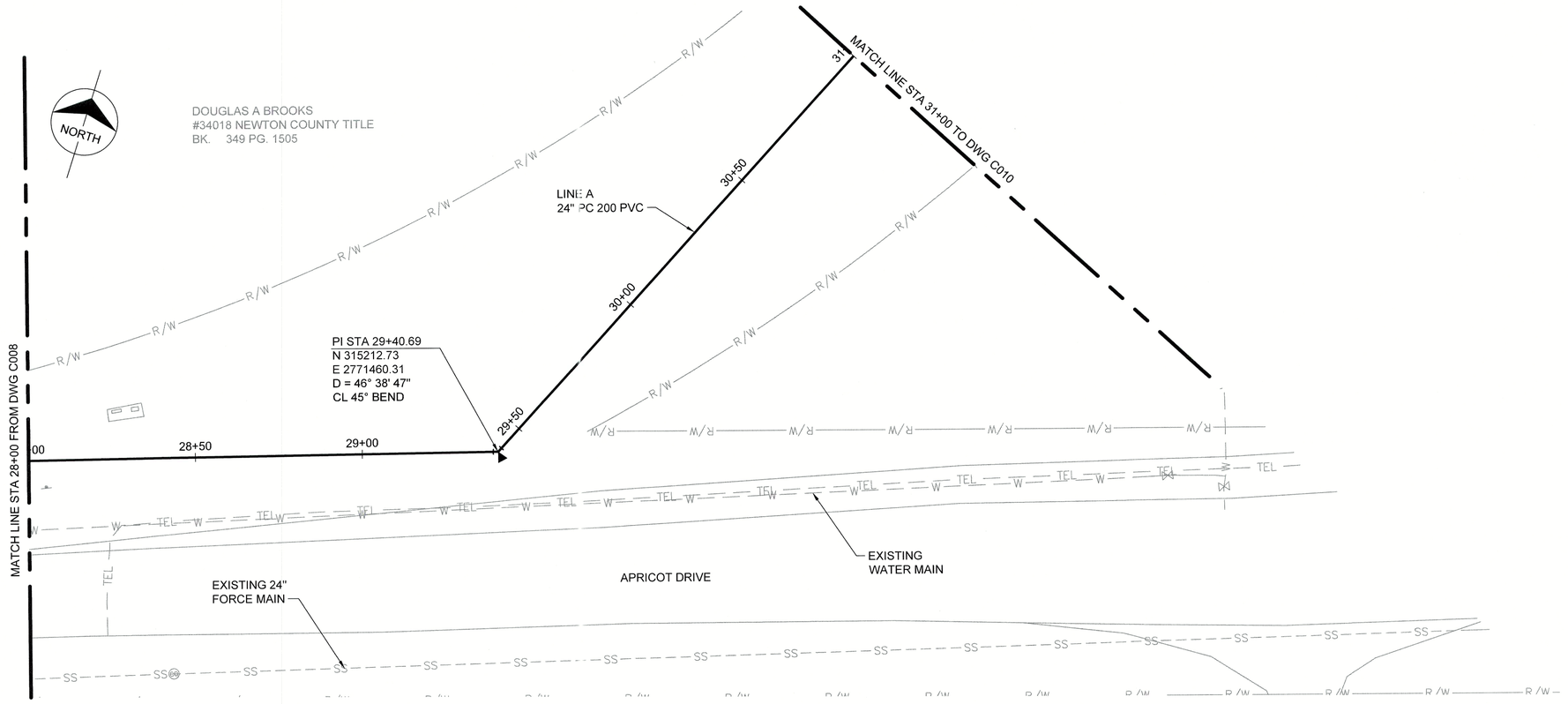
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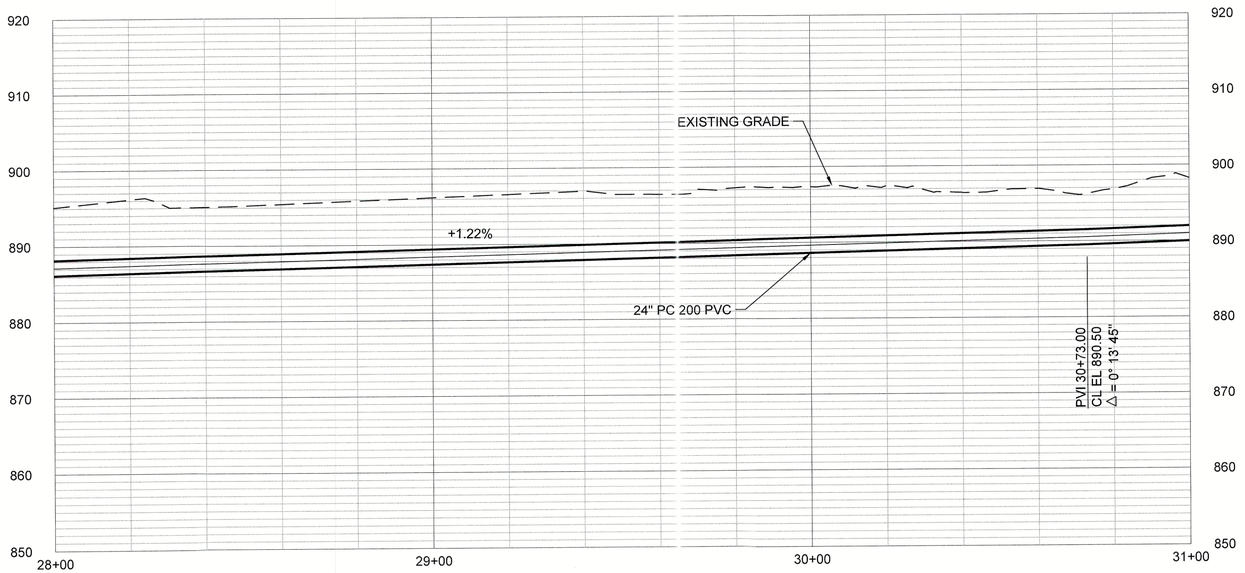
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file 105643_FORCE MAIN.DWG

Scale For Microfilming
Millimeters
Inches

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no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

HOR. SCALE 1"=20'
VERT. SCALE 1"=10'

SCALE IN FEET

BURNS McDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JUNE 15, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN

PLAN AND PROFILE

STA 28+00 TO STA 31+00

project	contract
105643	

drawing **C009** rev. **0**

sheet of sheets

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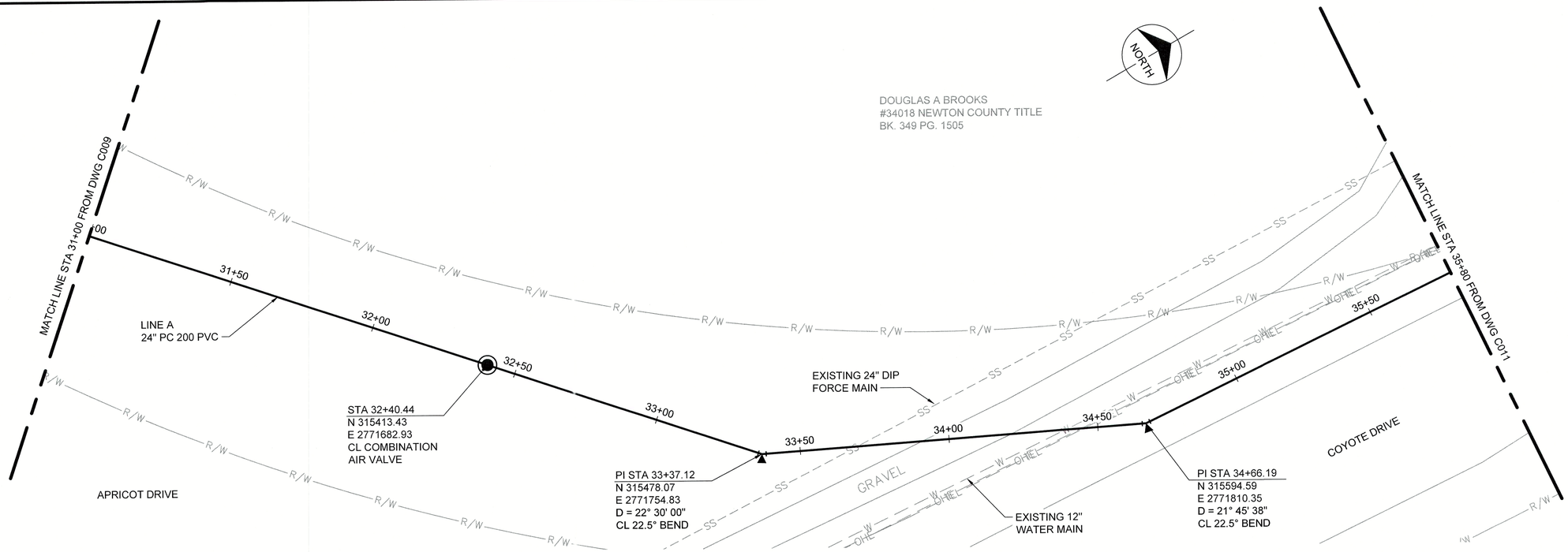
STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001078
PROFESSIONAL ENGINEER
8/1/19

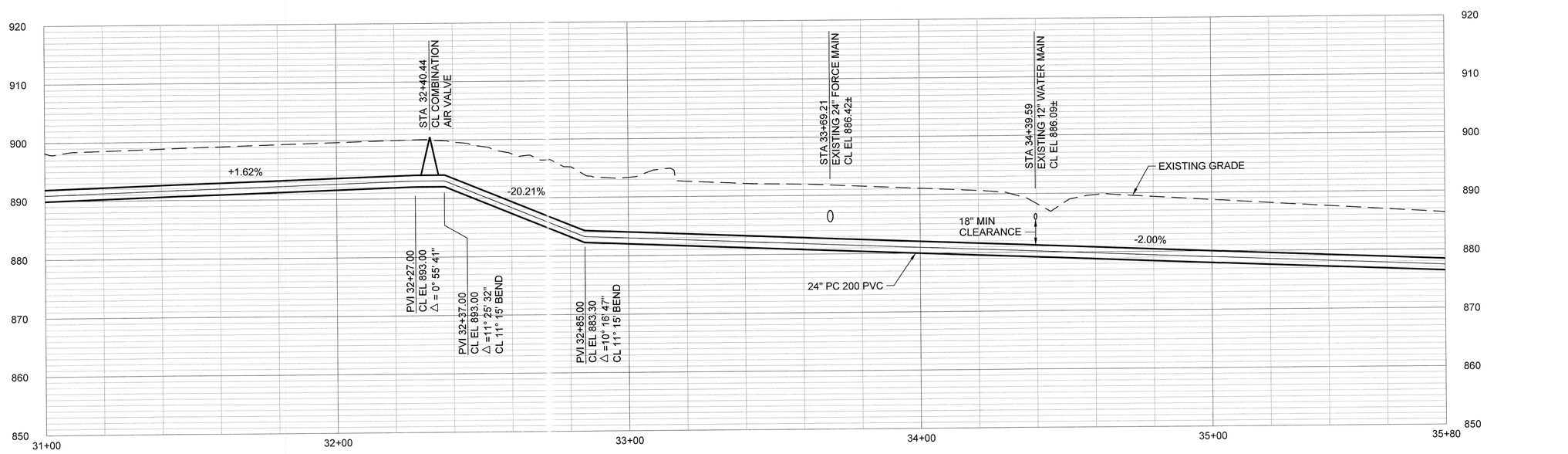
WILLIAM M. NASH
MECHANICAL
PE 2003001078

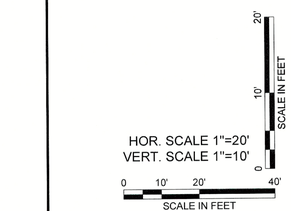
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\\bmcd\dfs\Clients\WTR\JoplinMO\105643_FilmoreDesign\Design\Cadd\Civil\Prod_Dwgs\105643_FORCE MAIN.dwg Aug 01, 2019 - 9:56am dhoward

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID







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KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JUNE 15, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN

