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CITY OF COLUMBIA, MISSOURI

DEPARTMENT OF PUBLIC WORKS

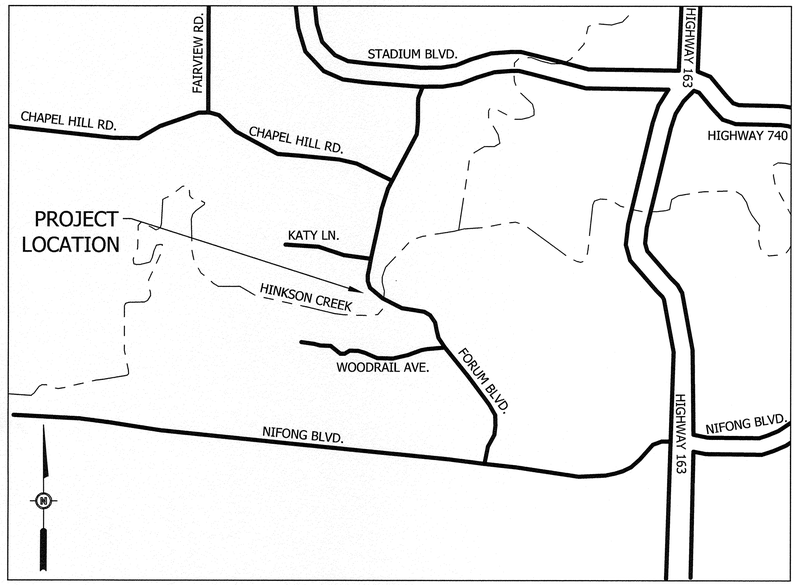
FORUM BOULEVARD TRAIL

MKT TRAIL TO WOODRAIL AVENUE

FINAL PLANS

AUGUST 2015

PROJECT NO. CPP 9999(516)



NO SCALE

LOCATION MAP

UTILITY CONTACTS

WATER
CITY OF COLUMBIA
P.O. BOX 6015
WATER & LIGHT DEPARTMENT
COLUMBIA, MO 65205
573-874-7325

ELECTRIC
CITY OF COLUMBIA
P.O. BOX 6015
WATER & LIGHT DEPARTMENT
COLUMBIA, MO 65205
573-874-7325

SANITARY SEWER
CITY OF COLUMBIA
P.O. BOX 6015
COLUMBIA, MO 65205
573-874-7250

TELEPHONE
CENTURY LINK
625 CHERRY STREET
COLUMBIA, MO 65205
573-886-3500

NATURAL GAS
AMEREN MISSOURI
2001 MCGUIRE BLVD.
COLUMBIA, MO 65201
573-876-3030

LOCATES
MISSOURI ONE CALL, INC.
1022 B NORTHEAST DRIVE
JEFFERSON CITY, MO 65109
1-800-334-7483

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LEGEND

B	BILLBOARD		ROOF DRAIN
	BORE HOLE or DRILL HOLE		CURB INLET
	LANDSCAPE BOULDER		SANITARY MANHOLE
WELL	WELL	CO	CLEANOUT
	FLAG POLE		YARD HYDRANT
	SATELLITE DISH		WATER SPRINKLER
	POST		WATER MANHOLE
	MAILBOX	W	WATER METER
	TWO POLE SIGN		WATER VALVE
	ONE POLE SIGN		FIRE HYDRANT
	PARKING METER		LIGHT
S	STOP SIGN		FLOOD LIGHT
R	GAS REGULATOR		LUMINARY (STREET LIGHT)
G	GAS RISER		MANHOLE COVER
GT	GAS TEST STATION	M	MISCELLANEOUS TOPO ITEM
G	GAS METER	FF	FINISH FLOOR
G	GAS VALVE	ME	MIN. OPENING ELEV.
	UTILITY POLE		STUMP
	GUY POLE		SHRUB
	GUY ANCHOR		DECIDUOUS TREE
T	TELEPHONE PEDESTAL		EVERGREEN SHRUB
	TELEPHONE MANHOLE		EVERGREEN TREE
C	CABLE TV PEDESTAL		
	ELECTRIC MANHOLE	SURVEY MONUMENTATION	
E	ELECTRIC METER	BM	BENCHMARK
E	TRANSFORMER/ELECTRIC PAD	TBM	TEMPORARY BENCHMARK
	AIR CONDITIONER		R/W MARKER
H	HAND HOLE		FOUND SURVEY MONUMENT
	TRAFFIC SIGNAL		SET SURVEY MONUMENT
	TRAFFIC SIGNAL BOX		SET SURVEY MONUMENT IN CONCRETE
	SIGNAL MANHOLE		CALCULATED SURVEY POINT
	STORM MANHOLE		CHISELED CROSS FOUND
	AREA INLET		CHISELED CROSS SET

BARTLETT & WEST
1719 SOUTHRIDGE DR., SUITE 100 JEFFERSON CITY MO 65109.400
PHONE 573.634.3181 FAX 573.634.7904
MISSOURI CERTIFICATE OF AUTHORITY NO. 001167 - ENGINEERING
WWW.BARTWEST.COM

City of Columbia, Missouri
Department of Public Works

No.	Date	By	Revision

PROJECT: 18082.000 Des. AKJ
Scale: None Dwn. AKJ
Date: 8/17/15 Chk. TCK
Sheet 1 of 58

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2010000590
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

FORUM BLVD.

Approved By
Director of Public Works
August 26, 2015
Date

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GENERAL NOTES:

1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH CITY OF COLUMBIA DETAILS AND SPECIFICATIONS UNLESS OTHERWISE NOTED. BRIDGE CONSTRUCTION SHALL FOLLOW MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
2. THE INFORMATION SHOWN IN THESE PLANS CONCERNING TYPE AND LOCATIONS OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE, PROTECT, AND RESTORE ALL EXISTING UTILITIES ENCOUNTERED ON THIS PROJECT. NOTIFY MISSOURI ONE-CALL (1-800-DIG-RITE) FOR THE LOCATION OF THE UTILITIES AT LEAST 5 DAYS PRIOR TO CONSTRUCTION. CONTRACTOR IS TO BE AWARE THAT SOME UTILITIES DO NOT PARTICIPATE IN THE MISSOURI "ONE-CALL" SYSTEM. THESE UTILITIES WILL NEED TO BE CONTACTED INDIVIDUALLY.
3. ALL EXCAVATION TO BE IN ACCORDANCE WITH SECTIONS 319.010-319.050, REVISED STATUTES OF THE STATE OF MISSOURI. SUCH COMPLIANCE SHALL NOT, HOWEVER, EXCUSE ANY PERSON MAKING ANY EXCAVATION FROM DOING SO IN A CAREFUL AND PRUDENT MANNER, NOR SHALL IT EXCUSE SUCH PERSON FROM LIABILITY FOR ANY DAMAGE OR INJURY TO UNDERGROUND UTILITIES RESULTING FROM THE EXCAVATION.
4. ALL CONSTRUCTION MUST BE ADA COMPLIANT. NON ADA COMPLIANT CONSTRUCTION MUST BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.
5. LANDINGS SHALL HAVE A MAXIMUM OF 2% CROSS SLOPE IN BOTH DIRECTIONS AND SHALL BE INSTALLED AT TOP OF RAMPS UNLESS OTHERWISE NOTED.
6. ALL PIPE SHALL BE CLASS III RCP UNLESS OTHERWISE INDICATED.
7. BACKFILL OF REINFORCED CONCRETE PIPE SHALL BE 1 INCH CLEAR ROCK OR SOIL COMPACTED TO 90 PERCENT OF STANDARD PROCTOR DENSITY.
8. REMOVAL OF TREES AND BUSHES SHALL BE VERIFIED BY FIELD INSPECTORS. EXERCISE CAUTION WHEN WORKING NEAR THE CONSTRUCTION LIMITS TO MINIMIZE DISTURBANCE TO ADJACENT TREES AND SHRUBS THAT ARE NOT BEING REMOVED BY CONSTRUCTION ACTIVITIES.
9. SHEET 6: ALL FILL PLACEMENT AROUND BRIDGE END BENT 1 (STA. 20+00.00 TO STA. 21+56.85) SHALL BE PLACED AHEAD OF CONSTRUCTION IN THIS AREA. THIS FILL SHALL BE LEFT FOR 4 MONTHS MINIMUM AT THE SPECIFIED ELEVATIONS TO ALLOW CONSOLIDATION OF UNDERLYING SOILS BEFORE ANY TRAIL CONSTRUCTION TAKES PLACE.
10. SHEET 7: THE EXISTING ENTRANCE AREA FROM FORUM BLVD IS NEEDED TO PROVIDE ACCESS FOR CONSTRUCTION OF SANITARY SEWERS (BY OTHERS). COORDINATE WITH THE WORK ON SANITARY SEWERS TO ALLOW CONSTRUCTION TRAFFIC IN. THE AREA FROM APPROXIMATELY STA. 29+00 TO APPROXIMATELY STA 30+00 TO BE FINISHED CLOSE TO THE END OF THIS PROJECT TO AID IN ACCESS FOR SEWER WORK.
11. ALL TREE CLEARING SHALL OCCUR BETWEEN NOVEMBER 1 AND MARCH 31. NO TREE CLEARING WILL BE ALLOWED OUTSIDE OF THIS PERIOD.

Item No.	Description	Quantity	Unit
	Base Bid		
1	Clearing and Grubbing	2.2	AC
2	Removal of Improvements	1	LS
3	Mobilization	1	LS
4	Contractor Furnished Surveying and Staking	1	LS
5	Unclassified Excavation	631	CY
6	Embankment in Place	6,410	CY
7	Type 5 Aggregate for Base (4 in. Thick)	2,056	SY
8	Gravel (A) or Crushed Stone (B) or Chat (C)	80	SY
9	11" Asphalt Pavement	389.0	SY
10	6" Reinforced PCC Trail	2,013.6	SY
11	Remove and Replace Barricade and Sign on Forum Nature Area	1	LS
12	Steel Split Rail Fence	390	LF
13	6' Wooden Privacy Fence	75	LF
14	Concrete Curb Ramp	64.7	SY
15	Truncated Domes	199	SF
16	Concrete Gutter Type A	251	LF
17	Paved Ditch	91.8	SY
18	Furnishing Type 2 Rock Blanket	1,213	CY
19	Placing Type 2 Rock Blanket	1,213	CY
20	Construction Signs	146	SF
21	Channelizer	125	EA
22	Pavement Marking Removal	1	LS
23	Type 2 Preformed White Midblock (Groved), 30 in.	4	EA
24	4 in. White Acrylic Waterborne Pavement Marking Paint	3,493	LF
25	4 in Solid Double Yellow Acrylic Waterborne Pavement Marking Paint	362	LF
26	4 in Two-Way Left Turn Lane Yellow Acrylic Waterborne Pavement Marking Paint	2,857	LF
27	4 in 9'/3' Broken Yellow Acrylic Waterborne Pavement Marking Paint	1,565	LF
28	4 in Solid Yellow Acrylic Waterborne Pavement Marking Paint	546	LF
29	12 in Solid Yellow Acrylic Waterborne Pavement Marking Paint	52	LF
30	Left Turn Arrow Acrylic Waterborne Pavement Marking Paint	9	EA
31	Permanent Signage	64	SF
32	U-Channel Post	112	LF
33	(54 in.) Pedestrian Fence (Structures)	663	LF
34	Drilled Shafts (3 ft. 6 in. Dia.)	66.5	LF
35	Drilled Shafts (4 ft. 0 in. Dia.)	23.0	LF
36	Rock Sockets (3 ft. 0 in. Dia.)	37.0	LF
37	Rock Sockets (3 ft. 6 in. Dia.)	16.0	LF
38	Supplementary Television Camera Inspection	3	EA
39	Foundation Inspection Holes	83.0	LF
40	Sonic Logging Testing	3	EA
41	Structural Steel Piles (10 in.)	180	LF
42	Pre-Bore for Piling	45	LF
43	Pile Point Reinforcement	6	EA
44	Class B Concrete (Substructure)	41.1	CY
45	Slab on Steel	417	SY
46	Reinforcing Steel (Bridges)	19,810	LB
47	Temporary Coating – Concrete Bents and Piers (Weathering Steel)	1	LS
48	Fabricated Structural Low Alloy Steel (I-Beam) A709, Grade 50	69,230	LB
49	Vertical Drain at End Bents	2	EA
50	Laminated Neoprene Bearing Pad	4	EA
51	Laminated Neoprene Bearing Pad Assembly	6	EA
52	Mechanically Stabilized Earth Wall Systems	3,029	SF
53	15 in. Class III Reinforced Concrete Pipe Culvert	50	LF
54	30 in. Class III Reinforced Concrete Pipe Culvert	91	LF
55	36 in. Class III Reinforced Concrete Pipe Culvert	35	LF
56	42 in. Class III Reinforced Concrete Pipe Culvert	442	LF
57	Precast Concrete Manhole - 60 in.	1	EA
58	Add Headwall and Pour Invert in Existing Stop Log Structure	1	EA
59	15 in. Precast Concrete Flared End Section	2	EA
60	30 in. Precast Concrete Flared End Section	2	EA
61	36 in. Precast Concrete Flared End Section	2	EA
62	42 in. Precast Concrete Flared End Section	8	EA
63	Seeding	1.3	AC
64	Silt Fence	516	LF
65	Straw Bale Check Dams	4	EA
66	Inlet Check	1	EA
67	Tree Protection	135	LF
68	Crashworthy End Section	1	EA

Item No.	Description	Quantity	Unit
	Add Alternate A - North Shoulder		
69	Coldmilling Bituminous Pavement for Removal of Surfacing	2,045	SY
70	2" Asphalt Pavement	2,045	SY
71	Construction Signs	96	SF
72	Channelizer	42	EA
73	4 in 9'/3' Broken Yellow Acrylic Waterborne Pavement Marking Paint	1,804	LF
74	Bicycle Lane Acrylic Waterborne Pavement Marking Paint	14	EA

Item No.	Description	Quantity	Unit
	Future Project - HOA Connection		
75	Clearing and Grubbing	0.3	AC
76	Unclassified Excavation	637	CY
77	Embankment in Place	322	CY
78	Type 5 Aggregate for Base (4 in. Thick)	500	SY
79	6" Reinforced PCC Trail	500	SY
80	Steel Split Rail Fence	39	LF
81	Truncated Domes	30	SF
82	Concrete Gutter Type A	268	LF
83	Furnishing Type 2 Rock Blanket	32	CY
84	Placing Type 2 Rock Blanket	32	CY
85	Mechanically Stabilized Earth Wall Systems	2,941	SF
86	42 in. Class III Reinforced Concrete Pipe Culvert	35	LF
87	42 in. Precast Concrete Flared End Section	2	EA

Item No.	Description	Quantity	Unit
	Future Project - South Shoulder		
88	Coldmilling Bituminous Pavement for Removal of Surfacing	1,761	SY
89	2" Asphalt Pavement	1,761	SY
90	Construction Signs	96	SF
91	Channelizer	48	EA

Item No.	Description	Quantity	Unit
	Future Project - MKT Connection		
92	Clearing and Grubbing	0.2	AC
93	Unclassified Excavation	68	CY
94	Embankment in Place	251	CY
95	Type 5 Aggregate for Base (4 in. Thick)	387	SY
96	6" Reinforced PCC Trail	387	SY
97	Furnishing Type 2 Rock Blanket	5	CY
98	Placing Type 2 Rock Blanket	5	CY
99	15 in. Class III Reinforced Concrete Pipe Culvert	28	LF
100	15 in. Precast Concrete Flared End Section	2	EA

NOTE: EMBANKMENT IN PLACE INCLUDES ALL FILL QUANTITY FOR THE PROJECT. THIS MAY CONSIST OF EXCAVATION ON SITE OR FROM A BORROW SITE.

#	DATE	DESCRIPTION	BY

BARTLETT & WEST
1719 SOUTHRIDGE DR., SUITE 100 - JEFFERSON CITY MO 65109-400
PHONE 573.634.3181 - FAX 573.634.7904
MISSOURI CERTIFICAT EOF AUTHORITY NO. 000167 - ENGINEERING
WWW.BARTWEST.COM

GENERAL NOTES AND QUANTITIES

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C. KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	9/18/15
DESIGNED BY:	AKJ
DRAWN BY:	JMS
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	SEPT. 2015
DRAWING NO:	
SHEET NO:	2 of 58

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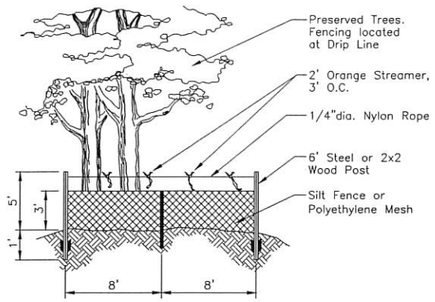
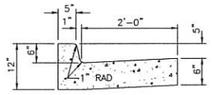
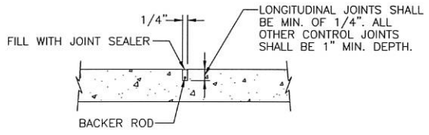


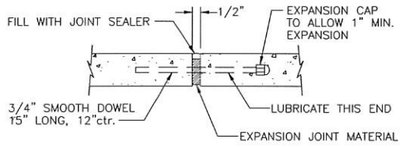
EXISTING TREE PROTECTION DETAIL



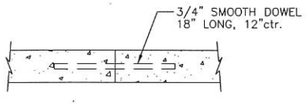
TYPICAL CURB AND GUTTER SECTION



CONTROL JOINT



EXPANSION JOINT

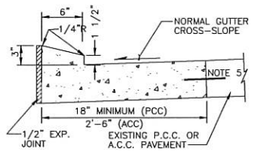


TRANSVERSE CONSTRUCTION JOINT

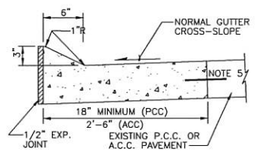
NOTES:

1. ALL JOINTS SHALL BE CLEANED BY APPROVED METHOD PRIOR TO SEALANT PLACEMENT.
2. SIDEWALKS SHALL BE CLEANED OF DEBRIS LEFT FROM SAWING OPERATIONS, THE SAME DAY AS SAWING OPERATIONS.

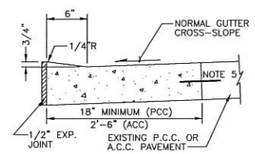
SIDEWALK JOINT DETAILS



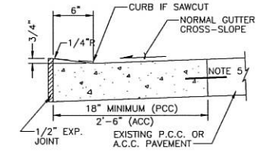
RESIDENTIAL DRIVEWAY CURB
MAXIMUM RISE (PREFERED)



RESIDENTIAL DRIVEWAY CURB
MAXIMUM RISE (ALTERNATE)



RESIDENTIAL DRIVEWAY CURB
MINIMUM RISE



COMMERCIAL DRIVEWAY CURB

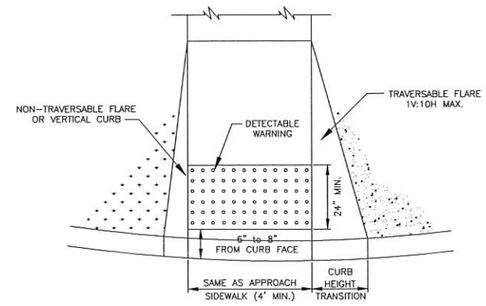
PCC PAVEMENT NOTES:

1. CONCRETE SHALL BE CLASS A.
2. PAVEMENT THICKNESS SHALL MATCH EXISTING. BASE SHALL MATCH EXISTING
3. EXPANSION JOINTS AND CONTRACTION JOINTS SHALL BE PLACED AT LOCATIONS SIMILAR TO THE PAVEMENT WHICH WAS REMOVED.
4. CURB EDGE SHALL BE TOOLED WITH 1/4" RADIUS
5. WHERE EXISTING PAVEMENT IS P.C.C., LOW CURB REPLACEMENT SHALL BE DOWELLED INTO EXISTING. 12" LONG #4 BARS AT 24" CTR.

GENERAL NOTES:

1. ELEVATION OF DRIVEWAY AT R.O.W. LINE REQUIRED TO BE A MINIMUM OF 6" ABOVE GUTTER ELEVATION. VERIFY R.O.W. WIDTH AND ALLOWABLE DRIVEWAY SLOPES PRIOR TO CONSTRUCTING MINIMUM RISE DRIVEWAY CURB.
2. ALTERNATE CURB PROFILES WHICH FALL WITHIN THE MINIMUM RISE AND MAXIMUM RISE CURBS SHOWN WILL BE APPROVED. SLOPE ACROSS RESIDENTIAL DRIVEWAY CURB TOP MUST BE AT LEAST 1/2" IN 6" TOWARD THE STREET.
3. FOR RESIDENTIAL DRIVEWAYS, HORIZONTAL SAWING OF CURB IS ALLOWED AS AN ALTERNATIVE TO REMOVING AND REPLACING STANDARD CURB. HORIZONTAL SAWING MACHINE AND METHOD REQUIRES PRIOR APPROVAL. HORIZONTAL SAWING NOT ALLOWED ON CITY BID PROJECTS.

CURB DETAILS



CONCRETE RAMP

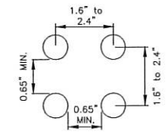
NOTES:

DETECTABLE WARNING STRIP SHALL BE COLORED "BRICK RED" AND BE EMBEDDED INTO THE CONCRETE. THE DETECTABLE WARNING STRIP SHALL BE PREFORMED AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. PRODUCTS THAT ARE BONDED TO THE SURFACE OF THE CONCRETE SHALL NOT BE ALLOWED IN NEW INSTALLATIONS. STAMPED CONCRETE DETECTABLE WARNINGS WILL NOT BE ALLOWED.

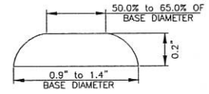
TRUNCATED DOMES SHALL SPAN THE FULL WIDTH (WITHIN 2") OF THE RAMP OR LANDING.

FINISHED SIDEWALK SHALL BE SLIP RESISTANT AND SHALL NOT POND WATER.

DETECTABLE WARNING DOMES SHALL BE ALIGNED PARALLEL TO THE SLOPE WHEN INSTALLED ON A RAMP. WHEN INSTALLED ON A LANDING OR BLEND TRANSITION, THEY SHALL BE ALIGNED PERPENDICULAR OR RADIAL TO THE BREAK BETWEEN THE RAMP, LANDING OR BLENDED TRANSITION AND THE STREET.



TRUNCATED DOME SPACING



TRUNCATED DOME CROSS SECTION

DETECTABLE WARNING

STANDARD DETAILS

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

BARTLETT & WEST
1719 SOUTHRIDGE DR., SUITE 100 · JEFFERSON CITY, MO 65109-400
PHONE 573.893.4336 · FAX 573.893.7504
MISSOURI CERTIFICAT EOF AUTHORITY NO. 000167 · ENGINEERING
WWW.BARTLETT.COM

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	JMS
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	3 of 58

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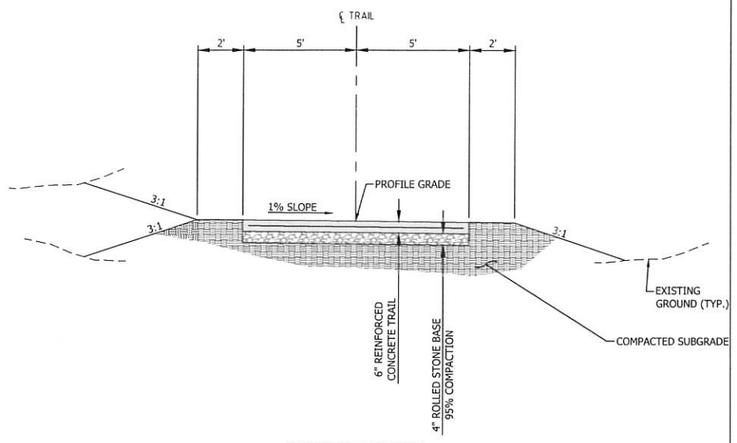
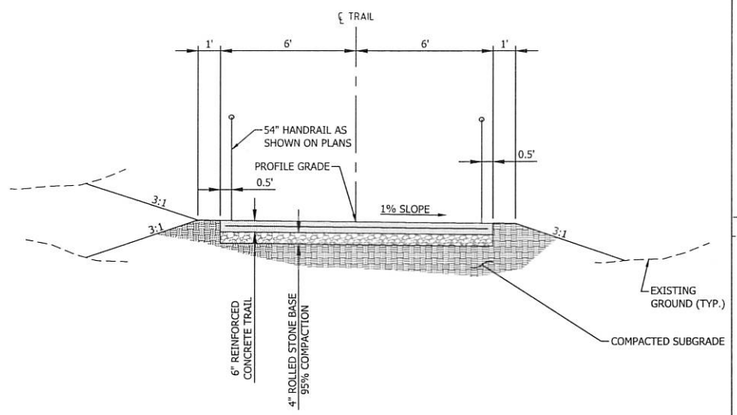
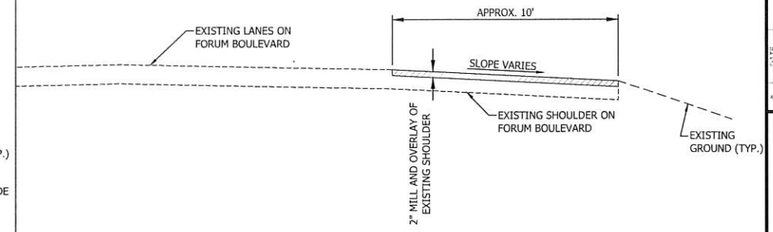


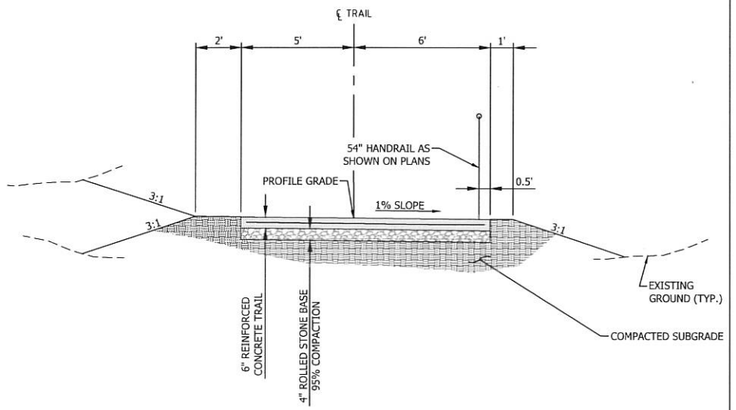
TYPICAL TRAIL SECTION



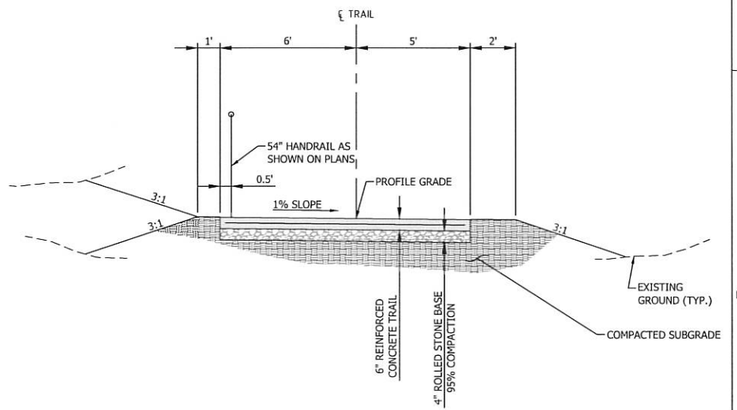
SECTION WITH HANDRAIL ON BOTH SIDES



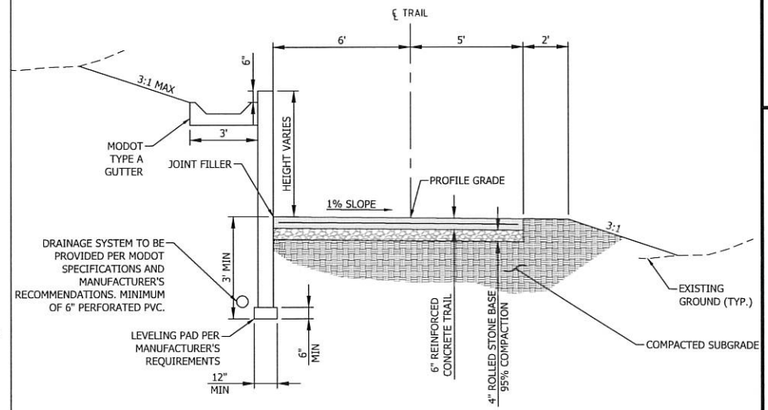
MILL AND OVERLAY SOUTH OF WILSON'S ENTRANCE



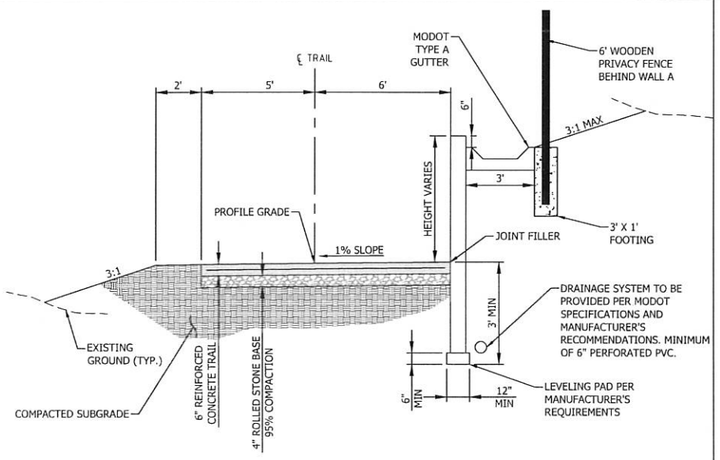
SECTION WITH HANDRAIL ON RIGHT



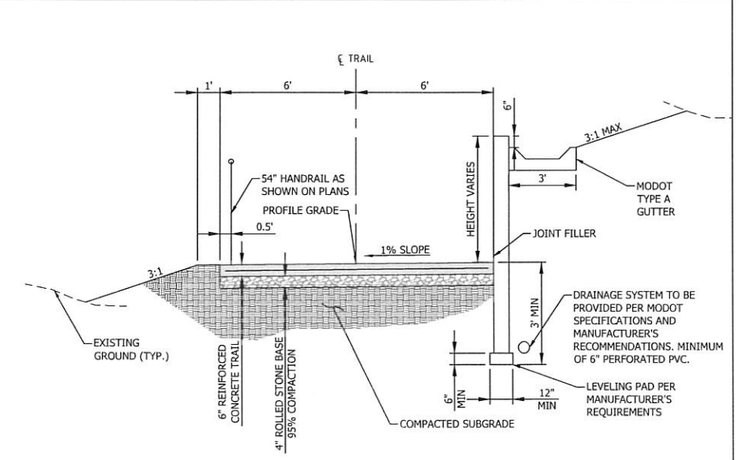
SECTION WITH HANDRAIL ON LEFT



SECTION WITH WALL ON LEFT



SECTION WITH WALL ON RIGHT



SECTION WITH WALL ON RIGHT AND HANDRAIL ON LEFT

NOTE:

CROSS SLOPE OF TRAIL SHALL BE MAXIMUM SLOPE OF 2.0% IN ALL LOCATIONS. ANY CONSTRUCTION THAT DOES NOT MEET ADA REQUIREMENTS WILL BE REMOVED AND REPLACED AT CONTRACTOR'S EXPENSE.

SEE CROSS SECTIONS FOR SLOPE AS THEY MAY VARY IN MAGNITUDE OR DIRECTION.

REINFORCING STEEL SHALL BE #4 BARS AT 24" CENTERS IN BOTH DIRECTIONS. STEEL SHALL BE CENTERED IN TRAIL.

NO LONGITUDINAL JOINTS WILL BE ALLOWED IN CONSTRUCTION OF TRAILS.

TRANSVERSE JOINTS SHALL BE 3/16" SAWCUT. SPACING SHALL BE EQUAL TO THE WIDTH OF THE TRAIL. EXPANSION JOINTS SHALL BE LOCATED AT A MAXIMUM OF 20' SPACING.

EXPANSION JOINT SHALL BE 1/2" PREFORMED CORK OR BITUMINOUS EXPANSION JOINT MATERIAL.

#	DATE	DESCRIPTION	BY

BARTLETT & WEST
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TYPICAL SECTIONS

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	4 of 58

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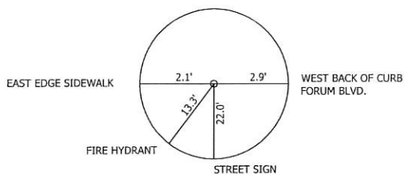
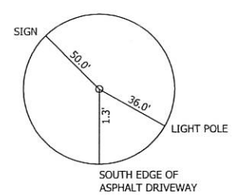
Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Front Sheets.dwg Layout Name: Typical Sections Plotted By: AKJ01272 Plotted on: 8/14/2015 4:02:38 PM

SURVEY CONTROL POINTS

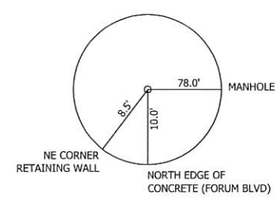
MODIFIED (GROUND) PROJECT COORDINATES - U.S. SURVEY FEET
MODIFIED (GROUND) COORDINATES = STATE PLANE (GRID) COORDINATES X 1.000090308



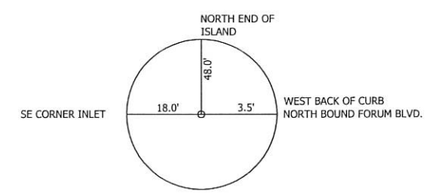
HORIZ. CONTROL PT. 100
SET 5/8 BAR W/CAP
MODIFIED PROJECT COORDINATES
N = 1125550.8010
E = 1678928.1030
ELEV. = 629.61



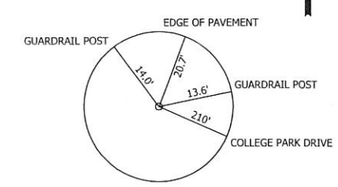
HORIZ. CONTROL PT. 101
SET PK NAIL, MISSOURI MKT ENTRANCE
MODIFIED PROJECT COORDINATES
N = 1124925.6380
E = 1678797.1790
ELEV. = 602.78



HORIZ. CONTROL PT. 102
SET 5/8 BAR W/CAP
MODIFIED PROJECT COORDINATES
N = 1124309.8750
E = 1679473.1760
ELEV. = 602.51



HORIZ. CONTROL PT. 103
CUT "X" AT SW CORNER INLET
MODIFIED PROJECT COORDINATES
N = 1123006.9690
E = 1681053.0190
ELEV. = 712.56



HORIZ. CONTROL PT. 1
DNR BO-25 ALONG STADIUM BLVD.
(NOT SHOWN ON CONTROL POINT MAP)
MODIFIED PROJECT COORDINATES
N = 1130697.970
E = 1677906.058
ELEV. = 634.81

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CONTROL POINTS

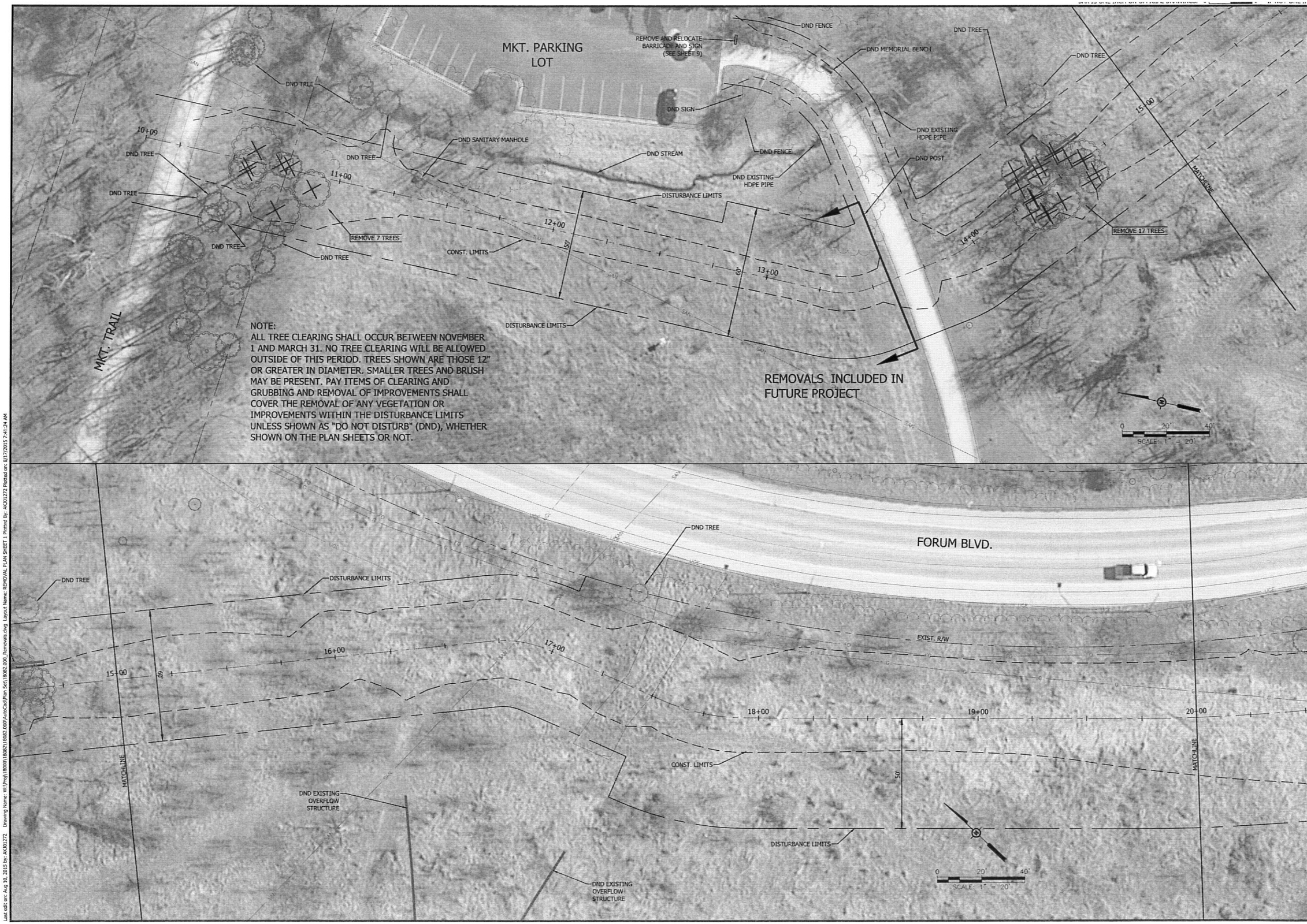
FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD. C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	KHE
DRAWN BY:	KHE
APPROVED BY:	DEK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	5 of 58

Last edit on: Aug 10, 2015 by: AK001272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Xrefs\18082-000 Control Point.dwg Layout Name: Control Points Plotted By: AK001272 Plotted on: 8/14/2015 4:03:39 PM



NOTE:
ALL TREE CLEARING SHALL OCCUR BETWEEN NOVEMBER 1 AND MARCH 31. NO TREE CLEARING WILL BE ALLOWED OUTSIDE OF THIS PERIOD. TREES SHOWN ARE THOSE 12" OR GREATER IN DIAMETER. SMALLER TREES AND BRUSH MAY BE PRESENT. PAY ITEMS OF CLEARING AND GRUBBING AND REMOVAL OF IMPROVEMENTS SHALL COVER THE REMOVAL OF ANY VEGETATION OR IMPROVEMENTS WITHIN THE DISTURBANCE LIMITS UNLESS SHOWN AS "DO NOT DISTURB" (DND), WHETHER SHOWN ON THE PLAN SHEETS OR NOT.

#	DATE	DESCRIPTION	BY

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REMOVAL PLAN SHEETS
FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	JMS
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	6 of 58

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Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: W:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Removals.dwg Layout Name: REMOVAL PLAN SHEET 1 Plotted By: AKJ01272 Plotted on: 8/17/2015 7:41:24 AM

Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Removals.dwg Layout Name: REMOVAL PLAN SHEET 2 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:05:25 PM

REMOVAL PLAN SHEETS
FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
PROFESSIONAL ENGINEER
TODD C. KLINKER
PE-NUMBER 2006006960
THIS SHEET WAS DIGITALLY SIGNED AND SEALED ELECTRONICALLY

SCALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	JMS
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	7 of 58

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Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Removals.dwg Layout Name: REMOVAL PLAN SHEET 3 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:05:34 PM

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	JMS
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	8 of 58

STATE OF MISSOURI
TODD C. KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

REMOVAL PLAN SHEETS
WILSON'S CONNECTION

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

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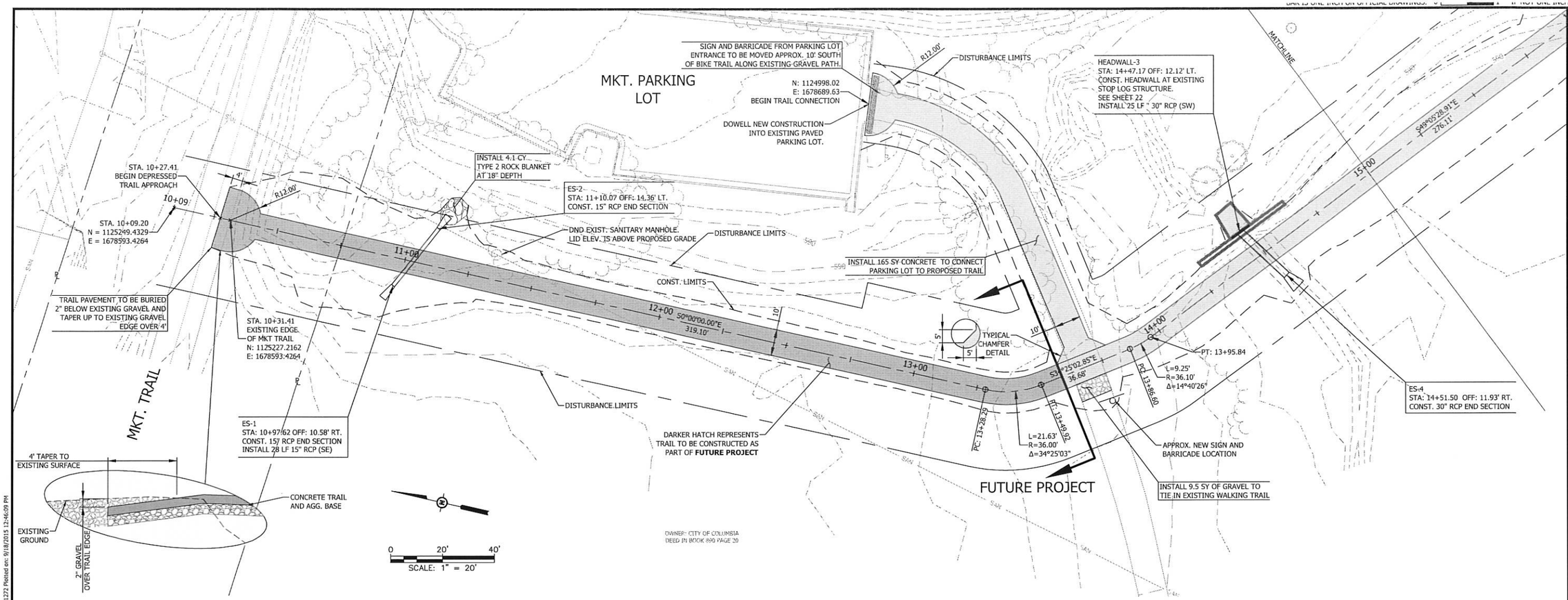

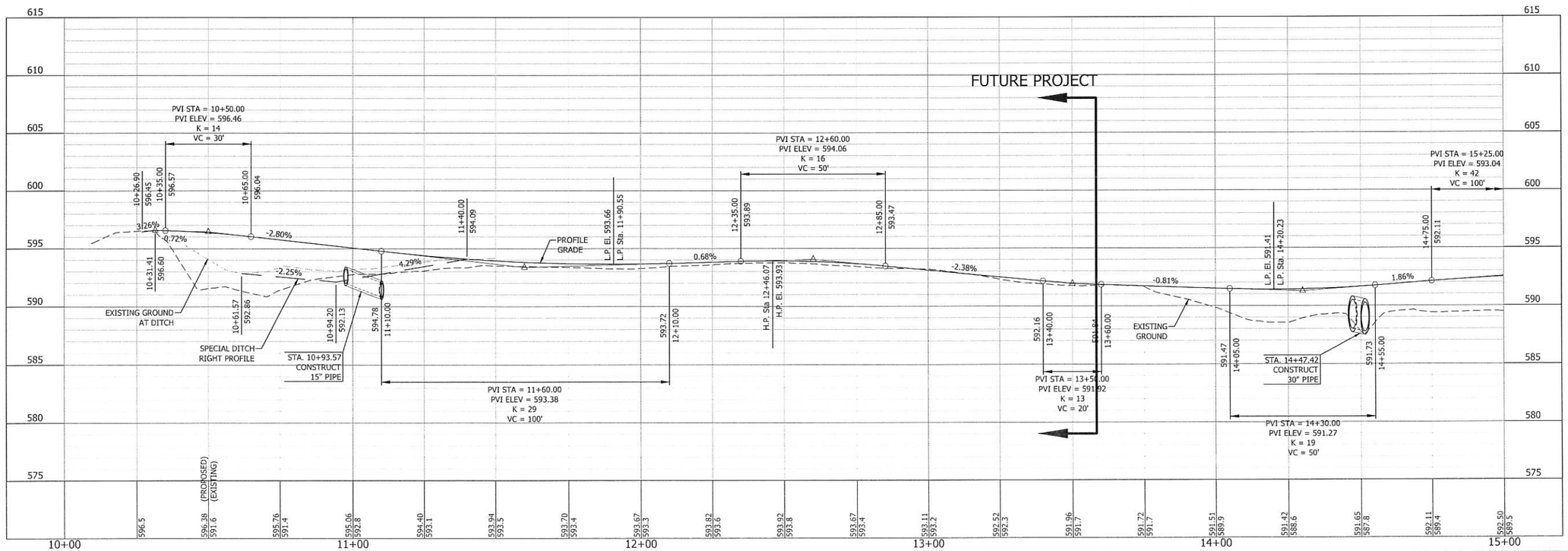

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PLAN/PROFILE SHEETS FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	9/18/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	SEPT. 2015
DRAWING NO:	
SHEET NO:	9 of 58