PLAN AND PROFILE

STA 31+00 TO STA 35+80

project	contract
105643	

drawing **C010** – rev. **0**

sheet of sheets

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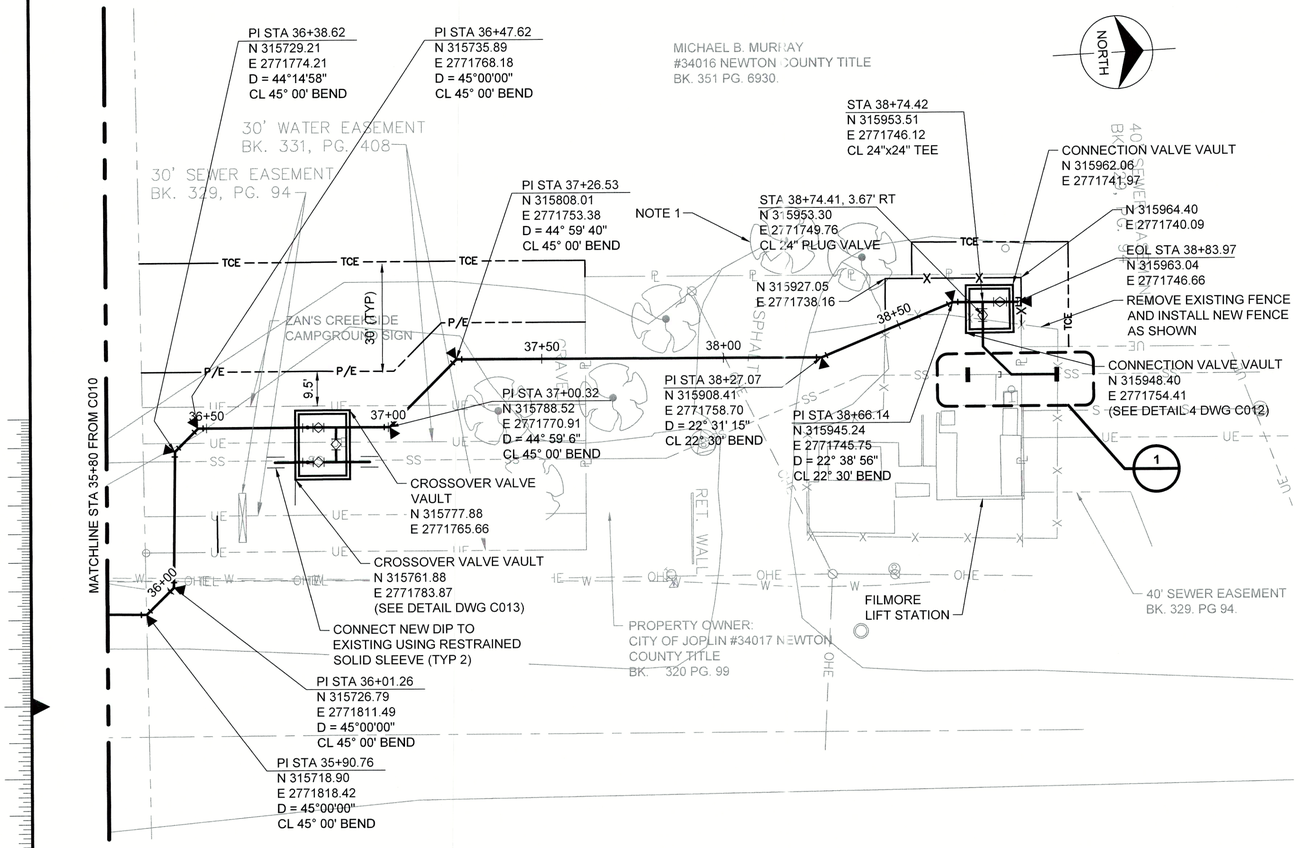
STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001078
PROFESSIONAL ENGINEER
8/1/19

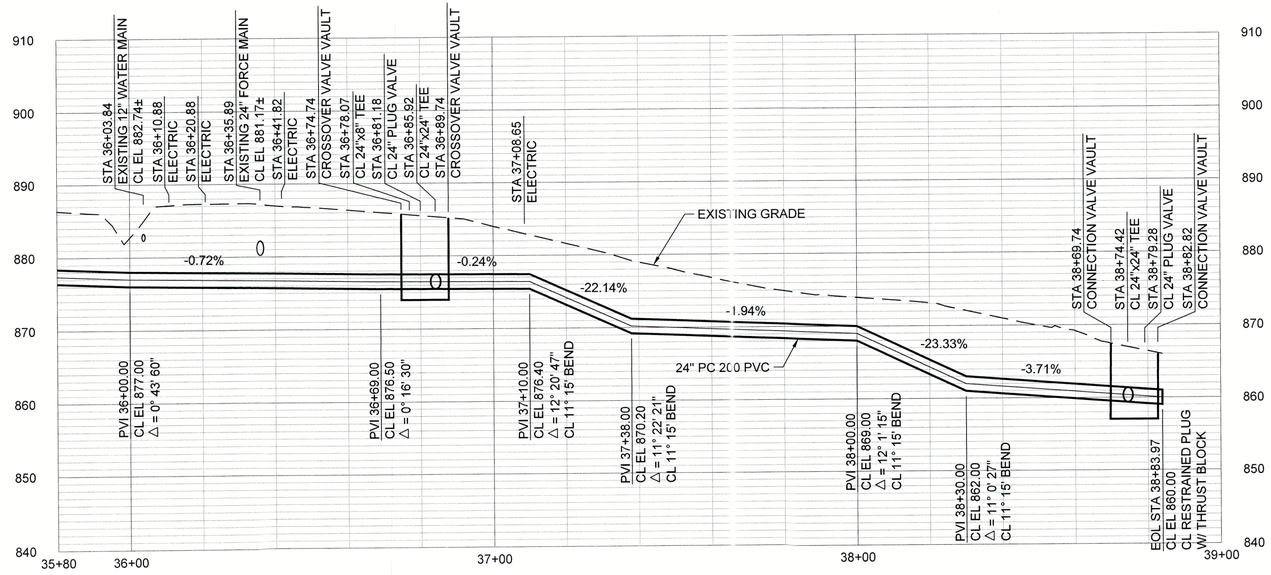
WILLIAM M. NASH
MECHANICAL
PE 2003001078

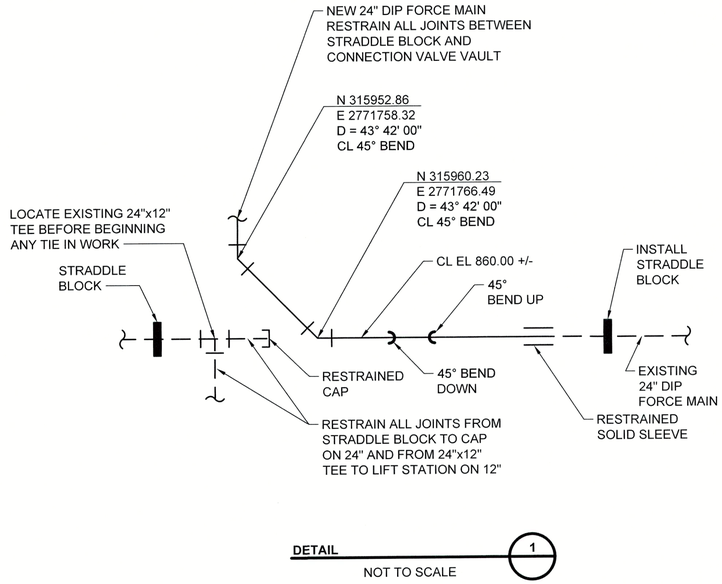
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Scale For Microfilming
Millimeters
Inches







DETAIL 1
NOT TO SCALE

NOTES:

1. CONTRACTOR SHALL SAVE ALL TREES FROM DAMAGE DUE TO THEIR ACTIVITIES.
2. CONTRACTOR SHALL POTHOLE EXISTING 24" FORCE MAIN AT CROSSOVER CONNECTION POINT TO CONFIRM ELEVATION. REPORT ELEVATION TO ENGINEER IF IT VARIES SIGNIFICANTLY FROM THE CROSSOVER CENTERLINE ELEVATION SHOWN (~876.5').

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

HOR. SCALE 1"=20'
VERT. SCALE 1"=10'
SCALE IN FEET

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JUNE 15, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI
JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN
PLAN AND PROFILE
STA 35+80 TO EOL STA 38+83.97

project	contract
105643	

drawing C011 – rev. 0
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file 105643_FORCE MAIN.DWG

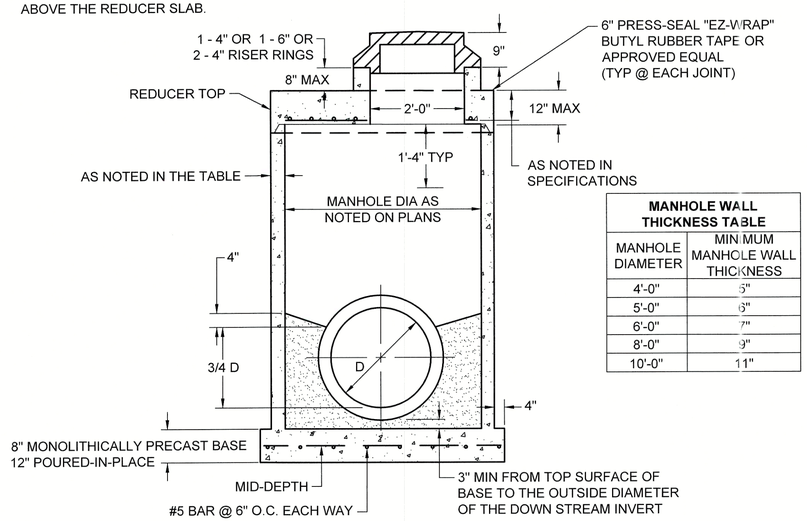
STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001078
PROFESSIONAL ENGINEER
8/1/19
WILLIAM M. NASH
MECHANICAL
PE 2003001078

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Scale For Microfilming: Millimeters / Inches

MANHOLE 5' AND GREATER IN DIAMETER SHALL BE FULL DIAMETER UP TO THE REDUCER TOP. ONLY THE ECCENTRIC CONE, RISER RINGS, AND CASTING SHALL BE PLACED ABOVE THE REDUCER SLAB.



6" PRESS-SEAL "EZ-WRAP" BUTYL RUBBER TAPE OR APPROVED EQUAL (TYP @ EACH JOINT)

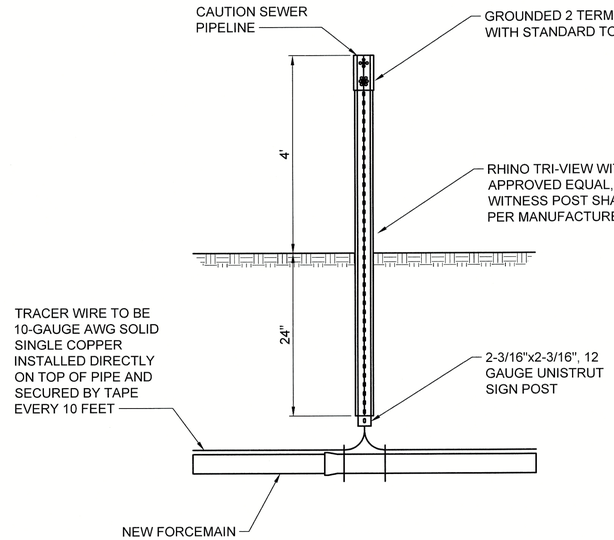
MANHOLE WALL THICKNESS TABLE

MANHOLE DIAMETER	MINIMUM MANHOLE WALL THICKNESS
4'-0"	5"
5'-0"	6"
6'-0"	7"
8'-0"	9"
10'-0"	11"

MANHOLE GENERAL NOTES:

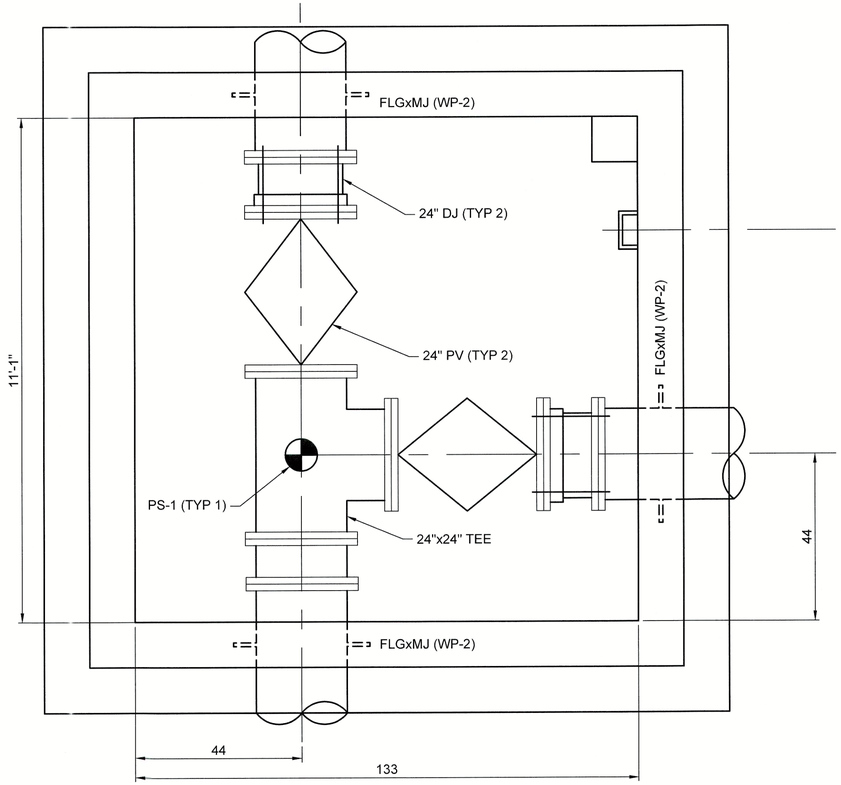
1. ALL MANHOLES SHALL BE POLYMER CONCRETE AS MANUFACTURED BY U.S. COMPOSITE PIPE, INC. OR APPROVED EQUAL.
2. ALL MANHOLE RINGS SHALL BE SET IN A MINIMUM OF TWO (2) ROWS OF 3/4 TO 1 INCH PRE-FORMED BUTYL JOINT SEALER.
3. ALL MANHOLE RINGS TO BE PLACED IN PAVEMENT OR IN AREAS TO BE SUBSEQUENTLY PAVED SHALL HAVE "MACHINED HORIZONTAL BEARING SURFACES" AND SHALL COMPLY WITH CLASS #25 AS ESTABLISHED IN ASTM A-48.
4. ALL MANHOLE BASES (PRE-CAST OR POURED-IN-PLACE) SHALL HAVE NO. 5 REINFORCING BARS PLACED 6" CENTERS BOTH WAYS.
5. ALL MANHOLE RINGS AND COVERS TO BE EAST JORDAN PRODUCT NUMBER COM 320069A01 (H20 LOAD RATED) OR APPROVED EQUAL.
6. MAXIMUM GRADE ADJUSTMENT ALLOWABLE IS 8". MINIMUM ALLOWABLE THICKNESS FOR PRECAST CONCRETE GRADE ADJUSTMENT RING IS 4".
7. REINFORCEMENT IN ALL PRECAST SECTIONS SHALL EQUAL OR EXCEED ASTM C-478 SPECIFICATIONS.
8. BUTYL MATERIAL TO BE USED AT ALL PRECAST SECTIONS JOINTS. O-RINGS MAY BE USED FOR JOINTS BELOW THE CONE SECTION, BUT THE CONE SECTION ITSELF SHALL NOT HAVE O-RING JOINTS.

DETAIL 1
STANDARD PRECAST MANHOLE (SHALLOW TYPE)
NOT TO SCALE

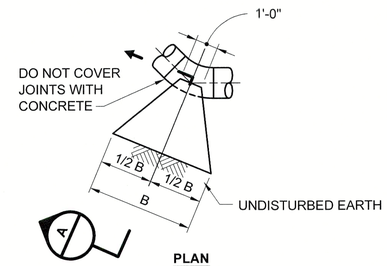


* SPACING TO BE APPROXIMATELY EVERY 500 FEET AND AT MAJOR DEFLECTIONS. ALL COST ASSOCIATED WITH WITNESS POSTS SHALL BE INCIDENTAL TO FORCE MAINS.

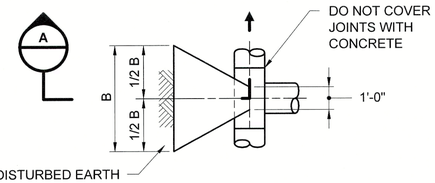
DETAIL 2
WITNESS POST WITH TRACER WIRE ACCESS BOX
NOT TO SCALE



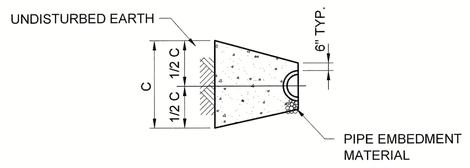
DETAIL 4
CONNECTION VALVE VAULT
NOT TO SCALE



PLAN



PLAN



SECTION A

HORIZONTAL THRUST BLOCK SCHEDULE			
SIZE	FITTING	"B"	"C"
24"	45°	9'	4.5'
24"	22.50°	6.5'	3.5'
24"	11.25°	4.5'	2.5'
24"	DEAD END	10.5'	5'

DETAIL 3
HORIZONTAL THRUST BLOCK
NOT TO SCALE

NOTES:

1. CONTRACTOR SHALL POTHOLE EXISTING 24" FORCE MAIN AT CONNECTION POINT TO CONFIRM CENTERLINE ELEVATION.
2. TRANSITION FROM PVC TO DIP PIPE MATERIAL OUTSIDE VAULT. PIPING MATERIALS SHALL REMAIN DIP, ONCE TRANSITIONED, TO CONNECTION WITH EXISTING FORCE MAIN AND TO RESTRAINED PLUG WITH THRUST BLOCK.
3. ANCHOR PIPING TO VAULT WALLS USING FLG X MJ WALL PIPE (WP-2).

STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001078
PROFESSIONAL ENGINEER
8/1/19
WILLIAM M. NASH
MECHANICAL
PE 2003001078

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JULY 3, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN

CIVIL DETAILS I

project	contract
105643	

drawing C012 – rev. 0

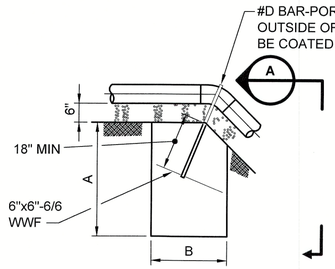
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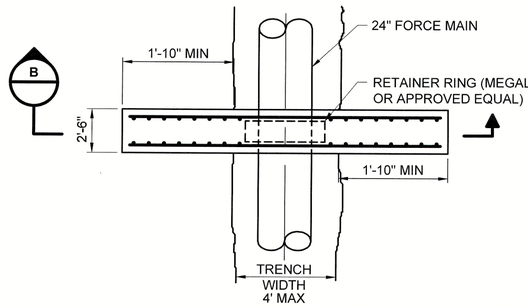
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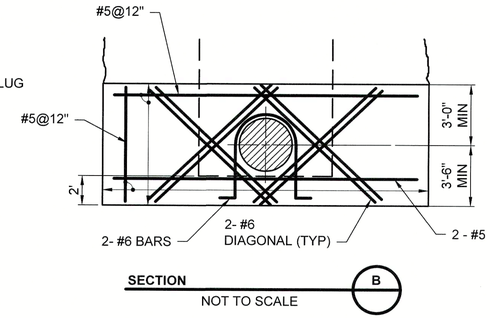
Scale For Microfilming
Millimeters
Inches



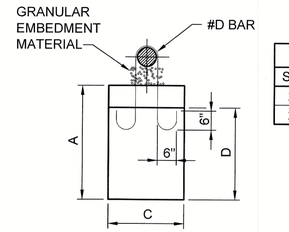
PROFILE
NOT TO SCALE



PLAN
NOT TO SCALE



SECTION B
NOT TO SCALE

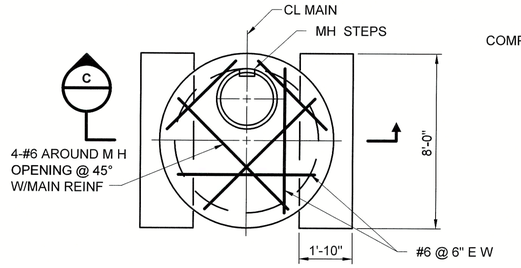


SECTION A
NOT TO SCALE

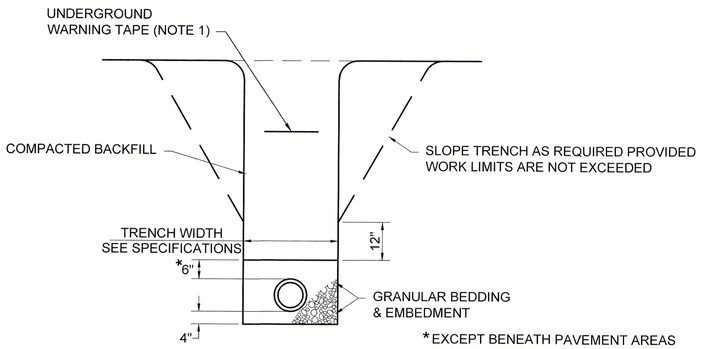
GRAVITY BLOCK SCHEDULE					
SIZE	FITTING	A	B	C	D
24"	22.5°	6'	6'	5.5'	#6
24"	11.25°	5'	5'	4'	#6

DETAIL 1
GRAVITY BLOCK
NOT TO SCALE

DETAIL 2
STRADDLE BLOCK
NOT TO SCALE



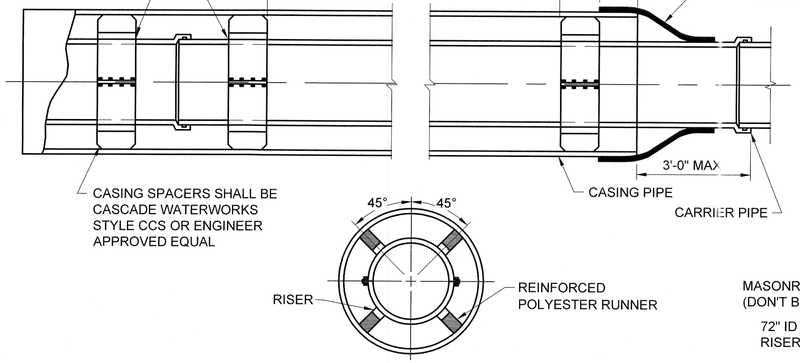
PLAN
NOT TO SCALE



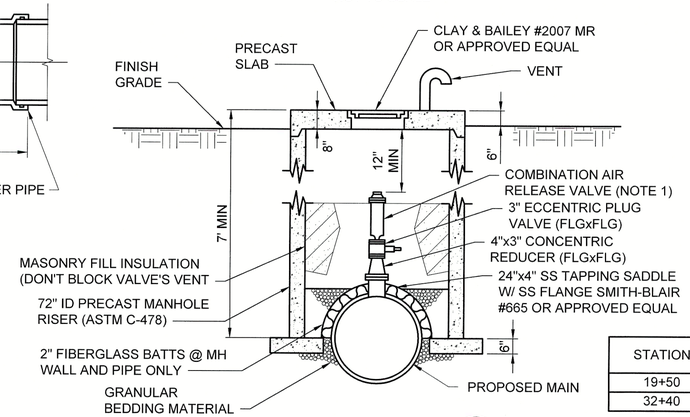
NOTE:

1. PROVIDE 3" WIDE APWA COMPLIANT WARNING TAPE. TAPE SHALL READ "CAUTION BURIED SEWER LINE BELOW." INSTALL ACCORDING TO MANUFACTURER'S RECOMMENDATION.