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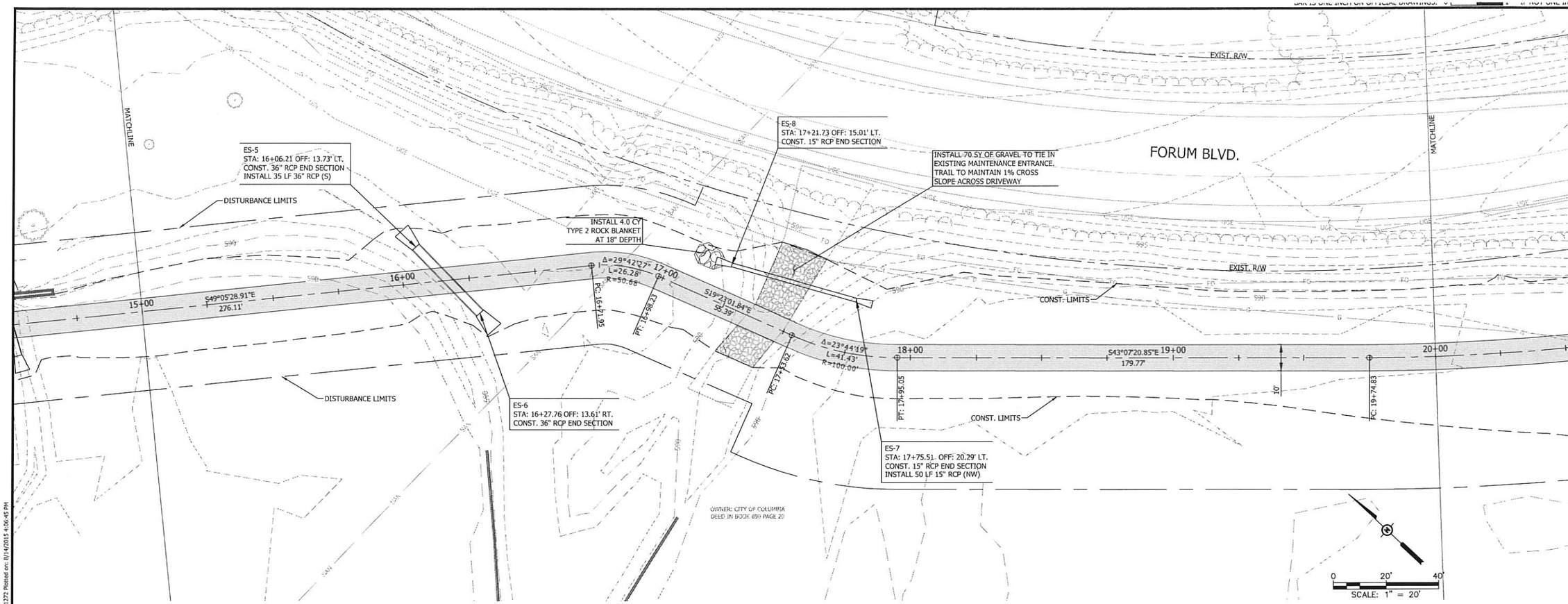
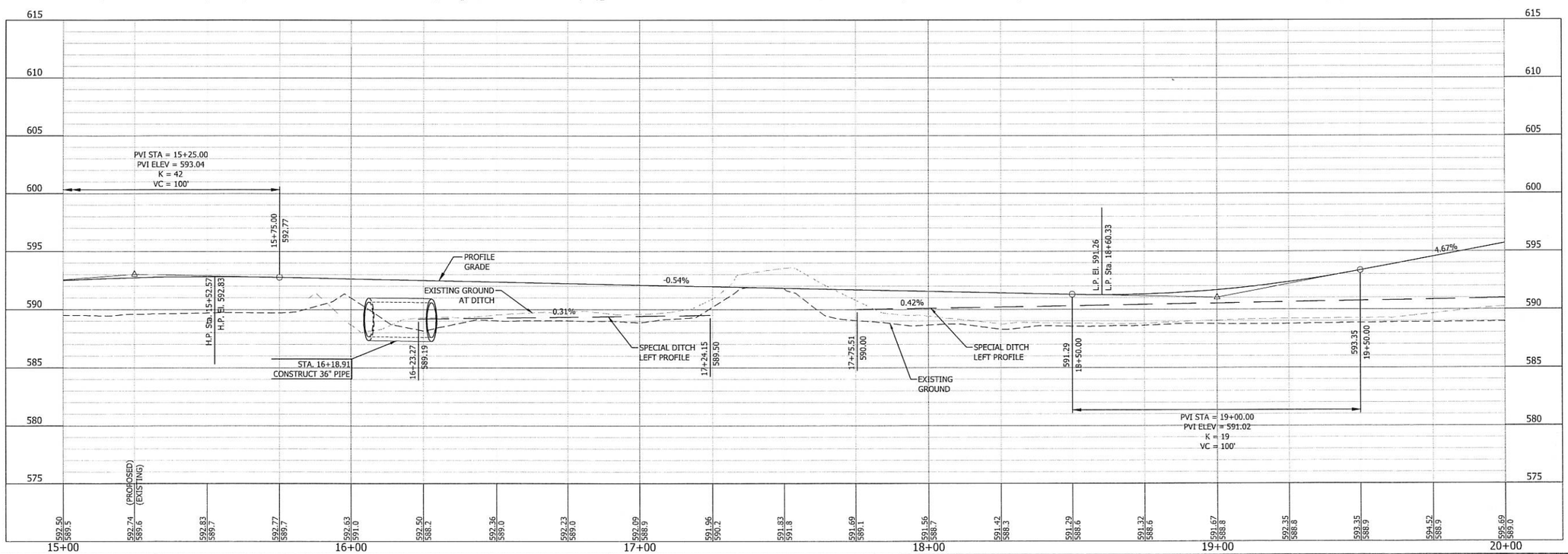
Last edit on: Aug 21, 2015 by: AKJ01272 Drawing Name: W:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Plan Profile_Main Trail.dwg Layout Name: Main Trail 1 Plotted By: AKJ01272 Plotted on: 9/18/2015 12:46:09 PM





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#	DATE	DESCRIPTION	BY

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PLAN/PROFILE SHEETS
FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C. KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	10 of 58

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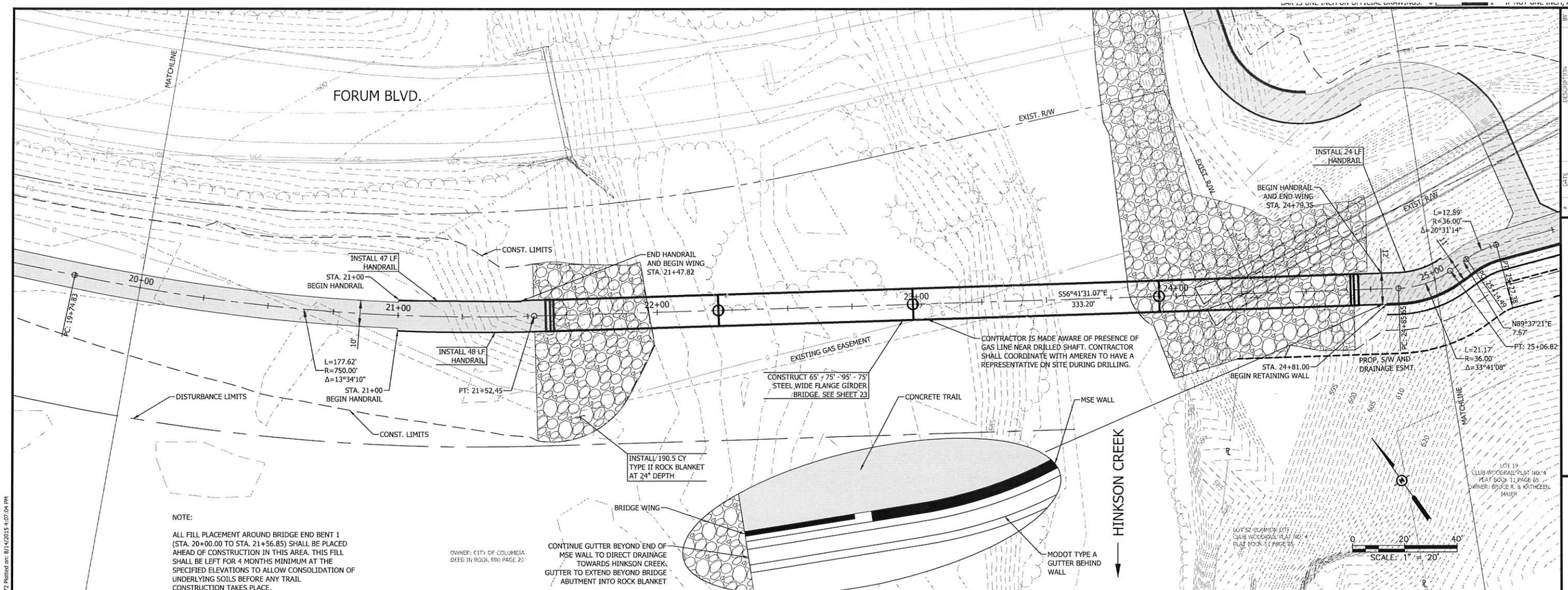
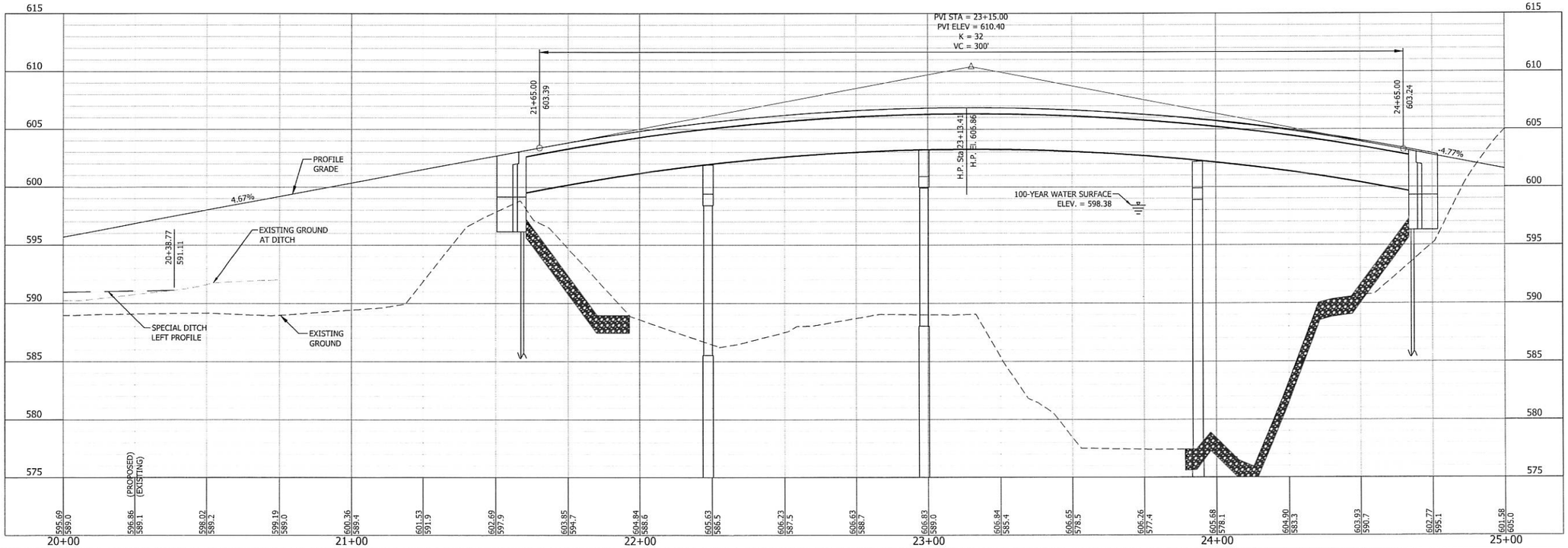
Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Plan Profile_Main Trail.dwg Layout Name: Main Trail 2 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:06:45 PM

BAR IS ONE INCH ON OFFICIAL DRAWINGS. IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.



NOTE:

ALL FILL PLACEMENT AROUND BRIDGE END BENT 1 (STA. 20+00.00 TO STA. 21+56.85) SHALL BE PLACED AHEAD OF CONSTRUCTION IN THIS AREA. THIS FILL SHALL BE LEFT FOR 4 MONTHS MINIMUM AT THE SPECIFIED ELEVATIONS TO ALLOW CONSOLIDATION OF UNDERLYING SOILS BEFORE ANY TRAIL CONSTRUCTION TAKES PLACE.



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MISSOURI CERTIFICATE OF AUTHORITY NO. 000167 - ENGINEERING
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BY	DESCRIPTION	DATE

PLAN/PROFILE SHEETS FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C. KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	11 of 58

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Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Plan Profile_Main Trail.dwg Layout Name: Main Trail 3 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:07:04 PM

BAR IS ONE INCH ON OFFICIAL DRAWINGS. IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

FUTURE PROJECT

INSTALL 20.3 CY TYPE 2 ROCK BLANKET AT 18" DEPTH FROM GUTTER TO END SECTION

FORUM BLVD.

EXIST. R/W

STA 25+06.82
END HANDRAIL

L=12.89'
R=36.00'
Δ=20°31'14"

25+00

PC: 24+85.93

PC: 25+14.99

PT: 25+27.88

PROP. S/W AND DRAINAGE ESMT.

INSTALL 75 LF 6' WOODEN PRIVACY FENCE BEHIND WALL

L=21.17'
R=36.00'
Δ=33°41'08"

N89°37'21"E
7.67'

PT: 25+06.82

TEMP. CONST. ESMT.

CONSTRUCT RETAINING WALL A SEE SHEET NO. 18

CONST. LIMITS

MATCHLINE

26+00

S85°51'25"E
89.78'

PC: 24+17.19

PT: 24+44.24

L=27.08'
R=100.00'
Δ=15°30'47"

S85°22'12"E
75.95'

27+00

PC: 27+20.19

L=22.63'
R=100.00'
Δ=12°58'05"

PT: 27+42.82

S72°24'07"E
102.93'

28+00

ES-10
STA: 28+03.81 OFF: 13.44' LT.
CONST. 42" RCP END SECTION

INSTALL 11.5 CY TYPE 2 ROCK BLANKET AT 18" DEPTH

MILL AND OVERLAY EXISTING 10' ASPHALT SOUTH SHOULDER 2" DEPTH

L=37.04'
R=36.00'
Δ=58°56'36"

30+00

N=1124115.8483
E=1679915.2695

PC: 29+57.29

PT: 30+94.33

2' MIN

EXIST. R/W

DARKER HATCH REPRESENTS TRAIL TO BE CONSTRUCTED AS PART OF **FUTURE PROJECT**

29+00

Δ=69°38'06"
L=121.54'
R=100.00'

PC: 28+45.76

STA: 28+05.00
END RETAINING WALL

CONC. TRAIL

MSE WALL

ES-9
STA: 28+28.52 OFF: 10.01' RT.
CONST. 42" RCP END SECTION
INSTALL 35 LF 42" RCP (NW)

INSTALL 20.0 CY TYPE 2 ROCK BLANKET AT 18" DEPTH

MODOT TYPE A GUTTER BEHIND WALL

CONTINUE GUTTER BEYOND END OF WALL AND TURN TO DIRECT DRAINAGE TOWARDS ES-9

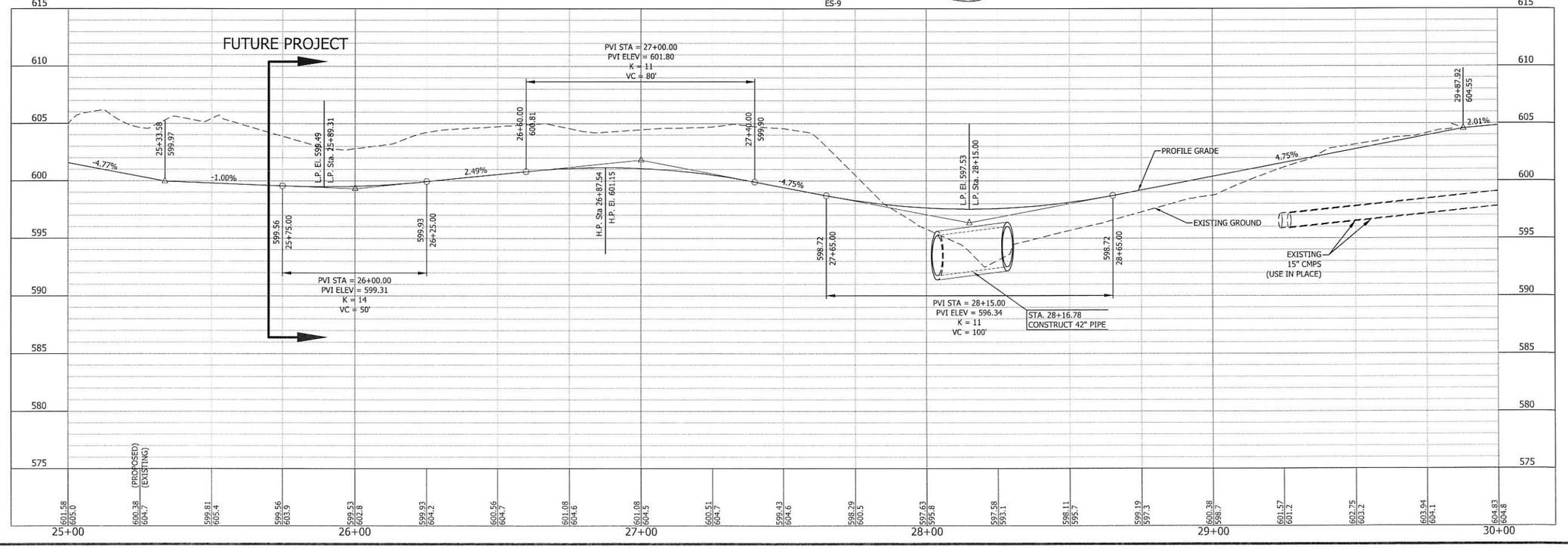
LOT 19
CLUB WOODRAIL PLAT NO. 4
PLAT BOOK 11 PAGE 85
OWNER: BRUCE F. & KATHLEEN MAIER

LOT 20
CLUB WOODRAIL PLAT NO. 4
PLAT BOOK 11 PAGE 85
OWNER: STEVEN E. & JULIA A. FABER

LOT 21
CLUB WOODRAIL PLAT NO. 4
PLAT BOOK 11 PAGE 85
OWNER: NICHOLAS ASHLEY HERMANY

LOT 92 COMMON LOT
CLUB WOODRAIL PLAT NO. 4
PLAT BOOK 11 PAGE 85

0 20' 40'
SCALE: 1" = 20'



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PHONE 573.634.3331 · FAX 573.634.7504
MISSOURI CERTIFICATE OF AUTHORITY NO. 000167 · ENGINEERING
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PLAN/PROFILE SHEETS FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2010000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	9/18/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	SEPT. 2015
DRAWING NO:	
SHEET NO:	12 of 58

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BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

LOT 1
RICH ECKEL PLAT
PLAT BOOK 22 PAGE 68
OWNER: VICTORIA PARK OWNERS ASSOCIATION
DEED IN BOOK 1173 PAGE 203

EXISTING GROUND AT BANK EDGE
24" TYPE 2 ROCK BLANKET
24" MIN. EMBEDMENT
TYPICAL RIPRAP TOE

INSTALL 979.7 CY TYPE 2 ROCK BLANKET AT 24" DEPTH

INSTALL 30" CROSSWALK BARS ACROSS EXISTING PRIVATE DRIVE

SAWCUT EXISTING CURB

N51°41'47.04"E 42.84'

STA. 104+54.47 BEGIN RETAINING WALL AND HANDRAIL

CONSTRUCT RETAINING WALL C SEE SHEET NO. 18

INSTALL 18 LF HANDRAIL

STA. 104+60.00 END RETAINING WALL AND HANDRAIL

TEMP. CONST. ESMT.

PROP. S/W AND DRAINAGE ESMT.

PI: 104+59.93

L=101.79'
R=45.17'
Δ=129°06'57"

L=26.68'
R=37.75'
Δ=40°29'55"

PRC: 103+90.38

PT: 104+17.07

DND EXISTING STORM SEWER PIPES, FLAP GATES, OR END SECTION

DND EXISTING INLET AND STORM SEWER PIPES

REMOVE AND REPLACE EXIST. SIGN

INSTALL 30" CROSSWALK BARS ACROSS EXISTING DRIVEWAY

S33°30'24.03"E 124.15'

DND HYDRANT

DND EXISTING INLET AND STORM SEWER PIPES

CONST. LIMITS

L=27.74'
R=36.00'
Δ=44°08'37"

PARCEL 3
LOT 1
CLUB WOODRAIL PLAT NO. 1
PLAT BOOK 19 PAGE 8
OWNER: 3 FORUMS, L.L.C.
DEED IN BOOK 2378 PAGE 66

TEMPORARY CONSTRUCTION EASEMENT = 0.324 AC.
PROPOSED PERMANENT SIDEWALK AND DRAINAGE EASEMENT = 0.344 AC.
REMAINING LOT = 19.447 AC. (AFTER PERM. ESMT.)

SCALE: 1" = 20'

ES-20
STA: 102+98.42 OFF: 30.12' LT.
CONST. 42" RCP END SECTION

ES-19
STA: 103+15.53 OFF: 27.95' RT.
CONST. 42" RCP END SECTION
INSTALL 60 LF 42" RCP (SW)

ES-17
STA: 102+88.45 OFF: 29.82' RT.
CONST. 42" RCP END SECTION
INSTALL 60 LF 42" RCP (SW)

PRC: 102+88.60

L=33.52'
R=36.00'
Δ=53°21'20"

STA: 102+55.07
END HAND RAIL

PC: 105+84.06

INSTALL 5.4 CY TYPE 2 ROCK BLANKET AT 18" DEPTH

STA. 106+05.00
END RETAINING WALL

CONSTRUCT RETAINING WALL D SEE SHEET NO. 19

PT: 106+11.79

PARCEL 2
LOT 2
CLUB WOODRAIL PLAT NO. 2
PLAT BOOK 21 PAGE 38
OWNER: RANDY & NANCI HUBBARD
DEED IN BOOK 674 PAGE 992

TEMPORARY CONSTRUCTION EASEMENT = 0.055 AC.
PROPOSED PERMANENT SIDEWALK EASEMENT = 0.059 AC.
REMAINING LOT = 3.502 AC. (AFTER PERM. ESMT.)

ES-18
STA: 102+92.41 OFF: 29.72' LT.
CONST. 42" RCP END SECTION

STA. 102+55.077
TURN RETAINING WALL 45 DEG.

STA. 102+60.22
OFF. 13.58' RT.
END RETAINING WALL

INSTALL 74.9 SY OF PAVED DITCH PER MODOT STANDAR PLAN 609.15C AROUND STORM SEWER PIPES, FLAP GATES, AND END SECTIONS. ENSURE 6" CLEARANCE OF CONCRETE FROM FLAP GATES IN ALL POSITIONS. ENSURE FLAP GATES ARE FULLY OPERATIONAL ONCE CONCRETE IS CURED.

CONSTRUCT RETAINING WALL B SEE SHEET NO. 19

MH-16
STA: 107+00.35 OFF: 8.87' RT.
CONST. 5' MANHOLE
REMOVE EXISTING RCP END SECTION AND CONNECT TO EXISTING 30" RCP

PT: 106+75.99

S34°20'58.68"E 42.37'

PC: 106+47.62

L=36.14'
R=36.00'
Δ=46°59'11"

35.83'
S10°38'12.80"W

INSTALL 372 LF HANDRAIL

HINKSON CREEK

N16°28'05.12"E 82.67'

EXIST. R/W

CONST. LIMITS

EMBED ROCK BLANKET PER DETAIL ABOVE

L=66.35'
R=36.02'
Δ=105°32'22"

PRC: 101+06.05

PT: 101+72.40

STA. 101+25.00
BEGIN RETAINING WALL

STA. 101+06.00
BEGIN HAND RAIL

L=62.65'
R=36.00'
Δ=99°42'32"

STA. 100+66.66
END HANDRAIL

FORUM BLVD.

STA. 107+20.00
END RETAINING WALL

INSTALL 6.5 CY TYPE 2 ROCK BLANKET AT 18" DEPTH

ES-15
STA: 107+67.74 OFF: 18.90' LT.
CONST. 30" RCP END SECTION
INSTALL 66 LF 30" RCP (NW)

PC: 107+18.36
L=5.17'
R=36.00'
Δ=8°13'53"
PRC: 107+23.54

CONSTRUCT 6.8 SY OF PAVED DITCH PER MODOT STANDARD PLAN 609.15C

SAWCUT AND DOWELL INTO EXISTING PAVED DITCH

L=75.90'
R=100.04'
Δ=43°28'20"

PCC: 107+99.44

N=1124209.1850
E=1679689.6979

ADD ALTERNATE A:
MILL AND OVERLAY EXISTING 10' NORTH ASPHALT SHOULDER 2" DEPTH

ES-14
STA: 101+38.22 OFF: 72.50' LT.
CONST. 42" RCP END SECTION

PC: 100+43.40

INSTALL 92 LF HANDRAIL

ES-13
STA: 100+44.16 OFF: 40.00' RT.
CONST. 42" RCP END SECTION
INSTALL 161 LF 42" RCP (W)

N=1124141.14
E=1679482.17
100+00.00 WILSON'S CONNECTION = 25+43.70 FORUM BLVD. TRAIL

N10°36'09.51"E 43.40'

ES-12
STA: 101+36.12 OFF: 79.21' LT.
CONST. 42" RCP END SECTION

ES-11
STA: 100+36.04 OFF: 40.66' RT.
CONST. 42" RCP END SECTION
INSTALL 161 LF 42" RCP (W)

STA. 25+77.79
BEGIN HANDRAIL

INSTALL 24.9 CY TYPE 2 ROCK BLANKET AT 18" THICK

LOT 52 COMMON LOT
CLUB WOODRAIL PLAT NO. 4
PLAT BOOK 11 PAGE 85

EXIST. R/W

PROP. S/W AND DRAINAGE ESMT.

TEMP. CONST. ESMT.

100+00 101+00 102+00 103+00 104+00 105+00 106+00 107+00 108+00 109+00

BARTLETT & WEST
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PLAN/PROFILE SHEETS
WILSON'S CONNECTION - PLAN

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	9/18/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	SEPT. 2015
DRAWING NO:	
SHEET NO:	13 of 58

DESCRIPTION · BY · DATE

Last edit on: Aug 21, 2015 by: AKJ01272 Drawing Name: W:\Proj\18000's\18082's\18082.000\AutoCad\Plan Set\18082.000_Plan Profile_North Shoulder.dwg Layout Name: Wilson's Connection - Plan Plotted By: AKJ01272 Plotted on: 9/18/2015 4:28:48 PM

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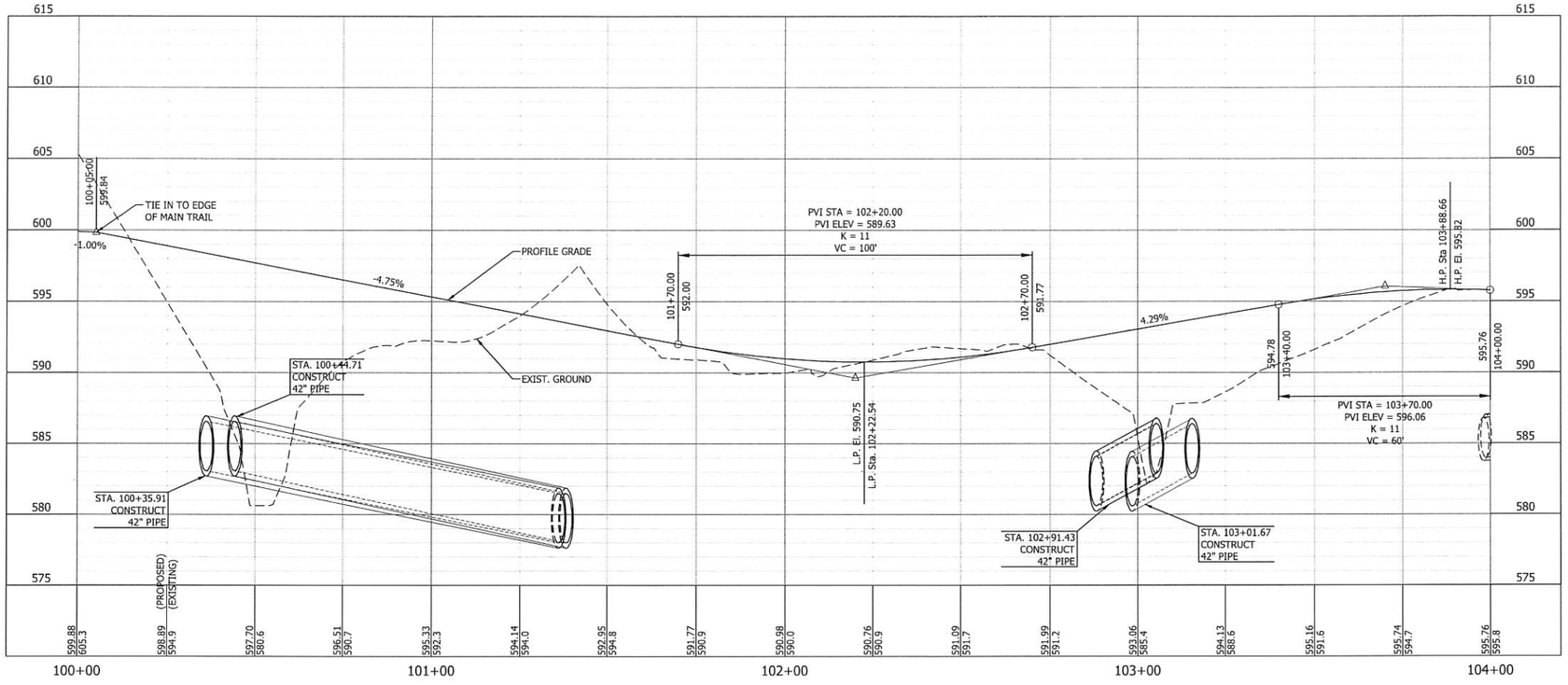

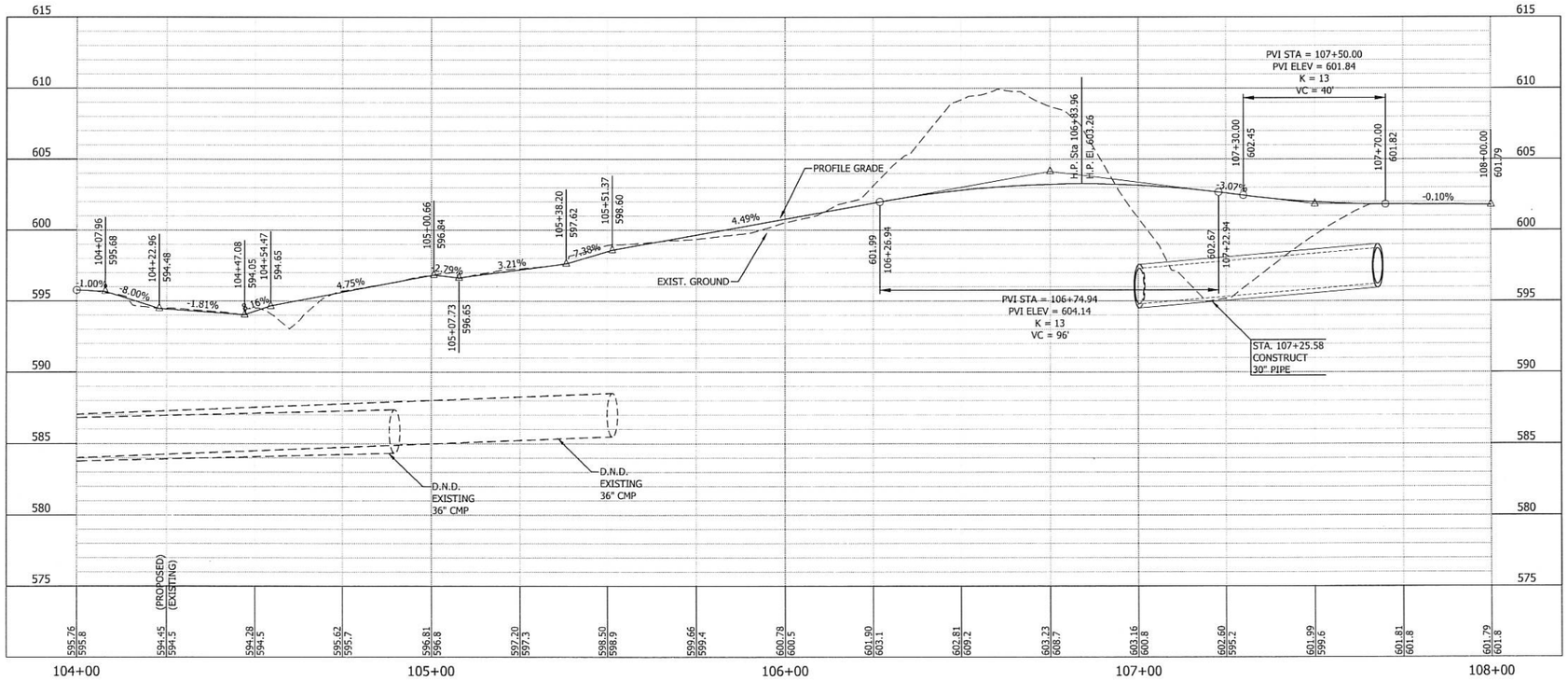

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PLAN/PROFILE SHEETS
WILSON'S CONNECTION - PROFILE

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	14 of 58

Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Plan Profile_North Shoulder.dwg Layout Name: Wilson's Connection - Profile Plotted By: AKJ01272 Plotted on: 8/14/2015 4:08:13 PM

WILSON'S FITNESS CENTER

HINKSON CREEK

EXAMPLE BIKE SYMBOL

INSTALL BIKE LANE SYMBOLS EVERY 300' (TYP)

APPROX. 300' INTERVALS

FORUM BOULEVARD

FUTURE PROJECT:
MILL AND OVERLAY EXISTING 10' SOUTH ASPHALT SHOULDER, 2" DEPTH

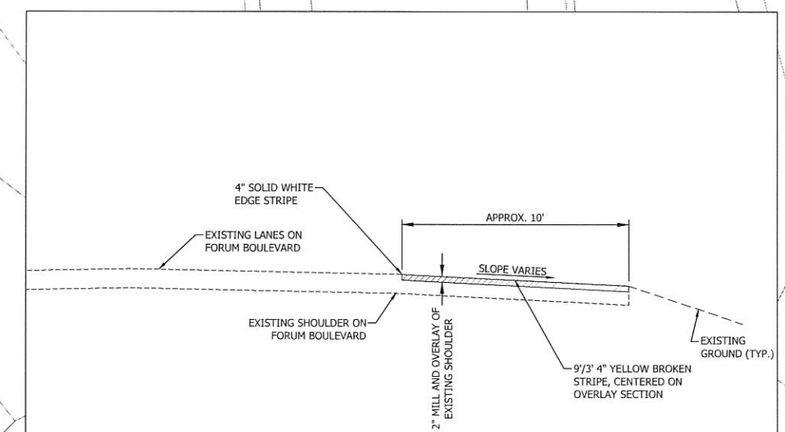
ADD ALTERNATE A:
MILL AND OVERLAY EXISTING 10' ASPHALT NORTH SHOULDER 2" DEPTH

0 60' 120'
SCALE: 1" = 60'

MILL AND OVERLAY ALL EXISTING ASPHALT AND STOP AT CONCRETE CURB AND GUTTER

MILL AND OVERLAY ALL EXISTING ASPHALT AND STOP AT EXISTING CONCRETE

WOODRAIL AVE.



MILL AND OVERLAY TYPICAL SECTION

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PLAN/PROFILE SHEETS
SHOULDER TREATMENT PLAN

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

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APPROVED BY:	TCK
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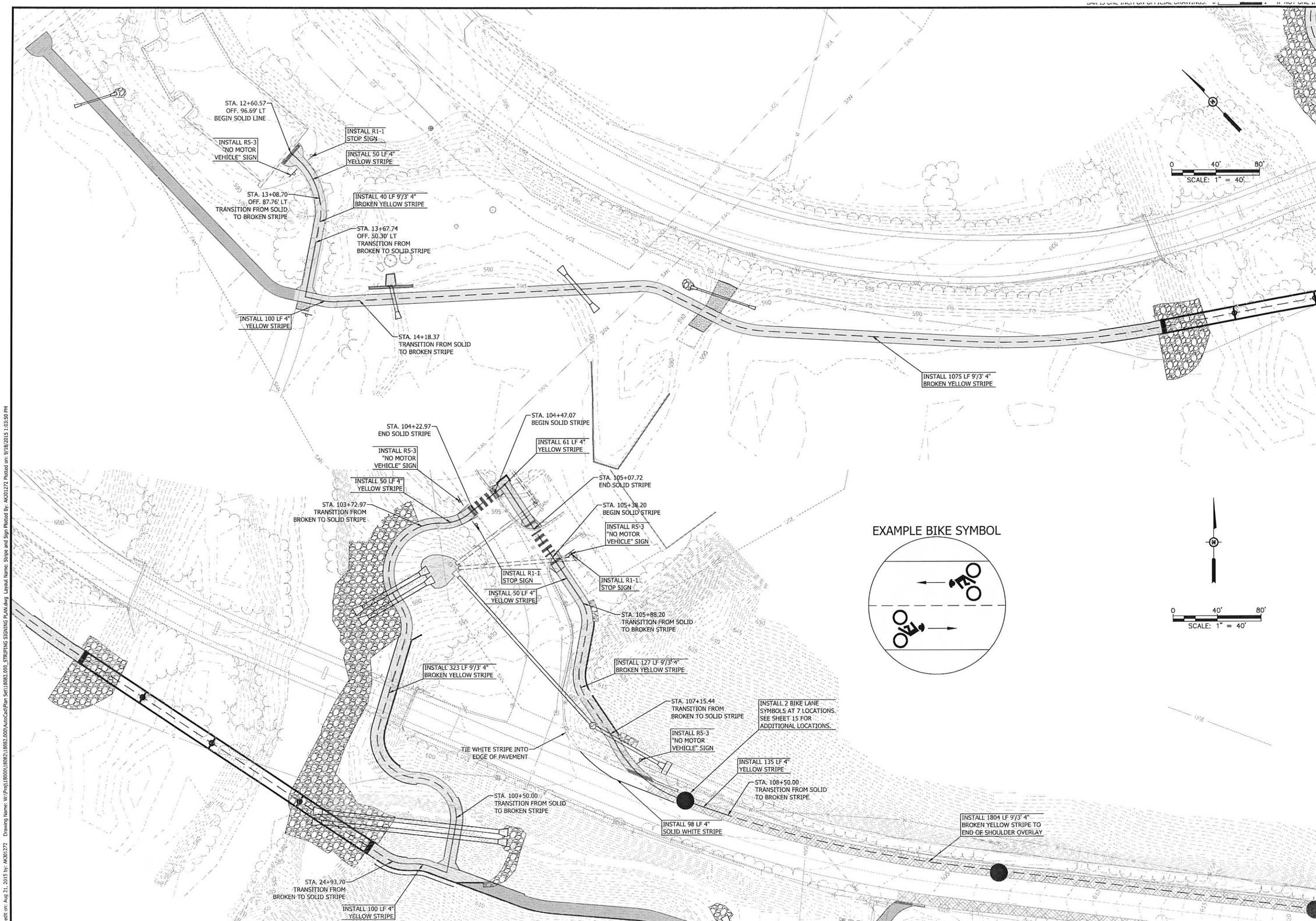
DATE:	SEPT. 2015
DRAWING NO:	
SHEET NO:	15 of 58

Last edit on: Aug 21, 2015 by: AKJ01272 Drawing Name: W:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Plan_Shoulder Treatment.dwg Layout Name: Shoulder Treatment Plan Plotted By: AKJ01272 Plotted on: 9/18/2015 1:00:04 PM



#	DATE	DESCRIPTION	BY

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SIGN AND STRIPING PLAN

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

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SHEET NO:	16 of 58

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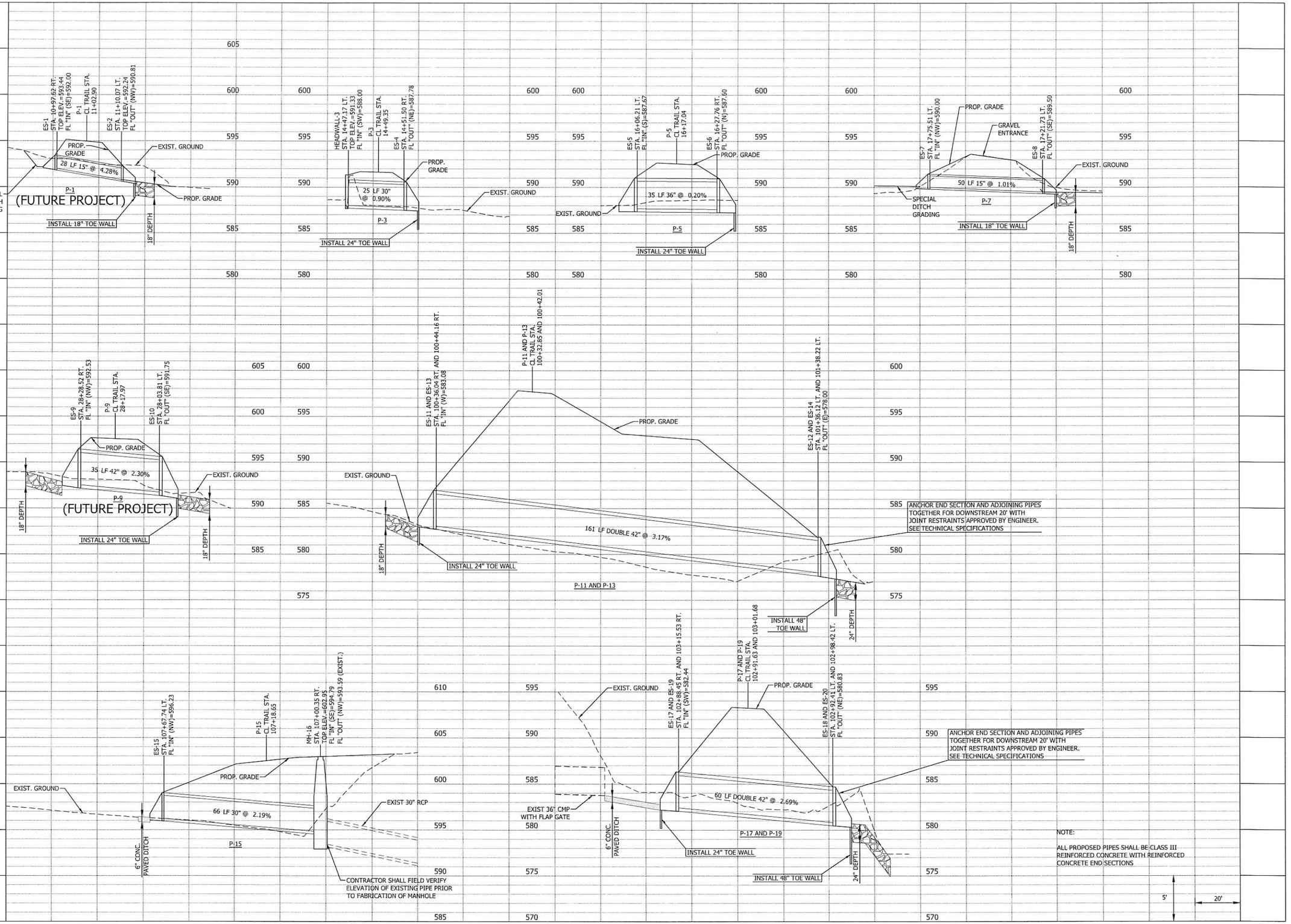
Last edit on: Aug 21, 2015 by: AKJ01272 Drawing Name: W:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_STRIPING SIGNING PLAN.dwg Layout Name: Stripe and Sign Plotted By: AKJ01272 Plotted on: 9/18/2015 1:03:50 PM

BAR IS ONE INCH ON ORIGINAL DRAWINGS. IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.



PIPE PROFILES

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

BARTLETT & WEST
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STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2010000590
PROFESSIONAL ENGINEER
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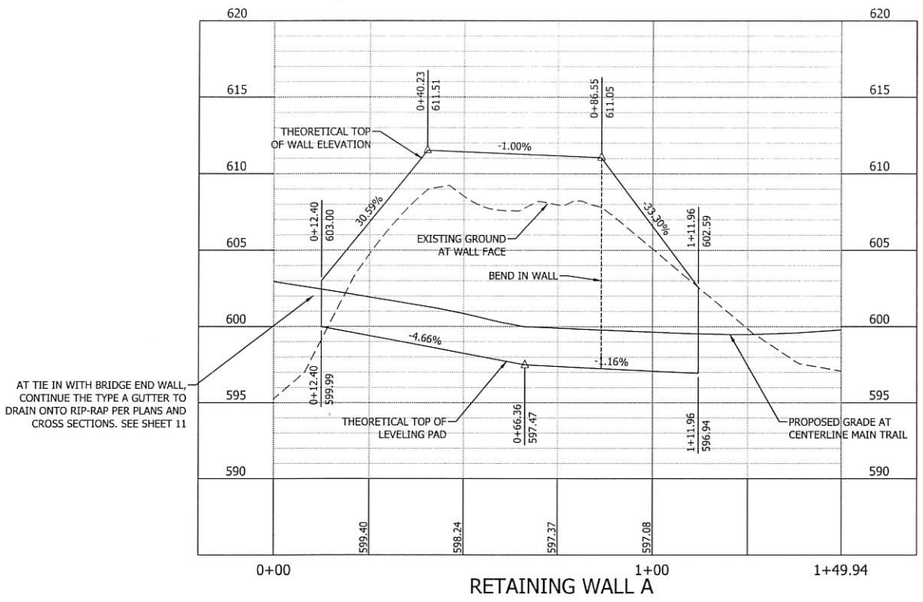

RETAINING WALL A

NOTES:

ALL STATIONS GIVEN ON THIS SHEET ARE WALL ALIGNMENT STATIONS. THE WALL ALIGNMENTS ARE 6 FT. OFFSETS OF THE REFERENCED TRAIL ALIGNMENT UNLESS OTHERWISE NOTED.

WALL A:
STA. 0+12.40, OFF. 0.00 MAIN TRAIL - RIGHT WALL BASE BID = STA. 24+81.00, OFF. 6.00' RT. MAIN TRAIL

STA. 0+86.55, OFF. 0.00 MAIN TRAIL - RIGHT WALL BASE BID = STA. 25+53.78, OFF. 6.00' RT. MAIN TRAIL

STA. 1+11.96, OFF. 0.00 MAIN TRAIL - RIGHT WALL BASE BID = STA. 25+77.79, OFF. 2.47' LT. MAIN TRAIL

6' WOOD PRIVACY FENCE TO BE INSTALLED BEHIND RETAINING WALL A.