DETAIL 5
TRENCH
NOT TO SCALE



DETAIL 3
CASING PIPE AND END SEAL
NOT TO SCALE



SECTION C
NOT TO SCALE

STATION	COMBINATION ARV SIZE (IN)
19+50	3
32+40	3

NOTE:

1. PROVIDE ARI MODEL D-26, STAINLESS STEEL, FLANGED WASTEWATER COMBINATION AIR VALVE OR APPROVED EQUAL.

DETAIL 4
AIR RELEASE VALVE
NOT TO SCALE

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

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date	detailed
JULY 3, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN

CIVIL DETAILS II

project	contract
105643	

drawing **C013** – rev. **0**

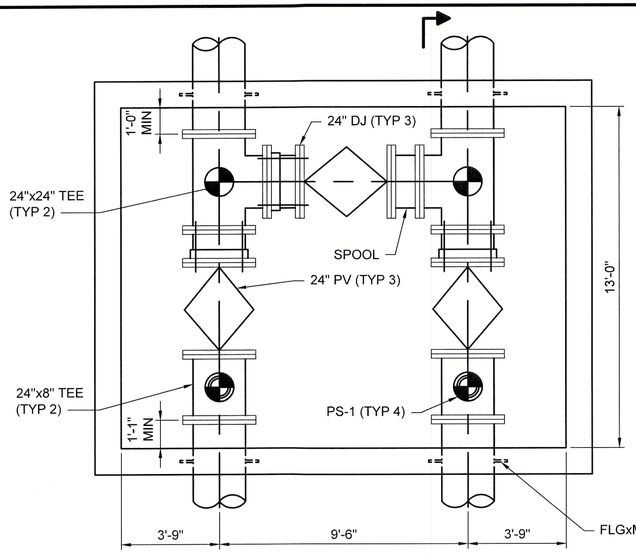
sheet of sheets

file 105643_C013-CIVIL DETAILS SHT 2.DWG

STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001078
PROFESSIONAL ENGINEER
8/1/19
WILLIAM M. NASH
MECHANICAL
PE 2003001078

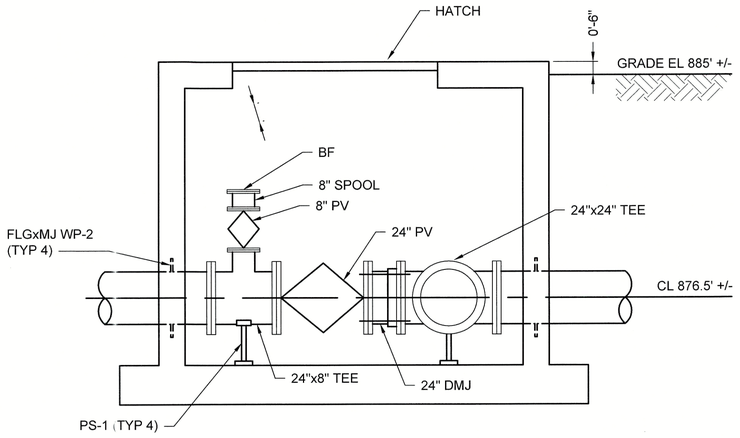
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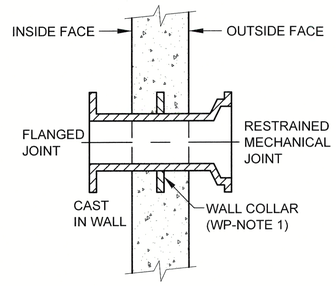
PLAN

A



SECTION A

NOT TO SCALE



NOTE:

1. WALL COLLAR SHALL BE LOCATED IN CENTER OF WALL.

DETAIL 6

WP-2 NEW WALL

NOT TO SCALE

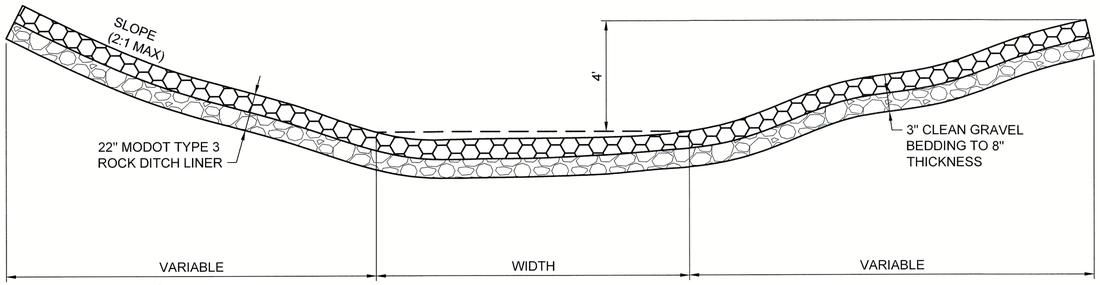
NOTES:

1. CONTRACTOR SHALL POTHOLE TO CONFIRM CENTERLINE ELEVATION OF EXISTING FORCE MAIN AT LOCATION OF PROPOSED 24"x24" TEE BEFORE BEGINNING CROSSOVER VALVE VAULT AND PIPING INSTALLATION. REPORT SIGNIFICANT VARIATION FROM CENTERLINE ELEVATION SHOWN TO ENGINEER. NEW 24" FORCE MAIN CENTERLINE ELEVATION AT PROPOSED 24"x24" TEE SHALL MATCH CENTERLINE ELEVATION OF NEW 24"x24" TEE ON EXISTING FORCE MAIN.
2. ALL PIPING INSIDE VAULT SHALL BE FLANGED DIP.
3. ANCHOR PIPING TO VAULT WALLS USING FLGxMJ WALL PIPE, (WP-2)
4. TRANSITION LINE A FORCE MAIN PIPE MATERIALS TO PVC OUTSIDE VAULT.

DETAIL 1

CROSSOVER VALVE VAULT

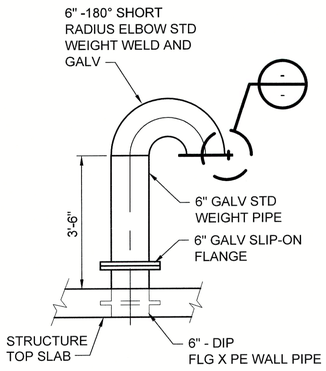
NOT TO SCALE



DETAIL 5 C007

TYPICAL DITCH LINER RIPRAP INSTALLATION

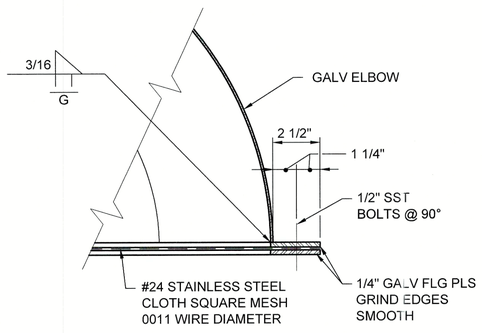
NOT TO SCALE



DETAIL 2

TOP MOUNT VENT PIPE

NOT TO SCALE



DETAIL 2A

NOT TO SCALE

CAUTION

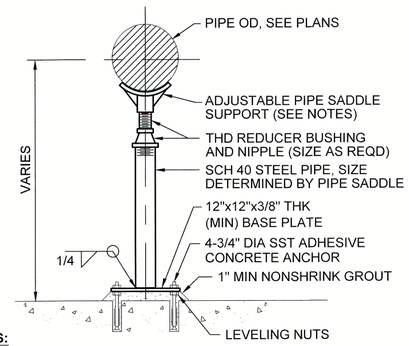
ENTRY PROHIBITED
WITHOUT PERMIT
TEST FOR
O_2 DEFICIENCY, H_2S AND
COMBUSTIBLE VAPORS

PROVIDE EMEDCO., INC. INDUSTRIAL CONFINED SPACE SIGN OR APPROVED EQUAL.

DETAIL 3

CONFINED SPACE SIGN

NOT TO SCALE



NOTES:

1. WHERE PIPE SUPPORT IS INDICATED TO BE LOCATED UNDER VALVE, PROVIDE ADJUSTABLE PLATE SUPPORT IN LIEU OF SADDLE SUPPORT.
2. COAT PIPE SYSTEM USING SYSTEM SPECIFIED IN SECTION 099000.

DETAIL 4

PIPE SUPPORT PS-1

NOT TO SCALE

STATE OF MISSOURI
WILLIAM M. NASH
NUMBER PE-2003001078
PROFESSIONAL ENGINEER
8/1/19

WILLIAM M. NASH
MECHANICAL
PE 2003001078

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

BURNS McDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JULY 3, 2018	B. FIFIELD
designed	checked
S. WILSON	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN

CIVIL DETAILS III

project	contract
105643	

drawing C014 — rev. 0

sheet of sheets

file 105643_C014-CIVIL DETAILS SHT 3.DWG

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GENERAL NOTES:

1. DESIGN STANDARDS:
   - A. MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES, ASCE 7-10.
   - B. CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES, ACI 350-06.
2. MATERIALS:
   - A. CAST-IN-PLACE CONCRETE: 4,500 PSI MINIMUM 28-DAY COMPRESSIVE STRENGTH.
   - B. REINFORCEMENT: ASTM A615 GRADE 60, UNO.
   - C. STRUCTURAL STEEL: ASTM A36.
   - D. GROUT: CEMENTITIOUS NON - SHRINK, NON - METALLIC.
   - E. WATERSTOP: 6 - INCH PVC WATERSTOP, INSTALLED PER MANUFACTURERS RECOMMENDATIONS.
3. POST-INSTALLED ADHESIVE ANCHORS
   - A. ADHESIVE FOR POST-INSTALLED ANCHORS AND DOWELS SHALL BE:
     1. HILTI HIT HY-200.
     2. ENGINEER APPROVED EQUAL.
   - B. SEE CONCRETE ANCHOR MINIMUM EMBEDMENT TABLE THIS SHEET.
4. DESIGN CRITERIA FOR INLET AND OUTLET STRUCTURES:
   - A. FLUID LOADS:
     1. WATER = 62.4 PCF
   - B. SOIL LOADS: GEOTECHNICAL REPORT WAS NOT AVAILABLE DURING DESIGN AND SHOWN GEOTECHNICAL PARAMETERS WERE ASSUMED.
     1. SOIL UNIT WEIGHT = 120 PCF
     2. EQUIVALENT SOIL FLUID PRESSURE = 95 PSF/FT DEPTH
     3. ALLOWABLE BEARING PRESSURE = 2000 PSF
5. DESIGN CRITERIA FOR JUNCTION BOXES:
   - A. LIVE LOAD:
     1. TOP SLAB = 250 PSF
   - B. FLUID LOADS:
     1. WATER = 62.4 PSF
   - C. SOIL LOADS:
     1. SOIL UNIT WEIGHT = 120 PCF
     2. EQUIVALENT SOIL FLUID PRESSURE = 95 PSF/FT DEPTH
6. ALL WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1 BY CERTIFIED WELDERS.
7. ALL EMBEDDED STEEL ITEMS SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123.

ABBREVIATIONS:

AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
ACI	AMERICAN CONCRETE INSTITUTE
ACO	AT CONTRACTORS OPTION
ADD	ADDITIONAL
AL	ALUMINUM
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AWS	AMERICAN WELDING SOCIETY
CB	CORNER BAR
CC	CLEAR COVER
CIS	CENTERED IN SLAB
CIW	CENTERED IN WALL
CJ	CONSTRUCTION JOINT
CL	CENTER LINE
CLR	CLEAR
CTRD	CENTERED
DIA	DIAMETER
DIAG	DIAGONAL
DWG	DRAWING
EF	EACH FACE
EL	ELEVATION
EW	EACH WAY
FF	FAR FACE
HK	HOOK
HORIZ	HORIZONTAL
ID	INSIDE DIAMETER
LG	LONG
LS	LAP SPLICE
MIN	MINIMUM
NF	NEAR FACE
OC	ON CENTER
OD	OUTSIDE DIAMETER
PCF	POUNDS PER CUBIC FOOT
PSF	POUNDS PER SQUARE FOOT
RCP	REINFORCED CONCRETE PIPE
REINF	REINFORCEMENT
RJ	ROUGHENED JOINT
SS	STAINLESS STEEL
STD	STANDARD
T&B	TOP AND BOTTOM
TOC	TOP OF CONCRETE
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL

CONCRETE CAST AGAINST & PERMANENTLY EXPOSED TO EARTH..... 3"

CONCRETE EXPOSED TO EARTH, WEATHER & WASTEWATER:
#6 THRU # 18 BARS..... 2"

#5 BAR, W31 OR D31 WIRE & SMALLER..... 1 1/2"

CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND :
SLABS, WALLS & JOISTS :
#14 & #18 BARS ..... 1 1/2"
#11 & SMALLER..... 3/4"

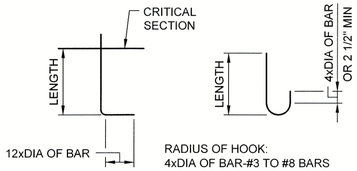
BEAMS AND COLUMNS :
PRIMARY REINF. TIES, STIRRUPS & SPIRALS ..... 1 1/2"

CONCRETE CLEAR COVER PROTECTION FOR REINF (NON-PRESTRESSED, CAST IN PLACE)
UNLESS NOTED OTHERWISE

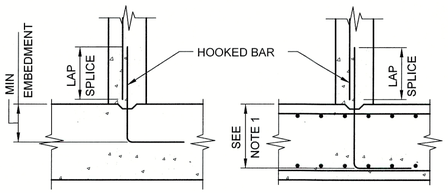
CONCRETE REFORCING BAR LAP SPLICES AND TENSION DEVELOPMENT LENGTHS IN INCHES

BAR SIZE	1 1/2" CC		2" CC		3" CC	
	TOP	OTHER	TOP	OTHER	TOP	OTHER
3	16	16	16	16	16	16
4	20	16	20	16	20	16
5	25	19	25	19	25	19
6	29	23	29	23	29	23
7	48	37	43	33	43	33
8	61	47	49	37	49	37
9	75	58	60	46	55	42
10	91	70	74	57	62	47

NOTES:
1. PROVIDE SPLICE LENGTHS AS INDICATED IN TABLE UNLESS NOTED OTHERWISE.
2. TABULATED VALUES ARE BASED ON UNCOATED GRADE 60 REINFORCING BARS AND NORMAL WEIGHT CONCRETE.
3. LAP SPLICE LENGTHS INDICATED IN TABLE ARE BASED UPON THE MINIMUM CENTER-TO-CENTER (C/C) BAR SPACING BEING GREATER THAN TWICE THE CONCRETE CLEAR COVER (CC) PLUS ONE BAR DIAMETER.
4. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF CONCRETE CAST BELOW THE BARS.



RADIUS OF HOOK:
4xDIA OF BAR-#3 TO #8 BARS
5xDIA OF BAR-#9 TO #11 BARS
6xDIA OF BAR-#14 & #18 BARS



DETAIL 1 **DETAIL 2**

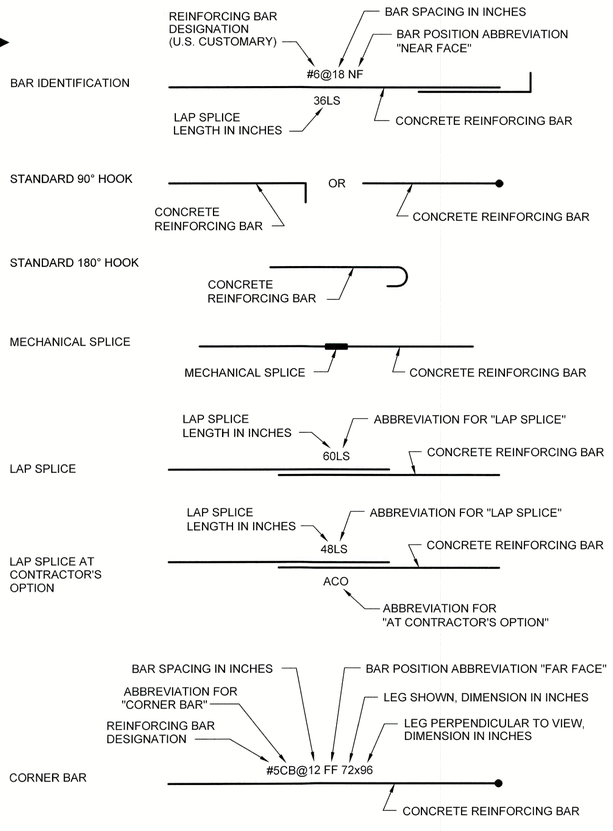
DEVELOPMENT LENGTH NOTES:
1. WHERE DWGS ARE DETAILED SIMILAR TO DETAIL 2, EXTEND THE EMBEDMENT LENGTH SUCH THAT THE HOOKED BAR CONTACTS THE LAYER OF MAIN REINFORCING SHOWN.
2. EMBEDMENT LENGTHS IN CHART ARE TYPICAL EXCEPT AS NOTED IN DETAIL 2, OR AS INDICATED ON DRAWINGS.

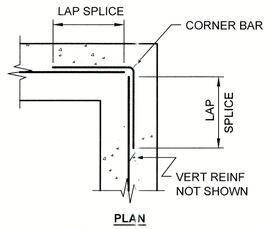
DEVELOPMENT LENGTHS HOOKED BARS (f'c = 4500psi)

BAR SIZE	LENGTH OR MIN EMBEDMENT
#3	7"
#4	10"
#5	1'-0"
#6	1'-3"
#7	1'-5"
#8	1'-7"
#9	1'-10"
#10	2'-0"
#11	2'-3"

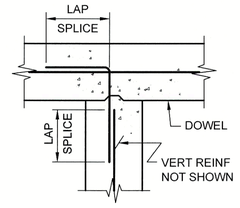
TYPICAL REINFORCING DEVELOPMENT AND SPLICES

CONCRETE REINFORCING BAR NOMENCLATURE

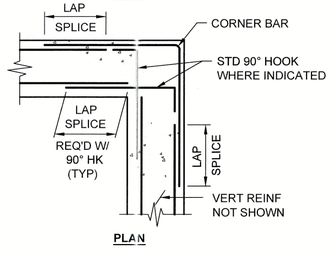




PLAN

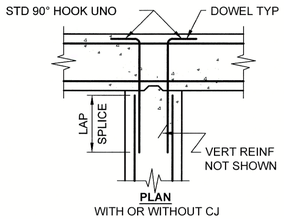


PLAN
WITH OR WITHOUT CJ



PLAN

HORIZONTAL WALL REINFORCEMENT DETAILS CORNERS
JNO



PLAN
WITH OR WITHOUT CJ

HORIZONTAL WALL REINFORCEMENT DETAILS INTERSECTIONS
UNO

MIN EMBED FOR EPOXY ADHESIVE ANCHORS

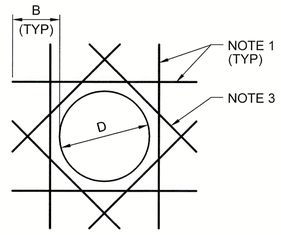
SIZE	CARBON/STAINLESS STEEL	HIGH STRENGTH STEEL
3/8"	3 1/2"	4 1/2"
1/2"	4 1/2"	6"
5/8"	5 5/8"	7 1/2"
3/4"	6 3/4"	9"
7/8"	7 7/8"	10 1/2"
1"	9"	12"
1 1/4"	11 1/4"	15"

MIN EMBED FOR WEDGE-TYPE ANCHORS

SIZE	EMBEDMENT
1/4"	2"
3/8"	2 1/2"
1/2"	3 1/2"
5/8"	4"
3/4"	4 3/4"
1"	6"

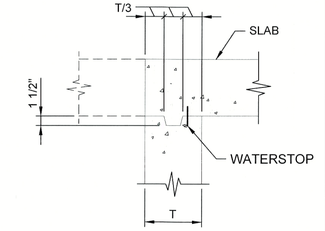
NOTE:
PROVIDE MIN EMBEDMENT AS INDICATED FOR CONCRETE ANCHORS AS SHOWN UNLESS NOTED OR REQUIRED OTHERWISE.

CONCRETE ANCHOR MINIMUM EMBEDMENT

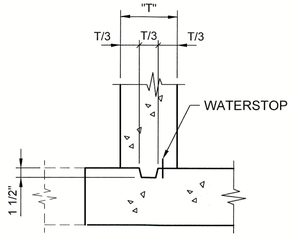


CO-1
12" ≤ D ≤ 54"

OPENING REINFORCING NOTES:
1. ADD BARS EQUAL TO THE TOTAL AREA OF REGULAR REINFORCING CUT BY THE OPENING EACH MAT. PLACE ONE HALF TOTAL AREA EACH SIDE OF OPENING EACH MAT.
2. (1) #5 BAR x 3'-0" EACH CORNER EACH MAT FOR CONCRETE THICKNESS < 18";
   (1) #6 BAR x 4'-0" EACH CORNER EACH MAT FOR CONCRETE THICKNESS ≥ 18".
3. (4) #5 BARS x D + 12" @ 45° TO REGULAR REINFORCING EACH MAT FOR CONCRETE THICKNESS < 18";
   (4) #6 BARS x D + 12" @ 45° TO REGULAR REINFORCING EACH MAT FOR CONCRETE THICKNESS ≥ 18".
4. B = TOP BAR LAP SPLICE
5. CENTER ALL BARS ON OPENING.
6. FOR OPENINGS (W, L, D) LESS THAN 12" NO ADD BARS REQUIRED IF NO REGULAR REINFORCING IS CUT BY THE OPENING, OTHERWISE SEE NOTE 1.
7. REINFORCE OPENINGS WITH W, L, OR D LARGER THAN 54" AS INDICATED ON THE DRAWINGS. IF NOT INDICATED CONTACT THE ENGINEER.



CJ-11



CJ-2

STATE OF MISSOURI
ANDREW D.YC BROWN
NUMBER PE-2017000276
PROFESSIONAL ENGINEER
Aug 1 2019
ANDREW DYC BROWN
STRUCTURAL
PE 2017000276

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date: FEB 12, 2018	detailed: R. SCOLES
designed: A. BROWN	checked: J. HEIDRICK

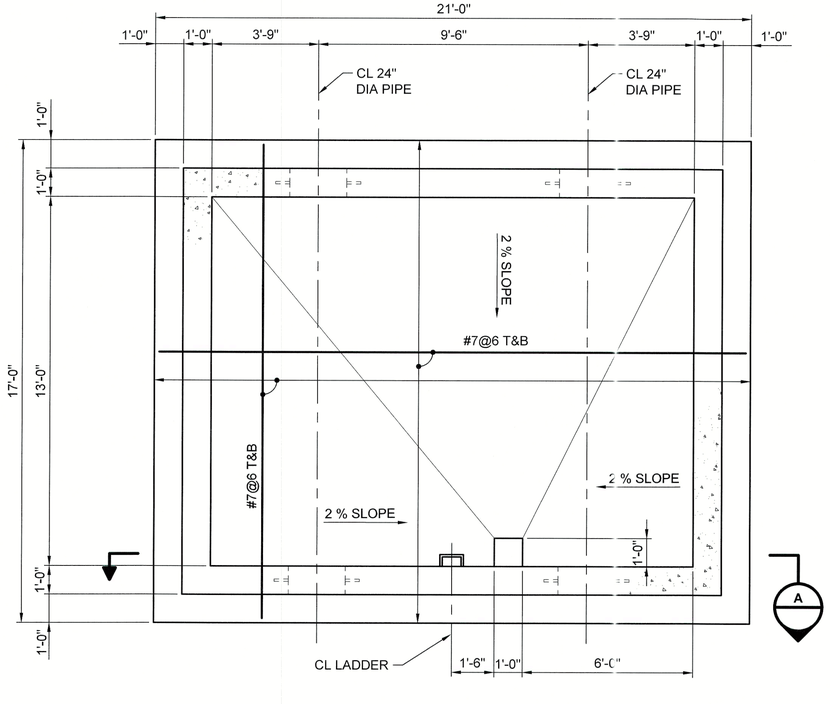
CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN
GENERAL NOTES AND LEGEND

project: 105643	contract:
drawing: S001	rev.: 0
sheet:	of sheets:
file: 105643_S001.DWG	

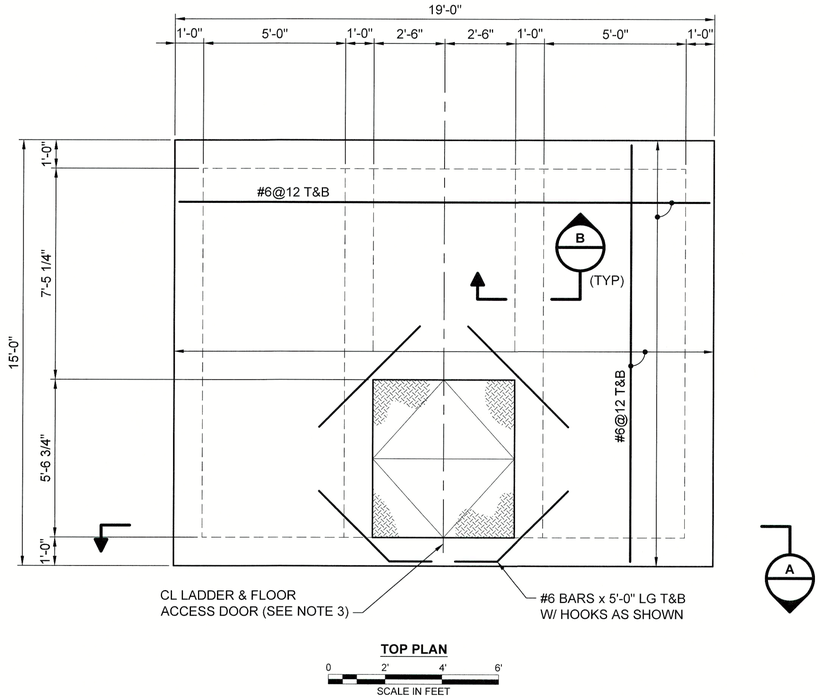
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BASE PLAN

0 2' 4' 6'