#	DATE	DESCRIPTION	BY

BARTLETT & WEST
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WALL PROFILES
FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000690
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
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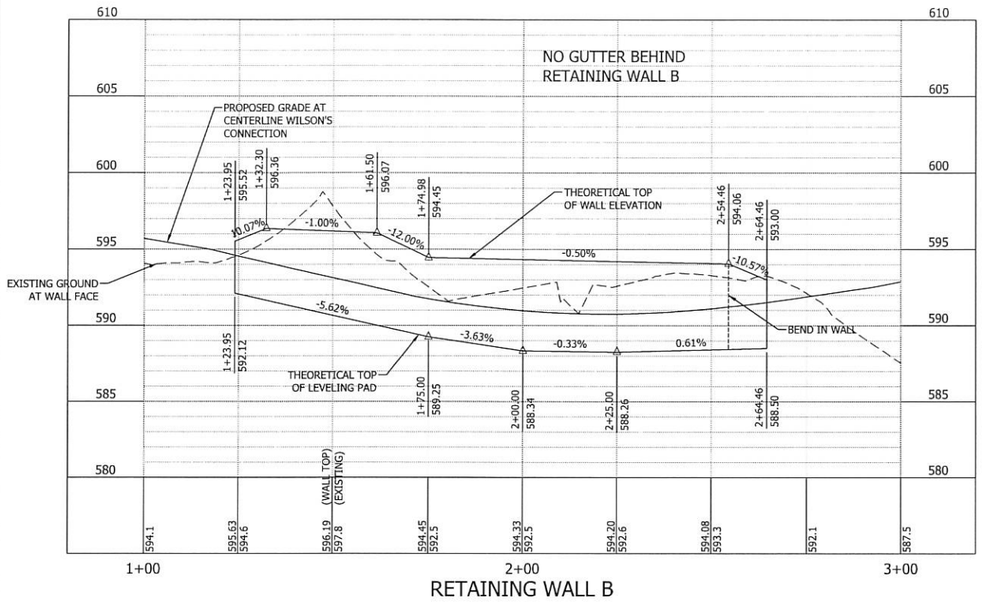

NOTES:

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WALL B:
STA. 1+23.95, OFF. 0.00 WILSON'S CONNECTION - RIGHT WALL = STA. 101+15.00, OFF. 6.00' RT. WILSON'S CONNECTION

STA. 2+54.46, OFF. 0.00 WILSON'S CONNECTION - RIGHT WALL = STA. 102+55.07, OFF. 6+00' RT. WILSON'S CONNECTION

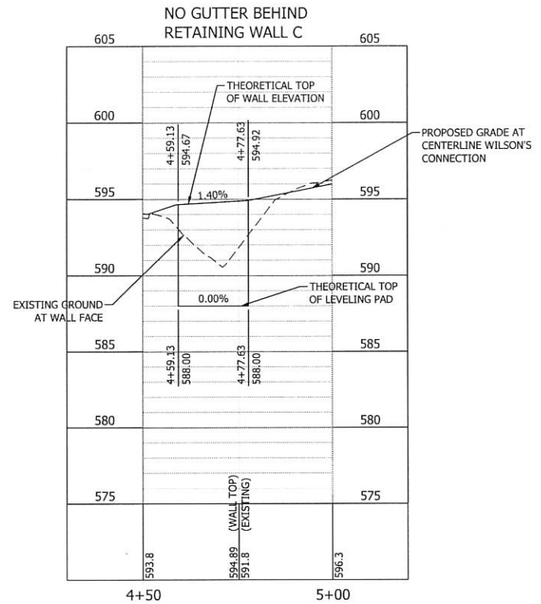
STA. 2+64.46, OFF. 0.00 WILSON'S CONNECTION - RIGHT WALL = STA. 102+60.22, OFF. 13.58' RT. WILSON'S CONNECTION

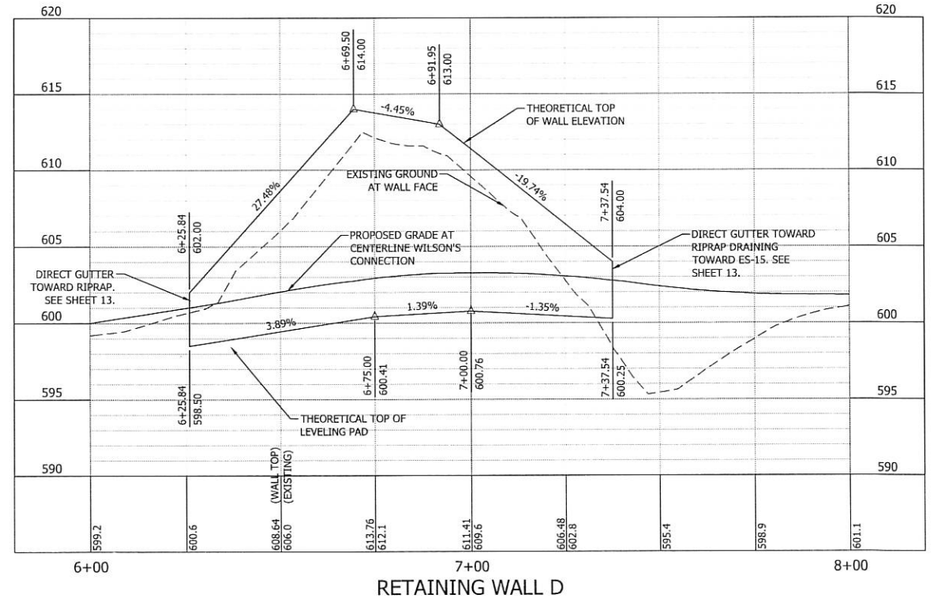
WALL C:
STA. 4+58.77, OFF. 0.00 WILSON'S CONNECTION - LEFT WALL = STA. 104+54.47, OFF 6.00' LT. WILSON'S CONNECTION

STA. 4+77.35, OFF. 0.00 WILSON'S CONNECTION - LEFT WALL = STA. 104+60.00, OFF. 6.00' LT. WILSON'S CONNECTION

WALL D:
STA. 6+25.84, OFF. 0.00 WILSON'S CONNECTION - LEFT WALL = STA. 106+05.00, OFF. 6.00' LT. WILSON'S CONNECTION

STA. 7+37.54, OFF. 0.00 WILSON'S CONNECTION - LEFT WALL = STA. 107+20.00, OFF. 6.00' LT. WILSON'S CONNECTION





BARTLETT & WEST
1719 SOUTHRIDGE DR., SUITE 100 · JEFFERSON CITY, MO 65109-4000
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MISSOURI CERTIFICATE OF AUTHORITY NO. 000167 · ENGINEERING
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WALL PROFILES
WILSON'S CONNECTION

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
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DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	19 of 58

DESCRIPTION | DATE | BY

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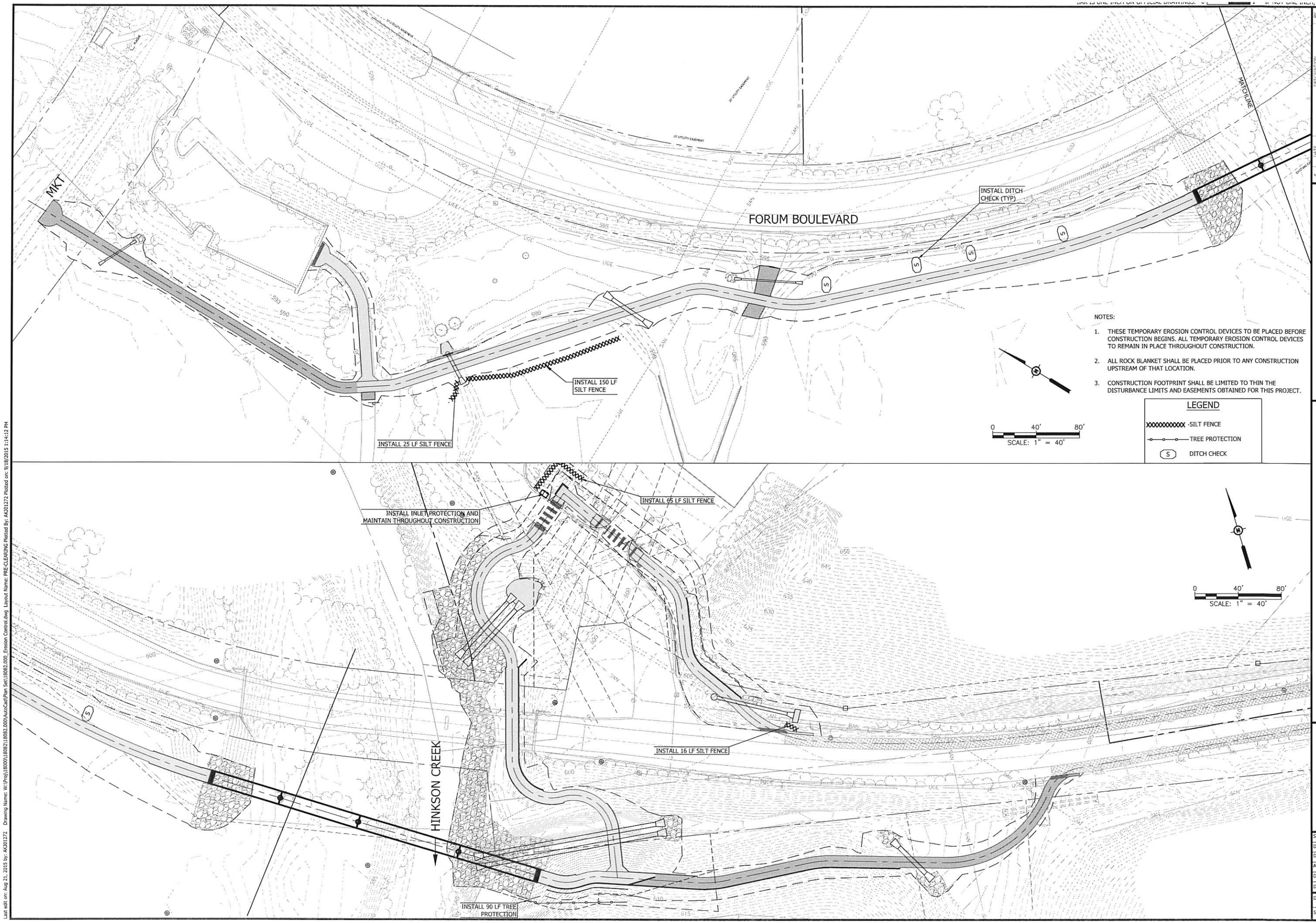

NOTES:

1. THESE TEMPORARY EROSION CONTROL DEVICES TO BE PLACED BEFORE CONSTRUCTION BEGINS. ALL TEMPORARY EROSION CONTROL DEVICES TO REMAIN IN PLACE THROUGHOUT CONSTRUCTION.
2. ALL ROCK BLANKET SHALL BE PLACED PRIOR TO ANY CONSTRUCTION UPSTREAM OF THAT LOCATION.
3. CONSTRUCTION FOOTPRINT SHALL BE LIMITED TO THIN THE DISTURBANCE LIMITS AND EASEMENTS OBTAINED FOR THIS PROJECT.

LEGEND

- SILT FENCE
- TREE PROTECTION
- (S) DITCH CHECK

#	DATE	DESCRIPTION	BY

BARTLETT & WEST
1719 SOUTHRIDGE DR., SUITE 100 - JEFFERSON CITY, MO 65109-400
PHONE 573.634.3181 - FAX 573.634.7904
MISSOURI CERTIFICATE OF AUTHORITY NO. 000167 - ENGINEERING
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EROSION CONTROL PLAN
FORUM BLVD. TRAIL

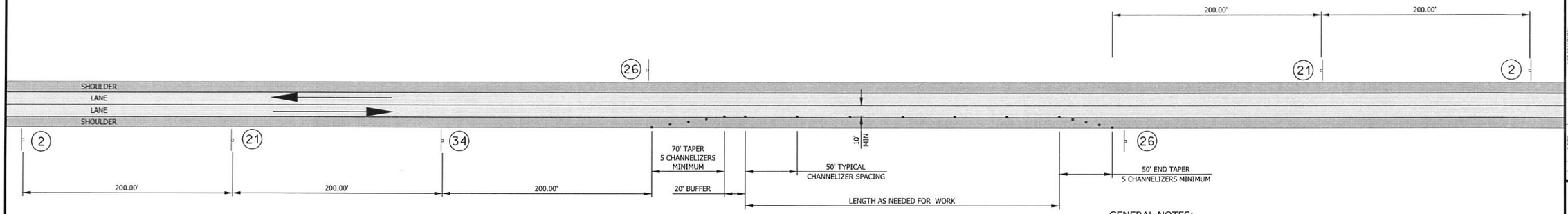
FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

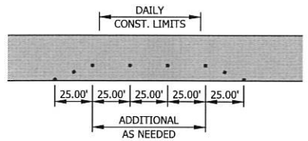
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	9/18/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	SEPT. 2015
DRAWING NO:	
SHEET NO:	20 of 58

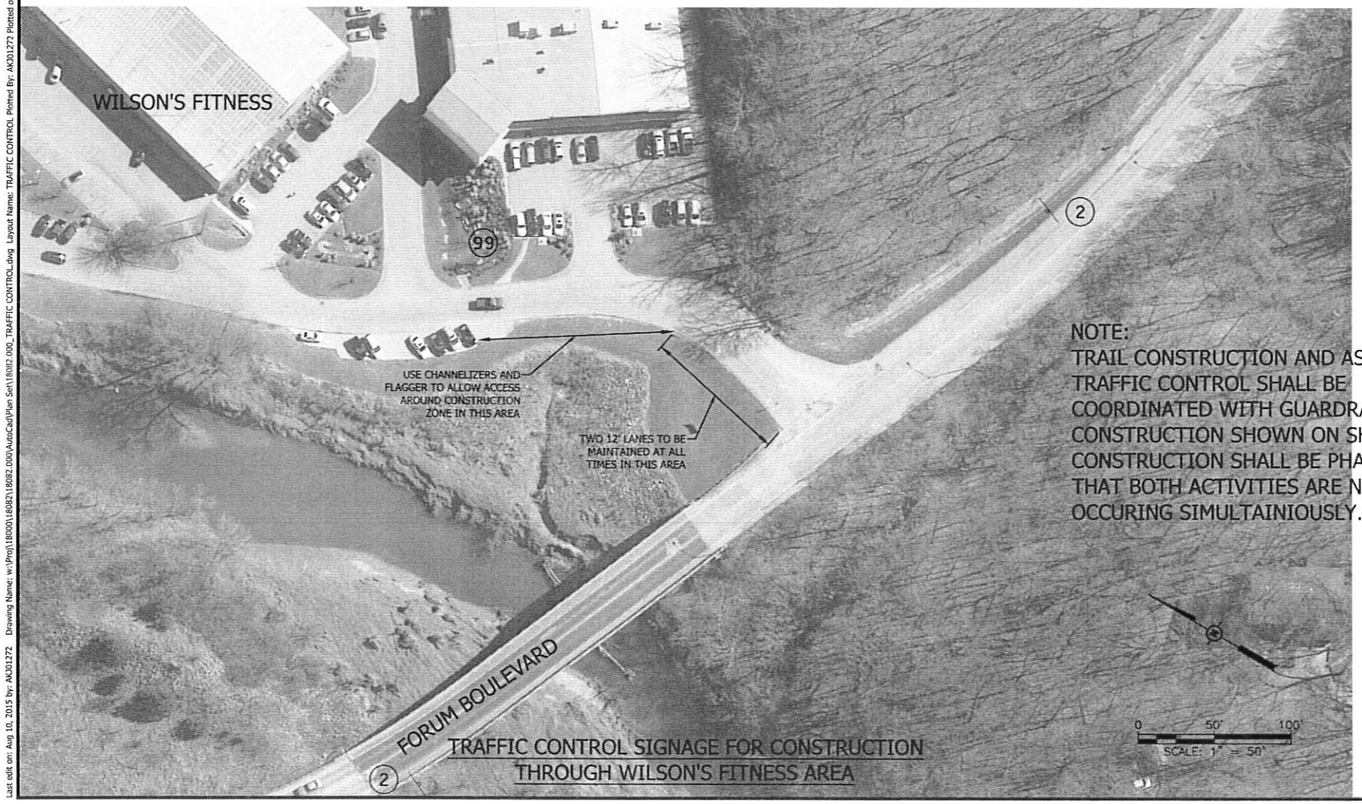
Last edit on: Aug 21, 2015 by: AKJ01272 Drawing Name: W:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Erosion Control.dwg Layout Name: PRE-CLEARING Plotted By: AKJ01272 Plotted on: 9/18/2015 1:14:12 PM



TYPICAL MILL AND OVERLAY TRAFFIC CONTROL



TYPICAL WILSON'S TRAFFIC CONTROL



TRAFFIC CONTROL SIGNAGE FOR CONSTRUCTION THROUGH WILSON'S FITNESS AREA

NOTE:
TRAIL CONSTRUCTION AND ASSOCIATED TRAFFIC CONTROL SHALL BE COORDINATED WITH GUARDRAIL CONSTRUCTION SHOWN ON SHEET 57. CONSTRUCTION SHALL BE PHASED SUCH THAT BOTH ACTIVITIES ARE NOT OCCURING SIMULTAINIOUSLY.

GENERAL NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE INSTALLED PRIOR TO PERTINENT CONSTRUCTION.
2. TRAFFIC CONTROL SIGNAGE FOR TRAIL CONSTRUCTION SHALL BE USED AS DISPLAYED ON THIS SHEET.
3. FLAGGER OPTION SHALL BE USED ON THE WILSON'S AREA DRIVEWAY WHEN TWO 12' LANES CAN NOT BE MAINTAINED. THE FIRST 100' OF DRIVE SHALL NEVER HAVE FEWER THAN TWO LANES OPEN TO TRAFFIC.
4. CONTRACTOR SHALL COMPLY WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR THE TRAFFIC CONTROL OF THIS PROJECT.
5. COVER ALL CONFLICTING SIGNS.
6. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING, POSITIONING, CLEANING AND REPLACING DAMAGED TRAFFIC CONTROL DEVICES. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR COVERING OR REMOVING TRAFFIC CONTROL SIGNS WHEN NO WORK IS IN PROGRESS AND THE ROADWAY IS UNRESTRICTED TO THE TRAVELING PUBLIC.
7. LOCATION OF TRAFFIC CONTROL DEVICES ARE SUBJECT TO CHANGE AS APPROVED BY ENGINEER.
8. AT NO TIME SHALL BOTH SHOULDERS OF FORUM BOULEVARD BE CLOSED AT ONE TIME.

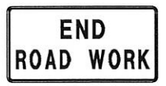
TRAFFIC CONTROL LEGEND

SIGN

CHANNELIZER

W020-1
2
48" X 48"

W021-5b
21
48" X 48"



G020-2
26
48" X 24"

W05-5
34
48" X 48"

R9-9
99
24" X 12"

BAR IS ONE INCH ON ORIGINAL DRAWINGS. IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

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TRAFFIC CONTROL DETAILS

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2010000690
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	21 of 58

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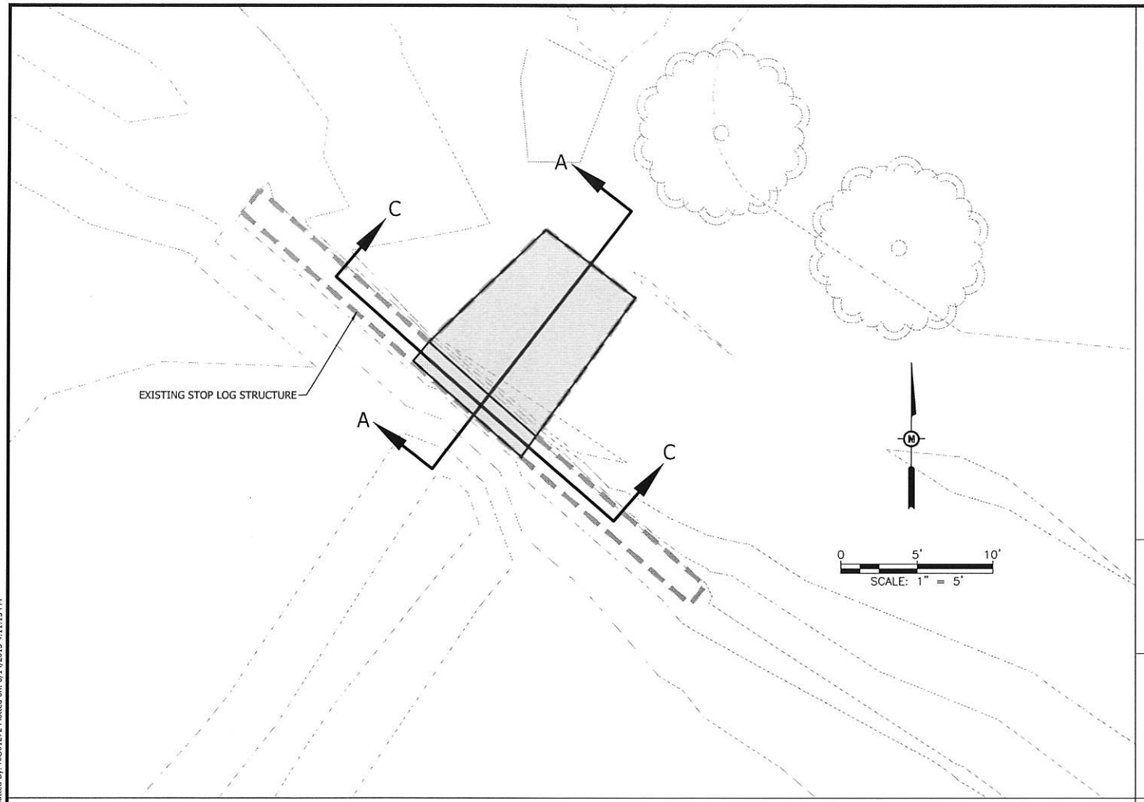
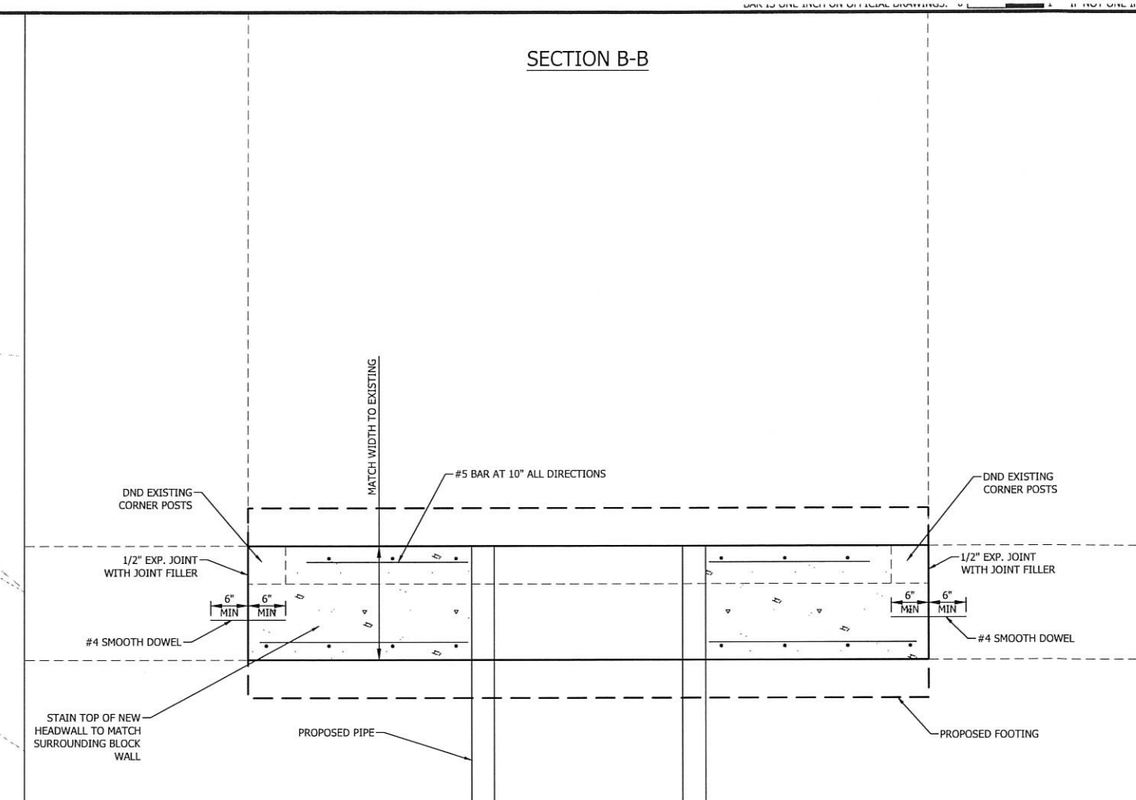
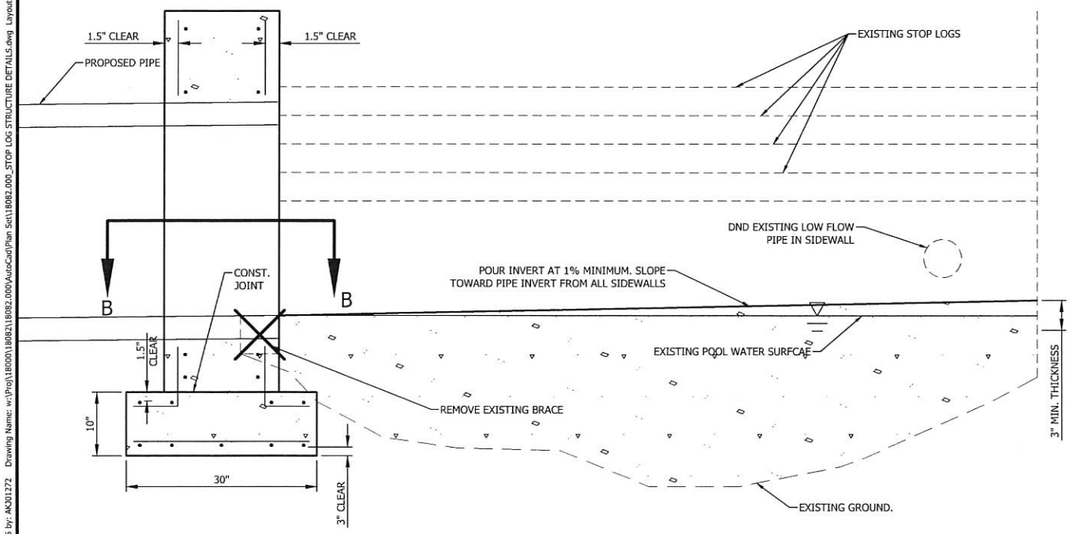


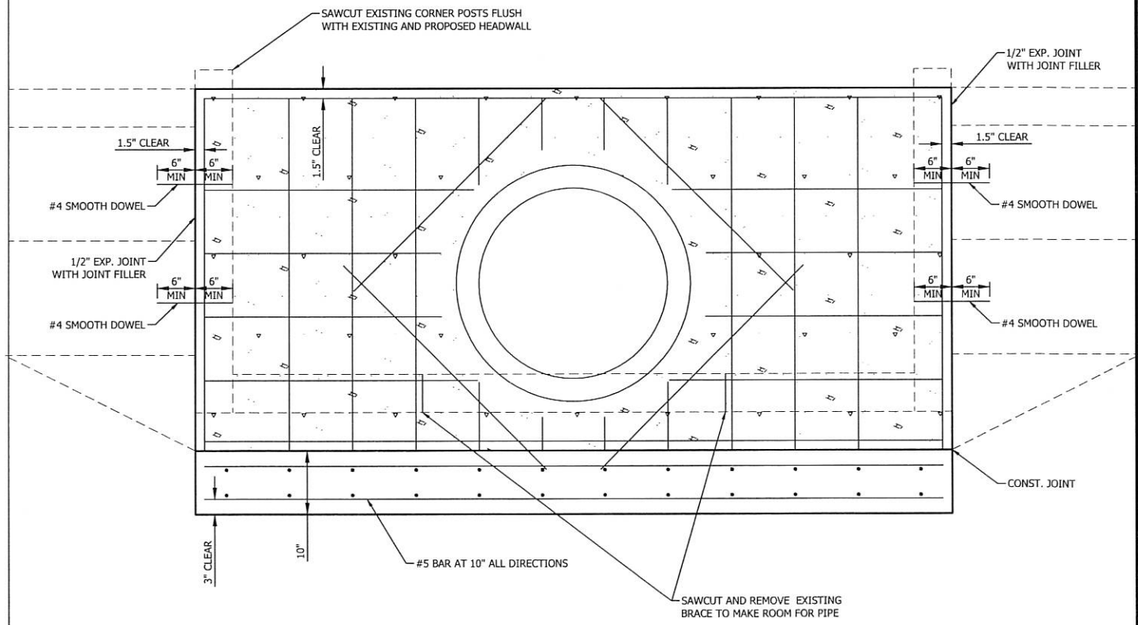
SECTION B-B



SECTION A-A



SECTION C-C



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STOP LOG STRUCTURE DETAILS
FORUM BOULEVARD TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD. C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	22 of 58

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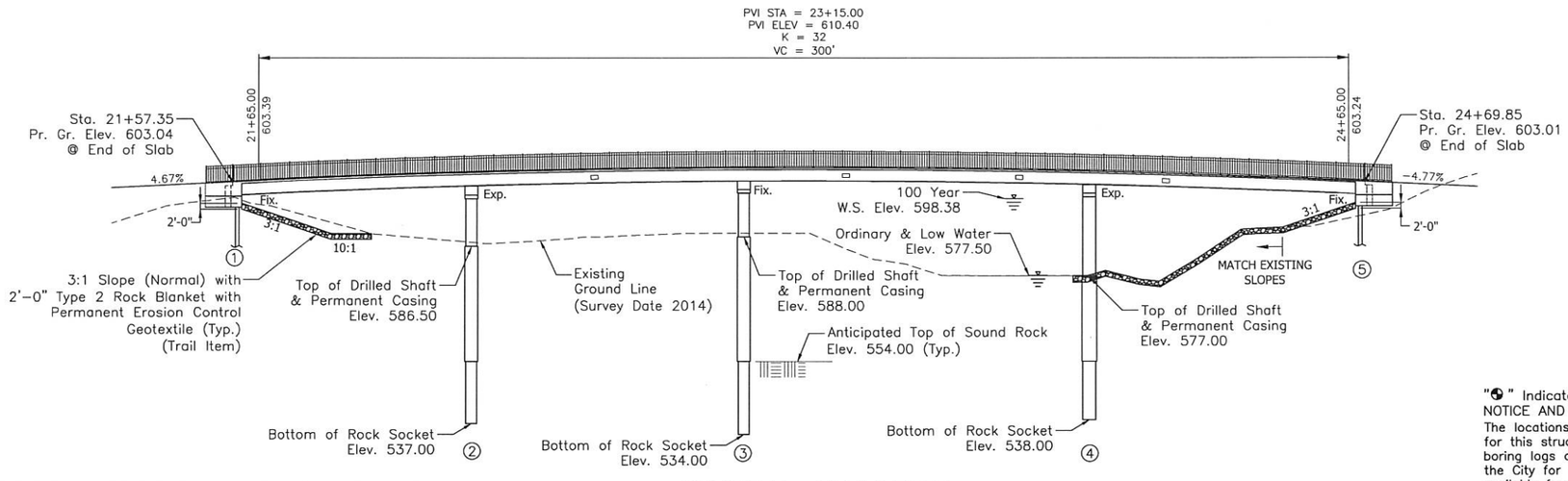
BAR IS ONE INCH ON OFFICIAL DRAWINGS. 0 1" IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

(65' – 75' – 95' – 75') CONTINUOUS COMPOSITE I–BEAM SPANS



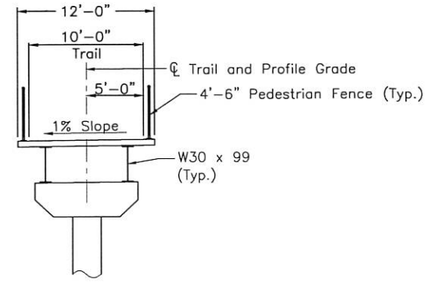
GENERAL ELEVATION

Notes:

Trail fill shall be completed to the final trail section and up to the elevation of the bottom of the concrete beam within the limits of the structure and for not less than 25 feet in back of the fill face of the end bents before any piles are driven for any bents falling within the embankment section.

For General Notes, Estimated Quantities, Estimated Quantities for Slab on Steel, Hydrologic Data and Foundation Data, see Sheet No. 24.

For Survey Control Points, see Sheet No. 5.



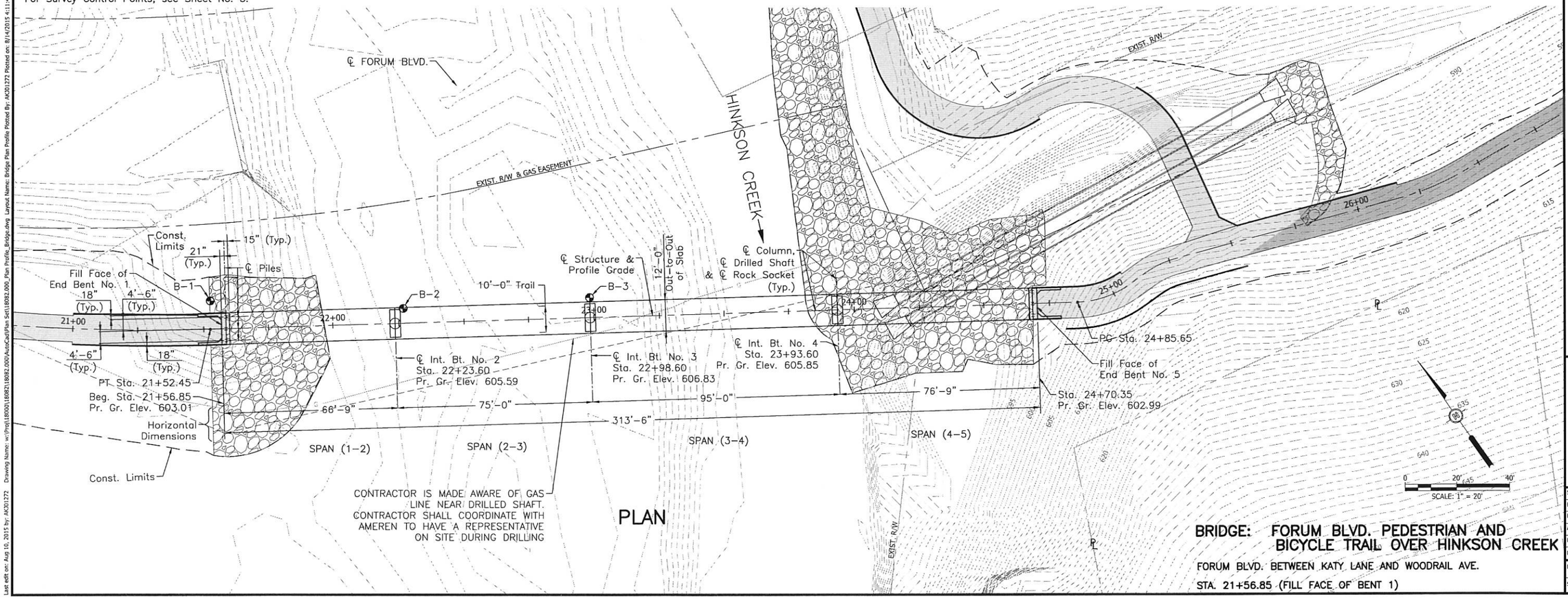
TYPICAL SECTION

"⊕" Indicates Location of Borings.

NOTICE AND DISCLAIMER REGARDING BORING LOG DATA

The locations of all subsurface borings for this structure are shown on the plan sheet(s) for this structure. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the City for the design of the project, are shown on Sheets No. 40 and 41 or will be available from the project contact upon written request. No greater significance or weight should be given to the boring data depicted on the plan sheets than is given to the subsurface data available from the city or elsewhere.

The City does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the City, or on any other documentation not expressly warranted, which the contractor may obtain from the City.



PLAN

BRIDGE: FORUM BLVD. PEDESTRIAN AND BICYCLE TRAIL OVER HINKSON CREEK

FORUM BLVD. BETWEEN KATY LANE AND WOODRAIL AVE.

STA. 21+56.85 (FILL FACE OF BENT 1)

#	DATE	DESCRIPTION	BY

BARTLETT & WEST
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BRIDGE DETAILS
BRIDGE PLAN AND ELEVATION

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
DAVID ANDREW STRAATMANN
NUMBER PE-2004000848
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	DAS
DRAWN BY:	MAB
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	23 of 58

Last eff on: Aug 10, 2015 by: AO01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Plan Profile_Bridge.dwg Layout Name: Bridge Plan Profile Plotted By: AO01272 Plotted on: 8/14/2015 4:11:41 PM
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Estimated Quantities

Item	Unit	Substr.	Superstr.	Total
Pedestrian Fence (Structures)	linear foot		663	663
Drilled Shafts (3 ft. 6 in. Dia.)	linear foot	66.5		66.5
Drilled Shafts (4 ft. 0 in. Dia.)	linear foot	23.0		23.0
Rock Sockets (3 ft. 0 in. Dia.)	linear foot	37.0		37.0
Rock Sockets (3 ft. 6 in. Dia.)	linear foot	16.0		16.0
Supplementary Television Camera Inspection	each	3		3
Foundation Inspection Holes	linear foot	83.0		83.0
Sonic Logging Testing	each	3		3
Structural Steel Piles (10 in.)	linear foot	180		180
Pre-Bore for Piling	linear foot	45		45
Pile Point Reinforcement	each	6		6
Class B Concrete (Substructure)	cubic yard	41.1		41.1
Slab on Steel	square yard		417	417
Reinforcing Steel (Bridges)	pound	19,810		19,810
Temporary Coating – Concrete Bents and Piers (Weathering Steel)	lump sum			1
Fabricated Structural Low Alloy Steel (I-Beam) A709, Grade 50W	pound		69,230	69,230
Vertical Drain at End Bents	each			2
Laminated Neoprene Bearing Pad (Tapered)	each		4	4
Laminated Neoprene Bearing Pad Assembly	each		6	6

All concrete between the upper and lower construction joints in the end bents is included in the Estimated Quantities for Slab on Steel.

All reinforcement in the end bents is included in the Estimated Quantities for Slab on Steel.

The cost of any required excavation to the top of the drilled shafts will be considered completely covered by the contract unit price for other items.

Cost of any required excavation for bridge will be considered completely covered by the contract unit price for other items.

GENERAL NOTES:

Design Specifications:
2012 AASHTO LRFD Bridge Design Specifications (6th Edition) and 2013 Interim Revisions
2009 AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges

Design Loading:
H5 Design Truck
90#/Sq. Ft. Pedestrian
15#/Sq. Ft. Future Wearing Surface
Earth 120#/Cu. Ft., Equivalent Fluid Pressure 45#/Cu. Ft.

Design Unit Stresses:

Class B Concrete (Substructure)	f'c = 3,000 psi
Class B-2 Concrete (Drilled Shafts & Rock Sockets)	f'c = 4,000 psi
Class B-2 Concrete (Superstructure)	f'c = 4,000 psi
Reinforcing Steel (Grade 60)	fy = 60,000 psi
Steel Pile (ASTM A709 Grade 50)	fy = 50,000 psi
Structural Steel (ASTM A709 Grade 50W)	fy = 50,000 psi

Neoprene Pads:
Bearings shall be 60 durometer neoprene pads. Laminated Neoprene Bearing Pads (Tapered) and Laminated Neoprene Bearing Pad Assembly shall be in accordance with Sec 716.

Fabricated Steel Connections:
Field connections shall be made with 3/4" diameter high strength bolts and 13/16" diameter holes, except as noted.

High strength bolts, nuts and washers will be sampled for quality assurance as specified in Sec. 106.

All connections shall be in accordance with Sec 1080 for high strength weathering fasteners.

Joint Filler:
All joint filler shall be in accordance with Sec 1057 for preformed sponge rubber expansion and partition joint filler, except as noted.

Reinforcing Steel:
Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

Concrete Protective Coatings:
Temporary coating for concrete bents and piers (weathering steel) shall be applied on all concrete surfaces above the ground line or low water elevation on all abutments and intermediate bents in accordance with Sec 711.

Miscellaneous:
Bridge construction shall be in accordance with the current Missouri Standard Specifications for Highway Construction and supplemental specifications.

"Sec" refers to the sections in the MoDOT standard and supplemental construction specifications unless specified otherwise.

Estimated Quantities for Slab on Steel

Item	Unit	Total
Class B-2 Concrete	cubic yard	82.6
Reinforcing Steel	pound	3,070
Reinforcing Steel (Epoxy Coated)	pound	12,120

The table of Estimated Quantities for Slab on Steel represents the quantities used by the City in preparing the cost estimate for concrete slabs. The area of the concrete slab will be measured to the nearest square yard with the horizontal dimensions as shown on the plan of slab. Payment for stay-in-place forms, conventional forms, all concrete and coated and uncoated reinforcing steel will be considered completely covered by the contract unit price for the slab. Variations may be encountered in the estimated quantities but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II or III.

Slab shall be cast-in-place with conventional forms or stay-in-place corrugated steel forms. Precast prestressed panels will not be permitted.

Bridge deck surface may be finished with a vibratory screed.

HYDROLOGIC DATA

Drainage Area	= 76.56 sq. miles
Design Flood Frequency	= 100 years
Design Flood Discharge	= 21,800 cfs
Design Flood (D.F.) Elevation	= 598.41 at centerline bridge
Base Flood Data (100 year)	
Base Flood Elevation	= 598.41 at centerline bridge
Base Flood Discharge	= 21,800 cfs
Estimated Backwater	= 0.18 feet
Average Velocity Through Opening	= 5.08 ft/s
Freeboard (50 year)	
Freeboard Roadway Bridge	= 1.22 feet
Freeboard Trail Bridge	= 3.81 feet
Roadway Overtopping – Roadway Bridge	
Overtopping Flood Discharge	= 16,100 cfs
Overtopping Flood Frequency	= 50 years
50 year Flood Elevation	= 596.48 at centerline bridge
Roadway Overtopping – Trail Bridge	
Overtopping Flood Discharge	= 5,740 cfs
Overtopping Flood Frequency	= 5 years
10 year Flood Elevation	= 590.63 at trail low point

Foundation Data

Bent No.			1	2	3	4	5
Driven Pile	Pile Type and Size		HP 10 x 42				HP 10 x 42
	Number		3				3
	Approximate Length	foot	48				12
	Pile Driving Verification Method		**				**
	Minimum Nominal Axial Compressive Resistance	kip	140				180
	Hammer Energy Required	foot-pound	8,000				8,000
Rock Socket	Number	each		1	1	1	
	Foundation Material			Rock	Rock	Rock	
	Elevation Range	foot		Below 554.00	Below 554.00	Below 554.00	
	Minimum Nominal Axial Compressive Resistance (Side Resistance)	ksf		3.4	3.5	3.6	
	Minimum Nominal Axial Compressive Resistance (Tip Resistance)	ksf		60.0	60.0	60.0	

Manufactured pile point reinforcement shall be used on all piles in this structure at End Bents No. 1 and 5.

** Modified Gates Formula

Driven Pile: Minimum Nominal Axial Compressive Resistance = Maximum Factored Loads/Resistance Factor

Rock Socket (Drilled Shaft): Minimum Nominal Axial Compressive Resistance (Side Resistance and Tip Resistance) = Maximum Factored Loads/Resistance Factor

Prebore for piles at End Bent No. 1 to elevation 589.00 and End Bent No. 5 to elevation 586.00. Preboring at End Bent No. 5 shall be completed with an oversized 18" diameter hole.

OPTIONAL STAY-IN-PLACE FORM DETAILS

Notes:

Corrugated steel forms, supports, closure elements and accessories shall be in accordance with grade requirement and coating designation G165 of ASTM A653. Complete shop drawings of the permanent steel deck forms shall be required in accordance with Sec 1080.

Corrugations of stay-in-place forms shall be filled with an expanded polystyrene material. The polystyrene material shall be placed in the forms with an adhesive in accordance with the manufacturer's recommendations.

Form sheets shall not rest directly on the top of beam flanges. Sheets shall be securely fastened to form supports with a minimum bearing length of one inch on each end. Form supports shall be placed in direct contact with the flange. Welding on or drilling holes in the flanges of the beams will not be permitted. All steel fabrication and construction shall be in accordance with Sec 1080 and 712.

Certified field welders will not be required for welding of the form supports.

The contractor shall provide temporary bracing as necessary to prevent girders from rotating during slab pour. The cost for temporary bracing shall be considered completely covered by the contract unit price for Slab on Steel.

The design of stay-in-place corrugated steel forms is per manufacturer which shall be in accordance with Sec 703 for false work and forms. Maximum actual weight of corrugated steel forms allowed shall be 4 psf assumed for girder loading.

#	DATE	DESCRIPTION	BY

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GENERAL NOTES AND ESTIMATED QUANTITIES

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
DAVID ANDREW STRAATMANN
NUMBER PE-2004000848
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	DAS
DRAWN BY:	TAA
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
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SHEET NO:	24 of 58

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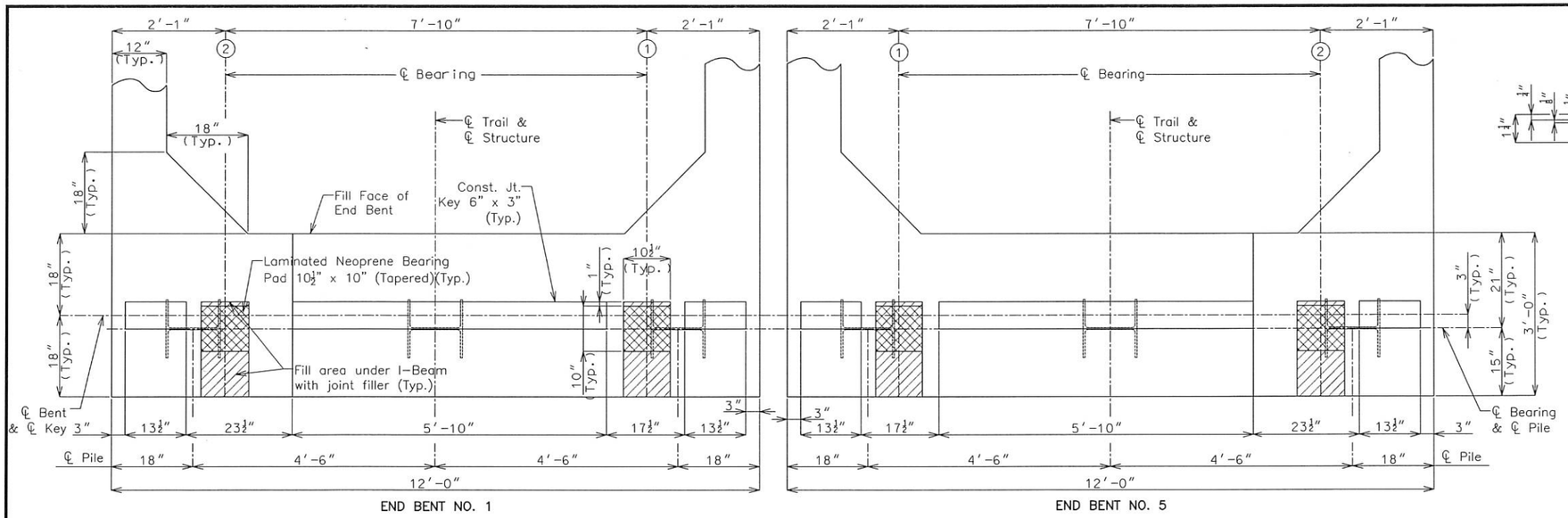
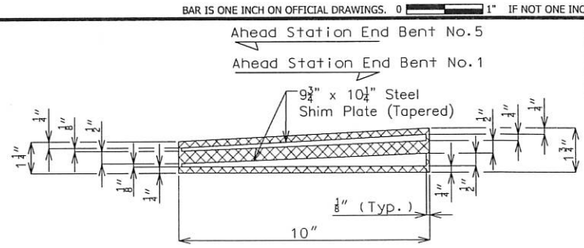
Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Bridge Plans\18082.000_BR_002_General Notes.dwg Layout Name: BR_002_General Notes Plotted By: AKJ01272 Plotted on: 8/14/2015 4:11:48 PM

BAR IS ONE INCH ON OFFICIAL DRAWINGS. 0 1" IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

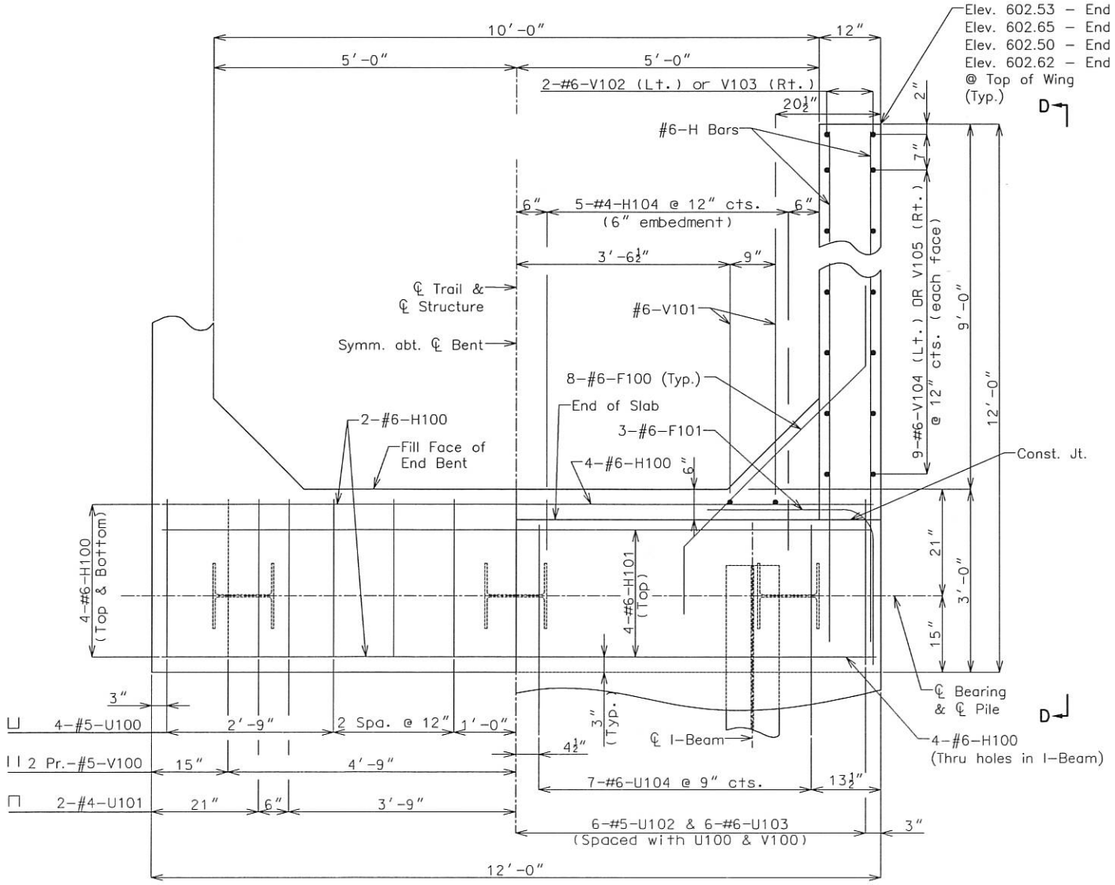


PLAN OF BEAM



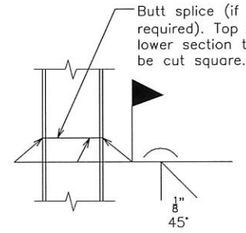
TYPICAL SECTION THRU 10" X 10½" LAMINATED NEOPRENE BEARING PAD (TAPERED)

Note:
The required shim plates shall be placed between layers of elastomer and molded together to form an integeral unit.

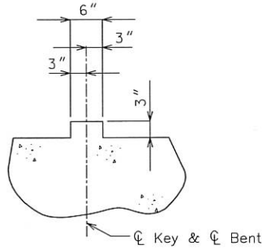


PART PLAN OF BEAM SHOWING REINFORCEMENT

PART PLAN SHOWING REINFORCEMENT



STEEL PILE SPLICE



TYPICAL SECTION THROUGH KEY

DETAILS OF END BENTS NO. 1 & 5

Note: This drawing is not to scale. Follow dimensions.

Notes:

For details of End Bent No. 1 & 5 not shown, see Sheets No. 26.

For Elevation D–D, see Sheet No. 26.

All reinforcing bars in the substructure beams or caps shall be field adjusted to clear piles by at least 1 1/2".

For details of Vertical Drain at End Bents, see Sheet No. 27.

All U–bars and Pr. V–bars in the End Bents are to be placed parallel to ℄ Trail.

All concrete in the end bents above top of beam and below top of slab shall be Class B–2.

Bend F100 bars in field to clear girders.

For details of Pedestrian Fence, see Sheet No. 35.

Cost of any required excavation for bridge will be considered completely covered by the contract unit price for other items.

Rock shall be excavated to provide at least 6" of earth under the beam and wings.

Concrete diaphragms at the integral end bents shall be poured a minimum of 12 hours before the slab is poured.

Substructure Quantity Table for Bent No. 1 & Bent No. 5

Item		Quantity Bent 1	Quantity Bent 5
Structural Steel Piles (10 in.)	linear foot	144	36
Pre–Bore for Piling	linear foot	24	21
Pile Point Reinforcement	each	3	3
Class B Concrete (Substructure)	cu. yard	6.3	6.3

Note: These quantities are included in the Estimated Quantities table on Sheet No. 24.

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DETAILS OF END BENT NO. 1 AND NO. 5

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
DAVID ANDREW STRAATMANN
NUMBER PE-2004008848
PROFESSIONAL ENGINEER
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SEALED DATE:	8/17/15
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DRAWN BY:	TAA
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	25 of 58

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Last edit on: Aug 10, 2015 by: AK201272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Bridge Plans\18082.000_BR_003_End Bt 1_5.dwg Layout Name: BR_003_End Bt 1_5.1 Plotted By: AK201272 Plotted on: 8/14/2015 4:11:53 PM

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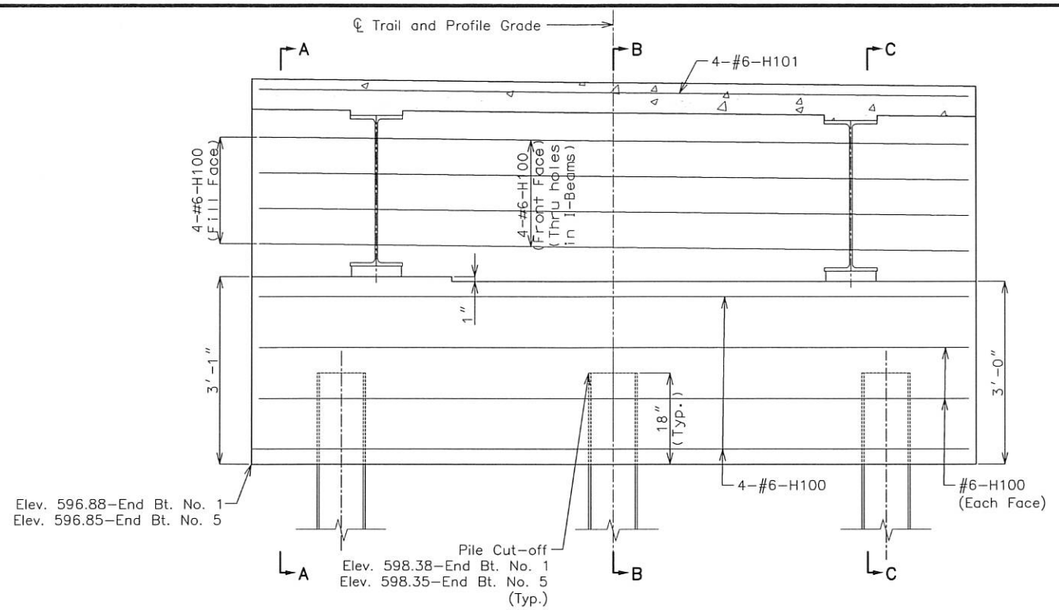
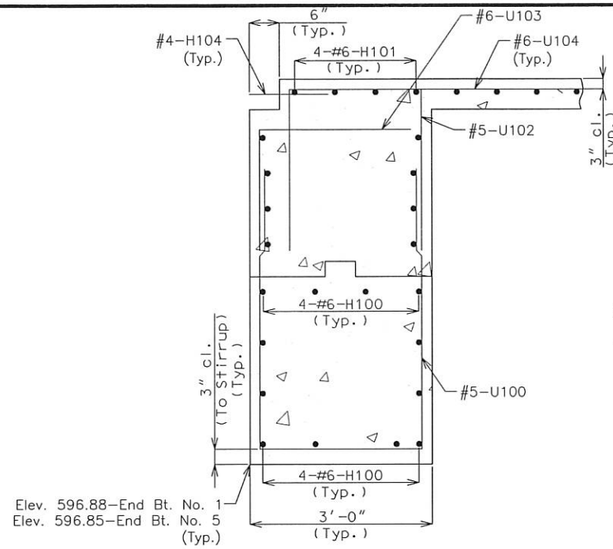


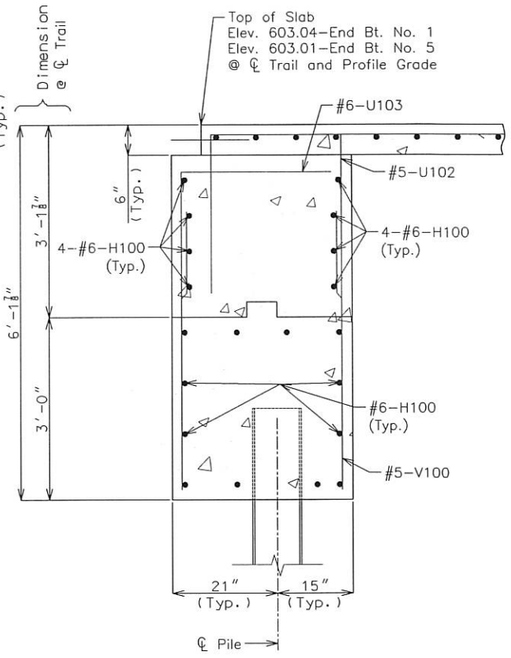
SECTION NEAR END BENT

(End Bt No. 1 shown, End Bt. No. 5 similar by 180°)

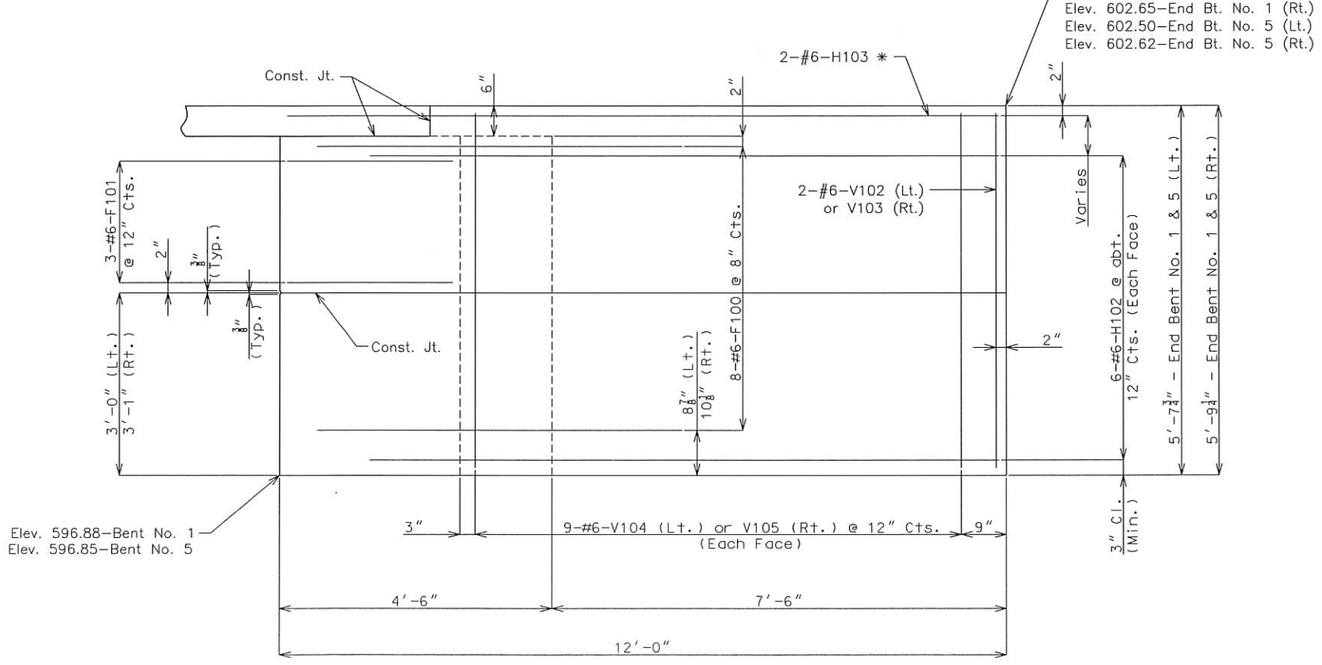
Notes:
For details and reinforcement of Pedestrian Fence, see Sheet No. 35.
For location of Elevation D-D, see Sheet No. 25.
For Substructure Quantity Table for End Bents No. 1 & 5, see Sheet No. 25.



SECTION A-A



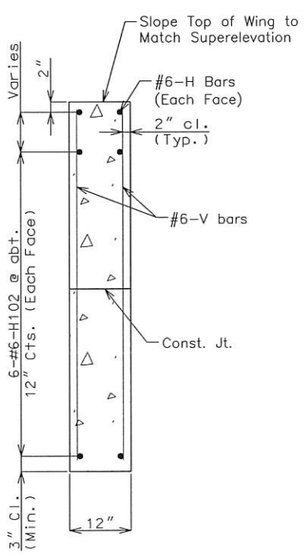
SECTION B-B



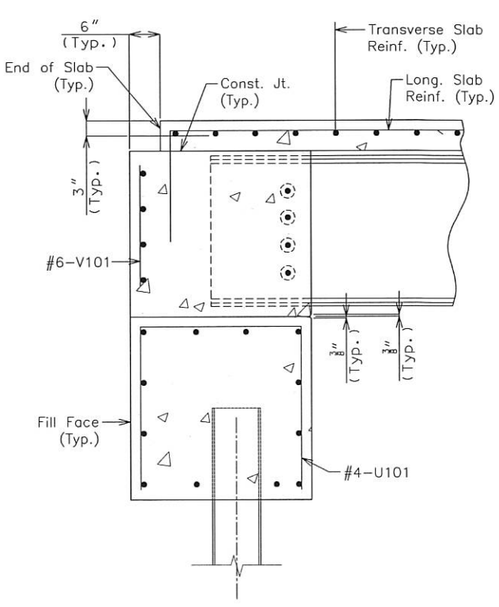
* Placed with grade.

ELEVATION D-D

(Left wing shown, Right wing similar by 180°)



TYPICAL SECTION THROUGH WING



SECTION C-C

DETAILS OF END BENTS NO. 1 & 5

Note: This drawing is not to scale. Follow dimensions.

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DETAILS OF END BENT NO. 1 AND NO. 5

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
DAVID ANDREW STRAATMANN
NUMBER PE-2004000848
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

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DRAWN BY:	TAA
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
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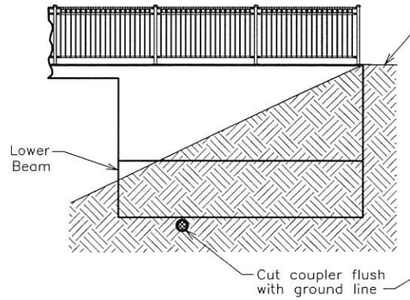
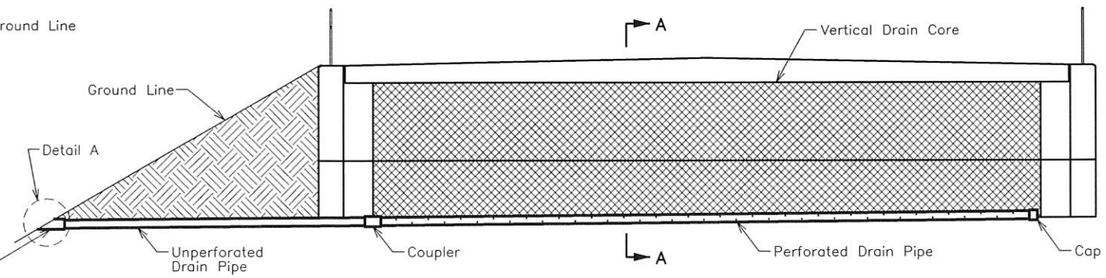
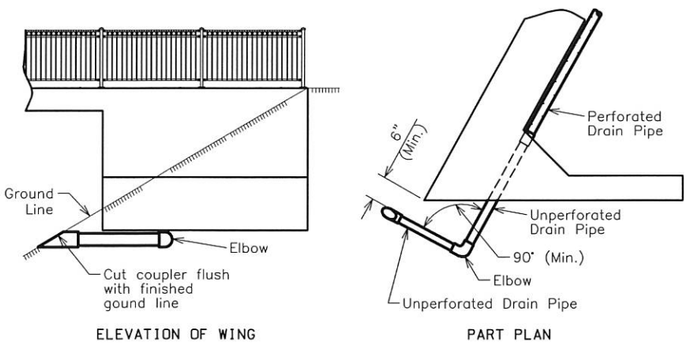


ELEVATION OF WING

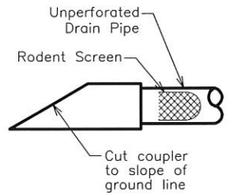


ELEVATION AT END BENT

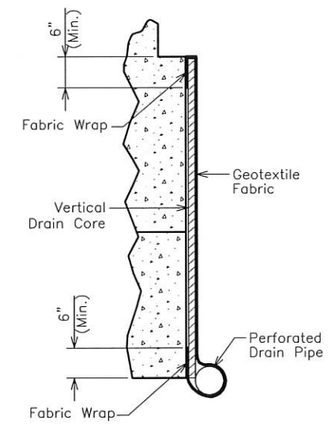


ELEVATION OF WING PART PLAN

OPTIONAL TURNED DRAIN
(Only if rock is encountered at outside of wing)



DETAIL A



PART SECTION A–A

Note:

Drain pipe may be either 6–inch diameter corrugated metallic–coated steel pipe underdrain, 4–inch diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4–inch diameter corrugated polyethylene (PE) drain pipe.

Place drain pipe at fill face of end bent and slope to lowest grade of ground line, also missing the lower beam of end bent by 1 1/2 inches. (See Elevation at End Bent.)

Perforated pipe shall be placed at fill face side at the bottom of end bent and plain pipe shall be used where the vertical drain ends to the exit at ground line.

VERTICAL DRAIN AT END BENTS

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VERTICAL DRAIN AT END BENTS

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STATE OF MISSOURI
DAVID ANDREW STRAATMANN
NUMBER PE-2004000848
PROFESSIONAL ENGINEER

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Last edit on: Aug 10, 2015 by: AKO01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Bridge Plans\18082.000_BR_005_DRAIN01_vert_i_SqW.dwg Layout Name: BR_005_DRAIN01_vert_i_SqW Plotted By: AKO01272 Plotted on: 8/14/2015 4:11:58 PM

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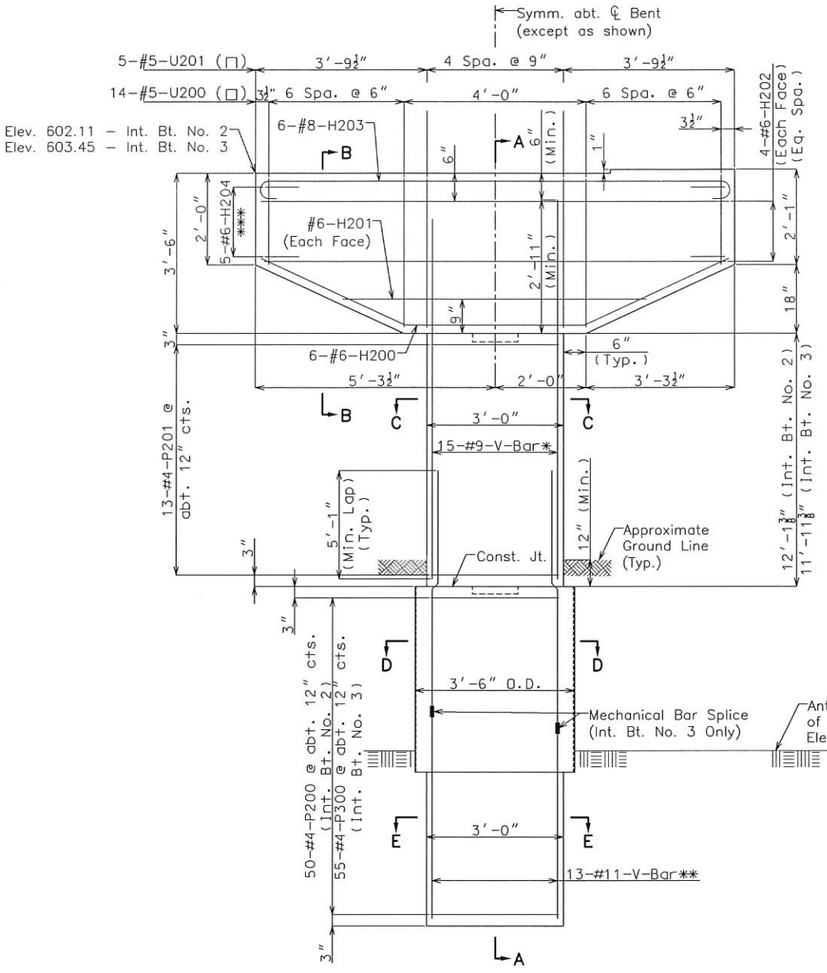
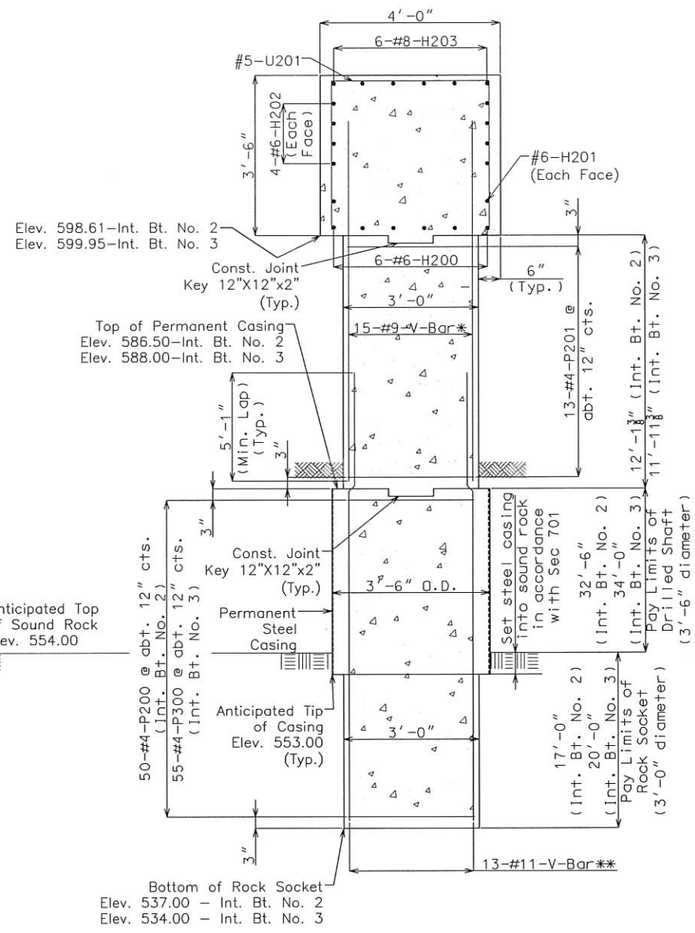
*** Place with #8-H203 & #6-H202 bars.



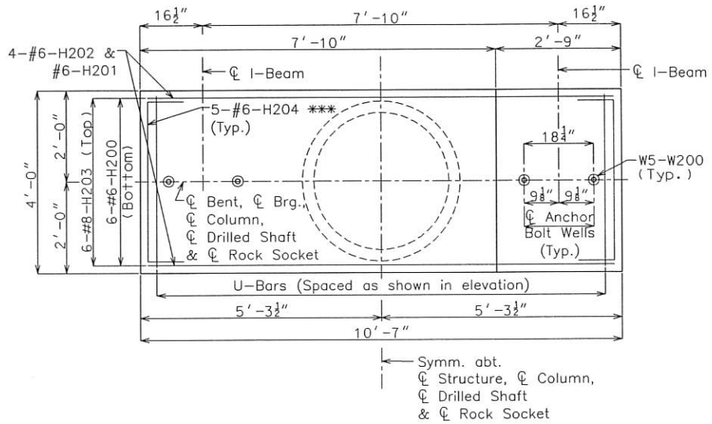
ELEVATION



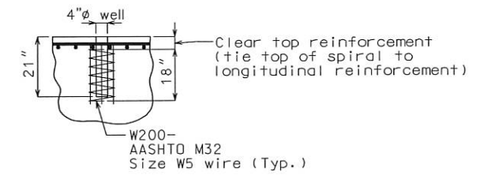
SECTION A–A

* V200 at Int. Bt. No. 2
V300 at Int. Bt. No. 3

** V201 at Int. Bt. No. 2
V301 or V302 at Int. Bt. No. 3



PLAN OF BEAM SHOWING REINFORCEMENT



DETAIL OF ANCHOR BOLT WELLS

Notes:

Design consultant to be notified of deviations in anticipated site conditions that affect the construction or design of drilled shafts or rock sockets.

An additional 4 feet has been added to #11–V201 & #11–V301 lengths and an additional 4–#4–P200 & 4–#4–P300 bars have been added in the quantities, if required, for possible change in drilled shaft or rock socket length. The additional V–bar length shall be cut–off if not required. The additional P–bars shall be spaced similarly to that shown in elevation, if required, or to a lesser spacing if not required, but not less than 6″ cts.

Sonic logging testing shall be performed on all drilled shafts and rock sockets.

Thickness of permanent steel casing shall be ⅜″ (Min.) and in accordance with Sec 701.

The cost of any required excavation to the top of the drilled shafts will be considered completely covered by the contract unit price for other items.

All reinforcement located in the drilled shafts and rock sockets are included in the Substructure Quantity Table.

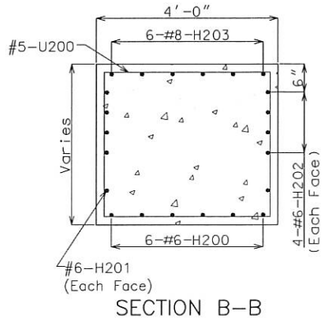
The contractor shall use a mechanical bar splice for V301 & V302 bars. The total bar lengths for bars indicated in the bill of reinforcing steel are determined based on the end of the bars being located flush to each other. No additional payment will be made for any additional bar lengths required for the mechanical bar splices. Stagger mechanical bar splices by alternating V301 & V302 bars.

Mechanical bar splices shall be in accordance with Sec 706 or 710 except that no measurement will be made for mechanical bar splices and they will be considered completely covered by the contract unit price for other items.

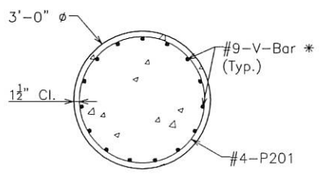
For Bearing Details, see Sheet No. 30.

Reinforcing steel shall be shifted to clear anchor bolt wells by at least ½″.

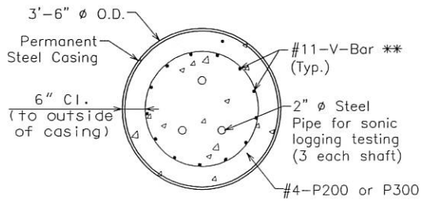
Holes for anchor bolts may be drilled into the substructure.



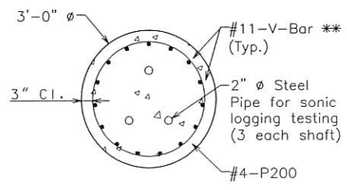
SECTION B–B



SECTION C–C



SECTION D–D



SECTION E–E

DETAILS OF INTERMEDIATE BENTS NO. 2 AND 3

Note: This drawing is not to scale. Follow dimensions.

Substructure Quantity Table for Bents No. 2 & 3

Item		Quantity Bent No. 2	Quantity Bent No. 3
Drilled Shafts (3 ft. 6 in. Dia.)	linear foot	32.5	34.0
Rock Sockets (3 ft. 0 in. Dia.)	linear foot	17.0	20.0
Supplementary Television Camera Inspection	each	1	1
Foundation Inspection Holes	linear foot	27.0	30.0
Sonic Logging Testing	each	1	1
Class B Concrete (Substructure)	cu. yard	8.0	7.9
Reinforcing Steel (Bridges)	pound	6,010	6,340

Note: These quantities are included in the Estimate Quantities Table on Sheet No. 24.

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DETAILS OF INTERMEDIATE BENTS NO. 2 & NO. 3

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
DAVID ANDREW STRAATMANN
NUMBER PE-2004000848
PROFESSIONAL ENGINEER
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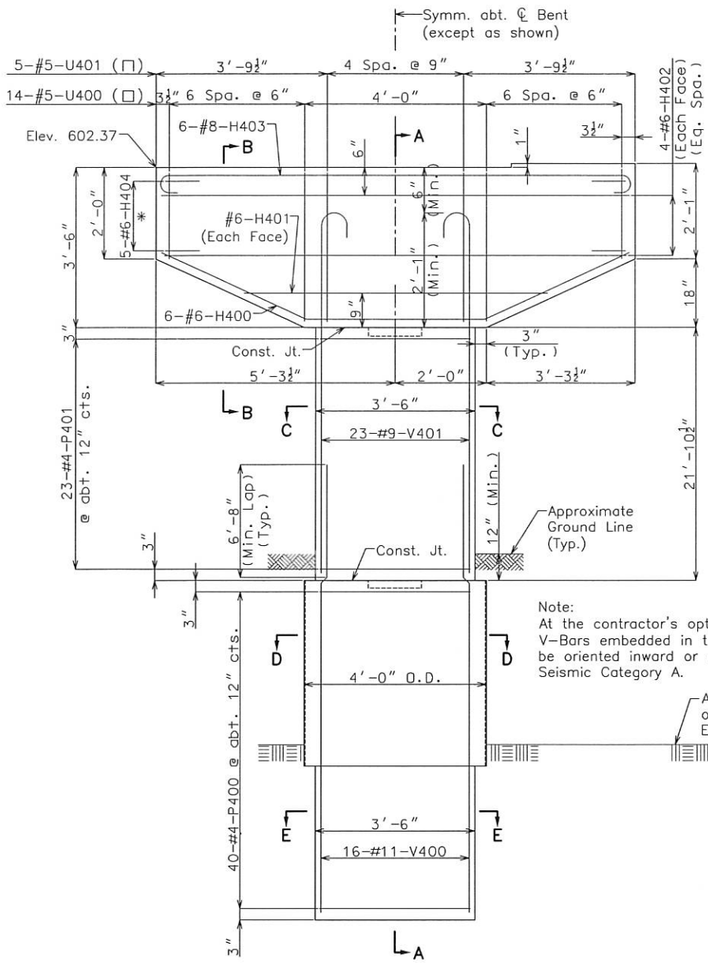
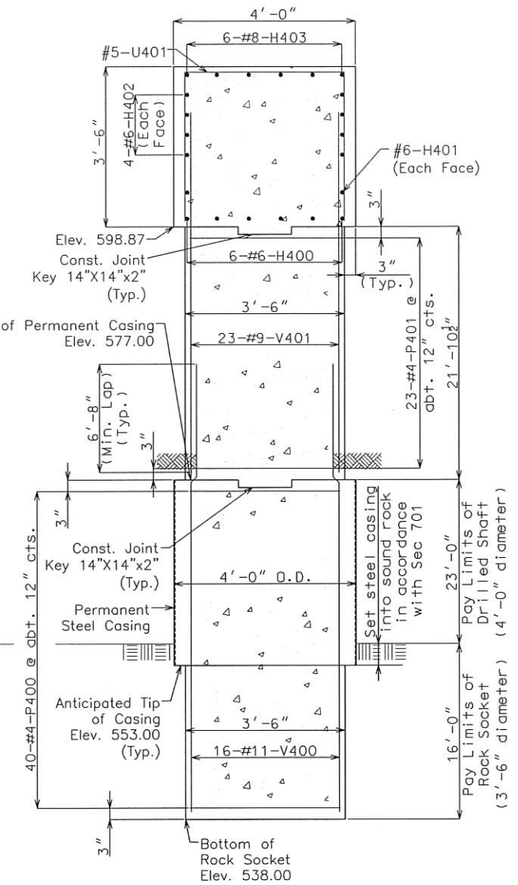
* Place with #8-H403 & #6-H402 bars.

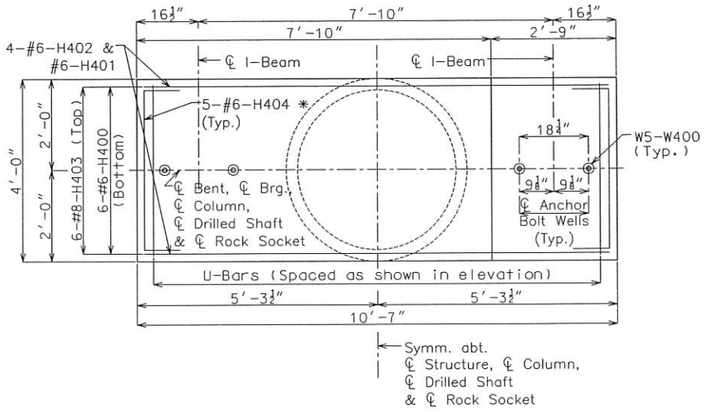


ELEVATION

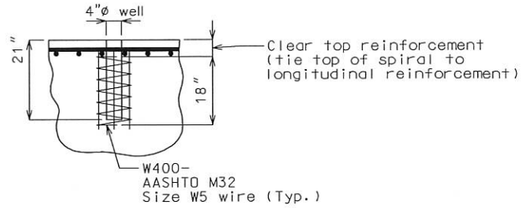


SECTION A–A

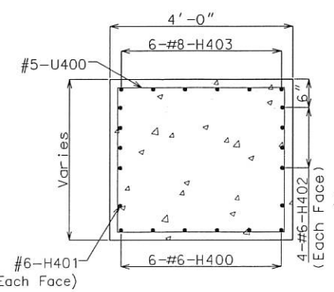
Note:
At the contractor's option, the hooks of V–Bars embedded in the beam cap may be oriented inward or outward for Seismic Category A.



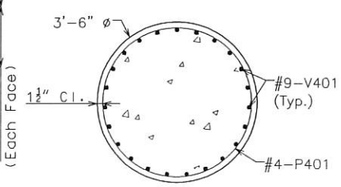
PLAN OF BEAM SHOWING REINFORCEMENT



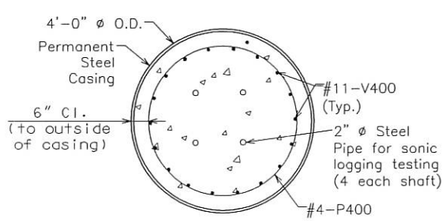
DETAIL OF ANCHOR BOLT WELLS



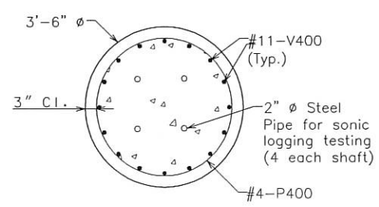
SECTION B–B



SECTION C–C



SECTION D–D



SECTION E–E

DETAILS OF INTERMEDIATE BENT NO. 4

Note: This drawing is not to scale. Follow dimensions.

Notes:

Design consultant to be notified of deviations in anticipated site conditions that affect the construction or design of drilled shafts or rock sockets.

An additional 4 feet has been added to #11–V400 lengths and an additional 4–#4–P400 bars have been added in the quantities, if required, for possible change in drilled shaft or rock socket length. The additional V–bar length shall be cut–off if not required. The additional P–bars shall be spaced similarly to that shown in elevation, if required, or to a lesser spacing if not required, but not less than 6" cts.

Sonic logging testing shall be performed on all drilled shafts and rock sockets.

Thickness of permanent steel casing shall be ⅜" (Min.) and in accordance with Sec 701.

The cost of any required excavation to the top of the drilled shafts will be considered completely covered by the contract unit price for other items.

All reinforcement located in the drilled shafts and rock sockets are included in the Substructure Quantity Table.

For Bearing Details, see Sheet No. 30.

Reinforcing steel shall be shifted to clear anchor bolt wells by at least ½".

Holes for anchor bolts may be drilled into the substructure.

Substructure Quantity Table for Bent No. 4

Item		Quantity
Drilled Shafts (4 ft. 0 in. Dia.)	linear foot	23.0
Rock Sockets (3 ft. 6 in. Dia.)	linear foot	16.0
Supplementary Television Camera Inspection	each	1
Foundation Inspection Holes	linear foot	26.0
Sonic Logging Testing	each	1
Class B Concrete (Substructure)	cu. yard	12.6
Reinforcing Steel (Bridges)	pound	7,460

Note: These quantities are included in the Estimate Quantities Table on Sheet No. 24.

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DETAILS OF INTERMEDIATE BENT NO. 4
FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
DAVID ANDREW STRATMANN
NUMBER PE-2004000848
PROFESSIONAL ENGINEER
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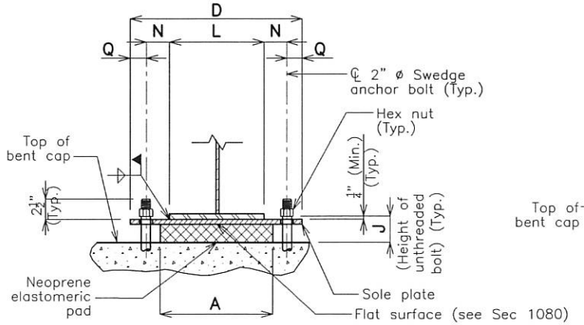
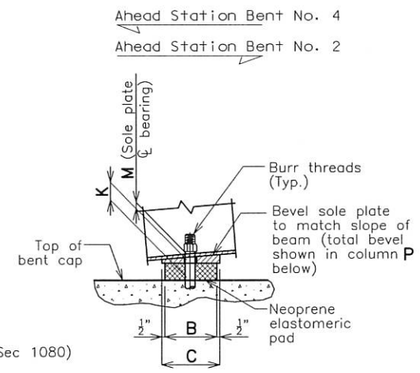
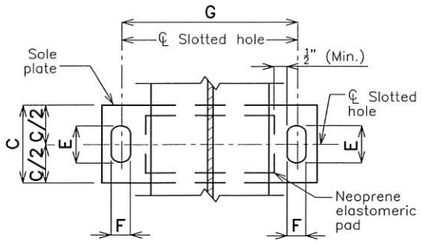


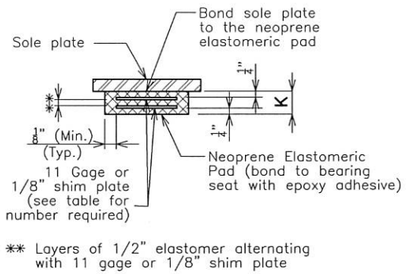
END VIEW



SIDE VIEW

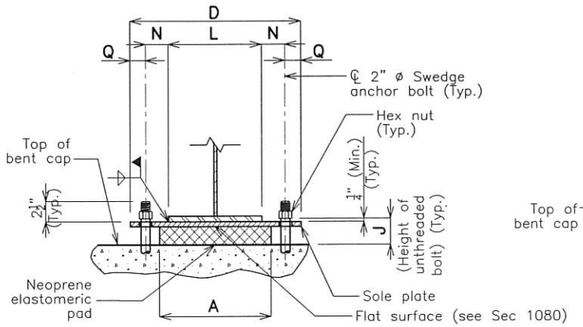


PART PLAN



** Layers of 1/2" elastomer alternating with 11 gage or 1/8" shim plate

NEOPRENE ELASTOMERIC PAD



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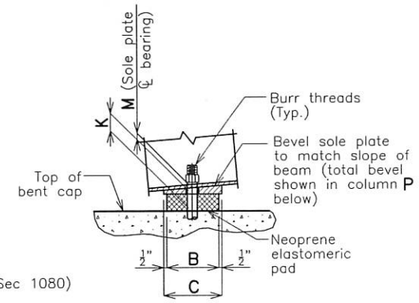
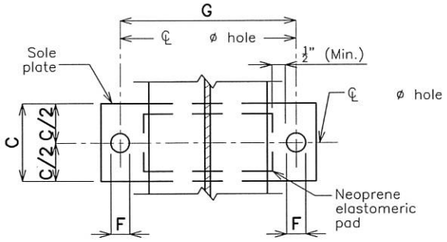
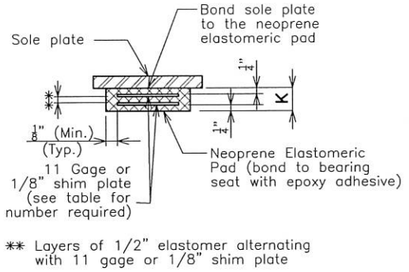


SIDE VIEW



PART PLAN



** Layers of 1/2" elastomer alternating with 11 gage or 1/8" shim plate

NEOPRENE ELASTOMERIC PAD

EXPANSION BEARINGS

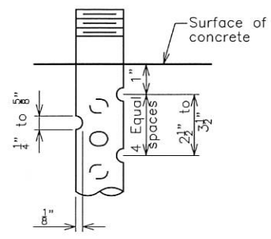
BENT NO.	A	B	C	D	E	F	G	J	K	L	M	N	P	Q	R	NUMBER OF SHIM PLATES *	NUMBER REQUIRED
2&4	15"	11"	12"	2'-0¼"	5⅛"	2⅛"	18¼"	4⅞"	3⅛"	10½"	1½"	3⅞"	¼"	3"	1/16"	5	4
																TOTAL BEARINGS	4

* The required shim plate shall be placed between layers of elastomer and molded together to form an integral unit.

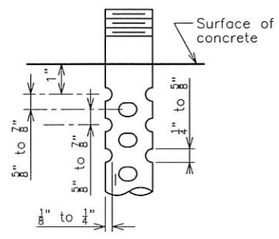
FIXED BEARINGS

BENT NO.	A	B	C	D	F	G	J	K	L	M	N	P	Q	NUMBER OF SHIM PLATES *	NUMBER REQUIRED
3	15"	11"	12"	2'-0¼"	2⅛"	18¼"	3⅝"	1⅞"	10½"	1½"	3⅞"	0"	3"	3	2
														TOTAL BEARINGS	2

* The required shim plate shall be placed between layers of elastomer and molded together to form an integral unit.



DETAIL OF 3/4"ø THRU 2 1/2"ø ANCHOR BOLTS



OPTIONAL DETAIL OF 1 3/8"ø THRU 2 1/2"ø ANCHOR BOLTS

SWEDGE ANCHOR BOLT DETAILS

GENERAL NOTES:

Anchor bolts shall be 2" ø ASTM F1554 Grade 55 swedged bolts and shall extend 18" into the concrete with ASTM A563 Grade A Hex or Heavy Hex nuts. Actual manufacturer's certified mill test reports(chemical and mechanical) shall be provided. Swedging shall be 1" less than extension into the concrete.

Anchor bolt shall be at the ℄ of slotted hole at 60°F. Bearing position shall be adjusted **R** for each 10° fall or rise in temperature at installation.

All structural steel for the anchor bolts and heavy hexagon nuts shall be coated with a minimum of two coats of inorganic zinc primer (5 mils minimum).

Neoprene Elastomeric Pads shall be 60 Durometer.

Structural steel for sole plate shall be ASTM A709 Grade 50W. The welds shall have corrosion resistance and weathering characteristics compatible with the base material.

Laminated Neoprene Bearing Pad Assembly shall be in accordance with Sec 716.

DETAILS OF LAMINATED NEOPRENE BEARING PAD ASSEMBLY

Note: This drawing is not to scale. Follow dimensions.

#	DATE	DESCRIPTION	BY

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DETAILS OF LAMINATED NEOPRENE BEARING PAD ASSEMBLY

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
DAVID ANDREW STRATMANN
NUMBER PE-2004000848
PROFESSIONAL ENGINEER
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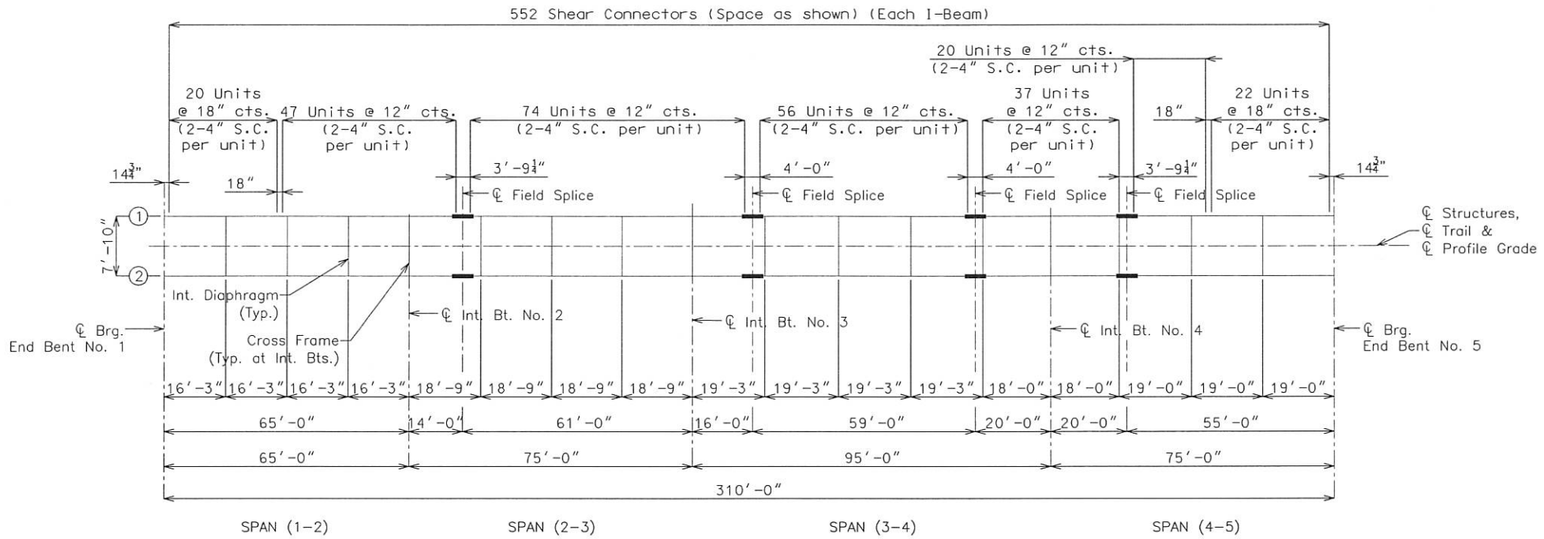
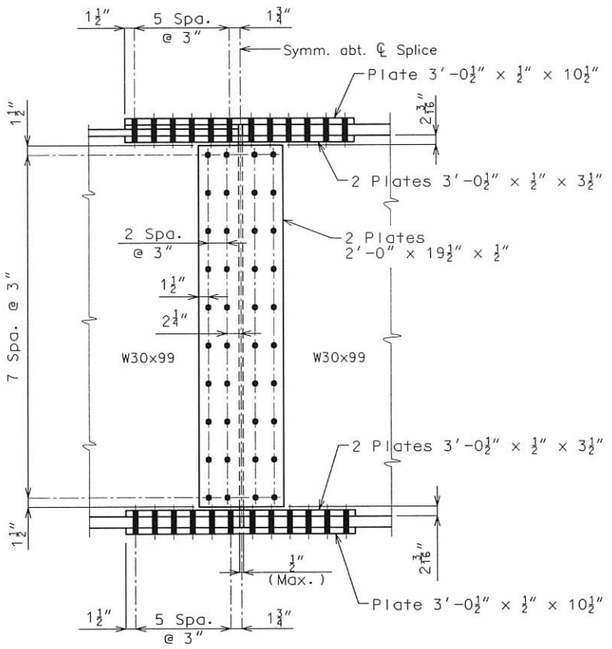


PLAN OF STRUCTURAL STEEL



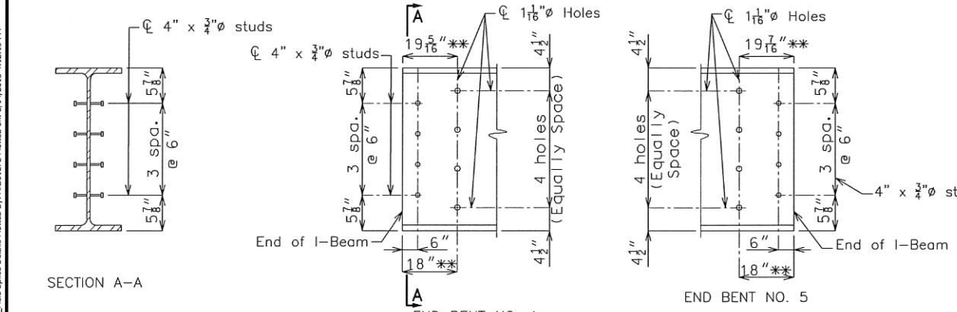
DETAIL OF BOLTED FIELD SPLICE

Note:
Use 7/8"ø high strength bolts with 15/16"ø holes.

Contact surfaces shall be in accordance with Sec 1081 for surface preparation.

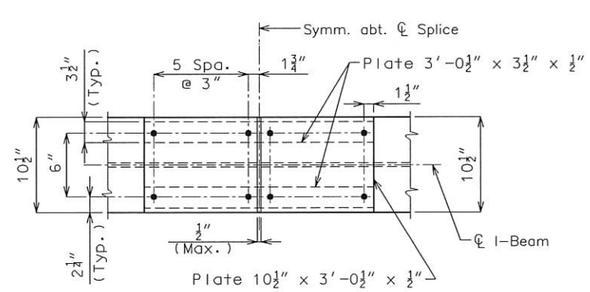
All splice plates (Web and Flange) shall be ASTM A709 Grade 50W.