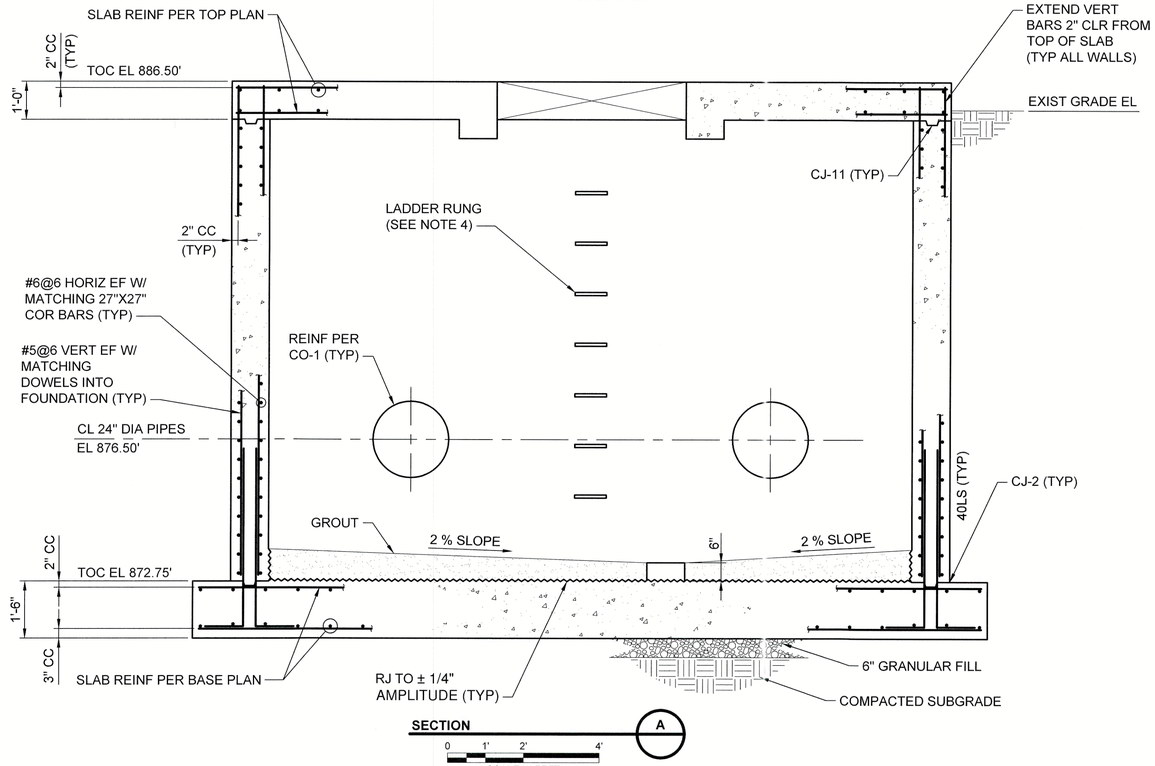
SCALE IN FEET

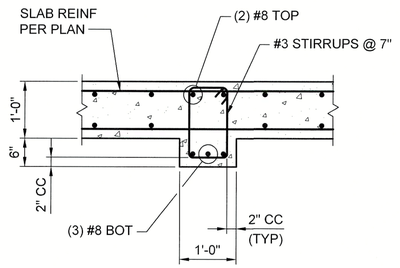


TOP PLAN

0 2' 4' 6'

SCALE IN FEET





NOTE:
TERMINATE REINFORCEMENT AT EACH END OF BEAM WITH STANDARD 90° HOOKS.

SECTION B

0 1' 2' 3'

SCALE IN FEET

NOTES:
1. REFER TO S001 FOR GENERAL NOTES AND LEGEND.
2. REFER TO CIVIL DRAWINGS FOR PIPE ALIGNMENT, ELEVATIONS, DETAILS AND PIPE SUPPORT.
3. FLOOR ACCESS DOORS SHALL BE BILCO 5'-0"X5'-6 3/4" TYPE KD OR ENGINEER APPROVED EQUAL
4. LADDER RUNGS TO BE POST INSTALLED OR CAST IN PLACE WITH 16" MAX SPACING.

STATE OF MISSOURI
ANDREW D.Y.C. BROWN
NUMBER PE-2017000276
PROFESSIONAL ENGINEER

Aug 1 2019

ANDREW DYC BROWN
STRUCTURAL
PE 2017000276

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

BURNS McDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JUNE 29, 2018	R. SCOLES
designed	checked
A. BROWN	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN
CROSSOVER VALVE VAULT

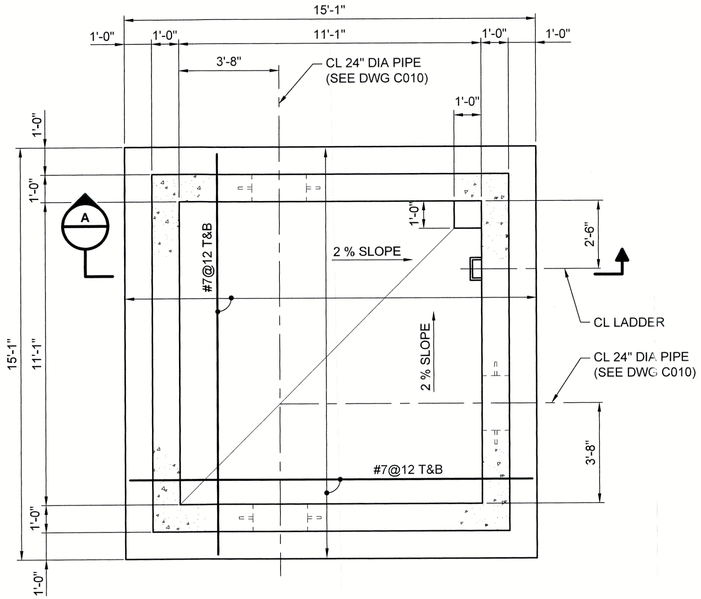
project	contract
105643	

drawing **S002** rev. **0**

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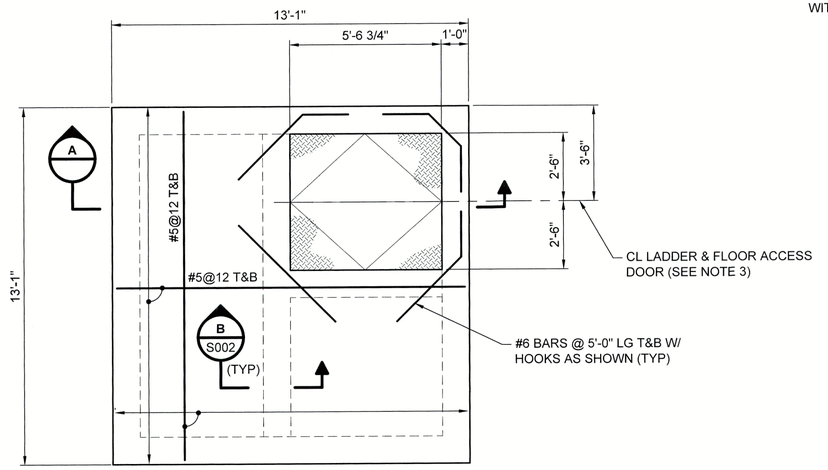
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BASE PLAN

0 2' 4' 6'

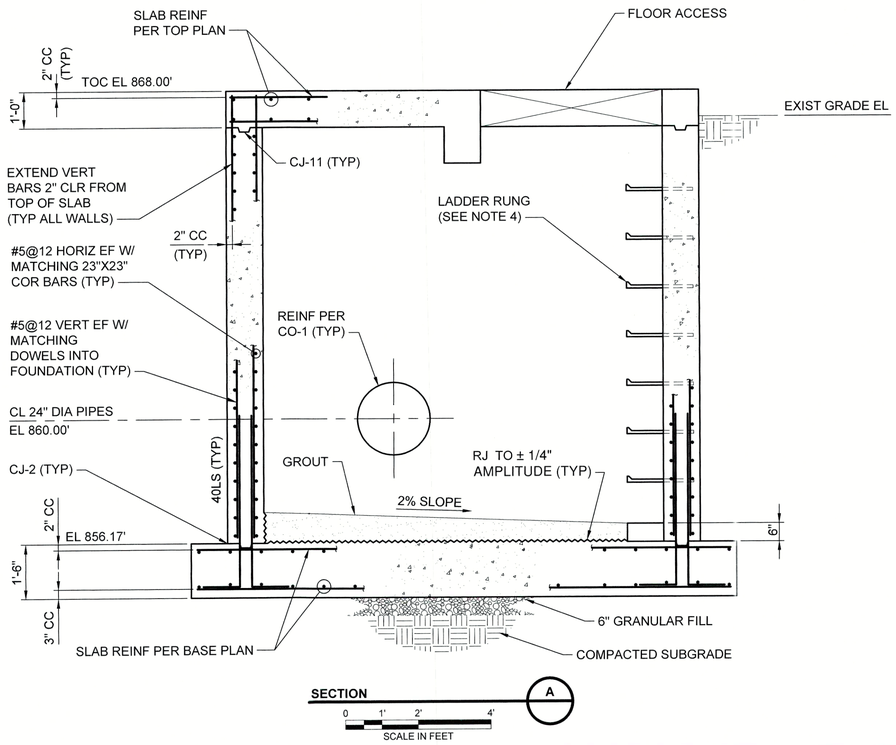
SCALE IN FEET



TOP PLAN

0 2' 4' 6'

SCALE IN FEET



SECTION A

0 1' 2' 4'

SCALE IN FEET

NOTES:

1. REFER TO S001 FOR GENERAL NOTES AND LEGEND.
2. REFER TO CIVIL DRAWINGS FOR PIPE ALIGNMENT, ELEVATIONS, DETAILS AND PIPE SUPPORT.
3. FLOOR ACCESS DOORS SHALL BE BILCO 5'-6 3/4"X5'-0" TYPE KD OR ENGINEER APPROVED EQUAL..
4. LADDER RUNGS TO BE POST INSTALLED OR EMBED WITH 16" MAX SPACING.

no.	date	by	ckd	description
0	8/02/19	SNW	JWH	ISSUED FOR BID

Aug 1 2019

ANDREW DYC BROWN
STRUCTURAL
PE 2017000276

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
LICENSEE NO. 000165

date	detailed
JUNE 29, 2018	R. SCOLES
designed	checked
A. BROWN	J. HEIDRICK

CITY OF JOPLIN MISSOURI

JASPER COUNTY, MISSOURI

FILMORE BRIDGE PARALLEL FORCE MAIN

PLAN AND SECTIONS

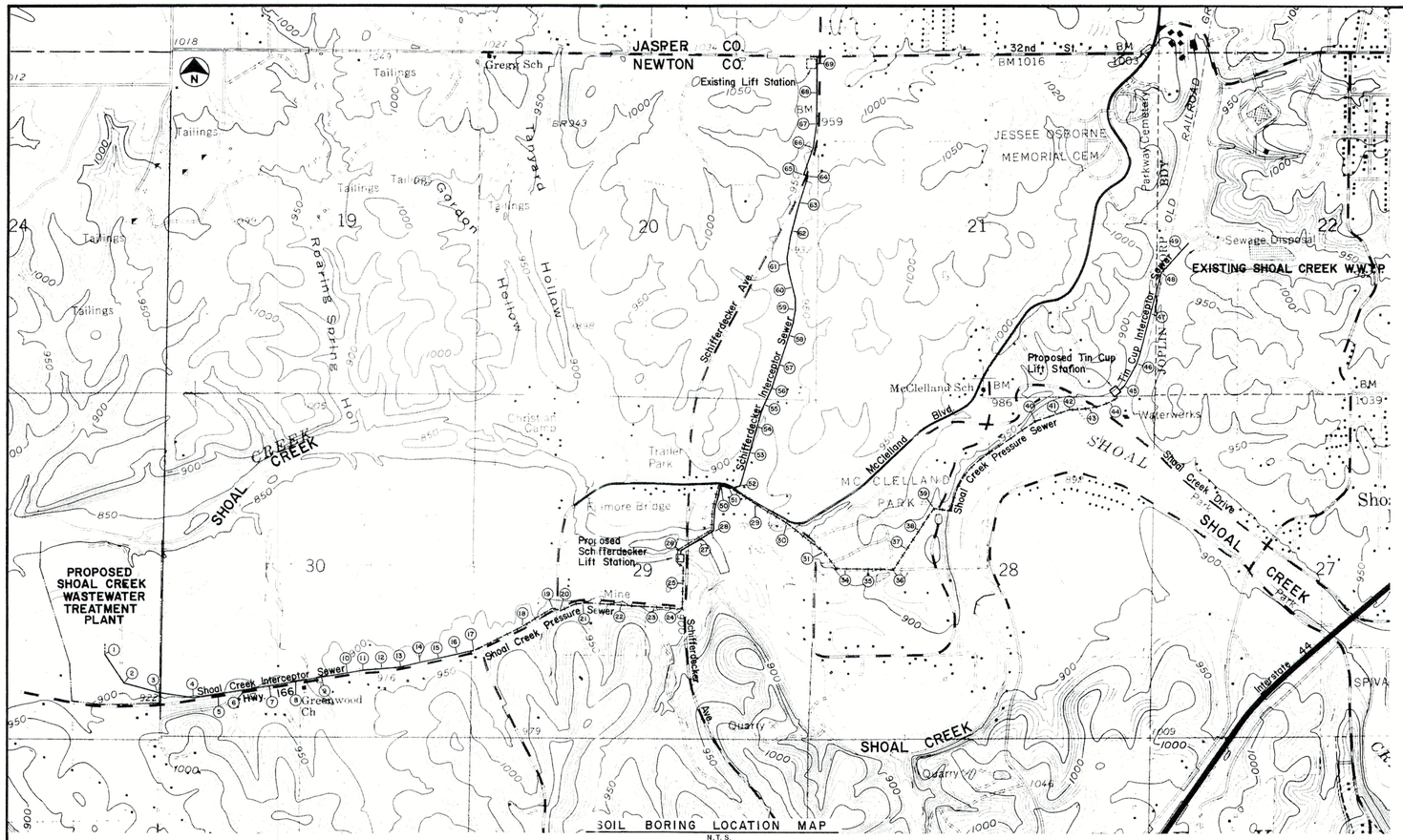
project	contract
105643	

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Terracon
CONSULTANTS, INC.
Return To:

Allgeier-Martin & Associates
Box 2277
Joplin, Missouri 64801

Date: 4-29-83
Phone Number: 250-0461

Attention: Mr. Glen Davidson
Job No.: 482577

Re: Shoal Creek Interceptor Sewer

Gentlemen:

We are transmitting
- [X] herewith
- [ ] under separate cover 3 copies of the

- [ ] Foundation Engineering Report
- [X] Field Data [ ] Laboratory Data [ ] Computations

Regarding:
- [ ] Compacted Fills
- [ ] Footings
- [ ] Caissons
- [ ] Piles
- [ ] Concrete
- [ ] Asphalt
- [ ] Roofing
- [ ] Aggregate
- [ ] Non-destructive Testing of Steel
- [ ] Non-destructive Testing of Concrete
- [ ] Grain Size Analysis
- [ ] Boring Logs
- [ ] Location Diagram
- [ ] Soil Samples
- [ ] Rock Core Samples
- [ ] Construction Material Samples
- [ ] Moisture-Density
- [ ] Consolidation
- [ ] Triaxial Compression
- [ ] Permeability
- [X] Field Boring Logs
- [ ] Geologic Report of
  - [ ] Seismic Testing
  - [ ] Resistivity Testing
  - [ ] Site Rock Conditions
  - [ ] Aggregate Development
- [ ] General Information
  - [ ] Technical Expertise
  - [ ] Resumes
  - [ ] Other

for the above job.

Remarks:

Yours truly,
TERRACON CONSULTANTS, INC.

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER MD
DRILLER MD
HELPER TT
RIG NO. 750 ATV

SAMPLING
SURFACE ELEV.
BORING STARTED 3-29-83
BORING COMPLETED 3-29-83
STATION
OFF SET 4' South
SS SIZE 1⅜" ID 2" OD
HAMMER: 140# DROP: 30"
ST SIZE ST. SIZE
CASING USED SIZE

Sheet of
WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: BCR ACR
WL: AB Hr. AB
24 Hr. AB

JOB NO. 482577 BORING NO. 1 CLIENT City of Joplin WEATHER

Sample No.	Depth or Elevation From	To	Standard Method	Split Spoon Blows 6"	6"	6"	6"	1 Ft.	Graph Penetration Resistance	R	Qp	Sample Description
	0	.5	PA									Silty topsoil - brown
	.5	2.5	PA									Silty clay, trace fine sand & gravel-red brown
	2.5	3.5	PA									Silty clay & gravel-red brown
	3.5	11.5	PA									Silty clay with gravel layer (drilled hard)
	11.5	13.5	PA									Silty clay, trace fine sand-tan (drilled easy) very wet
	13.5	15.0	PA									Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Bolton Casing Removed
A.C.R.—After Casing Removed
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER MD
DRILLER TT
HELPER TT
RIG NO. 750 ATV

SAMPLING
SURFACE ELEV.
BORING STARTED 3-30-83
BORING COMPLETED 3-30-83
STATION
OFF SET 3° South-2° East
SS SIZE 1⅜" ID 2" OD
HAMMER: 140# DROP: 30"
ST SIZE ST. SIZE
CASING USED SIZE

Sheet of
WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: BCR ACR
WL: None AB Hr. AB
24 Hr. AB

JOB NO. 482577 BORING NO. 8 CLIENT City of Joplin WEATHER

Sample No.	Depth or Elevation From	To	Standard Method	Split Spoon Blows 6"	6"	6"	6"	1 Ft.	Graph Penetration Resistance	R	Qp	Sample Description
	0	.2	PA									Silty topsoil-dark brown
	.2	3.0	PA									Silty clay & gravel fill-tan & brown
	3.0	4.0	PA									Silty clay, some gravel-red brown
	4.0	9.0	PA									Silty clay, trace fine sand;some gravel-red brown
	9.0	11.0	PA									Silty clay, trace fine sand & gravel-red brown
	11.0	15.0	PA									Silty clay, little fine sand, some gravel-red tan
												Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Bolton Casing Removed
A.C.R.—After Casing Removed
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER MD
DRILLER MD
HELPER TT
RIG NO. 750 ATV

SAMPLING
SURFACE ELEV.
BORING STARTED 3-29-83
BORING COMPLETED 3-29-83
STATION
OFF SET 6° South
SS SIZE 1⅜" ID 2" OD
HAMMER: 140# DROP: 30"
ST SIZE ST. SIZE
CASING USED SIZE

Sheet of
WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: BCR ACR
WL: None AB Hr. AB
24 Hr. AB

JOB NO. 482577 BORING NO. 3 CLIENT City of Joplin WEATHER

Sample No.	Depth or Elevation From	To	Standard Method	Split Spoon Blows 6"	6"	6"	6"	1 Ft.	Graph Penetration Resistance	R	Qp	Sample Description
	0	.5	PA									Silty topsoil - dark brown
	.5	2.0	PA									Silty clay, trace fine sand, some gravel-light brown
	2.0	5.5	PA									Silty clay, trace fine sand & gravel-red brown
	5.5	6.5	PA									Silty clay, trace fine sand & gravel-red brown
	6.5	15.0	PA									Silty clay, trace fine sand, some gravel-tan-moist
												Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Bolton Casing Removed
A.C.R.—After Casing Removed
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER MD
DRILLER MD
HELPER TT
RIG NO. 750 ATV

SAMPLING
SURFACE ELEV.
BORING STARTED 3-29-83
BORING COMPLETED 3-29-83
STATION
OFF SET 6' South
SS SIZE 1⅜" ID 2" OD
HAMMER: 140# DROP: 30"
ST SIZE ST. SIZE
CASING USED SIZE

Sheet of
WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: BCR ACR
WL: None AB Hr. AB
24 Hr. AB

JOB NO. 482577 BORING NO. 5 CLIENT City of Joplin WEATHER

Sample No.	Depth or Elevation From	To	Standard Method	Split Spoon Blows 6"	6"	6"	6"	1 Ft.	Graph Penetration Resistance	R	Qp	Sample Description
	0	.5	PA									Silty topsoil-dark brown
	.5	8.5	PA									Silty clay, trace sand & gravel-red brown
	8.5	15.0	PA									Silty clay, some gravel-red brown
												Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Bolton Casing Removed
A.C.R.—After Casing Removed
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER MD
DRILLER MD
HELPER TT
RIG NO. 750 ATV

SAMPLING
SURFACE ELEV.
BORING STARTED 3-29-83
BORING COMPLETED 3-29-83
STATION
OFF SET 10° South
SS SIZE 1⅜" ID 2" OD
HAMMER: 140# DROP: 30"
ST SIZE ST. SIZE
CASING USED SIZE

Sheet of
WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: BCR ACR
WL: None AB Hr. AB
24 Hr. AB

JOB NO. 482577 BORING NO. 6 CLIENT City of Joplin WEATHER

Sample No.	Depth or Elevation From	To	Standard Method	Split Spoon Blows 6"	6"	6"	6"	1 Ft.	Graph Penetration Resistance	R	Qp	Sample Description
	0	.2	PA									Silty topsoil-dark brown
	.2	2.0	PA									Silty clay & gravel-brown & tan
	2.0	12.0	PA									Silty clay, trace fine sand & gravel-red brown
	12.0	15.0	PA									Silty clay, trace fine sand & gravel-red-brown-moist
												Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Bolton Casing Removed
A.C.R.—After Casing Removed
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER MD
DRILLER MD
HELPER TT
RIG NO. 750 ATV

SAMPLING
SURFACE ELEV.
BORING STARTED 3-30-83
BORING COMPLETED 3-30-83
STATION
OFF SET 3° South
SS SIZE 1⅜" ID 2" OD
HAMMER: 140# DROP: 30"
ST SIZE ST. SIZE
CASING USED SIZE

Sheet of
WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: None BCR ACR
WL: None AB Hr. AB
24 Hr. AB

JOB NO. 482577 BORING NO. 9 CLIENT City of Joplin WEATHER

Sample No.	Depth or Elevation From	To	Standard Method	Split Spoon Blows 6"	6"	6"	6"	1 Ft.	Graph Penetration Resistance	R	Qp	Sample Description
	0	.2	PA									Silty topsoil-dark brown
	.2	1.5	PA									Silty clay & large gravel fill-brown
	1.5	5.5	PA									Silty clay, some gravel-dark brown
	5.5	9.0	PA									Silty clay, gravel seams-dark brown
	9.0	12.0	PA									Silty clay, trace very fine sand & gravel-red brown
	12.0	15.0	PA									Silty clay, some fine sand, trace gravel-red brown
												Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Bolton Casing Removed
A.C.R.—After Casing Removed
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER MD
DRILLER MD
HELPER RW
RIG NO. 750 A

SAMPLING
SURFACE ELEV.
BORING STARTED 3-29-83
BORING COMPLETED 3-29-83
STATION
OFF SET
SS SIZE 1⅜" ID 2" OD
HAMMER: 140# DROP: 30"
ST SIZE ST. SIZE
CASING USED SIZE

Sheet of
WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: BCR ACR
WL: None AB Hr. AB
24 Hr. AB

JOB NO. 482577 BORING NO. 2 CLIENT City of Joplin WEATHER

Sample No.	Depth or Elevation From	To	Standard Method	Split Spoon Blows 6"	6"	6"	6"	1 Ft.	Graph Penetration Resistance	R	Qp	Sample Description
	0	.5	PA									Silty topsoil - brown
	.5	3.5	PA									Silty clay, some gravel - red brown
	3.5	11.0	PA									Silty clay, trace fine sand & gravel-red brown
	11.0	13.0	PA									Silty clay, some fine sand, trace gravel red brown to moist
	13.0	15.0	PA									Silty clay, some fine sand, trace gravel
												Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Bolton Casing Removed
A.C.R.—After Casing Removed
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER DP
DRILLER MD
HELPER RW
RIG NO. 750 A

SAMPLING
SURFACE ELEV.
BORING STARTED 4-6-83
BORING COMPLETED 4-6-83
STATION
OFF SET +.4' Elevation
SS SIZE 1⅜" ID 2" OD
HAMMER: 140# DROP: 30"
ST SIZE ST. SIZE
CASING USED SIZE

Sheet of
WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: None BCR ACR
WL: None AB Hr. AB
24 Hr. AB

JOB NO. 482577 BORING NO. 4 CLIENT City of Joplin WEATHER

Sample No.	Depth or Elevation From	To	Standard Method	Split Spoon Blows 6"	6"	6"	6"	1 Ft.	Graph Penetration Resistance	R	Qp	Sample Description
	0	1.5	PA									5" Topsoil-silty & sand & gravel-dark brown
	1.5	10.0	PA									Silty clay & gravel-dark brown & brown
	10.0	18.0	PA									Silty clay, little gravel-red brown
												Bottom of boring 18.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Bolton Casing Removed
A.C.R.—After Casing Removed
A.B.—After Boring

THE SOIL BORING DATA CONTAINED HEREIN IS GENERAL IN NATURE ONLY AND ANY INTERPOLATION OF DATA BETWEEN SOIL BORING LOCATIONS SHALL BE AT THE CONTRACTOR'S RISK. UPON WRITTEN REQUEST, AND PRIOR TO BIDDING, ACCESS WILL BE GRANTED TO THE CONTRACTOR FOR ADDITIONAL SUBSURFACE INVESTIGATION. ANY COSTS INCURRED DURING SUCH AN INVESTIGATION SHALL BE BORNE SOLELY BY THE CONTRACTOR.