Portions of structural steel embedded or in contact with concrete shall be coated with a minimum of 2.0 mils of System H prime coat in accordance with Sec 1080. Cost of coating shall be considered completely covered by the contract unit price for Fabricated Structural Low Alloy Steel.

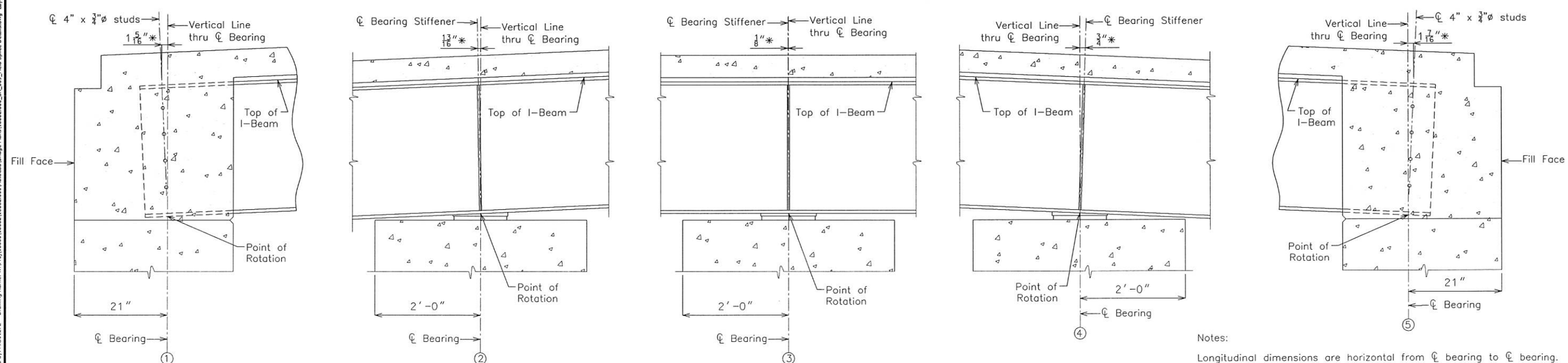


DETAILS OF WEB HOLES AT END BENTS

** Measured horizontally from top or bottom of I-Beam.



PLAN OF FLANGE SPLICE (Top & Bottom)



PART LONGITUDINAL SECTION

* Measured horizontally from Point of Rotation to Top of I-Beam

Note: This drawing is not to scale. Follow dimensions.

Notes:

Longitudinal dimensions are horizontal from ℄ bearing to ℄ bearing.

For details of intermediate diaphragms and Elevation of Girder, see Sheet No. 32.

For detail of anchor bolt wells and bearing details, see Sheets No. 28-30.

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FIELD SPLICE DETAILS, PART LONGITUDINAL SECTION AND PLAN OF STRUCTURAL STEEL

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STATE OF MISSOURI
DAVID ANDREW STRAATMANN
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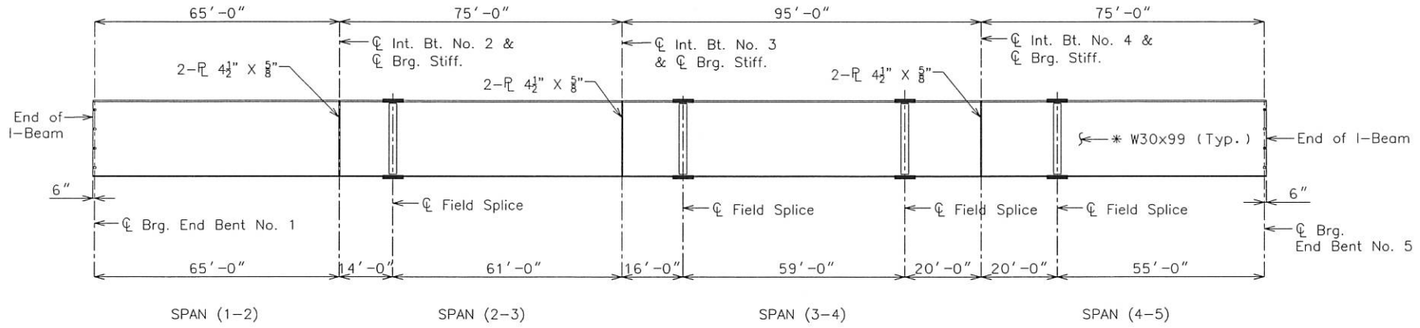
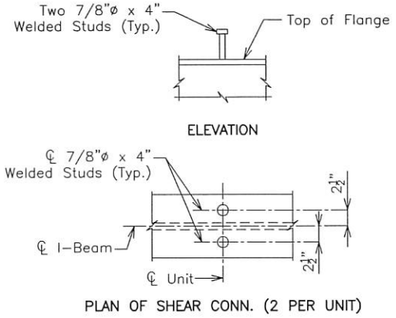


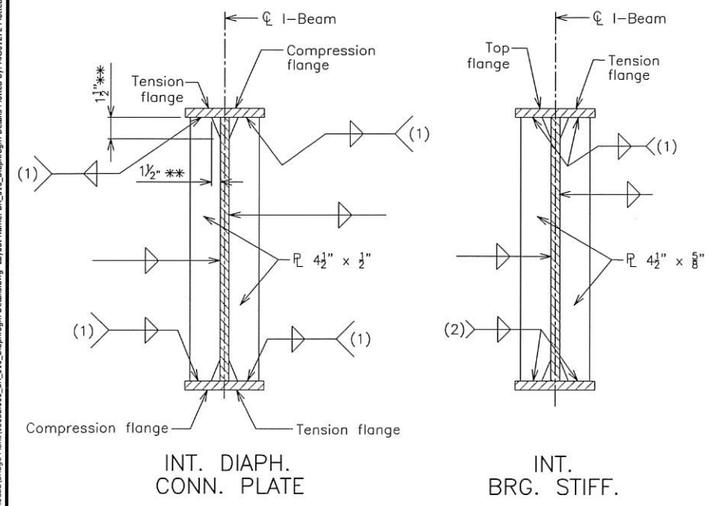
ELEVATION OF I-BEAM



DETAILS OF SHEAR CONNECTORS

Notes: Weight of 895 pounds of shear connectors is included in the weight of Fabricated Structural Low Alloy Steel (I-Beam) A709, Grade 50W.

Shear connectors shall be in accordance with Sec 712, 1037 & 1080.

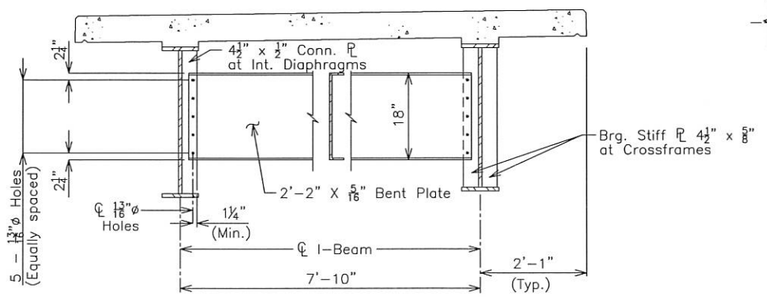


(1) Tight fit

(2) Grind or mill to bear.

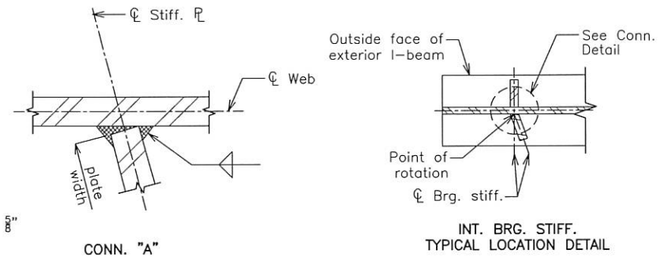
** Typical for all int. diaph. conn. pl. and brg. stiff.

WELDING DETAILS



TYPICAL PART SECTION SHOWING INTERMEDIATE DIAPHRAGMS AND CROSS FRAMES

Note: This drawing is not to scale. Follow dimensions.



WELDING DETAILS

Notes:

For Plan of Structural Steel Detail of Bolted Field Splice and location of web holes at End Bents, see Sheet No. 31.

Fabricated Structural Steel for diaphragms shall be ASTM A709 Grade 50W.

At the contractor's option, holes in the diaphragm plate of non slab bearing diaphragms may be made 3/16" larger than the nominal diameter of the bolt. A hardened washer shall be used under the bolt head and nut when this option is used. Holes in the girder diaphragm connection plate or transverse web stiffener shall be standard size.

I-Beams shall be fabricated to be in accordance with the camber diagram shown on Sheet No. 33.

Longitudinal dimensions are horizontal from ℄ bearing to ℄ bearing. See Part Longitudinal Section on Sheet No. 31.

* Notch toughness is required for all wide flange beams.

INTERMEDIATE DIAPHRAGM DETAILS AND ELEVATION OF I-BEAM

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

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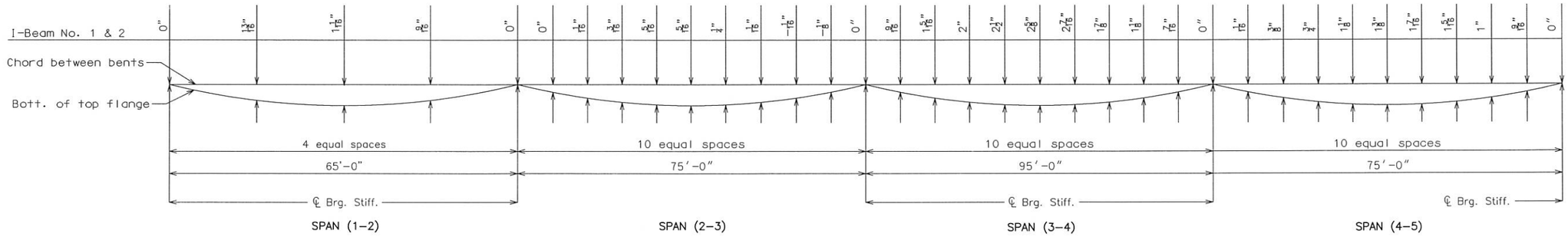
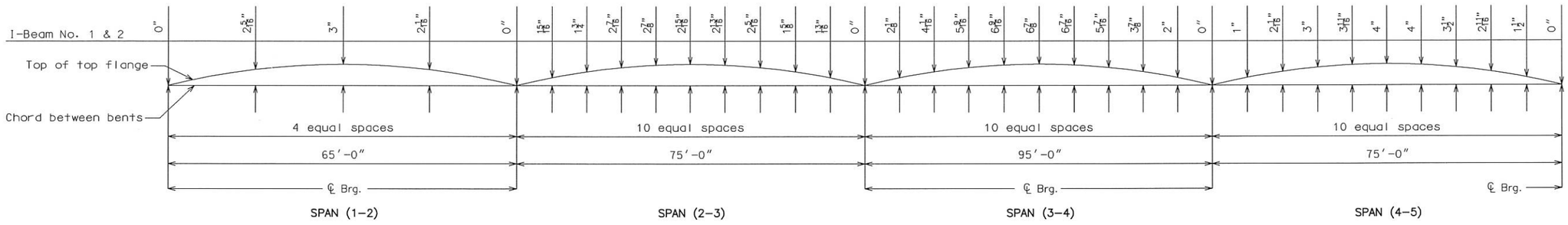


DEAD LOAD DEFLECTION

Note: 16.1% of dead load deflection is due to the weight of structural steel.
Dead load deflection includes weight of structural steel, concrete slab, SIP forms and pedestrian fencing.
A negative valve indicates an upward deflection.



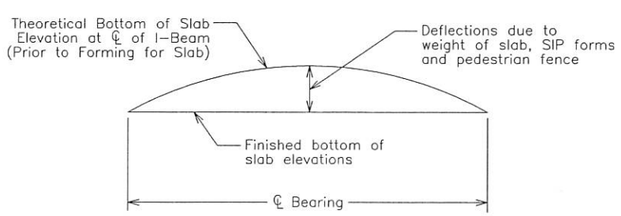
I-BEAM CAMBER DIAGRAM

Note: Camber includes allowance for vertical curve, and dead load deflection due to concrete slab, SIP forms, pedestrian fencing and structural steel.

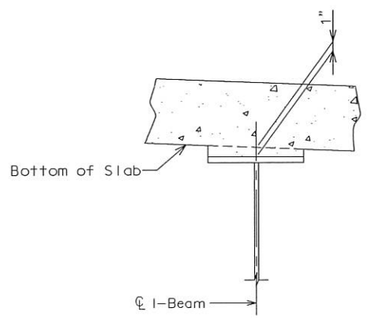
Theoretical Bottom of Slab Elevations at CL of I-Beam (Prior to Forming for Slab) **

	Span (1-2) (65'-0" ℄ brg. - ℄ brg.)										
	℄ Brg.	.25	.50	.75	℄ Brg.						
I-Beam No. 1	602.56	603.36	604.04	604.59	605.05						
I-Beam No. 2	602.64	603.44	604.12	604.67	605.13						
	Span (2-3) (75'-0" ℄ brg. - ℄ brg.)										
	℄ Brg.	.10	.20	.30	.40	.50	.60	.70	.80	.90	℄ Brg.
I-Beam No. 1	605.05	605.26	605.44	605.62	605.78	605.91	606.02	606.11	606.18	606.23	606.29
I-Beam No. 2	605.13	605.33	605.52	605.70	605.86	605.99	606.10	606.18	606.26	606.31	606.37
	Span (3-4) (95'-0" ℄ brg. - ℄ brg.)										
	℄ Brg.	.10	.20	.30	.40	.50	.60	.70	.80	.90	℄ Brg.
I-Beam No. 1	606.29	606.35	606.41	606.43	606.40	606.33	606.20	606.03	605.81	605.56	605.31
I-Beam No. 2	606.37	606.43	606.48	606.50	606.48	606.41	606.28	606.11	605.89	605.64	605.39
	Span (4-5) (75'-0" ℄ brg. - ℄ brg.)										
	℄ Brg.	.10	.20	.30	.40	.50	.60	.70	.80	.90	℄ Brg.
I-Beam No. 1	605.31	605.11	604.90	604.67	604.42	604.15	603.86	603.56	603.23	602.89	602.53
I-Beam No. 2	605.39	605.19	604.98	604.74	604.50	604.23	603.94	603.64	603.31	602.97	602.61

** Elevations are based on a constant slab thickness of 6" and include allowance for theoretical dead load deflections due to weight of slab, SIP forms and pedestrian fence.



TYPICAL SLAB ELEVATIONS DIAGRAM



THEORETICAL SLAB HAUNCH

* Dimension (bottom of slab to top of I-Beam) may vary if I-Beam camber after erection differs from plan camber by more than the % of Dead Load Deflection due to weight of structural steel. No payment will be made for additional forming or concrete required for variable haunching.

DEAD LOAD DEFLECTION, CAMBER & SLAB HAUNCH & SLAB ELEVATION

FORUM BOULEVARD TRAIL
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DESIGN PROJ:	18082.000
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DRAWING NO:	
SHEET NO:	33 of 58

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Last edit on: Aug 10, 2015 by: AK301272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Bridge Plans\18082.000_BR_011_DeadLoad_Camber_SlabElev.dwg Layout Name: BR_011_DeadLoad_Camber_SlabElev Plotted on: 8/14/2015 4:12:31 PM

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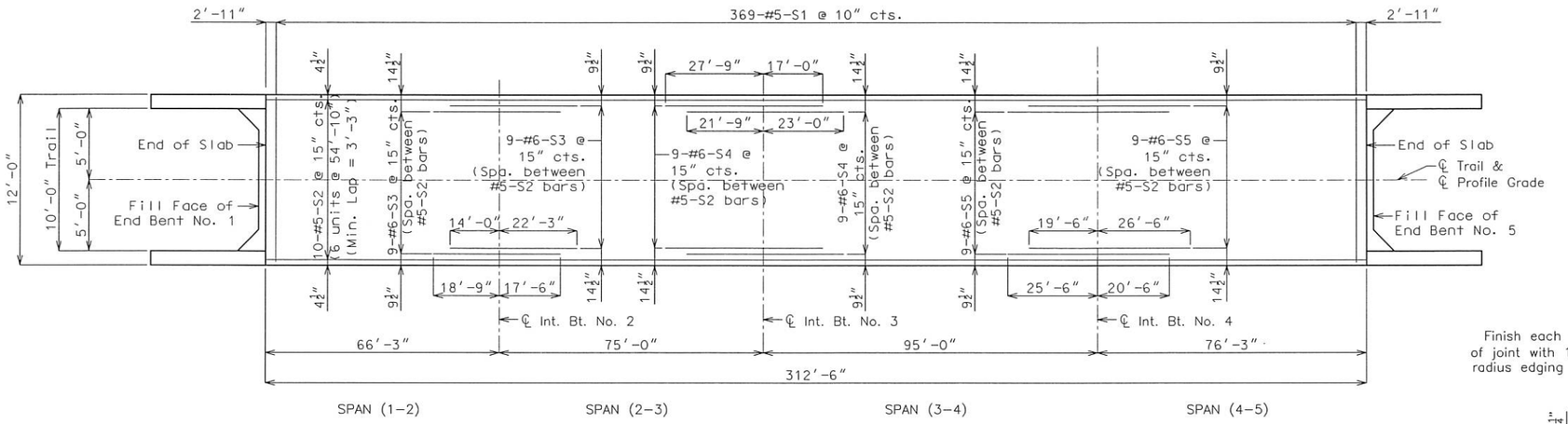
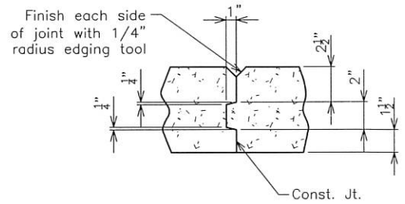
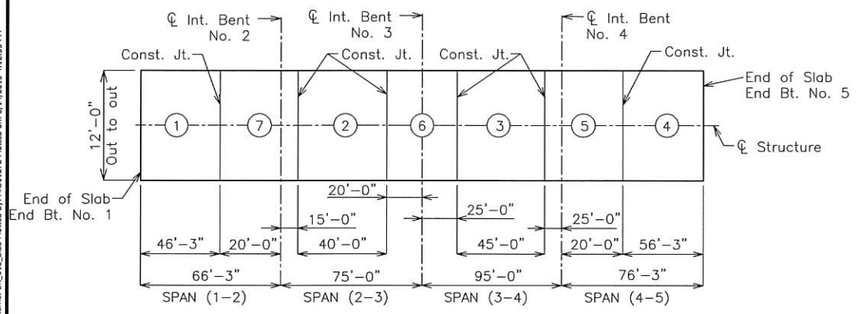


PLAN OF SLAB SHOWING REINFORCEMENT



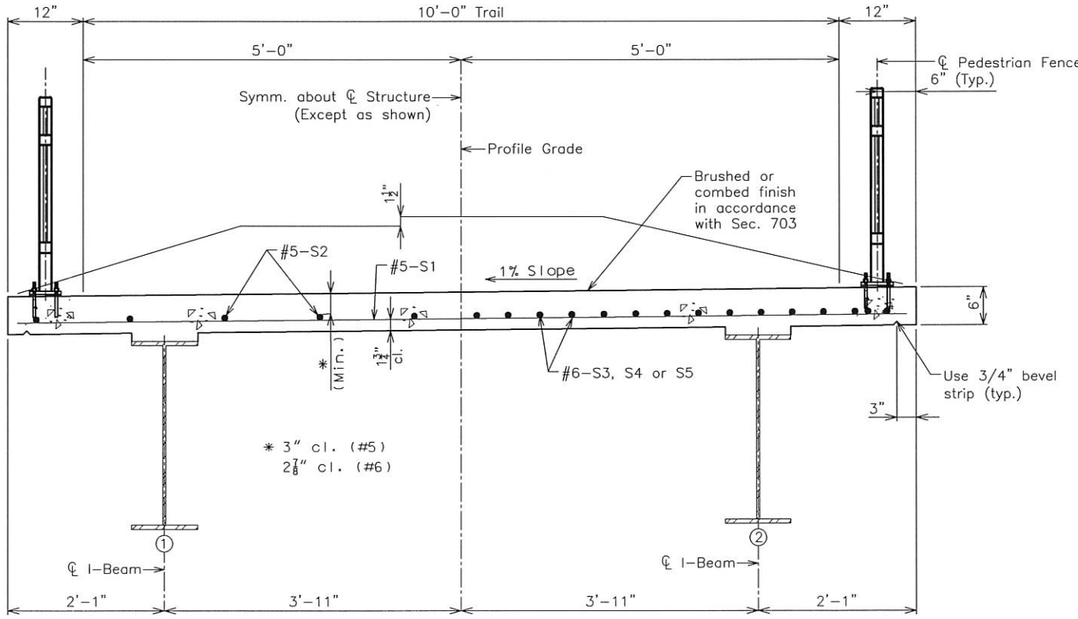
SLAB CONSTRUCTION JOINT DETAILS



	Sequence of Pours							Min. rate of pour cu. yds./hr.	
	Direction							With retarder	No retarder
Basic sequence	1	2	3	4	5	6	7	25	25
	Either direction								
Alternate pours to the basic skip sequence are subject to the approval of the engineer in accordance with Sec 703.									
Alternate "A" pours	1	7 + 2		6 + 3		5 + 4		25	25
	End to 7	1 to 6		2 to 5		3 to end			
Alternate "B" pours	1 + 7 + 2		6 + 3		5 + 4			25	25
	End to 6		2 to 5		3 to end				
Alternate "C" pours	1 + 7 + 2			6 + 3 + 5 + 4				25	25
	End to 6			2 to end					
Alternate "D" pours	1 + 7 + 2 + 6 + 3 + 5 + 4							25	25
	End to end								

Note: The contractor shall pour and satisfactorily finish the slab pours at the rate given. Retarder, if used, shall be an approved type and retard the set of concrete to 2.5 hours.

SLAB POURING SEQUENCE



HALF SECTION NEAR ℄ SPAN HALF SECTION NEAR INTERMEDIATE BENT

TYPICAL SECTION THRU SLAB

SLAB DETAILS

Note: This drawing is not to scale. Follow dimensions.

Notes:

Longitudinal dimensions shown are measured horizontally and parallel to ℄ Trail.

For Details of Pedestrian Fence not shown, see Sheet No. 35.

For Theoretical Slab Haunching Diagram, Bottom of Slab Elevations, Dead Load Deflections and Camber Diagram, see Sheet No. 33.

For Optional S.I.P. Form details, see Sheet No. 24.

BARTLETT & WEST
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SLAB DETAILS AND TYPICAL SECTION

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
DAVID ANDREW STRAATMANN
NUMBER PE-2004000848
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	DAS
DRAWN BY:	TAA
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	34 of 58

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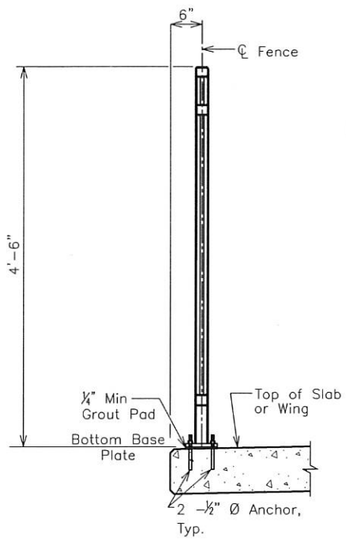
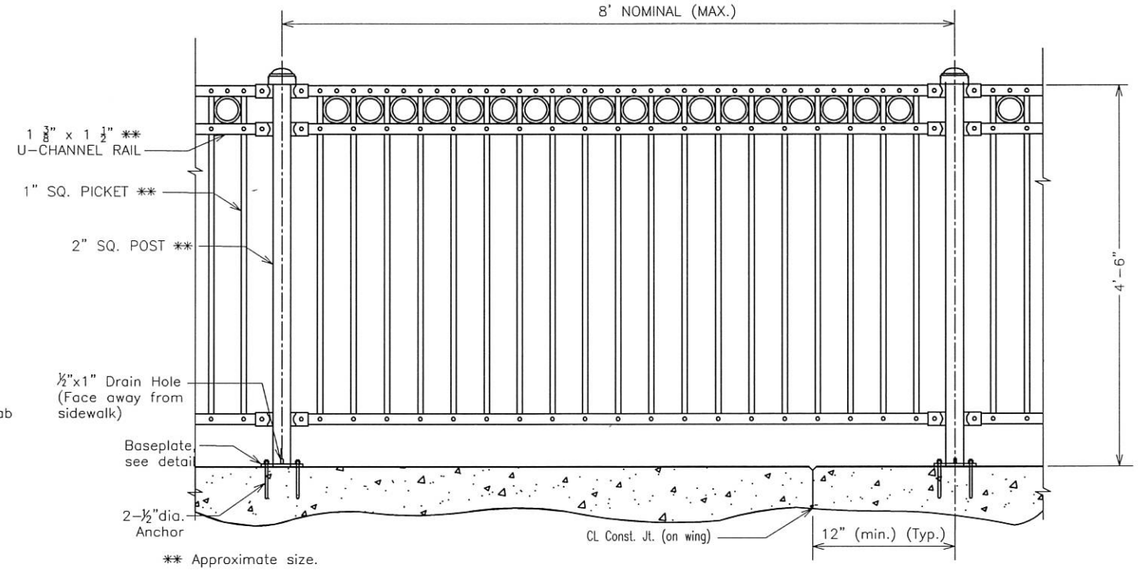
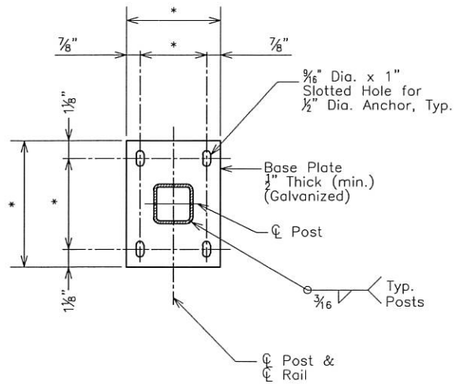


TYPICAL SECTION



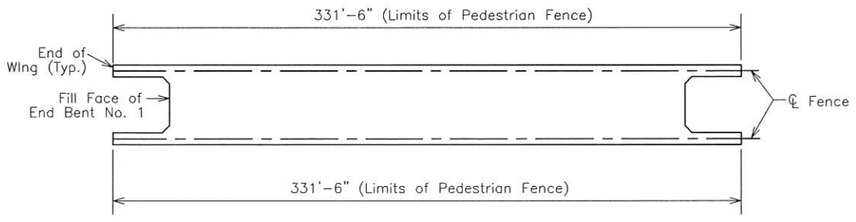
FENCE ELEVATION

NOTE:
Anchors shall be drilled in place. Exposed portion of anchors, nuts and washers shall be field painted after installation.



BASE PLATE DETAIL

* Dimensions per design



LIMITS OF PEDESTRIAN FENCE

Note: Longitudinal Dimensions are Horizontal.

STEEL PEDESTRIAN FENCE

Note: This drawing is not to scale. Follow dimensions.

GENERAL NOTES:

Plans are for the design of the post spacing and base plate connection only. Railing, post and base plate details are shown schematically. Contractor shall submit detailed shop drawings and calculations based on a design in accordance with the 2012–AASHTO CRFD 6th Edition and 2013 interims signed and sealed by a professional engineer registered in the State of Missouri. (50 lb/ft and 200 lb loading shall not be applied simultaneously)

Install fence per manufacturer's recommendations, the contract plans, and the Job Special Provisions. Every effort shall be made to keep panel lengths similar, to provide a uniform look across the length of the bridge.

All connections from post to rail shall be bolted.

Use E70 XX electrodes for all welding.

Tubular steel shall be ASTM A–924/A924M with a minimum yield strength of 45 ksi.

Base plates shall be ASTM A709, Grade 36.

Dimensions of fence are measured along the grade.

Rails and base plates shall be set parallel to top of slab. All posts and balusters shall be set vertical. Grout shall be used between concrete and base plate of post.

Grout of ¼" minimum thickness shall be placed under base plates to provide for vertical alignment of rail posts and shall be in accordance with Sec. 1066. The grout shall be mixed, applied and cured according to the manufacturer's recommendations.

Concrete anchors, nuts and washers shall be galvanized in accordance with ASTM A153 and Sec.1081.

Nuts shall conform to ASTM A307. Nuts shall be regular hexagon type. Washers shall be of standard commercial quality.

The concrete anchors shall have a minimum ultimate pullout strength of 7900 lbs. based on the concrete. The length of embedment into concrete shall conform to manufacturer's recommendations.

Expansion joints shall be provided per the manufacturer's recommendation.

Separation gaps shall be provided as stated in the Job Special Provisions.

For details of styles and specifications associated with the fence, see the Job Special Provisions.

Measurement of "Pedestrian Fence (Structures)" will be to the nearest linear foot from end of fence to end of fence on both sides of the bridge or as shown.

Cost of furnishing the concrete anchors complete–in–place will be considered completely covered by the contract unit price for Pedestrian Fence (Structures)".

All material, labor, splices, grout, and installation shall be paid for under the bid item "Pedestrian Fence (Structures)" per linear foot.

#	DATE	DESCRIPTION	BY

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MISSOURI CERTIFICATE OF AUTHORITY NO. 000167 ENGINEERING
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DETAILS OF STEEL PEDESTRIAN FENCE

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
DAVID ANDREW STRAATMANN
NUMBER PE-2004000848
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SHEET NO:	35 of 58

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Last edit on: Aug 10, 2015 by: AK001272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Bridge Plans\18082.200_BR_013_Pedestrian Fence.dwg Layout Name: BR_013_Pedestrian Fence Plotted By: AK001272 Plotted on: 8/14/2015 4:12:43 PM

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BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
		SUBSTRUCTURE																
		INT BT NO 2																
6	6 H200	BEAM		15		X			3 6.250	3 11.000	3 6.250	17.500	3 2.500	17.500	3 2.500	11 0	10 11	98
2	6 H201	BEAM		20		X			6 8.000							6 8	6 8	20
8	6 H202	BEAM		20		X			10 4.000							10 4	10 4	124
6	8 H203	BEAM		18		X			10 4.000							12 2	12 2	195
10	6 H204	BEAM		10	S	X				22.000	3 7.750					7 4	7 0	105
54	4 P200	SHAFT		16		X			2 6.000							8 9	8 9	316
13	4 P201	COLUMN		16		X			2 9.000							9 6	9 6	82
14	5 U200	BEAM		13	S	X	V	2	3 9.000	3 2.875	3 9.000	3 2.875				14 11	14 7	
		INCREMENT =							3 9.000	22.500	3 9.000	22.500				12 2	11 10	193
		5.500 INCH																
5	5 U201	BEAM		10	S	X				3 3.000	3 9.000					10 3	10 1	53
15	9 V200	COLUMN		20		X			14 11.000							14 11	14 11	761
13	11 V201	SHAFT		20		X			58 7.000							58 7	58 7	4046
4	W5 W200	A.B. WELL		22		X			18.000	9.125						26 1	26 1	17
		INT BT NO 3																
6	6 H200	BEAM		15		X			3 6.250	3 11.000	3 6.250	17.500	3 2.500	17.500	3 2.500	11 0	10 11	98
2	6 H201	BEAM		20		X			6 8.000							6 8	6 8	20
8	6 H202	BEAM		20		X			10 4.000							10 4	10 4	124
6	8 H203	BEAM		18		X			10 4.000							12 2	12 2	195
10	6 H204	BEAM		10	S	X				22.000	3 7.750					7 4	7 0	105
59	4 P200	SHAFT		16		X			2 6.000							8 9	8 9	345
13	4 P201	COLUMN		16		X			2 9.000							9 6	9 6	82
14	5 U200	BEAM		13	S	X	V	2	3 9.000	3 2.875	3 9.000	3 2.875				14 11	14 7	
		INCREMENT =							3 9.000	22.500	3 9.000	22.500				12 2	11 10	193
		5.500 INCH																
5	5 U201	BEAM		10	S	X				3 3.000	3 9.000					10 3	10 1	53
15	9 V300	COLUMN		20		X			14 9.000							14 9	14 9	752
13	11 V301	SHAFT		20		X			23 1.000							23 1	23 1	1594
13	11 V302	SHAFT		20		X			40 0.000							40 0	40 0	2763
4	W5 W200	A.B. WELL		22		X			18.000	9.125						26 1	26 1	17
		INT BT NO 4																
6	6 H400	BEAM		15		X			3 6.250	3 11.000	3 6.250	17.500	3 2.500	17.500	3 2.500	11 0	10 11	98
2	6 H401	BEAM		20		X			6 8.000							6 8	6 8	20
8	6 H402	BEAM		20		X			10 4.000							10 4	10 4	124
6	8 H403	BEAM		18		X			10 4.000							12 2	12 2	195
10	6 H404	BEAM		10	S	X				22.000	3 7.750					7 4	7 0	105
44	4 P400	SHAFT		16		X			3 0.000							10 4	10 4	304
22	4 P401	COLUMN		16		X			3 3.000							11 1	11 1	163

NO. REQ'D.	MARK NO. SIZE MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
14	5 U400	BEAM		13	S	X	V	2	3 9.000	3 2.875	3 9.000	3 2.875				14 11	14 7	
		INCREMENT =							3 9.000	22.500	3 9.000	22.500				12 2	11 10	193
		5.500 INCH																
5	5 U401	BEAM		10	S	X				3 3.000	3 9.000					10 3	10 1	53
16	11 V400	SHAFT		20		X			49 8.000							49 8	49 8	4222
23	9 V401	COLUMN		17		X			23 10.000							25 1	25 1	1962
4	W5 W400	A.B. WELL		22		X			18.000	9.125						26 1	26 1	17
		END BENTS																
		NO 1 & 5																
32	6 F100	DIAPHRAGM		23	S				14.000	4 5.500	14.000	9.875	9.875	9.875	9.875	6 10	6 9	324
12	6 F101	DIAPHRAGM		19	S				3 6.000	2 8.375						6 2	6 1	110
40	6 H100	BEAM/DIAPH		20					11 9.000							11 9	11 9	706
8	6 H101	DIAPH	E	20					11 9.000							11 9	11 9	141
48	6 H102	WING		20					10 5.000							10 5	10 5	751
8	6 H103	WING	E	20					11 7.000							11 7	11 7	139
20	4 H104	DIAPH	E	20					12.000							0 12	0 12	13
16	5 U100	BEAM		10	S					5 0.000	2 9.000					12 9	12 7	210
8	4 U101	BEAM		10	S					2 7.500	2 9.000					8 0	7 10	42
22	5 U102	DIAPHRAGM	E	21	S				2 3.000	2 4.250	2 3.000			2 3.000	1.250	6 10	6 8	153
22	6 U103	DIAPHRAGM		19	S				2 3.000	2 9.000						5 0	4 10	160
28	6 U104	DIAPHRAGM	E	15	S				4 6.000	2 7.000				4 6.000	2.500	7 1	6 11	291
12	5 V100	BEAM		20					5 0.000							5 0	5 0	63
8	6 V101	DIAPHRAGM		20					2 3.000							2 3	2 3	27
4	6 V102	WING		20					5 4.000							5 4	5 4	32
4	6 V103	WING		20					5 6.000							5 6	5 6	33
36	6 V104	WING		20			V	2	5 9.000							5 9	5 9	
		INCREMENT =							5 5.000							5 5	5 5	302
		0.250 INCH																
36	6 V105	WING		20			V	2	5 11.000							5 11	5 11	
		INCREMENT =							5 6.000							5 6	5 6	309
		0.250 INCH																
		SLAB																
369	5 S1	SLAB	E	20					11 9.000							11 9	11 9	4522
60	5 S2	SLAB	E	20					54 10.000							54 10	54 10	3431
18	6 S3	SLAB	E	20					36 3.000							36 3	36 3	980
18	6 S4	SLAB	E	20					44 9.000							44 9	44 9	1210
18	6 S5	SLAB	E	20					46 0.000							46 0	46 0	1244
		TOTALS																
	4																	1334
	4		E															13
	5																	1011

STIRRUP HOOK DIMENSIONS				
GRADES 40 – 50 – 60 KSI				
BAR SIZE	D (IN.)	90° HOOK: HOOK A or G	135° HOOK: HOOK A or G	135° HOOK: APPROX. H
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

NOTE: Unless otherwise noted diameter "D" is the same for all bends and hooks on a bar.

END HOOK DIMENSIONS				
BAR SIZE	D (IN.)	ALL GRADES 180° HOOKS A or G	180° HOOKS J	90° HOOKS A or G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"

Note: This drawing is not to scale. Follow dimensions.

NOTE:
All standard hooks and bends other than 180 degree are to be bent with same procedure as for 90 degree standard hooks.
Hooks and bends shall be in accordance with the procedures as shown on this sheet.
E = Epoxy Coated Reinforcement.
S = Stirrup.
X = Bar is included in substructure quantities.
V = Bar dimensions vary in equal increments between dimensions shown on this line and the following line.
No. Ea. = Number of bars of each length.
Nominal lengths are based on out to out dimensions shown in bending diagrams and are listed for fabricators use. (nearest inch)
Actual lengths are measured along centerline bar to the nearest inch.
Payweights are based on actual lengths.
Four angle or channel spacers are required for each column spiral. spacers are to be placed on inside of spirals. length and weight of column spirals do not include splices or spacers.
Reinforcing steel (Grade 60) FY = 60,000 PSI.

BENDING DIAGRAMS

BY | DESCRIPTION | DATE | #

BARTLETT & WEST
1719 SOUTHRIDGE DR., SUITE 100 · JEFFERSON CITY, MO 65109.4000
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BARBILL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
DAVID ANDREW STRAATMANN
NUMBER PE-2004000848
PROFESSIONAL ENGINEER

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SHEET NO:	36 of 58

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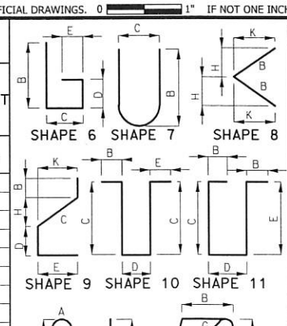
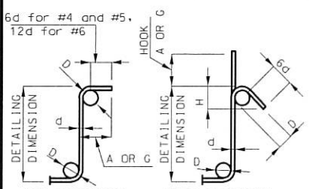
BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
	5		E															8106
	6																	3795
	6		E															4005
	8																	585
	9																	3475
	11																	12625
	W5																	51
		TOTAL																22876
		TOTAL	E															12124
		Slab on Girder																
	4																	42
	4		E															13
	5																	273
	5		E															8106
	6																	2754
	6		E															4005
		TOTAL																15193
		Reinforcing Steel (Bridges)																
	4																	1292
	5																	738
	6																	1041
	8																	585
	9																	3475
	11																	12625
	W5																	51
		TOTAL																19807

NO. REQ'D.	MARK NO. SIZE MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.

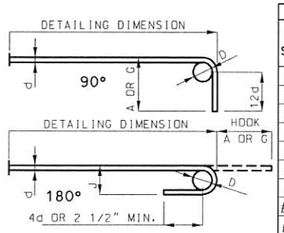


BENDING DIAGRAMS



STIRRUP HOOK DIMENSIONS GRADES 40 – 50 – 60 KSI			
BAR SIZE	D (IN.)	90° HOOK HOOK A or G	135° HOOK HOOK A or G	135° HOOK APPROX. H
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

NOTE: Unless otherwise noted diameter "D" is the same for all bends and hooks on a bar.



END HOOK DIMENSIONS				
BAR SIZE	D (IN.)	ALL GRADES 180° HOOKS A or G	J	90° HOOKS A or G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"

NOTE:
All standard hooks and bends other than 180 degree are to be bent with same procedure as for 90 degree standard hooks.
Hooks and bends shall be in accordance with the procedures as shown on this sheet.
E = Epoxy Coated Reinforcement.
S = Stirrup.
X = Bar is included in substructure quantities.
V = Bar dimensions vary in equal increments between dimensions shown on this line and the following line.
No. Ea. = Number of bars of each length.
Nominal lengths are based on out to out dimensions shown in bending diagrams and are listed for fabricators use. (nearest inch)
Actual lengths are measured along centerline bar to the nearest inch.
Payweights are based on actual lengths.
Four angle or channel spacers are required for each column spiral. spacers are to be placed on inside of spirals. length and weight of column spirals do not include splices or spacers.
Reinforcing steel (Grade 60) FY = 60,000 PSI.

Note: This drawing is not to scale. Follow dimensions.

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BY | DESCRIPTION | # | DATE

BARBILL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
DAVID ANDREW STRAATMANN
NUMBER PE-2004000848
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	DAS
DRAWN BY:	TAA
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	37 of 58

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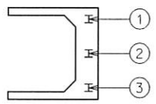
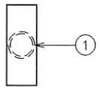
Last edit on: Aug 10, 2015 by: AK301272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Bridge Plans\18082.000_BR_015_Barbill_2.2.dwg Layout Name: BR_015_Barbill_2.2 Plotted By: AK091272 Plotted on: 8/14/2015 4:12:58 PM

BAR IS ONE INCH ON OFFICIAL DRAWINGS. 0 1" IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.



END BENT NO. 1



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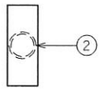
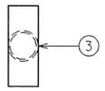


INT. BENT NO. 3



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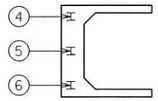

END BENT NO. 5

PART PLAN SHOWING PILE AND DRILLED SHAFT NUMBERING FOR RECORDING AS-BUILT PILE/DRILLED SHAFT DATA

As-Built Drilled Shaft Data				
Shaft No.	Top of Sound Rock (Elev.)	Tip of Casing (Elev.)	Bottom of Rock Socket (Elev.)	Remarks
				INT. BENT NO. 2
1				
				INT. BENT NO. 3
2				
				INT. BENT NO. 4
3				

As-Built Pile Data			
Pile No.	Length in Place (ft)	Computed Nominal Axial Compressive Resistance (kips)	Remarks
			END BENT NO. 1
1			
2			
3			
			END BENT NO. 5
4			
5			
6			

Note:

Indicate remarks in the remarks column.
A. Pile type and grade
B. Batter (If other than shown on Bent Detail sheet.)
C. Driven to practical refusal

This sheet to be completed by City of Columbia construction personnel.

Note: This drawing is not to scale. Follow dimensions.

BARTLETT & WEST
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AS-BUILT PILE/DRILLED SHAFT DATA

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
DAVID ANDREW STRAATMANN
NUMBER PE-2004000848
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	DAS
DRAWN BY:	TAA
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	38 of 58

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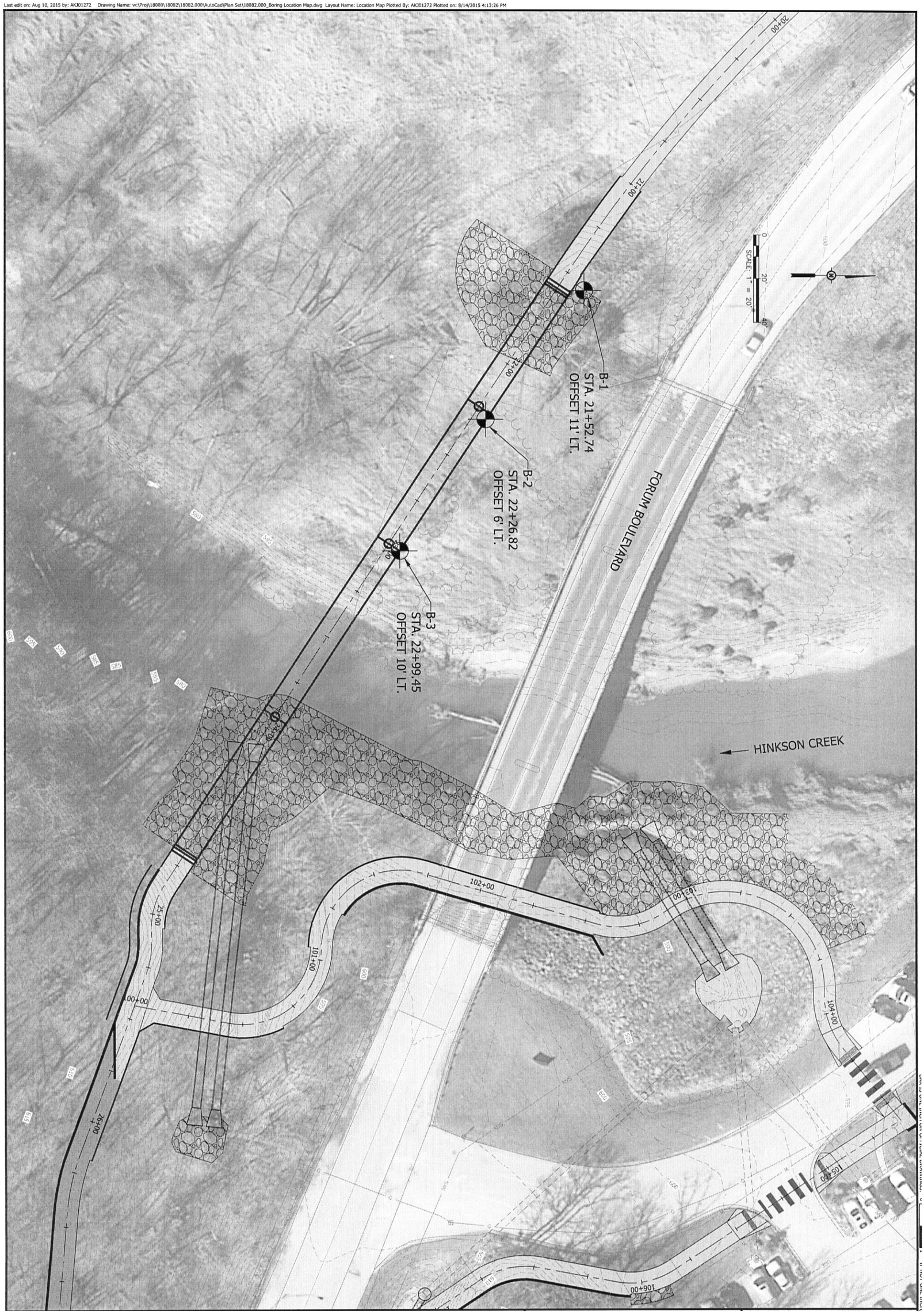
Last edit on: Aug 10, 2015 by: AK01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Bridge Plans\18082.000_BR_016_as_built_dshaft.dwg Layout Name: BR_016_as_built_dshaft Plotted By: AK01272 Plotted on: 8/14/2015 4:13:01 PM

Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Boring Location Map.dwg Layout Name: Location Map Plotted By: AKJ01272 Plotted on: 8/14/2015 4:13:26 PM



SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	39 of 58

STATE OF MISSOURI
TODD C. KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

BORING DATA LOCATION MAP

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

BARTLETT & WEST
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PHONE 573.634.3181 · FAX 573.634.7904
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#	DATE	DESCRIPTION	BY

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BORING LOG NO. B-1

Page 1 of 2

PROJECT: Forum Boulevard Pedestrian Bridge

CLIENT: Bartlett & West Engineers, Inc. Jeffferson City, Missouri

SITE: Forum Boulevard over Hinkson Creek Columbia, Missouri

LOCATION See Exhibit A-3

Latitude: 38.920975° Longitude: -92.364392°

Approximate Surface Elev: 597.5 (Ft.) +/-

DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI
0.3	597+/-	**4" topsoil**										
		FILL - LEAN CLAY (CL), with sand and silt, brown			X	14	3-4-4 N=8	9000 (HP)		17		
			5		X	9	3-4-6 N=10	1000 (HP)		20		31-21-10
7.0	590.5+/-											
		LEAN CLAY (CL), with sand and silt, brown, medium stiff to stiff			X	0	4-2-3 N=5					
			10									
			15		X	15	6-5-5 N=10	3000 (HP)		16		
			20		X	20	1-2-3 N=5	1000 (HP)		25		
22.0	575.5+/-			▽								
		GRAVEL (GP), poorly graded, with sand, trace clay, fine to coarse grained, brown and gray, loose to medium dense	25		X	10	4-8-9 N=17			13		
			30		X	9	1-2-3 N=5			20		
32.0	565.5+/-											
		SAND (SP), poorly graded, trace gravel, fine to coarse grained, brown and gray, loose to medium dense	35	▽	X	12	2-4-6 N=10			17		
			40		X	24	3-2-6 N=8			15		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method: Hollow-Stem Auger	See Exhibit A-4 for description of field procedures See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.	Notes:	
Abandonment Method: Boring backfilled with soil cuttings upon completion.			
WATER LEVEL OBSERVATIONS	Terracon 3601 Mojave Court, Suite A Columbia, Missouri	Boring Started: 12/12/2014	Boring Completed: 12/12/2014
▽ *While drilling*		Drill Rig: CME-550X	Driller: SB
▽ *At completion of drilling*		Project No.: 09145065	Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT: GEO SMART LOG-NO WELL 09145065.GPJ TERRACON2012.GDT 1/19/15

BORING LOG NO. B-1

Page 2 of 2

PROJECT: Forum Boulevard Pedestrian Bridge

CLIENT: Bartlett & West Engineers, Inc. Jeffferson City, Missouri

SITE: Forum Boulevard over Hinkson Creek Columbia, Missouri

LOCATION See Exhibit A-3

Latitude: 38.920975° Longitude: -92.364392°

Approximate Surface Elev: 597.5 (Ft.) +/-

DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI
42.0	555.5+/-	**SAND (SP)**, poorly graded, trace gravel, fine to coarse grained, brown and gray, loose to medium dense *(continued)*										
		WEATHERED SANDSTONE, brown and gray	45		X	7	10-10-9 N=19			16		
45.5	552+/-											
		WEATHERED LIMESTONE, gray										
48.7	549+/-				X	2	50/2"			13		
		Split-Spoon Sampler Refusal at 48.7 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method: Hollow-Stem Auger	See Exhibit A-4 for description of field procedures See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.	Notes:	
Abandonment Method: Boring backfilled with soil cuttings upon completion.			
WATER LEVEL OBSERVATIONS	Terracon 3601 Mojave Court, Suite A Columbia, Missouri	Boring Started: 12/12/2014	Boring Completed: 12/12/2014
▽ *While drilling*		Drill Rig: CME-550X	Driller: SB
▽ *At completion of drilling*		Project No.: 09145065	Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT: GEO SMART LOG-NO WELL 09145065.GPJ TERRACON2012.GDT 1/19/15

BORING LOGS

Note: This drawing is not to scale. Follow dimensions.

NOTICE AND DISCLAIMER REGARDING BORING LOG DATA

The locations of all subsurface borings for this structure are shown on the plan sheet(s) for this structure. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the City for the design of the project, are shown on Sheets No. 40 and 41 or will be available from the project contact upon written request. No greater significance or weight should be given to the boring data depicted on the plan sheets than is given to the subsurface data available from the city or elsewhere.

The City does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the City, or on any other documentation not expressly warranted, which the contractor may obtain from the City.

BY | DATE | DESCRIPTION

BARTLETT & WEST
1719 SOUTHRIDGE DR., SUITE 100 - JEFFERSON CITY, MO 65109-4000
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BORING DATA LOGS

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED, AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	DAS
DRAWN BY:	TAA
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	40 of 58

Last edit on: Aug 10, 2015 by: AKD1272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Bridge Plans\18082.000_BR_017_Boring Logs.dwg Layout Name: BR_017_Boring Logs 1.2 Plotted By: AKD1272 Plotted on: 8/14/2015 4:13:38 PM

BORING LOG NO. B-2

Page 1 of 1

PROJECT: Forum Boulevard Pedestrian Bridge

CLIENT: Bartlett & West Engineers, Inc.
Jeffferson City, Missouri

SITE: Forum Boulevard over Hinkson Creek
Columbia, Missouri

LOCATION See Exhibit A-3

Latitude: 38.920873° Longitude: -92.3642°

Approximate Surface Elev: 587.5 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI
0.3	587+/-	**4" topsoil**										
		LEAN CLAY (CL), with sand and silt, brown, soft to medium stiff			X	16	0-1-1 N=2	2000 (HP)		31		
					X	14	0-1-2 N=3	1000 (HP)		27		
			5									
					X	21	2-2-3 N=5	1000 (HP)		25		
			10									
12.0	575.5+/-											
		SAND (SP), poorly graded, trace gravel and clay, fine to coarse grained, brown and gray, loose to medium dense			X	11	3-5-11 N=16			19		
			15	▽								
					X	8	2-2-2 N=4			18		
			20									
22.0	565.5+/-											
		GRAVEL (GP), poorly graded, with sand, fine to coarse grained, brown and gray, medium dense			X	13	6-10-14 N=24			14		
			25	▽								
					X	13	4-9-8 N=17			20		
			30									
33.5	554+/-											
33.7	554+/-	**WEATHERED LIMESTONE**, gray			X	2	50/2"			10		
		Spilt-Spoon Sampler Refusal at 33.7 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method: Hollow-Stem Auger	See Exhibit A-4 for description of field procedures See Appendix B for description of laboratory procedures and additional data (if any).	Notes:	
Abandonment Method: Boring backfilled with soil cuttings upon completion.	See Appendix C for explanation of symbols and abbreviations.		
WATER LEVEL OBSERVATIONS	Terracon 3601 Mojave Court, Suite A Columbia, Missouri	Boring Started: 12/12/2014	Boring Completed: 12/12/2014
▽ *While sampling*		Drill Rig: CME-550X	Driller: SB
▽ *At completion of drilling*		Project No.: 09145065	Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 09145065.GPJ TERRACON2012.GDT 1/19/15

BORING LOG NO. B-3

Page 1 of 1

PROJECT: Forum Boulevard Pedestrian Bridge

CLIENT: Bartlett & West Engineers, Inc.
Jeffferson City, Missouri

SITE: Forum Boulevard over Hinkson Creek
Columbia, Missouri

LOCATION See Exhibit A-3

Latitude: 38.920756° Longitude: -92.363979°

Approximate Surface Elev: 589.0 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (psf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI
0.3	588.5+/-	**4" topsoil**										
		SANDY LEAN CLAY (CL), trace silt, brown, soft to medium stiff			X	12	1-1-1 N=2	1000 (HP)		25		
					X	13	0-1-1 N=2	1000 (HP)		21		
			5									
		trace gravel			X	6	3-2-2 N=4	1000 (HP)		17		
			10									
12.0	577+/-											
		CLAYEY SAND (SC), fine to coarse grained, gray, very loose to medium dense			X	0	7-7-4 N=11					
			15									
					X	12	2-1-1 N=2			30		
			20									
		trace gravel			X	8	6-6-9 N=15			17		
27.0	562+/-		25									
		GRAVEL (GP), poorly graded, with sand, trace clay, fine to coarse grained, brown and gray, medium dense to very dense			X	13	6-7-8 N=15			13		
			30									
35.0	554+/-				X		10-10-50/5"			13		
36.0	553+/-	**WEATHERED LIMESTONE**, gray	35									
		Auger Refusal at 36 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method: Hollow-Stem Auger	See Exhibit A-4 for description of field procedures See Appendix B for description of laboratory procedures and additional data (if any).	Notes:	
Abandonment Method: Boring backfilled with soil cuttings upon completion.	See Appendix C for explanation of symbols and abbreviations.		
WATER LEVEL OBSERVATIONS	Terracon 3601 Mojave Court, Suite A Columbia, Missouri	Boring Started: 12/12/2014	Boring Completed: 12/12/2014
Groundwater not encountered		Drill Rig: CME-550X	Driller: SB
		Project No.: 09145065	Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 09145065.GPJ TERRACON2012.GDT 1/19/15

BORING LOGS

Note: This drawing is not to scale. Follow dimensions.

NOTICE AND DISCLAIMER REGARDING BORING LOG DATA

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BORING DATA
LOGS

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

BARTLETT & WEST
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PHONE 573.634.3181 - FAX 573.634.7504
MISSOURI CERTIFICATE OF AUTHORITY NO. 000167 - ENGINEERING

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	DAS
DRAWN BY:	TAA
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	41 of 58

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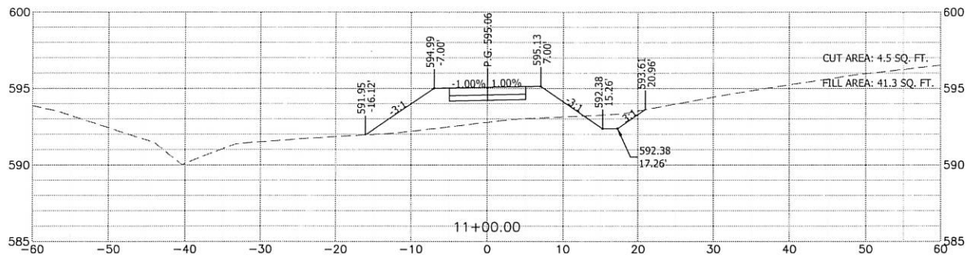
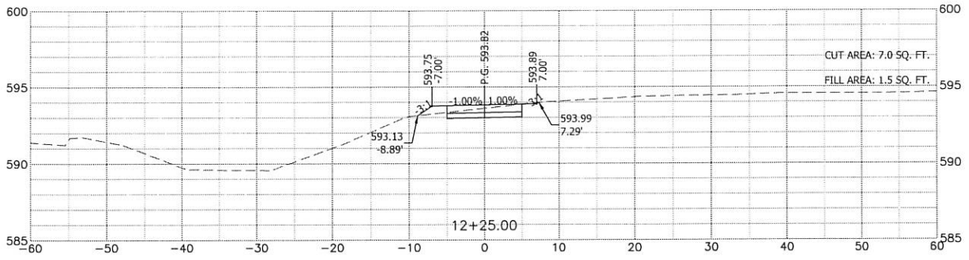
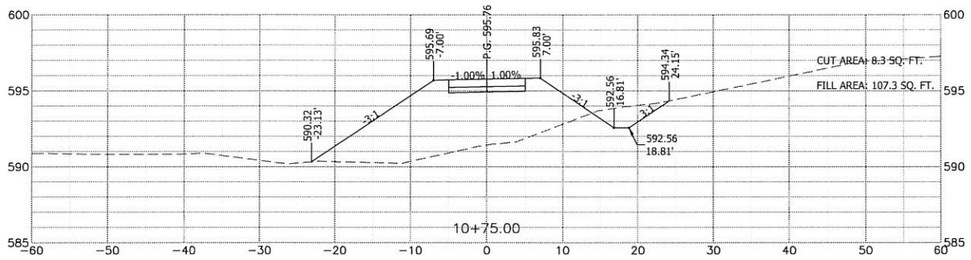
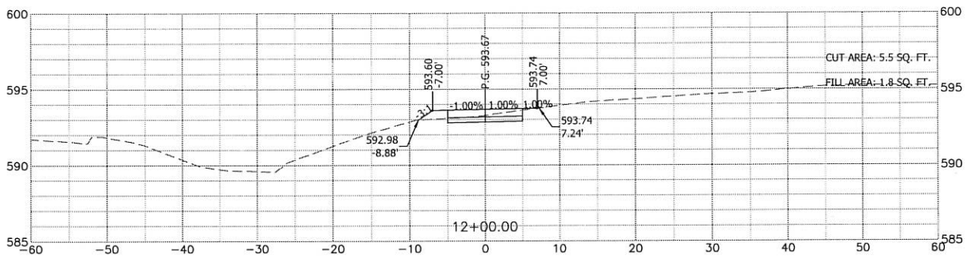
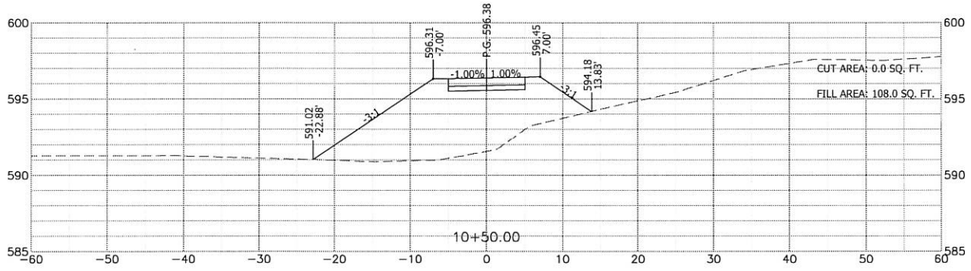
Last edit on: Aug 10, 2015 by: AKD1272 Drawing Name: w:\Proj\18080\18082\18082.000\AutoCad\Bridge Plans\18082.000_BR_017_Boring Logs.dwg Layout Name: BR_018_Boring Logs 2.2 Plotted By: AKD1272 Plotted on: 8/14/2015 4:13:44 PM

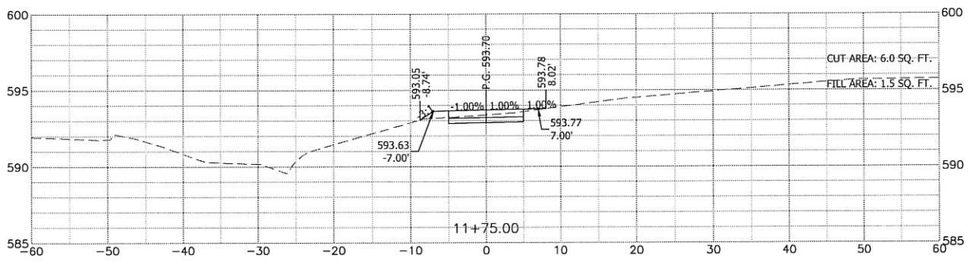


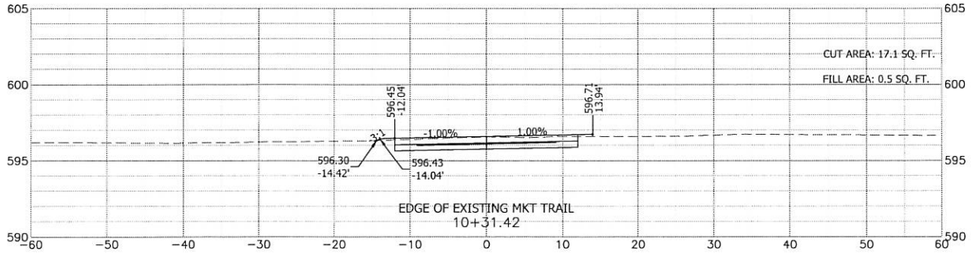


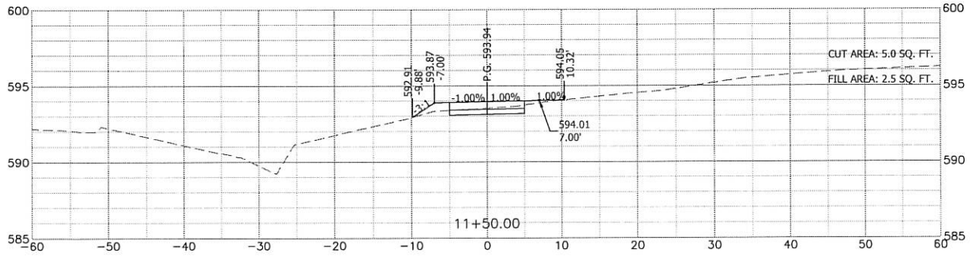


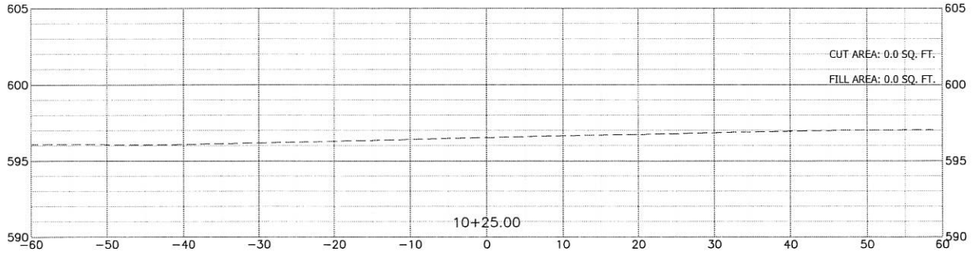


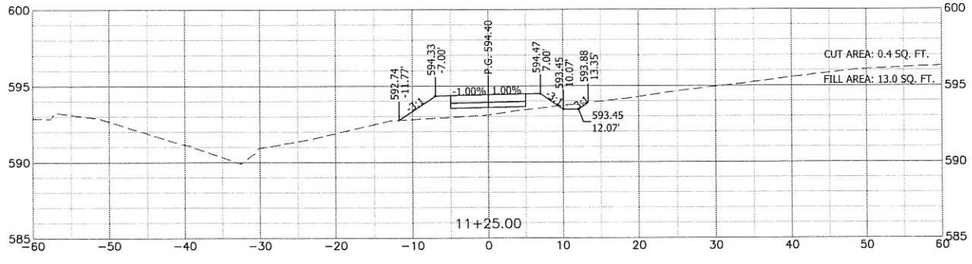












IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

BY	DESCRIPTION	DATE	#

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PHONE 573.634.3181 · FAX 573.634.7904
MISSOURI CERTIFICATE OF AUTHORITY NO. 000167 · ENGINEERING

CROSS SECTIONS
FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	42 of 58

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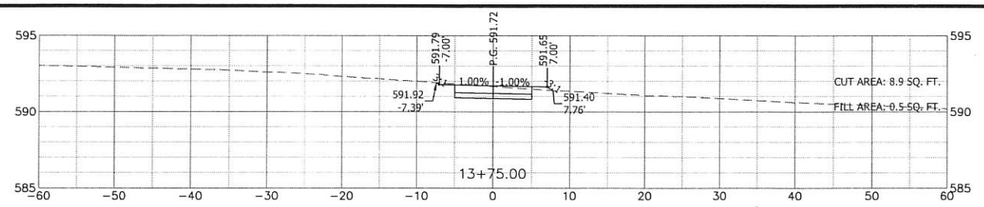
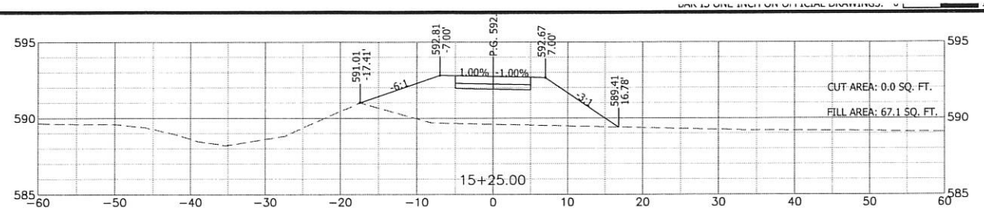
Last edit on: Aug 10, 2015 By: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Cross Sections_Main Trail.dwg Layout Name: Main Trail 1 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:14:13 PM

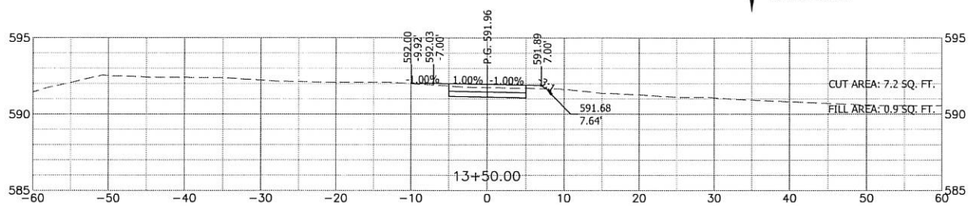
IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

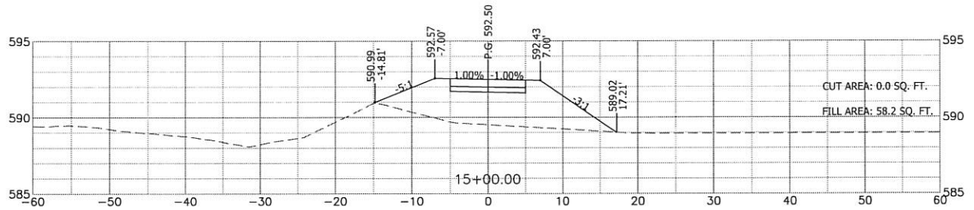


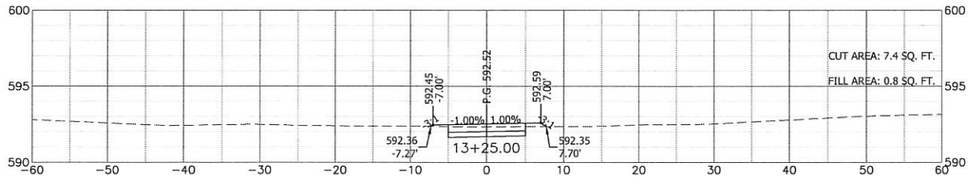


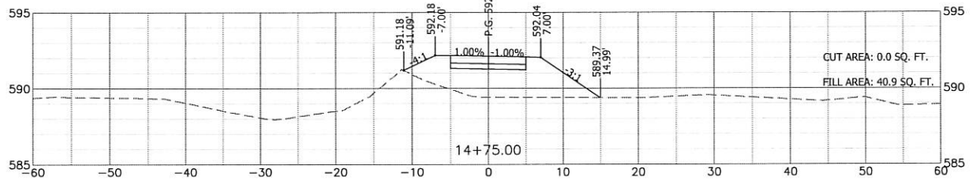
BASE BID

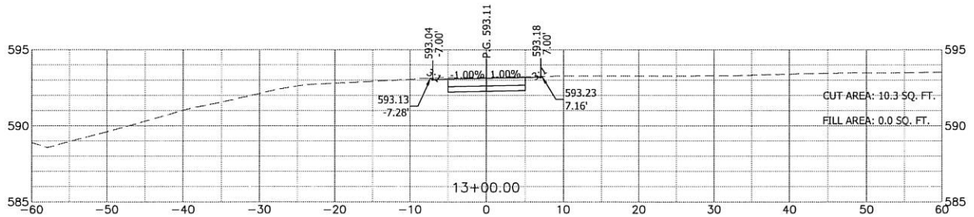
FUTURE PROJECT

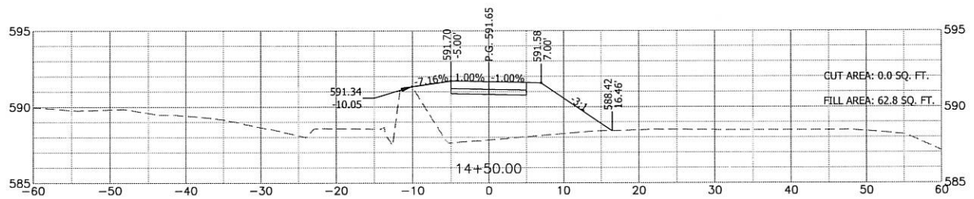


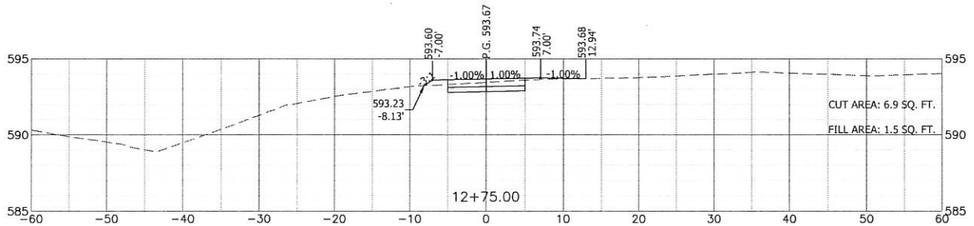


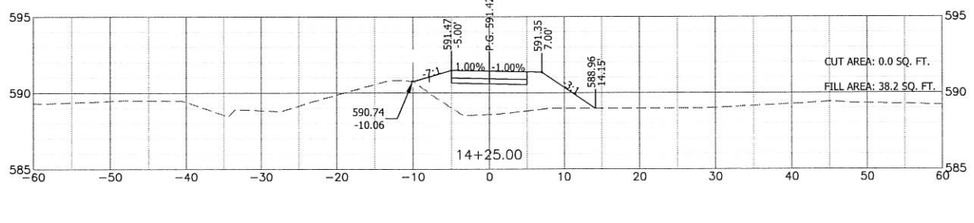


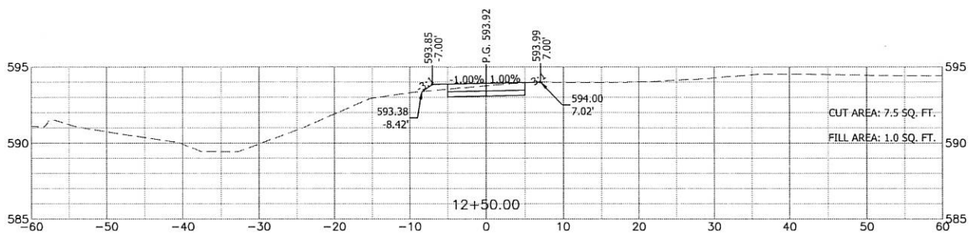


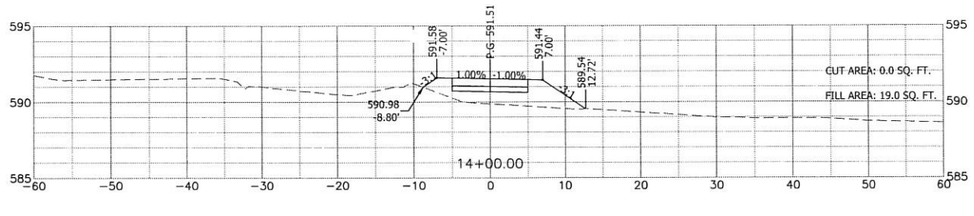












CROSS SECTIONS FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

BARTLETT & WEST
1719 SOUTHRIDGE DR., SUITE 100 - JEFFERSON CITY, MO 65109-400
PHONE 573.634.3191 - FAX 573.634.5770
MISSOURI CERTIFICATE OF AUTHORITY NO. 000167 - ENGINEERING

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	43 of 58

#	DATE	DESCRIPTION	INT.

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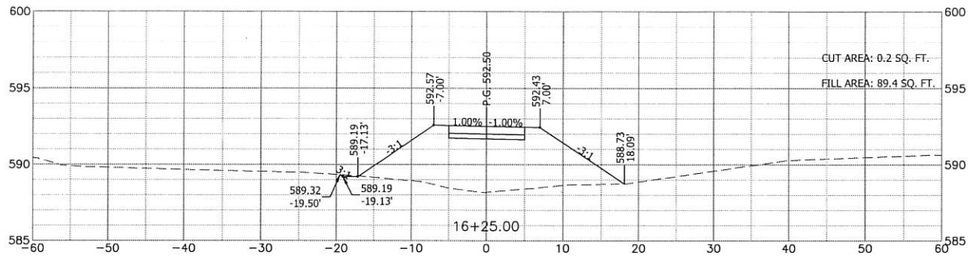
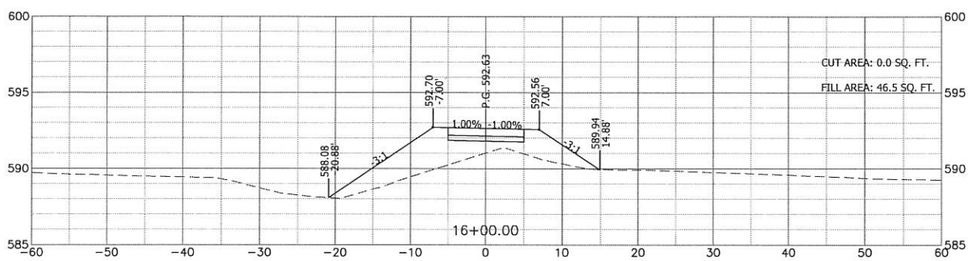
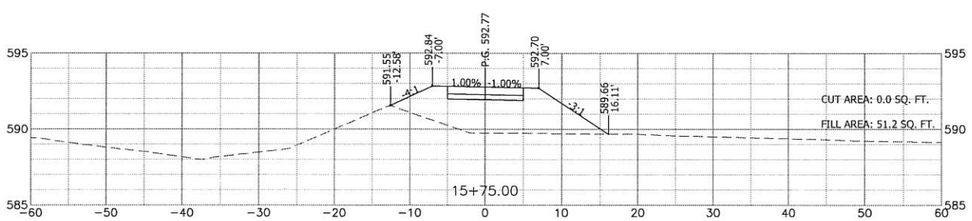
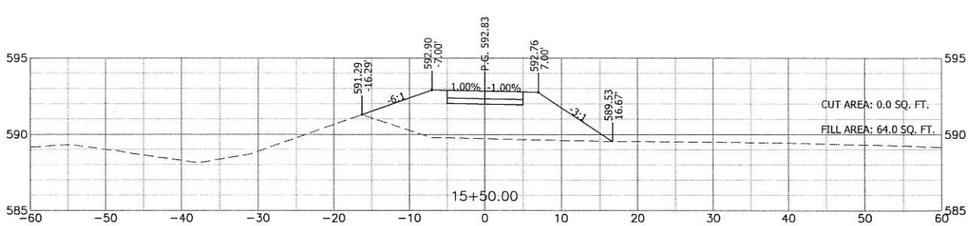
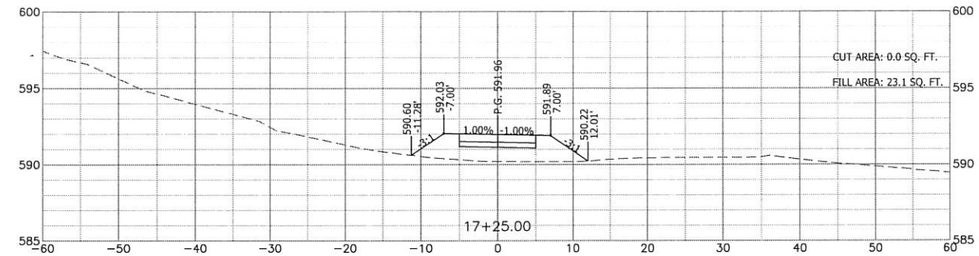
Last edit on: Aug 10, 2015 By: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\Autocad\Plan Set\18082.000_Cross Sections_Main Trail.dwg Layout Name: Main Trail 2 Plotted By: AKJ01272 Plotted on: 9/14/2015 4:14:22 PM

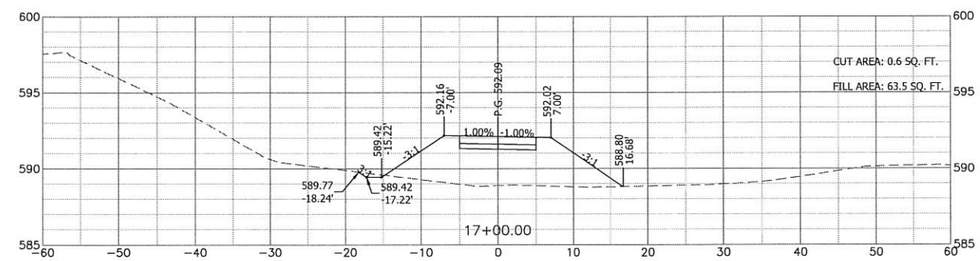


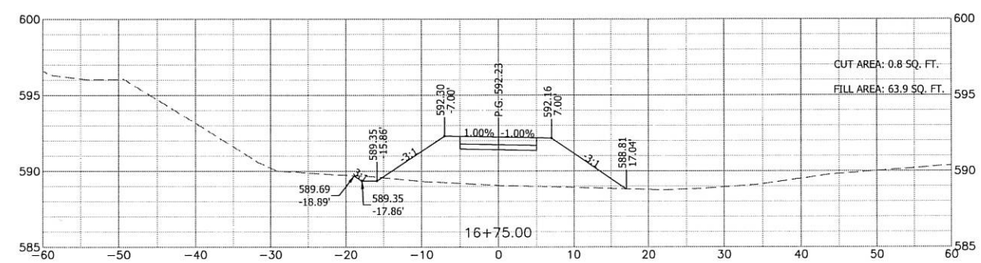


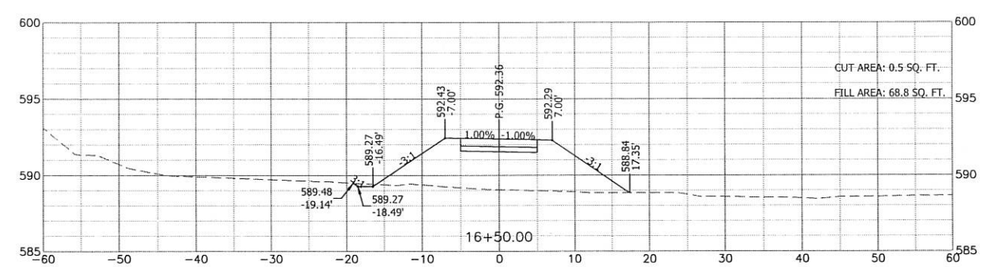












#	DATE	DESCRIPTION	BY

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1719 SOUTHRIDGE DR., SUITE 100 · JEFFERSON CITY MO 65109-400
PHONE 573.634.3181 · FAX 573.634.7904
MISSOURI CERTIFICATE OF AUTHORITY NO. 000167 · ENGINEERING
WWW.BARTWEST.COM

CROSS SECTIONS FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	44 of 58

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Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Cross Sections_Main Trail.dwg Layout Name: Main Trail 3 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:14:31 PM

#	DATE:	DESCRIPTION:	BY:

BARTLETT & WEST
1719 SOUTHRIDGE DR. SUITE 130 - JEFFERSON CITY, MO 65109-400
PHONE 573.634.3181 - FAX 573.634.7904
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CROSS SECTIONS
FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER
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SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
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APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	45 of 58

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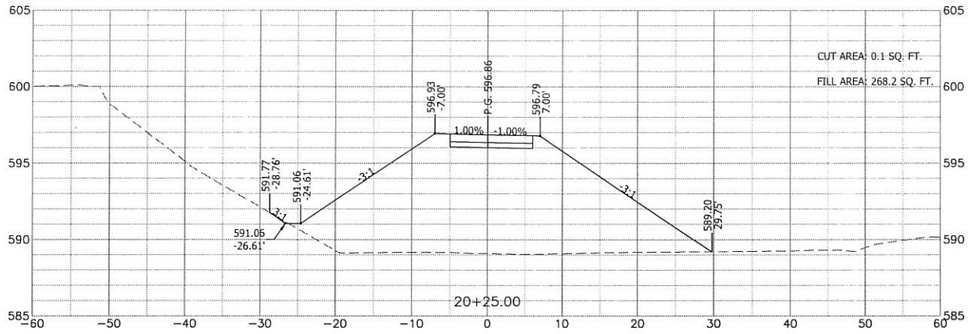
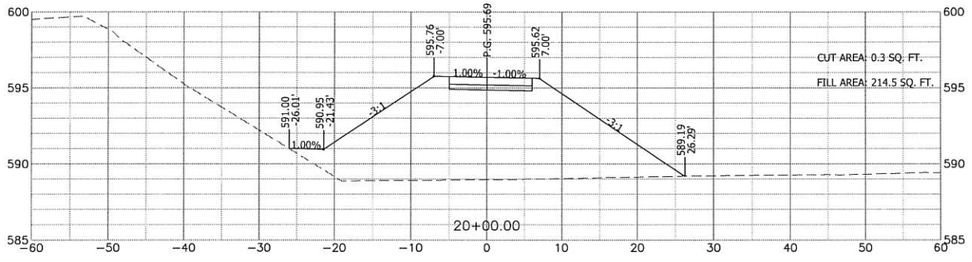
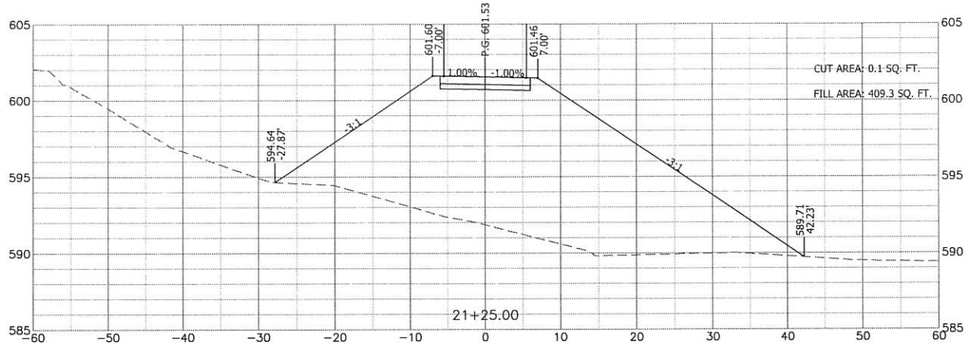
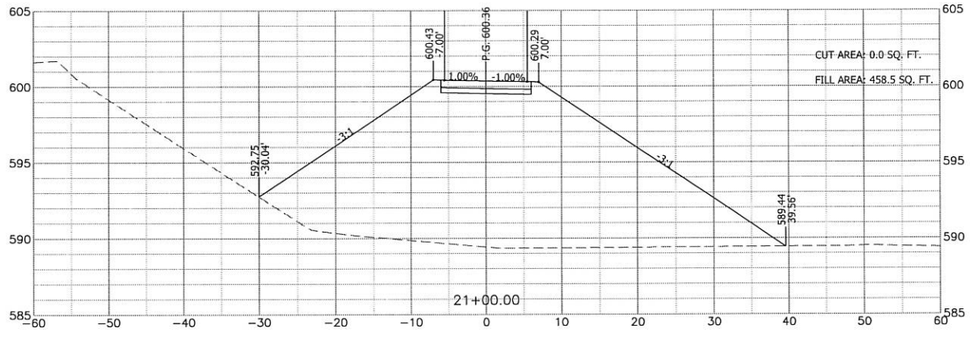
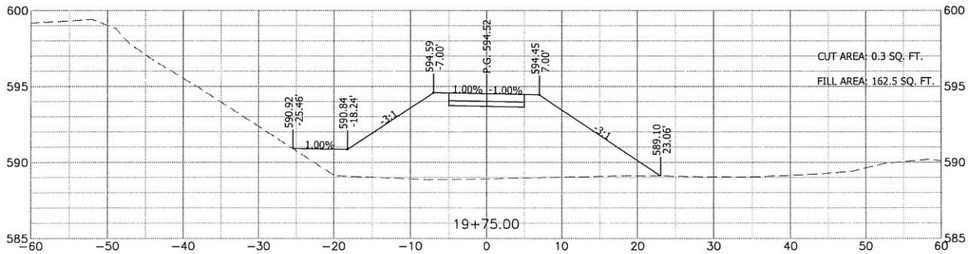
Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Cross Sections_Main Trail.dwg Layout Name: Main Trail 4 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:14:40 PM

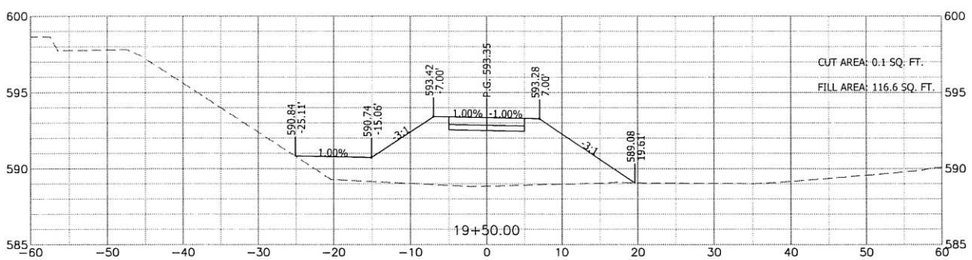


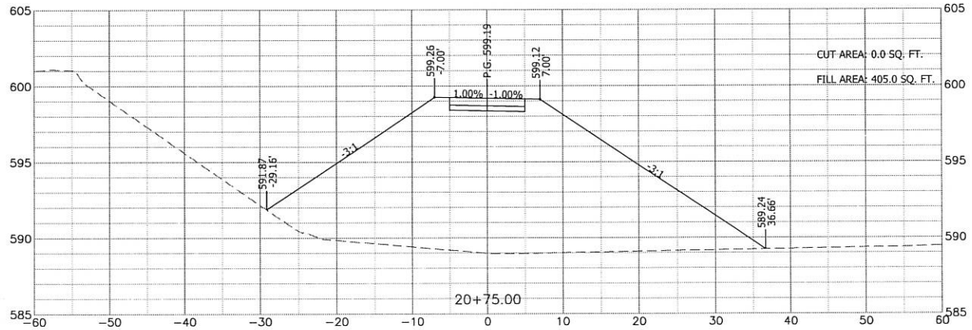


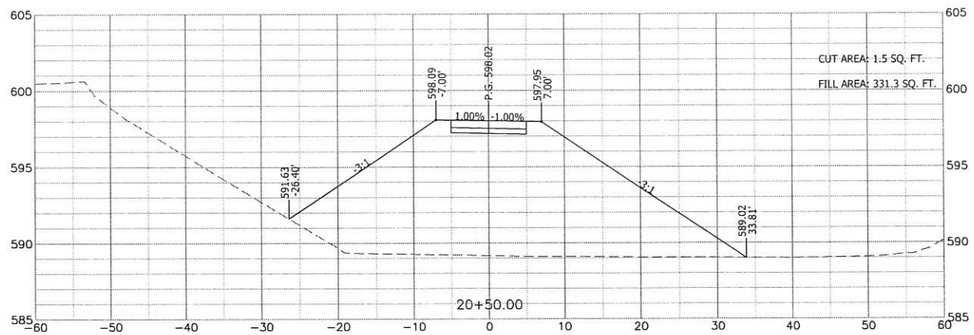












CROSS SECTIONS
FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

BARTLETT & WEST

1719 SOUTHRIDGE DR., SUITE 150 - JEFFERSON CITY MO 65109-400
PHONE 573.634.3181 - FAX 573.634.7904
MISSOURI CERTIFICATE OF AUTHORITY NO. 000167 - ENGINEERING
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STATE OF MISSOURI
TODD C. KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	46 of 58

#	DATE	DESCRIPTION	BY

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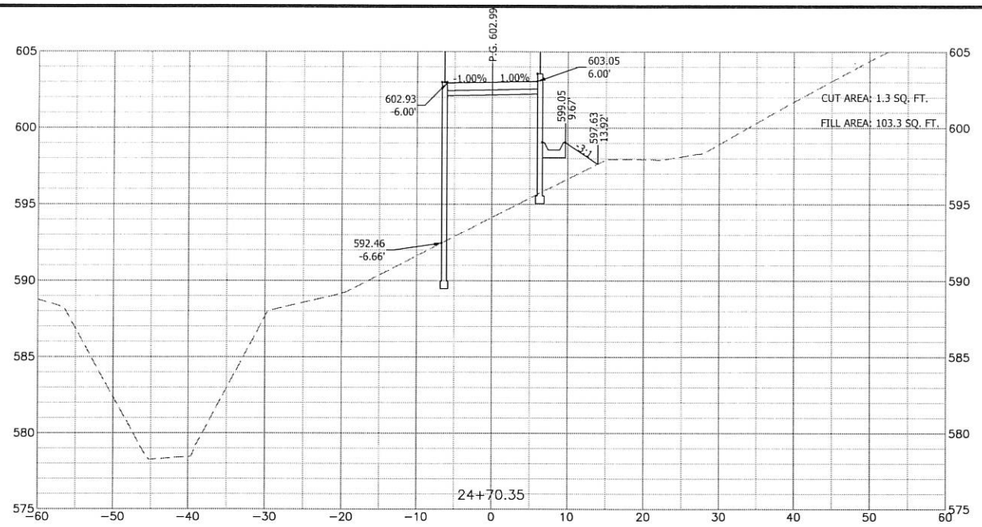
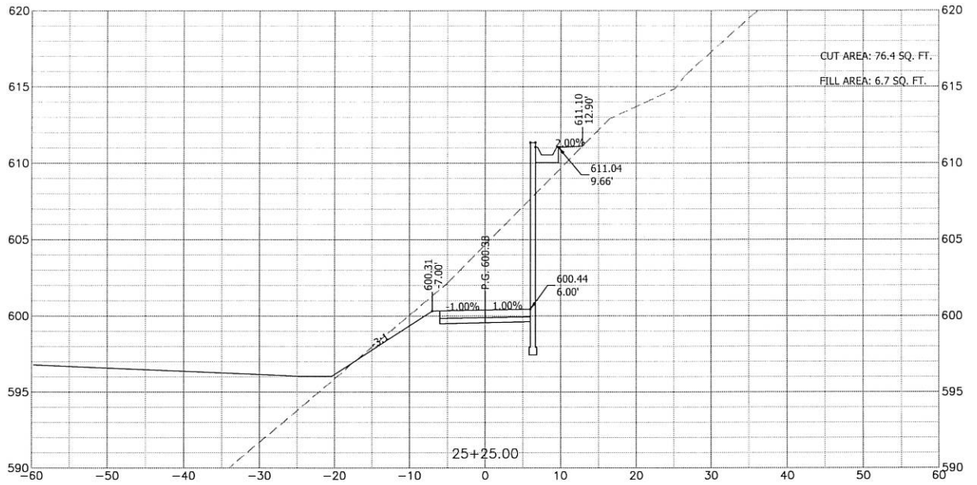
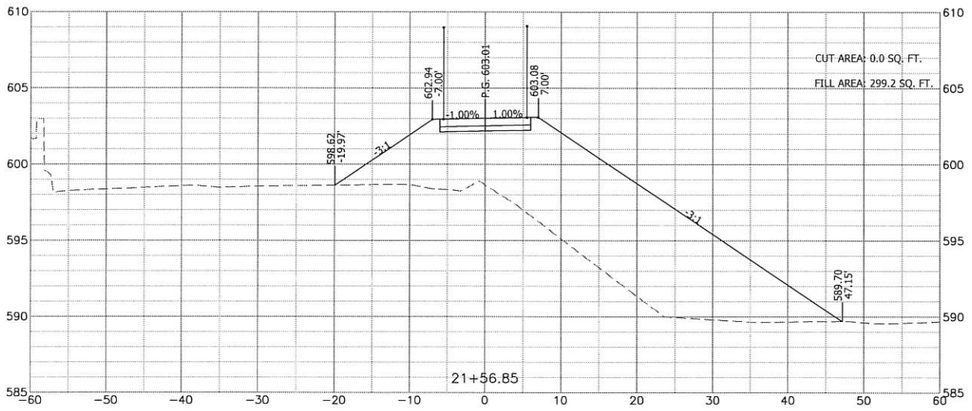
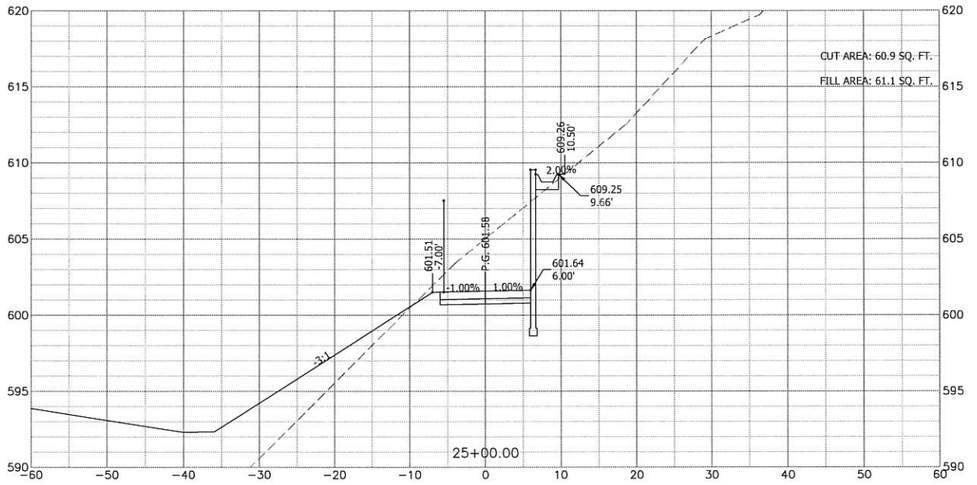
Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Cross Sections_Main Trail.dwg Layout Name: Main Trail 5 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:14:49 PM