ALLGEIER, MARTIN & ASSOCIATES, INC.
ENGINEERS — ARCHITECTS — PLANNERS — SURVEYORS
JOPLIN, MISSOURI

DWN. BY: BLH
CKD. BY: GRD
APPD. BY: DAW
DATE: 10 MAY, 83

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION
AUG, 1984	GENERAL REVISIONS		

SOIL BORING LOCATION MAP & LOGS
SHOAL CREEK INTERCEPTOR SEWERS — JOPLIN, MISSOURI

DWG. NO. 28

BRUNING 40-21 42956

sheet 1 of 3 sheets

CIVIL REFERENCE DRAWING

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER MG TT BORING STARTED 5-30-83 SS SIZE 1⅜" ID 2" OD
HELPER TT BORING COMPLETED 5-30-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET 8' South

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: ____ None ____ AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 10 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	.5	PA					Silty topsoil-dark brown
	.5	2.0	PA					Silty clay, trace fine sand-light brown
	2.0	7.5	PA					Silty clay, trace fine sand, some fine gravel red brown
	7.5	8.0	PA					Silty clay, trace fine sand & gravel-red brown
	8.0	15.0	PA					Silty clay, trace fine sand & gravel-red brown
								Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER MG TT BORING STARTED 5-30-83 SS SIZE 1⅜" ID 2" OD
HELPER TT BORING COMPLETED 5-30-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET 2° East

WATER LEVEL OBSERVATIONS
WL: 13.5' WS OR WD
WL: ____ BCR ____ ACR
WL: 11.5' AB .5 Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 11 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	.5	PA					Silty topsoil-dark brown
	.5	2.5	PA					Silty clay-brown
	2.5	3.5	PA					Silty clay, trace fine sand, some gravel-red brown
	3.5	7.5	PA					Silty clay, trace fine sand & gravel-red brown
	7.5	8.5	PA					Silty clay, trace fine sand, hard gravel layer
	8.5	10.0	PA					Silty clay, trace fine sand & gravel-red brown
	10.0	13.0	PA					Silty clay, some fine sand, some gravel-moist
	13.0	15.0	PA					Silty clay, trace fine sand & gravel, very wet red brown
								Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER MG TT BORING STARTED 5-30-83 SS SIZE 1⅜" ID 2" OD
HELPER TT BORING COMPLETED 5-30-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: ____ None ____ AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 12 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	.2	PA					Silty topsoil-dark brown
	.2	10.0	PA					Silty clay & gravel, trace fine sand-red brown
	10.0	10.2	PA					Very hard layer (boulder)
	10.2	12.5	PA					Silty clay, some fine sand & gravel-red brown
	12.5	15.0	PA					Silty clay, some fine sand & gravel-red brown
								Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-6-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 4-6-83 HAMMER: 140# DROP: 30"
RIG NO. 750 LTV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: None AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 13 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	2.0	PA					Clayey silt-dark brown
	2.0	11.0	PA					Silty Clay, little gravel-red brown
	11.0	15.0	PA					Sandy silty clay-red brown
								Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER MG TT BORING STARTED 4-6-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 4-6-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: None AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 14 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	.8	PA					Silty sandy topsoil-dark brown
	.8	1.5	PA					Clayey silt-light brown
	1.5	7.5	PA					Silty sandy clay & gravel-light red brown
	7.5	15.0	PA					Silty clay-red brown
								Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-7-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 4-7-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: None AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 15 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	2.5	PA					Sandy clayey silt-light brown
	2.5	16.5	PA					Silty clay & gravel-red brown
								Bottom of boring 16.5'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-7-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 4-7-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: None BCR ____ ACR
WL: None AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 16 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	4.0	PA					Sandy clayey silt & gravel-brown
	4.0	15.0	PA					Silty clay, little gravel-red brown
								Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER MG TT BORING STARTED 5-30-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 5-30-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET 4° East

WATER LEVEL OBSERVATIONS
WL: 3.5' WS OR WD
WL: ____ BCR ____ ACR
WL: None AB .5 Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 20 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	3.5	PA					Silty clay, trace fine sand, large gravel, small hard boulders
	3.5	7.5	PA					Silty clay-very wet-drilled very hard-red brown
	7.5	9.0	PA					Silty clay & large gravel-very wet-red brown
	9.0	15.0	PA					Silty clay & gravelly very hard-small boulders red brown
								Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER MG TT BORING STARTED 5-30-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 5-30-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: None AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 21 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	3.0	PA					Silty gravel fill-dark brown to brown
	3.0	9.0	PA					Silty sandy clay, trace gravel-red brown
	9.0	12.0	PA					Silty clay, some fine sand-brown
	12.0	15.0	PA					Silty clay, some sand, trace gravel-drilled very easy-red
								Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-7-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 4-7-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: None AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 22 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	.5	PA					Silty clay & gravel-red brown
	.5	15.0	PA					Silty clay, trace gravel-red brown
								Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-7-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 4-7-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: None AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 23 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	4.0	PA					Silty clay with gravel-red brown
	4.0	7.0	PA					Silty clay, little gravel-red brown
	7.0	15.0	PA					Sandy clayey silt-light brown
								Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-7-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 4-7-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: None AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 24 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	1.5	PA					Clayey silt-red brown
	1.5	5.0	PA					Silty clay & gravel-red brown
	5.0	11.0	PA					Silty clay & gravel-light red brown
	11.0	15.0	PA					Silty clay some gravel-light red brown
								Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-7-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 4-7-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: None AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 25 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	1.0	PA					Silty gravelly clay-brown
	1.0	12.0	PA					Silty clay & gravel-red brown
	12.0	13.0	PA					Gravel-light brown
								Bottom of boring 13.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-7-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 4-7-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: 9.5' WS OR WD
WL: ____ BCR ____ ACR
WL: ____ AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 26 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	1.0	PA					Clayey silt with gravel-dark brown
	1.0	4.0	PA					Sandy clayey silt with gravel-red brown
	4.0	11.5	PA					Clayey silt, trace sand & gravel-dark brown
								Bottom of boring 11.5'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-7-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 4-7-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: ____ AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 27 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	3.5	PA					Silty sand & gravel-dark brown
	3.5	9.0	PA					Silty clay with sand & Gravel-dark brown
	9.0	10.0	PA					Silty sand & Gravel, some cobbles-dark brown
	10.0	12.5	PA					Clayey sand & gravel
								Bottom of boring 12.5'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-6-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 4-6-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: 12" WS OR WD
WL: ____ BCR ____ ACR
WL: ____ AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 28 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	2.5	PA					Clayey sandy silt-dark brown
	2.5	6.0	PA					Clayey sandy silt with gravel-dark brown
	6.0	7.0	PA					Silty sand & gravel-brown
	7.0	12.0	PA					Sandy silty clay with gravel-dark brown
	12.0	14.5	PA					Sand & gravel-rock at 14.5'
								Bottom of boring 14.5'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

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JOPLIN LABORATORY 4401 RANGELINE (417) 782-7288

A/E

BORING LOG

BORING No. #29
CLIENT City of Joplin SHEET 1 OF 1
PROJECT Sewer line, Shoal Creek WWTP DATE DRILLED 6/7/84
DRILL RIG CME DRILLER MGA/JAD GROUND WATER; ENC None AT ____ HRS.

ELEVATION	DEPTH IN FEET	SOIL GRAPH	MATERIAL DESCRIPTION	DRILLING METHOD	SAMPLE TYPE	SAMPLE DEPTH
	0'0"					
	3'0"		Brown silty clay with some gravel			
	6'6"		Reddish brown silty clay firm with 20-30% chert.			
	7'6"		Cherty Limestone (Hard)			
			Discontinued drilling at 7'6".			

NOTE:
BORING NUMBERS 32 & 33 ARE DELETED DUE TO REROUTE.

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-6-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 4-6-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: None AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 34 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	2.5	PA					Silty clay & sandy gravel-brown
								Rock at 2.5'
								Bottom of boring 2.5'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-6-83 SS SIZE 1⅜" ID 2" OD
HELPER ____ BORING COMPLETED 4-6-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: None AB ____ Hr. AB
WL: ____ 24 Hr. AB

JOB NO. 482577 BORING NO. 35 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	4.0	PA					Silty sand with cobbles-dark brown
	4.0	15.0	PA					Silty clay & gravel-red brown
								Bottom of boring 15.0'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-6-83 SS SIZE 1⅜" ID 2" OD
HELPER DW BORING COMPLETED 4-6-83 HAMMER: 140# DROP: 30"
RIG NO. 750 ATV STATION ST SIZE ____ ST. SIZE ____ CASING USED ____ SIZE ____
OFF SET ____

WATER LEVEL OBSERVATIONS
WL: None WS OR WD
WL: ____ BCR ____ ACR
WL: None AB ____ Hr. AB
WL: ____ 24 Hr. AB

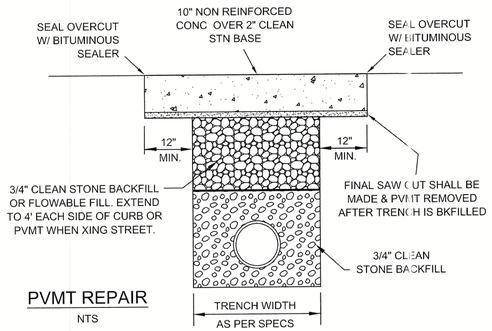
JOB NO. 482577 BORING NO. 36 CLIENT ____ City of Joplin ____ WEATHER ____

Sample No.	Depth or Elevation From	Depth or Elevation To	Sampling Method	Penetration Record Split Spoon Blows 6" 6" 6" (2 Pen)	R	Qp Length Att. Pocket Pen.	Qp Pocket Pen. Tsf	Sample Description
	0	.9	PA					Silt-brown
	.9	2.0	PA					Clayey gravel-brown
	2.0	5.5	PA					Sandy clayey silt-brown
	5.5	9.0	PA					Silty clayey gravelred brown
	9.0	9.5	PA					Broken rock
								Rock at 9.5'
								Bottom of boring 9.5'

ABBREVIATIONS
A.S.—Auger Sample
H.S.—Hollow Stem Auger
S.T.—Shelby Tube
S.S.—Split Spoon
D.B.—Diamond Bit
P.A.—Power Auger
R.B.—Rock Bit
W.S.—Wash Sampling
W.D.—Wash Drilling
B.C.R.—Before Casing Removal
A.C.R.—After Casing Removal
A.B.—After Boring

TERRACON CONSULTANTS, INC. Cedar Falls Cedar Rapids Davenport Des Moines, Iowa Kansas City Wichita, Kansas

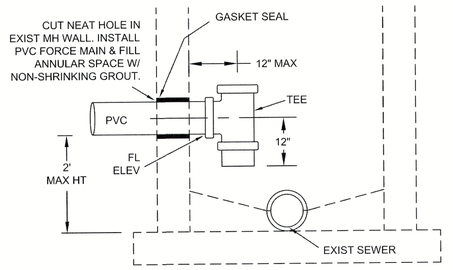
ENGINEER ____ SURFACE ELEV. ____ SAMPLING
DRILLER DP BORING STARTED 4-6-83 SS SIZE 1



PVMT REPAIR

NTS

CITY OF Joplin	CITY OF JOPLIN, MO	CKD BY: JOHNSON	PROJECT
	PUBLIC WORKS DEPT	DATE: 10/2017	CONC
	ENGINEERING DIVISION	ENGINEER: HERTZBERG	PVMT REPAIR
	602 S MAIN ST 64801	FILE: PVMTREPR	



PRESSURE
MH DETAIL

N.T.S.

CITY OF Joplin	CITY OF JOPLIN, MO	CKD BY: JOHNSON	PROJECT
	PUBLIC WORKS DEPT	DATE: 10/2017	PRESSURE
	ENGINEERING DIVISION	ENGINEER: HERTZBERG	MH DETAIL
	602 S MAIN ST 64801	FILE: PRESSUREMH	

CIVIL REFERENCE DRAWING