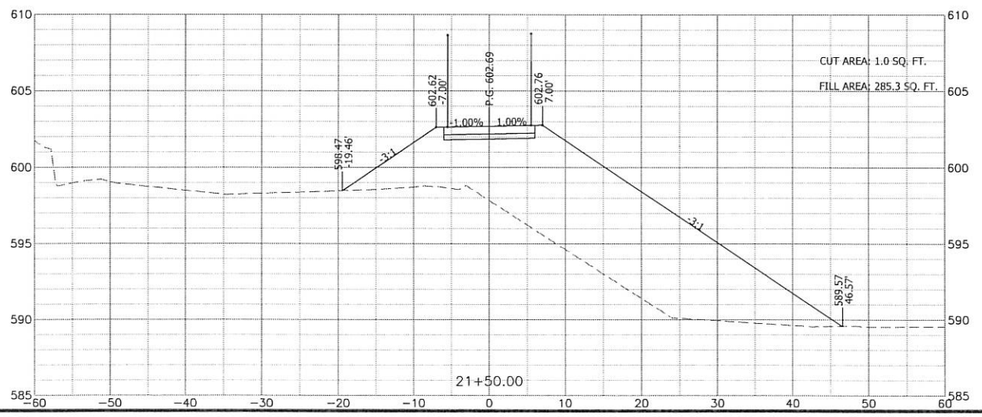


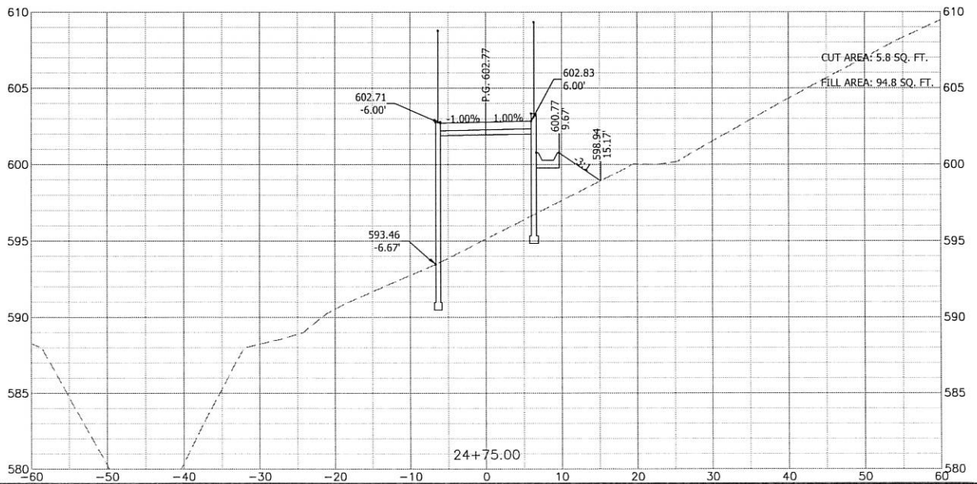


BRIDGE IS BETWEEN THESE TWO SECTIONS









#	DATE	DESCRIPTION	BY

BARTLETT & WEST
1719 SOUTHRIDGE DR., SUITE 100 - JEFFERSON CITY MO 65109-400
PHONE 573.634.3181 - FAX 573.634.7904
MISSOURI CERTIFICATE OF AUTHORITY NO. 000167 - ENGINEERING
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CROSS SECTIONS
FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

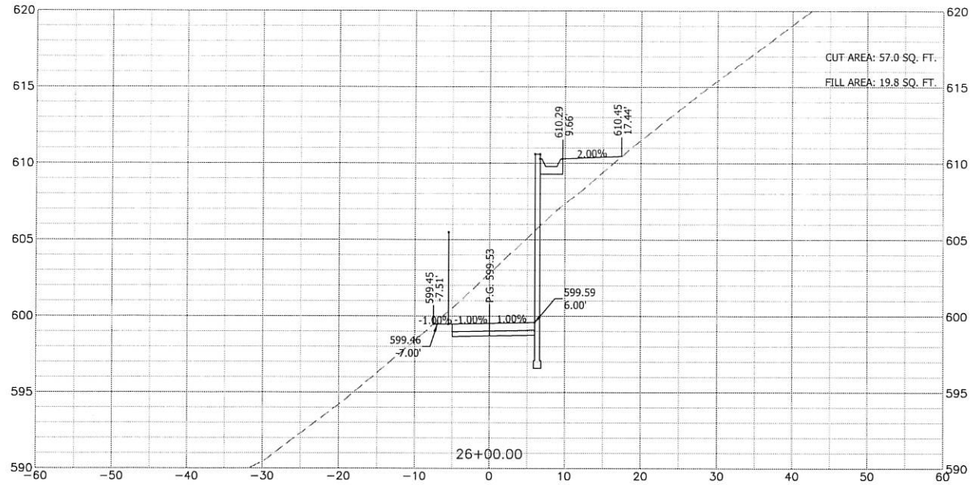
STATE OF MISSOURI
TODD. C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

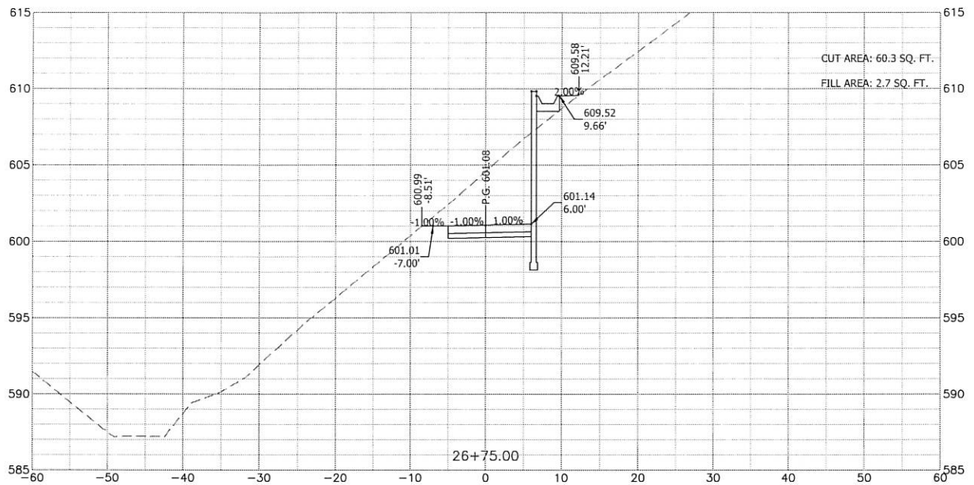
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

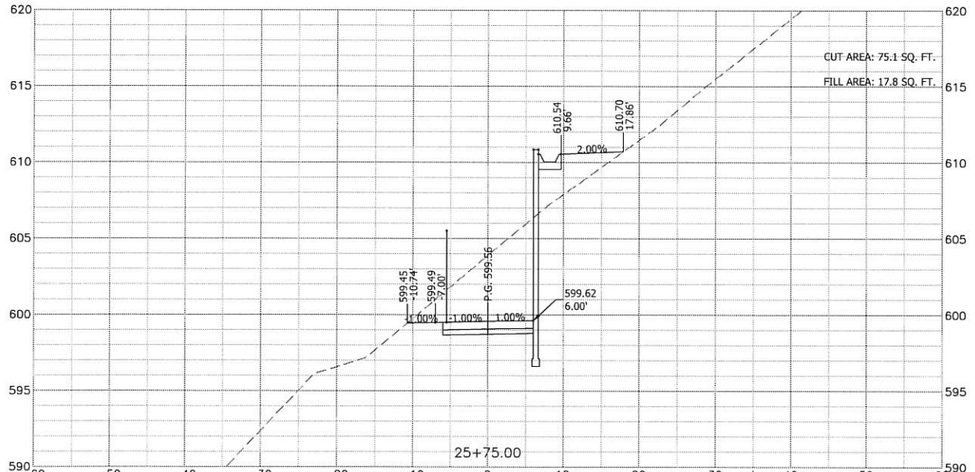
SEALED DATE:	9/18/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	SEPT. 2015
DRAWING NO:	
SHEET NO:	47 of 58

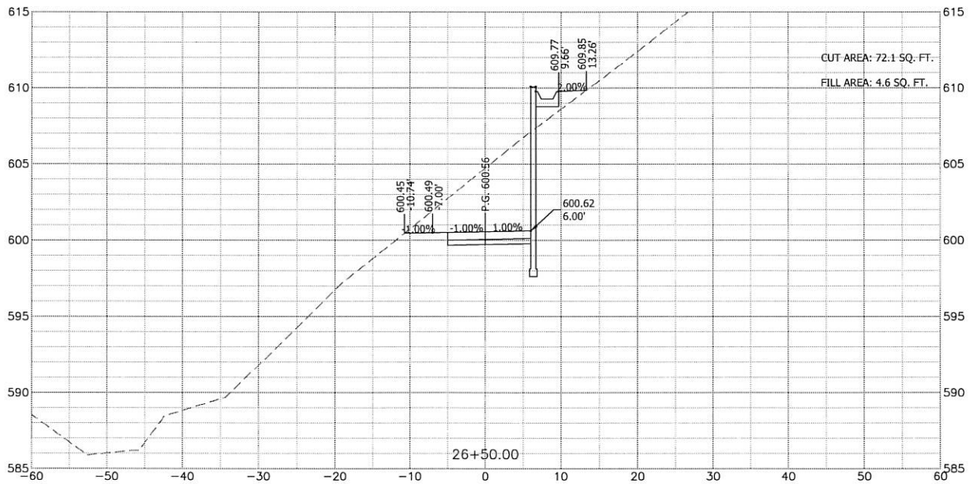
Last edit on: Sep 18, 2015 by: AKJ01272 Drawing Name: W:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Cross Sections_Main Trail.dwg Layout Name: Main Trail 6 Plotted By: AKJ01272 Plotted on: 9/18/2015 3:44:00 PM

BAR IS ONE INCH ON OFFICIAL DRAWINGS. IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.



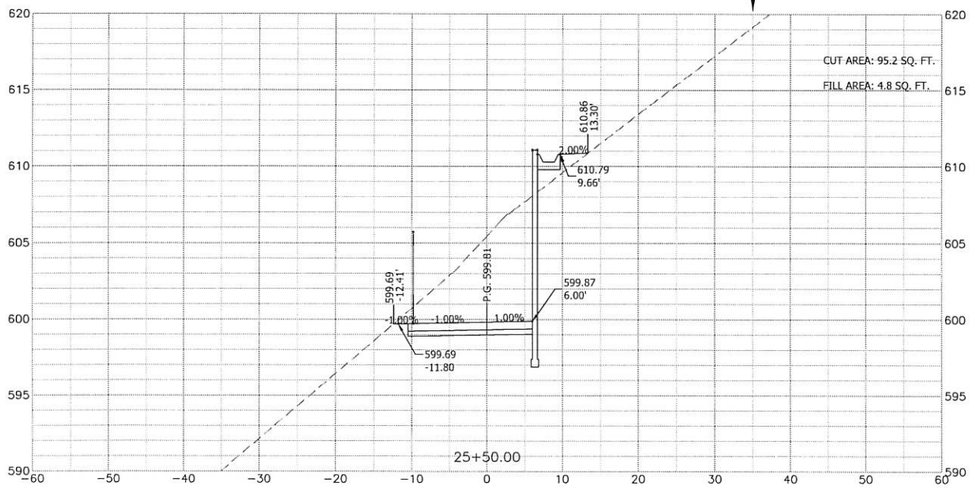


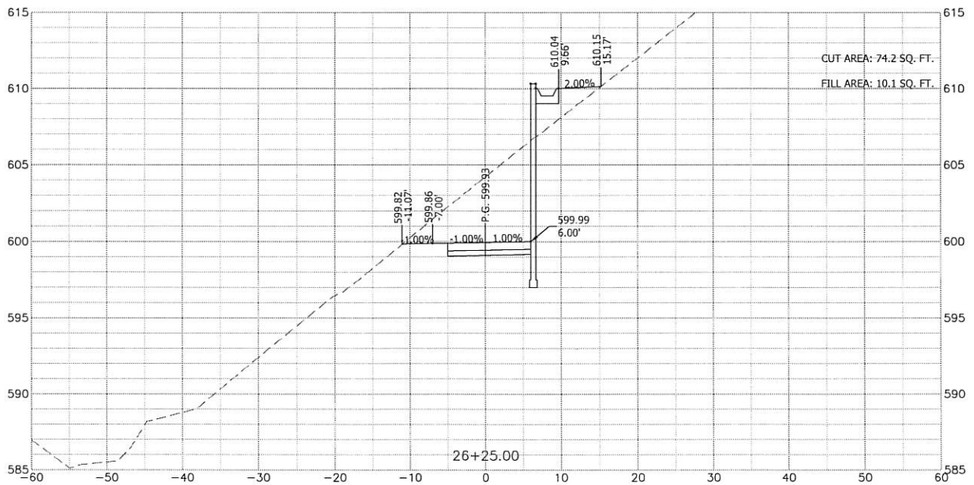




FUTURE PROJECT

BASE BID





#	DATE	DESCRIPTION	BY

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CROSS SECTIONS
FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

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DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	SEPT. 2015
DRAWING NO:	
SHEET NO:	48 of 58

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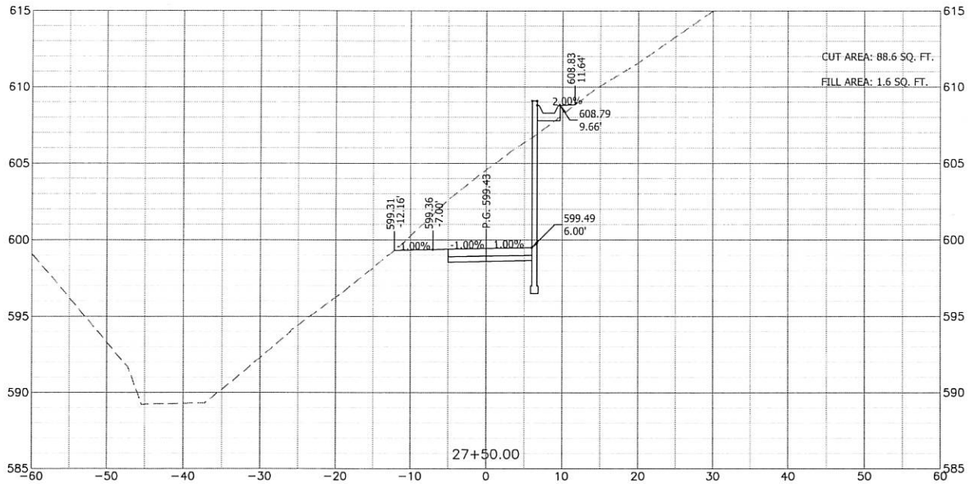
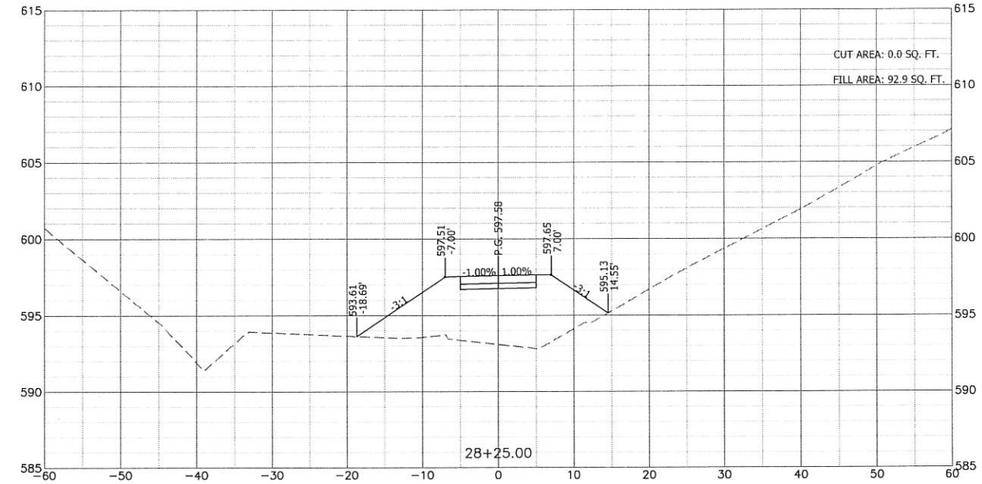
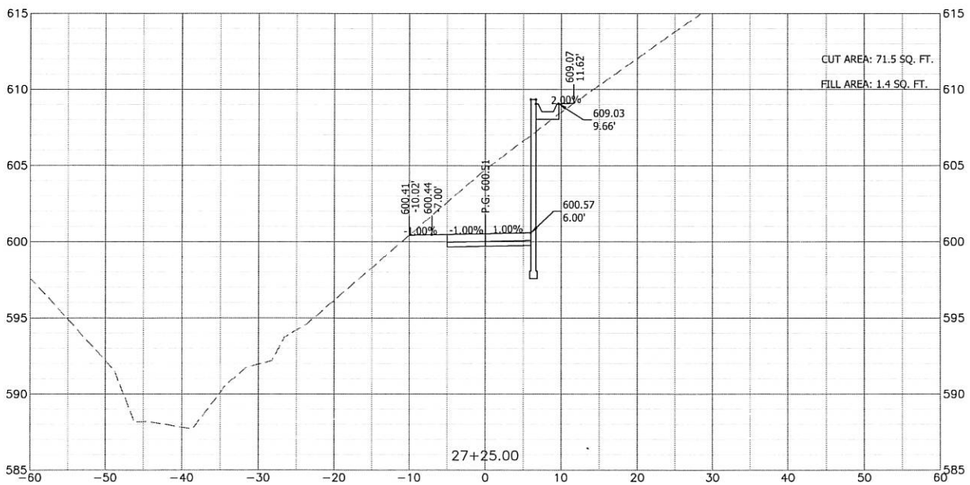
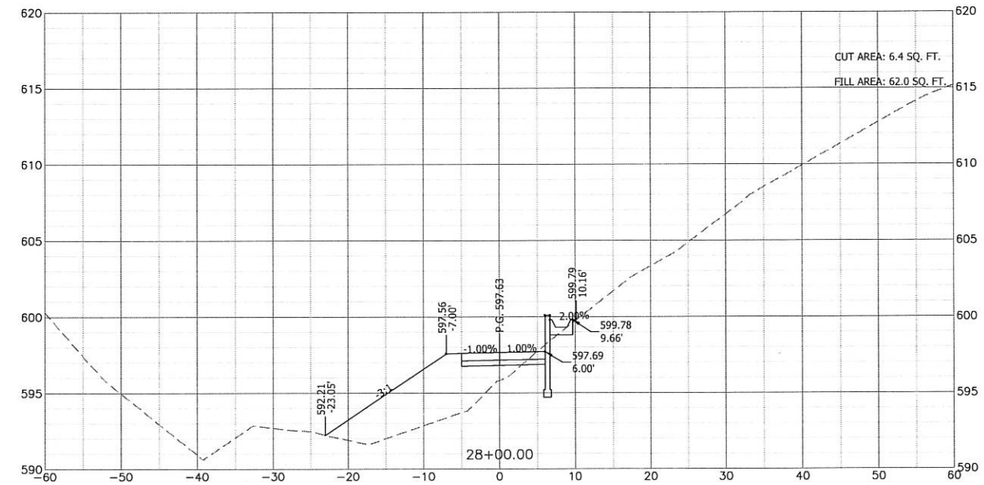
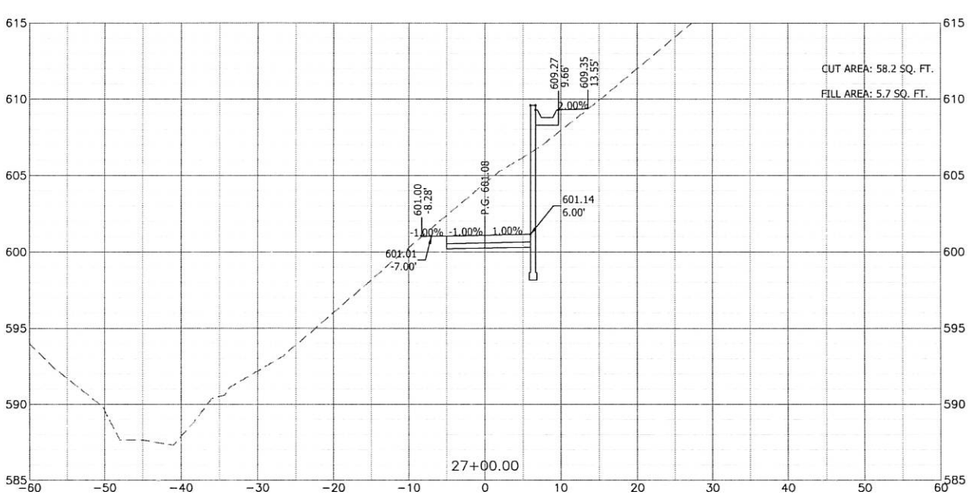
Last edit on: Aug 21, 2015 by: AKJ01272 Drawing Name: W:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Cross Sections_Main Trail.dwg Layout Name: Main Trail 7 Plotted By: AKJ01272 Plotted on: 9/18/2015 1:41:27 PM

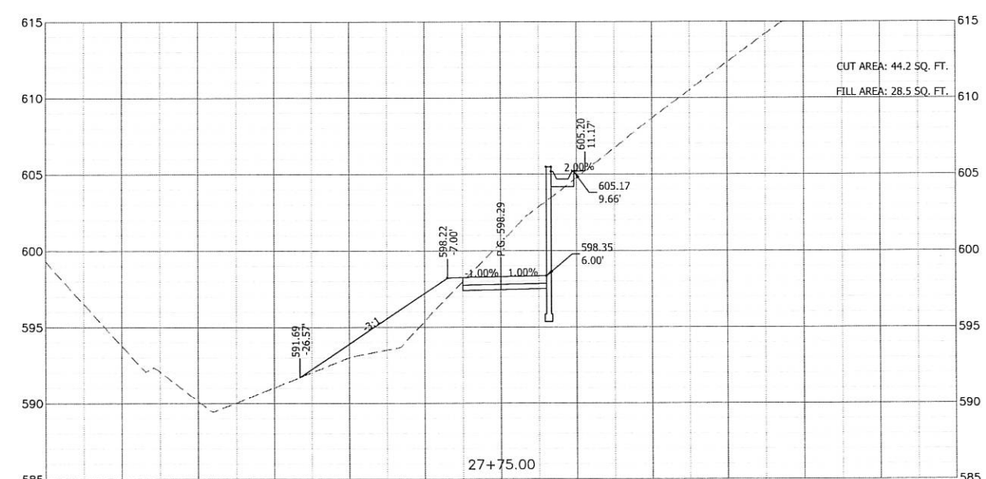












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CROSS SECTIONS FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	49 of 58

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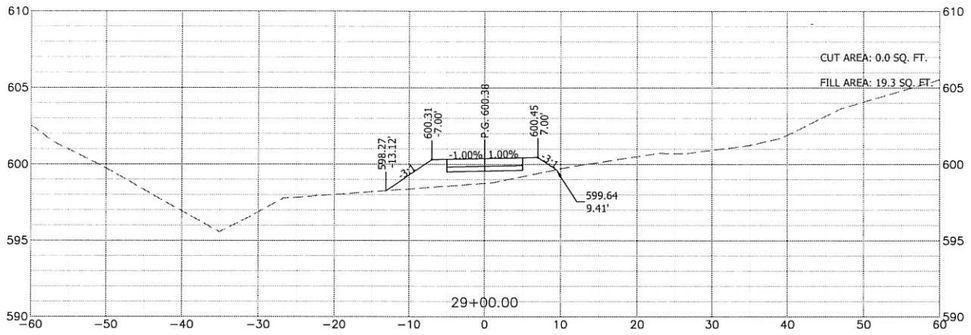
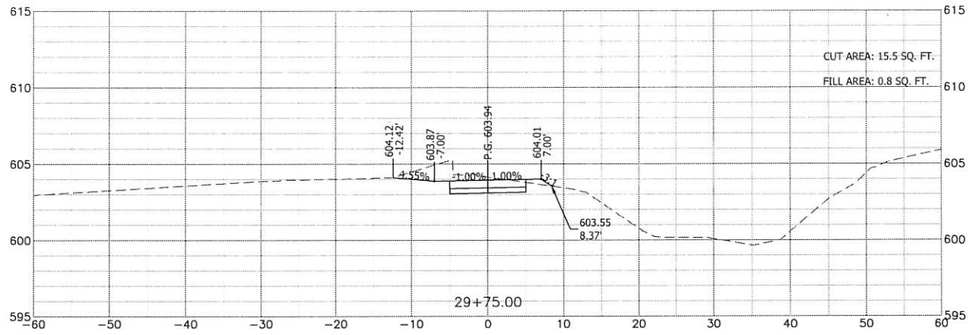
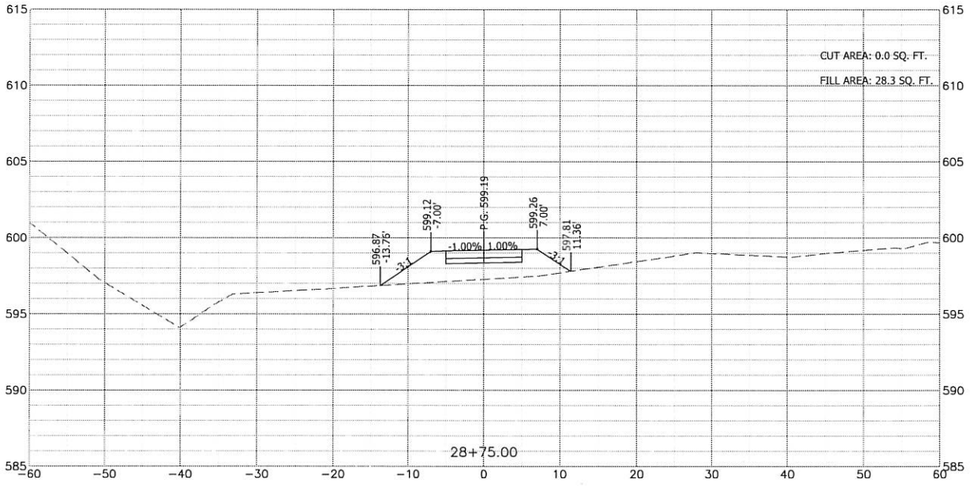
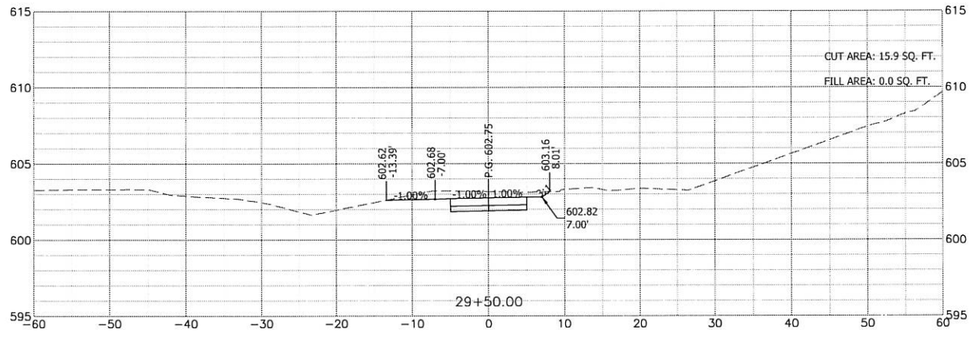
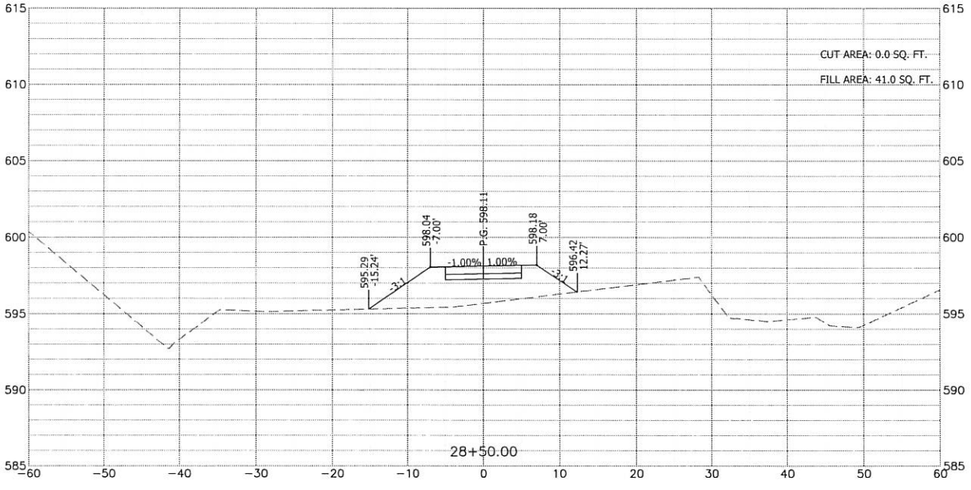
Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Cross Sections_Main Trail.dwg Layout Name: Main Trail 8 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:15:13 PM

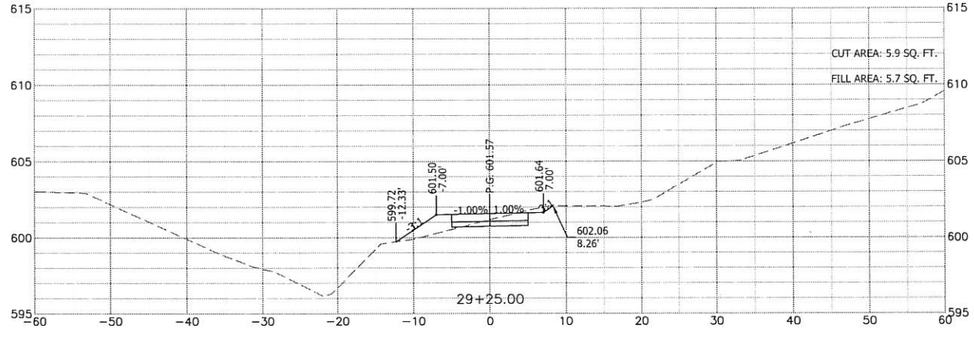












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CROSS SECTIONS FORUM BLVD. TRAIL

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	50 of 58

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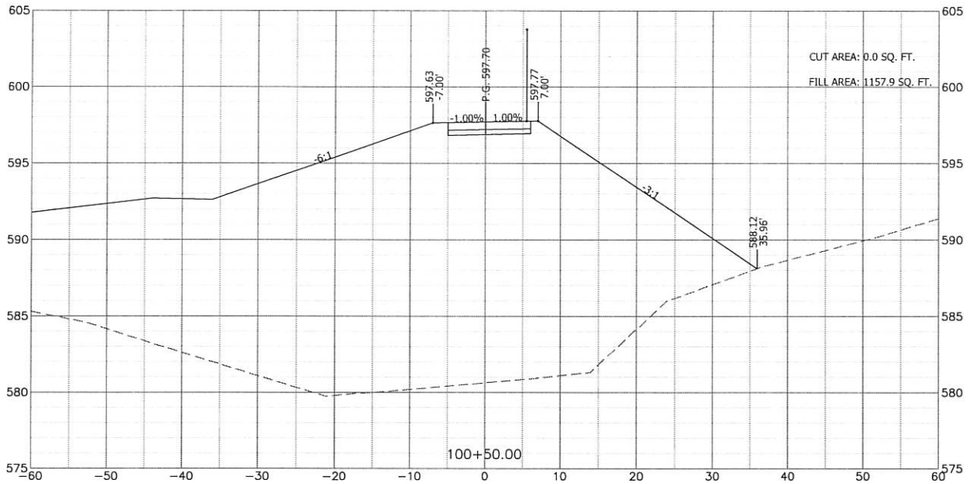
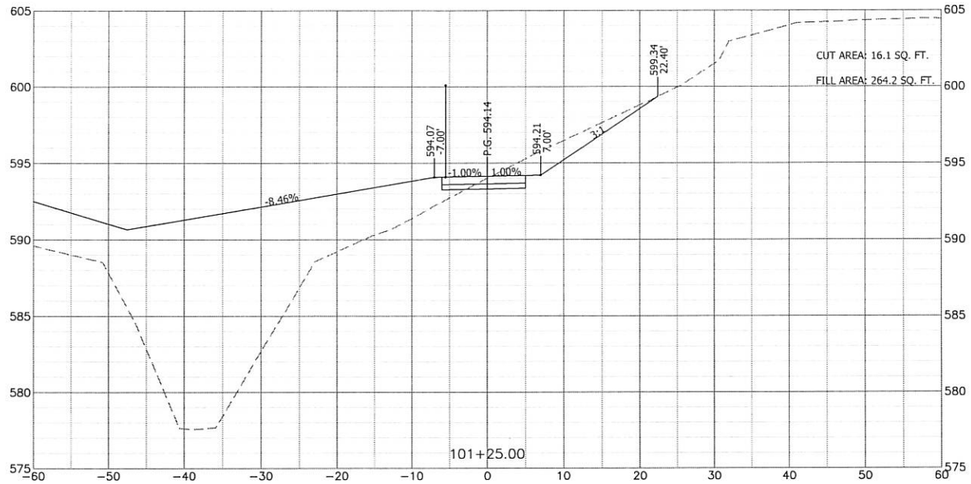
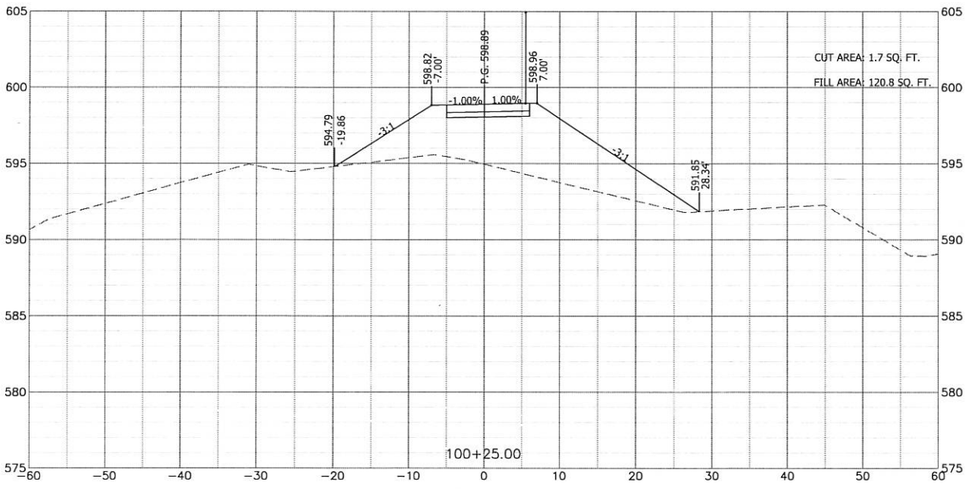
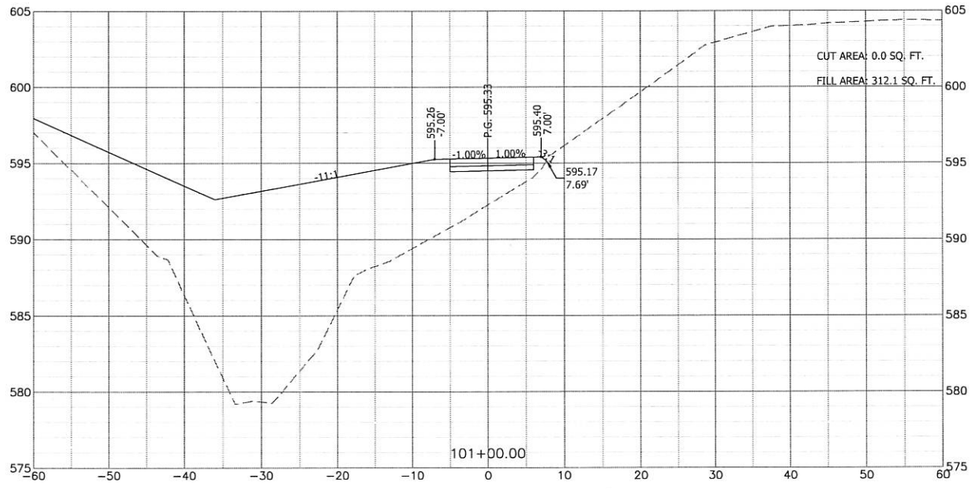
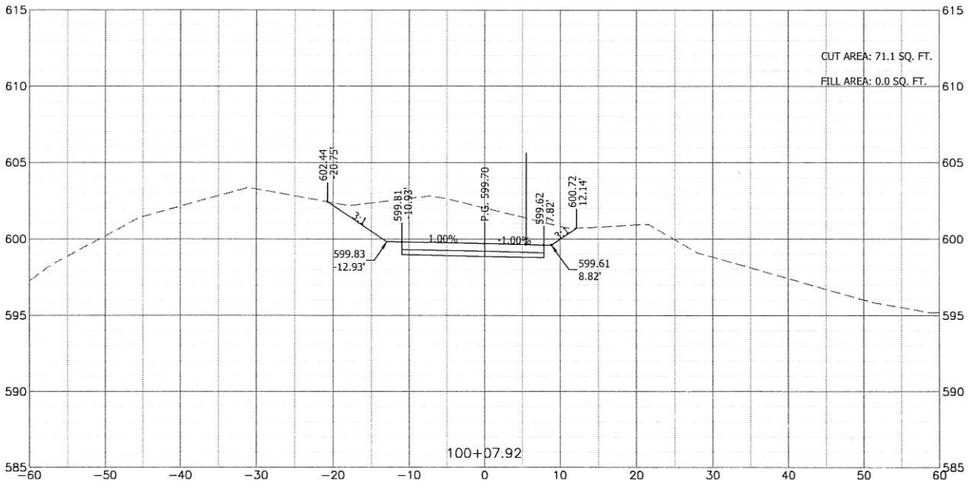
Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Cross Sections_Main Trail.dwg Layout Name: Main Trail 9 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:15:21 PM

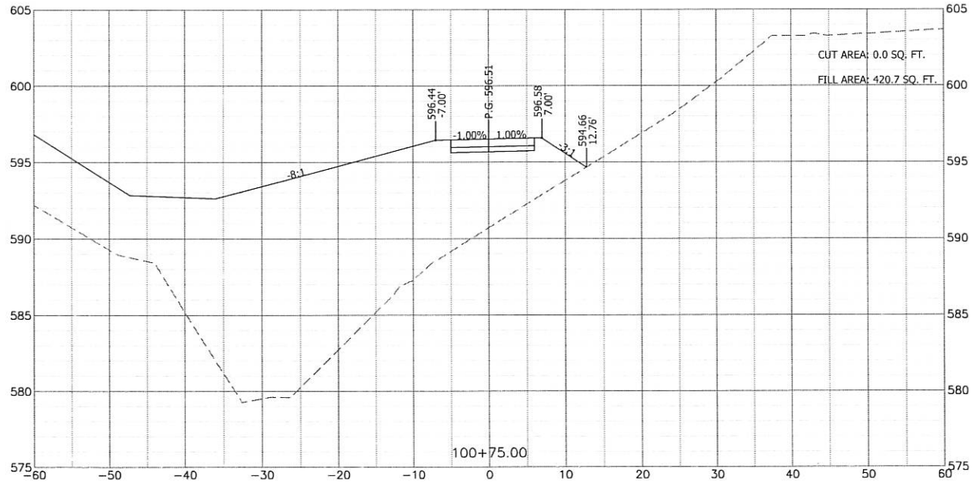












BY | DESCRIPTION | # | DATE

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MISSOURI CERTIFICATE OF AUTHORITY NO. 2001167 · ENGINEERING
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CROSS SECTIONS WILSON'S CONNECTION

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

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DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
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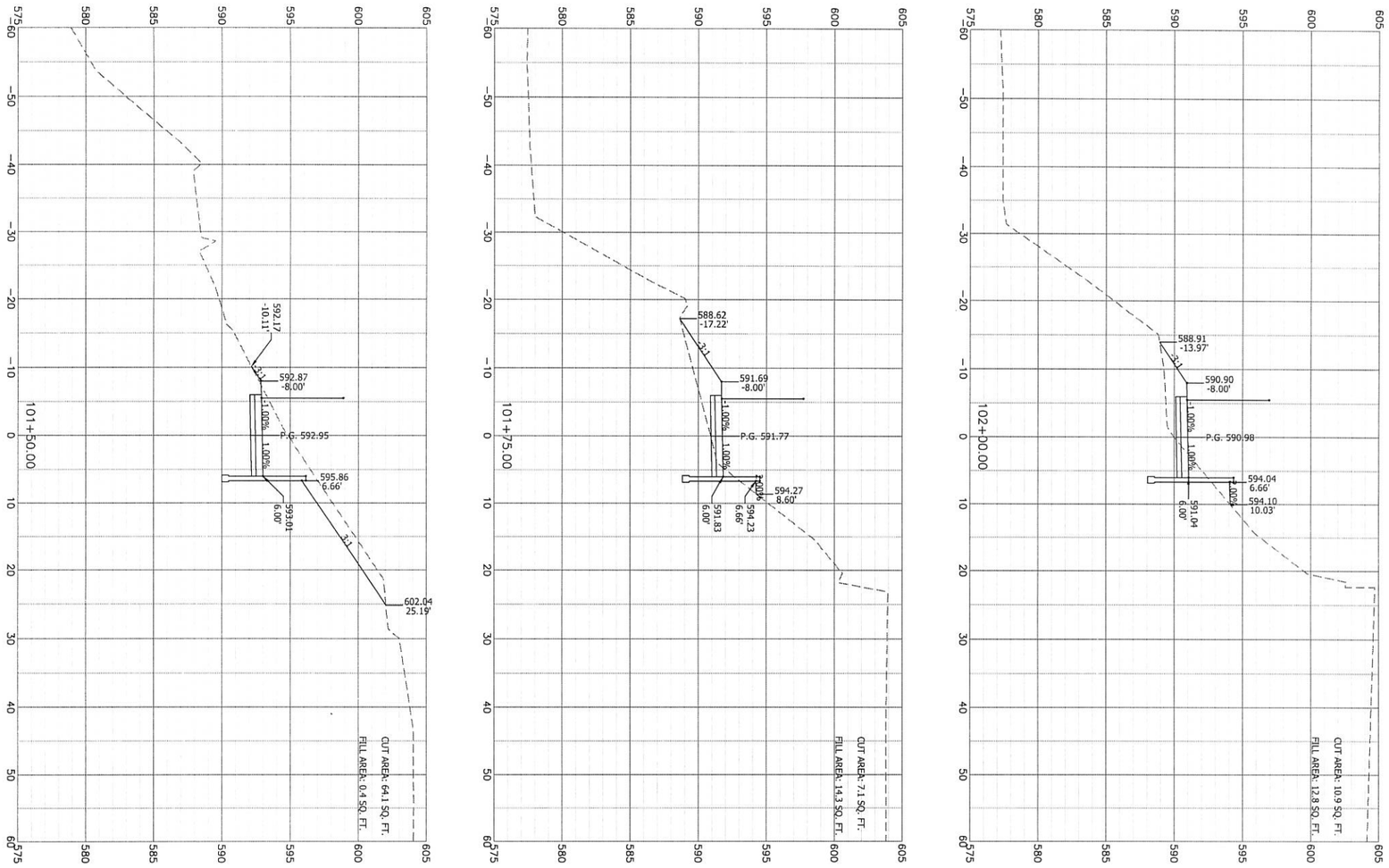
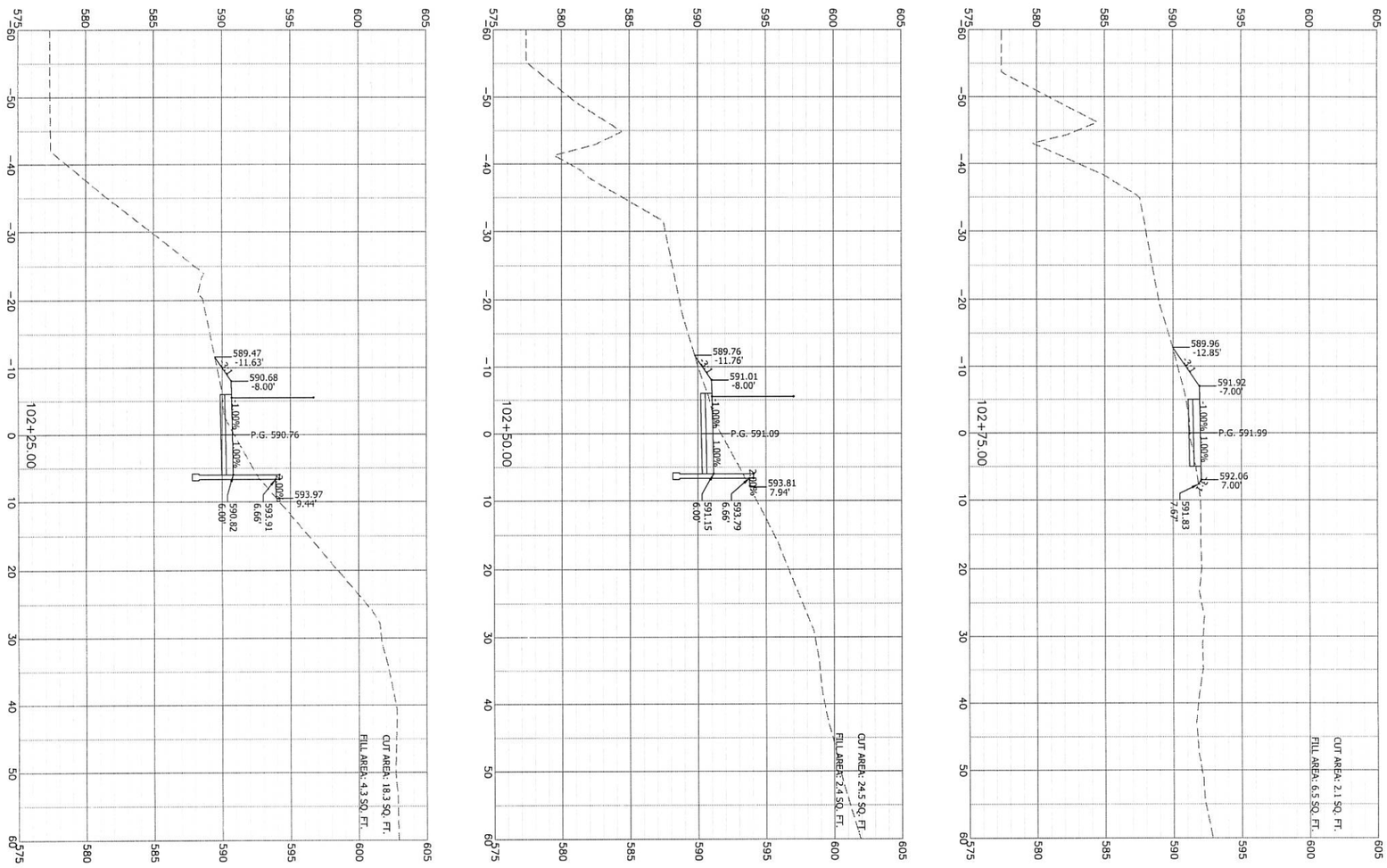
Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18821\8982.000\AutoCad\Plan Set\18982.000_Cross Sections_North Shoulder.dwg Layout Name: North Shoulder 1 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:15:55 PM

Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Cross Sections_North Shoulder.dwg Layout Name: North Shoulder 2 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:16:02 PM





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DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	52 of 58

STATE OF MISSOURI
TODD C. KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER

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CROSS SECTIONS
WILSON'S CONNECTION

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CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

BARTLETT & WEST
1719 SOUTHRIDGE DR., SUITE 100 · JEFFERSON CITY MO 65109.400
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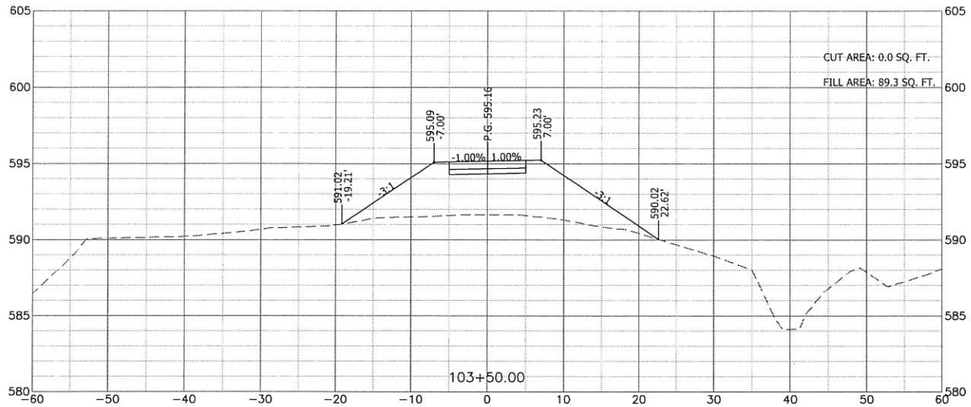

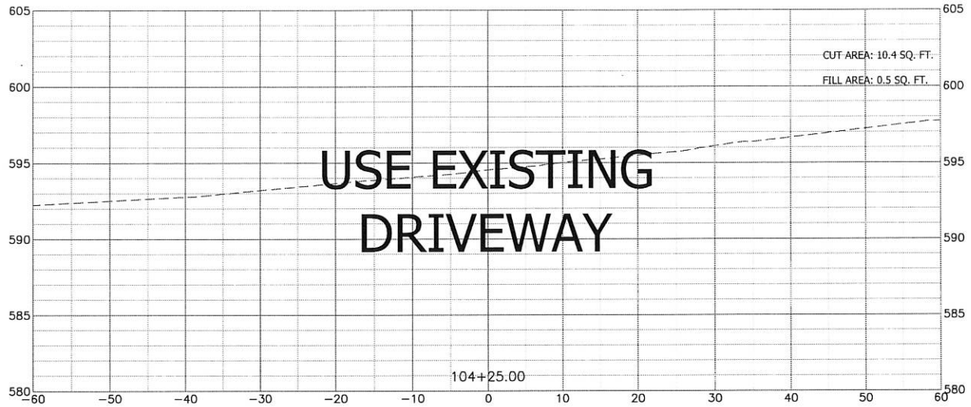

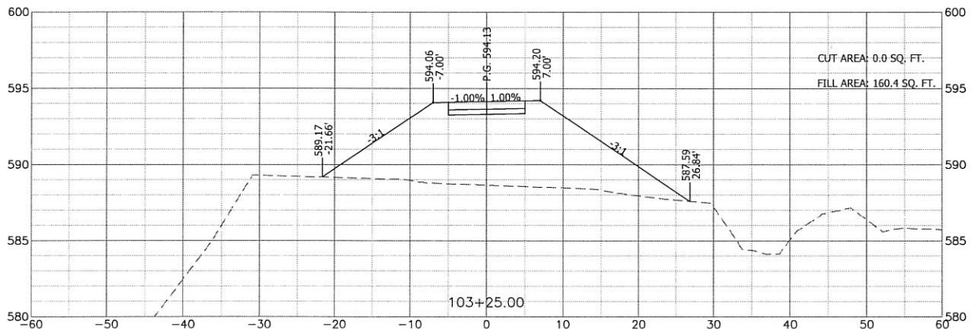

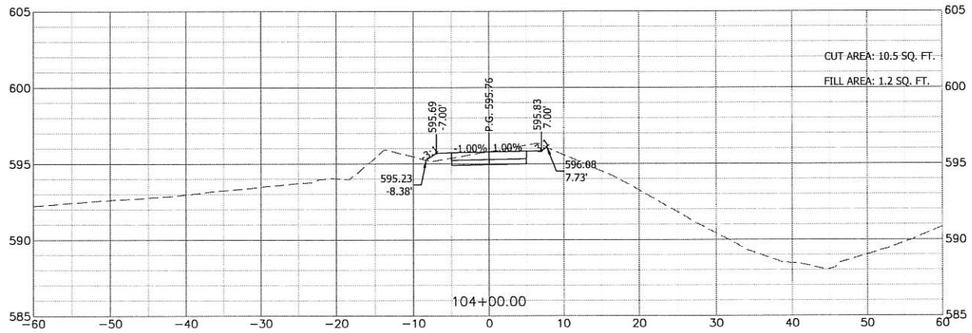

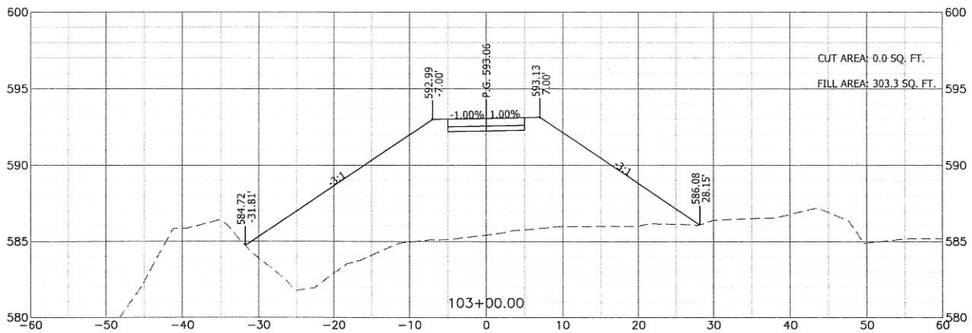

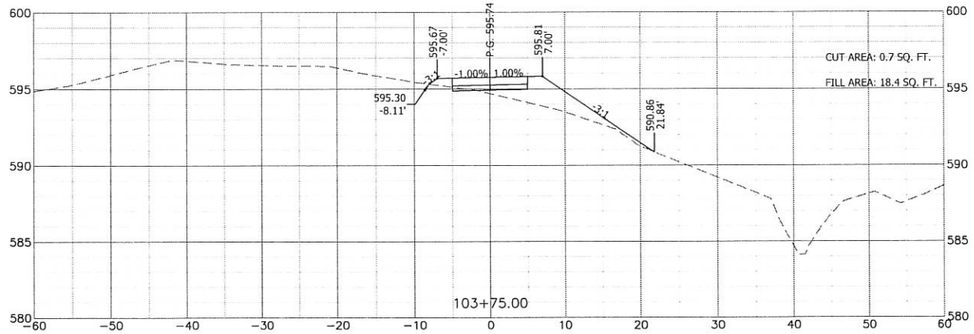

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CROSS SECTIONS
WILSON'S CONNECTION

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STATE OF MISSOURI
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SHEET NO:	53 of 58

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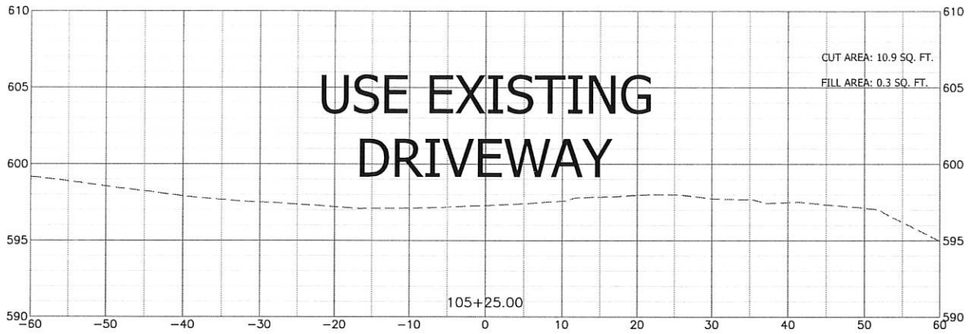
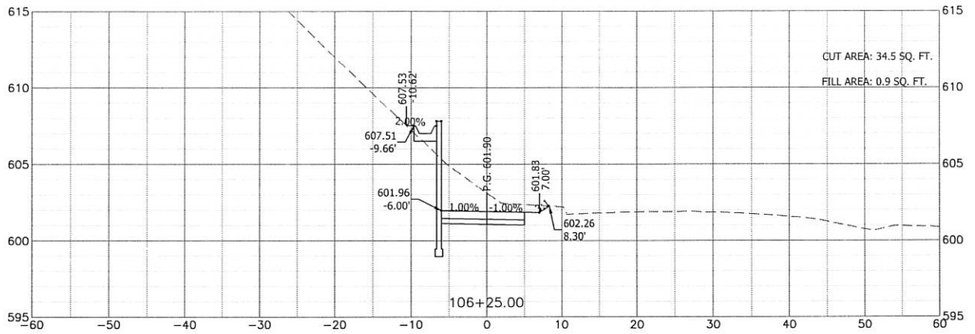
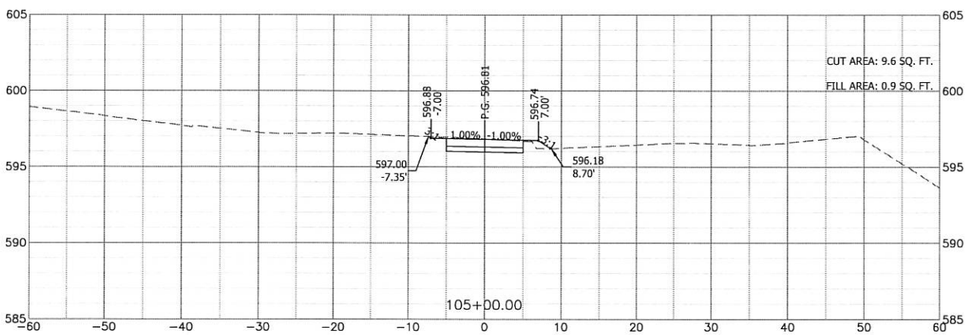
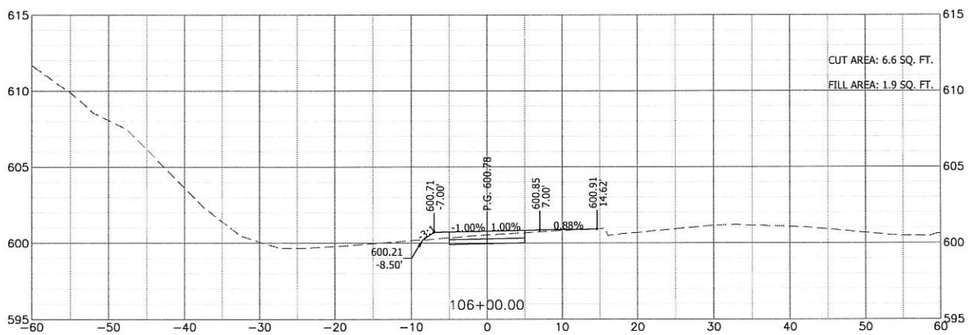
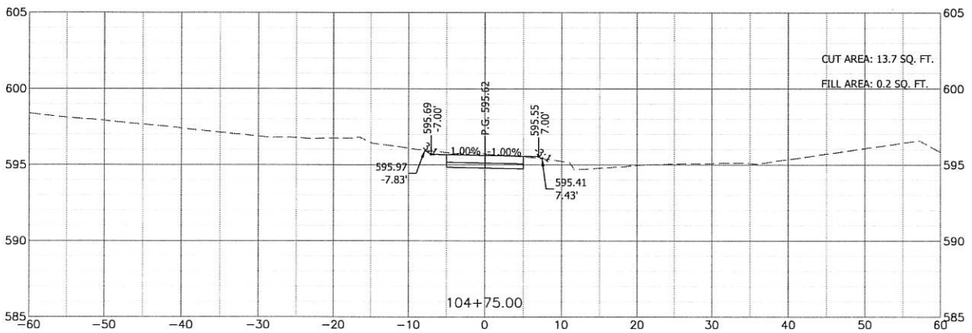
Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Cross Sections_North Shoulder.dwg Layout Name: North Shoulder 3 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:16:10 PM

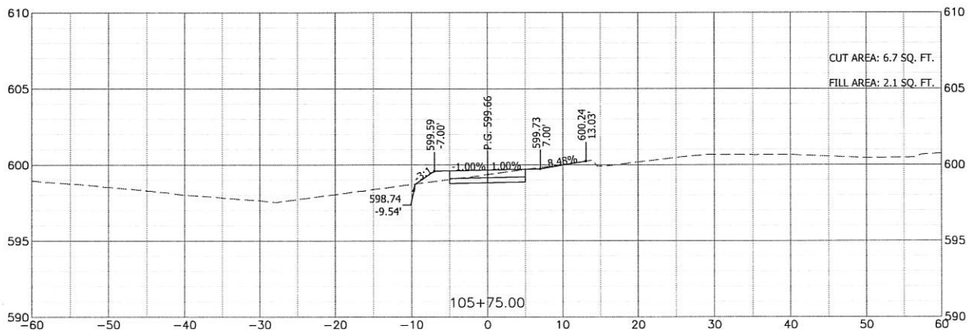


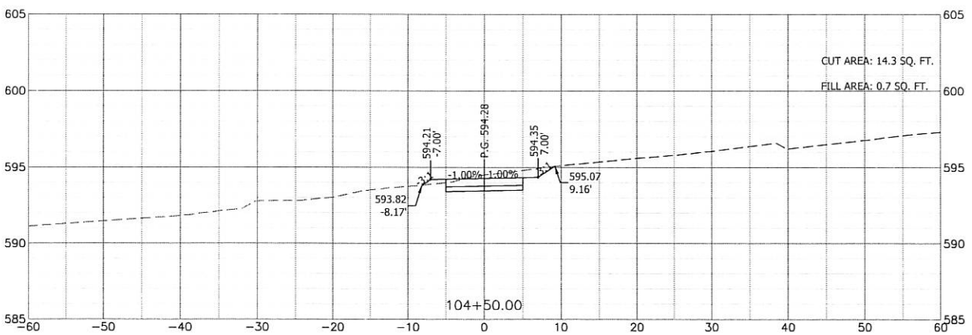


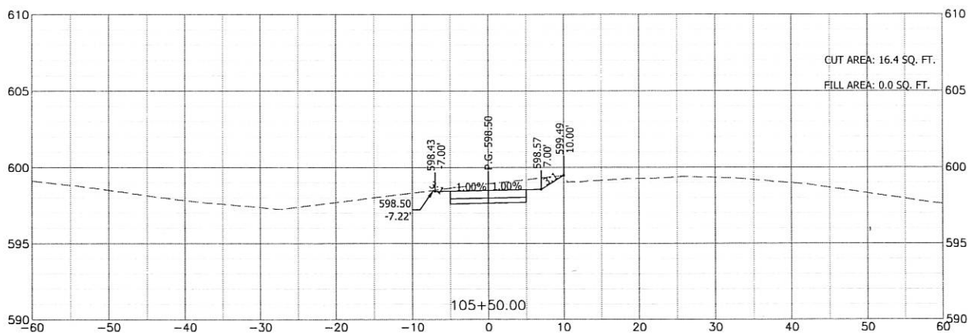












CROSS SECTIONS
WILSON'S CONNECTION

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

BARTLETT & WEST
1719 SOUTHRIDGE DR., SUITE 100 - JEFFERSON CITY, MO 65109-400
PHONE: 573.635.2748 FAX: 573.635.3017 CERTIFICATE OF AUTHORITY NO. 000197 - ENGINEERING
MISSOURI CERTIFICATE OF AUTHORITY NO. 000197 - ENGINEERING
WWW.BARTLETT.COM

STATE OF MISSOURI
TODD C KEMPKER
NUMBER PE-2013000590
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SEALED DATE:	8/17/15
DESIGNED BY:	AKJ
DRAWN BY:	AKJ
APPROVED BY:	TCK
DESIGN PROJ:	18082.000
DATE:	AUGUST 2015
DRAWING NO:	
SHEET NO:	54 of 58

#	DATE	DESCRIPTION	BY

BAR IS ONE INCH ON OFFICIAL DRAWINGS. IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

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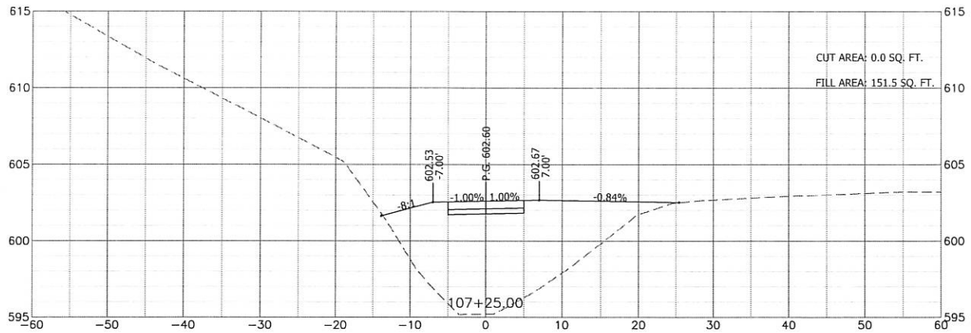

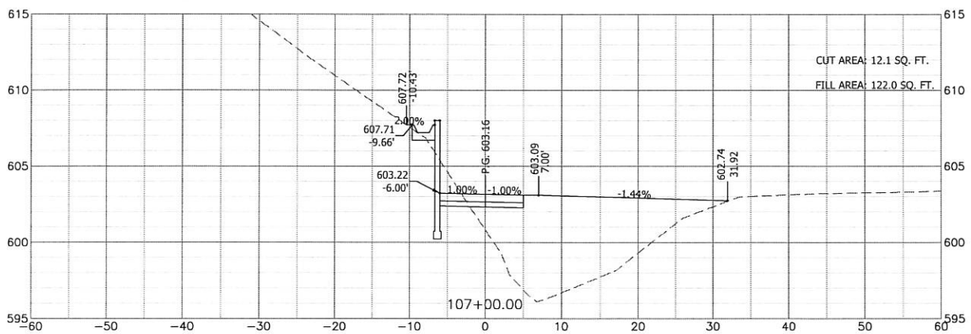

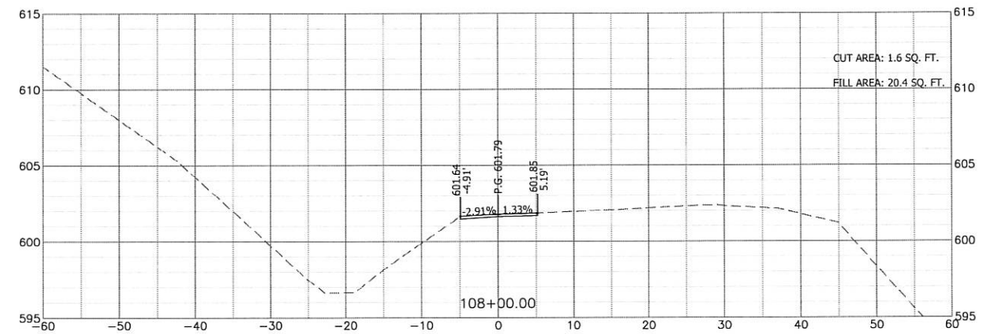

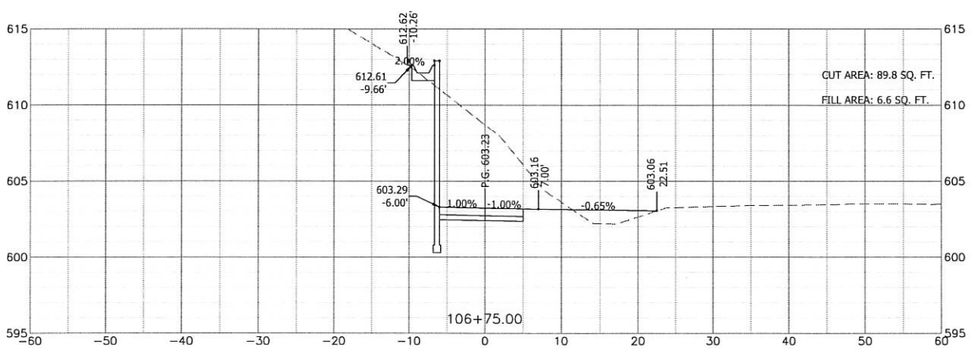

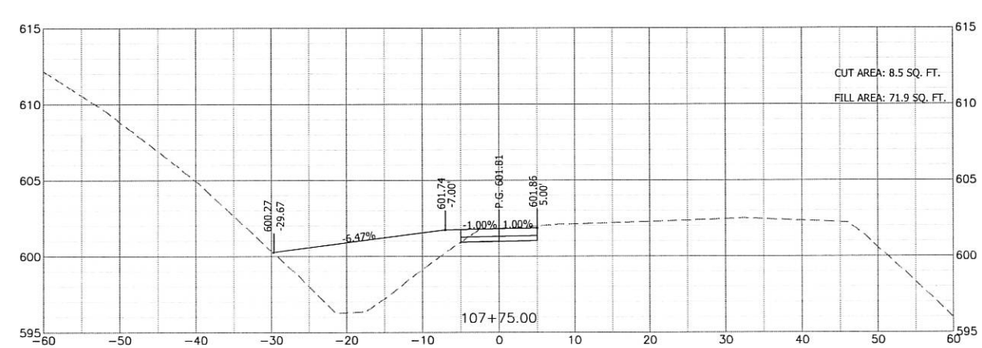

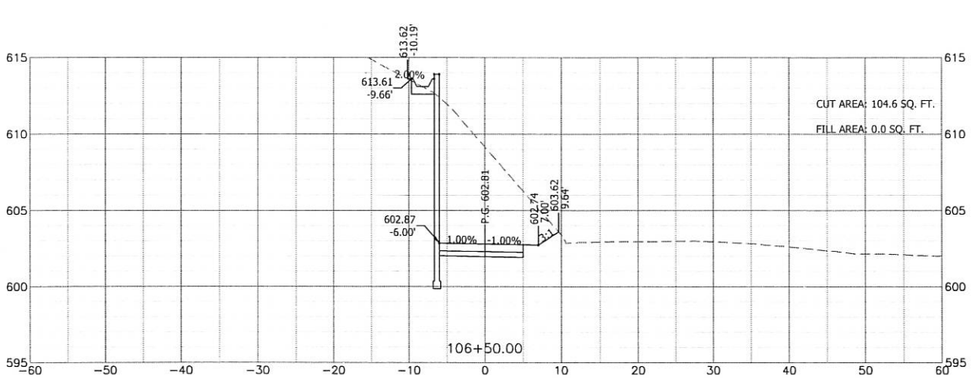

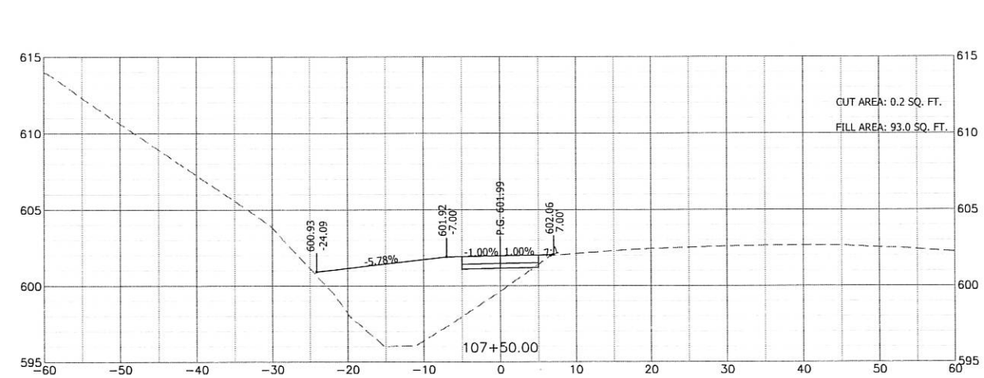

#	DATE	DESCRIPTION	BY

BARTLETT & WEST

1719 SOUTHRIDGE DR., SUITE 100 · JEFFERSON CITY MO 65109.400
PHONE 573.634.3181 · FAX 573.634.7904
MISSOURI CERTIFICATE OF AUTHORITY NO. 000167 · ENGINEERING
WWW.BARTWEST.COM

CROSS SECTIONS
WILSON'S CONNECTION

FORUM BOULEVARD TRAIL
CITY OF COLUMBIA, BOONE COUNTY, MISSOURI

STATE OF MISSOURI
TODD. C KEMPKER
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THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

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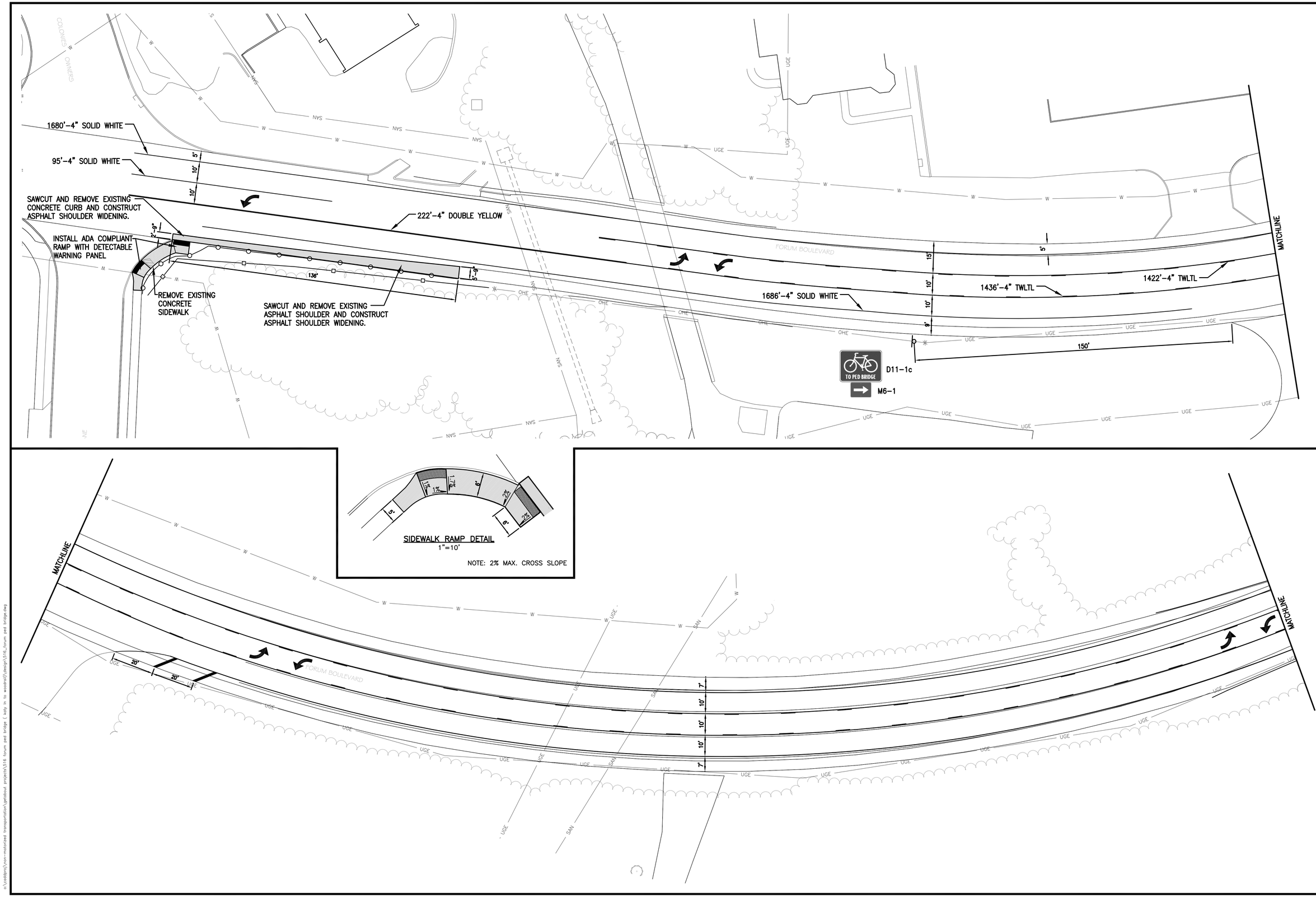
Last edit on: Aug 10, 2015 by: AKJ01272 Drawing Name: w:\Proj\18000\18082\18082.000\AutoCad\Plan Set\18082.000_Cross Sections_North Shoulder.dwg Layout Name: North Shoulder 5 Plotted By: AKJ01272 Plotted on: 8/14/2015 4:16:26 PM



No.	Date	By	Revision

FORUM CYCLE TRACK

Plan Sheet

City of Columbia, Missouri

Department of Public Works

File No.	
Scale:	1" = 20'
Date:	4/1/15
Des.	S.C.B.
Dwn.	D.G.W./J.L.H
Chk.	A.A.A.

Sheet

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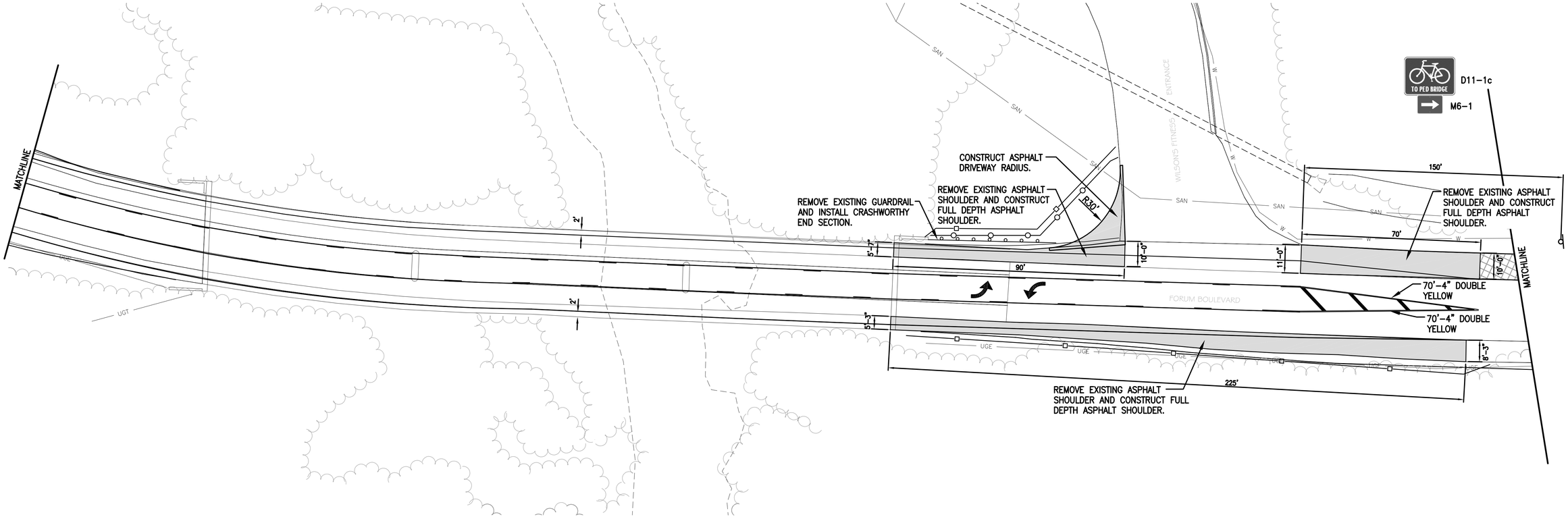
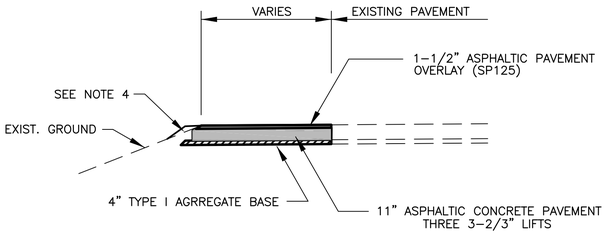
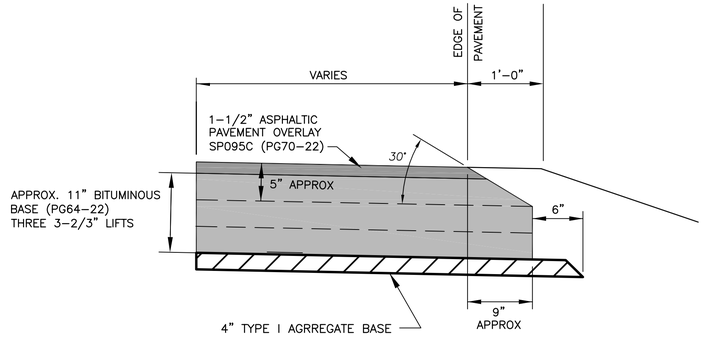




NOTES:

1. EXISTING ASPHALT PAVEMENT SHALL BE SAW CUT VERTICALLY TO FULL DEPTH FOR REMOVAL OF EXISTING SHOULDER.
2. THE BASE MATERIAL ADJACENT TO THE CUT ASPHALT SHALL BE STABLE AND WELL COMPACTED.
3. INSTALLATION OF 11" ASPHALT CONCRETE PAVEMENT SHALL MATCH THE SLOPE AND ELEVATION OF THE EXISTING PAVEMENT.
4. RE-GRADE BACK SLOPE AREA TO MATCH NEW PAVEMENT EDGE (NON BID ITEM). MAXIMUM 3:1 SLOPE.

PROPOSED TYPICAL PAVEMENT SECTION
(NOT TO SCALE)



SAFETY EDGE
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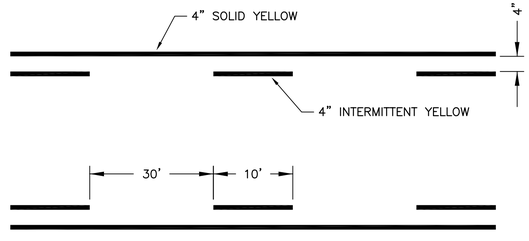
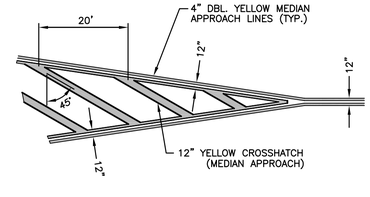


PAVEMENT MARKING DETAIL
(NOT TO SCALE)



PAINTED MEDIAN DETAIL
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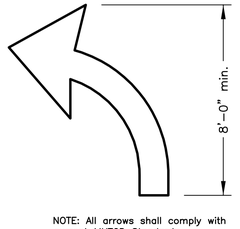

NOTE: All arrows shall comply with current MUTCD Standards.

TURN ARROW DETAIL
(NOT TO SCALE)

No.	Revision	By	Date

FORUM CYCLE TRACK
Plan Sheet

City of Columbia, Missouri

Department of Public Works

File No.	
Scale:	1" = 20'
Date:	4/1/15
Des.	S.C.B.
Dwn.	D.G.W./J.L.H
Chk.	A.A.A.

Sheet
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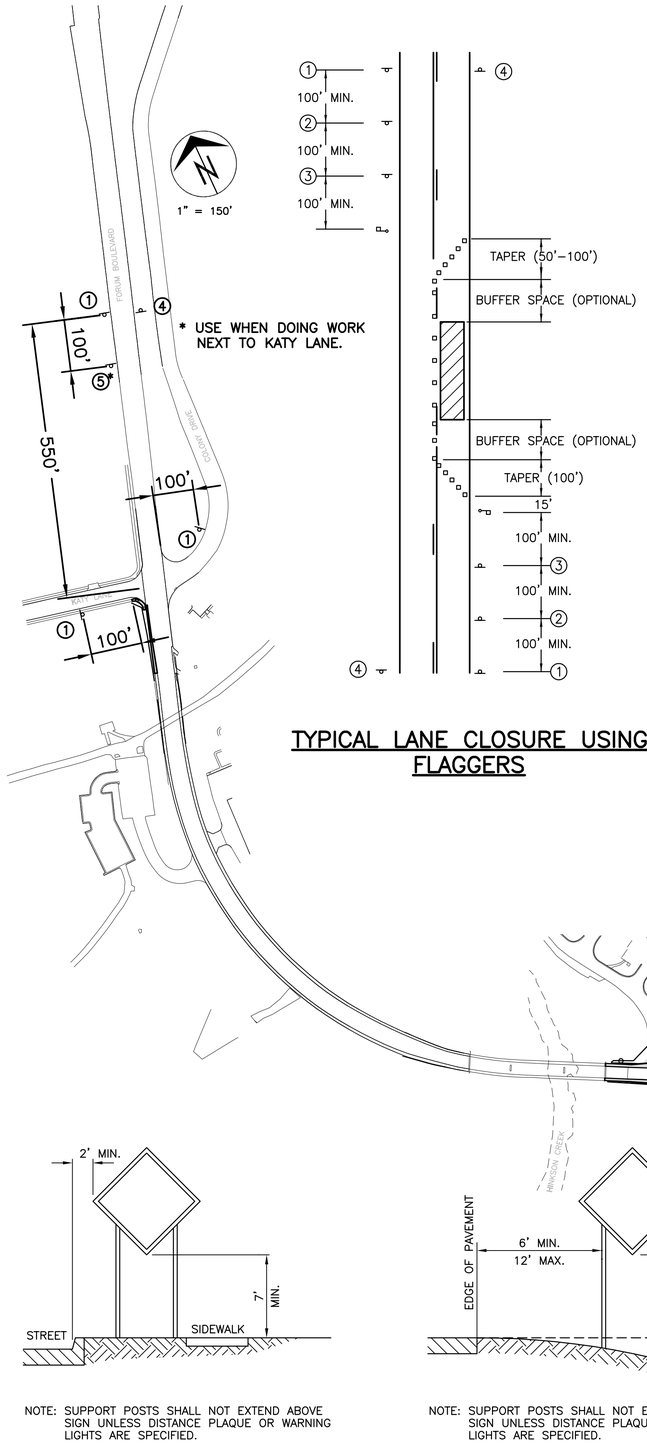
c:\coldgov\non-motorized transportation\getabout projects\516 forum ped bridge (kelly in to woodrail)\design\516_forum ped bridge.dwg



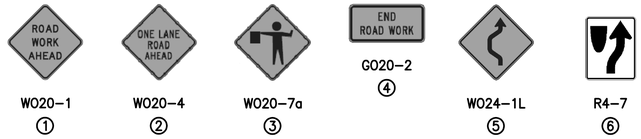
TYPICAL LANE CLOSURE USING FLAGGERS

LEGEND

	SIGN
	CHANNELIZER
	TYPE 3 BARRICADE
	FLAGGER
	WORK ZONE
	DIRECTION OF TRAVEL/LANE USE

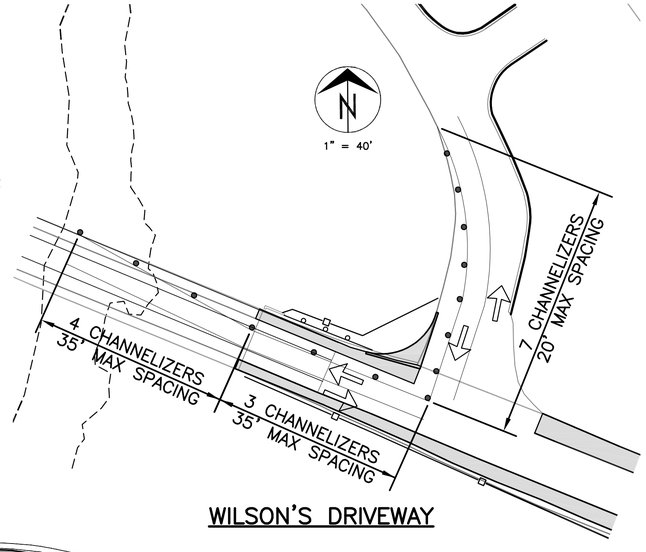
TRAFFIC CONTROL NOTES:

1. ALL TRAFFIC CONTROL DEVICES SHOWN ON PLAN SHOULD BE IN PLACE PRIOR TO BEGINNING CONSTRUCTION. ACTUAL QUANTITIES WILL DEPEND ON THE CONTRACTOR'S CONSTRUCTION SEQUENCE AND PROGRESS. NO MEASUREMENT WILL BE MADE OF ACTUAL QUANTITIES. QUANTITIES SHOWN ARE APPROXIMATE.
2. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL PROPERTIES IN THE CONSTRUCTION ZONE TO THE MAXIMUM EXTENT PRACTICABLE.
3. THE CONTRACTOR SHALL NOTIFY THE CITY JOINT COMMUNICATIONS OFFICE (874-7400) OF ALL ROAD CLOSURES OR LANE REDUCTIONS IN ADVANCE.
4. ALL BARRICADES, SIGNS, OTHER TRAFFIC CONTROL DEVICES AND PLACEMENT THEREOF SHALL CONFORM TO THE CURRENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). SIGNING SHOWN AS MINIMUM REQUIREMENTS FOR ADJACENT ROADWAYS PRIOR TO IMPROVEMENTS. CONTRACTOR RESPONSIBLE FOR ADDITIONAL SIGNING, MARKING OR DELINEATORS FOR SITE SPECIFIC CONSTRUCTION PHASING TO COMPLY WITH MUTCD GUIDELINES.
5. ALL OPEN TRENCHES ARE TO BE BARRICADED WITH CONSTRUCTION FENCING TO PROTECT MOTORISTS AND PEDESTRIANS.
6. BARRELS SHALL BE USED AS CHANNELIZATION DEVICES WHEN WORKING ADJACENT TO THROUGH TRAFFIC TO PROTECT MOTORISTS FROM WORK. BARRELS SHALL HAVE TYPE "C" WARNING LIGHTS WHEN USED DURING NIGHTTIME HOURS.
7. FLAGGERS SHALL BE USED DURING LANE CLOSURES. WHEN NOT PERFORMING CONSTRUCTION ACTIVITIES, CONTRACTOR SHALL OPEN BOTH LANES OF TRAFFIC AND COVER THE APPROPRIATE LANE CLOSURE SIGNAGE.

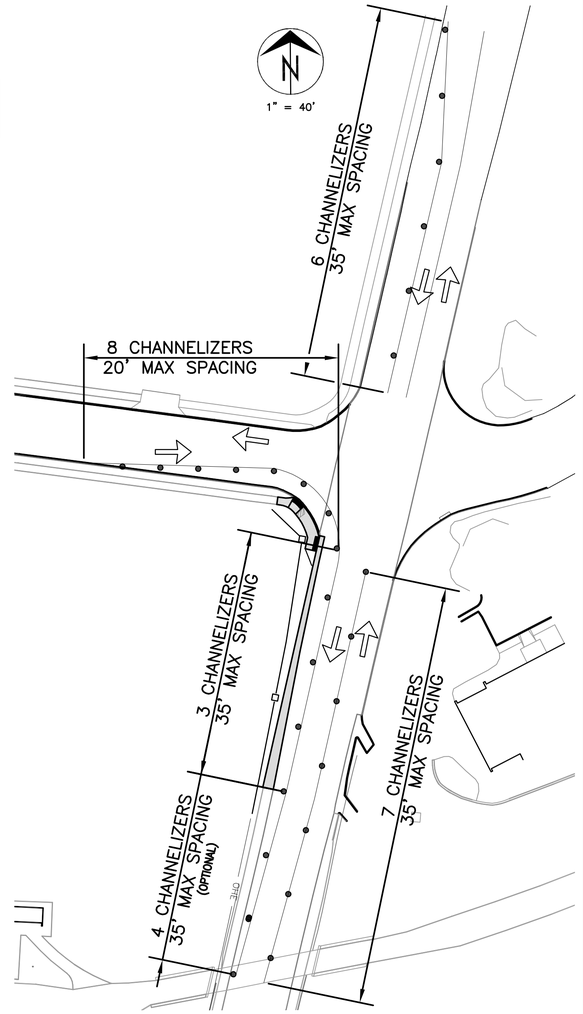


TRAFFIC CONTROL

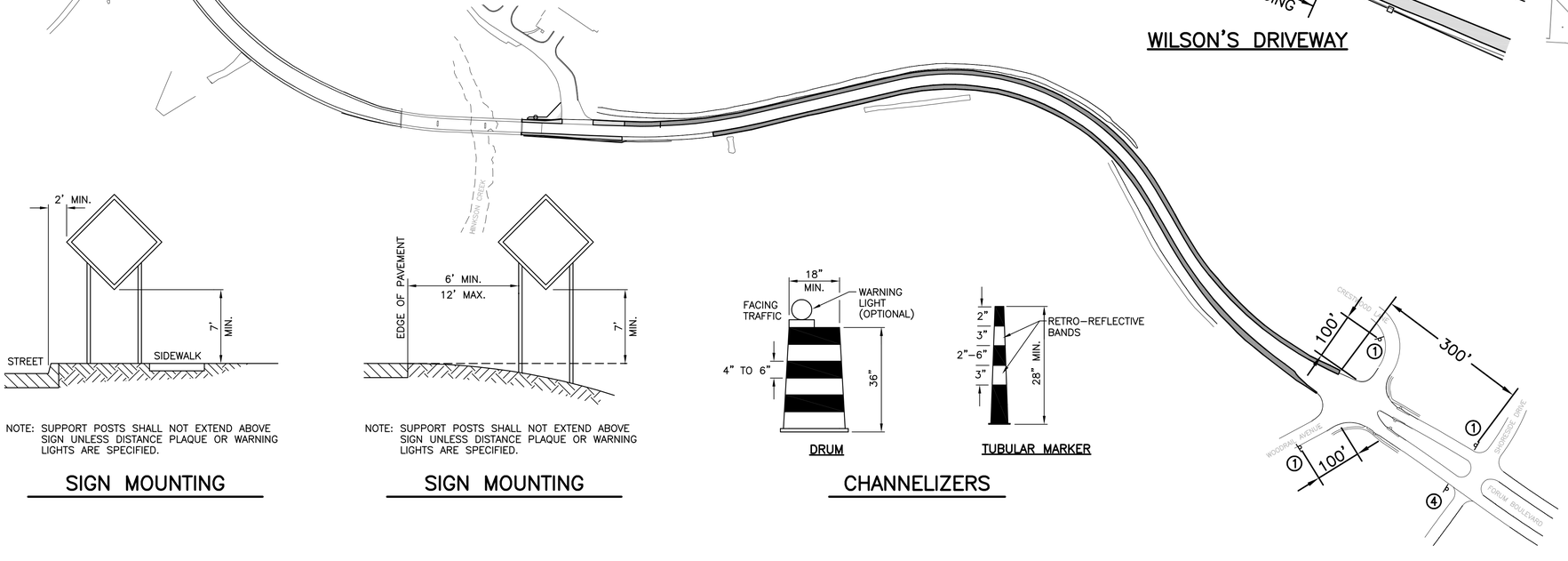
	MUTCD	LEGEND	SIZE	QUANT.
①	W020-1	"ROAD WORK AHEAD"	36" X 36"	6
②	W020-4	"ONE LANE ROAD AHEAD"	36" X 36"	2
③	W020-7a	FLAGGER (SYMBOL)	36" X 36"	2
④	G020-2	"END ROAD WORK"	36" X 18"	2
⑤	W024-1L	"DOUBLE REVERSE CURVE"	36" X 36"	1
⑥	R4-7	"KEEP RIGHT"	24" X 30"	2



WILSON'S DRIVEWAY



KATY LANE INTERSECTION



NOTE: SUPPORT POSTS SHALL NOT EXTEND ABOVE SIGN UNLESS DISTANCE PLAQUE OR WARNING LIGHTS ARE SPECIFIED.

SIGN MOUNTING

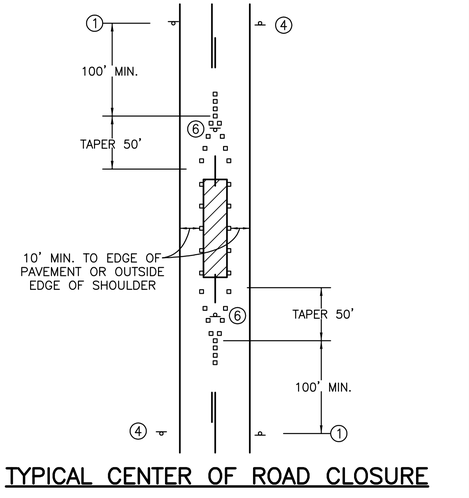
NOTE: SUPPORT POSTS SHALL NOT EXTEND ABOVE SIGN UNLESS DISTANCE PLAQUE OR WARNING LIGHTS ARE SPECIFIED.

SIGN MOUNTING

DRUM

TUBULAR MARKER

CHANNELIZERS



TYPICAL CENTER OF ROAD CLOSURE

No.	Revision	By	Date

FORUM CYCLE TRACK

Traffic Control Plan

City of Columbia, Missouri

Department of Public Works

File No.	
Scale:	As Shown
Date:	4/1/15
Des.	S.C.B.
Dwn.	D.G.W.
Chk.	A.A.A.

Sheet 57 of 57

n:\coddpro\non-motorized transportation\getabout projects\516 forum ped bridge (katy in to woodrail)\design\516_forum ped bridge.dwg